

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

RESOLUTION R5-2013-0131

APPROVING AN INITIAL STUDY,
ADOPTING A MITIGATED NEGATIVE DECLARATION,
AND APPROVING A REMEDIATION PLAN
FOR
CORONA AND TWIN PEAKS MINE REMEDIATION PROJECT
NAPA COUNTY

The California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) finds:

1. Tuleyome, Inc. ("Tuleyome") is a California nonprofit dedicated to "[p]rotecting the wild heritage and agricultural heritage of the Northern Inner Coast Range and Western Sacramento Valley for existing and future generations." In furtherance of this mission, Tuleyome has developed a remediation plan (the "Remediation Plan") designed, in part, to remedy actual and threatened water pollution related to abandoned mining facilities at the Corona and Twin Peaks Mines in Napa County.
2. In the Remediation Plan, Tuleyome proposes to conduct subsurface chemical treatment of the Corona Drain Tunnel discharge (install a pilot scale system) to reduce the metal loading from the Corona Drain Tunnel; consolidate mine waste; improve runoff controls; enhance revegetation of waste rock and tailings at the Boiler House Adit and Twin Peaks Adit; and improve the existing infiltration trenches at the Boiler House Adit and Twin Peaks Adit.
3. The property where the remediation actions are to be conducted is owned by Corona/Twin Peaks Historical Association, LLC and is located off of Oat Hill Mine Road and includes parcels identified by Napa County Assessor Parcel Nos. 016-020-035, 016-020-026, 016-020-020, 016-020-027, 016-020-023, 018-010-006, 018-010-007, and 018-010-009. Existing mining waste units will be located on the parcels identified by Napa County Assessor Parcel Nos. 016-020-035, 016-020-026, 016-020-020, 018-010-006, and 018-010-007.

REMEDIATION PLAN

4. The Remediation Plan will function in lieu of waste discharge requirements issued pursuant to Division 7 of the Water Code. The Remediation Plan has been developed in accordance with applicable regulatory requirements contained in the Water Code, regulations adopted thereunder (including regulations contained in Titles 23 and 27 of the California Code of Regulations), and the *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins*, Fourth Edition, revised October 2011.
5. The Remediation Plan is intended to provide "good Samaritan" protection to Tuleyome pursuant to Chapter 5.7 of Division 7 of the Water Code. For the purposes of approving

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AND REMEDIATION PLAN
CORONA AND TWIN PEAK MINE REMEDIATION PROJECT
NAPA COUNTY

the Remediation Plan, the Central Valley Water Board is acting as the “oversight agency” within the meaning of Water Code section 13397(e) and Tuleyome is the “remediating agency” within the meaning of Water Code section 13397(f). Compliance with the approved Remediation Plan will provide liability protection for Tuleyome, which could otherwise acquire liability under the Water Code by virtue of performing cleanup activities at the Corona and Twin Peaks Mines.

6. Tuleyome has entered into a cooperative agreement with the Napa County Regional Park and Open Space District (the “Park District”) in furtherance of the remediation effort. The remediation project has been funded by the California Department of Fish and Wildlife's Ecosystem Restoration Program.
7. The Remediation Plan contains the following elements:
 - a. An identification of the remediating agency (Tuleyome) and a certification that Tuleyome meets the definition of remediating agency contained in Water Code section 13397.5.
 - b. An identification of the abandoned mine lands that are the subject of the plan.
 - c. An identification of the waters of the state that are affected by the abandoned mine lands.
 - d. A description of the physical conditions at the abandoned mine lands that are causing or have caused adverse water quality impacts.
 - e. A description of the practices proposed to reduce, control, mitigate, or eliminate the adverse water quality impacts, and a schedule for implementing those practices.
 - f. An analysis demonstrating that the implementation of the practices described in the Remediation Plan will cause a significant improvement in water quality for the identified waters.
 - g. A description of the monitoring or other assessment activities to be undertaken to evaluate the success of the implemented practices during and after implementation, including an assessment of baseline conditions.
 - h. A budget and identified funding to pay for the implementation of the Remediation Plan.
 - i. Remediation goals and objectives.
 - j. Contingency plans.

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- k. A description of Tuleyome's legal right to enter and conduct the remedial activities.
- l. The signature of an authorized representative of Tuleyome.
- m. An identification of the pollutants to be addressed by the Remediation Plan.

The Central Valley Water Board finds that the Remediation Plan satisfies the requirements of Water Code section 13398.3.

- 8. The Central Valley Water Board finds that the Remediation Plan will substantially improve water quality affected by abandoned mine waste.

CEQA

- 9. The Central Valley Water Board has assumed the role of lead agency in accordance with California Code of Regulations, title 14, section 15050, for the purposes of satisfying the requirements of the California the California Environmental Quality Act (CEQA)(Pub. Resources Code, § 21000 et seq.).
- 10. The Central Valley Water Board has conducted an Initial Study in accordance with Section 15063 of Title 14 of the California Code of Regulations in order to evaluate potential significant environmental impacts that may occur as a result of work undertaken pursuant to the Remediation Plan.
- 11. Copies of the Initial Study and Mitigated Negative Declaration were transmitted to or made available to all agencies and persons known to be interested in these matters. The Central Valley Water Board responded to and addressed all public comments on the proposed project. None of the comments identified new significant impacts or showed how impacts previously thought to be insignificant and should instead be considered significant.
- 12. The Central Valley Water Board considered all testimony and evidence at a hearing held on 4 October 2013 in Rancho Cordova, California and good cause was found to approve the Initial Study and adopt a Mitigated Negative Declaration.
- 13. The Remediation Plan incorporates the various mitigation measures described in the Initial Study. The Remediation Plan contains a monitoring and reporting program and was developed to protect the beneficial uses of underlying groundwater and to prevent conditions of nuisance or pollution from occurring. The Remediation Plan contains monitoring and reporting provisions that will confirm that the project will not create significant effects to the environment and that all of the mitigation measures will be fully implemented. The monitoring and reporting provisions of the Remediation Plan will therefore satisfy the requirements of Public Resources Code section 21081.6(a)(1).

RESOLUTION R5-2012-0131
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AND REMEDIATION PLAN
CORONA AND TWIN PEAK MINE REMEDIATION PROJECT
NAPA COUNTY

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THEREFORE BE IT RESOLVED, pursuant to Section 21080, et seq. of the California Public Resources Code, and Water Code section 13398.7, the Central Valley Water Board, after considering the entire record, including written and oral testimony at the hearing:

1. Approves the Initial Study and adopts the Mitigated Negative Declaration for Corona and Twin Peaks Mine Remediation Project.
2. Approves the Remediation Plan, and thereby considers Tuleyome to enjoy all the immunities and benefits provided pursuant to Chapter 5.7 of Division 7 of the Water Code with respect to actions conducted pursuant to the Remediation Plan.
3. Finds the record before the Central Valley Water Board contains no substantial evidence that a fair argument has been made that the project may have a significant effect on the environment.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of a Resolution adopted by the California Regional Water Quality Control Board, Central Valley Region on 4 October 2013.

Original signed by

PAMELA C. CREEDON, Executive Officer



EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIGUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Central Valley Regional Water Quality Control Board

23 October 2013

Samuel M. Livermore
Corona/Twin Peaks Historical Association, LLC
c/o Cooley, LLP
101 California Street, 5th Floor
San Francisco, CA 94111

CERTIFIED MAIL NO.
7012 0470 0000 9904 0153

NOTICE OF ADOPTION OF RESOLUTION NO. R5-2013-0131

APPROVING AN INITIAL STUDY, ADOPTING A MITIGATED NEGATIVE DECLARATION AND APPROVING A REMEDIATION PLAN FOR CORONA AND TWIN PEAKS MINE REMEDIATION PROJECT NAPA COUNTY

TO ALL CONCERNED PERSONS AND AGENCIES:

Resolution No. R5-2013-0131 to remedy actual and threatened water pollution related to abandoned mining facilities at the Corona and Twin Peaks Mines in Napa County was adopted by the California Regional Water Quality Control Board, Central Valley Region at its meeting on 4 October 2013.

To conserve paper and reduce mailing costs, a paper copy of the resolution has been sent only to the Discharger. The full text of this resolution is available on the Central Valley Water Board's web site at www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/. Anyone without access to the Internet who needs a paper copy of the resolution can obtain one by calling Central Valley Water Board staff listed below.

If you have any questions, please contact Jeff Huggins at (916) 464-4639 or jhuggins@waterboards.ca.gov.

VICTOR J. IZZO
Senior Engineering Geologist
Title 27 Permitting and Mining

Enclosure - Resolution No. R5-2013-0131

cc list: see address list next page

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Notice of Determination

Appendix D

To:

☒ Office of Planning and Research

U.S. Mail:

Street Address:

P.O. Box 3044

1400 Tenth St., Rm 113

Sacramento, CA 95812-3044 Sacramento, CA 95814

☐ County Clerk

County of: _____

Address: _____

From:

Public Agency: Central Valley Water Board

Address: 11020 Sun Center Drive, Ste 200
Rancho Cordova, CA 95760

Contact: Mr. Victor Izzo

Phone: (916) 464-3291

Lead Agency (if different from above): _____

Address: _____

Contact: _____

Phone: _____

SUBJECT: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

State Clearinghouse Number (if submitted to State Clearinghouse): 2013072069

Project Title: Corona and Twin Peaks Mine Drainage Treatment Project

Project Applicant: Tuleyome, Inc.

Project Location (include county): Northern Napa County, northwest of Pope Valley off of Oat Hill Mine Road

Project Description:

The project is the Central Valley Regional Water Quality Control Board's approval of a "good Samaritan" mine and water quality cleanup plan sponsored by Tuleyome, Inc. The remediation plan consists of the consolidation and revegetation of unconsolidated mine waste, improvements to existing infiltration trench systems, and the completion of a pilot-scale subsurface chemical amendment system that will reduce metal loading from the Corona Drain Tunnel. The Board's conditional approval of the remediation plan provides Tuleyome, Inc. (the "remediating agency" within the meaning of Wat. Code § 13397.5) with protection from cleanup liability pursuant to Water Code section 13398.

This is to advise that the Central Valley Water Board has approved the above
(☒ Lead Agency or ☐ Responsible Agency)

described project on October 4, 2013 and has made the following determinations regarding the above
(date)
described project.

1. The project [☐ will ☒ will not] have a significant effect on the environment.
2. ☐ An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.
☒ A Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures [☒ were ☐ were not] made a condition of the approval of the project.
4. A mitigation reporting or monitoring plan [☒ was ☐ was not] adopted for this project.
5. A statement of Overriding Considerations [☐ was ☒ was not] adopted for this project.
6. Findings [☒ were ☐ were not] made pursuant to the provisions of CEQA.

This is to certify that the final EIR with comments and responses and record of project approval, or the negative Declaration, is available to the General Public at:

11020 Sun Center Drive, Ste 200, Rancho Cordova, CA 95760

Signature (Public Agency): Andrew Altough Title: Assistant Executive Officer

Date: October 8, 2013

Date Received for filing at OPR: _____

RECEIVED

Authority cited: Sections 21083, Public Resources Code.
Reference Section 21000-21174, Public Resources Code.

OCT 10 2013 Revised 2011

STATE CLEARING HOUSE

**DRAFT INITIAL STUDY/ MITIGATED NEGATIVE DECLARATION
FOR
CORONA AND TWIN PEAKS MINE
DRAINAGE TREATMENT REMEDIATION PROJECT
23 JULY 2013**

Prepared by

Central Valley Regional Water Quality Control Board
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Rancho Cordova, CA 95670
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Prepared for

Tuleyome
607 North Street,
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DRAFT MITIGATED NEGATIVE DECLARATION

Project Title: Corona and Twin Peaks Mine Drainage Treatment Project

Project Location: The property where the remediation actions are to be conducted is located off of Oat Hill Mine Road in Napa County and includes parcels identified by Napa County Assessor Parcel Nos. 016-020-035, 016-020-026, 016-020-020, 016-020-027, 016-020-023, 018-010-006, 018-010-007, and 018-010-009. The mining waste units will be located on the parcels identified by Napa County Assessor Parcel Nos. 016-020-035, 016-020-026, 016-020-020, 018-010-006, 018-010-007.

Summary Description of Project: Tuleyome has proposed the Corona and Twin Peaks Mine Drainage Treatment Project (also referred to as the “Project”), a Good Samaritan project and mine and water quality cleanup project sponsored by Tuleyome, Inc. on lands owned by the Corona/Twin Peaks Historical Association, LLC off of Oat Hill Mine Road in northern Napa County. The Corona and Twin Peaks mines are inactive mercury mines last operated in the 1970s and 1940s, respectively. The goal of the project is to improve the effectiveness of existing mine drainage treatment systems (current baseline conditions) to support healthy aquatic ecosystems downstream in James Creek, Pope Creek, Lake Berryessa, and Putah Creek, and to mitigate physical and chemical hazards so that the site is safe for potential future public use. This project will be conducted according to a remediation plan (the “Remediation Plan”) prepared by Tuleyome pursuant to Water Code section 13398.3. The Remediation Plan, upon approval by the Central Valley Water Board, will provide Tuleyome, the “remediating agency,” with protection from cleanup liability pursuant to Water Code section 13398. The Remediation Work Plan includes: the consolidation and revegetation of areas where unconsolidated mine waste threatens water quality, improvements to existing infiltration trench systems, and the completion of a pilot-scale subsurface chemical amendment system that will reduce metal loading from the Corona Drain Tunnel.

The Project includes consolidation of waste rock and calcined tailings present at the Corona and Twin Peaks mines. The mine waste piles are considered to be “existing mining units” in accordance with California Code of Regulations, title 27, section 22470. Total concentrations of metals in waste rock and tailings at the Corona and Twin Peaks mines are below the total threshold limit concentration (TTLC) for all metals except mercury. Mercury is present above the 20 mg/kg TTLC in each of the four waste rock and tailings samples (250 mg/kg to 840 mg/kg total mercury).

All waste extraction test (WET) metals results were reported below the STLC criteria for mine waste in extracts from Corona and Twin Peaks mine waste. Acid base accounting show that waste rock at the Corona Mine, and calcined tailing at the Twin Peaks Mine have a low potential to generate acidic leachate (Acid neutralization potential (ANP):Acid generation potential (AGP) > 1). However, calcined tailings at the Corona Mine have a ANP:AGP of about 0.5 and could generate acid drainage. Distilled water (DI) WET extract metal analyses were compared with retardation factors estimated using site specific soil properties and the VZCOMML model. The quotient of the DI WET extract metal concentrations to the retardation factors for each metal is less than water quality criteria, thus, the mine wastes are not expected to yield leachate concentrations that would threaten groundwater quality (the mine wastes are not a designated waste).

The mine waste consolidation will involve moving about 200 cubic yards of mine waste at the Corona calcine pile from its current location to an area within the main pile (see Remediation Plan figures). This action will reduce the area of mine waste at the site, directly reducing the area of the material available to generate drainage by about 3,000 square feet. Stabilization will

include grading up to 100 cubic yards of mine waste at the Twin Peaks mine to reduce the surface area, minimize traffic related disturbances of the mine waste, and stabilize the slope. The areas disturbed by consolidation and stabilization will then be revegetated.

The waste rock and tailings piles currently include areas that are devoid of vegetation. Such bare areas are subject to erosion, which can lead to off-site migration of metal-laden particulates, and to high rates of infiltration, which can lead to the creation of metal-laden drainage. Existing data collected by USGS (2007) and EnviroGeo (2007) show that metal-laden particulates are present in the sediment downstream of the Corona and Twin Peaks mines. Data collected by USGS (2007) and EnviroGeo (2007) also showed that drainage from the calcined tailings was capable of transporting metals, including mercury and nickel, off site. Minimizing erosion and the amount of the drainage will improve water quality in Kidd and James creeks by preventing the associated sediment and metals from entering surface waters. Increasing the amount of vegetative cover will also minimize the creation of airborne dust from the mine waste piles.

Improvements to the existing infiltration trenches at the Boiler House and Twin Peaks portals will consist of re-plumbing the distribution systems at each site and improving vegetation at each trench. Re-plumbing will allow more effective operations under seasonal changes in flow, and will facilitate maintenance by allowing for the isolation of separate reaches of each trench. Improved vegetation along the infiltration trenches will increase the stability of the slopes below the trenches, and will increase the amount of water that is transpired.

Subsurface chemical amendment, if determined to be effective at the Corona Mine, would identify a method to substantially reduce the metal loading from the Corona Drain Tunnel. Subsurface chemical amendment introduces chemicals that can change the chemical environment, thereby preventing the mobilization of metals at the source. The effectiveness of this technique at Corona Mine would be determined through the performance of a tracer study and subsequent pilot-scale operations. The tracer study would use the travel time and concentration of a non-toxic tracer released at the source area and detected in Corona Drain Tunnel drainage to evaluate chemical dosing rates for subsurface chemical amendment. This pilot study would be performed in the subsurface at the site (in-situ).

The tracer study would be performed by first advancing bore-holes to the vicinity of underground mine workings at the level of the Boiler House Adit, and a stope (void created during mining) located beneath Tunnel No. 1. The Boiler House Adit level is referred to as the '1,853' level on site mine maps based on the elevation of the tunnel. A significant ore body and stope associated with the 1,853 level are shown on mine maps and cross sections (see Remediation Plan and Exhibit 1 in Initial Study). The bore hole would be advanced at an angle from the ground surface using a drilling technique that will allow for the identification of the geologic materials encountered during drilling. The location of the drill bit would be monitored during drilling, and the borehole length will be compared to projected distances from the surface location to the ore body and stopes. The goal of advancing the borehole would be to encounter saturated mineralized rock, complete the borehole to allow application of tracers, and later application of sodium hydroxide and ethanol to amend subsurface chemical conditions. At least two boreholes are currently envisioned, advancing 250 feet and 400 feet, to two different targets in the subsurface.

The boreholes would be converted into cased remediation wells for use in applying subsurface chemical amendments during pilot-scale and future full scale-operations. Pilot-scale operations would allow for the evaluation of the chemical dosing rates, design, and operation of the full-scale chemical delivery system. While short term (about 60 to 90 days), pilot-scale operations (if successful) are expected to provide longer-term improvement in water quality by initially

precipitating metals, and then impeding oxidation of the sulfide minerals beyond the duration of the pilot operations. Metal-bearing precipitates are anticipated to remain within the fractures and foliation through which groundwater currently migrates. The goal of the pilot study is not so much to precipitate metals, but instead to prevent metal mobilization via amending the subsurface chemical environment. Substantial intermediate improvement of water quality could be attained through the pilot activities via armoring of some reactive sites within the source area for the drainage. Substantial long-term improvement of water quality could be then attained via longer-term implementation of the technique. The duration of water quality improvements expected from the subsurface chemical pilot scale dosing is uncertain without the quantitative results from the tracer study.

The chemical used for the initial tracer study will be a detergent that contains a brightener chemical, disodium diaminostilbene disulfonate, which will be released into the borehole and measured in the outfall at the Corona Mine Drain Tunnel Portal. This chemical is reported to be stable under acidic conditions, and is detectable using the analytical technique fluorescence spectroscopy (fluorometry). If the tracer chemical is detected in the outfall discharge at the Corona Drain Tunnel Portal within a residence time of about one day, then the addition of an organic lipid, such as ethanol, will be used to stimulate the growth of sulfate-reducing bacteria within the mine. Ideally, if the reducing conditions can be established within the mine, the metals will be removed by sulfate reduction and sulfide precipitation. This would be the preferred method to precipitate metals, because metal sulfides have a low solubility at near-neutral pH. However, if the tracer test indicates a longer residence time before the tracer chemical is detected in the Corona Drain Tunnel Portal discharge, then this condition would not be considered adequate for sulfate-reducing bacteria, and the pH will be reduced using sodium hydroxide. This would then increase the availability of sulfide for precipitation. Even if sulfate-reducing conditions using ethanol cannot be established, the majority of metals (95% plus) would still be precipitated by hydroxide precipitation with the addition of sodium hydroxide. Therefore, the following parameters will be measured in the discharge at the Corona Drain Tunnel Portal: tracer chemical in detergent solution, metals, pH, sulfate, alkalinity, oxidation-reduction potential, and organics (organic lipids or ethanol).

Jar tests in which sodium hydroxide was used to neutralize drain tunnel drainage were performed and identified that metals were precipitated and the pH raised to circum-neutral. The application rate for any chemicals used to amend subsurface chemical conditions will be carefully estimated based on the results of the tracer study, and site water chemistry. This will be done to minimize the likelihood for mobilizing metals such as manganese that may be present naturally within the subsurface or creating extreme chemical conditions such as elevated pH. Monitoring of drain tunnel discharge during and after the pilot test would also provide for direct measurement of any metals mobilized by the pilot test or presence of extreme chemical conditions.

Mitigation Measures for the Project:

Air Quality

Air-1: The following basic control measures (modified) shall be implemented during construction:

- All exposed surfaces (e.g., exposed soil piles and graded areas) shall be watered two times per day as needed to prevent windblown dust.
- All haul trucks transporting soil, sand, or other loose material to the site shall be covered.

- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- Grading and earth moving activities shall be suspended when winds exceed 25 mph.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes. (as required by the California airborne toxics control measure Cal. Code Regs., tit. 13, § 2485.) Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications.

Biological Resources

Bio-1: Preconstruction wildlife and rare plant surveys shall be conducted by a qualified biologist. Bloom periods of Pappose tarplant (*Centromadia parryi parryi*), Geysers dichanthelium (*Panicum acuminatum* var. *thermal*), Kentwood Marsh checkerbloom (*Sidalcea oregano valida*), Napa bluecurls (*Trichostema ruygtii*), Marsh checkerbloom (*Sidalcea oregano hydrophila*), and Socrates mine-jewel flower (*Streptanthus brachiatus brachiatus*) occur after May. These plants' bloom periods were missed during the original May 2012 survey and follow-up April 2013 survey (Appendix B). It is recommended a rare plant survey be conducted during Summer/Fall 2013 for these species.

The preconstruction surveys for wildlife shall be conducted no more than 14 days prior to vegetation removal and ground disturbing activities are to commence. A qualified biologist (biological monitor) shall be present onsite as needed to inspect construction-related activities to ensure that neither unnecessary ground disturbance nor any take of special-status species occurs. In the event that nesting birds are found, the property owner shall consult with CDFW and obtain approval for specific nest-protection buffers based on species.

In the event that a special-status plant is found, construction alignments shall be moved to avoid the special-status plant. The qualified biologist shall have the authority to stop work if there will be impacts to sensitive resources or protected special-status species.

Bio-2: Preconstruction bat surveys shall be conducted by a qualified biologist at the Corona Boiler House and Twin Peaks # 3 adits and at nearby tree cavities prior to the construction of adit gates. The microclimates of the adit interiors should be monitored at bat-active adits before construction/gate installation to assess changes, if any, which could occur with construction and gate installation, potentially affecting bat use. This information should be used in the design of the gates and management of potentially adverse habitat modifications, if any, during construction. Based on the survey, construction near the impacted areas shall be scheduled to avoid disturbance of bat colonies, as required to protect the species. Adit gates shall be bat-friendly, to allow bats to enter and exit freely.

Bio-3: In the event any mature tree must be removed, replacement trees shall be replaced with similar native tree species at a 2:1 ratio or greater, resulting in no net loss of trees on site. Replacement trees used shall be less than 4 inches diameter.

Bio-4: All trees to be removed shall be inspected by a qualified biologist for birds nest or roosting bats. If construction activities occur during the bird nesting season (estimated to be January through August), pre-construction surveys for the presence of special-status bird species or any nesting bird species within 300 feet of proposed construction areas shall be conducted by a qualified biologist. This survey shall be conducted within 14 days prior to the initiation of construction activities during the breeding season (raptors – February through August). During this survey, the biologist shall inspect all trees and grassland immediately adjacent to the impact area for nests. If active nests are found, a minimum 150 foot no-disturbance buffer shall be created around active nests and a minimum of 300 foot no-

disturbance buffer shall be created around active nest of raptors. These buffers shall remain until a qualified biologist has determined that all young have fledged. Buffer zones may be modified in coordination with CDFW based on existing conditions at the project site.

Bio-5: If vegetation will be removed by the proposed project and all necessary approvals have been obtained, substrate (e.g., trees and shrubs) containing nests shall be removed between November 1 and February 28 to ensure that active (containing intact eggs, live chicks, or presence of an adult) nests are not destroyed or disturbed as a result of project construction activities.

Bio-6: No pesticides or herbicides shall be used within 250 feet of riparian or wetland areas, including the area described as a potential wetland at the Corona Mine.

Bio-7: All sensitive areas and areas with potential populations of rare plants shall be clearly marked and flagged prior to construction to avoid disturbance to these areas. These areas include the riparian area and potential wetland at the Corona Mine. Major construction shall be performed in the dry season (approximately April 15 through October 15) if possible to reduce the likelihood of erosion in sensitive areas. All work in riparian areas and near streambeds shall comply with the grading plan, SWPPP, and BMPs to avoid impacts from erosion.

Bio-8: Prior to the initiation of construction activities, all elderberry bushes located within 100 feet of potential disturbance areas shall be identified and barricades shall be installed at the 100 foot buffer line.

If encroachment into the 100 foot buffer zone is deemed necessary by Tuleyome, they shall submit an elderberry location and protection plan to the USFWS for their review and approval. In areas where encroachment into the 100-foot buffer has been approved by the USFWS, a minimum setback of at least 20 feet from the drip line of each elderberry plant shall be established. Contractors shall be informed of the Federal requirement to avoid damaging elderberry plants and the penalties for not complying with said requirements. Signs shall be placed every 50 feet along the edge of the avoidance area prior to the initiation of any construction or grading work including, at a minimum, the following information, in both English and Spanish translation:

"This area is habitat of the valley elderberry longhorn beetle, a threatened species, and shall not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment."

Signs must be clearly legible from a distance of 20 feet, and maintained for the duration of construction.

Cultural Resources

Cul-1: Resources located immediately adjacent to project activities shall be protected from disturbance by temporary plastic fencing and a qualified archaeologist shall be retained as needed to monitor and advise during ground disturbing activities within culturally sensitive areas, and be given the authority to redirect those activities to other locations in the event that significant artifacts or features are encountered which require scientific mapping and recovery. In areas where avoidance of significant historic resources may not be possible, a qualified archaeologist shall be retained to conduct data recovery and analysis on those portions of the resources that will be damaged prior to project construction.

Cul-2: If any paleontological or cultural resources, such as buildings, structures, or objects over 50 years old (excluding buildings that have been previously evaluated as ineligible for the National or California Register), including human remains, are encountered during any project development activities, work shall be suspended and other applicable agencies will be

immediately notified. At that time, the County and Tuleyome shall coordinate any necessary investigations of the site with appropriate specialists, as needed.

Cul-3: When Native American archaeological, ethnographic, or spiritual resources are involved, all identification and treatment shall be conducted by qualified archaeologists who meet Federal standards, as stated in the Code of Federal Regulations (36 C.F.R. § 61) and appurtenances (i.e., pursuant to the National Historic Preservation Act, Senate Bill 18), and Native American representatives who are approved by the local Native American community as keepers of their cultural traditions. In the event that no such Native American is available, persons who represent tribal governments and/or organizations in the locale in which resources could be affected shall be consulted.

Cul-4: Pursuant to Public Resources Code section 5097.98 and Health and Safety Code section 7050.5, if human remains or bones of unknown origin are found during construction, all work shall stop in the vicinity of the find and the Napa County Coroner will be contacted immediately. If the remains are determined to be Native American, the coroner shall notify the Native American Heritage Commission who will notify the person believed to be the most likely descendant. The most likely descendant will work with the contractor to develop a program for reinterment of the human remains and any associated artifacts. No additional work shall take place within the immediate vicinity of the find until the identified appropriate actions have been implemented. If the Coroner determines that the remains are not related to a crime scene, then a qualified archaeologist who meets Federal standards (36 C.F.R. § 61) shall be retained to assess the find and make further recommendations.

Hazards and Hazardous Materials

Haz-1: Fences and gates shall be strategically placed around the ore processing area and some of the adits, structures, and mine features to restrict access. Two adits shall be gated using bat-friendly gates to restrict visitor access for safety purposes.

Haz-2: All workers and visitors to the site shall be provided a copy of the Occupational Safety and Health Administration (OSHA) standard SSHSP, and trained on proper procedures for working at the mining sites, around the mining features and drill rig for borehole drilling, contaminated soils, adits, handling chemicals during the pilot plant system operation, and directions to the nearest hospital, and emergency contact information.

Haz-3: If an accidental release or spill occurs during construction and maintenance of the project, the release shall be cleaned up immediately and reported in accordance with applicable federal, state, and local requirements.

Haz-4: Mine waste at Corona and Twin Peaks mine sites shall be revegetated to reduce risk of exposure to metals-contaminated tailings.

Haz-5: Submit a Hazardous Material Business Plan (HMBP) to Napa County Environmental Health Division. An HMBP will be prepared if hazardous chemicals will be used for the pilot plant system or for long-term treatment are equal to or greater than 55 gallons of a liquid, 500 lbs. of a solid, or 200 cubic feet of compressed gas, or extremely hazardous substances above the threshold planning quantity (Appendix A to 40 C.F.R. § 355) that will include an inventory of hazardous materials, a site map, an emergency plan, and implementing a training program for employees. All chemicals will be transported to the site in accordance with Department of Transportation regulations.

Hydrology and Water Quality

Hyd-1: Develop an operations, maintenance, and monitoring plan. An OMMP shall be prepared as a component of the Remediation Plan to measure the long-term sustainability and

effectiveness of the project treatment systems. The OMMP shall include schedules and maintenance activities for the drainage treatment systems (adits and infiltration systems) and pilot plant system, monitoring the success of vegetation growth, and monitoring mercury concentrations in in-stream biota.

Hyd-2: Prepare and Implement a Storm Water Pollution Prevention Plan and Implement Best Management Practices.

Prior to construction and issuance of grading permits, Tuleyome shall obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity from the State Water Board. Tuleyome shall prepare a SWPPP to identify sources of sediment and other pollutants on site and ensure the reduction of such pollutants in storm water discharged from the site during construction. The SWPPP shall identify the BMPs to control erosion, sediment discharge, and protect environmental sensitive areas and water quality.

Findings. Pursuant to Resolution [R5-2013-xxxx], the Central Valley Water Board has determined that, based on information contained in the Initial Study, the project would not have a significant adverse effect on the environment. Mitigation measures necessary to avoid or reduce to a less-than-significant level the project's potential significant effects on the environment are detailed herein. These mitigation measures are hereby incorporated and fully made part of this Draft Mitigated Negative Declaration. The project proponent has agreed to incorporate as part of the project and implement each of the identified mitigation measures, which are a part of the approved Remediation Plan.

Date: _____

Pamela C. Creedon, Executive Officer

DRAFT INITIAL STUDY

1. **Project Title:** Corona and Twin Peaks Mine Drainage Treatment Project
2. **Property Owner:** Corona/Twin Peaks Historical Association, LLC
3. **Contact person, phone number and email:** Lead Agency Contact is Victor Izzo, Central Valley Regional Water Quality Control Board, 11020 Sun Center Drive, Suite 200, Rancho Cordova, CA, 95670; (916) 464-4626; Victor.Izzo@waterboards.ca.gov.
4. **Project location and APN:** The proposed project is located on 32 acres within a larger 8- parcel holding of 328.8 acres in northern Napa County. The property is located off of Oat Hill Mine Road and includes Napa County Assessor's Parcel Numbers (APN) 016-020-035, 016-020-026, 016-020-020, 016-020-027, 016-020-023, 018-010-006, 018-010-007, and 018-010-009. Corona Mine is in the northern portion of the project area and project features are predominantly located on the parcel with APN 016-020-020. Twin Peaks Mine is located in the southern portion of the property and project features are predominantly located on parcels with APNs 018-010-006 and 018-010-007.
5. **Project Sponsor's Name and Address:** Tuleyome, Inc., at 607 North Street, Woodland, California 95695. Bob Schneider, Senior Policy Director and Project Lead, (530) 350-2599, bschneider@tuleyome.org.
6. **General Plan Description:** The project site is designated Agriculture, Watershed, and Open Space in the Napa County General Plan.
7. **Current Zoning:** Agricultural Watershed (AW). AW areas predominant use is agriculturally oriented, where watershed areas, reservoirs, and floodplain tributaries are located and development would adversely impact on all such uses, and where the protection of agriculture, watersheds, and floodplain tributaries from fire, pollution, and erosion is essential to the general health, safety, and welfare.
8. **Project Description:** A detailed Project Description is provided below, and additional project-related information is included in Attachments A through C, containing background reports and data. Attachment A contains completed air quality and greenhouse gas emission (GHG) calculations as well as the Napa County GHG checklist. Attachment B contains the project biological surveys. Attachment C contains a redacted public-review version of the archaeological survey report. Appendix E contains the Remediation Plan. Site maps follow the text.
9. **Environmental Setting and Surrounding Land Uses:** The project is located in northern Napa County, northwest of Pope Valley and due north of the Palisades (Figure 1). As the crow flies, the closest city is Calistoga, which is located approximately 7 miles southwest of the project site. Two former mercury mines, the Corona and Twin Peaks mines are located on the property (Figure 2). The mines were last operated in the 1940s (Twin Peaks) and 1970s (Corona). More recently, the property has been used for hunting. Oat Hill Mine Road is a dirt road that traverses north and south through the property. The land is undeveloped with the exception of a hunting camp (south of Twin Peaks Mine along Oat Hill Mine Road), and dirt spur roads that provide access to mine adits, drain tunnel portals, and other abandoned mine features. Kidd Creek traverses the northern portion of the property and Bateman Creek traverses the southern portion of

the property. Both creeks meet at a fork to the east of the property and flow into James Creek. The property contains mixed oak woodlands, California bay, Pacific Madrone, Douglas Fir, Gray Pine, California nutmeg, chaparral, dogwoods, manzanita, redbud, and riparian vegetation. See Attachments A-C for additional setting information.

10. **Other agencies whose approval is required:** (e.g., permits, financing approval, or participation agreement).

Responsible Agencies – Federal

US Environmental Protection Agency (EPA)

US Fish and Wildlife Service (USFWS)

Responsible Agencies – State

Central Valley Regional Water Quality Control Board (Central Valley Water Board)

Trustee Agencies – State

Department of Fish and Wildlife (CDFW)

Responsible Agencies – Local

Napa County Planning, Building, and Environmental Services

Napa County Public Works

DETAILED PROJECT DESCRIPTION

CORONA AND TWIN PEAKS MINE DRAINAGE TREATMENT PROJECT

Introduction

Tuleyome has proposed the Corona and Twin Peaks Mine Drainage Treatment Project (also referred to as the “Project”), a Good Samaritan project and mine and water quality cleanup project sponsored by Tuleyome, Inc. on lands owned by the Corona/Twin Peaks Historical Association, LLC off of Oat Hill Mine Road in northern Napa County. The goal of the project is to improve the effectiveness of existing mine drainage treatment systems (current baseline conditions) to support healthy aquatic ecosystems downstream in James Creek, Pope Creek, Lake Berryessa, and Putah Creek, and to mitigate physical and chemical hazards so that the site is safe for potential future public use. This project will be conducted according to a remediation plan (the “Remediation Plan”) prepared by Tuleyome pursuant to Water Code section 13398.3. Tuleyome is not the owner or operator of the Corona or Twin Peaks Mines and implementing the Remediation Plan would be at the direction of and upon approval by the landowner and the approval of the Central Valley Regional Water Quality Control Board (Central Valley Water Board).

The Central Valley Water Board is the lead agency responsible for complying with the provisions of California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.) and the oversight agency for approval of the Remediation Plan (see Attachment E). Good Samaritan projects are projects at orphan mine sites undergoing cleanup, voluntarily by parties who are not past or current operators of the mine and that under the US Environmental Protection Agency (EPA) guidelines would not be responsible parties (Wat. Code, §§ 13397(b) and 13398(a).), and thus protected from liability for cleanup (EPA, 2012a).

The following site figures and attachments are provided:

- Figure 1** – Corona and Twin Peaks Mine Site Location
- Figure 2** – Corona and Twin Peaks Mine Vicinity Map
- Figure 3** – Corona Mine Project Features Project Area - North
- Figure 4** – Twin Peaks Mine Project Features Project Area - South
- Figure 5** – Corona and Twin Peaks Mine Geologic Map
- Figure 6** – Corona and Twin Peaks Mine Soils Map
- Figure 7** – Landslides
- Figure 8** – Corona and Twin Peaks Mine Public Facilities

Exhibit 1 – Corona Mine Diagrammatic Cross Section

- Attachment A** – Air quality backup calculations and Napa County greenhouse gas checklist.
- Attachment B** – Two reconnaissance level biological surveys and a bat survey for the project area.
- Attachment C** – The archaeological report for the project area.
- Attachment D** – The Operations Maintenance and Monitoring Plan (Outline)
- Attachment E** – The Remediation Plan

Project Location

The Corona and Twin Peaks mines are located on private property in northern Napa County, northwest of Pope Valley and due north of the Palisades, and accessible from Oat Hill Mine Road (also named Oat Hill Road in Lake County and Lake County Road 102), which is 5 miles east of Middletown off of Butt Canyon Road (see Figures 1 and 2). The private property parcels includes APNs 016-020-035, 016-020-026, 016-020-020, 016-020-027, 016-020-023, 018-010-006, 018-010-007, 018-010-009. Corona Mine is in the northern portion and project features are predominantly located on the parcel with APN 016-020-020. Twin Peaks Mine is located in the southern portion and project features are predominantly located on parcels with APNs 018-010-006 and 018-010-007.

Project Goal and Objectives

The Corona and Twin Peaks mines are inactive mercury mines last operated in the 1970s and 1940s, respectively. This private property is an important component in the Napa County Open Space and Trails Plan, connecting two pieces of Palisades' area public lands and providing opportunity for a continuous trail running from Calistoga to Lake County (Napa District, 2009). In 2008 Napa County exercised its rights to reopen the southern section of Oat Hill Mine Road as a non-motorized trail, where that portion is now called the Oat Hill Mine Trail (Napa District, 2012). Napa County retains the right to reopen the remainder of the Oat Hill Mine Road (for public purposes) north of Aetna Springs and through the subject parcels. However, the northern section of Oat Hill Mine Road travels through former mercury mines, which need to be secured and cleaned up before public access can be allowed. Any eventual expansion of the Oat Hill Mine Trail would be Napa District's and/or Napa County's own discretionary action(s), subject to CEQA review at the time it is undertaken. The current project does not include expansion of recreational facilities.

The goal of the project is to improve the effectiveness of existing mine drainage treatment systems (current baseline conditions) to support healthy aquatic ecosystems downstream in James Creek, Pope Creek, Lake Berryessa, and Putah Creek and to mitigate physical and chemical hazards so that the site is safe for potential future public use. Remediation goals and objectives are to increase vegetative cover on mine waste piles, reduce erosion from mine waste piles, improve the operational flexibility of the infiltration trenches, and install subsurface chemical treatment systems to improve surface water quality. As part of the Remediation Plan, a pilot plant system will be constructed and operated to evaluate an in-situ chemical dosing treatment method to reduce metals loadings from the Corona Drain Tunnel, which, if successful could become a long-term treatment. The Remediation Plan has been included as Attachment E.

The Corona Drain Tunnel drains water from the Corona Mine directly into Kidd Creek through the Corona Drain Tunnel Portal. Under current baseline conditions at the Corona Drain Tunnel Portal, acidic water containing elevated iron and nickel flows into Kidd Creek. The pilot plant system would include advancing a borehole into the mineralized zones below the Corona Mine, conducting a tracer study by releasing an environmentally benign tracer through the borehole into the mineralized zone to confirm connectivity between the borehole and the Corona Drain Tunnel, and if successful, later dosing chemicals into the borehole to amend the subsurface chemical environment. The primary dosing chemicals under consideration are sodium hydroxide to neutralize acidic water, and ethanol to stimulate the growth of sulfate-reducing bacteria that generate hydrogen sulfide. Increasing pH and hydrogen sulfide will enhance precipitation and sequestration of nickel and iron in the Corona Drain Tunnel. Metal precipitates inside the tunnel will potentially decrease the volume of drainage water by coating the mineralized zone. Bacterial

consumption of ethanol will consume oxygen within the subsurface, generating a reducing environment which could further inhibit the oxidation processes that generate acidity and dissolves metals. If the pilot plant system is successful, a permanent system would be installed in the Corona Drain Tunnel for long-term subsurface chemical dosing of the surface water, at the direction and with the approval of the landowner, and approval of the remediation plan by the Central Valley water Board. An NPDES permit for discharge to surface water would be the responsibility of the landowner, but is statutorily exempt from CEQA pursuant to Water Code section 13389.

Surface water draining from the Corona and Twin Peaks mines has contributed metals and sediment in James Creek, which may be toxic to aquatic organisms, wildlife, and people. Pilot semi-passive drainage treatment systems (infiltration system), currently in place at Twin Peaks Mine and the upper Corona Mine's Boiler House portal consist of headwall, piping, and infiltration trenches in which sediment and metals in the mine drainage waters filter out before reaching nearby Bateman Creek and Kidd Creek. Kidd Creek and Bateman Creek both drain into James Creek. The existing infiltration drainage treatment systems (headwalls, piping and infiltration trenches), or Mining Units (as defined in Cal. Code Regs., tit. 27, § 22470.), at Twin Peaks and upper Corona Mine's Boiler House portal will be improved and the effectiveness of these treatment systems will be monitored and documented under an operations, maintenance, and monitoring plan (OMMP), a component of the Remediation Plan. The OMMP will be prepared to measure the long-term sustainability and effectiveness of the project treatment systems. The OMMP will include schedules and describe maintenance activities for the drainage treatment systems, surface water, and monitoring of vegetation growth and in-stream biota.

Mine waste (former tailings and waste rock) will be stabilized and revegetated and managed in Mining Units to prevent continued erosion of sediment and metals into the creeks. Mine waste pile (mining units) characterization is currently being conducted in accordance with Section 22480 of Title 27 of the California Code of Regulations to document locations of mine waste, to evaluate baseline conditions and metals mobility, and to assist in the design of surface water controls at the site. These activities are documented in the Remediation Plan (Appendix E). Additional safety features such as barriers, fences, and gates will be installed to restrict visitor access to the former mining features and structures.

Proposed Construction Components

As also explained in the Remediation Plan (Attachment E), the project construction consists of improving two existing mine drainage treatment systems (headwalls, piping and infiltration trenches) at Corona Mine and Twin Peaks Mine, mitigating physical and chemical hazards at both mines, minor grading on Oat Hill Mine Road (dirt road) and spurs to improve site access, consolidation of mine waste into mining units, revegetation of bare waste rock and tailings piles, and operating a pilot plant system at Corona Drain Tunnel. Project components are described below.

Corona Mine

Figure 3 shows project features for the Corona Mine and existing drainage treatment system. Project tasks and components include the following:

1. Excavate a new settling basin at the Boiler House portal entrance approximately 15 feet wide by 15 feet long and 2 feet deep to capture drainage from the mine adit, and closing the entrance using a bat-friendly gate to restrict access to the adit;
2. Replace existing plastic distribution pipe that directs water from the Boiler House portal to an existing infiltration trench that is about 435 feet long;
3. As needed, regrade existing culverts and infiltration trench and replace existing pipe to improve infiltration effectiveness and to control runoff;
4. Construct fences to restrict access to the Corona Mine furnace and ore processing area;
5. Landscape and revegetate mine waste (mining units) disturbed by historical mining and/or project construction, with the goal of reducing erosion, and mobilization of metals, sediment, and other toxins.
6. Install a borehole into the Corona Drain Tunnel, conduct a tracer study by releasing an environmentally benign tracer through the borehole into the mineralized zone to confirm connectivity between the borehole and the Corona Drain Tunnel, and operate a pilot plant system to evaluate subsurface treatment of mine discharge to improve water quality, and, if successful, operate permanent subsurface chemical dosing equipment for long-term treatment, at the direction and with the approval of the landowner and approval of the Central Valley Water Board. However, an NPDES for surface discharge would be the responsibility of the landowner.

Pilot Plant System at Corona Drain Tunnel: As a component of the Remediation Plan (Attachment E), a pilot plant system will be operated to determine if chemicals could be introduced into the drainage source(s) below Corona Mine to neutralize water and generate hydrogen sulfide, which would precipitate heavy metals inside of the tunnel (see Exhibit 1, schematic of the borehole and Corona Mine) to improve the water quality of the discharge from the Corona Drain Tunnel Portal. Most of the hydrogen sulfide is expected to be consumed by chemical reactions within the subsurface. Other potential benefits include: (1) decreasing the volume of drainage from the Corona Drain Tunnel due to accumulation of precipitates in the subsurface environment, and (2) coating the reactive metal sources in the tunnel with precipitates, thereby interfering with the chemical reactions that mobilize the metals in the first place. The application rate for any chemicals used to amend subsurface chemical conditions will be carefully estimated based on the results of a tracer study, and site water chemistry. This will be done to minimize the likelihood for mobilizing metals such as manganese that may be present naturally within the subsurface or creating extreme chemical conditions such as elevated pH. Construction and operation of the pilot plant system would entail the following steps:

1. Advance a borehole to a mineralized zone within the Corona Mine tunnel identified on available mine map.
2. Complete the borehole for use to deliver chemicals to the subsurface.
3. Conduct a tracer study by releasing an environmentally benign tracer from the borehole to confirm connectivity between the borehole and the drain tunnel and calculate chemical doses.
4. Release chemicals selected to amend the subsurface chemical environment to decrease the mobilization of metals and other drainage constituents, if the tracer study is successful.
5. Measure concentrations of chemicals in discharge water at the Corona Drain Tunnel Portal.

The tracer study will be conducted using Tide 2X detergent that contains a brightener chemical, disodium diaminostilbene disulfonate, which will be released into the borehole and measured at the outfall at the Drain Tunnel Portal. This chemical is detectable using the analytical technique fluorescence spectroscopy (fluorometry). The tracer study results, besides confirming connectivity between the mine and drain tunnel, also would be used to select the most effective chemicals for the pilot plant system, and to estimate the chemical dosing rates. Chemical dosing rates would be calculated to minimize impacts to beneficial uses of the receiving water. Drain tunnel water would be monitored for dosing chemicals. The following parameters will be measured in the discharge at the Corona Drain Tunnel Portal: tracer chemical in detergent solution, metals, pH, sulfate, alkalinity, oxidation- reduction potential, and organics (organic lipids or ethanol). If the Corona Drain Tunnel drainage pH increases above 7.5, the addition of sodium hydroxide will be interrupted until the pH begins to decrease.

The primary treatment chemicals under consideration for the pilot plant system are: sodium hydroxide for pH neutralization and ethanol to stimulate the growth of sulfate-reducing bacteria that generate sulfides. Both increased pH and sulfides generation would enhance precipitation of the nickel and iron present in Corona Drain Tunnel discharges. Bacterial consumption of the ethanol may also consume enough oxygen within the subsurface to generate a reducing environment which could further slow the oxidation processes that generate acidity and dissolve metals.

If the chemical residence time for contact with the mine waste is at least a day, then the addition of ethanol may be adequate to stimulate the growth of sulfate reducing bacteria to cause metal precipitation. However, if the residence time does not appear adequate, then sodium hydroxide would be introduced to increase the pH and generate metal hydroxide precipitates. It would be preferable to precipitate metals as metal sulfides (due to their low solubility at near-neutral pH) than as metal hydroxides.

If the pilot plant shows that subsurface chemical treatment is successful for improving water quality, then the subsurface treatment system will be continue for long-term operation and maintenance.

Twin Peaks Mine

Figure 4 shows the project features for the Twin Peaks Mine. Project tasks and components at the Twin Peaks Mine include the following:

1. Excavate a settling basin at the entrance to the Twin Peaks portal that is about 15 feet wide by 15 feet long and 2 feet deep to capture drainage from the mine adit, and close the entrance using a bat-friendly gate to restrict access to the adit;
2. Replace existing plastic distribution pipe that directs the water from the Twin Peaks portal to an existing infiltration trench that is approximately 600 feet long;
3. As needed, re-grade existing culverts and infiltration trenches and replace existing pipes to improve effectiveness and to control runoff; and
4. Landscape and revegetate selected areas (mining units) disturbed by historical mining and/or project construction, with the goal of reducing erosion and associated pollutant transport.

Project Operation

Project operation would include commissioning of the new plumbing system, routine operation and maintenance, and monitoring, subject to approval and at the direction of the landowner. The

commissioning includes confirming the valves and control structures along the infiltration trenches are working, leak testing the plumbing, and verifying that water is flowing through the pipes and infiltrating into the subsurface beneath the trenches. Commissioning would also include installation of the permanent chemical dosing system at the Corona Mine Drain Tunnel once the pilot plant system has been completed and has determined the optimum dosages of chemicals. Daily observations will be made of the infiltration pipelines to confirm system operation. Routine operations and maintenance of the infiltration pipelines include periodic visual inspections of the pipeline and trenches, flow adjustments at the valves in response to changing flow conditions, semi-annual pipeline clean out and solids management, inspection and clearing debris along the trenches, and monitoring the slopes below the infiltration trenches. Routine operations and maintenance at the Corona Mine Drain Tunnel will include verifying that the chemical doses are adequate and functioning correctly, making adjustments as necessary, and periodic sampling and analysis of the surface water discharge at the Corona Drain Tunnel portal. Maintenance and operation may also include minor adjustments to erosion controls, debris removal, and visual observations of revegetation plantings. Monitoring activities will include assessment of project success including photos of revegetation progress, continued surface water sampling upstream and downstream of the Corona and Twin Peaks Mines in Bateman and Kidd Creek, and monitoring mercury levels in in-stream biota. There are a few shallow groundwater wells in the vicinity of the Corona Mine infiltration trench that also could be monitored.

Project Construction Schedule and Equipment

Project construction is planned to begin in Fall 2013 and requires about nine months with completion expected by Summer 2014. The project will be completed in overlapping phases, estimated as follows or on a similar appropriate seasonal schedule in the event of administrative delays: (1) minor grading of roads to ensure safe passage of vehicles and equipment (September 2013); (2) improving existing infiltration systems (September-October 2013); (3) consolidating mine waste and grading (September-October 2013); (4) operating a pilot plant system (September 2013- March 2014); (5) installing bat-friendly gates on portals and adits, and installing fences around upper Corona Mine ore processing area and furnace (June 2014 or September-October 2014); (6) completing surface drainage work to stabilize and divert water before the rainy season (September-November 2013 and through 2014, as warranted); and (7) providing erosion control and revegetation (September 2013- June 2014).

Construction equipment may include, but not be limited to, a bulldozer, backhoe, trencher, dump truck, loader, all-terrain vehicle, and standard pickup truck. Other equipment will include a compact concrete mixer, hydro-mulcher, welder, and drill rig.

Required Permits and Approvals

Table 1 lists permits and approvals that will be required as part of the project and implementing the Remediation Plan. The landowner is responsible for obtaining appropriate permits for ongoing or remaining surface water discharges or treatment of mine drainage.

Table 1: Permits and Approvals for Corona and Twin Peaks Mine Drainage Treatment Project		
Permit or Approval	Lead Agency for Permit	Regulatory Purpose and Relation to Project
Good Samaritan Waiver under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)	US Environmental Protection Agency (EPA)	Provides liability protection for Good Samaritans (land owners who are not past or current owners or operators of mines and who are not liable for cleanup) who voluntarily agree to clean up orphan mine sites (EPA, 2012a).
Remediation Plan	Central Valley Water Board	Under Chapter 5.7 of Division 7 of the Water Code, an abandoned mine remediation plan to improve water quality will be prepared and submitted to the Regional Water Quality Control Board. The Remediation Plan will include system design and construction plans and operation and maintenance plans proposed to reduce, control, mitigate, or eliminate adverse water quality impacts.
Grading Permit	Napa County Planning, Building, and Environmental Services, Engineering Services	Approval for grading that involves earth disturbing activity (Napa County Ordinance Section 16.28). Required before construction and grading and provides protection of air quality and storm water quality. Must meet County Conservation Regulations that address erosion control and stream setbacks to protect riparian areas, as well as stormwater quality management plan requirements. This permit will be obtained for excavating and grading for road improvements.
General Permit for Storm Water Discharges Associated with Construction Activity (National Pollutant Discharge Elimination System Permit) and Storm Water Pollution Prevention Plan (SWPPP)	State Water Resources Control Board Reviewed by Napa County Planning, Building, and Environmental Services, Engineering Services	All non-agricultural construction projects involving soil disturbance on slopes greater than 5% or that disturb more than 1 acre, or that require a grading permit, must include a stormwater pollution prevention plan (SWPPP) and storm water permit, which will also be reviewed by the Napa County Public Works Department. A construction stormwater permit must be obtained before construction begins. Requires Best Management Practices in place before and during construction, inspections and monitoring during construction, and designation of a Qualified SWPPP Developer and Practitioner. Controls erosion, sediment, and waste materials from leaving the site and entering waterways. The SWPPP protects water quality and riparian areas. An NPDES permit and SWPPP will be prepared for grading and earth-moving activities for roadways, access paths, and infiltration systems.

Soil Boring Permit	Napa County Planning, Building & Environmental Services	Napa County processes applications for well construction and soil boring. Permit applications are reviewed for setback distances, proximity to Hazmat sites, and proposed use. Borings or wells that pertain to hazmat sites or sites covered by the Napa County Local Oversight Program are processed by the Public Works Department. Under Water Code section 231, the Department of Water Resources (DWR) developed minimum standards (DWR Bulletin 74-90) for water wells, monitoring wells, and cathodic protection wells to protect groundwater quality. These standards include requirements for construction, alteration, maintenance, and destruction of wells.
Hazardous Materials Business Plan	Napa County Division of Environmental Health	Businesses that handle hazardous materials in quantities equal to or greater than 55 gallons of a liquid, 500 pounds of a solid, or 200 cubic feet of compressed gas, or extremely hazardous substances above the threshold planning quantity (40 CFR, Part 355, Appendix A) to: Inventory their hazardous materials, develop a site map, develop an emergency plan, and implement a training program for employees.

Initial Study Checklist

I. AESTHETICS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant	No Impact
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

Discussion: The site provides sweeping views of surrounding mountain ranges. The project vicinity consists of former mercury mine adits, ore processing equipment, mine waste and calcite piles, cleared areas, roads, and paths, within a remote area on private property. Several seasonal creeks, including Bateman Creek and Kidd Creek that drain into James Creek are located on the property. The Corona and Twin Peaks mines are historical mercury mines from the East Mayacmas Mercury District (US Bureau of Mines, 1965). These former mines were used to extract cinnabar deposits from the late 1800s until late 1960s, to produce mercury at the site. Currently the property is used by deer hunters. The mines are accessed by dirt roads and located on steep slopes. At the project site, Oat Hill Mine Road is a dirt road that traverses north-south through the mine sites and was originally constructed to provide transportation from the mines to Calistoga and Aetna Springs. The southern portion of Oat Hill Mine Road, which is closed to the public, intersects the Upper Oat Hill Mine Trail, a Napa County Regional Park and Open Space District trail used by hikers and equestrians.

Answers to Checklist Questions:

a.-b. The project features will not impact a scenic vista and is not within a state scenic highway. The project site is located within a forested area and the small scale physical features constructed for the project, such as fences, adit gates, piping and infiltration trenches, will not be readily visible from the paved public portion of Oat Hill Road in Lake County. The construction equipment for the activities, including the pilot plant system, will not be readily visible from the public roads. The Napa County portion of the road, named Oat Hill Mine Road, traverses the upper Corona Mine site near the former ore processing area and Scott's furnace, where a new fence will be installed around the ore processing area and furnace to limit public access and will not be out-of character for this area of the project. Therefore, no impact will occur.

c. The existing site contains oak and madrone forests with scattered areas of disturbed mine waste, ore processing equipment, paths, and former infiltration trenches with associated PVC distribution pipes to transport the water to the trenches. The project will restore the existing infiltration trenches at Boiler House portal and Twin Peaks portal and consolidate and cap mine wastes and revegetate previously disturbed areas. Some clearing of small trees and brush will occur to create a temporary staging area for equipment. Following project construction, these areas will be allowed to revert back to their natural state. As needed, some small-scale equipment may be permanently installed at the Corona Mine to administer the water treatment doses to the Corona Mine Drain Tunnel. These new components and features will not stand out from the surrounding site or existing features and will not be visible from Oat Hill Mine Road. Capping of mine waste and revegetation activities will improve the general appearance of the mining sites. Native plants will be used to revegetate bare mine waste and infiltration trenches to control erosion, and will also improve the appearance of the scarred landscape and provide better habitat for wildlife. A few trees and some vegetation may be removed along the roads during grading. Therefore, this impact will be less than significant.

d. Lights will not be installed as a component of this project. The project will not include a new source of light or glare and will not adversely affect day or nighttime views in the area. There will be no impact on light or glare.

Mitigation Measures: No mitigation measures are necessary for aesthetic impacts.

II. AGRICULTURAL AND FOREST RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Important (Farmland) as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land as defined in Public Resources Code section 12220(g), timberland as defined in Public Resources Code section 4526, or timberland zoned Timberland Production as defined in Government Code section 51104(g)?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use in a manner that will significantly affect timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, or other public benefits?	☐	☐	☒	☐
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use?	☐	☐	☐	☒

Discussion: The project site is designated Agriculture Watershed and Open Space in the Napa County General Plan, and the parcels are zoned Agricultural Watershed (AW). The AW classification applies to areas where predominant use is agriculturally oriented, where watershed areas, reservoirs and floodplain tributaries are located, where development would adversely impact all such uses, and where the protection of agriculture, watersheds, and floodplain tributaries from fire, pollution, and erosion is essential to the general health, safety, and welfare. The current land use is undeveloped, vacant, open space.

Answers to Checklist Questions:

- a. The parcels do not include Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Based on the 2009 California Department of Conservation Farmland Mapping and Monitoring Program, the parcels are designated as “Other Land” and do not meet the criteria of any other category (California Department of Conservation, 2009). Typical uses include low density rural development, heavily forested land, mined land, or government land with restrictions on use. The site is designated Agriculture, Watershed and Open Space in the Napa County General Plan, and the parcels are zoned AW. Therefore, no impact will occur.
- b. The parcels are not in Williamson Act contracts. The project will not conflict with the current undeveloped vacant use of the parcels. Therefore, no impact will occur.
- c. The project will not convert forest land to non-forest uses. The parcels are designated “Other Land” and will remain open space land. Oat Hill Mine Road will remain available as a potential continuation of the Oat Hill Mine Trail system. Therefore, there will be no impact on identified forestland or timberland resources.
- d. The project may require removal of small individual oak and Manzanita trees, and brush, to improve access during construction. Based on Napa County policies and ordinances, conservation and protection of oak woodlands is important and removal of oak trees is subject to mitigation measures. In October 2010, Napa County adopted the Voluntary Oak Woodland Management Plan (Napa County, 2010). The purpose of the plan is to provide a conservation framework to preserve and restore Napa County’s oak woodland resources. The plan emphasizes the value of oak woodlands for habitat, scenic and public recreation, cultural and historical significance, flood control, erosion control, water quality protection, air quality protection, and carbon sequestration. Napa County General Plan, Policy CON-24 is to maintain and improve oak woodland habitat to provide slope stabilization, soil protection, species diversity, and wildlife habitat through appropriate measures (Napa County, 2010). These measures include compliance with the State Oak Woodlands Preservation Act (Pub. Resources Code, § 21083.4.), which includes suggested mitigation measures for conversion of oak woodlands. The project scope will not include conversion of oak woodlands or loss of forest land to other uses that would significantly impact timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, or other public benefits. Napa County incorporates tree preservation mitigation measures in the Conservation Regulations (Napa County Code, Chapter 18) and the Floodplain Management Regulations (Napa County Code, Chapter 16). The project will conform to these regulations to protect stream setbacks, protect lands from soil loss, maintain and improve water quality, and replace trees (see Biological Resources and Hydrology sections). As part of the project, native trees will be replanted to revegetate the disturbed mine waste areas (mining units) and along the two infiltration trenches (also see Bio-3 in Biology section). In addition, erosion control measures will be in place to protect sensitive habitats during construction (see Hydrology section). Therefore, the impact will be less than significant.
- e. The project will not involve conversion of farmland to non-farmland uses. The parcels are zoned AW and will remain in open space use and available for future agricultural use. Therefore, no impact will occur.

Mitigation Measures: No mitigation measures will be necessary.

III. AIR QUALITY

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☒	☐	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☒	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☒
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒

Discussion: During construction at the remote site, minor air emissions will be generated during construction (for improvements to the mine drainage treatment systems, revegetation of mine wastes, borehole drilling for the pilot plant system, and minor road improvements) by short-term exhaust emissions from construction equipment, worker vehicles, and fugitive dust during grading and vehicle travel over unpaved areas. Site characterization is on-going to protect human health and the environment, and this includes sampling of soil and waste rock. A large furnace (Scott Furnace) used in the early 1900s, along with a rotary furnace and condensers used to extract mercury, are located at the Upper Corona Mine site and likely contain mercury in the soil from losses during ore processing (USGS, 2007). This area will be closed to the public using fences and gates on the roads. Based on recent air sampling conducted at selected locations at the site and inside the large furnace, the air outside these structures does not contain mercury vapor at concentrations above the Occupational Safety and Health Administration (OSHA) 8-hour time-weighted average (Burlison, 2012c). As expected, the highest mercury vapors were measured at the Corona Mine site, inside the Scott Furnace and inside the retort tubes and brick furnace, and lower levels were measured outside on the mine waste piles.

Hydrogen sulfide will be created through bacterial reduction of sulfate. Most of the hydrogen sulfide is expected to be consumed by chemical reactions within the subsurface. The quantity of ethanol used as a food source to encourage bacterial growth will be carefully estimated to optimize bacterial growth and balance desired sulfate reduction with the need to prevent creation and accumulation of significant quantities of hydrogen sulfide. Hydrogen sulfide concentrations in air will be monitored periodically at the Boiler House Portal, Drain Tunnel, and vicinity of the boreholes during the pilot study to confirm that excess hydrogen sulfide is not produced

Pursuant to the federal Clean Air Act, EPA has designated Napa County as an area in non-attainment for ozone (O₃), with a "marginal" classification, attainment for particulate matter (PM) less than 10 microns in diameter (PM₁₀), non-attainment for PM less than 2.5 microns in diameter (PM_{2.5}), and a moderate maintenance area for carbon monoxide (CO), with respect to the National Ambient Air Quality Standards (NAAQS). The U.S. EPA and the California Air Resources Board (CARB) designated each county within California as either in attainment or non-attainment for the NAAQS and the California Ambient Air Quality Standards (CAAQS).

CARB has also designated Napa County as in non-attainment for O₃ (with a one-hour classification of “serious”), unclassifiable/attainment for PM₁₀, non-attainment for PM_{2.5}, and unclassifiable/attainment for CO with respect to the CAAQS (CARB, 2012). However, Napa County is in attainment for state and federal nitrogen dioxide (NO₂) standards and sulfur dioxide (SO₂) standards.

The Bay Area Air Quality Management District (BAAQMD) is the public agency entrusted with regulating stationary sources of air pollution in the nine counties that surround San Francisco Bay including Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, southwestern Solano, and southern Sonoma counties. BAAQMD regulates air pollution from stationary sources through rules, regulations, and permits.

The BAAQMD’s CEQA Guidelines were developed to assist local jurisdictions and lead agencies in complying with the requirements of CEQA regarding potentially adverse impacts to air quality. These CEQA Guidelines were updated in June 2010 to include reference to thresholds of significance (“Thresholds”) adopted by the BAAQMD Board on June 2, 2010 (BAAQMD, 2010). The Guidelines were further updated in May 2011. On March 5, 2012 the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the Thresholds. The court did not determine whether the Thresholds were valid on the merits, but found that the adoption of the Thresholds was a “project” under CEQA. The court issued a writ of mandate ordering the BAAQMD to set aside the Thresholds and cease dissemination of them until it had complied with CEQA.

In view of the court’s order, BAAQMD is no longer recommending that the Thresholds be used as a generally applicable measure of a project’s significant air quality impacts. Lead agencies will need to determine appropriate air quality thresholds of significance based on substantial evidence in the record. Lead agencies may rely on the BAAQMD’s CEQA Guidelines (updated May 2011) for assistance in calculating air pollution emissions, obtaining information regarding the health impacts of air pollutants, and identifying potential mitigation measures. Lead agencies may continue to rely on the BAAQMD’s 1999 Thresholds of Significance and they may continue to make determinations regarding the significance of an individual project’s air quality impacts based on the substantial evidence in the record for that project.

BAAQMD’s 1999 Thresholds of Significance consider construction-related emissions to be generally short-term in duration, but may still cause adverse air quality impacts (BAAQMD, 1999). BAAQMD regards PM₁₀ as the pollutant of greatest concern with respect to construction activities. PM₁₀ emissions can result from a variety of construction activities, including excavation, grading, demolition, vehicle travel on paved and unpaved surfaces, and vehicle and equipment exhaust. Construction-related emissions can cause substantial increases in localized concentrations of PM₁₀. Particulate emissions from construction activities can lead to adverse health effects as well as nuisance concerns such as reduced visibility and soiling of exposed surfaces.

BAAQMD 1999 Thresholds note that construction emissions of PM₁₀ can vary greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, weather conditions, and other factors. Despite this variability in emissions, experience has shown that there are a number of feasible control measures that can be reasonably implemented to significantly reduce PM₁₀ emissions from construction. The BAAQMD’s approach to CEQA analyses of construction impacts is to emphasize implementation of effective and comprehensive control measures rather than detailed quantification of emissions.

At a public hearing on September 15, 2010, the BAAQMD’s Board of Directors adopted the final Bay Area 2010 Clean Air Plan (BAAQMD CIAP) (BAAQMD, 2010), and certified the Final

Environmental Impact Report on the BAAQMD CIAP. The BAAQMD CIAP serves to update the Bay Area O3 plan in compliance with the requirements of Chapter 10 of the California Health & Safety Code. In addition, the BAAQMD CIAP provides an integrated, multi-pollutant strategy to improve air quality, protect public health, and protect the climate. The BAAQMD CIAP control strategy includes revised, updated, and new measures in the three traditional control measure categories: Stationary Source Measures, Mobile Source Measures, and Transportation Control Measures. In addition, the BAAQMD CIAP identifies two new categories of control measures: Land Use and Local Impact Measures, and Energy and Climate Measures. The BAAQMD CIAP addresses four categories of pollutants:

- Ground level O3 and its key precursors, reactive organic gases (ROG) and nitrogen oxides (NOx);
- Particulate matter: primary PM2.5, as well as precursors to secondary PM2.5;
- Air toxics; and
- Greenhouse gases.

Answers to Checklist Questions:

a. The project will not conflict with or obstruct implementation of the applicable air quality plan. The proposed project will result in short-term emissions from construction activities. Air emissions will be generated during construction/improvements of the mine drainage treatment system, revegetation of mine waste, and the roads by short-term exhaust emissions from construction equipment and worker vehicles, and fugitive dust from earth-moving activities and vehicle travel over unpaved areas. These activities will result in the temporary generation of ROG (a precursor to O3 formation), NOx, and PM10/PM2.5 emissions.

As previously discussed, BAAQMD's 2010 significance thresholds for these contaminants have been set aside pending BAAQMD's compliance with CEQA. BAAQMD is deferring to its 1999 significance thresholds in the meantime.

The BAAQMD has identified a set of feasible PM10 basic control measures for construction activities (BAAQMD 2012). Selected control measures applicable and relevant to the project and location are listed below as mitigation measure Air-1. The basic control measures are recommended at all construction sites, regardless of size. Additional measures, or "enhanced measures," should be implemented at larger construction sites (greater than 4 acres) where PM10 emissions generally will be higher; however, the proposed project disturbed acreage will be less than 4 acres (3.04 acres), so these enhanced measures are not necessary. The project does not include paving roads and routine haul trips on and off-site will not be required. During grading and revegetation of mine waste piles on windy days, water stored onsite in poly water tanks will be applied to dampen the areas. This water will be applied using discretion so that sediment is not inadvertently washed away from these mine waste areas into the creeks and sensitive habitats.

Despite the fact that BAAQMD's 2010 numerical thresholds of significance are temporarily suspended, sufficient data is available to calculate the proposed project's maximum daily emissions of ROG, NOx, and PM10/PM2.5 to gauge their magnitude against typical thresholds in other districts. Diesel-powered equipment will be used for the project, consisting of dozers, backhoes, excavators, loaders, borehole drill rig, etc.). However, at any one time there will be a maximum of two qualified equipment operators and one truck driver available to run the equipment. To estimate the maximum daily emissions, the following equipment was assumed to be operating for eight hours:

- 1 Bulldozer (90 hp)
- 1 Backhoe (85 hp)

- 1 Dump Truck (250 hp)

These construction activities were analyzed using the CARB-approved URBEMIS 2007 v. 9.2.4 for estimating maximum daily emissions from engine exhausts and fugitive dust (Jones and Stokes, 2007). The amount of soil disturbed per day is assumed to be 0.76 acre. Basic control measures outlined above were assumed in the analysis. The URBEMIS backup for the calculations is presented in Attachment A. The results of the URBEMIS model are presented in Table 2. To provide some perspective on these emission rates, thresholds of significance of air emission rates during the construction phase for several nearby Air Quality Management Districts (AQMD) are also presented in Table 2.

TABLE 2 Maximum Daily Construction Emissions Estimates and Comparison to Thresholds

	ROG (lb/day)	NO_x (lb/day)	PM₁₀ (lb/day)	PM_{2.5} (lb/day)
Project Construction	1.2 (lb /day)	8.5 (lb/day)	8.8 (lb/day)	2.2 (lb/day)
Bay Area AQMD (2011 update – on hold; for reference only)	54 lb/day	54 lb/day	82 lb/day	54 lb/day
Yolo-Solano AQMD (2007)	10 tpy (equivalent to 77 lb/day) ¹	10 tpy (equivalent to 77 lb/day) ¹	80 lb/day	None
Northern Sonoma County Air Pollution Control District (APCD), Lake County AQMD, Colusa County APCD	No Guidelines – Relies on BAAQMD for CEQA Guidance.			
Sacramento Metropolitan AQMD (2009)	None	85 lb/day	None for projects <15 acres disturbed	
Feather River AQMD (2010)	25 lb/day	25 lb/day	80 lb/day	None

By comparing the project's predicted construction emissions to typical thresholds of significance, and with implementation of mitigation measure Air-1, it can be concluded that the project will not represent a potential significant impact and will not conflict with or obstruct implementation of the BAAQMD CIAP.

Operation emissions will consist of exhaust emissions associated with visitor traffic and periodic use of maintenance vehicles. These emissions will likely be lower than maximum daily construction emissions.

Therefore, the impact from construction and operations of the project will be less than significant with mitigation incorporated.

b. As discussed, project construction and operation and implementation of Air-1 basic control measures derived from the BAAQMD, will result in emission rates that are less than significant with mitigation. The project will not violate any air quality standard or contribute substantially to an existing or projected air quality violation. Mercury vapors are below OSHA standards for exposure, limited to no more than 10 hours per day, 40 hours per week (Burleson, 2012c).

While some of the basic control measures are not applicable to this type of project in a remote private wooded area, those that are applicable will be implemented. For example, haul trips will include transporting soil amendments to the property but will not include routine trips on and off-site. All site dirt will remain on the property. During grading and revegetation of mine waste piles, water stored on site in water tanks will be applied as needed to dampen the areas during windy conditions. Therefore, with implementation of mitigation measure Air-1, this impact will be less than significant with mitigation incorporated.

c. As previously discussed above, project construction and operation will result in emission rates that are less than significant. The project will not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for O₃ precursors) because the project will comply with the BAAQMD CIAP. Therefore, this impact is less than significant.

d. There are no sensitive receptors within the vicinity of the project that will be exposed to substantial pollutant concentrations. Locations where the very young, elderly, and those suffering from certain illnesses or disabilities reside are considered to be "sensitive receptors" to air quality impacts. Sensitive receptors include schools, daycare centers, parks, recreational areas, medical facilities, rest homes, convalescent care facilities, and residences. Land use conflicts can arise when sensitive receptors are located near major sources of air pollutant emissions. The project is located in a fairly remote area on private property and no sensitive receptors are located near proposed construction areas. The nearest residence is about 2 miles from the project site.

In addition, mercury vapors are below OSHA standards for worker exposure, limited to no more than 10 hours per day, 40 hours per week (Burleson, 2012c). During the pilot study, hydrogen sulfide will be created through bacterial reduction of sulfate. Most of the hydrogen sulfide is expected to be consumed by chemical reactions within the subsurface. The quantity of ethanol used as a food source to encourage bacterial growth will be carefully estimated to optimize bacterial growth and balance desired sulfate reduction with the need to prevent creation and accumulation of significant quantities of hydrogen sulfide. Hydrogen sulfide concentrations in air will be monitored periodically at the Boiler House Portal, Drain Tunnel, and vicinity of the boreholes during the pilot study to confirm that excess hydrogen sulfide is not produced. Therefore, no impact will occur.

e. The project will not generate objectionable odors. Therefore, no impact will occur.

Mitigation Measures:

Air-1: The following basic control measures (modified) shall be implemented during construction:

- All exposed surfaces (e.g., exposed soil piles and graded areas) shall be watered two times per day as needed to prevent windblown dust.
- All haul trucks transporting soil, sand, or other loose material to the site shall be covered.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- Grading and earth moving activities shall be suspended when winds exceed 25 mph.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes. (as required by the California airborne toxics control measure Cal. Code Regs., tit. 13, § 2485.) Clear signage shall be provided for construction workers at all access points.

- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications.

IV. BIOLOGICAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☒	☐	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, Coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☒	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☒	☐

Discussion: A reconnaissance-level biological survey was conducted on 8 and 9 May 2012 for the project (Burleson, 2012a) (see report in Attachment B). This survey included a review of previous reports and surveys conducted at the sites. One of the reports titled, Oat Hill Mine Trail in Napa County (O'Donnell, 2005), prepared by Richard O'Donnell, describes the biology and botany of the project site with an emphasis on California native plants that was compiled from surveys conducted between 2001 and 2005. A visual, acoustic and mist net survey for bats was conducted at the Corona and Twin Peaks mine sites on September 27-29 and October 3-4 2012 (West Ecosystems, 2013) (see bat survey in Attachment B). Burleson completed a follow-up plant survey was conducted on April 3, 2013 at the project site for rare plants within their spring bloom period (see report in Attachment B). The targeted plant species were Ricon Ridge ceanothus (*Ceanothus confuses*), Calistoga ceanothus (*Ceanothus divergens*), Sonoma ceanothus (*Ceanothus sonomensis*), and Adobe-lily (*Fritillaria pluriflora*). All four plant species bloom periods were missed during the previous year. No special status plants, wildlife, or nests were observed at the Upper Corona Mine and Twin Peaks Mine areas surveyed. However, two special status plants were observed in an area above the Corona Mine, designated for the pilot plant system. Sonoma Ceanothus was observed growing within and along the existing road leading up to the Corona Mine upper pit area. Sonoma Ceanothus co-occurred with Jepson Ceanothus (*Ceanothus jepsoni*, now includes the subspecies *albiflorus*). Additionally, a population of at least 100 plants of Morrison's Jewel-flowers was observed in the upper Corona Mine pit area. The highest number of plants was observed in the outcrops above an adit.

Several habitat types and features occur within the project site. The dominant tree community throughout all sites and the bioregion was montane hardwood-conifer, typified by a mix of oak including canyon live oak (*Quercus chrysolepis*), interior live oak (*Quercus wislenzii*) and California black oak (*Quercus kelloggii*), as well as California bay (*Umbellularia californica*), Pacific Madrone (*Arbutus menziesii*), Douglas fir (*Pseudotsuga menziesii m.*), California nutmeg (*Torreya californica*), and Pinus sp. Plants of chaparral, Dogwood (*Cornus sp.*), and redbud

(*Cercis occidentalis*) were present in the understory. The various plant communities in the project area provide potential nesting, foraging, roosting, and other habitat for a variety of plant and wildlife species, including several special-status species. The mine sites were composed of plants typical of disturbed areas including a mix of nonnative and native grasses, herbs, and native trees. A list of the plants is included in Attachment B.

Commonly occurring invertebrates that were sighted near and within the project area include several species of grasshoppers (Order *Orthoptera*), water strider (*Gerris remigis*), and butterflies (Family *Lepidoptera*).

Bird species observed during the survey include various species of woodpeckers, flycatchers, jays, finches, hawks, vultures, and thrushes (see biological survey in Attachment B). Other than a Lewis's woodpecker, no special-status birds or nests of birds were found on the survey dates. Lewis's woodpeckers are on the USFWS watch list of birds of special concern; however, this species is not a federal or state-listed species.

During the visual, acoustic and mist net survey for bats, no special-status bats were observed (West Ecosystems, 2012). The results of the initial fall survey documented eight species of bats: Yuma myotis (*Myotis yumanensis*), California myotis (*M. californicus*), small-footed myotis (*M. ciliolabrum*), long-eared myotis (*M. evotis*), canyon bat (*Parastrellus hesperus*), western red bat (*Lasiurus blossevillei*), Brazilian free-tailed bat (*Tadarida brasiliensis*), and big brown bat (*Eptesicus fuscus*). Two Yuma myotis were mist netted at the Twin Peaks Adit 1a. Visual surveys of adits did not result in evidence of regular or long-term use of the adits (e.g. no guano deposition); however, it is possible that maternity colonies could potentially be established in some of the adits during the spring. Adits 1a, 3, and 5 likely provide roost habitat for a small number of bats.

Five mammal species were observed throughout the project area. Scat was found for California black-tailed jackrabbit (*Lepus californicus*), mule deer (*Odocoileus hemionus*), California black bear (*Ursus americanus*), and coyote (*Canis latrans*). A western gray squirrel (*Sciurus griseus*) stick nest and individual were also observed.

Two species of reptiles and two species of amphibians were observed on the survey dates. The western fence lizard (*Sceloporus occidentalis*) and California alligator lizard (*Elgaria multicarinata*) were both observed. These species of reptiles are all highly common throughout most of California. The amphibians observed were Pacific Treefrog (*Hyla regilla*) and a dead salamander determined in the lab to be a member of the genus *Ensatina*.

The May 2012 biological survey was conducted for land only and did not include creeks. However, in 1998, a survey along the Pope Creek watershed was conducted and little to no aquatic life was found in Kidd Creek, Bateman Creek, or James Creek (Slotton and Ayres, 1999). Aquatic biosentinel monitoring consists of collecting small fish and aquatic insects before cleanup and treatment to establish baseline conditions, and post-treatment to evaluate effectiveness. Small resident fish and aquatic insects are used as 'mercury biosentinels' to indicate relative mercury exposure levels and biological uptake. The conclusion was that iron-based floc precipitate was the main reason for the localized absence of typical flora and fauna directly within the creek. The 1998 survey also concluded that any reduction of the precipitate would result in a recovery of flora and fauna.

On May 20, 2012, Darell Slotton and Shaun Ayers performed similar surveys along Kidd, Bateman, and James creeks, and found Pacific giant salamanders (*Dicamptodon ensatus*) and foothill yellow-legged frog (*Rana boylei*) near the mines (Slotton, 2012). Small fish, most commonly California roach and prickly sculpin, and aquatic insects were collected at creek locations upstream and downstream of the Corona Mine and Twin Peaks Mine, which included

Bateman, Kidd, James creeks, and other creeks further downstream. A total of 60 small fish were individually analyzed for mercury, as well as 45 multi-individual composite samples of aquatic insects, using species with broad spatial overlap where possible. Fish were present downstream of Corona and Twin Peaks mines in James Creek. Though there are physical barriers preventing fish from reaching upstream to Bateman and Kidd creeks, rainbow trout (*Oncorhynchus mykiss*) were found downstream in James Creek. The survey indicated that the overall reduction in iron-based turbidity in James Creek since 1998 is a leading explanation for the successful reproduction and rearing of trout in this stream. Lastly, the survey noted the presence of mayflies and stoneflies near the Corona Mine drain indicates that the existing infiltration drainage treatment systems on the property appear to be improving ecosystem viability.

Answers to Checklist Questions:

a. - b. Sixty-four special-status species were identified by the California Natural Diversity Database (CNDDB) and U.S. Fish and Wildlife Service (USFWS) searches for Detert Reservoir and the eight surrounding 7.5 minute quadrangles (Burleson, 2012a). Thirty-one of these species are unlikely to occur on the project site due to lack of habitat, species typically found outside the project elevation, and/or have not been documented within five miles of the project location. Based on these databases and surveys there are a variety of special-status species that inhabit or may inhabit the project area.

Plants

Forty-one special-status plants were identified by the CNDDB search. Eighteen of these species are not likely to occur at the proposed project site because of lack of suitable habitat, generally occurring at lower elevations than the project site, and have not been observed within five miles of the project. The only notable disturbance to plants anticipated to occur is during construction at the infiltration trench systems. The original May 8 and 9, 2012 survey was conducted within the blooming periods of all but eleven special-status species (Burleson, 2012a). The follow-up survey was conducted April 3, 2013 to survey the project site for the 11 plants that were missed during their bloom period in 2012. The targeted plant species were Ricon Ridge ceanothus (*Ceanothus confuses*), Calistoga ceanothus (*Ceanothus divergens*), Sonoma ceanothus (*Ceanothus sonomensis*), and Adobe-lily (*Fritillaria pluriflora*). However, two special status plants were observed in an area above the Corona Mine. Sonoma Ceanothus was observed growing within and along the existing road leading up to the Corona Mine upper pit area. Sonoma Ceanothus co-occurred with Jepson Ceanothus. Additionally, a population of at least 100 plants of Morrison's Jewel-flowers was observed in the upper Corona Mine pit area. The highest number of plants was observed in the outcrops above an adit.

Bloom periods of Pappose tarplant (*Centromadia parryi parryi*), Geysers dichantherium (*Panicum acuminatum* var. *thermal*), Kentwood Marsh checkerbloom (*Sidalcea oregano valida*), Napa bluecurls (*Trichostema ruygtii*), Marsh checkerbloom (*Sidalcea oregano hydrophila*), and Socrates mine-jewel flower (*Streptanthus brachiatus brachiatus*) all occur after May. These plants bloom periods were also missed during the April 2013 surveys (Appendix B). It is recommended that a rare plant survey be conducted during Summer/Fall 2013 for these species. Therefore, with implementation of mitigation measure Bio-1, this impact will be less than significant with mitigation incorporated.

Preconstruction surveys for rare plants will be conducted prior to construction to minimize the potential for special status species of plants to be disturbed during construction. According to the California Native Plant Society's policy on mitigation guidelines regarding impacts to rare, threatened, and endangered plants, avoidance is the preferred mitigation (California Native Plant Society, 1998). Avoidance includes pre-project planning and design, reconfiguring an

existing project design, or adopting the no-project alternative. Other mitigation measures would include reducing impacts, restoration, reduction over time, and off-site compensation. With implementation of mitigation measure Bio-1, this impact will be less than significant with mitigation incorporated.

There are currently no protected trees in Napa County; however, the Napa County General Plan has goals and policies in place to preserve oak woodlands. Napa County also designates certain areas as environmentally sensitive, which is defined under Napa County Code Section 18.08.270-Environmentally Sensitive Area as follows:

Environmentally sensitive area (ESA) means those floodways, active fault zones, landslide areas, extended clear zones for heliports and airports, archaeologically sensitive areas, and rare and endangered plant and animal habitat areas as delineated on the Napa County environmental sensitivity maps on file in the conservation, development and planning department.

No proposed project construction at the Corona Mine is within ESA areas, based on the resource map provided by Napa County (and included as an attachment to the biological survey in Attachment B). The most notable ESA in the area is a "Sensitive Biotic Oak Woodland" that is located below the Corona Mine and outside the project construction area.

The project may require removal of a few trees to improve the roads, and prepare the pilot plant system staging area, which could increase the likelihood of impact to tree-harboring nests or special status bat species. As part of the project, native trees will be planted to revegetate the mine waste areas (mining units) and infiltration trenches, resulting in no net loss of trees or conversion of oak woodlands. Therefore, with implementation of mitigation measure Bio-3, this impact will be less than significant with mitigation incorporated.

Wildlife

Twenty-three special-status wildlife species were identified by the CNDDDB. Thirteen of these species are not likely to occur on the project site because of a lack of suitable habitat. The only anticipated disturbance to wildlife would occur during the construction phase of the project. During the survey, one special-status bird species, Lewis's woodpecker, was observed flying overhead. This bird is currently on a watch list, but it is not a federally or state-listed species. Other than this species, no other special-status species were observed flying, foraging, or nesting on the proposed project site. However, the Migratory Bird Treaty Act (MBTA), administered by the USFWS, establishes seasons for hunting and permitted actions for the protection of all migratory birds. Project proponents of actions that have potential to negatively affect migratory birds, their nests, or their eggs are required to enter into a Memorandum of Understanding with USFWS to ensure that impacts to migratory birds are minimized and that suitable habitats are restored and/or enhanced where possible and practicable. Fish and Game Codes sections 3511, 3503, 3513 protect birds of prey and nests or eggs of any bird. Therefore, preconstruction wildlife surveys will be completed to minimize the potential for special-status wildlife or nests to be disturbed during construction. Therefore, with implementation of mitigation measures Bio-1, Bio-4 and Bio-5, this impact will be less than significant with mitigation incorporated.

Special-status bat species that especially roost in mines or caves include the Townsend's big-eared bat (*Corynorhinus townsendii*) and the pallid bat (*Antrozous pallidus*). Both of these species occurred on the CNDDDB search and have been observed within 5 miles of the project site. These species are very sensitive to disturbance of their roosting sites. However, no special-status bats were observed during the initial bat survey in the fall of 2012; although eight species of bats were documented. The project site has openings (adits) to mine shafts. These mines may serve as roost sites for special-status bat species. Visual surveys of adits did not find evidence of regular or long-term use of the adits (e.g. no guano deposition); however, it is

possible that maternity colonies could be established in some of the adits during the spring. Adits 1a, 3, and 5 likely provide roost habitat for a small number of bats. The fall survey recommended that spring surveys of the adits be conducted during March to mid-May to determine bat use patterns prior to spring or summer construction. Because the survey was conducted during the fall, information on the spring/summer use of the adits by bats for maternity roosts, migration stop-over sites or other requirements (e.g. night roosts) was not obtained. If any of the adits are being used by bats for spring roosts, it is important to know which species occur there and adit use (e.g. maternity roost, night roost only etc.) to determine the relative level of disturbance sensitivity those species are prone to and what avoidance/minimization measures are needed, if any. However, the lack of strong evidence for long-term (i.e. multi-year) bat use of any of the adits (West Ecosystems, 2012) suggests low seasonal use, if any. The design of the bat gates may require knowledge of the flight pathways and behaviors of the bats at the entrances of each occupied adit and also the existing microclimates of those adits to avoid creating obstructions or degrading extant habitat conditions. Also, tree cavities should be surveyed prior to tree removal to avoid disturbance to any bats that may have established roosts during the interim from the current survey.

The project construction will include placing bat-friendly gates at the Corona Boiler House and Twin Peaks (Adit 3) portal openings to prevent humans from having access to the mines. A preconstruction bat survey will be conducted at these adits. In addition, prior to removing any tree, a qualified biologist will ensure that there are no nests or bats in the tree. Therefore, with implementation of mitigation measures Bio-1, Bio-2, and Bio-4, this impact will be less than significant with mitigation incorporated.

Elderberry bushes were observed on site and may serve as host plants for the special-status species valley elderberry longhorn beetle. Host plants were not located in areas where vegetation removal is necessary. All elderberry bushes where traffic, construction, or people may encounter them will be barricaded with construction fencing to ensure no elderberry longhorn beetles are taken or disturbed. According to USFWS, complete avoidance (i.e., no adverse effects) may be assumed when a 100-foot (or wider) buffer is established and maintained around elderberry plants containing stems measuring 1.0 inch or greater in diameter at ground level. Firebreaks may not be included in the buffer zone. In buffer areas, construction-related disturbance should be minimized, and any damaged area should be promptly restored following construction. The USFWS must be consulted before any disturbances within the buffer area are considered. In addition, the USFWS must be provided with a map identifying the avoidance area and written details describing avoidance measures. Therefore, with implementation of mitigation measure Bio-8, this impact will be less than significant with mitigation incorporated.

Sensitive habitat within the project area includes riparian habitat in the lower portion of the Corona Mine along a drainage area (see Figure 3). This area had well established riparian vegetation (willow, *Salix* spp.), including alder (*Alnus rhombifolia*) and rush (*Juncus* sp.). Napa County Floodplain Management Regulations (Napa County Code Chapter 16.04) seek to preserve riparian vegetation in order to preserve fish and game and reduce siltation. Since these riparian areas flow directly into the creek, activities that promote erosion such as removing trees and grading should be avoided in these areas. Therefore, with implementation of mitigation measure Bio-7, this impact will be less than significant.

An NPDES general stormwater permit for construction will be approved by Napa County prior to beginning construction. The permit requires a SWPPP that includes BMPs to ensure erosion and sediment do not enter adjacent creeks (see further discussion and mitigation in Hydrology Section). Therefore, with implementation of mitigation measures Bio-6 and Bio-7 this impact will be less than significant.

c. A potential jurisdictional wetland (approximately 15 feet in diameter) was found on the project site (see location on Figure 3). Soil surface cracks which are primary indicators of wetland hydrology were observed. Plants associated with wetlands such as Rabbit's foot (*Polypogon monspeliensis*) and Pond knotweed (*Polygonum polygaloides confertiflorum*) were found in the ponding area. This area is not pristine for wetland species because it appears to have been formed by a mine waste berm. This area will be avoided and no construction or soil disturbance will take place within any wetland on the project site. Therefore, with implementation of mitigation measures Bio-1, Bio-6, and Bio-7, this impact will be less than significant.

d. Construction may interfere with resident wildlife corridors. Scat of deer, coyote, and bear were seen during biological surveys along game trails. Construction activities may temporarily exclude these wildlife species from using their own trails; however, after construction has been completed, these species would likely return to using them. New fencing will be installed along the perimeter of the Ore Processing Area at the Corona Mine. The fencing will act as a deterrent or warning for people for safety and hazards due to potential mercury in the sediment or dust. The fencing will only be about 150 feet long and this distance would have no impact on wildlife movement; they would be expected to easily move around it, and this impact will be less than significant.

Kidd Creek and Bateman Creek are outside the project area, ephemeral, and do not contain fish species. Project activities would not interfere with native fish species because physical barriers in James Creek prevent fish from accessing both creeks at the project site. Therefore, no impact to fish species will occur.

e. The project will not conflict with any local policy or ordinance protecting biological resources or any Napa County tree preservation policy or ordinance. Following construction, the forest disturbed in the vicinity of any construction areas will regenerate through natural recruitment. This project will result in no loss of woodlands since only individual trees would be removed. As part of the project, trees will be planted to revegetate the disturbed mine waste areas and along the two infiltration trenches. This project will adhere to these Napa County policies and regulations, including the Conservation Regulations (Napa County Code Chapter 18) and the Floodplain Management Regulations (Napa County Code Chapter 16). Therefore, with implementation of mitigation measure Bio-3, this impact will be less than significant with mitigation incorporated.

f. There are no Habitat Conservation Plans, Natural Community Conservation Plans, or other approved local, regional, or state Habitat Conservation Plans applicable to the subject project. The project will conform to the Napa County Conservation Regulations to protect stream setbacks, protect lands from soil loss, and maintain and improve water quality. Impacts will be less than significant.

Mitigation Measure(s):

Bio-1: Preconstruction wildlife and rare plant surveys shall be conducted by a qualified biologist. Bloom periods of Pappose tarplant (*Centromadia parryi parryi*), Geysers dichantherium (*Panicum acuminatum var. thermal*), Kentwood Marsh checkerbloom (*Sidalcea oregano valida*), Napa bluecurls (*Trichostema ruygtii*), Marsh checkerbloom (*Sidalcea oregano hydrophila*), and Socrates mine-jewel flower (*Streptanthus brachiatus brachiatus*) occur after May. These plants' bloom periods were missed during the original May 2012 survey and follow-up April 2013 survey (Appendix B). It is recommended a rare plant survey be conducted during Summer/Fall 2013 for these species.

The preconstruction surveys for wildlife shall be conducted no more than 14 days prior to vegetation removal and ground disturbing activities are to commence. A qualified biologist (biological monitor) shall be present onsite as needed to inspect construction-related activities to ensure that neither unnecessary ground disturbance nor any take of special-status species occurs. In the event that nesting birds are found, the property owner shall consult with CDFW and obtain approval for specific nest-protection buffers based on species.

In the event that a special-status plant is found, construction alignments shall be moved to avoid the special-status plant. The qualified biologist shall have the authority to stop work if there will be impacts to sensitive resources or protected special-status species.

Bio-2: Preconstruction bat surveys shall be conducted by a qualified biologist at the Corona Boiler House and Twin Peaks # 3 adits and at nearby tree cavities prior to the construction of adit gates. The microclimates of the adit interiors should be monitored at bat-active adits before construction/gate installation to assess changes, if any, which could occur with construction and gate installation, potentially affecting bat use. This information should be used in the design of the gates and management of potentially adverse habitat modifications, if any, during construction. Based on the survey, construction near the impacted areas shall be scheduled to avoid disturbance of bat colonies, as required to protect the species. Adit gates shall be bat-friendly, to allow bats to enter and exit freely.

Bio-3: In the event any mature tree must be removed, replacement trees shall be replaced with similar native tree species at a 2:1 ratio or greater, resulting in no net loss of trees on site. Replacement trees used shall be less than 4 inches diameter.

Bio-4: All trees to be removed shall be inspected by a qualified biologist for birds nest or roosting bats. If construction activities occur during the bird nesting season (estimated to be January through August), pre-construction surveys for the presence of special-status bird species or any nesting bird species within 300 feet of proposed construction areas shall be conducted by a qualified biologist. This survey shall be conducted within 14 days prior to the initiation of construction activities during the breeding season (raptors – February through August). During this survey, the biologist shall inspect all trees and grassland immediately adjacent to the impact area for nests. If active nests are found, a minimum 150 foot no-disturbance buffer shall be created around active nests and a minimum of 300 foot no-disturbance buffer shall be created around active nest of raptors. These buffers shall remain until a qualified biologist has determined that all young have fledged. Buffer zones may be modified in coordination with CDFW based on existing conditions at the project site.

Bio-5: If vegetation will be removed by the proposed project and all necessary approvals have been obtained, substrate (e.g., trees and shrubs) containing nests shall be removed between November 1 and February 28 to ensure that active (containing intact eggs, live chicks, or presence of an adult) nests are not destroyed or disturbed as a result of project construction activities.

Bio-6: No pesticides or herbicides shall be used within 250 feet of riparian or wetland areas, including the area described as a potential wetland at the Corona Mine.

Bio-7: All sensitive areas and areas with potential populations of rare plants shall be clearly marked and flagged prior to construction to avoid disturbance to these areas. These areas include the riparian area and potential wetland at the Corona Mine. Major construction shall be performed in the dry season (approximately April 15 through October 15) if possible to reduce the likelihood of erosion in sensitive areas. All work in riparian areas and near streambeds shall comply with the grading plan, SWPPP, and BMPs to avoid impacts from erosion.

Bio-8: Prior to the initiation of construction activities, all elderberry bushes located within 100 feet of potential disturbance areas shall be identified and barricades shall be installed at the 100 foot buffer line.

If encroachment into the 100 foot buffer zone is deemed necessary by Tuleyome, they shall submit an elderberry location and protection plan to the USFWS for their review and approval. In areas where encroachment into the 100-foot buffer has been approved by the USFWS, a minimum setback of at least 20 feet from the drip line of each elderberry plant shall be established. Contractors shall be informed of the Federal requirement to avoid damaging elderberry plants and the penalties for not complying with said requirements. Signs shall be placed every 50 feet along the edge of the avoidance area prior to the intonation of any construction or grading work including, at a minimum, the following information, in both English and Spanish translation:

"This area is habitat of the valley elderberry longhorn beetle, a threatened species, and shall not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment."

Signs must be clearly legible from a distance of 20 feet, and maintained for the duration of construction.

V. CULTURAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant	No Impact
a) Cause a substantial adverse change in the significance of a historical resource defined in CEQA Guidelines §15064.5?	☐	☒	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines §15064.5?	☐	☒	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geological feature?	☐	☒	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

Discussion: A cultural resources investigation of the Corona and Twin Peaks mine sites and associated historic resources in the James Creek watershed was conducted by John W Parker and Cheyanne Parker, of Archeological Research. A copy of the report is provided in Attachment C. Dr. Parker holds a Ph.D. in Archaeology and is a Registered Professional Archaeologist. Field work took place between May 18 and May 30, 2012. The investigation included a review of published and unpublished historical documents, maps, photographs, and field inspection of about 53 acres. This work discovered six historic sites (containing at least 37 definable features), one combination historic/prehistoric site, and one isolated prehistoric feature. Six of the cultural resources appear to be significant as defined under CEQA. Four of these sites are within the immediate project area (Parker, 2012). The historic and prehistoric sites include lithic scatter, residences, ore processing features, cabins, and Oat Hill Mine Road.

Environmental Setting

The project area consists of steep rugged terrain along the north slope of Mt. St. Helena in the Mayacamas Mountains. Soils within the project area are a mix of those derived from the volcanic bedrock making up much of Mt. St. Helena and the Palisades and those derived from the serpentine bedrock that makes up much of the Franciscan Formation in the area. These soils support a mixed coniferous/hardwood forest with patches of chaparral and occasional meadows. Springs are evident throughout the area. Historically, the project area was used for

hunting and mining. The latter included extensive logging of timber in the immediate watershed for use in the mines and ore processing.

Prehistoric Cultural Setting: Prior to European arrival, the project area was within the Central Wappo tribal territory. The Wappo territory encompassed the northern Napa River drainage to a point just south of Glass Mountain and also included the upper reaches of the Pope Creek drainage east of Mt. St. Helena (Barrett 1908, Sawyer 1978). Native American use of the region dates back to between 14,000 and 20,000 years ago (Parker 2008). Though the origins of the Wappo are unknown, it is likely that people were using the Napa Valley resources during this time period. Wappo villages were predominantly located along major streams and rivers. Though the mountain location of the project area would not have been suitable for a permanent village, it was certainly used for resource procurement involving both plant gathering and hunting. It is possible that the project area may also have been used by nearby Lake Miwok and Patwin tribal groups for casual hunting and resource gathering.

Historic Cultural Setting: The first recorded European use of the project area appears to have been in the 1850s. The Government Land Office Plat Map prepared between 1857 and 1867 shows two trails through the area and two "cabin" locations. By 1861, mining claims were being filed in the project vicinity.

Oat Hill Mine Road: In 1893, Oat Hill Mine Road was completed through the area connecting Napa and Lake counties. The road was the only free wagon route connecting Napa and Lake counties over Mt. St. Helena from 1893 to 1924. It provided an essential connection between the railhead in Calistoga and the mercury mining areas north of Mt. St. Helena (Stanton, 2010).

Corona Mine: In 1895, James McCauley and the Vallejo Quicksilver Mining Company opened the Corona Mine and operated it until 1906 (Bradley, 1918:81; Davey, 1895; Williams, 1895). Though he never worked the mine again, McCauley owned the Corona Mine until his death in 1943. He leased out the claim to various individuals and companies who worked the mine in 1911, 1916, and between 1939-44 (Gould, 1929). It appears that Don Emerson obtained the mine from the McCauley estate. Under Emerson's ownership, Hugh Ingle, Jr. leased and operated the mine from 1957 to 1972 (Swent, 2000). The Corona Claim was purchased by John Livermore in 1995 (Parker, 2012). The Corona Mine has one of the longest mining histories in the region and witnessed many changes in cinnabar mining and mercury extraction practices. These changes left their mark on the ground, from the stone and brick Scott Furnace built in 1901, to the tube and "D" retorts, to the Gould and Cottrell rotary furnaces of the 1930s and 1940s. The Corona Mine has the distinction of still containing examples of most of the mercury mining and processing innovations that took place over a 70-year period. In addition to mining and ore processing features, the Corona Mine site also contains residential features that span the 70-year period of mine use. Most of these features appear to be intact and contain significant amounts of cultural material useful in reconstructing the lifestyles of both the mine managers and workers.

Twin Peaks Mine: Though claims in the area were filed in the 1860s, the Twin Peaks Mine was not opened until 1904. The mine was worked for 2 years by W.H. and E.L. Herrick but shut down when the pocket of ore was depleted (Livermore, 2012). The mine was sold to B.A. and A.A. Wilson and L.D. Fay in 1915 and by 1917 had produced 275 flasks of mercury (Bradley, 1918:91). Twin Peaks final period of operation was in 1942 when a 60-ton rotary furnace was installed before it was discovered that no new ore was available. The owners sub-leased the nearby Corona Claim and trucked Corona Mine ore to the Twin Peaks furnace. They produced \$46,000 in mercury before stopping operations in 1943 (Ingle, nd.).

Findings

CEQA relies on the California Register of Historic Resources to determine what is a “Unique” or “Significant” historical resource. According to the California Register, a resource is determined “significant” if it meets one of the following criteria:

- A. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- B. Is associated with the lives of persons important in our past;
- C. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic value; or
- D. Has yielded, or may be likely to yield, information important in history or prehistory.

The cultural resources fieldwork discovered six historic sites (containing at least 37 definable features), one combination historic/prehistoric site, and one isolated prehistoric features. Six of the cultural resources appear to be significant as defined under CEQA. Four of these sites are within the immediate project area. Table 3 lists the sites and their level of significance based on the criteria listed above.

Table 3 Archaeological Resources and Significance for Corona and Twin Peaks Mine Project

Resource	Significance Determination	California Register Criteria Used	Land Use Planning Recommendation
P-28-1654 Manhattan Flat Prehistoric and Historic Site	significant	D	avoidance
P-28-1657 Isolated Bedrock Mortar	not significant	n/a	n/a
P-28-1534 Corona Mine Processing and Residential Site	significant	A, B, C, D	avoidance
P-28-1656 Twin Peaks Mine Processing and Residential Site	likely significant	A, D	avoidance
P-28-1658 Oat Hill Mine Road	significant	A, C	avoidance
P-28-695 Joe Hooker's Cabin Site	significant	A, D	avoidance
P-28-1655 West Corona Mine Site	undetermined	n/a	n/a
P-28-1653 Wooten Cabin Site	likely significant	A, D	avoidance

Answers to Checklist Questions:

a. Eight archaeological resources were identified during the survey. Four of the historic resources are within or immediately adjacent to the project area (P-28-1534, 1654, 1656, 1658). All four of these sites have been determined "significant" or "likely significant" based on the criteria listed in the Public Resources Code section 5024.1 (see Cal. Code Regs., tit. 14, § 4852.) (Parker 2012). To lessen the potential for impacts to these significant historic resources, a qualified archaeologist would be retained to review and comment on proposed designs of ground disturbance activities. The goal of this review will be to avoid impacts to historic resource locations as called for in Public Resources Code section 21083.2(b)(1).

To assist in avoidance and avoid accidental impacts, those resources located immediately adjacent to project activities would be protected from those activities by temporary fencing. In areas where avoidance of significant historic resources is not possible, a qualified archaeologist would be retained to conduct data recovery and analysis on those portions of the resources that would be damaged prior to project construction as outlined in Public Resources Code section 15126.4(c).

There is always the possibility that potentially significant unidentified prehistoric, historic, or paleontological materials could be encountered below the surface during project construction. Therefore, as a precaution, a qualified archaeologist will be retained to monitor any ground-disturbing activities when they occur, and be given the authority to redirect those activities to other locations in the event that significant artifacts or features are encountered which require scientific mapping and recovery.

Therefore, with implementation of mitigation measures Cul-1, Cul-2, Cul-3, this impact will be less than significant with mitigation incorporated.

b. One prehistoric archaeological site (P-28-1654) has been recorded adjacent to the project area and may be affected by project activities. This site has been listed as "significant" based on the criteria listed in Public Resources Code section 5024.1 (see Cal. Code Regs., tit. 14, § 4852.).

To mitigate potential impacts the measures listed in item (a) above will be applied to this resource. Therefore, with implementation of mitigation measures Cul-1, Cul-2, Cul-3, this impact will be less than significant with mitigation incorporated.

c. Based on the survey, no unique paleontological or geological features were identified within or near the project area. However, in the event paleontological resources are discovered during project construction, work would be suspended and the applicable agencies immediately notified. Therefore, with implementation of mitigation measures Cul-1, Cul-2, Cul-3, this impact is considered less than significant with mitigation incorporated.

d. No human remains are known to exist within or near the project area. If human remains are encountered, all work in the immediate vicinity of the discovery would be suspended and procedures outlined in the Health and Safety Code section 7050.5 and Public Resources Code sections 5097.98 and 5097.99 would be followed. Work within the area encompassed by the human remains would not resume until all actions required by the Health and Safety Code and Public Resources Code have been completed to the satisfaction of the Napa County Planning Division. Therefore, with implementation of mitigation measure Cul-4, this impact will be less than significant with mitigation incorporated.

Mitigation Measures

Cul-1: Resources located immediately adjacent to project activities shall be protected from disturbance by temporary plastic fencing and a qualified archaeologist shall be retained as needed to monitor and advise during ground disturbing activities within culturally sensitive areas, and be given the authority to redirect those activities to other locations in the event that significant artifacts or features are encountered which require scientific mapping and recovery. In areas where avoidance of significant historic resources may not be possible, a qualified archaeologist shall be retained to conduct data recovery and analysis on those portions of the resources that will be damaged prior to project construction.

Cul-2: If any paleontological or cultural resources, such as buildings, structures, or objects over 50 years old (excluding buildings that have been previously evaluated as ineligible for the National or California Register), including human remains, are encountered during any project

development activities, work shall be suspended and other applicable agencies will be immediately notified. At that time, the County and Tuleyome shall coordinate any necessary investigations of the site with appropriate specialists, as needed.

Cul-3: When Native American archaeological, ethnographic, or spiritual resources are involved, all identification and treatment shall be conducted by qualified archaeologists who meet Federal standards, as stated in the Code of Federal Regulations (36 C.F.R. § 61) and appurtenances (i.e., pursuant to the National Historic Preservation Act, Senate Bill 18), and Native American representatives who are approved by the local Native American community as keepers of their cultural traditions. In the event that no such Native American is available, persons who represent tribal governments and/or organizations in the locale in which resources could be affected shall be consulted.

Cul-4: Pursuant to Public Resources Code section 5097.98 and Health and Safety Code section 7050.5, if human remains or bones of unknown origin are found during construction, all work shall stop in the vicinity of the find and the Napa County Coroner will be contacted immediately. If the remains are determined to be Native American, the coroner shall notify the Native American Heritage Commission who will notify the person believed to be the most likely descendant. The most likely descendant will work with the contractor to develop a program for re-interment of the human remains and any associated artifacts. No additional work shall take place within the immediate vicinity of the find until the identified appropriate actions have been implemented. If the Coroner determines that the remains are not related to a crime scene, then a qualified archaeologist who meets Federal standards (36 C.F.R. § 61) shall be retained to assess the find and make further recommendations.

VI. GEOLOGY AND SOILS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant	No Impact
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
iv) Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1997), creating substantial risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

Discussion: The project is located within the Coast Range geomorphic province of California. The Coast Ranges formed within a seismically active region at the western margin of North America. Active faults in the region include the Hunting Creek-Berryessa fault about 7 miles east of the project, the West Napa fault about 10 miles southeast of the project, and the Green Valley Fault about 12 miles southeast of the project. Figure 5 provides a geologic map for the project site. Figure 6 provides a map of the soil types for the project area. The project is located

at the contact of Franciscan Complex sandstone in close proximity to Great Valley serpentinite (USGS, 2007). Other geologic units present near the project are Sonoma Volcanic rocks to the southwest, and Great Valley sandstone to the southeast. The Franciscan Complex sandstone and Great Valley serpentinite are interpreted to be emplaced over Great Valley Sandstone southeast of the project by a thrust fault. The contacts between serpentinite and sandstone, and serpentinite and Sonoma Volcanic rocks are interpreted to be high angle faults (USGS, 2007). These faults are not identified as active (Napa County, 2007).

The site is at an elevation of about 1,900 feet and the topography is relatively steep. Dwyer and others (1976) identified two probable landslides west of the Corona Mine area; these features are shown on Figure 7.

Answers to Checklist Questions:

a i: California Geological Survey Special Publication 42, 2007 Interim Revision, shows that the project is not located within an Alquist-Priolo fault zone (California Geological Survey, 2007). The Draft EIR for the Napa County General Plan (2007), in Figure 4.10-2, shows normal and thrust faults mapped near the project site; however, these faults are not considered to be active (Napa County, 2007). The United States Geological Survey (USGS) shows these faults located at the contacts of serpentinite with other rock units, and are likely related to emplacement of the rock units in the geologic past (USGS, 2007). Therefore, no impact will occur.

a ii: Seismic ground shaking is the result of the interaction of seismic forces with the underlying rock and soil at a particular location, and the proximity of the location to the earthquake. The peak ground shaking anticipated to be experienced at the project area due to movement along active faults in the region is acceleration from 0.318 to 0.365 of gravity (California Geological Survey, 2012). This is moderate ground acceleration and has a 10 percent probability of being exceeded within a 50-year period. Therefore, the impact will be less than significant.

a iii: Project soils are generally well drained and granular, thus liquefaction is not believed to be a significant threat to the project. Much of the project area is on steep slopes underlain by bedrock. Project features do not include structures that would be occupied and are similar to existing features at the site that have not failed for more than 10 years. Thus impacts from seismic induced ground failure are anticipated to be negligible. Therefore, no impact will occur.

a iv: Landslides are known or suspected to be present near the project (USGS, 1976). Landslides are believed to have developed on slopes that were clear-cut more than 100 years ago. Since this time, the slopes have become reforested rendering them much less likely to fail due to the stabilizing effects of plant roots. The existing infiltration trenches at upper Corona Mine area are constructed on steep slopes and have not induced landslides. The soil properties at the site are not consistent with being prone to liquefaction, lateral spreading, or subsidence.

Therefore, this impact is considered less than significant.

b: Grading will be conducted under a Napa County grading permit. Soil erosion will be addressed by a SWPPP as discussed in the Hydrology section. The project construction would improve vegetation on currently unvegetated project areas, such as mine waste piles, and this is expected to reduce soil erosion in the future. Therefore, this impact will be less than significant.

c: Project construction will include upgrading the infiltration system piping and trenches at the Boiler House Portal and Twin Peaks Portal, re-grading and vegetation planting at the Corona and Twin Peaks mine waste areas, and installing a borehole and operating the pilot plant system. These types of activities are not expected to cause landslides. The existing infiltration trenches are located on steep slopes at the upper Corona Mine area that have been

receiving infiltration for more than 10 years, without causing landslides or other failures. Therefore, this impact is considered less than significant.

d: The linear extensibility of site soils is reportedly less than 3 percent indicating a low shrink-swell potential (NRCS, 2012). Site soils are not expansive. Therefore, no impact will occur.

e: The project will not require use of or installation of septic tanks. Therefore, no impact will occur.

Mitigation Measures: No mitigation measures will be necessary.

VII. GREENHOUSE GAS EMISSIONS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant	No Impact
a) Generate a net increase in greenhouse gas emissions in excess of applicable thresholds adopted by the Bay Area Air Quality Management District or the California Air Resources Board which may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with a county-adopted climate action plan or another applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☒

Discussion: Scientists have concluded that climate change (“global warming”) is a regional as well as global concern that is likely caused, in large part, by human activity. Human influences have:

- very likely contributed to sea level rise during the latter half of the 20th century;
- likely contributed to changes in wind patterns, affecting extra-tropical storm tracks and temperature patterns;
- likely increased temperatures of extreme hot nights, cold nights and cold days; and
- more likely than not increased risk of heat waves, areas affected by drought since the 1970s and frequency of heavy precipitation events. (IPCC, 2007)

GHG emissions, primarily CO₂, from cars, power plants, and other human activities, are believed to be the primary cause of contemporary global warming, due largely to the combustion of fossil fuels. Atmospheric concentrations of CO₂, the principal GHG, are elevated. Nitrous oxide (N₂O) and free methane (CH₄) are also believed to be contributors in small amounts.

CEQA requires that lead agencies consider the reasonably foreseeable adverse environmental effects of projects they are considering for approval. GHGs have the potential to adversely affect the environment because such emissions contribute, on a cumulative basis, to global climate change. In turn, global climate change has the potential to result in rising sea levels, which can inundate low-lying areas; reduce snowpack, leading to less overall water storage in the Sierra Nevada; affect rainfall, leading to changes in water supply, increased frequency and severity of droughts, and increased wildfire risk; and affect habitat and agricultural land, leading to adverse effects on biological and agricultural resources.

Cumulative impacts are the collective impacts of one or more past, present, and future projects that, when combined, result in adverse changes to the environment. When the adverse change is substantial and the project’s contribution to the impact is considerable, the cumulative impact would be significant. The cumulative project list for this issue (global climate change) comprises anthropogenic (i.e., human-made) GHG emission sources across the entire planet. No project alone would contribute to a noticeable incremental change to the global climate. However,

California Assembly Bill (AB) 32 and executive order S-3-05 have established a statewide context for GHG emissions, and an enforceable statewide cap on GHG emissions. Given the nature of environmental consequences from GHGs and global climate change, CEQA requires that the cumulative impacts of GHGs, even additions that are relatively small on a global basis, need to be considered.

Currently there are no formally adopted quantitative CEQA thresholds of significance to address project-related GHGs. In 2008, the Office of the California Attorney General issued “The California Environmental Quality Act—Addressing Global Warming Impacts at the Local Agency Level” (Office of California Attorney General, 2008). This document provides information that may be helpful to local agencies in carrying out their duties under CEQA as they relate to global warming. The suggested mitigation measures consist of a wide variety of methods, practices, and products to reduce thermal and electric energy use and thus reduce activities that contribute to the formation of GHG. A discussion of GHG studies and regulations follows.

Federal Framework

The EPA is focusing on large stationary sources and transportation to reduce GHG emissions. The EPA prepared a national GHG inventory report, which presents estimates of US GHG emissions and sinks for the years 1990 through 2009 (EPA, 2009). This report discusses the methods and data used to calculate the emission estimates. The purpose of the inventory is to track the national trend in emissions and removals since 1990. The national GHG inventory was submitted to the United Nations in accordance with the Framework Convention on Climate Change. On March 10, 2009, in response to the Consolidated Appropriations Act of 2008 (House of Representatives 2764; Public Law 110–161), EPA proposed a rule (EPA Docket ID. No. EPA-HQ-OAR-2008-0508, 40 C.F.R. §§ 86, 87, 89, et al.), which requires mandatory reporting of GHG emissions from large sources in the United States. The proposed rule would collect accurate and comprehensive emissions data to inform future policy decisions.

On April 17, 2009, the EPA began the process of creating a comprehensive regulatory program aimed at climate change by releasing a proposed finding that GHGs in the atmosphere endanger public health and welfare. The EPA also proposed a finding that GHG emissions from new motor vehicles are contributing to these atmospheric GHG levels.

State Framework

The California Global Warming Solutions Act of 2006 (AB 32) recognizes the serious threat to the “economic well-being, public health, natural resources, and the environment of California” resulting from global warming. To counter such effects, AB 32 requires the State to reduce its carbon emissions by approximately 25 percent by the year 2020.

The Sustainable Communities and Climate Protection Act of 2008 (Sustainable Communities, SB 375, Steinberg, Statutes of 2008) enhances California's ability to reach its AB 32 goals by promoting good planning with the goal of more sustainable communities. SB 375 requires CARB to develop regional GHG emission reduction targets to be achieved from the automobile and light truck sectors for 2020 and 2035.

AB 32 also requires adopting a regulation that establishes a system of market-based declining annual aggregate emission limits for sources or categories of sources that emit greenhouse gas emissions, applicable from January 1, 2012, to December 31, 2020. (Health & Saf. Code, §38562(c).) In 2011, California ARB adopted the cap-and-trade regulation. The cap-and-trade program covers major sources of GHG emissions in the State such as refineries, power plants, industrial facilities, and transportation fuels. This program only applies to major sources of GHG emissions and would not be relevant to the proposed project.

Local Framework

As discussed in the Air Quality section, BAAQMD is the public agency entrusted with regulating stationary sources of air pollution in the nine counties that surround San Francisco Bay: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, southwestern Solano, and southern Sonoma counties. BAAQMD regulates air pollution from stationary sources through rules, regulations, and permits.

The BAAQMD's CEQA Guidelines were developed to assist local jurisdictions and lead agencies in complying with the requirements of CEQA regarding potentially adverse impacts to air quality. As discussed in the Air Quality section, on September 15, 2010, the BAAQMD's Board of Directors adopted the final Bay Area 2010 Clean Air Plan (BAAQMD CIAP) (BAAQMD, 2010), and certified the Final Environmental Impact Report on the BAAQMD CIAP. However, on March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the Thresholds. In view of the court's order, BAAQMD is no longer recommending that the GHG Thresholds be used as a generally applicable measure of a project's significant air quality impacts. Lead agencies will need to determine appropriate GHG thresholds of significance based on substantial evidence in the record.

Napa County has proposed a Climate Action Plan (Napa CAP) (Napa County, 2012b). The Napa CAP describes the latest (2005) GHG emissions and forecasted emissions for 2020, and identifies the feasible measures that Napa County intends to implement to reduce emissions by 2020 to 15 percent below the 2005 levels. By seeking to reduce emissions to 15 percent below 2005 levels by 2020, the Napa CAP addresses the commitment in the Napa County General Plan (General Plan) that is similar to the State goals in AB 32. The Napa CAP proposes county-level and project-level measures: county measures include six local energy efficiency measures, four water efficiency measures, three waste measures, two renewable energy measures, and fourteen transportation measures.

Napa County requires a checklist to calculate a project's business-as-usual (BAU) emissions, the benefits of the Napa CAP, and additional emissions avoided through project-level action. All projects would be required to follow the County's procedures for GHG emissions documentation and measure selection in order to secure project approval. Thirty eight percent (38%) of all project emissions must be avoided through any suite of actions above and beyond those already included in the Napa CAP (Napa County, 2012).

Answers to Checklist Questions:

a. To determine whether the project would generate a net increase in GHG emissions in excess of applicable thresholds adopted by the BAAQMD or the California ARB, the GHG emissions from construction and operation of the project have been analyzed.

Construction Impacts

Short-term exhaust emissions will be generated by construction equipment. Based on a detailed schedule of equipment and planned usage during the 2013-2014 construction schedule, a detailed calculation of estimated GHG emissions was performed (see Attachment A). The calculation considered the entire fleet of construction equipment (dozers, backhoes, excavators, loaders, drill rig, and welder) and on-road vehicles (pickups and diesel trucks) that would be used intermittently during the construction phases. Total estimated CO₂ emissions are 35.3 tons (32.1 metric tons, or MTCO₂) for all construction phases. This value is also assumed to be equal to the value of CO₂ equivalent (CO₂e) emissions, as nitrous oxide and free methane are only present in very small amounts.

Construction GHG emissions were quantified using emission factors for diesel construction equipment from ARB's OFFROAD2007 software database and EPA (2009) for on-road gasoline and diesel vehicles. Detailed calculations are presented in Attachment A.

As discussed, neither BAAQMD nor any other governmental agency has established a mass emission significance threshold for construction or operational GHGs, but these emissions are of concern and will be under greater scrutiny in the future. However, in the interim, and based on their analysis of available data, ARB staff believe that the 7,000 MTCO₂e/year benchmark may be a suitable significance threshold for GHG emissions during operations (CARB, 2008). Construction GHG emissions for the proposed project (approximately 32.1 MTCO₂e) are well below this proposed threshold; therefore, this impact is considered less than significant.

Operational Impacts

Project operation will not produce emissions. Very limited volumes of vehicle exhaust GHGs would be generated operationally. Emissions would primarily result from routine maintenance activities. Impacts will be less than significant.

b. The project will not conflict with any of the four energy and climate control measures contained in the BAAQMD CIAP, adopted for the purpose of reducing the emissions of GHGs, or the Napa CAP. The Napa CAP includes a form to calculate project GHGs, "Checklist of Project - Green House Gas Emissions & Emission Reductions." This form has been provided in Attachment A. Based on the requirements and calculations, possible mitigation to fulfill the requirements of the Napa CAP (2012) (assuming the Napa CAP is formally adopted by the County) of reducing GHG emissions by 38 percent of BAU (construction emissions) would include purchasing GHG offsets equal to $32.1 \text{ MTCO}_2\text{e} \times 0.38 = 12.2 \text{ MTCO}_2\text{e}$. Because this project will comply with Napa County's CAP, should it be adopted, it will not conflict with any adopted local climate plan.

Mitigation Measures: No mitigation measures will be necessary.

VIII. HAZARDS AND HAZARDOUS MATERIALS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☒	☐	☐
b) Create a significant hazard to the public or the environment through reasonable foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☒	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
h) Expose people or structures to a significant risk of loss, injury or death involving wild-land fires, including where wild-lands are	☐	☒	☐	☐

adjacent to urbanized areas or where residences are intermixed with wild-lands?

Discussion: The project is located within an unincorporated mountainous area of Napa County and is part of the West Mayacmas Mercury Mining District. Mercury was mined from this region for use in gold mining in the Sierra Nevada. The Knoxville (Napa and Lake Counties) and the Abbott-Turkey Run (Lake County) mines are among the most well-known but there are over 80 abandoned mercury mines in the Putah and Cache Creek watersheds, some of which were among the largest producers in the state. This mining legacy contributes to the State's listing as impaired of James Creek (nickel and mercury), Lake Berryessa (mercury), and lower Putah Creek (mercury and boron). James Creek has been identified as prime trout habitat. A fish consumption advisory is posted for Lake Berryessa and for lower Putah Creek because of mercury contamination. Lower Putah Creek is a Wild Trout stream and drains into the Yolo Bypass, a nationally recognized fish rearing, wildlife habitat, farming, and flood control area with some of the highest mercury concentrations in the Sacramento-San Joaquin and San Francisco estuary (Bay-Delta).

Historically, the mercury mines in this project area were in operation intermittently over a one hundred year period, run by various companies and private owners. This created a site that contains multiple forms of mining technologies preserved on-site due to the remote nature of the area. The project site contains both physical hazards, from mine artifacts and features, and chemical hazards present in the site soil, mine waste, mine drainage, and surface water. On-going research is being conducted to characterize the mine waste, soil, mine drainage, and surface water at the site in accordance with requirements in Title 27 of the California Code of Regulations. These media are being sampled and analyzed for metals, methylmercury, and other parameters to evaluate risks to human and ecological receptors, complete remediation plans to address mine drainage, prepare a removal action memorandum, and design, build, and operate mine drainage treatment systems, as well as improving existing systems. Chemical characteristics of soil that will be evaluated include metals content, metals mobility, acid generating potential, organic carbon content, and cation exchange capacity. Surface water in upstream and downstream locations of Kidd Creek, Bateman Creek, and James Creek, as well as within the adits and infiltration trenches will be collected and analyzed for metals and other constituents. Surface water will be evaluated for potential water quality threats relying on physical site attributes including slope, vegetation, soil characteristics, distance to receiving water, and receiving water beneficial uses. Evaluating water quality threats also requires information regarding chemistry of soil and water, for both site-affected and background conditions (that were not affected by the site).

Former Mining Artifacts and Features

Within the project area there are many historical mining artifacts including a large rotary furnace, footings, scattered home sites, and various other dilapidated structures. A large furnace (Scott Furnace) used in the early 1900s along with a rotary furnace and condensers used to extract mercury are located at the Upper Corona Mine site and likely contain elevated concentrations of mercury in soil from losses during ore processing (USGS, 2007). This area will be closed to the public using fencing and gates. Based on recent air sampling conducted at selected locations at the site and inside the large furnace, the air outside these structures does not contain mercury vapor at concentrations above the OSHA 8-hour time weighted average threshold (Burleson, 2012c).

At the Corona Mine area there are at least four mining adits that are open. As part of the project, the entrances to the Boiler House portal will be closed using a bat-friendly gate. Above this area, within the upper Corona Mine site, there are two or more additional open adits, one of which is a partially caved-in adit located further west of Oat Hill Mine Road. The second of the

two additional adits is dug into a large excavated pit. Other hazards include protruding mine cart tracks, concrete footings, and many dilapidated structures.

There are five adits at the Twin Peaks mine area. One of the adits is sealed and the other four are open or partially open. The Twin Peaks portal discharges are piped into an infiltration trench. As part of the project, this adit drainage treatment system will be improved. The Twin Peaks portal #3 will be closed using a bat-friendly gate. One of the adits located south of the Twin Peaks portal and concrete footings is tall enough to walk in and may also be covered by a bat-friendly gate, if needed. The other three adits are closed or partially closed and not as readily visible.

Mine Waste and Soil

Currently, mine waste, in the presence of waste rock and calcined tailings, is located at both Corona and Twin Peaks Mine sites. This waste contains metals, sulfur, and sulfide minerals. In-situ, or subsurface rock, is rock within mines that has been fractured and drained, providing pathways for water and oxygen to circulate. This leads to chemical reactions that can mobilize metals (Burleson, 2012b). Areas of concern include mine waste at several locations (see figures 3 and 4), which contain high concentrations of mercury and other metals (typically 400 to 1200 parts per million [ppm]) (USGS, 2007). As part of the project, the mine waste (mining units) will be characterized in accordance with Water Code section 13260(k) and classified in accordance with Section 22480(b) of Title 27 of the California Code of Regulations and revegetated, which will prevent potential exposure to the metal-contaminated tailings (USGS 2007).

Soil at the mine sites can be affected by elemental mercury that was spilled or sublimated during production, contributing to secondary source introductions into the environment, including volatilization if quantities are sufficient. This condition has been encountered in the vicinity of retorts and tailings at other inactive mercury mines (Burleson, 2012b). Sediments in creeks and the infiltration systems could contain mine waste. Plants growing in sediments can transfer waste to humans and animals through ingestion. Wind can distribute and deposit dust borne metals on plant surfaces, soil, and surface water (Burleson, 2012b).

Secondary sources of hazards from mine waste include mine drainage, surface water, groundwater, soil, and sediment. Mine drainage from in-situ rock is formed by the oxidization of sulfur and sulfide minerals that contain salts and metals. Drainage flows from the Corona Drain Tunnel Portal into Kidd Creek. Surface runoff may entrain metals and minerals from mine waste, draining into Kidd and Bateman creeks.

Groundwater, Surface Water, and Mine Drainage

Groundwater drainage could collect site-related contaminants, and there are spring-fed water sources on site.

The Corona Mine drains to Kidd Creek and the Twin Peaks Mine drains to Bateman Creek. Both drain into James Creek, which is a tributary to Lake Berryessa, and originates at the confluence of these creeks. Lake Berryessa is a source of drinking water and recreation activities for the area (Burleson, 2012b). The Corona Drain Tunnel Portal, sometimes called the Lower Corona Mine adit, currently drains water from the Upper Corona Mine to the surface and into Kidd Creek. This water contains nickel and iron at elevated concentrations. The Boiler House adit drains surface water with iron and nickel. This water is currently piped to an infiltration trench that allows sediment and metals to filter out before reaching Kidd Creek. This system will be improved as part of the proposed project. Drainage from the Twin Peaks Mine adit is piped from the Twin Peaks portal to an existing infiltration trench, which will also be improved as part of the proposed project. These two infiltration treatment systems were originally intended to be temporary and are in need of improvement. Surface water will be accessible to visitors and as

part of the project, fences, and gates will be placed across selected dirt roads that traverse the site, restricting public access to project and former mining features.

Currently, mercury, nickel, and iron in the soil, mine waste, and in-situ rock potentially contribute to hazards that may be released from infiltration, surface water runoff, erosion, and aerial suspension. Erosion of mine waste, surface water runoff, and adit drainage contributed to Bateman and Kidd Creeks' elevated concentrations of mercury in sediment and biota.

Answers to Checklist Questions:

a.- b. The Corona and Twin Peaks mines contain physical and chemical site safety hazards. Former mine features, such as open adits and ore processing equipment and machinery, could pose physical safety hazards to workers or visitors who have access to the site from Oat Hill Mine Road. Entrances to two adits (Corona Boiler House and Twin Peaks #3) closest to roads will be closed off with bat-friendly gates as part of the project. Other site hazards include protruding mine cart tracks, concrete footings, and old dilapidated structures. Fences will be placed around some of the structures and ore processing mine features to restrict or limit visitor access. Fencing will act as a deterrent or warning for people for safety and hazards due to potential mercury in the sediment or dust. With implementation of mitigation measure Haz-1, impacts will be less than significant with mitigation measures incorporated.

The Corona Drain Tunnel Portal currently drains water from the Corona Mine to the surface and into Kidd Creek. Corona Drain Tunnel Portal discharge is partially oxidized acid drainage and contains elevated iron and nickel concentrations (see Hydrology section). Under current baseline conditions, the only source of water to lower Kidd Creek during the dry season is Corona Drain Tunnel Portal discharge. Pools below the Corona Drain Tunnel Portal are coated with orange iron oxide and iron sulphate precipitates that form as the mine drainage oxidizes and acidifies. Under current baseline conditions, the acidic water and mineral precipitates at the Corona Drain Tunnel Portal can negatively affect aquatic organisms and may create a nuisance to downstream property owners. The remoteness of the Corona Drain Tunnel Portal and steep terrain make this area not readily accessible from the road for potential visitors.

As a component of the Remediation Plan (Attachment E), the pilot plant system will be operated to determine if chemicals could be introduced into the drainage source(s) below Corona Mine to neutralize the water and generate hydrogen sulfide, which would precipitate heavy metals inside of the tunnel (see Exhibit 1, schematic of the borehole and Corona Mine) to improve the water quality of the discharge from the Corona Drain Tunnel Portal. The pilot plant system, if successful, will improve the water quality from the existing baseline conditions at the Corona Drain Tunnel Portal. Substantial intermediate improvement of water quality could be attained through the pilot activities via armoring of some reactive sites within the source area for the drainage. Substantial long term improvement of water quality could be then attained via longer term implementation of the technique. The duration of water quality improvements expected from the subsurface chemical pilot scale dosing is uncertain without the quantitative results from the tracer study.

Work will include drilling a borehole about 200 feet deep into the Corona Drain Tunnel (see borehole location on Figure 3). All site workers will be instructed on the proper procedures for safely working around a drill rig, including wearing the proper personal protective equipment in accordance with the site-specific health and safety plan.

Potential benefits of the pilot plant system include: (1) decreasing the volume of drainage from the Corona Drain Tunnel due to accumulation of precipitates in the subsurface environment, and (2) coating the reactive metal sources in the tunnel with precipitates, thereby interfering with the chemical reactions that mobilize the metals in the first place. Metal bearing precipitates are

anticipated to remain within the fractures and foliation through which groundwater currently migrates. The goal of the pilot study is not so much to precipitate metals, but instead to prevent metal mobilization via amending the subsurface chemical environment.

The project will include the transportation and use of Tide 2X laundry detergent, sodium hydroxide, and ethanol. A Hazardous Materials Business Plan (HMBP) will be submitted to Napa County Division of Environmental Health, who will verify the information and provide it to agencies responsible for the protection of public health and safety and the environment. All chemicals will be transported to the site in accordance with Department of Transportation regulations. Workers will be instructed on the safe handling of chemicals and all work will be conducted in accordance with the Site Specific Health and Safety Plan (SSHSP).

During the tracer study, the mine drainage at the Corona Drain Tunnel Portal will be tested for the presence of the brightener ingredient in Tide 2X. The amount of Tide 2X that will be added to the borehole in the mine will be the lowest concentration confirming detection of the brightener ingredient at the Drain Tunnel Portal, and in a dose considered non-toxic to the environment. According to the Material Safety Data Sheet (MSDS) for Tide 2X, “based on ecotoxicity and fate data for the individual ingredients in these mixtures, and for related consumer household cleaning product formulations, it is expected that these mixtures would exhibit a non-hazardous order of toxicity at relevant environmental concentrations.” The tracer study results, besides confirming connectivity between the mine and drain tunnel, would be used to select the most effective chemicals for the pilot plant system, and estimate the lowest chemical dosing rates to achieve results. Drain tunnel water will be monitored for mine drainage and dosing chemicals (sodium hydroxide and ethanol) to document that water quality is not adversely impacted. This will include testing the mine drainage for pH, alkalinity, metals, sulfate, oxidation/reduction potential, and organics. If the pH in the drain tunnel drainage increases above 7.5, the addition of sodium hydroxide would be interrupted until the pH begins to decrease. This is intended to avoid exceeding a pH of 8.5 in the drainage. Therefore, with implementation of mitigation measures Haz-2, Haz-3, and Haz-5, this impact will be less than significant with mitigation measures incorporated.

The Boiler House and Twin Peaks portals discharge water with elevated concentrations of nickel and iron into existing infiltration trenches that will be improved by the project. As mitigation for incidental contact by visitors, fences and signs will be strategically placed around some of the structures and ore processing mine features, and gates at the roads to limit or restrict visitor access to the trenches and other features. Therefore, with implementation of mitigation measure Haz-1, this impact will be less than significant with mitigation measures incorporated.

Elevated concentrations of metals are present in the water and soil within the project area. Hazards to workers and visitors on site come primarily from mine waste. Mine waste, in the presence of waste rock and tailings, is located at both Corona and Twin Peaks mine sites. Mine waste contains various amounts of metals, sulfur, and sulfide minerals posing a risk of ingestion and absorption through the skin. The soil at these locations contains elevated concentrations of mercury and will be closed to the public using fences and gates on the roads (mitigation measure Haz-1). Potential visitors and workers could be affected through direct contact and incidental ingestion. As mitigation (Haz-2), workers will read and comply with the SSHSP that includes discussion of site hazards and required personal protective equipment (Burleson, 2012b). As part of the project, the mine waste (mining units) will be revegetated (Mitigation Haz-4), which will prevent potential exposure to the metal-contaminated tailings. Therefore, with implementation of mitigation measures Haz-1, Haz-2, and Haz-4, this impact will be less than significant with mitigation measures incorporated.

Sediments in creeks and the infiltration treatment systems could contain elevated metals concentrations from mine drainage. Plants growing in sediments can transfer contaminants into humans and animals through ingestion. Wind could also present a hazard through inhalation of dust from mine waste or by depositing dust borne metals on plant surfaces, soil, and surface water. To limit and restrict site access to the mine features and infiltration trenches, fences will be placed around some of the ore processing mine features and gates placed across the roads. With implementation of mitigation measure Haz-1, this impact will be less than significant with mitigation measures incorporated.

The remoteness of the project site and steep terrain pose a hazard to construction workers who will have poor access to emergency services in case of accidents. The potential for accidents is due to the nature of the work site, age of existing structures, open adits, and working around a drill rig. Workers will read and comply with the site health and safety work plan that includes discussion of site hazards and required personal protective equipment, (Burleson, 2012b). With implementation of mitigation measure Haz-2, this impact will be less than significant with mitigation measures incorporated.

The current system and proposed improvements include piping and infiltration of mine drainage that would not require any transportation, routine use, or disposal of hazardous materials to or from the project site. However, the pilot plant system will use chemicals and require transportation of Tide 2X laundry detergent, liquid sodium hydroxide, and ethanol. If successful, ongoing subsurface treatment of the mine drainage would require permanent storage of chemicals onsite. Therefore, a HMBP will be prepared and submitted to Napa County Environmental Health Division, who will verify the information and provide it to any agencies responsible for the protection of public health and safety and the environment. All chemicals will be transported to the site in accordance with Department of Transportation regulations. Therefore, with implementation of mitigation measures Haz-3 and Haz-5, this impact will be less than significant with mitigation measures incorporated.

Heavy machinery and equipment operating on-site during construction will require gasoline or diesel fuel. Fueling will be conducted on-site from a mobile tanker truck or a stationary tank with a containment box underneath, depending on project requirements. Therefore, with implementation of mitigation measure Haz-3, this impact will be less than significant with mitigation measures incorporated.

c. There are no schools within one quarter mile of the project site. The nearest school is Pope Valley Elementary school approximately 4 miles southeast of the project area. Therefore, no impact will occur.

d. The project is not located on a site pursuant to Government Code section 65962 (Cortese list) that would result in a significant hazard to the public or environment (EDR, 2012). However, the site is considered an orphan mine site and contains hazardous substances. In 2007, the EPA established guidelines for orphan mine cleanup by Good Samaritans (EPA, 2007). Under the Good Samaritan Initiative, parties who are not past or current owners or operators of the mine would not be liable for cleanup and can voluntarily agree to clean up an orphan mine site that is not listed or proposed for listing on the National Priorities List. Based on this activity, under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 1079d) (1), such parties are not potentially responsible parties. This project meets the criteria, and cleanup will be conducted under the Good Samaritan protection. Once implemented, the project will further reduce the risks of release of hazardous substances to the environment. Therefore, no impact will occur.

e.-f. The project is not located within an airport land use plan or within 2 miles of an airport, be it public or private. The nearest airport is the Angwin-Parrot general aviation public use

airport which is approximately 8 miles southeast of the project area. There are no safety hazards from the project being located within close proximity to an airport. No impact will occur.

g. The project site is located on private property in an unincorporated area of Napa County. A SSHDP has been prepared with emergency contact information and location of the nearest emergency services. The project will not impair implementation or interfere with any emergency response or evacuation plan. Therefore, this impact is less than significant.

h. The project site is within an area that Cal Fire considers as a High Risk area for forest fires (Cal Fire, 2007). The remote nature of the project site further increases the potential for injury or loss of life due to forest fire. The usage of heavy equipment and tools are potential causes of fire, putting both visitors and the natural environment at increased risk of human-induced wildfires. Construction work will be supervised and performed by the existing site caretaker using one or two additional staff persons. A SSHSP has been prepared and all workers will be trained on the procedures in the plan (mitigation measure Haz-2). In addition, an HMBP (mitigation measure Haz-5) will be prepared and submitted to Napa County Environmental Health Division. On-site water tanks will be used during project construction and could be utilized in the event of a fire. With implementation of mitigation measures Haz-2 and Haz-5, the risk of injury from wildfires will be less than significant with mitigation incorporated.

Mitigation Measures:

Haz-1: Fences and gates shall be strategically placed around the ore processing area and some of the adits, structures, and mine features to restrict access. Two adits shall be gated using bat-friendly gates to restrict visitor access for safety purposes.

Haz-2: All workers and visitors to the site shall be provided a copy of the Occupational Safety and Health Administration (OSHA) standard SSHSP, and trained on proper procedures for working at the mining sites, around the mining features and drill rig for borehole drilling, contaminated soils, adits, handling chemicals during the pilot plant system operation, and directions to the nearest hospital, and emergency contact information.

Haz-3: If an accidental release or spill occurs during construction and maintenance of the project, the release shall be cleaned up immediately and reported in accordance with applicable federal, state, and local requirements.

Haz-4: Mine waste at Corona and Twin Peaks mine sites shall be revegetated to reduce risk of exposure to metals-contaminated tailings.

Haz-5: Submit a Hazardous Material Business Plan (HMBP) to Napa County Environmental Health Division. An HMBP will be prepared if hazardous chemicals will be used for the pilot plant system or for long-term treatment equal to or greater than 55 gallons of a liquid, 500 lbs. of a solid, or 200 cubic feet of compressed gas, or extremely hazardous substances above the threshold planning quantity (40 CFR, Part 355, Appendix A) that will include an inventory of hazardous materials, a site map, an emergency plan, and implementing a training program for employees. All chemicals will be transported to the site in accordance with Department of Transportation regulations.

IX. HYDROLOGY AND WATER QUALITY

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant	No Impact
a) Violate any water quality standards or waste discharge requirements?	☐	☒	☐	☐

- | | | | | |
|---|--------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)? | ☐ | ☐ | ☒ | ☐ |
| c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site? | ☐ | ☒ | ☐ | ☐ |
| d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site? | ☐ | ☒ | ☐ | ☐ |
| e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff? | ☐ | ☒ | ☐ | ☐ |
| f) Otherwise substantially degrade water quality? | ☐ | ☐ | ☒ | ☐ |
| g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map? | ☐ | ☐ | ☐ | ☒ |
| h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows? | ☐ | ☐ | ☐ | ☒ |
| i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam? | ☐ | ☐ | ☐ | ☒ |
| j) Inundation by seiche, tsunami, or mudflow? | ☐ | ☐ | ☐ | ☒ |

Discussion: The project site is located upgradient to Kidd Creek and Bateman Creek in the headwaters of James Creek. James Creek is a tributary to Pope Creek which enters Lake Berryessa about 15 miles downstream from the project. Lake Berryessa drains to lower Putah Creek which flows into the Yolo Bypass and the Sacramento-San Joaquin River Delta. James Creek is listed as an impaired water body under California's Clean Water Act (CWA) Section 303(d) Total Maximum Daily Load (TMDL) Program list due to nickel and mercury attributed to discharges from historical mercury mines (Central Valley Water Board, 2012). Kidd Creek is an intermittent stream above the Corona Drain Tunnel Portal. Discharge from the Corona Drain Tunnel Portal is the principal source of water to lower Kidd Creek during the summer dry season. Bateman Creek is an intermittent stream and receives runoff from the Twin Peaks Mine area.

Listing a water body as impaired in California is governed by the Water Quality Control Board's Policy for Developing California's Clean Water Act Section 303(d) Listing Policy. The State and Regional Water Boards assess water quality data for California's waters every two years to determine if they contain pollutants at concentrations that exceed protective water quality criteria and standards. This biennial assessment is required under Section 303(d) of the Federal Clean Water Act. The Central Valley Water Board develops and implements TMDLs to bring waters of the state back into compliance with water quality standards. The State of California's 303(d) list can be found at http://www.waterboards.ca.gov/water_issues/programs/tmdl/.

Kidd Creek flows during the spring but is dry from mid-June through January depending on the quantity of precipitation. The Corona Drain Tunnel Portal discharges directly to Kidd Creek, and is its only water source during the dry season. The Corona Drain Tunnel Portal discharge rate varies with higher flows in spring and lower flows in summer and fall. Flow rates estimated for the Corona Drain Tunnel Portal discharge range from about 35 gallons per minute (gpm) to 150 gpm. Corona Drain Tunnel Portal discharge is partially oxidized acid drainage and contains elevated iron and nickel concentrations (see Table 4). Pools in the creek below the Corona Drain Tunnel Portal are coated with orange iron oxide and iron sulfate precipitates that form as the acid drainage oxidizes and acidifies. The acid water and mineral precipitates can negatively affect aquatic organisms and may create a nuisance to downstream property owners.

Sampling of drainage at the Corona Drain Tunnel by Board staff in 1997 identified iron and nickel in the drainage and Kidd Creek downstream from the tunnel that were elevated above water quality criteria. A 2002 technical report concluded that nickel concentrations downstream from Twin Peaks Mine periodically exceeded the chronic aquatic life water quality criterion (MFG 2002). Results from field investigations completed during 2003 and 2004 by the US Geological Survey, and EnviroGeo during 2007 documented that the Corona and Twin Peaks mines release iron, sulfate, nickel, and mercury to the James Creek watershed (USGS 2007, EnviroGeo 2007). Corona Drain Tunnel discharges about 25 gpm to 60 gpm seasonally with 100 gpm peaks during extreme rain years based on observations since 2003. Corona Drain Tunnel pH varies from about 3 SU to 6 SU and contains iron (62 mg/L to 130 mg/L) and nickel (4.0 mg/L to 5.4 mg/L) above water quality criteria.

Mine wastes that include waste rock and calcined tailings at both of the mine sites are present on steep slopes adjacent to seasonal drainages (surface water runoff occurs only during and immediately after rain events). Metals and salts present in the mine wastes could be mobilized to surface water through erosion and transport downhill, and/or through dissolution of soluble materials and transport in runoff to surface water.

The Boiler House Adit discharges mine drainage at about 5 to 50 gpm. Drainage flow varies seasonally with rainfall and the observed peak flow was 80 gpm based on observations since 2003. Boiler House Adit drainage pH varies from about 4.8 standard units (SU) to 6.8 SU and contains iron (4.7 mg/L to 14 mg/L) and nickel (3.2 mg/L to 3.5 mg/L) above water quality criteria. Boiler House Adit drainage has been effectively controlled by diversion to an infiltration trench since 1998. Monitoring wells are present adjacent to the Boiler House infiltration trench. Groundwater is measured within only three of the wells (MW-3, MW-5, and MW-7) during the winter months despite their close proximity to the infiltration trench. In addition to monitoring wells, the slopes below the infiltration trench are periodically inspected for signs of seepage (aquatic vegetation, vigorous vegetation during the dry season, and wet or moist soil). One seasonal seep has been observed downhill from the Corona infiltration trench. This seep dries up during the annual summer drought. Lack of groundwater in the monitoring wells, and lack of persistent moisture on the slopes below the infiltration trench is herein interpreted as evidence that the acid rock drainage infiltrates to bedrock beneath the infiltration trench.

The Twin Peaks Adit discharges mine drainage at about 2 to 35 gpm. Drainage flow varies seasonally with rainfall and the observed peak flow was 60 gpm based on observations since 2003. Twin Peaks Adit drainage pH varies from about 4 SU to 7 SU and contains iron (0.4 mg/L to 9 mg/L) and nickel (1.2 mg/L to 1.5 mg/L) above water quality criteria.

Table 4 Water Quality at Corona Mine and Kidd Creek (Sampled 8-14-1997)

All values mg/L	T (Total) or D (Dissolved)	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Corona Upper Adit	T	<0.005	<0.002	<0.0005	<0.0005	0.0069	0.12	0.0016	32	<0.001	<0.0002	3.3	<0.002	<0.0005	<0.001	<0.02	0.069
	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Corona Drain Tunnel Portal	T	<0.005	<0.002	<0.0005	<0.0005	0.054	0.18	0.0023	140	<0.001	<0.0002	5.8	<0.002	<0.0005	<0.001	<0.02	0.11
	D	<0.005	<0.002	<0.0005	<0.0005	0.0027	0.17	0.0049	140	<0.001	<0.0002	5.8	<0.002	<0.0005	<0.001	<0.02	0.11
Kidd (sic) Creek 200 feet below Adit	T	<0.005	<0.002	<0.0005	<0.0005	0.02	0.17	0.0033	120	<0.001	<0.0002	5.7	<0.002	<0.0005	<0.001	<0.02	0.11
	D	<0.005	<0.002	<0.0005	<0.0005	0.0027	0.17	0.0036	120	<0.001	<0.0002	5.7	<0.002	<0.0005	<0.001	<0.02	0.11

Source: Water samples were collected by Bill Croyle, Central Valley Regional Water Quality Control Board (Central Valley Water Board), Project Number PCA-453-07. Samples analyzed by CLS laboratory, CLS ID N8901, CLS Job No. 808901. Creek sample location 200 feet below adit is actually on Kidd Creek, which drains into James Creek about 2,000 feet downstream from the adit. Chain of Custody form listed "James Creek 200 feet below adit."

NA = not analyzed

Answers to Checklist Questions:

a. Surface water from the site drains into adjacent Kidd and Bateman creeks, which flow into James Creek. The metals in James Creek (mercury, nickel) continue downstream to Pope Creek, Lake Berryessa (mercury), Lake Solano (mercury), and lower Putah Creek (boron, mercury), each of which are listed as impaired water bodies on the State's 303(d) List for the pollutants noted (Central Valley Water Board, 2012). According to the Central Valley Water Board, mercury and nickel exceedances are caused by historical mining operations. The beneficial use for James Creek is commercial or recreational collection of fish, shellfish, organisms, and warm freshwater habitat. Project construction activities will stabilize mine waste

and contribute to complying with water quality standards by reducing the amount of nickel, mercury, and sediment discharged. Construction activities for intercepting and treating mine drainage in the infiltration trenches at Corona Mine and Twin Peaks Mine are designed to reduce the amount of iron and nickel entering James Creek, thereby contributing to compliance with water quality standards. The pilot plant system, if successful, will improve the water quality above the existing baseline conditions in Kidd Creek. The objectives of the project are to reduce the load of metals to surface waters by stabilizing solid mine wastes and intercepting and treating mine drainages and improving water quality.

During the pilot plant system operation, the Corona Drain Tunnel Portal will continue to discharge drainage waters to Kidd Creek as under existing baseline conditions. The pilot plant system will introduce chemicals into the subsurface mineralized zone within the Corona Mine to infiltrate into the Corona Mine Drain Tunnel. The initial tracer study will be conducted initially to confirm connectivity between the borehole and the drain tunnel and to select the most effective chemicals and dosing rate for the pilot study. In accordance with the Remediation Plan, the drain tunnel will be monitored for mine drainage and dosing chemicals.

The tracer to be used will be detergent that contains a brightener chemical, disodium diaminostilbene disulfonate. This substance is non-toxic and is widely used to assess potential discharges from septic systems and water treatment plants to surface water throughout California. Any tracer released within the Corona Mine will be subject to the following potential fates: 1) capture by groundwater flowing to the Corona Drain Tunnel and discharge to Kidd Creek; 2) retention in the geologic materials that occur between the release point and the Corona Drain Tunnel; and 3) destructive chemical reactions with the minerals present along the flow path from the release point to the Corona Drain Tunnel. If the tracer is not detected in Corona Drain Tunnel drainage, no adverse impact to water quality is anticipated, but pilot operation of the subsurface chemical amendment system will not be performed. If the tracer is detected in Corona Drain Tunnel drainage, no adverse impact to water quality is anticipated, and the resulting information will be used to plan the subsurface chemical amendment pilot operations.

Pilot operations will include the release of chemicals (sodium hydroxide and ethanol) at rates to be determined based on results of the tracer test, and tracer concentrations measured in drainage. These chemicals will be applied at rates estimated to be sufficient to react with minerals in the drainage source area and result in consumption of the chemicals. The application rates will be determined in part based on the results of the tracer test, and in part on the results of bench scale neutralization tests performed as part of earlier treatability studies using Corona drain tunnel discharge. The quantities of chemicals anticipated to be used will be small in relation to the volume of drainage discharged from the Corona Drain Tunnel, and are intended to be consumed in chemical reactions along the flow path from the remediation wells to the Corona Drain Tunnel. Thus, discharge of the chemicals to Kidd Creek at concentrations that would impact water quality will be avoided. Drainage from the Corona Drain Tunnel will be monitored for the applied chemicals, metals, and pH to assess the improvements to water quality due to subsurface chemical amendment. Therefore, the following parameters will be measured in the discharge at the Corona Drain Tunnel Portal: tracer chemical in detergent solution, metals, pH, sulfate, alkalinity, oxidation- reduction potential, and organics (organic lipids or ethanol). If the pH in the drain tunnel drainage increases above 7.5, the addition of sodium hydroxide would be interrupted until the pH begins to decrease. This is intended to avoid exceeding a pH of 8.5 in the drainage. This monitoring data would also be used to confirm that no significant impact to water quality is caused by pilot operations. Metal bearing precipitates are anticipated to remain within the fractures and foliation through which groundwater currently migrates. The goal of the pilot study is not so much to precipitate metals,

but instead to prevent metal mobilization via amending the subsurface chemical environment. Substantial intermediate improvement of water quality could be attained through the pilot activities via armoring of some reactive sites within the source area for the drainage. Substantial long term improvement of water quality could be then attained via longer term implementation of the technique. The duration of water quality improvements expected from the subsurface chemical pilot scale dosing is uncertain without the quantitative results from the tracer study.

The primary chemicals under consideration for use in the pilot plant system are sodium hydroxide for pH neutralization and ethanol to stimulate the growth of sulfate reducing bacteria that generate sulfide. Both increased pH and sulfide generation work to remove the nickel and iron present in Corona Drain Tunnel drainage by precipitating these metals.

The chemical used for the initial tracer study will be Tide 2X detergent that contains a brightener chemical, disodium diaminostilbene disulfonate, which will be released into the borehole and measured in the outfall at the Corona Mine Drain Tunnel Portal. This chemical is detectable using the analytical technique fluorescence spectroscopy (fluorometry). If the tracer chemical is detected in the outfall discharge at the Corona Drain Tunnel Portal within a residence time of about one day, then the addition of an organic lipid, such as ethanol, will be used to stimulate the growth of sulfate-reducing bacteria within the mine. Ideally, if the reducing conditions can be established within the mine, the metals will be precipitated by the sulfate reduction and sulfide precipitation. However, if the tracer test indicates a longer residence time before the tracer chemical is detected in the Corona Drain Tunnel Portal discharge, then this condition would not be considered adequate for sulfate- reducing bacteria and the pH will be reduced using sodium hydroxide. This would then increase the availability of sulfide for precipitation. Even if sulfate-reducing conditions using ethanol cannot be established, the majority of metals (95% plus) would still be precipitated by hydroxide precipitation with the addition of sodium hydroxide.

An Operations, Maintenance, and Monitoring plan (OMMP) will be prepared as a component of the Remediation Plan to ensure the sustainability and effectiveness of the drainage treatment systems (mitigation measure Hyd-1). The OMMP will include schedules and maintenance activities for the drainage treatment systems (adits and infiltration systems) and the pilot plant system, monitoring the success of vegetation growth, and monitoring mercury concentrations in in-stream biota.

Although TMDLs have not been established for the surface water, the project would be expected to improve water quality, and implementing mitigation measure Hyd-1 will measure progress. Therefore, the impact to water quality from construction activities will be less than significant with mitigation incorporated.

b. The project will not result in the development or use of groundwater or interfere with recharge. There are no groundwater wells at the same depth. Shallow groundwater wells are located near the Corona Mine infiltration trench. The Corona Mine is not located within a groundwater basin used to supply drinking water. The Corona Drain Tunnel was constructed to capture groundwater at the Corona Mine and discharge the captured groundwater to Kidd Creek. The Corona Mine is not located within a groundwater basin used to supply drinking water. The Corona Drain Tunnel was constructed to capture groundwater at the Corona Mine and discharge the captured groundwater to Kidd Creek. Therefore, this impact will be less than significant.

c. The project will alter drainage patterns in the vicinity of mine waste piles to reduce the erosion and sediment transported off site. As part of the construction phases, surface water will be diverted around waste piles and from the Corona Mine and Twin Peaks Mine adits into infiltration trenches. These rerouted drainage patterns will be designed to prevent substantial erosion or siltation off site. Prior to any grading in these areas, a grading permit will be obtained

from Napa County, requiring preparation of a SWPPP. The State Water Board also requires preparation of a SWPPP to comply with the California Construction General Permit (mitigation measure Hyd-2).

The project will not alter the existing drainage pattern of the site in a manner that would result in flooding off-site. While drainage patterns will be altered and rerouted around project features, such as waste mine piles (mining units), revegetation of waste piles using native plants and trees will reduce the peak quantity of runoff from the site contributing to flood control and reducing the pollutant load to Kidd Creek, Bateman Creek, and James Creek. An OMMP (mitigation measure Hyd-1) will be developed to ensure that the project's infiltration systems and surface diversions remain in place and are effective. Therefore, this impact will be less than significant with mitigation incorporated.

d. The project will not alter the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. As explained in (c) above, erosion and sedimentation in runoff are the most potential noticeable water quality impacts from construction. Prior to construction and part of the project, an NPDES Stormwater Permit for Construction and SWPPP will be prepared (Mitigation Hyd-2). BMPs will be implemented to prevent release of pollutants, such as sediment, from construction activities along roads, access paths, and waste piles into the nearby creeks and sensitive riparian areas. No construction is planned with a stream or river. Therefore, this impact will be less than significant with mitigation incorporated.

e. The project will not create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. As explained in (c) above, erosion and sedimentation in runoff are the most potential noticeable water quality impacts from construction. Prior to construction and part of the project, an NPDES Stormwater Permit for Construction and SWPPP will be prepared (Mitigation Hyd-2). BMPs will be implemented to prevent release of pollutants, such as sediment, from construction activities along roads, access paths, and waste piles into the nearby creeks and sensitive riparian areas. Therefore, this impact will be less than significant with mitigation incorporated.

f. After construction, the project is expected to improve water quality. No additional impacts to water quality will occur once the project has been completed. Therefore, this impact will be less than significant.

g. - i. The project will not place housing or structures within a 100-year flood hazard area and does not include construction or operation of levees or dams. Therefore, there is no impact from the project that will expose people or structures to significant risks from flooding.

j. The project will not contribute to or be affected by a seiche, tsunami, or mudflow because the site is located inland and not near a large body of water. Therefore, no impact will occur.

Mitigation Measures:

Hyd-1: Develop an operations, maintenance, and monitoring plan. An OMMP shall be prepared as a component of the Remediation Plan to measure the long-term sustainability and effectiveness of the project treatment systems. The OMMP shall include schedules and maintenance activities for the drainage treatment systems (adits and infiltration systems) and pilot plant system, monitoring the success of vegetation growth, and monitoring mercury concentrations in in-stream biota.

Hyd-2: Prepare and Implement a Storm Water Pollution Prevention Plan and Implement Best Management Practices.

Prior to construction and issuance of grading permits, Tuleyome shall obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity from the State Water Board. Tuleyome shall prepare a SWPPP to identify sources of sediment and other pollutants on site and ensure the reduction of such pollutants in storm water discharged from the site during construction. The SWPPP shall identify the BMPs to control erosion, sediment discharge, and protect environmental sensitive areas and water quality.

X. LAND USE AND PLANNING

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant	No Impact
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

Discussion: The site is located in an area designated Agriculture, Watershed, and Open Space in the Napa County General Plan and project parcels are zoned Agricultural Watershed (AW). The AW classification applies to areas where the predominant use is agriculturally oriented, where watershed areas, reservoirs and floodplain tributaries are located, where development would adversely impact on all such uses, and where the protection of agriculture, watersheds, and floodplain tributaries from fire, pollution, and erosion is essential to the general health, safety, and welfare.

Answers to Checklist Questions:

- a. The project will not alter the existing land use and the site will remain open space. The future land use will not divide an established community. Therefore, no impact will occur.
- b. The project will not conflict with the Napa County General Plan, Napa County ordinances, or with other State or local agency regulations with jurisdiction over the project area. There will be no change to the current land use which is open space. Therefore, no impact will occur.
- c. The project will abide by the Napa County Conservation Regulations, preserving stream setbacks and protecting lands from soil loss in order to maintain and improve water quality. Therefore, no impact will occur.

Mitigation Measures: No mitigation measures will be necessary.

XI. MINERAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

Discussion: Historically, the two most valuable mineral commodities in Napa County in economic terms have been mercury and mineral water. Of less importance were asbestos, chromite, clay, gold, magnesite, manganese, and silver. Currently, Napa County mineral production consists of aggregate quarries.

The project contains two historical mercury mines, now inactive. Mercury mining occurred intermittently from the 1860s through the early 1970s. Mercury mining was discontinued because the price of mercury declined.

Answers to Checklist Questions:

a: The project construction and operation will not result in the loss of a known mineral resource. Therefore, there will be no impact.

b: Currently, Napa County mineral production consists of aggregate. This mineral resource is not within the project area and the project will not impact mineral resources. Therefore, there will be no impact.

Mitigation Measures: No mitigation measures will be necessary.

XII. NOISE

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant	No Impact
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels?	☐	☐	☒	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Discussion: The project is located in an undeveloped area. The nearest house is approximately two miles to the northwest. Due to the nature of the undeveloped area and work which is to take place along existing narrow dirt trails and road adjacent to steep heavily forested terrain, equipment to be used will tend to be small, including, but not limited to: 90 HP bulldozer, 85 HP backhoe, 40 HP excavator, 76 HP skid steer, 62 HP loader, 27 HP welder, 40HP trencher, 15 HP compactor, 16 HP hydromulcher, LDT1 standard pick up, and LHD1 line truck. In addition, a

300 HP drill rig will be used to drill the borehole into the Corona Drain Tunnel. A description of equipment operation dates and hours is included in the Air Quality section.

Answers to Checklist Questions:

- a. Currently the most common noises present are sounds made by birds, animals, flowing water in the creeks and off-highway vehicles (especially during hunting seasons). Noise levels from construction equipment will temporarily increase noise levels in the area while in use. As part of normal worker health and safety precautions, construction workers, equipment operators, and monitors will wear hearing protection when near noise-generating construction equipment. Predicted noise levels will not expose persons to noise in excess of standards established in the Napa County Noise Ordinance (Napa County Code § 8.16.080), or the applicable standards of other agencies. The loudest pieces of equipment, such as excavators or drill rigs, are expected to generate a maximum of 85 dBA at 50 ft (U.S. Department of Transportation, Federal Highway Administration, 2006). The nearest sensitive receptor is approximately 2 miles away. Noise levels from construction at this distance, based on the Inverse Square Law of Noise Propagation (sound intensity at a distance from a point source will decrease in proportion to inverse square of the distance from the source), will not exceed 39 dBA, which is no more than the ambient levels at that nearest receptor's residence. Therefore, the impact is considered less than significant.
- b. The construction equipment will generate minor temporary ground-borne vibrations during installation of the borehole, digging, trenching, and installation of bat-friendly gates and fence posts. These construction activities will not expose persons to excessive ground-borne vibration or ground-borne noise levels. Therefore, the impact is considered to be less than significant.
- c. There will be no permanent increases in noise expected from this project. Only equipment used during project construction is expected to generate noise. Following project construction, there will be no noise generated. Therefore, there will be no impact.
- d. Construction activities will produce a temporary increase in noise that will not affect off site receptors. The increase will only be expected during daytime hours. Therefore, the impact is considered to be less than significant.
- e. The nearest airport is the Angwin-Parrot public airport, approximately 8 miles south of the project site and the project is not within any airport land use plan. Therefore, there will be no impact.
- f. There are no private airstrips anywhere in the project vicinity. Therefore, there will be no impact.

Mitigation Measures: No mitigation measures will be necessary.

XIII. POPULATION AND HOUSING

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant	No Impact
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Discussion: The project is located in an unincorporated area in the northern portion of Napa County in wooded areas along a section of Oat Hill Mine Trail. The nearest towns are Middletown to the northwest and Calistoga to the southwest. Napa County has a population of 136,484 and a total of 49,179 households with an average of 2.61 persons per household (US Census, 2010).

Answers to Checklist Questions:

a. Project implementation will not induce substantial growth in the area directly or indirectly. Even though the project allows for future improvement of trails, it will be for private property, limiting its use. The project proposes no new infrastructure such as new homes or businesses. Therefore, no impact will occur.

b. - c. The project will modify and improve existing mine drainage systems and improve site conditions; it will not displace any existing housing. The project site is about 2 miles from the nearest residence. Therefore, no impact will occur.

Mitigation Measures: No mitigation measures will be necessary.

XIV. PUBLIC SERVICES

	Potentially Significant <u>Impact</u>	Less Than Significant With <u>Mitigation</u>	Less Than Significant	<u>No Impact</u>
Would the project:				
a) Substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☒	☐
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

Discussion: The project is located in an unincorporated area of Napa County, northeast of the town of Calistoga. Public facilities within the vicinity of the project area are shown on Figure 8.

Answers to Checklist Questions:

a. The project is located within the Cal Fire State response. The nearest Napa County fire station is the Pope Valley Volunteer Fire Department, at 5875 Pope Valley Road, in Pope Valley. The project site is located in a very high fire hazard severity zone based on the Cal Fire fire hazard severity map (CalFire, 2007). The nearest hospital is located in the town of Saint Helena at 10 Woodland Road. The project will not be expected to alter response times for fire protection. Construction equipment could increase the potential for fire hazards; however, this impact will be expected to be less than significant.

The Napa County Sheriff Department provides police services for the project area. The nearest station is the Napa County Sheriff Regional Office located at 100 Howell Mountain Road in Angwin. The project will not impact these services.

The local school district for the project area is the Pope Valley Elementary School District which feeds into the Napa Valley Unified School District. Pope Valley Union Elementary is located north of the town of Pope Valley. The nearest High School within the Napa Valley Unified School District is in the city of Napa at 2475 Jefferson Street. The project will not impact schools in the area.

The project site is within the Napa County Regional Park and Open Space District. The main office is located at 1195 3rd Street in Napa (see Figure 8). Oat Hill Mine Road traverses the project area and is used occasionally by hunters accessing the existing Hunter's camp located on Oat Hill Mine Road south of the Twin Peaks Mine. Because the project is located in a remote location, it will not adversely affect any public services. The project will potentially benefit the Park District by allowing for future public use of Oat Hill Mine Road. Therefore, no negative impact will occur.

Mitigation Measures: No mitigation measures will be necessary.

XV. RECREATION

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant	No Impact
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☐
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☒	☐

Discussion: The project is located in Napa County on private property; however, this private property is an important part of the Napa County Trail Plan and the Napa County Regional Park and Open Space District Master Plan. The property connects two pieces of Palisades-area public lands and provides the opportunity to connect a trail to Lake County (District, 2009). The two mines are adjacent to Oat Hill Mine Road which is a dirt road that runs north-south and is subject to a Napa County reassertion of public rights of access, most likely for non-motorized trail use. The southern portion of Oat Hill Mine Road has recently been opened by the Park District as a non-motorized recreational trail. The project area lies within the northern portion of Oat Hill Mine Road, which previously has not been re-opened for public due to District concerns about the hazards posed by mines and mine waste. After the mercury mines have been properly secured, the District may in the future pursue public access (District, 2012).

Answers to the Checklist Questions:

a. The project will improve the effectiveness of mine drainage treatment and install safety features at the abandoned mines, thus allowing for potential future safe public access to the northern portion of Oat Hill Mine Road. However, the site is not an existing park. In the future, the Park District would be in charge of constructing and maintaining any additional improvements, such as the road or signage, required for potential future public usage. The nature of those improvements is unknown at this point, putting them outside the scope of this document and, impacts to existing parks and/or recreational facilities will be negligible. Therefore, the impact is less than significant.

b. The project will clean up existing mine drainage, install bat-friendly safety gates at two adits, and fencing around some ore-processing areas, which will allow for potential future safe public access. Oat Hill Mine Road is an existing dirt road and the use as a non-motorized trail will not require any new road construction. Any eventual expansion of the Oat Hill Mine Trail for public access would be subject to the owner and Park District's discretion and also subject to CEQA review at the time it is undertaken. The current project features do not include the expansion of recreational facilities and will not create any adverse effects on the environment. Therefore, the impact is less than significant.

Mitigation Measures: No mitigation measures will be necessary.

XVI. TRANSPORTATION AND TRAFFIC

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant	No Impact
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system and/or conflict with General Plan Policy CIR-16, which seeks to maintain an adequate Level of Service (LOS) at signalized and unsignalized intersections, or reduce the effectiveness of existing transit services or pedestrian/bicycle facilities?	☐	☐	☒	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the Napa County Transportation and Planning Agency for designated roads or highways?	☐	☐	☐	☒
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature, (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☐	☒
f) Conflict with General Plan Policy CIR-23, which requires new uses to meet their anticipated parking demand, but to avoid providing excess parking which could stimulate unnecessary vehicle trips or activity exceeding the site's capacity?	☐	☐	☐	☒
g) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☒

Discussion: Oat Hill Road is a public road in Lake County, but becomes a private road at the Napa County line and remains as such through the project site. The public portion of the road is paved while the private portion is dirt. Access to the project site from the north is either from Livermore Road to Oat Hill Mine Road, or Butts Canyon Road to Oat Hill Road. Public vehicular access is not available from the south, and only accessible by foot or bike from the Oat Hill Mine Trail.

Answers to the Checklist Questions:

a. The project is located on private property with access via a dirt road. Construction will require bringing about 13 pieces of equipment onto the property and then removing them at the end of construction. This will cause a slight temporary increase to the existing traffic load. The intersection of Butts Canyon Road and Oat Hill Road in Lake County is not signalized. This temporary impact to the capacity of the street system will not conflict with the Lake County General Plan Policy T-1.8, Level of Service, which specifies a Level of Service (LOS) of "C" or better for existing traffic and allows LOS "E" when improving the road. The project will also conform to Lake County General Plan Policy T-1.10, Construction methods, for utilizing methods that seek to reduce air, water, and noise pollution associated with road and highway development, and Policy T-1.9, to reduce heavy truck traffic in residential areas and near noise sensitive land uses. The few pieces of equipment will only be brought to and from the property at the beginning and end of construction. Therefore, the impact will be less than significant.

b. Since the project is on private property there will be no conflict with an applicable congestion management program, including, but not limited to LOS standards and travel demand measures, or other standards established by Lake County General Plan Chapter 6 for designated roads or highways. Therefore, no impact will occur.

c. The project is located on property approximately 8 miles from the nearest airport. There will be no change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks. Therefore, no impact will occur.

d. Since the project is on remote private property along existing dirt roads, there will be no increased hazards due to incompatible uses (e.g., farm equipment) with the project construction. However, the portion of Oat Hill Road at the Corona and Twin Peaks mine sites is private and narrow. As part of the project, some minor improvements will be made to the road (slight regrading) to allow safe passage of the construction equipment. The road is used during the hunting season by hunters accessing the hunter's camp. During construction times that may conflict with hunting season, signs and flagging will be placed to alert the occasional visitor to the hunter camp that people are working in the area. Also, no design features (e.g., sharp curves or dangerous intersections) are part of the project. Therefore, no impact will occur.

e. The project is on private property in an unincorporated remote area of the County. The nearest hospital and fire stations are in St. Helena (which requires about a one hour drive). The project features will not physically alter the existing emergency access situation in the vicinity. Therefore, no impact will occur.

f. The project is on private property and does not include construction of additional industrial, commercial, or residential buildings that will cause an increase in parking demand. Therefore, no impact will occur.

g. The project is on remote private property and will not require or conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities. Therefore, no impact will occur.

Mitigation Measure(s): No mitigation measures will be required.

XVII. UTILITIES AND SERVICE SYSTEMS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant	No Impact
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of a new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of a new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☒
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

Discussion: The project site is located on private property in northwestern Napa County southeast of the town of Middletown, and accessible from Lake County's Oat Hill Road (County Road 102). The property is in a natural setting and not in an urbanized area.

Answers to Checklist Questions:

- a. There is no wastewater treatment at the site. The mine drainage treatment systems are in the form of infiltration trenches to direct and infiltrate surface water and mine drainage from the Corona Mine (Boiler House Portal) and Twin Peaks Mine. Infiltration or subsurface chemical treatment of mine drainage will be expected to improve the environment downstream from the site. Therefore, no impact will occur.
- b. Wastewater treatment facilities are not in place at the project site and wastewater treatment facilities will not be a project component. The mine drainage and surface water treatment systems are in the form of infiltration trenches that direct and treat surface water. The pilot plant system will evaluate the effectiveness of subsurface chemical treatment of mine drainage from the Corona Drain Tunnel Portal. Mine drainage infiltration and potential pilot system treatment will be expected to improve the environment downstream from the site. Therefore, no impact will occur.
- c. Project construction includes rerouting existing storm water runoff and flow. Currently, storm water is routed overland through creeks and drainage areas. Storm water will be directed around mine waste areas to improve the water quality reaching adjacent creeks. Therefore, the impact will be less than significant.
- d. Water will be required during grading and construction of the access paths and infiltration trenches, installing fences and gates, drip irrigation for establishing new trees and plants, and during the pilot plant system operation to introduce chemicals at the proper dose. Water is available from a natural spring on site and will be stored in 3 tanks with capacity to hold about 6,500 gallons, more than needed on a weekly basis. Water may also be provided using a water truck. The water use proposed here is very limited both in term and in volume and will be far below the County's Phase 1 fair-share threshold. Therefore, no impact will occur.
- e. Wastewater facilities are not present at the site and therefore the treatment capacity of a treatment provider will not be affected. New or expanded water or wastewater treatment facilities will not be required as a result of project implementation. Therefore, no impact will occur.
- f. The project will generate small amounts of construction trash, such as leftover concrete bags and plastic irrigation pipe. The amount of waste generated will be less than would fit in a commercial dumpster. Most waste materials, such as wood, will be recycled and re-used for fence posts, sign posts, steps, and along the paths, as needed. The small amount of solid waste refuse will be transported to Upper Valley Landfill Disposal and Recycling, in Calistoga. Therefore, no impact will occur.
- g. As discussed in (f), the project will generate small amounts of solid waste refuse that will be transported to Upper Valley Landfill Disposal and Recycling, in Calistoga. The project will comply with federal, state, and local statutes and regulations related to solid waste. Therefore, no impact will occur.

Mitigation Measures: No mitigation measures will be necessary.

XVIII. MANDATORY FINDINGS OF SIGNIFICANCE

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife	☐	☒	☐	☐

species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

- b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)? ☐ ☐ ☒ ☐
- c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly? ☐ ☒ ☐ ☐

Discussion: The Environmental Checklist was completed to assess the potential significance of environmental impacts that could result from the proposed project.

Answers to Checklist Questions:

a. As noted in the checklist for Biological Resources, Cultural Resources, Geology and Soils, and Hydrology and Water Quality, the project could have potential impacts to nesting birds, rare plants, bats, sensitive habitats, and unidentified prehistoric, historic, or paleontological materials that might be encountered. The project goal is to improve habitat and water quality for the area. Mitigation measures have been incorporated into the project that effectively reduces impacts to sensitive resources to less-than-significant levels.

b. All of the potential individual impacts identified will be mitigated to a less-than-significant level. As discussed in the Air Quality checklist, project construction and operation will result in air quality emission rates that are not significant. The project will not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for O3 precursors) because the project will comply with the BAAQMD CIAP. As indicated in the Greenhouse Gas Emissions checklist, the project will not conflict with any of the four energy and climate control measures contained in the BAAQMD CIAP, adopted for the purpose of reducing the emissions of GHGs, and the project will comply with the Napa CAP, should it be adopted. The project does not have impacts that are individually limited but cumulatively considerable. This impact will be less than significant.

c. No environmental effects caused by this project during construction or operation will result in substantial ("significant") adverse effects on human beings, whether directly or indirectly. The proposed project's impacts on the environment included impacts identified as having "no impact," "less-than-significant impact," and "less-than-significant with mitigation incorporated." As noted in the checklist for Hazards and Hazardous Materials, mitigation measures were included for project related impacts to construction workers and visitors for potential exposure to mine waste and mining features and chemicals that reduced the impacts to less-than-significant levels.

Environmental Factors Potentially Affected

The environmental factors checked below would be potentially affected by this project:

☐ Aesthetics	☐ Greenhouse Gas Emissions	☐ Population and Housing
☐ Agriculture and Forestry Resources	☒ Hazards and Hazardous Materials	☐ Public Services
☒ Air Quality	☒ Hydrology and Water Quality	☐ Recreation

☒ Biological Resources	☐ Land Use and Planning	☐ Transportation and Traffic
☒ Cultural Resources	☐ Mineral Resources	☐ Utilities and Service Systems
☐ Geology and Soils	☐ Noise	☐ Mandatory Findings of Significance

On the basis of this initial evaluation:

- ☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
- ☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
- ☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
- ☐ I find that the proposed project MAY have a “potentially significant impact” or “potentially significant unless mitigated” impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must only analyze only the effects that remain to be addressed.
- ☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature
Pamela C. Creedon, Executive Officer

Date

Acronyms

<	less than
APCD	Air Pollution Control District
AEGL	acute exposure guideline levels
AQMD	Air Quality Management District
ARB	California Air Resources Board
AW	Agricultural Watershed
BAAQMD	Bay Area Air Quality Management District
CIAP	BAAQMD Clean Air Plan
BAU	business-as-usual
BMP's	Best Management Practices
CAAQS	California Ambient Air Quality Standards
CAP	Napa Climate Action Plan
CDFW	California Department of Fish and Wildlife
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQA	California Environmental Quality Act
C.F.R.	Code of Federal Regulations
CH ₄	methane
CNDDDB	California Natural Diversity Database
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalents
CWA	Clean Water Act
Central Valley Water Board	Central Valley Regional Water Quality Control Board
dBa	decibels in A-weighted scale
dbh	diameter at breast height
District	Napa County Regional Park and Open Space District
DTSC	Department of Toxic Substances Control Board
EPA	U.S. Environmental Protection Agency
ESA	Napa County Environmentally Sensitive Areas
GHG	greenhouse gas
HMBP	Hazardous Materials Business Plan
hp	horsepower
H.R.	House of Representatives
Lb	pound
LOS	Level of Service
MMRP	Mitigation, Monitoring, and Reporting Program (MMRP)
MTCO ₂ e	metric tons CO ₂ e
N ₂ O	Nitrous oxide
Napa CAP	Napa County Climate Action Plan
NAAQS	National Ambient Air Quality Standards
NHPA	National Historic Preservation Act
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides NO and NO ₂ (nitric oxide and nitrogen dioxide)
NPDES	National Pollutant Discharge Elimination System
O ₃	ozone
OMMP	Operations, maintenance, and monitoring plan
OSHA	Occupational Safety and Health Administration
PM	particulate matter
PM 2.5	PM less than 2.5 microns in diameter
PM 10	PM less than 10 microns in diameter
PPE	personal protective equipment
ppm	parts per million
ROG	Reactive Organic Gases

SB	Senate Bill
SO ₂	sulfur dioxide
SWPPP	Stormwater Pollution Prevention Plan
SSHSP	Site Specific Health and Safety Plan
TMDL	Total Maximum Daily Load
USBR	US Bureau of Reclamation
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service
USGS	United States Geological Survey

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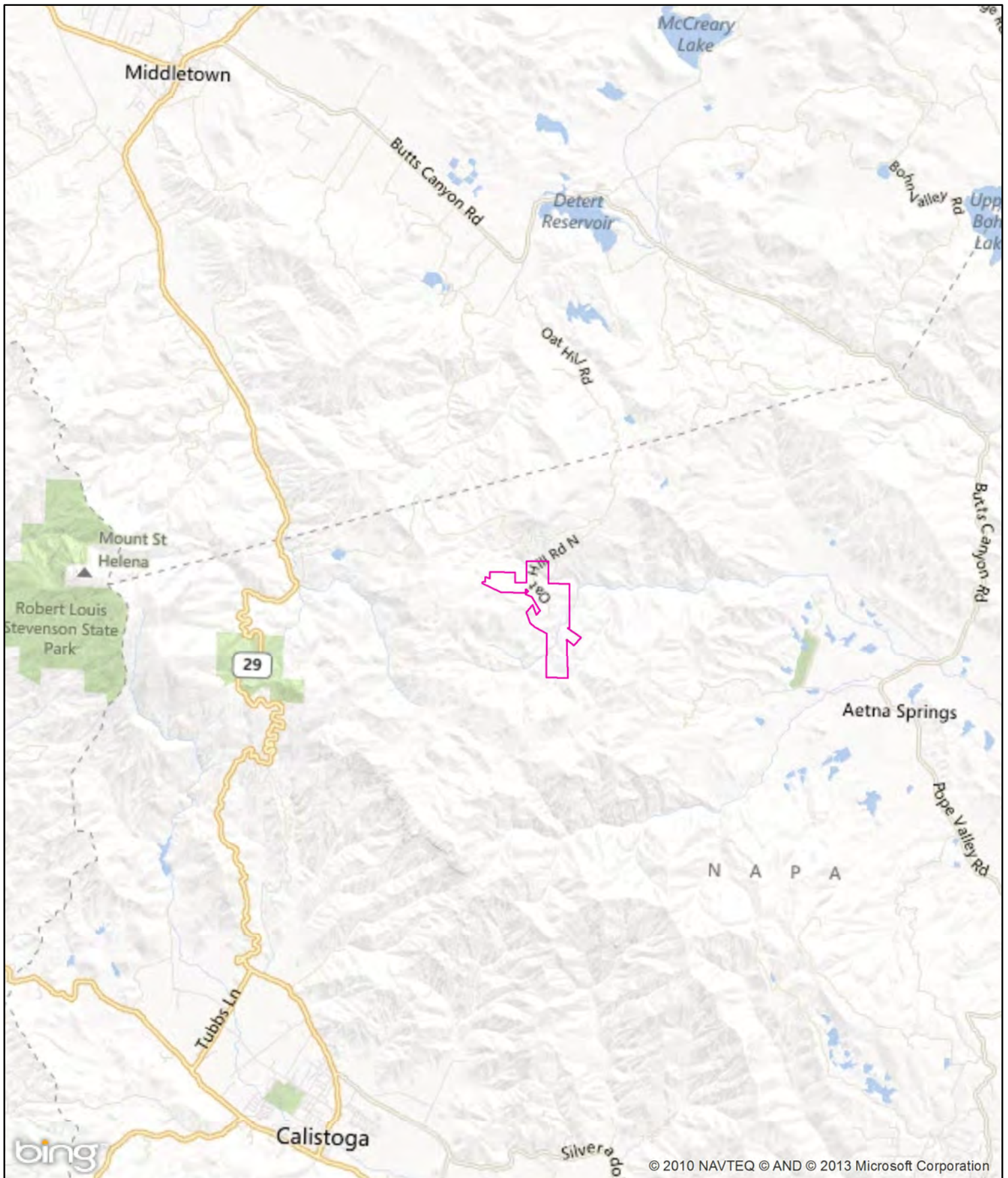
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Legend

 John Livermore Property



0 0.5 1 2
Miles



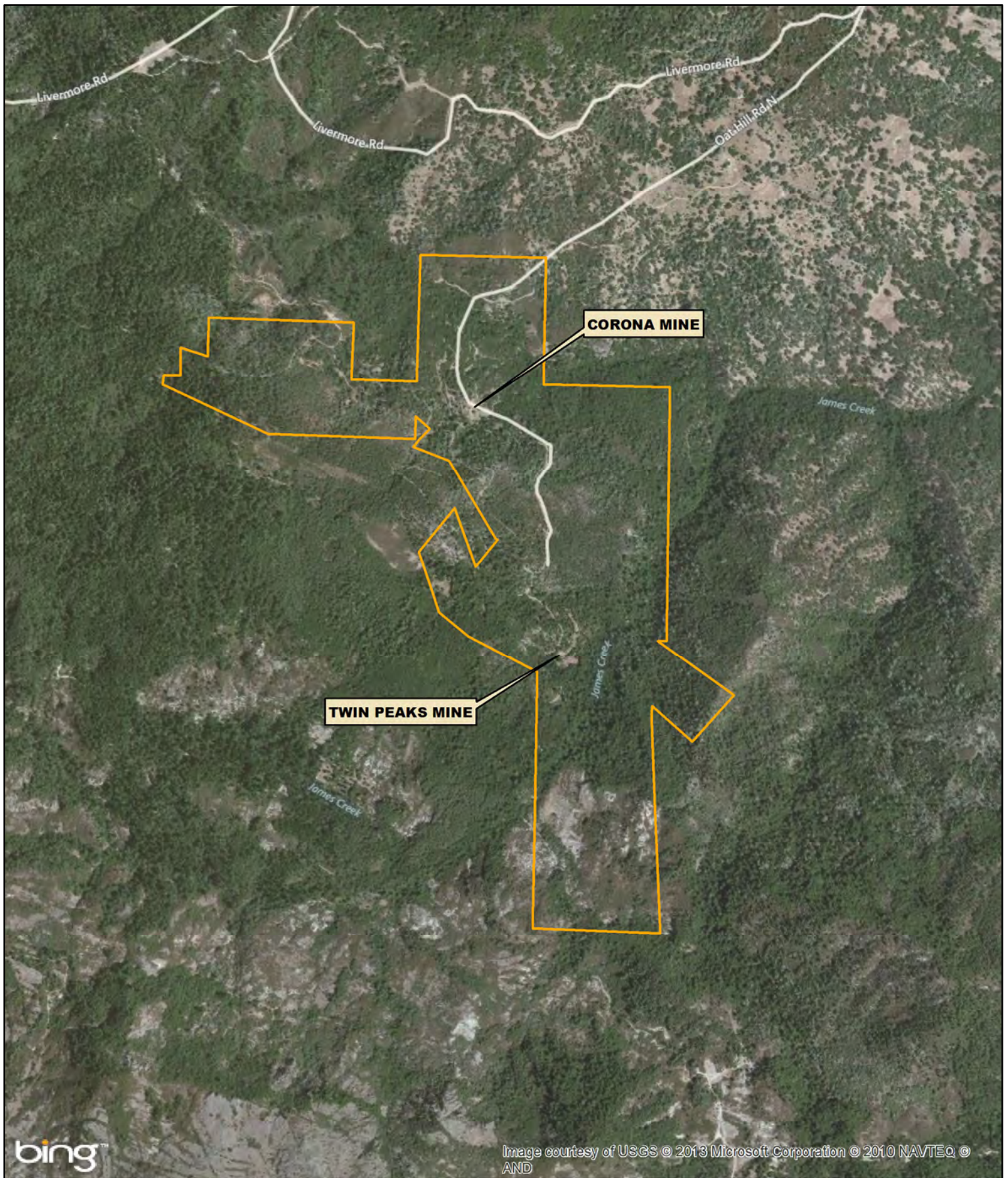
Corona Mine & Twin Peaks Mine

Figure 1 - Site Location

Source: Bing Maps roadways web mapping service;
Napa County GIS Department 2012.



Burleson Consulting, Inc.

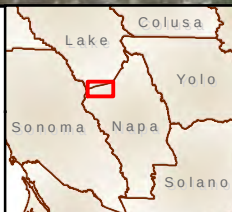


Legend

 John Livermore Property



0 370 740 1,480
Feet



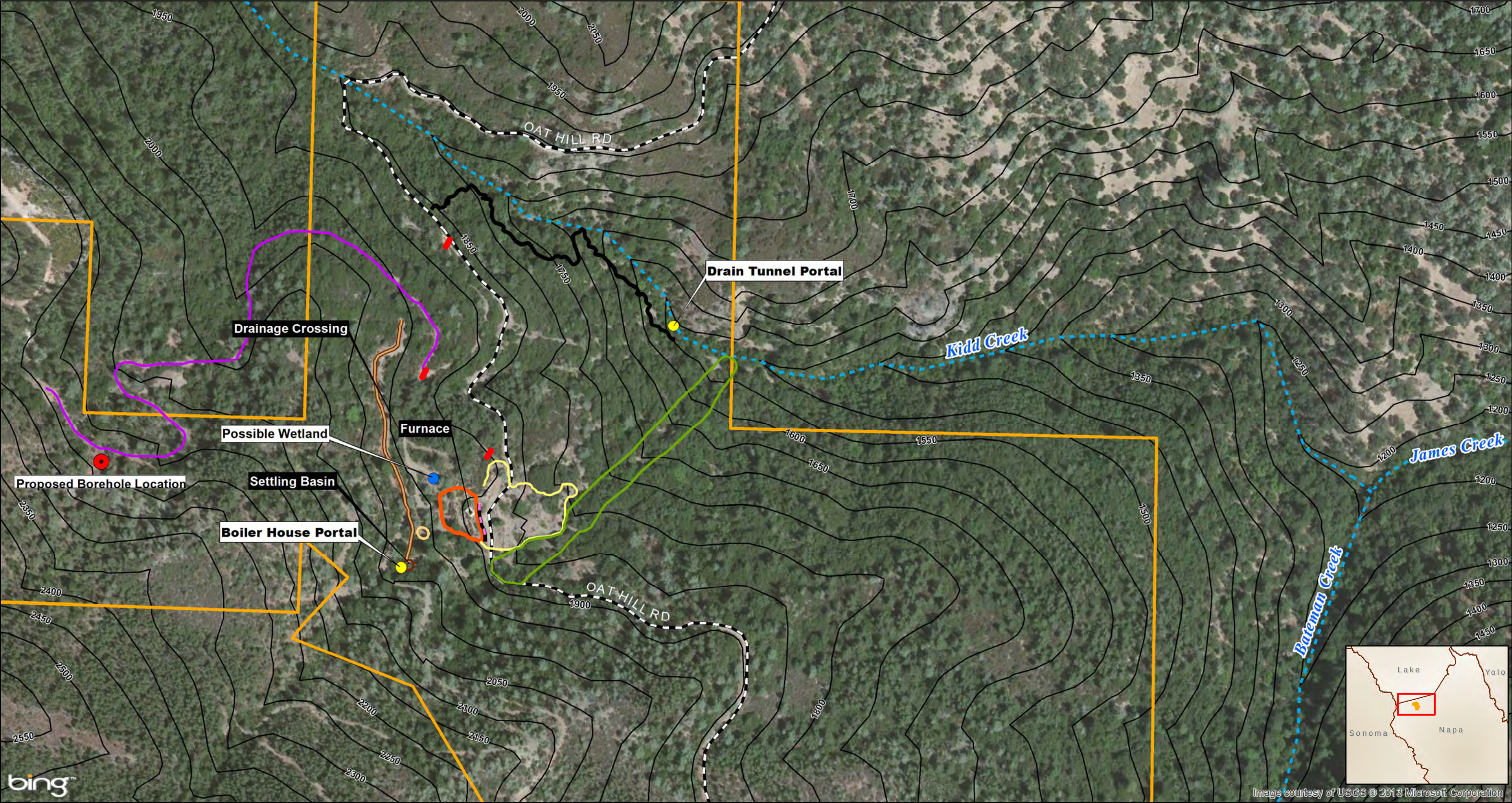
Corona Mine & Twin Peaks Mine

Figure 2 - Vicinity Map

Source: Bing Maps aerial web mapping service;
Napa County GIS Department 2012.



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Legend

- | | | | |
|------------------------------|------------------|---------------|---------------------------------|
| John Livermore Property | Creeks | Riparian Area | Future Spoils Storage |
| Historic Ore Processing Area | Portal | Existing Road | Existing Infiltration Trench |
| 50ft Contour | Possible Wetland | Existing Path | Settling Basin |
| Roads | Future Gate | Future Fence | Approximate Limit of Mine Waste |



0 280 560
Feet

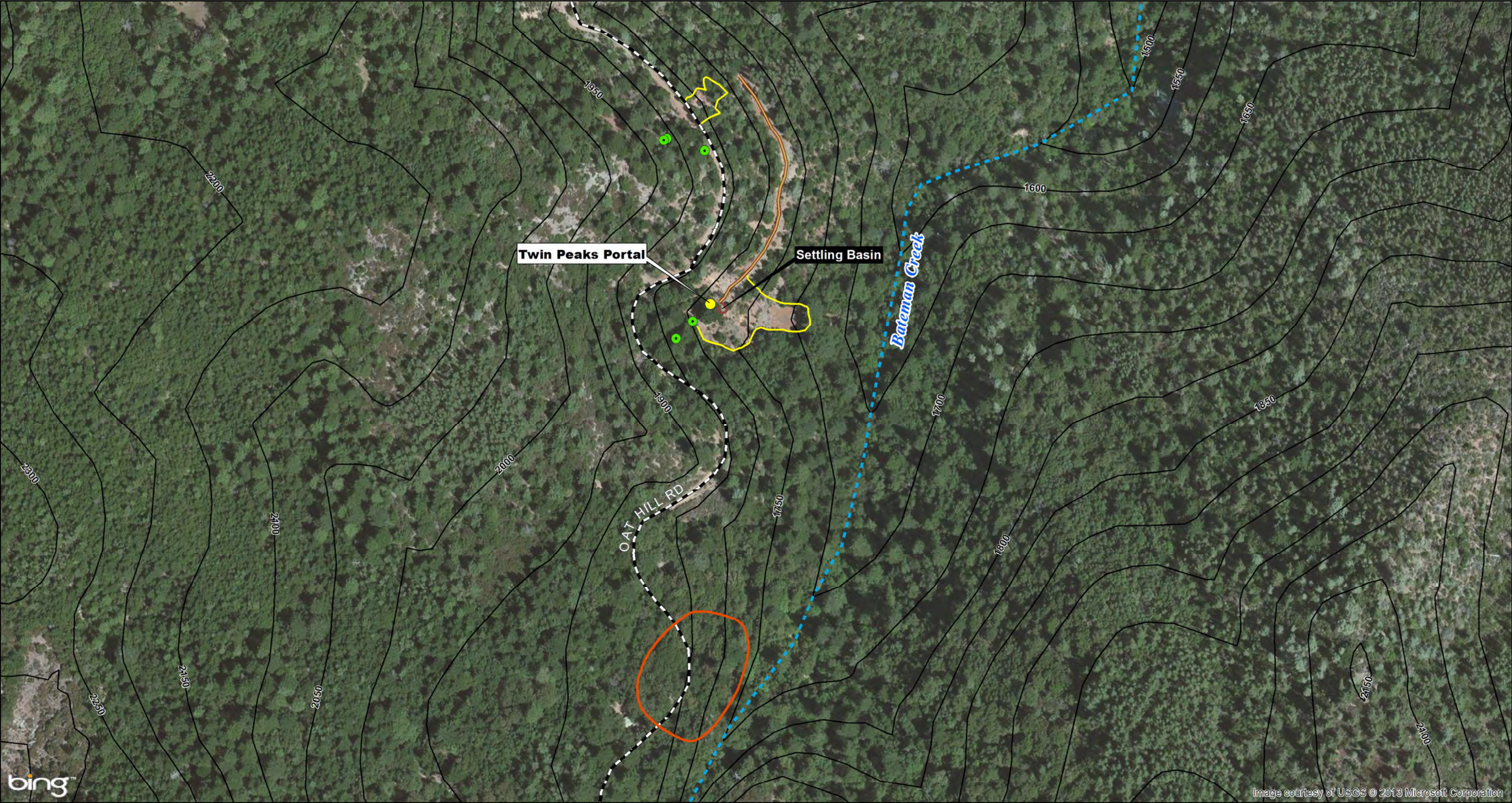
Corona Mine

**Figure 3: Project Features
Project Area - North**

Source: Bing Maps aerial imagery
web mapping service;
Napa County GIS Department 2011;
Burleson Consulting 2012.



Burleson Consulting, Inc.



Legend

Approximate Limit of Hunting Club

Adit

Existing Infiltration Trench

50ft Contour

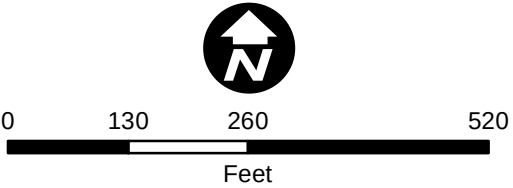
Portal

Settling Basin

Roads

Creeks

Approximate Limit of Mine Waste

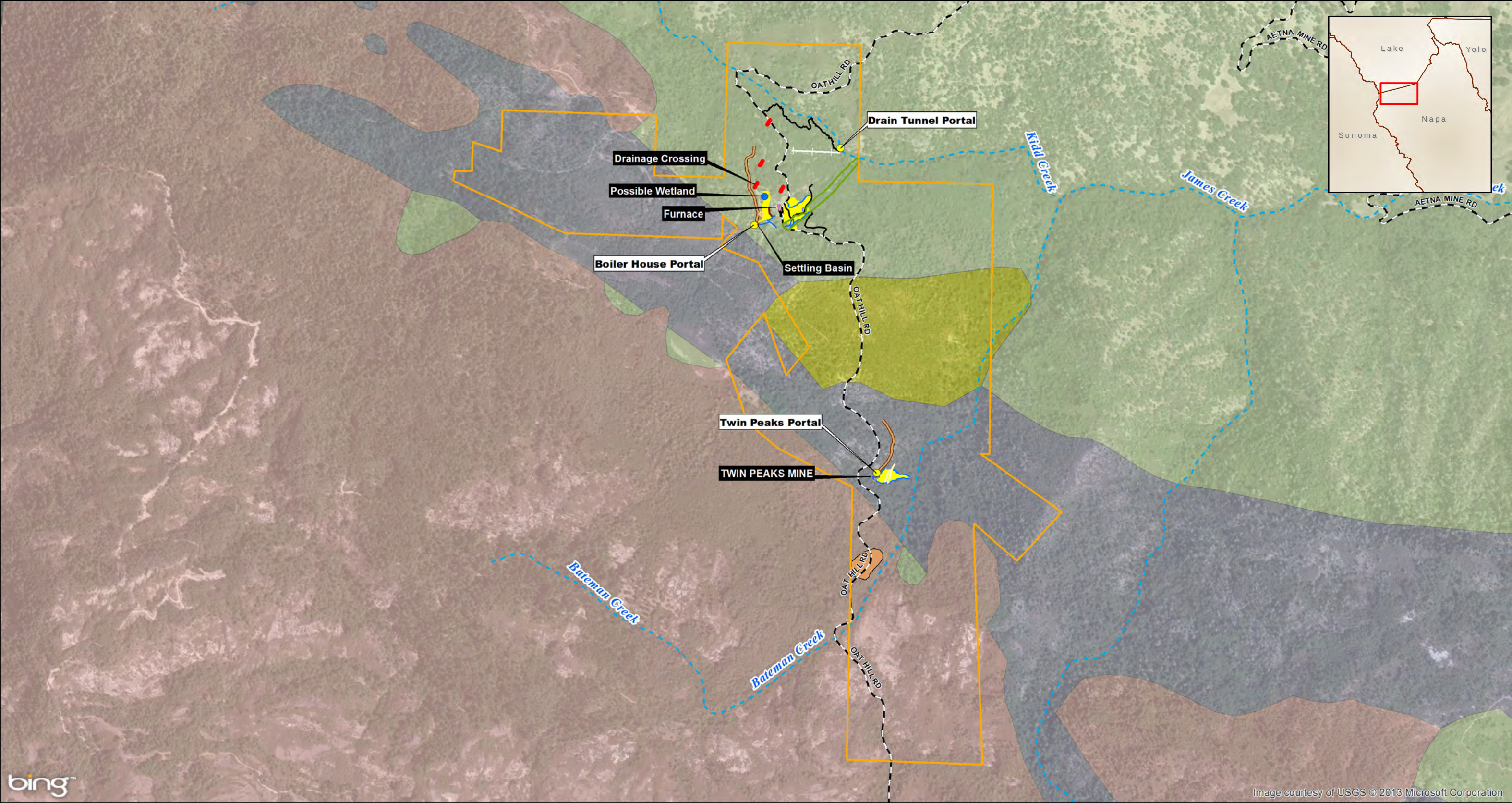


Twin Peaks Mine

**Figure 4: Project Features
Project Area - South**

Source: Bing Maps aerial imagery
web mapping service;
Napa County GIS Department 2011;
Burleson Consulting 2012.

Burleson Consulting, Inc.



bing™

Image courtesy of USGS © 2013 Microsoft Corporation

Legend

 John Livermore Property

 Roads

 Creeks

 Portal

 Possible Wetland

 Future Gate

 Bench

 Existing Path

 Timber Wall

 Drainage

 Existing Path

 Existing Rail Track Line

 Future Spoils Storage

 Riparian Area

 Future Fence

 Existing Infiltration Trench

 Settling Basin

 Settling Basin

 Hunters Camp

 Mine Waste

Geologic Types

 Jsp - Great Valley Complex serpentinite

 KJfs - Franciscan Complex sedimentary rocks

 Qsl - Hillslope Deposits

 Tpmv - Sonoma Volcanic rocks

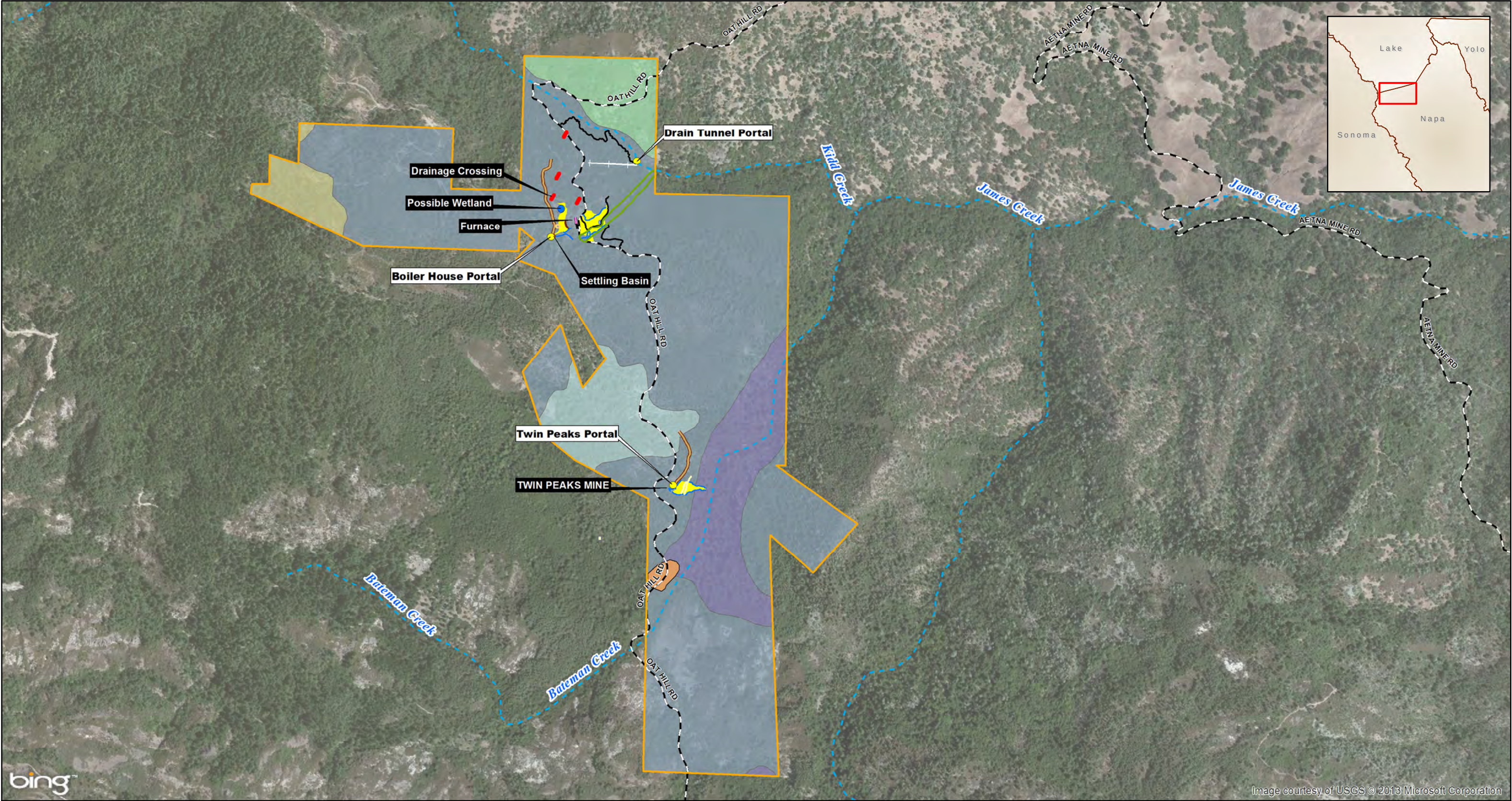
Corona & Twin Peaks Mine

Figure 5 - Geologic Map

Source: Bing Maps aerial imagery
web mapping service; USGS 2012;
Napa County GIS Department 2011;
Burleson Consulting 2012.

Burleson Consulting, Inc.

Path: S:\GIS\Projects\Corona - Twin Peaks Mine\ISMND\Figure 5 - Geologic ISMND Revised Draft.mxd

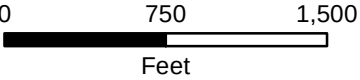


Legend

- | | | | |
|-------------------------|---------------|--------------------------|------------------------------|
| John Livermore Property | Bench | Existing Path | Future Fence |
| Roads | Existing Path | Existing Rail Track Line | Existing Infiltration Trench |
| Creeks | Timber Wall | Future Spoils Storage | Settling Basin |
| Portal | Drainage | Riparian Area | Settling Basin |
| Possible Wetland | | | Hunters Camp |
| Future Gate | | | Mine Waste |

Soil Types

- | |
|---|
| Boomer gravelly loam, 30 to 50 percent slopes |
| Felton gravelly loam, 30 to 50 percent slopes |
| Forward gravelly loam, 30 to 75 percent slopes |
| Maymen-Millsholm-Lodo association, 30-75 percent slopes |
| Rock outcrop-Kidd complex, 50 to 75 percent slopes |

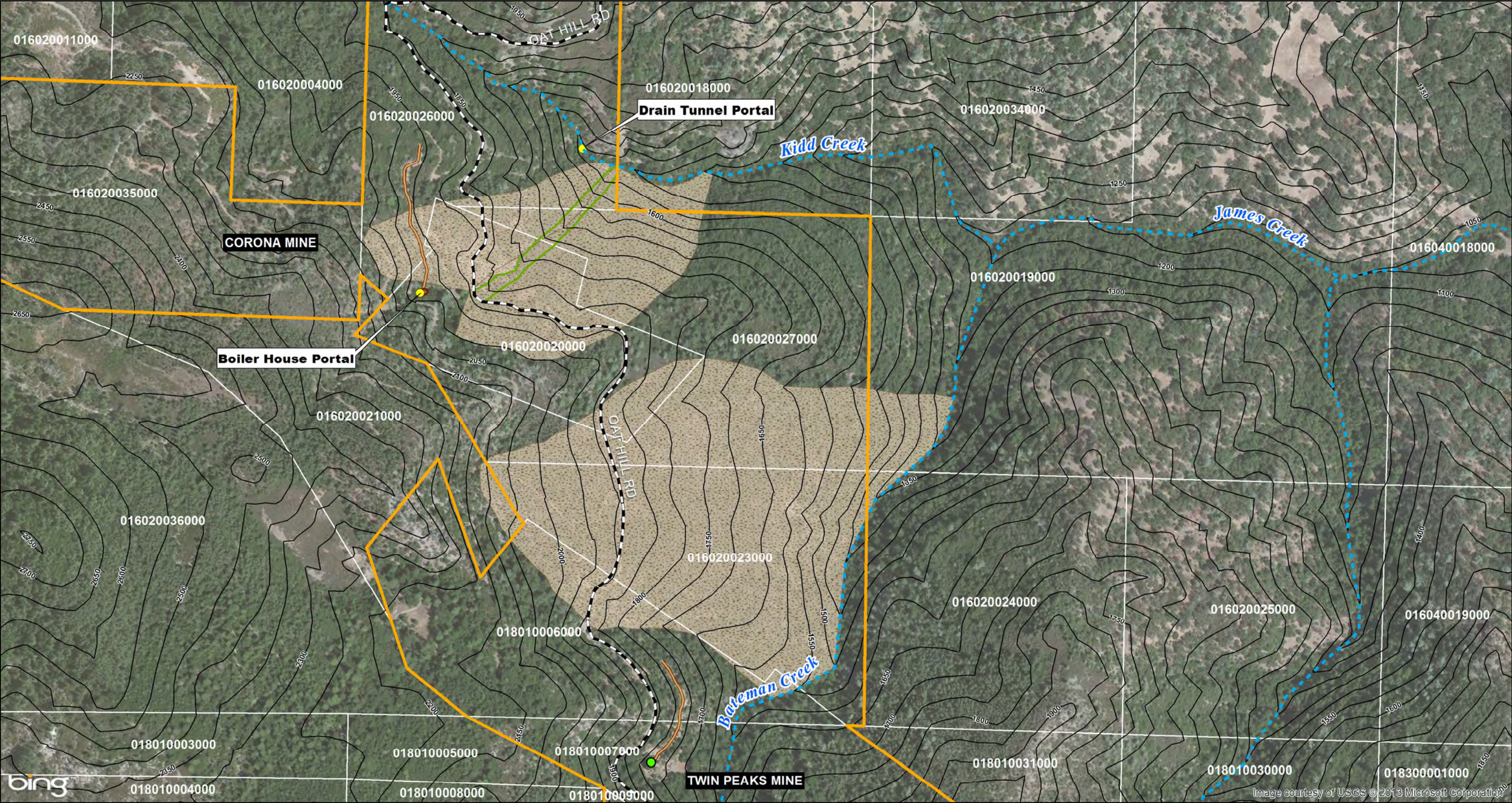


Corona & Twin Peaks Mine

Figure 6 - Soil Map

Source: Bing Maps aerial imagery
web mapping service; USDA NRCS 2012;
Napa County GIS Department 2011;
Burleson Consulting 2012.





Legend

- | | | |
|-------------------------|----------------------------------|------------------------------|
| John Livermore Property | Portal | Settling Basin |
| Parcel Lines | Adit | Existing Infiltration Trench |
| 50ft Contour | Previously Identified Landslides | Direction of Grade |
| Roads | Riparian Area | |
| Creeks | | |



0 245 490 980
Feet



Corona Mine

Figure 7 - Landslides

Source: Bing Maps aerial imagery
web mapping service;
Napa County GIS Department



Burleson Consulting, Inc.

Urbemis 2007 Version 9.2.4

Detail Report for Summer Construction Mitigated Emissions (Pounds/Day)

File Name: C:\Users\Joel\AppData\Roaming\Urbemis\Version9a\Projects\Corona Mine-MaxDay.urb924

Project Name: Corona Mine - Max Daily

Project Location: California State-wide

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Mitigated)

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10 Dust</u>	<u>PM10 Exhaust</u>	<u>PM10 Total</u>	<u>PM2.5 Dust</u>	<u>PM2.5 Exhaust</u>	<u>PM2.5 Total</u>	<u>CO2</u>
Time Slice 9/2/2013-10/31/2013	<u>1.20</u>	<u>8.50</u>	<u>4.93</u>	<u>0.00</u>	<u>8.33</u>	<u>0.52</u>	<u>8.84</u>	<u>1.74</u>	<u>0.47</u>	<u>2.21</u>	<u>1,041.07</u>
Active Days: 44											
Fine Grading 09/02/2013-10/31/2013	1.20	8.50	4.93	0.00	8.33	0.52	8.84	1.74	0.47	2.21	1,041.07
Fine Grading Dust	0.00	0.00	0.00	0.00	8.33	0.00	8.33	1.74	0.00	1.74	0.00
Fine Grading Off Road Diesel	1.18	8.46	4.27	0.00	0.00	0.51	0.51	0.00	0.47	0.47	964.38
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.02	0.03	0.66	0.00	0.00	0.00	0.01	0.00	0.00	0.00	76.69

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 9/2/2013 - 10/31/2013 - Default Fine Site Grading Description

For Soil Stabilizing Measures, the Replace ground cover in disturbed areas quickly mitigation reduces emissions by:

PM10: 5% PM25: 5%

For Soil Stabilizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

Phase Assumptions

Phase: Fine Grading 9/2/2013 - 10/31/2013 - Default Fine Site Grading Description

Total Acres Disturbed: 3.04

Maximum Daily Acreage Disturbed: 0.76

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

5/17/2013 10:35:20 AM

Off-Road Equipment:

- 1 Crawler Tractors (90 hp) operating at a 0.43 load factor for 8 hours per day
- 1 Off Highway Trucks (250 hp) operating at a 0.38 load factor for 8 hours per day
- 1 Tractors/Loaders/Backhoes (85 hp) operating at a 0.37 load factor for 8 hours per day

Checklist of Project Green House Gas Emissions & Emission Reductions



A Tradition of Stewardship
A Commitment to Service

The Napa County Climate Action Plan requires that staff calculate the GHG emissions of all discretionary projects assuming "business as usual" (BAU), and that applicants reduce those emissions by 39%. This checklist identifies the data needed to complete the required calculations and allows applicants to select the emissions reduction measures they wish to use. Applicants may retain consultants to prepare their own calculations if desired. Default calculations will be based on the URBEMIS and Bay Area Air Quality Management District's BGM model, as well as standard factors for vegetation removal and retention/replacement.

PROJECT NAME: Corona and Twin Peaks Mine Drainage Treatment TARGET YEAR (OF BUILD-OUT): 2013
PROJECT ADDRESS: 8 parcels on Oat Hill Mine Road, Napa County, CA
APPLICANT: Tuleyome Inc. for property owner, John Livermore
CONTACT INFO: Stephen McCord, 530-220-3165 or Beth Kelly, 916-984-4651

1. PROJECT DATA

1.1 Proposed Land Uses (See Notes, No change to land use)

(NOTE: to complete the required calculations, all non-residential uses will be translated into uses contained within the BGM & URBEMIS models)

		gross sq. ft.	
1. Dwelling unit (number) _____	Dwelling unit		
2. Non-Residential Uses			
A. Office (General Office)			
B. Warehouse (Warehouse)			
C. Industrial/Winery Production (General Light Industry)			
D. Winery Tasting/Hospitality/Retail (Quality Restaurant)			
E. Retail (Regional Shopping Center)			
3. Quality Restaurant (seats) _____	Restaurant		
4. High Turnover/Sit Down Restaurant (seats) _____	Restaurant		
5. Lodging (Hotel) rooms _____	Lodging		acres
6. Planted & Landscaped Areas			
A. Vineyard area, including roads			
B. Other agricultural uses (please specify)			
C. Irrigated landscape			
7. Other uses (explain)			

1.2 Utilities See notes.

(NOTE: Information in this section is optional because URBEMIS and BGM will calculate default values based on the square footages provided above.)

- Potable water use: _____ gallons per day
- Recycled water use: _____ gallons per day
- Please describe the sources of potable and recycled water: _____
- Wastewater treatment volumes: _____ units
- Will wastewater treatment occur on site? NO
- Electricity consumption: _____ kilowatt-hours per year
- Natural gas /propane consumption: _____ cubic feet per year
- Will there be a diesel powered back-up generator on site? _____

1.3 Refrigerants (ALL are NA for 1.3 see notes)

(NOTE: BGM will estimate emissions based on default leakage rates if the type of refrigeration or air conditioning systems are known)

	Refrigerant Charge (pounds)
1. Project Refrigeration Systems	
A. Centralized	
B. Cold Storage	
C. Process Cooling	
D. Refrigerant Condensing Units	
2. Project AC Systems	
A. Centrifugal Chiller (large)	
B. Centrifugal Chiller (medium)	
C. Packaged Chiller (medium)	
D. Unitary AC (small)	

1.4 Agriculture & Industry See notes.

(NOTE: BGM will estimate emissions from livestock, equipment, and fertilizer use, if any)

1. Mobile Equipment	Gal/year	
A. Gasoline		
B. Diesel Fuel		
C. Propane		
2. Stationary Equipment		
A. Gasoline		
B. Diesel Fuel		
C. Stationary Equipment		Kwh/year
3. Electricity Consumption	Tons/year	
4. Fertilizer Used		

1.5 Tree & Vegetation Removal See notes.

(NOTE: Standard factors from the CAP will be used to calculate sequestration rates, carbon in soil, and carbon stocks unless site specific data is provided.)

1. Coniferous Forest (acres)	acres	0
2. Oak Woodland (acres)		0
3. Shrub (acres)		0
4. Grassland (acres)		0
5. Wetland (acres)		0
6. Vineyard (acres)		0
7. Other vegetated area (explain)		0
8. Number of trees >6" diameter proposed for removal	40	

1.6 Other Construction Activities See notes.

(NOTE: URBEMIS will calculate construction emissions if data is provided)

1. Total duration of construction:	9 months		
2. Maximum number of employees on site:	3		
3. Describe phasing & equipment used for each phase:	See Excel Calculations	number	months
A. 1 Bulldozer @ horsepower	90 HP		hours per day
B. 1 Graders @ horsepower	85 HP		8 not continuous
C. 1 Other @ horsepower	250 HP		8 not continuous

1.7 Proposed Project Operations See notes.

(NOTE: BGM & URBEMIS will calculate transportation emissions based on square footage unless specific data is provided regarding employees & vehicle miles travelled)

1. Maximum number of employees on site (daily):	1
2. Maximum number of visitors on site (daily):	1
3. Estimate of Vehicle Miles Travelled (VMT) from a traffic study prepared for the project:	No traffic study required. No increase in traffic.

Information provided in Section 1 will be used to estimate the proposed project's GHG emissions under "business as usual" (BAU). Calculations will be based on generic factors derived from relevant literature unless project applicants/consultants provide site-specific information. Any emission reduction strategies (e.g. energy conservation, alternative energy generation, habitat restoration, etc.) proposed as part of the project will be factored into the emission reductions in Section 2.

FOR STAFF USE ONLY: BAU Emissions

SECTOR	EMISSIONS PER BGM	ADJUSTMENTS*	BAU EMISSIONS
	(MT CO2e)	(MT CO2e)	(MT CO2e)
Buildings (Annual)			
Transportation (Annual)			
Agricultural Operations (Annual)			
Land Use (Annual Sequestration)			
Land Use (One-time stock loss)			
Construction (One-time emissions)			
	Annual	One-Time	(NOTE: Per BAAQMD, Construction emissions are addressed via best practices & not quantitative reductions)
TOTAL PROJECT EMISSIONS			
REDUCTIONS NEEDED TO MEET 39% GOAL			

*Emissions from vegetation loss and construction must be added to BGM results manually. Transportation adjustments back-out the State measures assumed in the BGM (Pavely & the Low Carbon Fuels Rule). See Table 2 & 3 of BAAQMD's User Manual, April 29, 2010. These measures and implementation of the CalGreen building code were not included in the CAP baseline and may be used as reductions in Section 2.

2. EMISSION REDUCTIONS (CHECK ALL THAT APPLY)

Applicants will be credited with GHG reductions for the CalGreen Building Code, State transportation measures, and any of the other measures selected below that can be quantified. The number of measures quantified will change based on the amount of project-specific data provided and the outcome of ongoing scientific research.

2.1 Construction

- Will the contractor use alternative fueled (e.g. biodiesel, electric) construction vehicles or equipment for at least 15% of the fleet?
- Will the project use at least 10% local building materials?
- Will the contractor recycle or re-use more than 50% of construction waste and demolition materials?
- Will the contractor minimize idling time of diesel powered construction equipment to two minutes?
- Will the project include other construction-related emission reductions (explain)? See notes.

Yes	No	Comment
	X	BAAQMD recommend.
X		BAAQMD recommend.
X		BAAQMD recommend.
X		BAAQMD recommend.
X		BAAQMD recommend.

2.2 Site Design & Energy Conservation (ALL are NA for 2.2 see notes)

- Will the project comply with Title 24 and the CalGreen Building Code
- Will the project plant trees to shade structures?
- Will the project be designed to take advantage of natural cooling and passive solar aspects?
- Will the project include a "cool" (lightly colored or reflective) or permeable/living roof?
- Will the project install a solar water heater?
- Will the project install Energy Star (EPA rated) appliances?
- Will the project increase energy efficiency beyond Title 24?
- Will the project comply with CalGreen Tier 1 or Tier 2?
- Will the project be LEED certified?

		Required by law
		Required by the CAP
		Required by the CAP
		Quantified in BGM
		Quantified in BGM
		Quantified in BGM

2.2 Energy Production

- Will the project include on-site energy generation & if so, how much will be generated? Please explain.
- Will the project include off-site energy generation & if so, how much will be generated? Please explain.

	X	Quantified in BGM
	X	Quantified in BGM

2.3 Transportation (ALL are NA for 2.3 see notes)

- Is there access to public transportation?
- Is pedestrian and bicycle access provided for?
- Will bicycle parking be provided?
- Will there be preferential parking for carpools and alternative fuel vehicles?
- Will the operator develop and implement a transportation demand management program?
- Will the owner/operator offer employee trip-reduction incentives including transit passes if the site is accessible by transit?
- Will the owner/operator offer or coordinate worker vanpools or carpools?
- Will there be traffic calming measures implemented as part of the project?

2.4 Water Conservation (2.4.5, 2.4.6, & 2.4.7 are NA see notes)

- Will the project include drought tolerant landscaping?
- Will the project be subject to the County's Water Efficient Landscape Ordinance (projects with $\geq 2,500$ sf of landscaping)?
- Will the project include high-efficiency drip irrigation?
- Will the project use water for frost protection?
- Will the project install low flow toilets?
- Will the project install a tankless water heater?
- Will the project include ultra efficient fixtures and appliances?

X		Quantified in BGM
	X	
X		
	X	
		Quantified in BGM
		Quantified in BGM

2.5 Solid Waste & Material Recycling (2.5.1 is NA see notes)

- Will the project include or facilitate composting of food waste?
- Will the project achieve solid waste reductions by maximizing recycling? (Estimate % reduction if possible: _____)
- Will the project use vegetation that is removed from the site for fuel, for other wood products, or for mulch? (Please explain)

X		Quantified in BGM
X		

2.6 Natural Resources (2.6.3 is NA see notes)

- Will the project include the restoration of degraded habitat on site? If so, please explain. Include the type of habitat, location, and acreage.
- Will the project replace trees that are removed on site at $\geq 2:1$ ratio?
- Will the project use wood that is sustainably harvested or rapidly renewable (e.g. bamboo)?

X		
X		Quantified in BGM

		Yes	No	Comment
2.7	Farming & Business Practices (All are NA for 2.7 see notes)			
1.	Will the operator use alternatively fueled (e.g. biodiesel, electric) vehicles/equipment for at least 15% of the fleet?			
2.	Will there be a 70-80% cover crop?			
3.	Will the project use reduced or no-tillage?			
4.	Will the project reduce its use of nitrogen fertilizers?			
5.	Will the project retain biomass that is removed via pruning and thinning by chipping the material and using it in the vineyard?			
6.	Will refrigeration use ammonia instead of CFCs or HCFCs?			Quantified in BGM
7.	Will the project be enrolled in a third party certification program (e.g. Napa Green Winery, Napa Green Land or Fish Friendly Farming)?			

FOR STAFF USE ONLY (Emission Reductions):

Reductions attributable to State transportation measures (on road): _____ Reductions attributable to State transportation measures (off road): _____ Reductions attributable to State measures related to building energy use: _____ Reductions attributable to measures selected above: _____ Emissions Offsets Required: _____

3.	EMISSION OFFSETS	Yes	No	Comment
3.1	Natural Resources Will the project include the restoration of degraded habitat off site? If so, please explain. Include the type of habitat, location, and acreage.		X	NA
3.2	Avoided Deforestation Will the project permanently protect land that is suitable for vineyard development either on or off site? If so, please explain. Include the type of habitat, location, acreage, and proposed easement holder.		X	NA
3.3	Purchase of Offsets from a Valid Source Will the project purchase emission offsets that are real, surplus, permanent, quantifiable, and enforceable? (Please specify.)		X	One-time construction No offsets required

4.	ADDITIONAL INFORMATION
4.1	Please use the space below or attach supplemental sheets to amplify on the information provided above & describe sustainable project features that may not have been captured: See attached notes for answers to questions above and information about the project's features.
4.2	Any comments, suggestions, or questions regarding the County's efforts to reduce GHG Emissions?

(Please attach supplemental sheets with supporting information & calculations as needed.)

Supplemental Notes to Napa County Checklist of Project
Green House Gas Emissions & Emission Reductions
Corona and Twin Peaks Mine Drainage Treatment Project

General Notes:

The Corona and Twin Peaks Mines are located on private property in northwestern Napa County southeast of the town of Middletown, and accessible from Oat Hill Road (County Road 102), which is off Highway 128 and Chiles Pope Valley Road. The property is in a natural setting, not in an urbanized area. The purpose of the project will be improve the effectiveness of existing mine drainage treatment systems, implement a pilot plant system, and mitigate site physical and chemical hazards so that the sites are safe for future public use in Napa County, California, and support a healthy aquatic ecosystem in the watershed. The property is an important component in the Napa County Open Space and Trails Plans, and eventually would connect two pieces of the Palisades public lands and a trail to Lake County. Construction activities associated with the project will include grading to create access paths for equipment, creation of infiltration trenches to control mine drainage, erosion control, minor grading, planting, revegetation of mine waste piles, and borehole construction.

Specific Question Notes:

1.1) All questions related to 1.1 Proposed Land Uses are not applicable to the project. The site is designated Agricultural Watershed/Open Space and there will be no change to the land use. Some of the former disturbed mine waste areas will be revegetated using on-site native plants that are self-sustaining and do not require irrigation once established. Approximately 3.0 total acres will be revegetated.

1.2) The source of water at the site is spring-fed water that will be stored in several onsite water tanks (6,500 total gallon capacity) for use for irrigation to establish revegetation plantings and for dust control if needed, and for the pilot plant system. No utilities, drinking water, recycled water, or wastewater use are part of the project. Diesel-powered construction equipment will be used for grading.

1.3) All questions related to 1.3 Refrigerants are not applicable because the project does not include installation of any refrigeration systems.

1.4) All questions related to 1.4 Agriculture and Industry are not applicable because the open space land use will not change. No agriculture or industry will be developed on the site. Diesel-powered construction equipment will be used during grading and revegetation activities. Native vegetation will be initially planted using some soil amendments as needed. Quarterly maintenance site visits are conducted by the site foreman to check on the condition of the property (similar to the past).

1.5) During creation of the staging area for equipment, a few individual trees at least 6 inches diameter or greater at 5 feet from the ground (dbh) may be removed. The trees that will be removed are a mixture of oak, manzanita, and madrones. No oak woodlands or forests are being removed. Once the construction is complete, the areas will be allowed to passively revert to their natural state. Revegetation at the site is proposed using native trees that will grow fast, at a replacement ratio of 2:1 or greater (see note for question 1.1).

1.6) Total GHG emissions for project construction are estimated at 35.4 tons, calculated using ARB's OFFROAD2007 emission factors for off-road construction equipment and EPA emission factors for gasoline and diesel on-road vehicles. Detailed calculations of GHG emissions from all construction equipment and on-road vehicles during the seven phases of construction are provided as an attachment.

1.7) There will be no change in project operations from existing conditions and no increase in traffic to the site. The only traffic associated with the operation of the site includes a site visit to check condition of property, in accordance with the operations, monitoring, and maintenance plan and the site will remain as open space.

2.1 -5) Emission reduction measures will include dust control measures (water spray) and adherence to burn days for brush removal.

2.2) All questions related to 2.2 Site Design & Energy conservation are not applicable because all aspects of the project do not include design or energy conservation features that are associated with this section. There will be no construction of buildings or structures, installation of appliances, or other related site design/energy conservation features associated with this section.

2.3) All the questions associated with 2.2 Transportation are not applicable for this project because the project is on private property and open space land, and does not include any buildings or residences as part of the project.

2.4.5-7) These three questions are not applicable because the project does not involve construction of buildings or installing toilets, water heaters, or appliances.

2.5.1) This question is not applicable because the project does not involve food, food waste or consumption, and therefore no composting of food waste is possible.

2.6) Degraded mine waste areas (approximately 3.0 acres) will be revegetated using native plants and trees. Individual trees removed to create the access paths for equipment will be replaced at a ratio of 2:1 or greater using a native species mix of fast growing trees. 2.6.3 - This question is not applicable because the project will not use wood for construction of buildings, etc.

2.7) All questions related to 2.7 Farming and Business Practices are not applicable because the project does not involve farming or business practices. The land use is open space.

3.3) As project GHG emissions are due solely to one-time construction emissions, no offsets are required.

4.1) The project will improve the site conditions by revegetating disturbed mine waste areas using native plants and trees, which will improve the potential for erosion and overland flow of mine-waste contaminated surface water. The newly constructed and restored infiltration trenches will capture and passively treat mine drainage, thus improving the water quality in the adjacent creeks.

SUMMARY - GHG EMISSIONS DURING PROJECT CONSTRUCTION

PHASE	CO2 (tons) Diesel Equip.	CO2 (tons)	
		On-road Vehicles	Total per Phase
1	1.95	0.27	2.22
2	0.84	0.36	1.20
3	20.67	1.01	21.69
4	3.50	0.55	4.05
5	3.89	0.17	4.06
6	0.87	0.22	1.08
7	0.94	0.15	1.08
All Phases	32.65	2.73	35.38 tons

REFERENCES:

For CO2 emission factors for gasoline and diesel:

U.S. Environmental Protection Agency, 2009. Emission Facts: Average Carbon Dioxide Emissions Resulting from Gasoline and Diesel Fuel. Office of Transportation and Air Quality. EPA420-F-05-001. Last updated on Friday, February 13th, 2009.

For diesel construction equipment load factors:

California Air Resources Board, 2010. Staff Report: Initial Statement Of Reasons For Proposed Rulemaking Proposed Amendments to The Regulation For In-Use Off-Road Diesel-Fueled Fleets And The Off-Road Large Spark-Ignition Fleet Requirements - Appendix D: OSM and Summary of Off-Road Emissions Inventory Updates. Mobile Source Control Division. Emissions Reductions Incentives Branch. October.

For diesel construction equipment emission factors:

California Air Resources Board, 2007. OFFROAD2007 (software package used to generate emissions inventory data for off-road mobile sources). Mobile Source Emissions Inventory Program. November.

Construction Equipment Data for use in air quality analysis
Activity - Minor Grading of roads to ensure safe passage of vehicles and equipment.

Examples of equipment

[illegible]

Vehicle Class	Minimum GVWR (lbs)	Maximum GVWR (lbs)	EMFAC Description	EMFAC Category
2	0	3,750	Light-duty Trucks	LDT1
3	3,751	5,750	Light-duty Trucks	LDT2
4	5,751	8,500	Medium-duty Trucks	MDV
5	8,501	10,000	Light-Heavy-duty	LHD1
6	10,001	14,000	Light-Heavy-duty	LHD2
7	14,001	33,000	Medium-Heavy-Duty	MHD
8	33,001	60,000	Heavy-Heavy-duty	HHD

Construction Equipment Data for use in air quality analysis
Adit gates and fences around ore processing and furnace

0.36

Construction Equipment Data for use in air quality analysis
Borehole Construction

[illegible]

1.01

Construction Equipment Data for use in air quality analysis
Improve existing trenches and settling basins

		CO2 Emission Factor	Total Phase CO2 Emissions	
Hp-Hrs	Load Factor	(g/hp-hr)		(ton)
	5120	0.38	568.3	1.22
	1984	0.37	568.3	0.46
	1920	0.38	568.3	0.46
	2240	0.43	568.3	0.60
	240	0.38	568.3	0.06
	3040	0.37	568.3	0.70
	0		568.3	0.00
	0		568.3	0.00
	0		568.3	0.00
	0		568.3	0.00
	0		568.3	0.00
	0		568.3	0.00
	0		568.3	0.00
	0		568.3	0.00
	0		568.3	0.00
	0		568.3	0.00
				3.50
Total Phase CO2				
Miles traveled	Assumed mpg	Gallons fuel consumed	Emissions (ton)	
	300	10	30.00	0.29
	50	8	6.25	0.07
	0			
	0			
	100	6	16.67	0.19
	0			
	0			
	0			
	0			
				0.55

0.55

Construction Equipment Data for use in air quality analysis
Consolidate mine waste and cap with soil

Consolidate mine waste and cap with soil

Examples of equipment

[illegible]

Vehicle Class	Minimum GVWR (lbs)	Maximum GVWR (lbs)	EMFAC Description	EMFAC Category
2	0	3,750	Light-duty Trucks	LDT1
3	3,751	5,750	Light-duty Trucks	LDT2
4	5,751	8,500	Medium-duty Trucks	MDV
5	8,501	10,000	Light-Heavy-duty	LHD1
6	10,001	14,000	Light-Heavy-duty	LHD2
7	14,001	33,000	Medium-Heavy-Duty	MHD
8	33,001	60,000	Heavy-Heavy-duty	HHD

Construction Equipment Data for use in air quality analysis
Erosion Control and Planting

[illegible]

0.22

Construction Equipment Data for use in air quality analysis

Surface Drainage work - stabilize and divert water around trenches and waste piles

Examples of equipment

Hp-Hrs	Load Factor	CO2	Total Phase
		Emission Factor (g/hp-hr)	CO2 Emissions (ton)
1600	0.38	568.3	0.38
1824	0.37	568.3	0.42
496	0.43	568.3	0.13
0		568.3	0.00
0		568.3	0.00
0		568.3	0.00
0		568.3	0.00
0		568.3	0.00
0		568.3	0.00
0		568.3	0.00
0		568.3	0.00
0		568.3	0.00
0		568.3	0.00
0		568.3	0.00
0		568.3	0.00
			0.94

0.15

Vehicle Class	Minimum GVWR (lbs)	Maximum GVWR (lbs)	EMFAC Description	EMFAC Category
2	0	3,750	Light-duty Trucks	LDT1
3	3,751	5,750	Light-duty Trucks	LDT2
4	5,751	8,500	Medium-duty Trucks	MDV
5	8,501	10,000	Light-Heavy-duty	LHD1
6	10,001	14,000	Light-Heavy-duty	LHD2
7	14,001	33,000	Medium-Heavy-Duty	MHD
8	33,001	60,000	Heavy-Heavy-duty	HHH

Attachment B – Two reconnaissance level biological surveys and a bat survey for the project area.

Final Draft

Report of Findings Reconnaissance Level Biological Survey for the Corona and Twin Peaks Mine Drainage Treatment Project



Prepared for
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August 2012

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List of Attachments

- Attachment A: Biological Survey Photo Log
- Attachment B: List of Species Observed
- Attachment C: Napa County Environmentally Sensitive Area Map

Acronyms and Abbreviations

AMSL	Above Mean Sea Level
Burleson	Burleson Consulting Inc.
CalHerps	California Herps Website
CESA	California Endangered Species Act
CNDDDB	California Natural Diversity Database
CDFG	California Department of Fish and Game
CNPS	California Native Plant Society
CRWQCB	California Regional Water Quality Control Board
CTS	California Tiger Salamander
CWA	Clean Water Act
EPA	Environmental Protection Agency
ESA	Environmental Sensitive Area
FESA	Federal Endangered Species Act
MBTA	Migratory Bird Treaty Act
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
VELB	Valley Elderberry Longhorn Beetle

1.0 Introduction

Burleson Consulting, Inc. (Burleson) prepared this report of findings regarding the reconnaissance-level biological survey for the Corona and Twin Peaks Mine Drainage Treatment Project located in Napa County for the non-profit organization Tuleyome. The site location and vicinity are presented in Figures 1 and 2. Burleson's biologist Jeremy Ashe and botanist Virginia Moran completed a reconnaissance-level biological survey of the proposed project site on May 8 and 9, 2012. The four main site areas surveyed included upper and lower Corona Mine, Twin Peaks Mine, and an existing hunter's camp, shown on Figures 3 and 4. In addition, riparian areas, creeks, drainages, and waterways were recorded on the survey maps when they were encountered in the field. This report presents results of the reconnaissance level survey, potential impacts, and recommendations based on research, interviews, and the two-day survey of the project area.

2.0 Existing Environmental Conditions

The proposed project site is located within Napa County, California in Section 32, Township 10 North, and Range 6 West of the Detert Reservoir Quad of the U.S. Geological Survey (USGS) topographic quadrangle map (Latitude 38.6693°N; Longitude 122.5411°W; UTM 539921 Northing; and UTM 4280179°Easting). The site is located in the northwest corner of Napa County about 1.5 miles south of the Lake County border. The site is rather isolated from towns and cities with nearest towns being Middletown (7 miles to the northwest), Calistoga (7 miles to the southwest), and Pope Valley (7 miles to the southeast). Oat Hill Road runs through the property. This road is paved from Butt Canyon Road to a locked yellow gate. From this point the Oat Hill Road is unpaved and becomes private, although Napa County retains right of way access for trail use.

The proposed project site is comprised of about 32 acres, much of which is covered by native trees and a mix of native and non-native plants. The project site includes four distinct areas: Upper Corona Mine, Lower Corona Mine, Twin Peaks Mine, and the hunter's camp. The site was historically mined for mercury but has not been in operation since the 1960s. More recently, the property has been used by a hunting club. The land is undeveloped with elevations from 1550 to 2000 feet above mean sea level (AMSL). The hunter's camp includes some dilapidated structures. The nearest water sources are Kidd Creek which is ephemeral and traverses the northern portion of the property, and Bateman

Creek which traverses the southeastern portion. These two creeks meet to the east of the property to form the headwaters of James Creek.

The Corona Mine area encompasses five existing and two future project features (Figure 3). The upper Corona Mine area existing features include an ore processing area with furnace located adjacent to the west side of Oat Hill Road; a boiler house portal with existing infiltration ditch located uphill of the furnace; a mine waste area located adjacent to the east side of Oat Hill Road; and an existing access path and rail track located downhill from the furnace and leading to the lower Corona Mine area. The lower Corona Mine area existing feature includes the drain tunnel portal. Future project features will be a new access path to the lower Drain Tunnel Portal and a new infiltration water treatment system, consisting of a new pipeline extending from the drain tunnel portal east about 1,000 feet to a new infiltration system location. The elevation of the Corona Mine area starts at about 2000 feet AMSL by the boiler house portal and drops down to about 1500 feet AMSL at the drain tunnel portal's proposed new infiltration system location.

The Twin Peaks Mine area is about 0.5 mile south of the Corona Mine area and encompasses two existing features that include a drain portal with an infiltration ditch located on the east side of Oat Hill Road, and a mine tailings waste area downhill of the drain portal and extending to the east (Figure 4). The Twin Peaks area elevation ranges from 1800 feet AMSL at the portal and drops to about 1600 feet amsl at the downhill edge of the mine tailings.

The hunter's camp is less than 0.25 mile south of the Twin Peaks Mine (Figure 4). The camp contains many human-made structures (buildings/shacks), vehicles, stacks of fire wood, and other hunting/camping-related equipment. The elevation of the camp is about 1800 feet AMSL.

3.0 Habitat Assessment

The following text describes the methods and biological conditions in the proposed project area, including vegetation near the site, local wildlife species, and special-status species with potential to occur in the general vicinity.

3.1 Methods

A list of federal and state special-status plant and wildlife species was developed for the proposed project site using a database search, which included a query of processed data from the California Natural Diversity Database (CNDDDB) for the Whispering Pines, Middletown, Jericho Valley, Mount Saint Helena, Detert Reservoir, Aetna Springs, Mark West Springs, Calistoga, and Saint Helena USGS

7.5-minute quadrangles. A list of federally endangered or threatened species was generated by the U.S. Fish and Wildlife Service (USFWS). Table 1 presents primary habitat, critical seasonal periods, and the species' likelihood of occurrence. A spatial query of the CNDDDB was conducted to produce a map of special-status species with known occurrences within 5 miles of the site (Figure 5). Also, a general background and history of the site and list of plants, was reviewed from the report, the Oat Hill Mine Trail in Napa County, prepared by Richard O'Donnell (O'Donnell et al. 2001-2005).

For the purpose of this investigation, special-status species are defined as plants and wildlife that are legally protected under the State or Federal Endangered Species Act (FESA), plants that are considered rare (listed 1-3 but not including plant rank 4) by the California Native Plant Society (CNPS), species of concern under California Department of Fish and Game (CDFG), wildlife on special watch lists, and all birds protected under the Migratory Bird Treaty Act (MBTA).

On May 8 and 9, 2012 Mr. Ashe and Ms. Moran completed a reconnaissance-level pedestrian survey of the proposed project site. These surveys were conducted on land only and did not include streams and creeks. Plants and wildlife were observed and recorded as they were sighted along meandering transects throughout the proposed site. Binoculars were used to scan for birds, apparent nesting sites, and potential nesting sites. Binoculars were also used to survey for plants around potential contaminated areas such as the ore processing feature of the Corona Mine. Photographs were taken of the various habitat types, wildlife, and plants (Attachment A). Plant presses were made of various species that needed further examination in the lab to determine the species. An unknown species of salamander was later identified in the lab.

3.2 General Habitat

Several habitat types and features occur within the project site. The dominant tree community throughout all sites and the bioregion was montane hardwood-conifer typified by a mix of oak includes canyon live oak (*Quercus chrysolepis*), interior live oak (*Quercus wislenzii*) and California black oak (*Quercus kelloggii*), as well as California bay (*Umbellularia californica*), Pacific madrone (*Arbutus menziesii*), Douglas fir (*Pseudotsuga menziesii* m.), California nutmeg (*Torreya californica*), and *Pinus* sp. Plants of chaparral, Dogwoods (*Cornus* sp.), and redbud (*Cercis occidentalis*) were present in the understory. The various plant communities in the project area provide potential nesting, foraging, roosting, and other habitat for a variety of plant and wildlife species, including several special-status species. The mine sites were composed of plants typical of disturbed areas including a mix of nonnative and native grasses, herbs, and native trees.

3.3 General Plants

The plant list for each area is included in Attachment B. A summary of the typical species identified in each area during the biological survey is provided in this section (“*” indicates a nonnative species).

3.3.1 Hunter’s Camp Plants

This area was composed of intermediate closed canopy montane hardwood-conifer as noted above. Nuttall’s dogwood (*Cornus nuttallii*) occurred in the understory. The large crowns supported high bird activity.

There was very little understory and herbaceous vegetation because the area includes campsite residences that are heavily used. The soils are compacted in the high use areas. Most of the vegetation observed was on the edges of the camp. Typical herb, vine, and shrub species occurring primarily on the edges of the camp included: California coffeeberry (*Rhamnus californica*), canyon gooseberry (*Ribes menziesii*), California little wood rose (*Rosa gymnocarpa*), hairy honeysuckle (*Lonicera hispidula*), Pacific pea (*Lathyrus vestitus*), white hawkweed (*Hieracium albiflorum*), grand hound’s tongue (*Cynoglossum grande*), poison oak (*Toxicodendron diversilobum*), Pacific sanicle (*Sanicula crassicaulis*), pine lobed violet (*Viola lobata*), starflower (*Trientalis latifolia*), California milkwort (*Polygala californica*), hedge nettle (*Stachys ajugoides ajugoides*), small flowered lotus (*Acmispon parviflorus*), death camas (*Toxicoscordion micranthum*), stick sedge (*Carex multicaulis*), bracken fern (*Pteridium aquilinum* var. *pubescens*), and *hedgehog dogtail grass (*Cynosurus echinatus*). One elderberry shrub (*Sambucus nigra* subsp. *canadensis*) was observed at this site. Small populations of unidentified plants, thought to be orchids (*Pipera* sp.) were found in the camp; however, they were not yet in flower so the exact species could not be identified.

3.3.2 Corona Mine Plants

The ore processing features and slopes were not directly surveyed by foot due to potential elemental mercury contaminated soil concerns. The dominant plant community in this area was disturbed annual grassland and mixed chaparral. Typical species included: coyote brush (*Baccharis pilularis*), common manzanita (*Arctostaphylos manzanita*), deerbrush (*Ceanothus integerrimus*), Yerba Santa (*Eriodictyon californicum*), woolly sunflower (*Eriophyllum lanatum*), toyon (*Heteromeles arbutifolia*), poison oak, foothill penstemon (*Penstemon heterophyllus*), hedge nettle, Pacific pea, woolly lotus (*Acmispon brachycarpus*), slender owl’s clover (*Castilleja attenuata*), and goldback fern (*Pentagramma triangularis*). Native grasses included California fescue (*Festuca californica*) and little California melic (*Melica imperfecta*). Typical of disturbed sites, nonnative grasses and herbs formed locally dominant stands and included *soft chess (*Bromus hordeaceus*),

*noxious brome (*Bromus madritensis madritensis*), *wild oat (*Avena barbata*), *ruby sand spurry (*Spergularia rubra*), and *purple hairy vetch (*Vicia villosa*).

Areas surveyed above Oat Hill Road, in the upper portion of the Corona Mine were more wooded and included an infiltration ditch and boiler house portal. Willow, alder, rush (*Juncus* sp.), cattail (*Typha* sp.) and introduced *pampas grass (*Cortaderia* sp.) were observed in the infiltration ditch.

Typical species at this feature were similar to the other features and included deerbrush, coyote brush, Yerba Santa, orange bush monkeyflower (*Mimulus aurantiacus*), toyon, California coffeeberry, chamise (*Adenostoma fasciculatum*), white-leaf manzanita (*Arctostaphylos viscida viscida*), scrub oak (*Quercus berberidifolia*), hairy honeysuckle, woolly lotus, Pacific pea, California cudweed (*Pseudognaphalium californicum*), soap plant, death camas, California bedstraw, Andrew's bedstraw (*Galium andrewsii*), mouse-ear chickweed (*Cerastium arvense*), and mountain agoseris. Native grasses included California fescue, California melic, Idaho fescue, and blue wildrye. The nonnative species component was comprised of many of the same species as the previous locations including *smooth cat's ear (*Hypochaeris glabra*), *hedge parsley, *wintercress (*Barbarea orthoceras*), *willow lettuce (*Lactuca saligna*), Harding grass, *barley, *European hairgrass, and *rat-tail fescue.

Five native fern species were found growing at the entrance to the boiler house portal. Spicebush (*Calycanthus occidentalis*) was also found in this location. Fern species were goldback fern, California polypody (*Polypodium californicum*), California lip fern (*Aspidotis californica*), holly shield fern (*Polystichum lonchitis*), and giant chain fern (*Woodwardia fimbriata*).

A dried basin of a shallow temporary pool was found at the upper portion of the Corona Mine. Species associated with wetland habitats were observed including: pond knotweed (*Polygonum polygaloides confertiflorum*), *wintercress, *rabbit's foot (*Polypogon monspeliensis*), *narrow leaf filago (*Logfia gallica*), woolly marbles (*Psilocarphus tenellus*), cottonweed (*Micropus californicus californicus*), *scarlet pimpernel (*Anagallis arvensis*), *ruby sand spurry, and tall annual willowherb (*Epilobium brachycarpum*).

The lower portion of the Corona Mine and areas surveyed below Oat Hill Road had a dry drainage area with well-established riparian vegetation (willow, *Salix* spp.), including alder (*Alnus rhombifolia*) and rush (*Juncus* sp.) bordering the area to the west. Burleson identified these as a riparian drainage area (Figure 3).

Typical species at the lower portion of the Corona Mine included those listed above and California deerweed (*Acmispon glaber* var. *glaber*), leather oak (*Quercus durata durata*), Tolmie's cat's ears (*Calochortus tolmei*), little tarweed (*Madia*

exigua), California bedstraw (*Galium californicum* c.), soap plant (*Chlorogalum pomeridianum*), mountain agoseris (*Agoseris heterophylla*), small flowered lotus, small headed clover (*Trifolium microcephalum*), chaparral nightshade (*Solanum xanti*), twining wild onion (*Dichelostemma volubile*), and mugwort (*Artemisia douglasiana*). Native grasses included California fescue, California melic, Idaho fescue (*Festuca idahoensis*), and blue wildrye (*Elymus glaucus glaucus*). The nonnative species included *hedge parsley (*Torilis arvensis*), *little hop clover (*Trifolium dubium*), *soft chess, *noxious brome, *ripgut (*Bromus diandrus*), *wild oat, *Harding grass (*Phalaris aquatica*), *barley (*Hordeum* spp.), *European hairgrass (*Aira caryophyllea*), *rat-tail fescue (*Festuca myuros*), and an ornamental garden clover species, *reversed clover (*Trifolium resupinatum*).

The existing path from Oat Hill Road down to the Drain Tunnel Portal had a more closed canopy forest and more species associated with shade (Figure 3). Typical native species included toyon, poison oak, California coffeeberry, California little wood rose, California milkwort, hairy honeysuckle, California grape (*Vitis californica*), Tolmie's cat's ear, golden fairy lantern (*Calochortus amabilis*), grand hound's tongue, starflower, red larkspur, variable-leaf nemophila (*Nemophila heterophylla*), Whipplea, Pacific pea, miner's lettuce (*Claytonia perfoliata*), California and Nuttall's bedstraw, woodland star (*Lithophragma heterophyllum*), wild onions (*Alliums* pp.), death camas, Pacific sanicle, hedge nettle, and big tarweed. Native woodland brome was also encountered. Ferns grew on the shaded slopes and included wood fern, California maidenhair fern (*Adiantum jordanii*), and California polypody. Many fritillaries (*Fritillaria* spp.) were observed but many species could not be positively identified due to timing (the plants were already in fruit) and many were already eaten by wildlife.

Locations for proposed project features (future access path, infiltration system, and pipeline) were surveyed, although the specific alignment for these features has not been confirmed; however, the surveyed area encompassed a proposed location using a flagged path created by Justin Smith, property caretaker and ranch manager. A walk-through of the proposed feature indicated heavy growth closed-canopy (80-100% estimated cover) montane hardwood-conifer forest (mostly oak) with a very light herbaceous and shrub understory. Some species encountered in the understory included: poison oak, wild rose (*Rosa* sp.), hairy honeysuckle, bedstraw (*Galium* sp.), hedge nettle, starflower, and death camas. There were pockets of higher floral diversity noted but without a specific alignment, it was difficult to determine if these areas would be affected by the project design. The proposed location for the new infiltration system at the lower Corona Mine is in closed-canopy Pacific madrone (hereafter madrone) woodland of intermediate age.

3.3.3 Twin Peaks Mine Plants

This area included a revegetation site of native grasses along the existing infiltration system that appeared to be successful (Figure 4). The dominant species in this area was California fescue. Alder was observed growing in the infiltration system.

Typical species at this location were coyote brush, deerbrush, common manzanita, Yerba Santa, orange-bush monkeyflower, deerweed, poison oak, and a population of tree poppy (*Dendromecon rigida*) observed on the upper slopes near the Twin Peaks portal (Figure 4). Native grasses and herbs included those of other areas including California fescue, California melic, blue wildrye, few flowered fescue (*Festuca microstachys*), and woodland brome (*Bromus laevipes*). Herbaceous species included woolly sunflower (*Eriophyllum lanatum* var. *achilleoides*), Tolmie's cat's ear, twining wild onion, bowl iris (*Iris macrosiphon*), false bindweed (*Calystegia purpurata*), California and Nuttall's bedstraw (*Galium nuttallii*), mountain agoseris, white hawkweed, hedge nettle, small flowered lotus, California filago (*Logfia flaginoides*), little tarweed, big tarweed (*Madia sativa*), and Whipplea (*Whipplea modesta*). A large population of wood fern (*Dryopteris arguta*) co-occurring with goldback fern was found on the northeast facing slope. Giant chain fern grew at the portal to the mine. Nonnative grasses and herbs were similar to those at the other areas and included *purple hairy vetch, *hedge parsley, *rosy clover (*Trifolium hirtum*), *crimson clover (*Trifolium incarnatum*), *wild oat, *soft chess, *noxious brome, *ripgut, *barley, *European hairgrass, and *rattail fescue.

3.3.4 Special-Status Plant Species

Forty-one special-status plants were identified by the CNDDDB and USFWS search for Detert Reservoir and the eight surrounding 7 ½ minute quadrangles (CDFG, 2012; USFWS, 2012). Eighteen of these species are not likely to occur at the proposed project site because of the lack of suitable habitat, generally occurring at lower elevations than the project site, and/or have not been observed within five miles of the project (Table 1). Special-status species unlikely to occur include: Clara Hunt's milk-vetch (*Astragalus claranus*), Indian Valley brodiaea (*Brodiaea rosea*), Pappose tarplant (*Centromadia parryi parryi*), Loch Lomond button-celery (*Eryngium constancei*), Boggs Lake hedge-hyssop (*Gratiola heterosepala*), Lake County western flax (*Hesperolinon didymocarpum*), Burke's goldfields (*Lasthenia burkei*), Sebastopol meadowfoam (*Limnanthes vinculans*), Baker's navarretia (*Navarretia leucocephala bakeri*), Few-flowered navarretia (*Navarretia leucocephala pauciflora*), Many-flowered navarretia (*Navarretia leucocephala plieantha*), Slender Orcutt grass (*Orcuttia tenuis*), Geysers dichanthelium (*Panicum acuminatum* var. *thermal*), Calistoga popcorn-flower (*Plagiobothrys strictus*), Napa blue grass (*Poa napensis*), Lake County stonecrop

(*Sedella leiocarp*), Keck's checkerbloom (*Sidalcea keckii*), and Kenwood Marsh checkerbloom (*Sidalcea oregano valida*).

The remaining twenty-three species were determined to have a low, moderate, or high likelihood of occurrence if they were found within five miles of the property, had suitable habitat, and generally occurred within the elevations of the project site. Special-status species with a low, moderate, or high likelihood of occurrence include: Napa false indigo (*Amphora californica* var. *napensis*), Bent-flowered fiddleneck (*Amsinckia lunaris*), Konocti Manzanita (*Arctostaphylos manzanita elegans*), Jepson's milk-vetch (*Astragalus rattanii* var. *jepsonianus*), Narrow-anthered brodiaea (*Brodiaea leptandra*), Ricon Ridge ceanothus (*Ceanothus confusus*), Calistoga ceanothus (*Ceanothus divergens*), Sonoma ceanothus (*Ceanothus sonomensis*), Greene's narrow-leaved daisy (*Erigeron greenei*), Adobe-lily (*Fritillaria pluriflora*), Hall's harmonia (*Harmonia hallii*), Two-carpellate western flax (*Hesperolinon bicarpellatum*), Santa Lucia dwarf rush (*Juncus luciensis*), Colusa layia (*Layia septentrionalis*), Jepson's leptosiphon (*Leptosiphon jepsonii*), Cobb Mountain lupine (*Lupinus sericatus*), Marin County navarretia (*Navarretia rosulata*), Sonoma beardtongue (*Penstemon newberryi* var. *sonomensis*), Marsh checkerbloom (*Sidalcea oregano hydrophila*), Socrates Mine jewel-flower (*Streptanthus brachiatus brachiatus*), Green jewel-flower (*Streptanthus hesperidis*), Early jewel-flower (*Streptanthus vernalis*), and Napa bluecurls (*Trichostema ruygtii*).

No special-status plants were observed during the May 8 and 9, 2012 reconnaissance level biological survey. The survey was conducted within the blooming periods for all but eleven special-status species (Calflora, 2012). Ricon Ridge ceanothus, Calistoga ceanothus, and Sonoma ceanothus bloom periods were missed; however, these are perennial shrubs and therefore would have been recorded if observed. Pappose tarplant, Geysers dichanthelium, and Kenwood Marsh checkerbloom bloom periods were missed; however, they are not likely to occur because they occur at lower elevations or their habitat is not present on the project area. Napa bluecurls bloom period was missed; however this species generally occurs at lower elevations and the potential habitat on site is marginal. The remaining three species not surveyed during the bloom period include: Adobe-lily (February-April bloom period), Marsh checkerbloom (July-September bloom period), and Socrates Mine jewel-flower (June-July bloom period). These three species are generally found in serpentine soils or pristine wetland/marsh habitats. Serpentine soils are present at the Twin Peaks Mine area; however, serpentine soils are not the dominant soil type present at the specific locations where construction activities will occur (Twin Peaks setting basin, infiltration trench, and the mine waste). Serpentine soils are not the dominant type present at the Corona Mine area where construction activities will

occur. There are no pristine wetland/marsh habitats within the project features at the Corona or Twin Peaks mines.

3.4 General Wildlife

Commonly occurring invertebrates that were sighted near and within the project area include several species of grasshoppers (Order *Orthoptera*), water strider (*Gerris remigis*), and butterflies (Family *Lepidoptera*).

Bird species observed during the survey include various species of woodpeckers, flycatchers, jays, finches, hawks, vultures, and thrushes (Attachment B). The hunter's camp had the highest bird activity and species observed or heard at this time of year. The intermediate aged trees with large crowns likely facilitate higher bird activity and diversity at the camp. Other than a Lewis's woodpecker, no special-status birds or nests of birds were found on the survey dates. Lewis's woodpeckers are on the USFWS watch list of birds of special concern; however, this species is not a federal or state listed species.

Five mammal species were observed throughout the project area. Scat was found for California black-tailed jackrabbit (*Lepus californicus*), mule deer (*Odocoileus hemionus*), California black bear (*Ursus americanus*), and coyote (*Canis latrans*). A western gray squirrel (*Sciurus griseus*) stick nest and individual were also observed.

Three species of reptiles and two species of amphibians were observed on the survey dates. The western fence lizard (*Sceloporus occidentalis*) and California alligator lizard (*Elgaria multicarinata multicarinata*) were both observed on the project area. At the drain tunnel portal of the Corona Mine a common garter snake (*Thamnophis sirtalis*) was observed basking in the sun. These three species of reptiles are all highly common throughout most of California. The amphibians observed were Pacific Treefrog (*Hyla regilla*) and a dead salamander. The frog, like the previously mentioned reptiles, is a highly common species of treefrog in California. The dead salamander was found in a human-made drain at the Twin Peaks Mine (Attachment A). Because it was found dehydrated, it was only identified to genus. It was determined in the lab to be a member of the genus *Ensatina*. The two subspecies, yellow-blotched salamander (*Ensatina eschscholtzii croceator*) and large-blotched salamander (*Ensatina eschscholtzii klauberi*), are the only members of the genus that are special-status species. However, their range is restricted to the southern portion of California (CalHerps, 2012). There are no other special-status species or subspecies in this genus.

The results of this survey were for land only and did not include the creeks. In 1998, a survey along the Pope Creek watershed was conducted and little to no

aquatic life was found in Kidd Creek, Bateman Creek, and James Creek (Slotton and Ayres, 1999). The conclusion was that iron-based floc precipitate was the predominate reason for the localized absence of typical flora and fauna directly within the creek. The 1998 survey also concluded that any remediation in reduction of the precipitate would result in a recovery of flora and fauna. On May 20, 2012 Darell Slotton PhD and Shaun Ayers performed surveys along the nearby creeks and found Pacific giant salamanders (*Dicamptodon ensatus*) and foothill yellow-legged frog (*Rana boylei*) near the mines (Slotton and Ayers, 2012). Though there are physical barriers preventing fish from reaching upstream to Bateman and Kidd creeks, rainbow trout (*Oncorhynchus mykiss*) were found downstream in James Creek. Lastly, the presence of mayflies and stoneflies near the Corona Mine drain indicates that the existing passive drain control efforts (infiltration systems) on the property appear to be improving ecosystem viability.

3.4.1 Special-Status Wildlife Species

Twenty-three special-status wildlife species were identified in the CNDDDB and USFWS search for Detert Reservoir and the eight surrounding 7.5 minute quadrangles (CNDDDB, 2012; USFWS, 2012). Fourteen of these species are not likely to occur on the project site because of a lack of suitable habitat (Table 1).

Two of the special-status species are invertebrates (branchiopods and insects) that occur in or near vernal pools or aquatic environments. California freshwater shrimp (*Syncaris pacifica*) lives in perennial streams. It is unlikely that this species will be on site because the streams on site are ephemeral. The conservancy fairy shrimp (*Branchinecta conservatoria*) lives in vernal pools. Field survey showed evidence of a potential seasonal wetland on site; however, this habitat appeared to be formed from the mine waste pile (not a durapan) and therefore, most likely would not be considered a vernal pool. Therefore, potential for this species to be on site is unlikely.

The valley elderberry longhorn beetle (VELB) (*Desmocerus californicus dimorphus*) is completely dependent on its host plant, elderberry, and elderberry trees were seen on the site. Because hosts plants were found there is a potential for VELB to be on site.

Four species of amphibians were identified by the database searches. The California tiger salamander (CTS) (*Ambystoma californiense*) is restricted to grasslands and low foothill regions with aquatic sites for breeding. The western pond turtle requires permanent ponds for habitat. Both species are not expected to occur at the project site because of a lack of appropriate habitat. The California red-legged frog (*Rana aurora draytonii*) is the largest native frog in the Western United States. These frogs require dense, shrubby or emergent

vegetation associated with deep still or slow-moving water. The foothill yellow-legged frog has been observed near the site. Both species have a likelihood of occurrence; however, the California red-legged frog is less likely.

Five special-status fish species were identified by the database searches; however, physical barriers within the streams prevent fish from reaching the mine sites. Also, the streams located on site are ephemeral and dry up yearly. Therefore, spawning habitat for these special-status fish species is absent from the site.

Seven special-status birds were identified in the search. The Lewis's woodpecker (*Melanerpes lewis*) was observed during the field visit. Four of these species are not likely to occur because of the general lack of habitat. The northern spotted owl (*Strix occidentalis*) resides in old-growth, multi-layered mixed conifer, redwood, Douglas-fir habitats. They feed on small mammals and typically nest in a tree or snag cavity, or in the broken top of a large tree. The proposed project is lacking suitable old growth trees for nesting and foraging habitat. Special-status birds that have been recorded within 5 miles of the proposed project site include prairie falcon (*Falco mexicanus*), peregrine falcon (*Falco peregrines*), and tri-colored blackbird (*Agelaius tricolor*). For both falcon species, rocky cliffs are essential habitat requirements needed for nesting and cover. From the pedestrian survey and aerial photos no such habitat was identified at the proposed project site; therefore, it is unlikely that these falcon species will be present. Tricolored blackbirds are known to intermingle with very commonly seen red-winged blackbirds (*Agelaius phoeniceus*) and seek cover in emergent wetland vegetation, especially cattails and tules. These birds are also known to roost in large flocks in emergent wetland or in trees. Neither species of blackbird was observed on the survey dates, nor were any habitats for these species identified on the project site. Therefore, tri-colored blackbirds are unlikely to occur on the project site.

The bald eagle (*Haliaeetus leucocephalus*) was not recorded within 5 miles of the proposed project. This species requires large bodies of water, or free flowing rivers with abundant fish and they typically nest in old-growth forests, especially ponderosa pine. These habitats are located 7 miles north of the project site. It is possible that a bald eagle could be seen on site; however, this occurrence would most likely be a flyby.

Purple martin habitat includes woodlands and low elevation coniferous forests. These habitats were observed on the project site. Purple martins typically nest in old woodpecker cavities or human-made structures. They were not observed nor were any nests found during the survey. However, woodpeckers were observed at the hunter's camp. Therefore, Purple martins have a likelihood to occur at the project site.

There are three special-status species of bats that have been reported within 5 miles of the project site (CNDDDB, 2012). Accounts of bats have been documented in the project area (Smith, 2012). The pallid bat (*Antrozous pallidus*) is a species that forages in a variety of habitats and may occur in grasslands, shrublands, woodlands, and forests from sea level up through mixed conifer forests. Day roosts include caves, mines, and occasionally hollow trees and buildings. The Townsend's big-eared bat (*Corynorhinus townsendii*) is found throughout California in all but subalpine and alpine habitats. Day roosts require caves, mines, tunnels, buildings, or other human-made structures. The silver-haired bat (*Lasionycteris noctivagans*) can be found anywhere in California during their spring and fall migrations, and their summer habitats include coastal and montane coniferous forests, valley foothill woodlands, pinyon-juniper woodlands, and valley foothill and montane riparian habitats. This species roosts in hollow trees, snags, buildings, rock crevices, caves, and under bark. The proposed project site may provide suitable foraging habitat and roosting sites for these bat species. Therefore, all three species have likelihood to occur at the proposed project site.

4.0 Regulatory Setting

The project may require permits in compliance with California Endangered Species Act (CESA) and Federal Endangered Species Act (FESA) and the Clean Water Act (CWA). Brief descriptions of these laws, as well as other biological regulations that may apply to the project site and activities, are provided below.

4.1 Federal and State Endangered Species Act

USFWS and NOAA Fisheries are the federal agencies, and CDFG is the state agency, respectively, responsible for protecting endangered and threatened fish and wildlife and for regulating activities that may affect those species. The laws that protect sensitive species, FESA and CESA, are administered by these agencies.

Section 7 of the FESA provides a means for authorizing incidental take of federally endangered or threatened species that result from federally conducted, permitted, or funded projects. Similarly, Section 10 authorizes take of federally endangered or threatened species by non-federal agencies.

Species listed pursuant to the CESA cannot be "taken" or harmed, except under specific permits pursuant to Section 2081 of the Fish and Game Code. At present, "take" means to do or attempt to do the following: hunt, pursue, capture, or kill.

4.2 Clean Water Act Sections 404 and 401

The CWA made it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained. Environmental Protection Agency's (EPA) National Pollutant Discharge Elimination System (NPDES) permit program controls discharges. Point sources are discrete conveyances such as pipes or man-made ditches. Industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. The NPDES program regulates construction projects through storm water discharge permits.

Section 404 of the CWA protects waters of the United States that include wetlands and drainages, by requiring projects that would discharge fill material into them to obtain a permit or authorization from the U.S. Army Corps of Engineers (USACE). The permitting program is designed to minimize the fill of Waters of the United States, hereinafter referred to as "wetlands," and when impacts cannot be avoided, require compensatory mitigation.

In 1989, EPA issued guidance to States on applying Section 401 certification to protect wetlands. Section 401 of the CWA requires any applicant for a federal license or permit that could result in any discharge into a navigable water (*i.e.*, USACE permit to fill wetlands) to obtain certification from the California Regional Water Quality Control Boards (CRWQCB).

4.3 California Fish and Game Codes

Fish and Game Code Sections 1600-1607 involves the issue of a Lake or Streambed Alteration Agreement authorization from CDFG if a project would divert, obstruct, or change the natural flow of the bed, channel, or bank of any river, stream, or lake. A Streambed Alteration Agreement must also be issued if the project would use material from the streambeds designated by CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit.

Fish and Game Code Section 3511 describes bird species, primarily raptors that are "fully protected." Fully protected birds may not be taken or possessed, except under specific permit requirements.

Fish and Game Code Section 3503 states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto.

Fish and Game Code Section 3503.5 protects all birds of prey and their eggs and nests.

Fish and Game Code Section 3513 makes it unlawful to take, possess, or destroy any birds of prey or to take, possess, or destroy the nest or eggs of any such bird.

Fish and Game Code Sections 4700, 5050, and 5515 lists mammal, amphibian, and reptile species that are fully protected in California.

Fish and Game Code Sections 1900, et seq., the Native Plant Protection Act (NPPA), lists threatened, endangered, and rare plants protected by the state.

4.4 Migratory Bird Treaty Act

The MBTA (Title 16, United States Code, § 703-712) was implemented through various treaties and conventions between the United States, Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. The law was enacted in 1918 and was last amended in 1989. Pursuant to the Act, taking, killing, or possessing migratory birds is unlawful. The MBTA is administered by the USFWS, which establishes seasons for hunting and permitted actions (e.g., licensed hunting or research activities). Project proponents of actions that have potential to negatively affect migratory birds, their nests, or their eggs are required to enter into a Memorandum of Understanding with USFWS to ensure that impacts to migratory birds are minimized and that suitable habitats are restored and/or enhanced where possible and practicable.

4.5 Napa County General Plan

The Napa County General Plan is a product of years of efforts by residents and businesses in the community to maintain and improve Napa County's quality of life. The plan serves as a broad framework for planning the future of Napa County through its goals and policies. For the purposes of this project the conservation goals and policies related to woodlands are relevant.

Goal CON-4: Conserve, protect, and improve plant, wildlife, and fishery habitats for all native species in Napa County.

Goal CON-6: Preserve, sustain, and restore forests, woodlands, and commercial timberland for their economic, environmental, restoration, and open space values.

Policy CON-24: Maintain and improve oak woodland habitat to provide for slope stabilization, soil protection, species diversity, and wildlife habitat through appropriate measures including one or more of the following:

- Preserve, to the extent feasible, oak trees and other significant vegetation

- Comply with Oak Woodlands Preservation Act
- Provide replacement of lost oak woodlands or preservation of like habitat 2:1 when retention of existing vegetation is infeasible
- Retain stands of oaks for wildlife and slope/soil protection
- Maintain a mixture of oak species to ensure acorn production
- Prevent Sudden Oak Death and similar future threats to woodlands.

4.6 Napa County Ordinances

The following Napa County Ordinances pertain to protection of biological species and habitat.

4.6.1 Protected Trees

Protected trees are typically oak trees or trees with a specified diameter; however, there are no Napa County ordinances directly protecting trees (Napa County Code of Ordinances, 1993). Ordinances from the Napa County Code that indirectly serve to support protection of trees can be found in the Zoning Ordinance (Title 18), in particular the Conservation Regulations (Chapter 18.108) and the Floodplain Management Regulations (Chapter 16.04), as summarized below.

Napa County Conservation Regulations were adopted in 1991 and are intended to establish procedures for review of projects that may have an effect on water quality. In general, whenever a project within an erosion hazard area requires erosion control plan or storm water management plan the following types of conditions are relevant (summarized from regulations):

18.108.025-General provisions-Intermittent/perennial streams

- Protection of streams with setbacks of feet based upon slope
- Protection of water supply drainages through maintenance of 60% of tree canopy cover and 40% of shrubby herbaceous cover (18.108.027).

18.108.100-Erosion hazard areas-Vegetation preservation and replacement

- Existing vegetation shall be preserved to the maximum extent consistent with the project
- Trees six inches in diameter or larger shall not be removed until permits have been approved
- Trees retained shall be protected with construction fencing barricades
- Replacement of removed trees with fifteen-gallon trees at a ratio of 2:1

Napa County Floodplain Management Regulations seek to preserve riparian vegetation in order to preserve fish and game or reduce siltation. All development activities within riparian zones, 50 feet from the top of stream bank require a permit. In general these regulations also limit the type and amount of vegetation that may be removed (summarized from regulations).

16.04.750-Riparian zones-Restricted activities

- Only one native eighteen-inch diameter tree can be removed,
- or three native twelve-inch diameter trees can be removed,
- or six native six-inch diameter trees can be removed per one hundred linear feet of riparian zone.

4.6.2 Napa County Environmentally Sensitive Area

Napa County designates certain areas as environmentally sensitive areas. These are defined under Section 18.08.270-Environmentally sensitive area as follows:

- “Environmentally sensitive area” means those floodways, active fault zones, landslide areas, extended clear zones for heliports and airports, archaeologically sensitive areas, and rare and endangered plant and animal habitat areas as delineated on the Napa County environmental sensitivity maps on file in the conservation, development and planning department.”

Burleson identified through this map that project features at the Corona Mine are within some ESA areas (Attachment C). The most notable being the future access path which is located within a “Sensitive Biotic Oak Woodland.”

5.0 Potential Impacts to Biological Resources with Recommendations

The proposed project would improve the effectiveness of existing drainage treatment systems, implement a new mine drainage treatment system, mitigate physical and chemical hazards so that the site is safe for recreational use, and support a healthy aquatic ecosystem. The potential impacts of mine waste and infiltration system water accessibility to wildlife species were not specifically addressed in this report. They were not addressed because ecological toxicity levels for the project site have not been determined. If ecological toxicity levels are evaluated for the mine waste and infiltration systems, then the potential impacts on wildlife species can be addressed in a separate study.

Recommendations to protect sensitive species and habitat are included.

5.1 Bird Species

At the time of the survey, one special-status bird species, Lewis's woodpecker, was observed. This bird is currently on a watch list, but it is not a federally or state-listed species. Other than this species, no other special-status species were observed flying, foraging, or nesting on the proposed project site. The absence of nesting birds and special-status species during the pedestrian survey is not evidence that there will be no nesting birds or special-status species on the project area during construction.

Therefore, if construction activities will occur during the nesting season (estimated to be January through August), pre-construction surveys for the presence of special-status bird species or any nesting bird species within 500 feet of proposed construction areas should be conducted by a qualified biologist. This survey should be conducted no more than 14 days prior to the initiation of construction activities during the breeding season (raptors – February through August). During this survey, the biologist would inspect all trees and grassland immediately adjacent to the impact area for nests. If any other nest sites of bird species protected under the MBTA are observed within the vicinity of the project site, then the project should be modified and/or delayed as necessary to avoid direct take of identified nest, eggs, and/or young.

If vegetation will be removed by the proposed project and all necessary approvals have been obtained, substrate (e.g., trees and shrubs) containing nests should be removed between November 1 and February 28 to ensure that active (containing intact eggs, live chicks, or presence of an adult) nests are not destroyed or disturbed as a result of project construction activities. If a nest may be destroyed during the nesting season, a qualified biologist should survey the nest to determine if it is active.

5.2 Rare Plants and other Vegetation

No rare plant species were found at the site. The absence of rare plants on the survey dates is not evidence that there are no rare plants on the project area. Two populations of orchids were observed at the hunter's camp during the survey. These areas were flagged to ensure they could be located again.

Therefore, rare plant surveys should be conducted at the proposed project site between April and June. These surveys should be completed before any construction activities begin and should be floristic in nature.

The Twin Peaks Mine revegetation efforts at the existing infiltration ditch appear to be successful. Many native grasses and other plants were observed. Therefore, it is recommended to the extent feasible that construction activities minimize disturbances to the revegetated areas. The tunnel entrances for both mines provide near perfect habitat for native fern species.

5.3 VELB

Elderberry shrubs were observed at the hunter's camp and at another location on Oat Hill Road. The presence of VELB should be assumed. Proper avoidance measures such as barricading all elderberry shrubs with construction fencing should be implemented.

5.4 Trees

The trees in the hunter's camp were predominantly intermediate aged trees with large crowns. These trees likely facilitated higher bird activity and diversity at the camp; therefore, these trees should remain undisturbed. Soil at the hunter's camp is compacted and very little new growth can be found within the camp proper. It will benefit the site to promote tree recruitment if no longer used as a camp. This will involve planting young trees or seeds within the hunter's camp.

The proposed new access path to the lower Corona Mine drain tunnel portal, new infiltration system, and proposed pipeline is located in a closed-canopy (80-100% estimated cover) montane hardwood-conifer forest with a very light herbaceous and shrub understory. The construction of the new access path to the drain tunnel portal may require the removal of trees, mostly madrones and oak. The Napa County General Plan does not protect individual trees but has specific goals and policies that protect woodlands. Conservation Regulations (Chapter 18.108) in the Napa County Code of Ordinances specify the current mitigation for tree removal is replacement of 2:1 (18.108.100). Avoiding as many trees as possible during path construction will reduce impacts and the number of trees requiring mitigation.

The proposed new infiltration system is designed to meander through an area dominated by madrones. Many studies have concluded that populations of madrones have been declining in the Pacific North West in both urban and managed areas over the last twenty years (Bergendorf & Chalker-Scott 2001, Švihra et al. 2001, Maloney et al. 2004, and others). These studies attribute the decline mostly due to soil compaction, drought, fire suppression, and fungal diseases (i.e. Arbutus canker, madrones canker, root rot, and sudden oak death). Damage by these fungal pathogens is at its highest during drought but waterlogged root systems can have the same effects as drought on a tree (Elliot, 1999). Madrones are not protected or a special status species; however, the added

water from the new infiltration system to the madrones' root system may impact the long-term health of the trees in this area.

5.5 Riparian and Wetland Areas

Evidence of an isolated potential jurisdictional wetland of less than 1000 square feet in area was found on the project site. Soil surface cracks which are primary indicators of wetland hydrology were observed. Plants associated with wetlands such as Rabbit's foot, **Polypogon monspeliensis*, and Pond knotweed, *Polygonum polygaloides subsp. confertiflorum* were found in the ponding area. This area is unlikely to provide habitat for special-status branchiopod species because the ponding area appears to be created inadvertently by mine waste buildup. It does not appear to be a vernal pool which is the primary habitat for these branchiopod species. To avoid formal wetland delineations, 401/404 permitting, and possible branchiopod surveys, avoidance of this area is recommended.

Riparian areas were found in drainages that lead to Kidd Creek (Figure 3). These areas have special ordinances (Floodplain Management Regulations Chapter 16.04) that protect them. Since these riparian areas flow directly into the creek, activities that promote erosion such as cutting down trees and grading should be avoided in these areas. Slopes are very steep at the project site and are estimated at greater than 30% in particular spots. Therefore to protect streams, setbacks of streams for this project will likely be based upon slope and may require erosion control permits (16.04.750) or the appropriate stormwater pollution prevention plans. A formal discussion with Napa County should be conducted to discuss appropriate stream setbacks and preparation of the appropriate plan. A Section 1600 Streambed Alteration Permit from DFG would likely be required.

5.6 Bats

No bat species were observed during the pedestrian survey; however, the abandoned mines' portals may provide habitat for various bat species. According to a conversation with Justin Smith, property caretaker and ranch manager, there have been reported sightings of unknown bat species using the mines. In addition to mines, potential habitat in trees and buildings at the hunter's camp were also present. Special-status bat species that roost in mines or caves are the Townsend's big-eared bat (*Corynorhinus townsendii*) and the pallid bat (*Antrozous pallidus*). Both of these species occurred on the CNDDDB search and have been observed within 5 miles of the project site. These species are very sensitive to disturbance of roosting sites. The project construction plans to include placing bat-friendly gates over the portal openings to allow bats access to the mines. Construction activities near roosting areas may have impacts on bats if they are present. Therefore, it is recommended that prior to construction activities near the mine portals or possible roosting sites (trees) a bat survey be

completed including recommendations for avoidance of trees that provide bat habitat.

5.7 Other wildlife

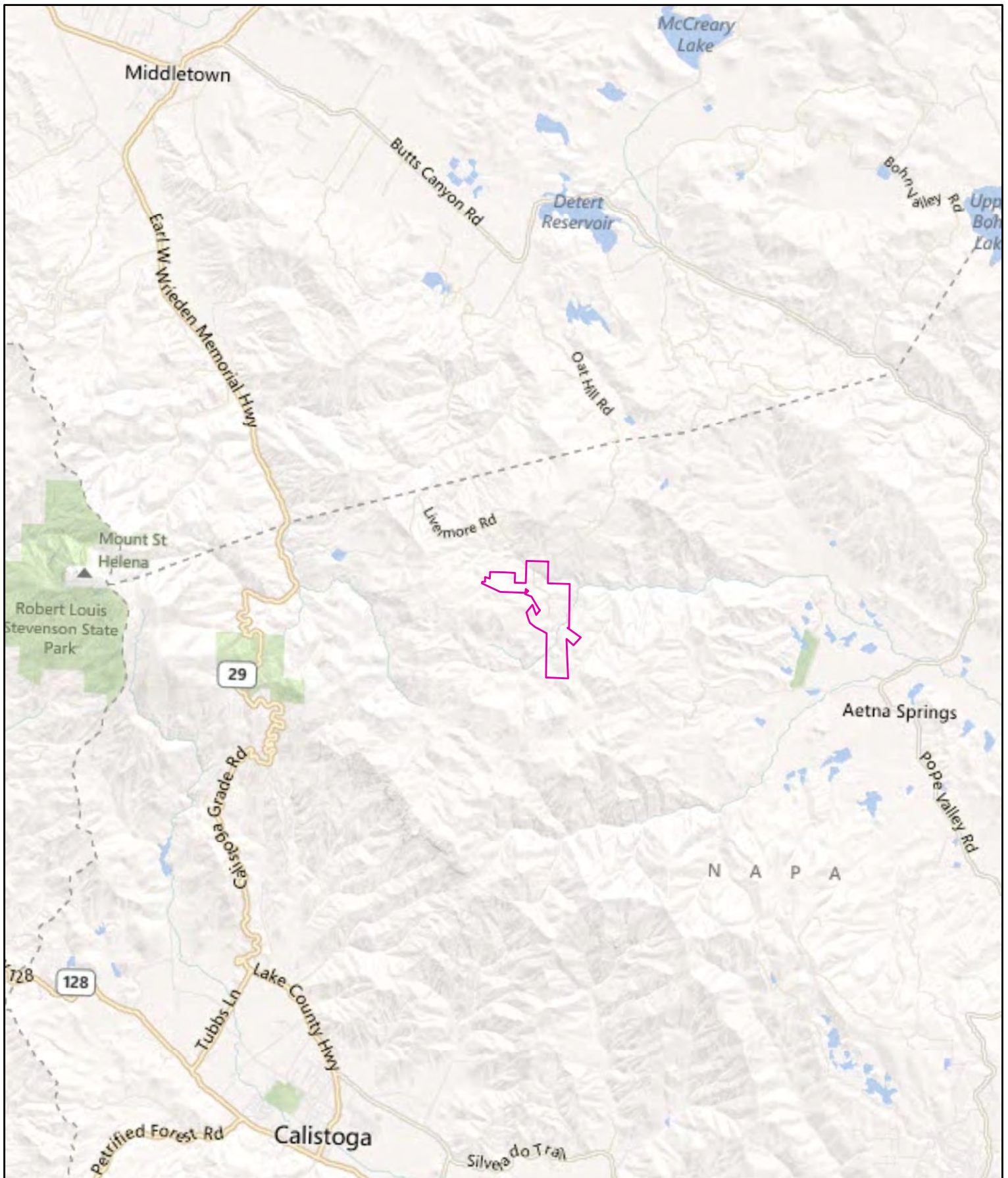
A dead salamander (genus *Ensatina*) was found in a man-made drain that is located about 50 feet down hill from the Twin Peaks portal; therefore, this drain may pose a hazard to small wildlife (amphibians and reptiles). It is recommended to install water-passing screens to maintain the integrity of the drain but prevent small animal access.

Bears have been reported on site and scat was observed during the survey. Mountain lions (*Puma concolor*) and scat were not observed; however, Justin Smith stated he has observed signs including tracks, scrapes on trees, and deer bone evidence supporting mountain lion presence on site. Therefore, it is recommended that safety signs be placed at entrances to the property warning visitors about the presence of these animals.

5.8 General Recommendations

The following general recommendations for protection of the habitat and plant and wildlife species should be considered, in addition to the specific recommendations listed above:

- Where present, existing paved and unpaved roads should be used to access the work area.
- All work should be performed in the dry season (approximately April 15 through October 15) to reduce the likelihood of erosion. A qualified biologist (biological monitor) should be present onsite to inspect any construction-related activities to ensure that no unnecessary ground disturbance or take of species occurs.
- No pesticides or herbicides should be used within 250 feet of riparian or wetland areas.
- Construction equipment should be washed before entering the site to avoid introducing non-native or invasive species to the area.
- All sensitive areas (riparian, potential wetland, and bat-roosting) should be clearly delineated and flagged prior to construction to avoid disturbance to these areas.
- Erosion control measures to protect environmental sensitive areas should be in place prior to the beginning of construction activities.



Legend

 John Livermore Property



0 0.5 1 2
Miles



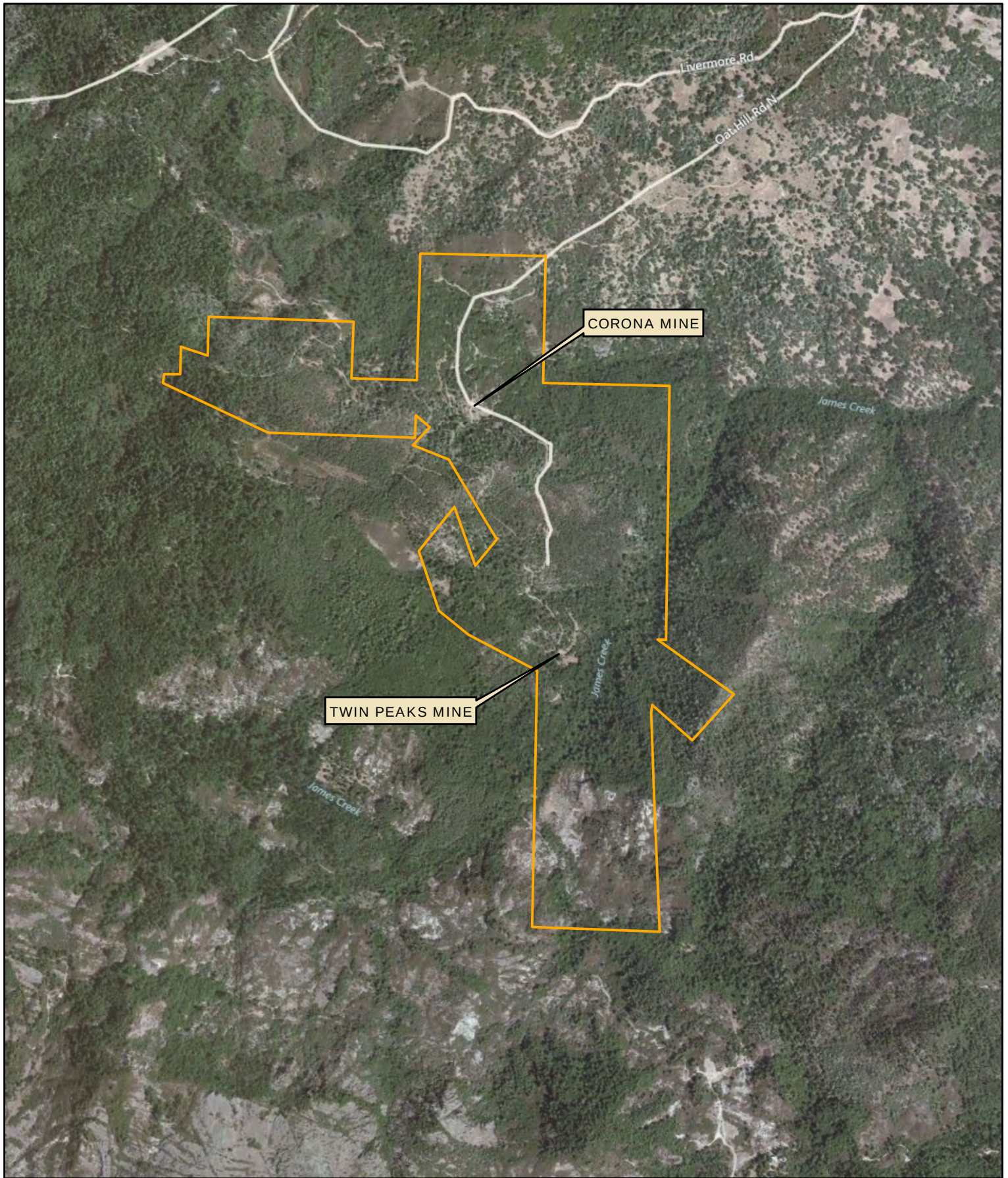
Corona Mine & Twin Peaks Mine

Figure 1 - Site Location

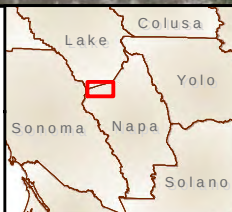
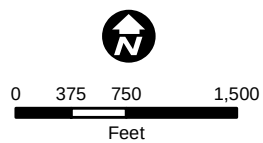
Source: Bing Maps roadways web mapping service;
Napa County GIS Department 2012.



Burleson Consulting, Inc.



Legend
 John Livermore Property

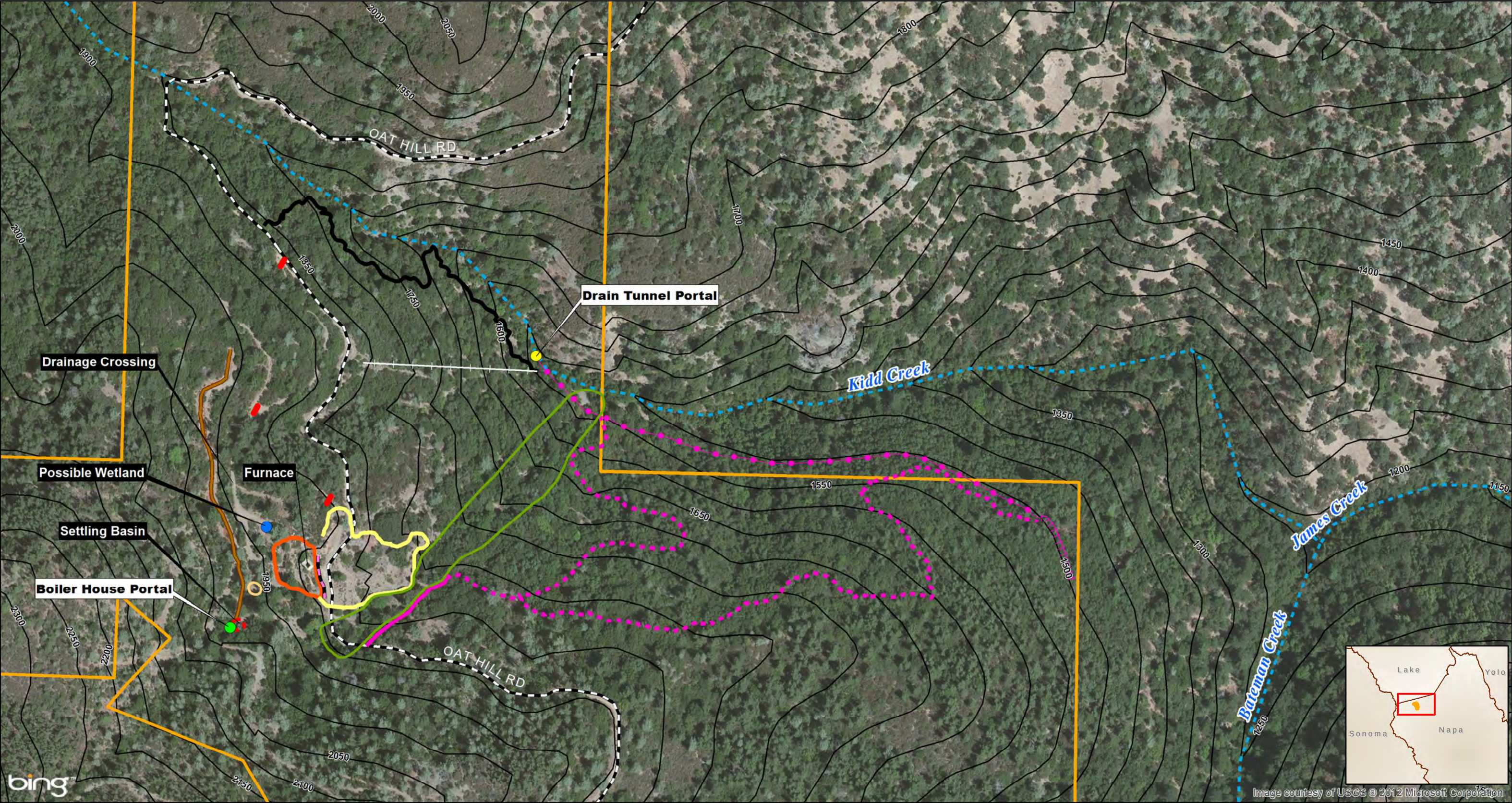


Corona Mine & Twin Peaks Mine

Figure 2 - Vicinity Map

Source: Bing Maps aerial web mapping service;
 Napa County GIS Department 2012.

Burleson Consulting, Inc.



Legend

John Livermore Property

Historic Ore Processing Area

50ft Contour

Roads

Creeks

Existing Path

Existing Rail Track Line

Existing Road

Future Spoils Storage

Riparian Area

Future Settling Basin

Future Trench

Future Access Path

Future Pipeline

Future Fence

Existing Trench

Approximate Limit of Mine Waste

Possible Wetland

Drain Tunnel Portal

Portal

Future Gate

N

0

150

300

600

Feet

Corona Mine

Figure 3: Project Features
Project Area - North

Source: Bing Maps aerial imagery
web mapping service;
Napa County GIS Department 2011;
Burleson Consulting 2012.

Burleson Consulting, Inc.

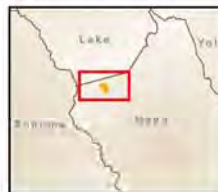
Path: S:\GIS\Projects\Corona - Twin Peaks Mine\Biological Report\Figure 3 - Corona Mine-07-23-2012.mxd



Image courtesy of USGS © 2012 Microsoft Corporation

Legend

- John Livermore Property
- Twin Peaks Portal
- Approximate Limit of Hunting Club
- 50ft Contour
- - - Future Settling Basin
- - - Roads
- Approximate Limit of Mine Waste
- - - Creeks
- Existing Infiltration Ditch

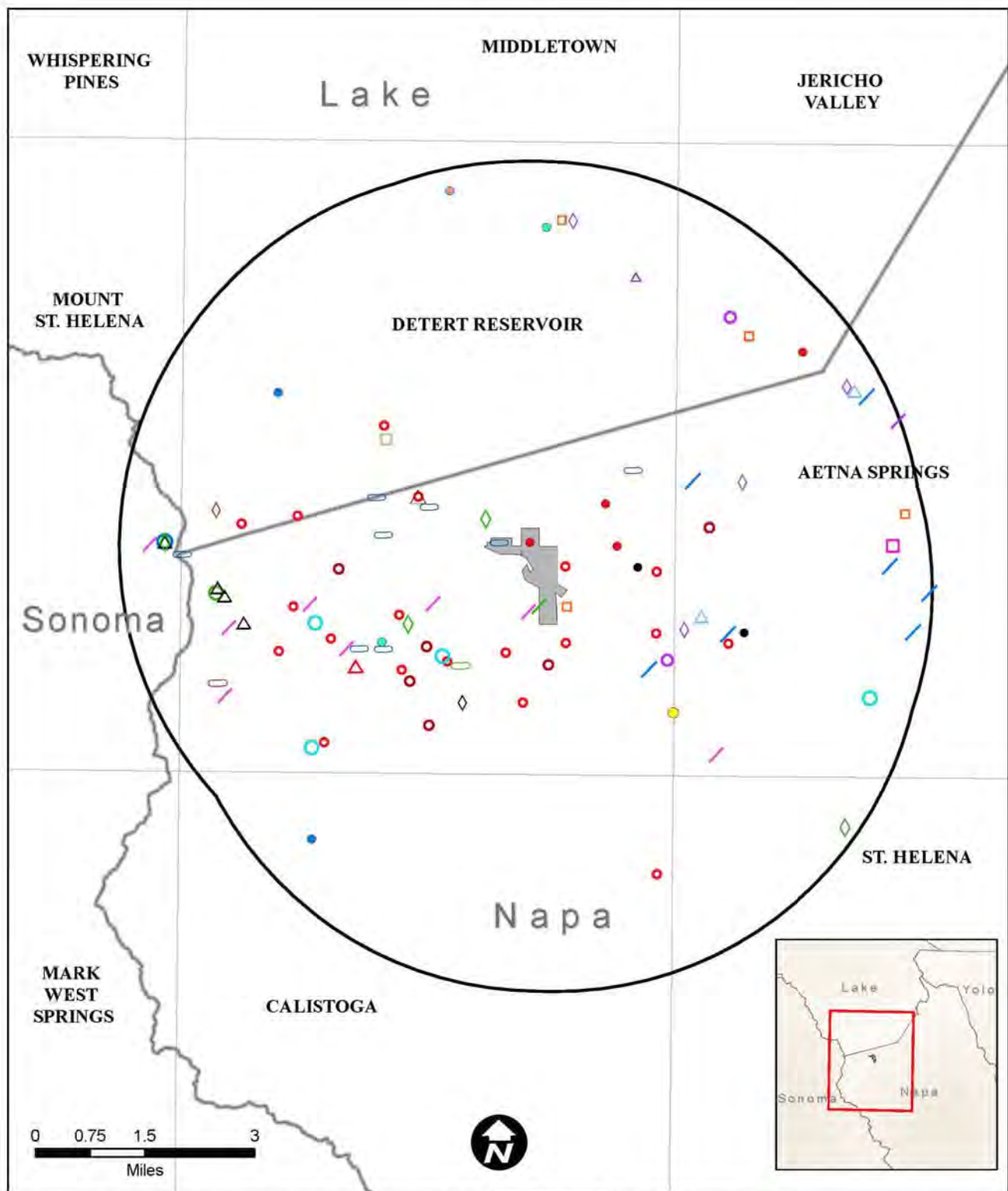


Twin Peaks Mine

Figure 4: Project Features Project Area - South

Source: Bing Maps aerial imagery
web mapping service;
Napa County GIS Department 2011;
Burleson Consulting 2012.

Burleson Consulting, Inc.



Corona Mine & Twin Peaks Mine

Source: California Natural Diversity Database
Biogeographic Data Branch
Department of Fish and Game 2012;
Napa County GIS Department 2010.



Burleson Consulting, Inc.

Legend

John Livermore Property

5 Mile Buffer

CNDDDB - Native Plant Society

Cobb Mountain lupine

Colusa layia

Calistoga ceanothus

Greene's narrow-leaved daisy

Hall's harmonia

Jepson's leptosiphon

Jepson's milk-vetch

Konocti manzanita

Marin County navarretia

Napa bluecurls

Napa false indigo

Rincon Ridge ceanothus

Santa Lucia dwarf rush

Socrates Mine jewel-flower

Sonoma beardtongue

Sonoma ceanothus

Tehama County western flax

adobe-lily

bent-flowered fiddleneck

early jewel-flower

green jewel-flower

marsh checkerbloom

narrow-anthered brodiaea

two-carpellate western flax

woolly meadowfoam

CNDDDB - DFG

Townsend's big-eared bat

foothill yellow-legged frog

pallid bat

purple martin

tricolored blackbird

western pond turtle

Figure 5
Species of Special Concern

TABLE 1
Special-Status Species List

Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood of Occurrence in Project Site and Comments
Plants				
Napa false indigo	<i>Amphora californica</i> var. <i>napensis</i>	– / – /1B.2	Shrub. Occurs in chaparral, mixed evergreen forest, and oak woodland. Known from <800m elevation. Blooms from May through July.	Low to Moderate: Potential habitat is present. Known to occur within 5 mile buffer zone of the proposed project site (site).
Bent-flowered fiddleneck	<i>Amsinckia lunaris</i>	– / – /1B.2	Annual herb. Occurs on gravelly slopes, in grassland, openings in woodlands and often on serpentine. Known from 5(50)-800m elevation. Blooms from March through June.	Low to Moderate: Potential habitat is present. Known to occur within 5 mile buffer zone of ranch.
Konocti Manzanita	<i>Arctostaphylos manzanita</i> <i>elegans</i>	– / – /1B.3	Shrub. Generally found on volcanic soils within woodland, chaparral, and coniferous forest. Known from 220-1850m elevation. Blooms from February-May.	Low to Moderate: Potential habitat is present. Known to occur within 5 mile buffer zone of ranch.
Clara Hunt's milk-vetch	<i>Astragalus claranus</i>	E/T/1B.1	Annual herb. Occurs in open grassy openings with thin clay soil. Known from 100-200m elevation. Blooms from April through May.	Not Likely: Occurs in elevations outside the project area. Potential habitat is absent. The nearest occurrence to the project site is 12 miles south of the site.
Jepson's milk-vetch	<i>Astragalus rattanii</i> var. <i>jepsonianus</i>	– / – /1B.2	Annual herb. Commonly on serpentine in meadows and on grassy hillsides within woodland, valley and foothill grassland, and chaparral. Known from 150-700m elevation. Blooms from April through June.	Low to Moderate: Potential habitat is present. Known to occur within 5 mile buffer zone of ranch.

TABLE 1
Special-Status Species List

Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood of Occurrence in Project Site and Comments
Narrow-anthered brodiaea	<i>Brodiaea leptandra</i>	– / – /1B.2	Perennial herb. Occurs in gravelly soils within open mixed evergreen forest and chaparral. Known from 40-1220m elevation. Blooms from May through July.	Moderate: Known to occur within 5 mile buffer zone of ranch. Suitable habitat on project sites.
Indian Valley brodiaea	<i>Brodiaea rosea</i>	– /E/1B.1	Perennial herb. Occurs on serpentine in openings, along drainages, chaparral, closed-cone coniferous forest, valley grassland, and wetland-riparian communities. Known from 450-600m elevation. Blooms from May through June.	Not Likely: Suitable habitat near the stream bottoms. These areas are all outside the project foot print. Nearest occurrence is 12 miles to the north of project site.
Ricon Ridge ceanothus	<i>Ceanothus confusus</i>	– / – /1B.1	Shrub. Occurs on volcanic slopes in chaparral, pine-oak woodland, and closed-cone pine forest. Known from 75-1100 m elevation. Blooms from February through April.	Moderate to High: Known occurrence on the ranch. Habitat present on project sites. Not observed during surveys.
Calistoga ceanothus	<i>Ceanothus divergens</i>	– / – /1B.2	Shrub. Occurs on volcanic slopes in chaparral, pine-oak woodland, and closed-cone pine forest. Known from 150-950m elevation. Blooms from February through April.	Low to Moderate: Known to occur within 5 mile buffer zone of ranch. Potential habitat is present on ranch.
Sonoma ceanothus	<i>Ceanothus sonomensis</i>	– / – /1B.2	Shrub. Occurs on serpentine and volcanic substrates within chaparral. Known from 140-600m elevation. Blooms from March through April.	Moderate to High: Known occurrences on the ranch. Potential habitat is present. Not observed during surveys.

TABLE 1
Special-Status Species List

Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood of Occurrence in Project Site and Comments
Pappose tarplant	<i>Centromadia parryi parryi</i>	– / – /1B.2	Annual herb. Occurs in coastal salt marshes, alkaline springs and seeps within coastal prairie and salt marsh, meadows, and valley and foothill grassland. Known from <400m elevation. Blooms from June through October.	Not Likely: Known occurrences within 5 mile buffer zone of ranch. Found at < 400m elevation. Project sites are minimum 488m elevation and specific habitat type is not present.
Greene's narrow-leaved daisy	<i>Erigeron greenei</i>	– / – /1B.2	Perennial herb. Occurs on serpentine, rocky alluvium within chaparral, woodland, and coniferous forest. Known from 500 (100)-1600m elevation. Blooms from May through September.	Low to Moderate: Known to occur within 5 mile buffer zone of ranch. Potential habitat is present.
Loch Lomond button-celery	<i>Eryngium constancei</i>	E/E/1B.1	Annual or perennial herb. Primary habitat is undisturbed vernal pools within wetland habitat. Known from +-800m. Blooms April through June.	Not Likely: No suitable habitat on project site. The nearest occurrence to the project site is 9 miles southwest of project site.
Adobe-lily	<i>Fritillaria pluriflora</i>	– / – /1B.2	Perennial herb. Occurs in adobe and in general, serpentine soils of chaparral, woodland, and foothill grassland within interior foothills. Known from <900m elevation. Blooms from February through April.	Low to Moderate: Known to occur within 5 mile buffer zone of ranch. Potential habitat is present.
Boggs Lake hedge-hyssop	<i>Gratiola heterosepala</i>	– /E/1B.2	Annual herb. Occurs in marshes, swamps, shallow water, and margins of vernal pools. Known from <1600 (2400) m elevation. Blooms from April through September.	Not Likely: No suitable habitat on project site. The nearest occurrence to the project area is 12 miles south project site.

TABLE 1
Special-Status Species List

Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood of Occurrence in Project Site and Comments
Hall's harmonia	<i>Harmonia hallii</i>	– / – /1B.2	Annual herb. Occurs in open sites, hills and ridges, open rocky areas, and disturbed areas in serpentine chaparral. Known from 500-1000m elevation. Blooms from April through June.	Low to Moderate: Known to occur within 5 mile buffer zone of ranch. Potential habitat is present.
Two-carpellate western flax	<i>Hesperolinon bicarpellatum</i>	– / – /1B.2	Annual herb. Occurs on serpentine soils in and on barren edges of chaparral. Known from 60-1000m elevation. Blooms May through July.	Low to Moderate: Known to occur within 5 mile buffer zone of ranch. Potential habitat is present.
Lake County western flax	<i>Hesperolinon didymocarpum</i>	– /E/1B.2	Annual herb. Occurs on serpentine within chaparral, valley grassland, and foothill woodlands. Known from 100-200m elevation. Blooms from May through June.	Not Likely: Project site is located above the normal occurrence elevation. No suitable habitat present on project sites. The nearest occurrences are all located north about 9 miles away.
Santa Lucia dwarf rush	<i>Juncus luciensis</i>	– /E/1B.2	Annual herb. Occurs in wet sandy soils of seeps, ephemeral drainages, wet meadows, vernal pools, streams, and roadsides within wetland-riparian communities. Known from 300-1900m elevation. Blooms from April through August.	Low: Known to occur within 5-mile buffer zone of ranch. Potential habitat is marginal.
Burke's goldfields	<i>Lasthenia burkei</i>	E/E/1B.1	Annual herb. Primary habitat is vernal pools and wet meadows within foothill woodland, freshwater wetlands, and wetland-riparian communities. Known from <500m elevation. Blooms from April through June.	Not Likely: No suitable habitat on project site. Elevation of this species is generally lower than project site elevation. The nearest occurrence was 6 miles to the southwest of the project site.

TABLE 1
Special-Status Species List

Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood of Occurrence in Project Site and Comments
Colusa layia	<i>Layia septentrionalis</i>	– / – /1B.2	Annual herb. Found in serpentine or sandy soils of openings on grassy slopes within chaparral, valley grassland, and foothill woodland communities. Known from 100-900m elevation. Blooms from April through June.	Low: Known to occur within 5-mile buffer zone of ranch. Potential habitat is marginal.
Jepson's leptosiphon	<i>Leptosiphon jepsonii</i>	– / – /1B.2	Annual herb. Occurs primarily on volcanic or serpentine substrates in open to partially shaded grassy slopes within chaparral and woodland communities. Known from <500m elevation. Blooms from April through May.	Low: Known to occur within 5-mile buffer zone of ranch. Elevation of this species is generally lower than project site elevation. Potential habitat is present.
Sebastopol meadowfoam	<i>Limnanthes vinculans</i>	E/E/1B.1	Annual herb. Primary habitat is wet meadows and vernal pools within foothill woodland, freshwater wetlands, and wetland-riparian communities. Known from <300m elevation. Blooms from April through May.	Not Likely: Elevation of this species is lower than project site. No suitable habitat on project site. The nearest occurrence was 9 miles to the west of the project site.
Cobb Mountain lupine	<i>Lupinus sericatus</i>	– / – /1B.2	Perennial herb. Primary habitat is gravelly soil on open wooded slopes within knobcone pine-oak woodland, chaparral, and lower montane coniferous forest communities. Known from 500-1500m elevation. Blooms from March through June.	Moderate: Known to occur within 5-mile buffer zone of ranch. Potential habitat is present. Not observed during surveys.
Baker's navarretia	<i>Navarretia leucocephala bakeri</i>	– / – /1B.1	Annual herb. Primary habitat is vernal pools, swales, wet meadows and seeps within woodlands, valley and foothill grassland, and lower montane coniferous forest communities. Known from <1700m elevation. Blooms from April through July.	Not Likely: Potential habitat is marginal. Nearest known occurrence is six miles to the southwest of the project site.

TABLE 1
Special-Status Species List

Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood of Occurrence in Project Site and Comments
Few-flowered navarretia	<i>Navarretia leucocephala pauciflora</i>	E/T/1B.1	Annual herb. Primary habitat is vernal pools within chaparral, freshwater wetlands, and wetland-riparian communities. Known from 400-900m elevation. Blooms from May through June.	Not Likely: No suitable habitat on project site. The nearest occurrence was 12 miles to the north of the project site.
Many-flowered navarretia	<i>Navarretia leucocephala plieantha</i>	E/E/1B.2	Annual herb. Primary habitat is vernal pools within yellow pine forest, freshwater wetlands, and wetland-riparian communities. Known from 800-1100m elevation. Blooms from May through June.	Not Likely: No suitable habitat on project site. The nearest occurrence was 12 miles to the north of the project site.
Marin County navarretia	<i>Navarretia rosulata</i>	– / – /1B.2	Annual herb. Rocky serpentine areas within closed-cone coniferous forest and chaparral communities. Known from 200-600m elevation. Blooms May through July.	Low : Known to occur within 5- mile buffer zone of ranch. Elevation of this species is generally lower than project site elevation. Potential habitat is present.
Slender Orcutt grass	<i>Orcuttia tenuis</i>	T/E/1B.1	Annual herb. Primary habitat is vernal pools within valley grassland, foothill woodland, freshwater wetlands, and wetland-riparian communities. Known from 200-1100m elevation. Blooms May through October.	Not Likely: No suitable habitat on project site. The nearest occurrence was 12 miles to the north of the project site.
Geysers dichanthelium	<i>Panicum acuminatum var. thermale</i>	– /E/1B.1	Perennial herb. Peaty meadows and pockets, often at hot springs and fumaroles within wetland-riparian communities. Known from 500-2700m elevation. Blooms from June through September.	Not Likely: No suitable habitat on project site. Nearest occurrence was 12 miles to the northwest of the project site.
Sonoma beardtongue	<i>Penstemon newberryi var. sonomensis</i>	– / – /1B.3	Subshrub-perennial herb. Occurs in outcrops and talus within chaparral habitats. Known from 500-2400m elevation. Blooms from June through August.	Moderate: Known to occur within 5-mile buffer zone of ranch. Potential habitat present. Not observed during surveys.

TABLE 1
Special-Status Species List

Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood of Occurrence in Project Site and Comments
Calistoga popcorn-flower	<i>Plagiobothrys strictus</i>	E/T/1B.1	Annual herb. Occurs in moist to wet sites near hot springs. Known from 100-150m elevation. Blooms from March through June.	Not Likely: No suitable habitat on project site. Elevation of this species is lower than project site elevation. Location is confidential by CDFG.
Napa blue grass	<i>Poa napensis</i>	E/E/1B	Perennial herb. Found in low sterile ground, runoff, near hot springs. Known from 100-200m elevation. Blooms in May.	Not Likely: No suitable habitat on project site. Elevation of this species is lower than project site elevation. Nearest occurrence is 6 miles southwest of project site near the town of Calistoga.
Lake County stonecrop	<i>Sedella leiocarpa</i>	E/E/1B.1	Annual herb. Occurs in seasonally wet-dry vernal pools and rocky depressions within valley and foothill grassland. Known from 500-600m elevation. Blooms April through May.	Not Likely: Marginal habitat present on project site. The nearest occurrence was 13 miles to the north.
Keck's checkerbloom	<i>Sidalcea keckii</i>	E/-/1B.1	Annual herb. Occurs on grassy slopes within valley grassland and foothill woodland communities. Known from 75-650m elevation. Blooms from April through May.	Not Likely: Occurs in generally lower elevations than project site. No suitable habitat on project site. Nearest occurrence was 11 miles to the northeast of the project site.
Marsh checkerbloom	<i>Sidalcea oregano hydrophila</i>	-/-/1B.2	Perennial herb. Occurs in wet soils of streambanks and meadows within wetland-riparian communities. Known from 440-2300m elevation. Blooms from July through September.	Low to Moderate: Known to occur within 5 mile buffer zone of ranch. Habitat present on project site.

TABLE 1
Special-Status Species List

Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood of Occurrence in Project Site and Comments
Kenwood Marsh checkerbloom	<i>Sidalcea oregano valida</i>	E/E/1B.1	Perennial herb. Occurs in freshwater marsh habitat within wetland and wetland-riparian communities. Known from +/-150m elevation. Blooms from June through September.	Not Likely: Elevation of this species is lower than project site elevation. No suitable habitat on project site. The nearest occurrence was 9 miles to the west of the project site.
Socrates Mine jewel- flower	<i>Streptanthus brachiatus brachiatus</i>	- / - /1B.2	Perennial herb. Occurs in serpentine barrens within open chaparral and woodland. Known from 600-950m elevation. Blooms from June-July.	Low to Moderate: Known to occur within 5 mile buffer zone of ranch. Potential habitat is present.
Green jewel-flower	<i>Streptanthus hesperidis</i>	- / - /1B.2	Annual herb. Occurs in serpentine barrens associated with openings in chaparral and oak woodland and cypress woodland. Known from 250-600m elevation. Blooms from May through July.	Low to Moderate: Known to occur within 5 mile buffer zone of ranch. Potential habitat present. Not observed during surveys.
Early jewel-flower	<i>Streptanthus vernalis</i>	- / - /1B.2	Annual herb. Occurs in serpentine talus and gravels within chaparral and closed-cone coniferous forest. Known from 600-900m elevation. Blooms from March through May.	Low to Moderate: Known to occur within 5 mile buffer zone of ranch. Potential habitat is present.
Napa bluecurls	<i>Trichostema ruygtii</i>	- / - /1B.2	Annual herb. Occurs in open areas in generally thin clay soils. May be seasonally saturated. Found within woodland, chaparral, valley and foothill grassland, vernal pools, and lower montane coniferous forests. Known from 30-600m elevation. Blooms June through October.	Low: Known to occur within 5 mile buffer zone of ranch. Elevation of this species is generally lower than project site elevation. Potential habitat is marginal.
Invertebrates				

TABLE 1
Special-Status Species List

Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood of Occurrence in Project Site and Comments
Conservancy fairy shrimp	<i>Branchinecta conservatio</i>	E/ – / –	Inhabit highly turbid water in vernal pools. Cysts hatch and shrimp become active when pools fill during the winter rainy season.	Not Likely: No occurrences documented in the proposed project vicinity. Possible seasonal wetland within the proposed project site may provide suitable habitat.
Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	T/ – / –	Endemic with patchy distribution. Valley elderberry longhorn beetles are completely dependent on their host plant, the elderberry shrub. Adult active period is from March to June.	High: No occurrences documented within project area. Suitable habitat (elderberry shrub) is present at the hunter's camp.
California freshwater shrimp	<i>Syncaris pacifica</i>	E/ – / –	Found in low elevation-low gradient perennial streams of Marin, Sonoma, and Napa counties.	Not Likely: No suitable habitat within project area. No occurrences documented within proposed project area. The nearest occurrence was 9 miles to the southwest of the project site.
Reptiles and Amphibians				
California tiger salamander	<i>Ambystoma californiense</i>	T/SC/ –	Terrestrial salamander. Restricted to grasslands and low foothill regions with aquatic sites for breeding that may include valley needle grassland, valley wild rye grassland, non-native grassland and wildflower fields with vernal pools or other temporary ponds. Other habitats include valley-oak woodland.	Not Likely: No suitable habitat present within project area. No occurrences documented in the proposed project vicinity.

TABLE 1
Special-Status Species List

Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood of Occurrence in Project Site and Comments
Western pond turtle	<i>Emys marmorata</i>	– /SC/ –	Aquatic turtle that requires basking sites such as partially submerged logs, rocks, mats of floating vitiation, or open mud banks. Associated with permanent or nearly permanent water.	Not Likely: No suitable habitat present within project area.
California red-legged frog	<i>Rana aurora draytonii</i>	T/SC/ –	Largest native frog in the Western United States. Requires dense, shrubby or emergent vegetation associated with deep still or slow-moving water. Requires water 11-20 weeks of permanent water. Breeds from November through March.	Low: The nearest occurrence was documented 6 miles to the southeast project area. Not ideal habitat within the proposed project site.
Foothill yellow-legged frog	<i>Rana boylei</i>	– /SC/ –	Frequents rocky streams and rivers in forests and woodlands. Eats aquatic and terrestrial invertebrates.	High: Occurrences documented within 5 miles of project area. Garter snakes, predators of foothill yellow-legged frogs, were observed on biological survey.
Birds				
Tricolored blackbird	<i>Agelaius tricolor</i>	– /SC/ –	Summer migrant to area. Found throughout the Central Valley, where it is associated with wetland areas with dense vegetation such as cattails, tule, and bulrush. Forage in grassland and agricultural fields. Nest in large colonies. Breeding season is April-July. However, has also been reported breeding in October and November.	Not Likely: No occurrences documented in the proposed project vicinity. No suitable habitat present within the proposed project area.

TABLE 1
Special-Status Species List

Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood of Occurrence in Project Site and Comments
Prairie Falcon	<i>Falco mexicanus</i>	*	Uncommon permanent resident of California. Feeds mostly on small mammals and some birds. Requires sheltered cliff ledges for cover and nesting. Breeding is from mid-February through mid-September.	Not Likely: Documented in the proposed project vicinity. No suitable habitat within the project area. No cliff ledges for cover or nesting. If present, birds are most likely to be seen soaring overhead.
Peregrine Falcon	<i>Falco peregrinus</i>	– /FP/ –	Very uncommon breeding resident and uncommon as a migrant. Found primarily in central valley of California. Feeds on a variety of birds up to duck size. Requires protected cliffs and ledges for cover. Breeds near wetlands, lakes, rivers, or other water on high cliffs, banks, dunes, or mounds.	Not Likely: Documented in the proposed project vicinity. No suitable habitat within the project area. No cliff ledges for cover or nesting nor food sources on project area. If present, birds are most likely to be seen soaring overhead.
Bald Eagle	<i>Haliaeetus leucocephalus</i>	– /E/ –	Requires large bodies of water, or free flowing rivers with abundant fish, and adjacent snags or other perches. Feeds on birds, fish, or scavenges. Nesting is in large, old-growth forests, typically ponderosa pine.	Low: No suitable nesting areas on site. The nearest occurrence was on McCreary Lake (7 miles) from the project area. Most likely to see this species flying overhead.
Lewis' woodpecker	<i>Melanerpes lewis</i>	*	Requires open habitats with scattered trees and snags with cavities. Cover provided by cavities and foliage of trees and shrubs. Prefers oaks threes and frequents deciduous and conifer habitats with brushy understory.	High: Observed during the survey on the hunter's Camp. Suitable habitat on site.

TABLE 1
Special-Status Species List

Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood of Occurrence in Project Site and Comments
Purple martin	<i>Progne subis</i>	–/SC/–	Known spring migrant to the area. Largest North American swallow. Colonial nester in woodlands; mostly woodpecker cavities or human-made structures. Nests are often located in a tall isolated tree. Breeds from late March through July.	Low to Moderate: No occurrences documented in the proposed project vicinity. The project site contains grassland for foraging and may nest in human-made structures at hunter's camp or Woodpecker nests.
Northern Spotted Owl	<i>Strix occidentalis caurina</i>	T/–/–	Resides in old-growth, multi-layered mixed conifer, redwood, Douglas-fir habitats. Feeds on small mammals. Probably requires a permanent water source. Typically nests in a tree or snag cavity, or in broken top of large tree.	Not Likely: No old growth habitat on site. No occurrences documented in the proposed project vicinity.
Fish				
Delta smelt	<i>Hypomesus transpacificus</i>	T/T/–	Salt-tolerant. Endemic to the Sacramento-San Joaquin estuary, where it spends most of its adult life. Spawn in shallow, fresh or slightly brackish water upriver from the mixing zone, including the Sacramento River, Mokelumne River system, Cache Slough region, San Francisco Bay Delta, and Montezuma Slough area. Spawning occurs in fresh water between January and July.	Not Likely: No occurrences within 5 miles of project site. Physical barrier, downstream in James Creek, preventing the fish from reaching the proposed project site. Also creeks are ephemeral.

TABLE 1
Special-Status Species List

Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood of Occurrence in Project Site and Comments
Lahontan cutthroat trout	<i>Oncorhynchus clarki henshawi</i>	T/ – / –	Occur in a wide variety of cold-water river and lake habitats in the Carson, Walker, and Truckee basins. Only a few streams contain this species though fish have been planted and established outside of their historic range. Primarily occupy streams with well-vegetated and stable stream banks and pools. Spawning occurs in April to July depending on stream flow.	Not Likely: No occurrences within 5 miles of project site. Physical barrier, downstream in James Creek, preventing the fish from reaching the proposed project site. Also creeks are ephemeral.
Coho salmon	<i>Oncorhynchus kisutch</i>	E/ – / –	Anadromous: Associated with fresh, brackish, and marine riverine habitats. In the Klamath and Eel rivers spawns from November to January.	Not Likely: No occurrences within 5 miles of project site. Physical barrier, downstream in James Creek, preventing the fish from reaching the proposed project site. Also creeks are ephemeral.
Central valley steelhead	<i>Oncorhynchus mykiss</i>	T/SC/ –	Anadromous. Associated with fresh, brackish, and marine riverine habitats. Spawns in main stems of the Sacramento and San Joaquin Rivers. Spawning occurs between December and June.	Not Likely: No occurrences within 5 miles of project site. Physical barrier, downstream in James Creek, preventing the fish from reaching the proposed project site. Also creeks are ephemeral.

TABLE 1
Special-Status Species List

Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood of Occurrence in Project Site and Comments
Central Valley chinook, Spring-run	<i>Oncorhynchus tshawytscha</i>	T/T/ –	Anadromous. Associated with fresh, brackish, and marine riverine habitats. Spawns in main stems and tributaries of the Sacramento River. Principal holding and spawning areas were in the middle and headwater reaches, including the San Joaquin, Feather, and upper Sacramento and San Joaquin Rivers. Spawning occurs from late August through October.	Not Likely: No occurrences within 5 miles of project site. Physical barrier, downstream in James Creek, preventing the fish from reaching the proposed project site. Also creeks are ephemeral.
Central Valley chinook, winter-run	<i>Oncorhynchus tshawytscha</i>	E/E/ –	Anadromous. Associated with fresh, brackish, and marine riverine habitats. Spawns in main stems and tributaries of the Sacramento and San Joaquin Rivers. Principal holding and spawning areas were in the middle and headwater reaches including the San Joaquin, Feather, and upper Sacramento Rivers. Spawning occurs from April to mid-August.	Not Likely: No occurrences within 5 miles of project site. Physical barrier, downstream in James Creek, preventing the fish from reaching the proposed project site. Also creeks are ephemeral.
Mammals				
Pallid bat	<i>Antrozous pallidus</i>	–/SC/ –	The pallid bat is a locally common species of low elevations in California. Occupies grasslands, shrublands, and woodlands. Requires a source of drinking water.	Moderate: Mines, woodlands and abandoned buildings may provide roost sites. Suitable foraging habitat is present in the project area.

TABLE 1
Special-Status Species List

Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood of Occurrence in Project Site and Comments
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	– /SC/ –	Found throughout California in all habitats that are not subalpine or alpine. Feeds on small moths and a variety of beetles. Roosts require caves, mines, tunnels, or buildings. Requires a source of drinking water.	Moderate: Mined, woodlands and abandoned buildings may provide roost sites. Suitable foraging habitat is present in the project area.
Silver-haired bat	<i>Lasionycteris noctivagans</i>	*	Summer habitats include coniferous forests, woodlands, and riparian habitats. Roosts in hollow trees, snags, buildings, rock crevices, caves, and under bark. Requires a source of drinking water.	Moderate: Mined, woodlands and abandoned buildings may provide roost sites. Suitable foraging habitat is present in the project area.

Key to Status Codes:Federal Status:

E: Endangered

T: Threatened

State Status:

E: Endangered

T: Threatened

SC: California species of special concern

FP: CDFG fully protected

CNPS- California Native Plant Society Status:

1B = Rare, threatened or endangered in California and elsewhere and are rare throughout their range. According to CNPS, all of the plants constituting List 1B meet the definitions of Sec. 1901.

* Watch List or Species of Local Concern

Likelihood of occurrence is for projects sites only: hunter's camp, Corona Mine, and Twin Peaks Mine. All project sites are disturbed lowering the likelihood of occurrence. CNPS rank 4 plants (limited distribution or infrequent throughout a broader area in California) were omitted from the table. According to CNPS, very few of the rank 4 plants meet the definitions of Sec. 1901. Only processed data from the CNDDDB were included in the table. Unprocessed data were omitted.

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ATTACHMENT A

Biological Survey Photo Log

Attachment A
Representative Biological Survey Photos 5/8-9/2012

Viewing Direction	Photo Description	Photo
EAST	Corona and Twin Peaks Mine Drainage Treatment Project Landscape	
WEST	Corona Mine Boiler House Fern	

Attachment A
Representative Biological Survey Photos 5/8-9/2012

Viewing Direction	Photo Description	Photo
WEST	Hunters Camp	
SOUTH	Hunters Camp	

Attachment A
Representative Biological Survey Photos 5/8-9/2012

Viewing Direction	Photo Description	Photo
SOUTH	Twin Peaks Ferns and California Torrea Tree	
NA	Dead Salamander (<i>Ensatina. sp.</i>) found in a drain at the Twin Peaks Mine	

Attachment A
Representative Biological Survey Photos 5/8-9/2012

Viewing Direction	Photo Description	Photo
NORTH	Future Access Path Mostly Oak Trees, Madrone, and Steep Slopes	
EAST	Future Infiltration Trench Mostly Madrone Trees Present	

Attachment A
Representative Biological Survey Photos 5/8-9/2012

Viewing Direction	Photo Description	Photo
EAST	Potential Jurisdictional Wetland Located above the Corona Mine Furnace	
EAST	Mine Waste Berm of Potential Jurisdictional Wetland Located Above The Corona Mine Furnace	

Attachment A
Representative Biological Survey Photos 5/8-9/2012

Viewing Direction	Photo Description	Photo
EAST	Orchids	
SOUTH	Infiltration Ditch Area with Madrones *Photo Taken 5/22/12	

Attachment A
Representative Biological Survey Photos 5/8-9/2012

Viewing Direction	Photo Description	Photo
SOUTH	Elderberry Shrub near Oat Hill Road *Photo Taken 5/22/12	
WEST	Ferns near Mine Entrances *Photo Taken 9/27/11	

Attachment A
Representative Biological Survey Photos 5/8-9/2012

Viewing Direction	Photo Description	Photo
SOUTH	Riparian Area near Upper Corona Mine *Photo Taken 5/22/12	
NORTH	Revegetation of Infiltration Ditch *Photo Taken 9/27/11	

ATTACHMENT B

List of Species Observed

Attachment B LIST OF SPECIES OBSERVED

Corona Mine (CM), Twin Peaks Mine (TP), Hunter's Camp (HC),
and Existing Access Sites (EA)

May 8 and 9, 2012

This is a list of species observed for the time of year the surveys took place and should not be considered a comprehensive list.

Plant taxonomy is according to the Jepson Interchange, UC Berkeley.

Bird identification was based on National Geographic Field Guide to the Birds of North America. Taxonomy is according to the American Ornithological Union. All other wildlife identification and taxonomy is based on Peterson Field Guides.

HERBACEOUS PLANTS AND SHRUBS

LATIN NAME	COMMON NAME	SITE
<u>FERNS</u>		
BLECHNACEAE (Deer Fern Family)		
<i>Woodwardia fimbriata</i>	Giant chain fern	CM, TP
DENNSTAEDTIACEAE (Bracken Fern Family)		
<i>Pteridium aquilinum</i> var. <i>pubescens</i>	Bracken fern	HC
DRYOPTERIDACEAE (Wood Fern Family)		
<i>Dryopteris arguta</i>	Wood fern	EA, TP
<i>Polystichum lonchitis</i>	Holly shield fern	CM
POLYPODIACEAE (Polypody Family)		
<i>Polypodium californicum</i>	California polypody	CM, TP, EA
PTERIDACEAE (Cliff Brake Family)		
<i>Adiantum jordanii</i>	California maidenhair fern	EA
<i>Aspidotis californica</i>	California lip fern	CM
<i>Pentagramma triangularis</i>	Goldback fern	CM, TP

MONOCOTS**AGAVACEAE (Agave Family)**

<i>Chlorogalum pomeridianum</i> (genus formerly included in Liliaceae)	Soap plant	CM
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ALLIACEAE (Onion Family)

<i>Allium</i> spp.	Wild native onions	EA
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CYPERACEAE (Sedge Family)

<i>Carex multicaulis</i>	Stick sedge	HC
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IRIDACEAE (Iris Family)

<i>Iris macrosiphon</i>	Bowl iris	TP
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JUNCACEAE (Rush Family)

<i>Juncus</i> spp.	Rush	CM, TP
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LILIACEAE (Lily Family)

<i>Calochortus amabilis</i>	Golden fairy lantern	EA
<i>Calochortus tolmiei</i>	Tolmie's cat's ear	CM, TP, EA
<i>Fritillaria</i> spp.	Fritillary lily	EA
<i>Prosartes hookeri</i> (formerly <i>Disporum hookeri</i>)	Hooker's fairy bells	HC

MELANTHIACEAE (False Hellebore Family)

<i>Toxicoscordion micranthum</i> (genus, <i>Zigadenus</i> , formerly included in Liliaceae)	Death Camas or Star Lily	HC, CM, EA
<i>Trillium chloropetalum</i> (genus formerly included in Liliaceae)	Giant wake robin	HC

ORCHIDACEAE (Orchid Family)

<i>Piperia</i> sp.	Piperia orchid	HC
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POACEAE (Grass Family)

* <i>Aira caryophyllea</i>	European hairgrass	CM, TP
<i>Agrostis exarata</i>	Spike bent grass	CM, TP
* <i>Avena barbata</i>	Wild oat	CM, TP, HC
* <i>Bromus diandrus</i>	Ripgut	CM, TP
* <i>Bromus hordeaceus</i>	Soft chess	CM, TP, HC
<i>Bromus laevipes</i>	Woodland brome	HC, TP, EA
* <i>Bromus madritensis m.</i>	Noxious brome	CM, TP

* <i>Cortaderia</i> spp.	Pampas grass	CM
* <i>Cynosurus echinatus</i>	Hedgehog dogtail grass	HC
<i>Elymus glaucus glaucus</i>	Blue wildrye	HC, CM, TP, EA
<i>Festuca californica</i>	California fescue	CM, TP
<i>Festuca idahoensis</i>	Idaho fescue	CM, TP
<i>Festuca microstachys</i>	Few-flowered fescue	HC, CM, TP
* <i>Hordeum marinum</i>		
subsp. <i>gussoneanum</i>	Introduced barley	CM, TP
* <i>Hordeum murinum</i>	Introduced barley	CM, TP
<i>Melica imperfecta</i>	Little California melic	CM, TP
* <i>Phalaris aquatica</i>	Harding grass	CM
* <i>Polypogon monspeliensis</i>	Rabbit's foot	CM
* <i>Festuca myuros</i> (formerly <i>Vulpia myuros</i>)	Rat-tail fescue	CM, TP

THEMIDACEAE (Brodiaea Family)

<i>Dichelostemma volubile</i> (genus formerly included in Liliaceae)	Twining wild onion	CM, TP
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TYPHACEAE (Cattail Family)

<i>Typha</i> sp.	Cattail	CM
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EUDICOT HERBS, VINES, AND SHRUBS**ADOXACEAE (Muskroot Family)**

<i>Sambucus nigra</i>		
subsp. <i>canadensis</i> (formerly <i>Sambucus mexicana</i> ; genus formerly included in Caprifoliaceae)	Elderberry	HC

ANACARDIACEAE (Sumac/Cashew Family)

<i>Toxicodendron diversilobum</i>	Poison oak	HC, CM, TP, EA
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APIACEAE (Carrot Family)

* <i>Torilis arvensis</i>	Hedge-parsley	CM, TP
<i>Sanicula crassicaulis</i>	Pacific sanicle	HC, TP, EA

ASTERACEAE (Aster Family)

<i>Agoseris heterophylla</i>	Mountain agoseris	CM, TP
<i>Artemisia douglasiana</i>	mugwort	CM
<i>Baccharis pilularis</i>	Coyote brush	CM, TP
* <i>Carduus pycnocephalus</i>	Italian thistle	TP
<i>Eriophyllum lanatum</i>	Woolly sunflower	CM, TP

<i>E. lanatum</i> var. <i>achilleoides</i>	Woolly sunflower	CM, TP
<i>Hieracium albiflorum</i>	White hawkweed	HC, TP
* <i>Hypochaeris glabra</i>	Smooth cat's ear	CM, TP
* <i>Lactuca saligna</i>	Willow lettuce	CM
<i>Logfia filaginoides</i> (formerly <i>Filago californica</i>)	California filago	TP
* <i>Logfia gallica</i> (formerly <i>Filago gallica</i>)	Narrow leaf filago	CM
<i>Maida exigua</i>	Little tarweed	CM, TP
<i>Madia sativa</i>	Big tarweed	EA, CM, TP
<i>Micropus californicus</i> var. <i>californicus</i>	Cottonweed	CM
<i>Pseudognaphalium californicum</i> (formerly <i>Gnaphalium californicum</i>)	California cudweed	CM
<i>Psilocarphus tenellus</i>	Woolly marbles	CM
BORAGINACEAE (Borage Family)		
<i>Cynoglossum grande</i>	Grand hound's tongue	HC, EA
<i>Eriodictyon californicum</i> (genus formerly included in Hydrophyllaceae)	Yerba Santa	CM, TP
<i>Nemophila heterophylla</i> (genus formerly included in Hydrophyllaceae)	Variable-leaf nemophila	EA
BRASSICACEAE (Mustard Family)		
* <i>Barbarea orthoceras</i>	Wintercress/Yellow Rocket	CM
CALYCANTHACEAE (Spicebush Family)		
<i>Calycanthus occidentalis</i>	California Spicebush	CM
CAPRIFOLIACEAE (Honeysuckle Family)		
<i>Lonicera hispidula</i>	Hairy honeysuckle	HC, CM, EA
CARYOPHYLLACEAE (Pink Family)		
* <i>Spergularia rubra</i>	Ruby sand spurry	CM
<i>Cerastium arvense</i>	Mouse-ear chickweed	CM
CONVOLVULACEAE (Morning Glory Family)		
<i>Calystegia purpurata</i>	False bindweed	TP

ERICACEAE (Heath Family)

<i>Arctostaphylos manzanita</i>	Common Manzanita	CM, TP
<i>Arctostaphylos. viscida</i> subsp. <i>Viscida</i>	White-leaf Manzanita	CM

FABACEAE (Pea Family)

<i>Acmispon brachycarpus</i> (formerly <i>Lotus humistratus</i>)	Woolly lotus	CM
<i>Acmispon glaber</i> var. <i>glaber</i> (formerly <i>Lotus scoparius</i> var. <i>scoparius</i>)	California deerweed	CM, TP
<i>Acmispon parviflorus</i> (formerly <i>Lotus micranthus</i>)	Small flowered lotus	CM, TP
<i>Cercis occidentalis</i>	western redbud	HC, EA
<i>Lathyrus vestitus</i>	Pacific pea	HC, CM, EA
* <i>Medicago polymorpha</i>	Bur clover	CM, TP
* <i>Trifolium dubium</i>	Little hop clover	CM, TP
* <i>Trifolium hirtum</i>	Rosy clover	CM, TP
* <i>Trifolium incarnatum</i>	Crimson clover	TP
<i>Trifolium microcephalum</i>	Small headed clover	CM
* <i>Trifolium resupinatum</i>	Reverse clover	CM
* <i>Vicia hirsuta</i>	Hirsute vetch	CM
* <i>Vicia villosa</i>	Purple hairy vetch	CM, TP

FAGACEAE (Oak Family)

<i>Quercus berberidifolia</i>	Scrub oak	CM
<i>Quercus durata</i> var. <i>durata</i>	Leather oak	CM

GERANIACEAE (Geranium Family)

* <i>Geranium dissectum</i>	Cut-leaf Geranium	CM, TP
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GROSSULARIACEAE (Gooseberry Family)

<i>Ribes menziesii</i>	Canyon gooseberry	HC
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HYDRANGEACEAE (Hydrangea Family)

<i>Whipplea modesta</i> (genus formerly included in Philadelphaceae)	Whipplea	EA, CM
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HYPERICACEAE (St. Johnswort Family)

<i>Hypericum anagalloides</i>	Tinker's Penny	CM
<i>Hypericum concinnum</i>	St. Johnswort	TP

LAMIACEAE (Mint Family)

<i>Stachys ajugoides</i>	Hedge nettle	HC, CM, TP, EA
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MALVACEAE (Mallow Family)

<i>*Malva nicaeensis</i>	Nice mallow	CM
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MONTIACEAE (Miner's Lettuce Family)

<i>Claytonia perfoliata</i> (genus formerly included in Portulacaceae)	Miner's Lettuce	EA
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MYRSINACEAE (Myrsine Family)

<i>*Anagallis arvensis</i> (genus formerly included in Primulaceae)	Scarlet Pimpernel	CM
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<i>Trientalis latifolia</i> (genus formerly included in Primulaceae)	Starflower	HC, EA
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ONAGRACEAE (Evening Primrose Family)

<i>Epilobium brachycarpum</i>	Tall Annual Willow Herb	CM
<i>Epilobium minutum</i>	Little willowherb	CM

OROBANCHACEAE (Broom Rape Family)

<i>Castilleja attenuata</i>	Slender owl's clover	CM
<i>Pedicularis densiflora</i> (genus formerly included in Scrophulariaceae)	Indian Warrior	HC

PAPAVERACEAE (Poppy Family)

<i>Dendromecon rigida</i>	Tree poppy	TP
<i>Eschscholzia californica</i>	California poppy	CM

PHRYMACEAE (Monkeyflower Family)

<i>Mimulus aurantiacus</i>	Orange-bush Monkeyflower	CM, TP
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PLANTAGINACEAE (Plantain Family)

<i>Penstemon heterophyllus</i>	Foothill penstemon	CM
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POLEMONIACEAE (Phlox Family)

<i>Collomia heterophylla</i>	Variable leaved collomia	HC
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POLYGALACEAE (Milkwort Family)

<i>Polygala californica</i>	California milkwort	HC, EA
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POLYGONACEAE (Buckwheat Family)

<i>Polygonum polygaloides</i> subsp. <i>Confertiflorum</i>	Pond knotweed	CM
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RANUNCULACEAE (Buttercup Family)

<i>Clematis lasiantha</i>	Chaparral virgin's bower	CM
<i>Delphinium nudicaule</i>	Red larkspur	EA

RHAMNACEAE (Buckthorn Family)

<i>Ceanothus integerrimus</i>	Deerbrush	CM, TP
<i>Rhamnus californica</i>	California coffeeberry	HC, CM, EA

ROSEACEAE (Rose Family)

<i>Adenostoma fasciculatum</i>	Chamise	CM
<i>Heteromeles arbutifolia</i>	Toyon	CM, EA
<i>Rosa gymnocarpa</i>	California little wood rose	HC, CM, EA

RUBIACEAE (Bedstraw or Madder Family)

<i>Galium andrewsii</i>	Andrew's Bedstraw	CM
<i>Galium californicum</i>		
<i>californicum</i>	California bedstraw	HC, CM, EA
<i>Galium nuttallii</i>	Nuttall's bedstraw	EA

SAXIFRAGACEAE (Saxifrage Family)

<i>Lithophragma heterophyllum</i>	Woodland Star	EA
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SOLANACEAE (Nightshade Family)

<i>Solanum xanti</i>	Chaparral nightshade	CM
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VIOLACEAE (Violet Family)

<i>Viola lobata</i>	Lobed or Pine Violet	HC
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VITACEAE (Grape Family)

<i>Vitis californica</i>	California Grape	EA
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TREES Common Throughout All Sites and the Bioregion**BETULACEAE (Birch Family)**

<i>Alnus rhombifolia</i>	White Alder	
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CORNACEAE (Dogwood Family)

<i>Cornus nuttallii</i>	Nuttall's dogwood	
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CUPRESSACEAE (Cypress Family)

<i>Calocedrus decurrens</i>	Incense Cedar or Cypress	
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ERICACEAE (Heath Family)

<i>Arbutus menziesii</i>	Pacific Madrone	
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FABACEAE (Pea Family)

Cercis occidentalis western redbud

FAGACEACE (Oak Family)

Quercus agrifolia Coast live oak
Quercus chrysolepis Canyon Live Oak
Quercus kelloggii California Black Oak
Quercus wiszlenzii Interior Live Oak

LAURACEAE (Laurel Family)

Umbellularia californica California Bay

PINACEAE (Pine Family)

Pinus attenuata Knobcone Pine
Pinus lambertiana Sugar Pine
Pinus ponderosa Ponderosa Pine
Pinus sabiniana Gray or Ghost Pine
Pseudotsuga menziesii var.
menziesii Douglas Fir

SALICACEAE (Willow Family)

Salix spp. Willow
Salix laevigata Red willow

SAPINDACEAE (Soapberry or New Maple & Buckeye Family)

Acer macrophyllum Big Leaf Maple
(genus formerly included
in the Aceraceae Family)
Aesculus californica California Buckeye
(genus formerly included
in Hippocastanaceae)

TAXACEAE (Yew Family)

Torreya californica California nutmeg

ANIMALS Species scat observations are denoted by an "***"

AMPHIBIANS

PLETHODONTIDAE (Lungless Salamanders)

Ensatina sp. Ensatinas

HYLIDAE (Tree Frog Family)

Hyla regilla Pacific Treefrog

COLUBRIDAE (Colubrids Family)

Thamnophis sirtalis Common Gartersnake

ANGUIDAE (Alligator Lizards and Allies Family)

Elgaria multicarinata
multicarinata California Alligator Lizard

SCELOPORUS (Spiny Lizards Family)

Sceloporus occidentalis Western Fence Lizard

BIRDS

ODONTOPHORIDAE (New World Quail Family)

Callipepla californica California Quail

CATHARTIDAE (New World Vultures Family)

Cathartes aura Turkey Vulture**

ACCIPITRIDAE (Hawks, Kites, Eagles, and Allies Family)

Buteo jamaicensis Red-tailed Hawk**

TROCHILIDAE (Hummingbirds Family)

Carduelis tristis Anna's Hummingbird

PICIDAE (Woodpeckers Family)

Melanerpes formicivorus Acorn Woodpecker
Melanerpes lewis Lewis's Woodpecker

TYRANNIDAE (Tyrant Flycatchers Family)

Contopus sordidulus Western Wood-Pewee
Empidonax difficilis Pacific-slope Flycatcher
Sayornis nigricans Black Phoebe
Myiarchus cinerascens Ash-throated flycatcher

CORVIDAE (Crows and Jays Family)

Aphelocoma californica Western Scrub-Jay
Corvus brachyrhynchos American Crow
Cyanocitta stelleri Steller's Jay

TIMALIIDAE (Babblers Family)

Chamaea fasciata Wrentit

PARIDAE (Chickadees and Titmice Family)

Psaltirparus minimus Bushtit

TURDIDAE (Thrushes Family)

Turdus migratorius American Robin

THRAUPIDAE (Tanagers Family)

Piranga ludoviciana Western Tanager

CARDINALIDAE (Cardinals, Saltators, and Allies Family)

Pheucticus melanocephalus Black-headed Grosbeak

FRINGILLIDAE (Fringilline and Cardueline Finches, and Allies Family)

Carduelis tristis American Goldfinch

MAMMALS

SCIURIDAE (Tree Squirrel Family)

Sciurus griseus Western Gray Squirrel

LEPORIDAE (Rabbits and Hares Family)

Lepus californicus Black-tailed Jack Rabbit**

CANIDAE (Foxes and True Dogs Family)

Canis latrans Coyote**

URSIDAE (Bear Family)

Ursus americanus American Black Bear**

CERVIDAE (Deer Family)

Odocoileus hemionus
columbianus Columbian Black-tailed Deer**

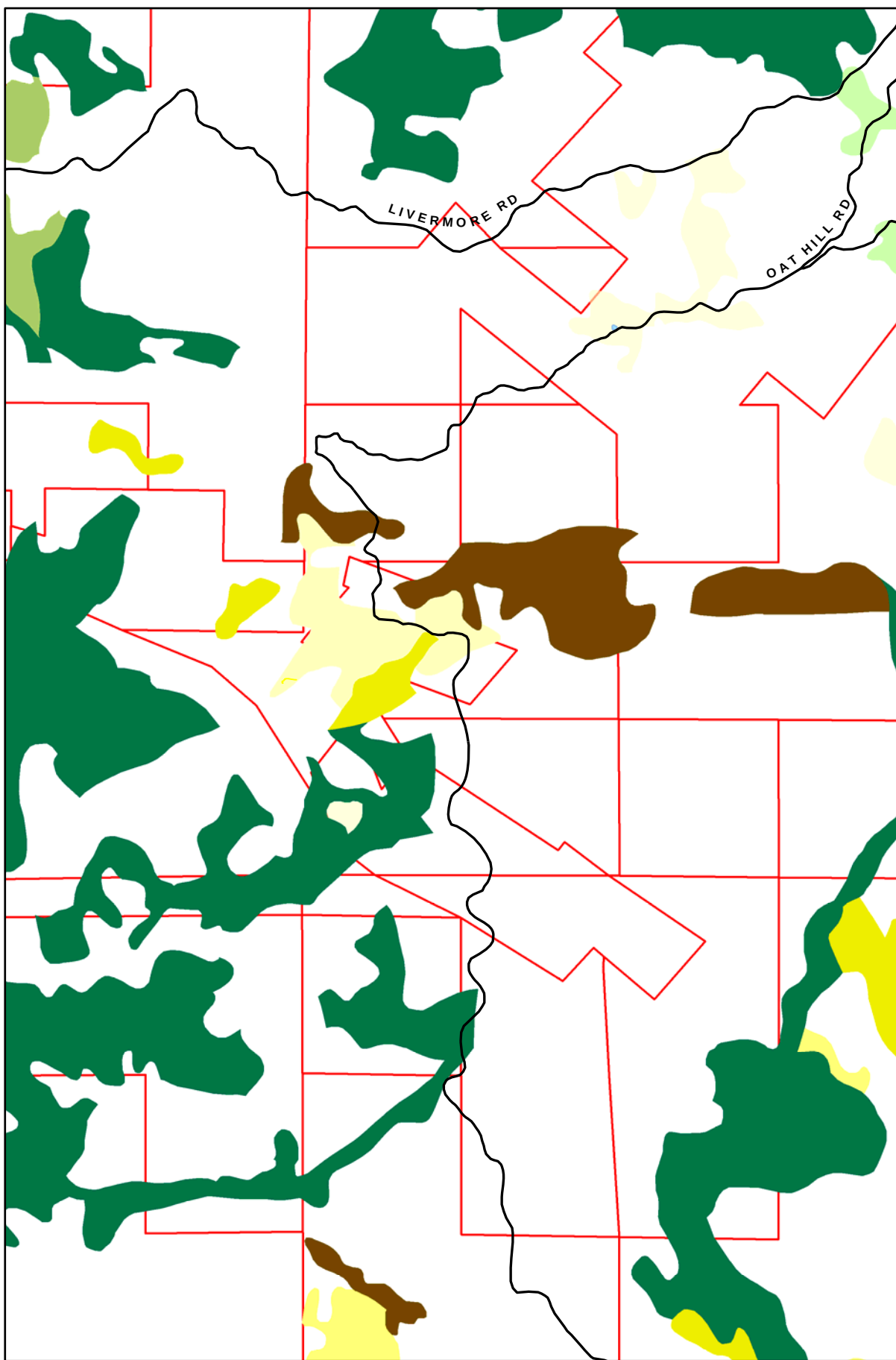
ATTACHMENT C

Napa County Environmentally Sensitive Area Map



Legend

- Roads
- Major Roads
- Sensitive Biotic Riparian Woodland Forest
- Brewer Willow Alliance
 - Mixed Willow Super Alliance
- Sensitive Biotic Aquatic
- (Bulrush - Cattail) Fresh Water Marsh
 - (Carex spp.-Juncus spp.-Wet Meadow
 - Riverine, Lacustrine and Tidal Mudfla
 - Saltgrass - Pickleweed
 - Vernal Pools
- Sensitive Biotic Chaparral/Scrub
- Calif Bay-Leather Oak-Mesic Serpen
 - Leather Oak-Calif Bay-Mesic Serpen
 - Leather Oak- White Leaf Manzanita-
 - White Leaf Manzanita-Leather Oak-(
- Sensitive Biotic Coniferous Forest
- Coast Redwood Alliance
 - Douglas-fir - Ponderosa Pine Alliance
 - McNab Cypress Alliance
 - Ponderosa Pine Alliance
 - Sargent Cypress Alliance
- Sensitive Biotic Grassland
- Calif Annual Grasslands Alliance
 - Perennial Bunchgrass Restoration
 - Serpentine Grasslands NFD
 - Upland Annual Grasslands & Forbs F
- Sensitive Biotic Oak Woodland
- Calif Bay-Madrone-Coast Live Oak-(
 - Oregon White Oak Alliance
 - Tanbark Oak Alliance
- Parcels
- Water Bodies
- American Canyon
- Calistoga
- County
- Napa
- St Helena
- Yountville
- County Boundary



Horizontal Datum: NAD 83,
CA State Plane Coordinates,
Zone II, feet

Disclaimer: This map was prepared for
informational purpose only. No liability
is assumed for the accuracy of the
data delineated hereon.

0 600 1,200 2,400 3,600 4,800 Feet

County of Napa



Conservation, Development
& Planning

Planning General

Revised Date: 8/25/2011

Corona Mine and Twin Peaks Mine 2012 Fall Initial Bat Survey



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October 20, 2012

Executive Summary

Visual, acoustic and mist net surveys for bats were conducted at Corona Mine and Twin Peaks Mine in Napa County, California on September 27-29 and October 3-4, 2012. Seven open mine adits/portals were surveyed, two at Corona Mine and five at Twin Peaks Mine. In addition, a primitive 0.4 km (0.25 mi) trail from Corona Mine to a proposed drain filtration field was surveyed for tree roosting bats. The project area is located on 32 acres of mixed coniferous/hardwood forest and chaparral in steep terrain at 400 m -700 m (1,300 – 2,300 ft.) elevation in the Mayacmas Mountains approximately 11 km (7 mi) southeast of Middletown, CA.

Eight species of bats were acoustically detected at the study site: Yuma myotis (*Myotis yumanensis*), California myotis (*M. californicus*), small-footed myotis (*M. ciliolabrum*), long-eared myotis (*M. evotis*), canyon bat (*Parastrellus hesperus*), western red bat (*Lasiurus blossevillei*), Brazilian free-tailed bat (*Tadarida brasiliensis*) and big brown bat (*Eptesicus fuscus*). During the visual survey, single bats (unidentified) were observed flying in Twin Peaks Mine Adit 1A on 9/26 and 9/27. Two Yuma myotis were mist netted shortly after sunset at that adit on 9/27. No bat sign (guano, urine stains, insect middens, ammonia odor etc.) or bats were observed at any of the other adits, or in small tree cavities along the filtration field trail. Passive acoustic monitoring of bat calls at the entrances of Corona Mine Drain Portal (9/27-28), Twin Peaks Mine Adit 1A/B (9/28-29 and 9/29-30), Adit 3 (10/3) and Adit 5 (10/3) showed low call levels at the presumptive emergence time indicating that none of the adits support large colonies of bats, but Adits 1A, 3 and 5 likely provide roost habitat for a small number of bats.

The results of this initial study document bat activity and use patterns at the mines for fall conditions only. While visual surveys of the adits did not result in evidence of regular or long-term use of the adits (e.g. no guano deposition), it is possible that maternity colonies could potentially be established in some of the adits during the spring. It is recommended that pre-construction surveys of the adits be conducted again during the spring (March to mid-May) to determine bat use patterns at that time. Also the tree cavities in trees within the proposed disturbance zone along the filtration field trail should be surveyed prior to tree removal to avoid disturbance of any bats that may have established roosts there during the interim from the current study.

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Acronyms

DFG	California Department of Fish and Game
SSC	California Department of Fish and Game Species of Special Concern
SD2	Titley Scientific, Inc. Anabat bat detector model
EM3	Wildlife Acoustics bat detector model (“EchoMeter”)
KML	Google earth mapping file

Bat Species Codes:

Anpa	Pallid bat (<i><u>A</u>ntrozous <u>p</u>allidus</i>)
Coto	Townsend’s big-eared bat (<i><u>C</u>orynorhinus <u>t</u>ownsendii</i>)
Euma	Spotted bat (<i><u>E</u>uderma <u>m</u>aculatum</i>)
Eupe	Western mastiff bat (<i><u>E</u>umops <u>p</u>erotis</i>)
Labl	Western red bat (<i><u>L</u>asiurus <u>b</u>lossevillii</i>)
Laci	Hoary bat (<i><u>L</u>asiurus <u>c</u>inereus</i>)
Lano	Silver-haired bat (<i><u>L</u>asionycteris <u>n</u>octivagans</i>)
Myci	Western small-footed myotis (<i><u>M</u>yotis <u>c</u>iliolabrum</i>)
Myev	Long-eared myotis (<i><u>M</u>yotis <u>e</u>votis</i>)
Mylu	Little brown bat (<i><u>M</u>yotis <u>l</u>ucifugus</i>)
Myth	Fringed myotis (<i><u>M</u>yotis <u>t</u>hysanodes</i>)
Myvo	Long-legged myotis (<i><u>M</u>yotis <u>v</u>olans</i>)
Nyma	Big free-tailed bat (<i><u>N</u>yctinomops <u>m</u>acrotus</i>)
Pahe	Canyon bat (<i><u>P</u>arastrellus <u>h</u>esperus</i>)
Tabr	Brazilian free-tailed bat (<i><u>T</u>adarida <u>b</u>rasiliensis</i>)
##MY	<i>Myotis</i> species with minimum call frequency at ##kHz (e.g. 40MY is a <i>Myotis</i> species with a minimum call frequency at 40 kHz)
HiF	Bat species with minimum call frequency above 35 kHz
MiF	Bat species with minimum call frequency between 25 kHz and 35 kHz
LoF	Bat species with minimum call frequency below 25 kHz

Introduction

Tuleyome has proposed the Corona Mine and Twin Peaks Mine Drainage Treatment Project (“Project”) to improve downstream aquatic ecosystems in James Creek, Pope Creek, Lake Berryessa, and Putah Creek and to mitigate physical and chemical hazards so that the site is safe for recreational use. Located on 32 acres in northwestern Napa County (Figure 1), the project consists of upgrading the existing settling basins and drainage trenches at Corona Mine and Twin Peaks Mine, installing a third drainage treatment system at the lower portion of Corona Mine, and mitigating physical and chemical hazards at both mines. Minor grading will be conducted on Oat Hill Road (dirt road) and spurs to improve site access, and for a new supply trail (0.4 km [0.25 mi]) from Oat Hill Road to the lower Drain Tunnel Portal at Corona Mine (Figure 2). Construction of the supply trail and new infiltration trench will involve removal of about 40 oak (*Quercus* spp.) and Pacific madrone (*Arbutus menziesii*) trees greater than 15 cm (6 in) diameter at breast height (dbh), clearing smaller brush, and disturbing about 0.08 hectare (0.21 acre).

As part of the environmental review process, wildlife surveys are being conducted within the project area to assess local biodiversity, determine the presence/absence of species of special concern and evaluate the potential for disturbance to these species from project activities. Six species of bats, recognized by the California Department of Fish and Game (DFG) as species of special concern (SSC) have range distributions that include the project area. These include the pallid bat (*Antrozous pallidus*), Townsend’s big-eared bat (*Corynorhinus townsendii*), spotted bat (*Euderma maculatum*), western red bat (*Lasiurus blossevillei*), western mastiff bat (*Eumops perotis*) and big-free-tailed bat (*Nyctinomops macrotis*). Three of these species (pallid bat, Townsend’s big-eared bat, spotted bat) are known to roost in mines (Table A1; Appendix A). The western red bat typically roosts in the foliage of deciduous trees and the western mastiff bat and big-free-tailed bat commonly occupy rock crevices in cliff habitats. Because all of these habitats occur within, or in the vicinity of the project study area, focused bat surveys are being conducted at the mine sites. Burleson Consulting, Inc. has contracted West Ecosystems Analysis, Inc. to conduct an initial survey for bats at all open adits, mine facilities and potential tree roost sites within areas of potential disturbance in project study area. This report presents the results of visual, acoustic and mist net surveys conducted between September 27 and October 4, 2012 as part of the initial survey.

Study Area

The proposed project is located in steep mountainous terrain between 400 m -700 m (1300 – 2300 ft.) elevation in the Mayacamas Mountains approximately 8 km (5 mi) east of Mt. St. Helena and 11 km (7 mi) southeast of Middletown CA (Figure 3). Soils within the area are a mix of gravelly loam and volcanic/serpentine bedrock that support a mixed coniferous/hardwood forest with patches of chaparral and occasional meadows (Figure 4). Large areas of open rock/cliff habitat suitable for bat roosts occur near (Figure 3) and to the southeast of the project (Figure 3). Springs are evident throughout the area and numerous ranch ponds and reservoirs are located in adjacent lowland valleys (Figure 3).

Seven open mine adits/portals located within the project area (Figure 4), two at Corona mine and five at Twin Peaks Mine, are the principal sites for the bat surveys. In addition, a primitive, flagged trail from Oak Hill Road at Corona Mine to the proposed water filtration field was surveyed for bat tree roosts. Intermittent streams in the area include Kidd Creek and Bateman Creek, which are tributaries of James Creek (Figure 4).



Figure 1. Locations of the Corona Mine and Twin Peaks Mine, Napa County, California.



Figure 2. Representative mixed conifer/chaparral habitat typical of the project area.



Figure 3. Example of cliff/rock outcrop habitat suitable for bat roosts found on the ridge above Corona Mine.

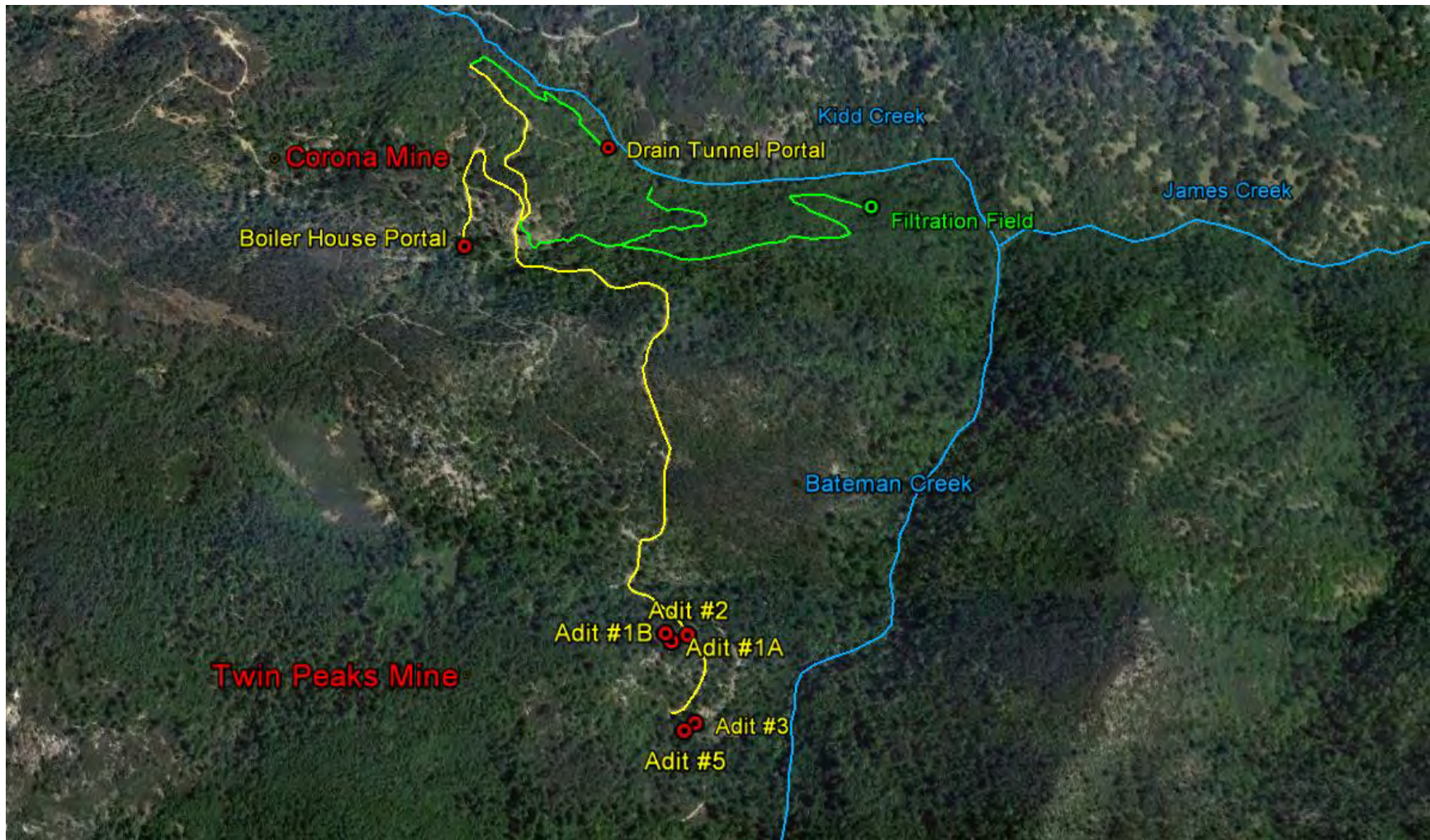


Figure 4. Diagram showing the locations of the Corona Mine portals, Twin Peaks Mine adits, drain portal and filtration field access trails (green), active acoustic survey route (yellow), and local intermittent streams (blue).

Methods

Prior to conducting the surveys, available reports and literature on bats of northern California were reviewed to determine which species were likely to occur at the project site and what their ecological requirements and conservation status were. This information was summarized and species occurrence potentials were prioritized to guide field observations and the acoustic monitoring.

Both visual and acoustic surveys for bats were conducted at the mine portals and adits and along the proposed filtration field access trail. During the day, each adit was closely inspected from the entrances for bats and bat sign (guano deposition, urine stains, insect debris middens, ammonia odor etc.) using a high intensity flashlight and 10x42 Leica binoculars. The access trail was hiked and all potential tree roost sites (snags, tree cavities etc.) within the proposed disturbance area were visually inspected for bats and bat sign and acoustically monitored with a bat detector to determine if bats were present.

At dusk and after dark, bat activity was monitored both visually (with spotlights after dark; used briefly) and acoustically with ultrasonic bat detectors. Anabat[®] SD2 bat detectors (Titely Scientific, Inc.) were set up outside the Corona Mine drain portal (Figure 9; 9/27-28), and Twin Peak Mine adits 1A/B [Figures 12 and 13; 9/28-29], 3 and 5 (Figures 16-19; 10/3-4) to passively monitor bat activity from 6PM until 6AM the following morning each night. An EM3 Echometer[®] (Wildlife Acoustics, Inc.) with a Garmin GPS unit was also used to actively monitor bat activity periodically throughout the night (9/27-28) at each of the adits, along the trail to the Corona Mine drain portal and along the road between the mines. All calls of bats foraging within approximately 30 m (98 ft.) of the microphones were recorded and downloaded to FlashDisks in each detector. Each recording was time/date stamped and all EM3 calls were also tagged with a GPS location.

All bat calls recorded on the Anabat SD2 units were downloaded to a computer using CFRead[™] (Titely Scientific) and sonograms were produced using AnalookW[™] (Titely Scientific). Each sonogram was then visually compared to sonograms of known species in a digital library to determine species/species group identities. The EM3 recordings were similarly downloaded to a computer and analyzed using SonoBat 3.1 (June 2012 release, SonoBat[™]). Following batch scrubbing of extraneous ultrasonic recordings (i.e. road noise, hiking through leaves etc.) the bat calls were automatically identified using the SonoBat SonoBatch feature. Whenever the call quality met the identification threshold standards of the SonoBat program the call WAV files were tagged with species identification codes. Calls that did not meet quality criteria to immediately provide species identification were individual inspected, filtered to remove extraneous noise and re-analyzed. All calls that were clearly identified to species by the program or could so be identified by visual comparison with a digital library of species-specific calls were assigned the appropriate species identification tag.

Some call sequences recorded were not of sufficient quality (<10 clean calls per sequence, reduced amplitude, masked in noise etc.) to make confident species determinations from. However, many could be, and were, categorized into species groups by their characteristic minimum frequency. For example, species with minimum call frequencies (f_m) above 35 kHz were grouped into a high frequency species

category (HiF), species between 25 and 35 kHz into the medium frequency category (MiF), and species below 25 kHz) into the low frequency species (LoF) category.

In northern California, HiF bats include Yuma myotis (*Myotis yumanensis*; Myyu [species code]), California myotis (*Myotis californicus*; Myca), canyon bat (*Parastrellus hesperus*; Pahe), little brown bat (*Myotis lucifugus*; MyLu), western small-footed myotis (*Myotis ciliolabrum*; MyCi), long-legged myotis (*Myotis volans*; Myvo), and western red bat (Labl); MiF species include the long-eared myotis (*Myotis evotis*; Myev), fringed-myotis (*Myotis thysanodes*; Myth), pallid bat (Anpa), big brown bat (*Eptesicus fuscus*; Epfu), and silver-haired bat (*Lasionycteris noctivagans*; Lano); and LoF species include the Townsend's big-eared bat (Coto), hoary bat (*Lasiurus cinereus*; Laci), spotted bat (Euma), Brazilian free-tailed bat (*Tadarida brasiliensis*; Tabr), western mastiff bat (*Eumops perotis*; Eupe) and big free-tailed bat (*Nyctinomops macrotis*; Nyma).

All SonoBat and GPS files for calls for which species/species group identifications could be obtained were then converted to a KML file and mapped in Google Earth™ using Myotissoft™ Transect 1.0.5b (Beta release July, 2012).

In addition to the visual and acoustic surveys, bat mist nets were set up (9/27-28) at the Corona Mine Boiler House Portal (Figure 10) and at Twin Peaks Mine Adit 1A (Figure 12). (CDFG Scientific Collecting Permit #SC-2919). Table 1 summarizes the survey and monitoring actions conducted at each mine site.

Survey Site	Visual	Acoustic		Mist Net
		EM3	SD2	
Corona Mine				
Active survey	x	x		
Boiler House Portal	x	x		x
Drain Portal	x	x	x	
Filtration Field Access Trail	x	x		
Twin Peaks Mine				
Active Survey	x	x		
Adit 1A	x	x	x	x
Adit 1B	x	x	x	
Adit 2	x	x		
Adit 3	x		x	
Adit 5	x		x	

Table 1. Summary of bat survey methods used at the project study area.

Results

Pre-Field Bat Species Assessment

Table A1 (Appendix A) summarizes the ecological status, roost and habitat requirements and home range for 18 bat species that have distribution ranges that include the Corona Mine and Twin Peaks Mine study area. The eight species documented during this study are identified in the table.

Visual Surveys

Corona Mine Filtration Field Access Trail

The vegetation cover along the access trail consisted primarily of madrone dominated chaparral with a mix of small oaks (*Quercus* spp.) and gray pine (*Pinus sabiniana*) (Figure 5). A variety of small tree crevices and cavities potentially suitable for day/night roosts for one or several bats (e.g. Figures 6 and 7) were observed during the survey. However, none showed any signs of bat presence (incl. guano, urine stains, etc.) nor were any ultrasonic detections made at any of the sites. However, there were a number of large deciduous trees in the vicinity of Corona mine (Figure 8) that could provide suitable roost habitat for foliage roosting bats such as the western red bat, which was acoustically detected during the night surveys.



Figure 5. Proposed filtration field (orange pin flags) at end of the access trail. Photo shows typical madrone/oak vegetation of the trail area with general lack of large trees and snags.

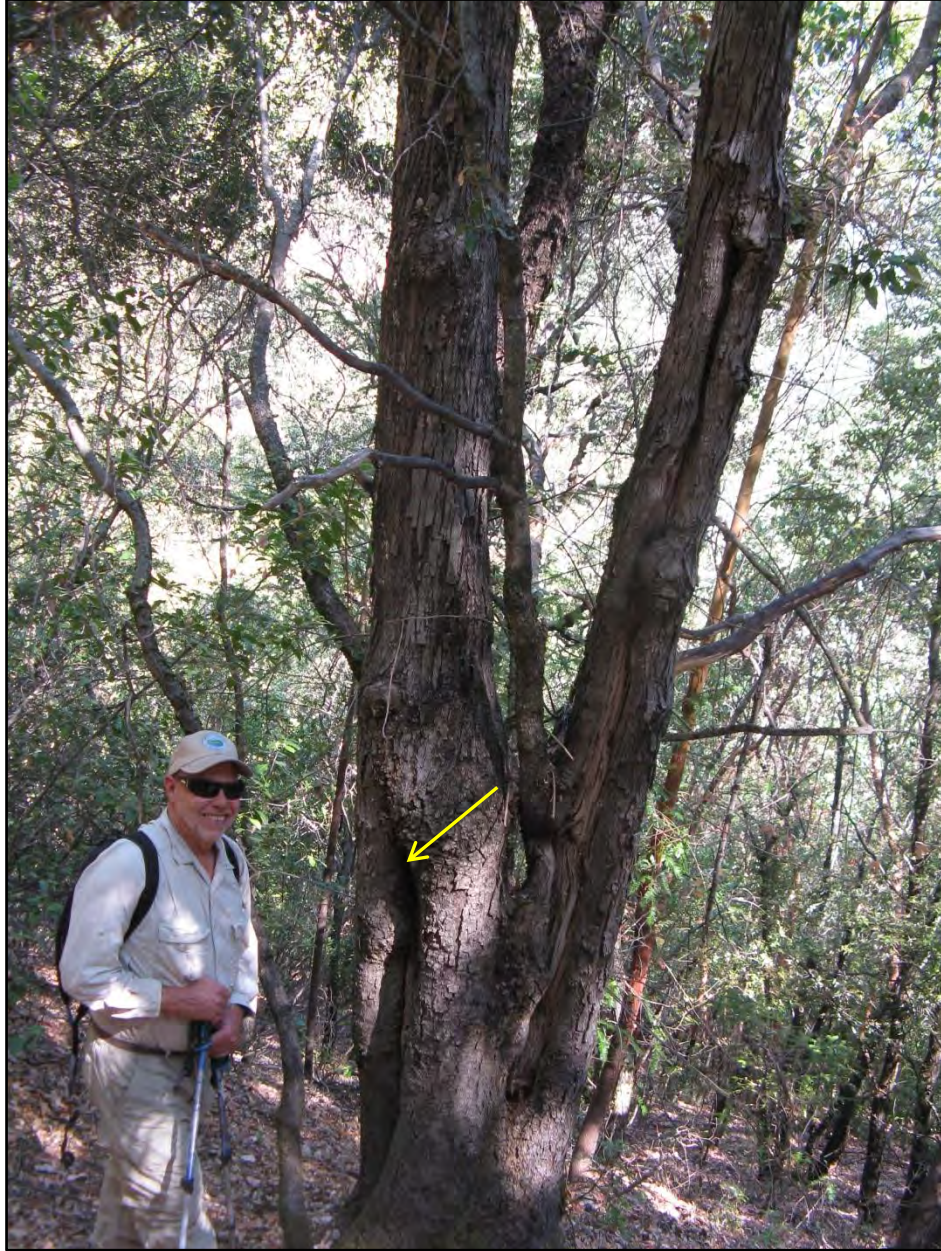


Figure 6. Tree cavity that could potentially serve as a roost site for one or a small number of bats. No evidence of use was found.



Figure 7. Photo showing potential bat tree roost cavity (arrow). No evidence of use was found.



Figure 8. Large deciduous tree potentially suitable for foliage roosting bats (e.g. western red bat) at the head of the Corona Mine filtration field access trail.

Mine Adits and Portals

Figure 4 shows the locations of two mine portals at Corona Mine and the five adits at Twin Peaks Mine that were surveyed. The visual assessments of each are summarized below.

Corona Mine Drain Portal

Figure 9 shows the entrance to the Corona Mine drain portal which is currently being retrofitted with drain control devices. Until recently the entrance was closed off by a door on the existing wood portal. The arrow shows a portion of the rock portal that was partially open, but clogged with a lot of debris.

Visual access to the interior of the portal was not safely possible. This site could potentially be used by roosting bats if there were dry ceiling pockets within the portal high enough above water levels to provide suitable roosting microclimate. No bats or bat sign were observed at the site during this survey, but numerous bat calls were recorded in the forest opening outside of the portal (see below).



Figure 9. Entrance to Corona Mine drain portal. Arrow shows restricted potential bat flight passage area largely filled with debris.

Corona Mine Boiler House Portal

Figure 10 shows the entrance to the Corona Mine Boiler House Portal and surrounding vegetation. Figure 11 shows the bulkhead and drainage control features and the immediate interior of the portal.

At its present condition (fall dry season), the portal is quite spacious and offers apparent suitable roosting habitat for bats on the ceiling and upper walls. However, during the wet season the portal supports larger flows and is likely not suitable for bat use. This seasonal scouring of the channel and exclusion of bats may preclude all but occasional roosting by bats. No bats or bat sign were observed at this site during the survey and no bats were captured in the mist net set at the entrance of the portal (Figure 10). However, bat calls were recorded in the forest opening in front of the entrance (see below) and along the road leading to the portal.



Figure 10. Entrance to Corona Mine Boiler House Portal. Mist net poles (yellow arrows) are supporting a mist net across portal entrance. (CDFG Scientific Collecting Permit #SC-2919). The bulkhead at the entrance (see Figure 11) is just visible left of the rock wall (red arrow) .



Figure 11. Entrance to Corona Mine Boiler House Portal showing the bulkhead and drain pipe (top) and the interior (bottom) showing standing water.

Twin Peaks Mine Adit 1A

Figure 12 shows the entrance and interior of Twin Peaks Mine Adit 1A. This adit is located approximately 30 m (98 ft.) upslope from Oak Hill Road. It is not visible from the road and is accessible only by hiking up a steep grade. The adit is approximately 1.5 m (5 ft.) at the entrance and expands into a larger chamber about 10 m (33 ft.) from the entrance. There appears to have been a fairly recent collapse of the ceiling area creating a domed arch ceiling. One bat was briefly observed flying during visual surveys of this adit on 9/26 and 9/27. The species could not be identified, but appeared to be larger than a *Myotis* species. The interior of the adit is dry and appears to be good habitat for bats to roost in. However, there were not signs (e.g. guano piles, urine stains, or ammonia odor) suggesting regular or long-term use.



Figure 12. Twin Peaks Mine Adit 1A.

Twin Peaks Mine Adit 1B

Adit 1B (Figure 13) is located approximately 15 m (50 ft.) to the right of and upslope from Adit 1A. It is somewhat smaller and shallow. The ceiling was lower and there was considerable amount of rubble, possibly from cave-ins scattered throughout the interior. This adit appears to some potential roosting habitat for bats, although the microclimate may be subject to greater temperature extremes than Adit 1A due to the smaller size opening of the cavity. No bats or bat sign were observed at this addit during the survey.



Figure 13. Twin Peaks Mine Adit 1B.

Twin Peaks Mine Adit 2

Twin Peaks Adit 2 (Figure 14) is located immediately adjacent to and east of Oak Hill Road, approximately 15 m (49 ft.) south of the yellow gate. The entrance is not very obvious due to trees and shrubs growing in front (Figure 14). The interior is a small dry cavity partially filled with rock debris (Figure 15). This adit did not appear to provide good roosting habitat, except possibly for a few bats due to the large amount of vegetation occluding direct flight into the mine and the shallowness of the opening which could expose roosting bats to numerous predators. No bats or bat sign were observed at this adit during this survey.



Figure 14. Entrance to Twin Peaks Mine Adit 2 showing dense vegetation blocking the opening.



Figure 15. Interior of Twin Peaks Mine Adit 2.

Twin Peaks Mine Adit 3

Twin Peaks Mine Adit 3 (Figures 16 and 17) is located just north of the existing rotary furnace. It is a deep tortuous mine opening with a low ceiling and running water on the bottom. During the wet season this adit likely has high water flows making it unsuitable for bat use. However, during the dry season the water levels are apparently quite low (Figure 17) and some areas of the mine opening could be suitable for bats, particularly farther in the adit if ceiling pockets provide suitable microclimate. However, no bats or bat sign were observed at this adit during this survey.



Figure 16. Entrance to Twin Peaks Mine Adit 3.



Figure 17. Interior of Twin Peaks Mine Adit 3 showing running water and a relatively narrow and low channel.

Twin Peaks Mine Adit 5

Twin Peaks Mine Adit 5 (Figures 18 and 19) is a dry mine opening located approximately 15 m (49 ft.) south of the rotary furnace. A small tree is growing at the entrance, but it does not significantly block the opening. The interior of the adit is deep with a moderately high ceiling and appears to provide good potential bat roosting habitat. However, there were no signs of regular use by bats at the time of this survey. The site was acoustically monitored (see below) during which numerous bat calls were recorded in close vicinity to the entrance.



Figure 18. Entrance to Twin Peaks Mine Adit 5.



Figure 19. Interior of Twin Peaks Mine Adit 5.

Mist Netting

One 2.6 m x 6 m (8.5 ft. x 20 ft.) mist net was set up at the entrances the Corona Mine Boiler House Portal and the Twin Peaks Mine Adit 1A. Two Yuma myotis (Figure 20) were captured shortly after sunset in the net set at Adit 1A. No bats were captured at the Corona Mine net.



Figure 20. One of two Yuma myotis (*Myotis yumanensis*) captured in a mist net set at the entrance of Twin Peaks Mine Adit 1A. (CDFG Scientific Collecting Permit #SC-2919). Each bat was released immediately after it was identified.

Acoustic Monitoring

On 9/27, bats were first detected at Corona Mine at 7:07 PM, 13 minutes after sunset (6:54 PM) and 17 minutes after sunset at the Twin Peaks Mine on 9/28. Eight species of bats were acoustically documented within the project study area during this study: Yuma myotis, California myotis, small-footed myotis, long-eared myotis, canyon bat, western red bat, Brazilian free-tailed bat and big brown bat.

Active Acoustic Surveys

Figures 21-26 show the spatial distribution of all bat calls recorded for each species during the active surveys. Yuma myotis (Myyu) and California myotis (Myca) were frequently recorded at both Corona Mine (Figure 21) and Twin Peaks Mine (Figure 25). Canyon bats (Pahe) were recorded commonly at Twin Peaks Mine, but much less frequently at Corona Mine (Figure 26). Records of bats that could only be identified as high frequency species (incl. Yuma myotis, California myotis, and canyon bat) also show wide distribution and habitat use, particularly along the survey route to the Boiler House Portal (Figure 22) and Adits 1A, 1B and 2 at Twin Peaks Mine (Figure 24). Western red bats (Labl) were recorded at both Corona Mine and Twin Peaks Mine, but only a few times. Big brown bats (Epfu) were recorded at

Corona Mine during the active survey, but also at Twin Peaks Mine (Adit 1A) during the passive acoustic monitoring. The Brazilian free-tailed bat (Tabr) was recorded only once at Corona Mine (Figure 21). The small-footed myotis (Myci) was only recorded in the Twin Peaks Mine area (Figure 26), not at Corona Mine. The long-eared myotis (Myev) was only recorded during the passive acoustic surveys conducted at the adits.



Figure 21. Locations of Yuma myotis (Myyu), California myotis (Myca) and canyon bat (Pahe) detected at Corona mine during active acoustic survey September 27-28, 2012. Bat icons may represent more than one detection at each location.



Figure 22. Locations of high frequency bats (likely mostly Myyu and Myca) detected at Corona mine during active acoustic survey September 27-28, 2012. Icons show broader distribution of detections along route to the Boiler House Portal. Bat icons may represent more than one detection at each location.



Figure 23. Locations of western red bat (Labl), big brown bat (Epfu), Brazilian free-tailed bat and medium frequency bats (MiF) detected at Corona Mine during active acoustic survey September 27-28, 2012. Bat icons may represent more than one detection at each location.



Figure 24. Locations of high frequency bats (likely mostly Myyu and Myca) detected at Twin Peaks Mine during active acoustic survey September 27-28, 2012. Icons show broader distribution of detections along route to the Boiler House Portal. Bat icons may represent more than one detection at each location.



Figure 25. Locations of Yuma myotis (Myyu), and California myotis (Myca) detected at Twin Peaks Mine during active acoustic survey September 27-28, 2012. Bat icons may represent more than one detection at each location.



Figure 26. Locations of western red bat (Labl), small-footed myotis (Myci), and canyon bat (Pahe) detected at Twin Peaks Mine during active acoustic survey September 27-28, 2012. Bat icons may represent more than one detection at each location.

Passive Acoustic Surveys

Anabat SD2 bat detectors were set out at Corona Mine Drain Portal (9/27-28), Twin Peaks Mine Adit 1A/B (9/28-29 and 9/29-30), Adit 3 (10/3) and Adit 5 (10/3). All echolocation calls emitted by bats within approximately 30 m (98 ft.) of the detectors were recorded from 6 PM until 6 AM the following day for each survey period. Figures 27-30 summarize the results of those surveys. Figures 30-34 summarize the temporal pattern of call activity at each site. The latter data provide information on whether or not large numbers of bats were emerging from the adits shortly after sunset. This measure can provide insight into relative use levels of each site.

Corona Mine Drain Portal

Figure 27 summarizes the number of species' and species' group calls that could be identified. At this site most of the calls were not identifiable to species due to either the dense vegetation in immediate area or the calls were emitted by bats foraging above the forest canopy at the edge of detectability. Many of the calls were too short to identify or did not have clear enough definition to allow species determinations. Of those calls that could be identified, Yuma myotis were the most prevalent. Many of the HiF and 50/55MY grouped calls were likely this species.

Figure 28 shows the temporal pattern of calls detected at the drain portal entrance area throughout the night. The initial pulse of calls out to 1 hour after sunset, albeit low (approx. 1 call per minute), suggests either an emergence of a small number of bats from a local roost (possibly the drain portal) that are swarming (post emergence orientation behavior) or foraging in the immediate area due to a concentrated local food source. The two successive call pulses centered at 2:40 hours and 4:00 hours after sunset may be indicative of bats returning to the portal area to roost between feeding bouts (i.e. using it as a night roost). Regardless, the relative low number of calls overall indicates that, at this time of year, the Corona Mine drain portal does not appear to support a large colony of bats, assuming of course that the portal entrance is the principal emergence path for bats that would use the adit.

Twin Peaks Mine Adit 1A

Adit 1A was of particular interest because of the daytime bat sightings in the adit on 9/26 and 9/27. Those sightings verified the adit was being used as a day roost, at least for one bat, if not a small colony. Figure 29 summarizes the number and species/species group categorization of calls recorded at the site. The calls pattern shows that Yuma myotis are the most common bats using the area. This is consistent with the mist net capture results described above.

Figure 30 shows the temporal pattern of bat calls for two nights at this site. The call rates for each night are less than those for the Corona Mine Drain Portal area. The period of apparent emergence of bats from the adit (within the first hour after sunset), if they use the entrance shown in Figure 12, shows no indication that large numbers of bats use the mine as a day roost. The increased numbers of calls between 3-6 hours after sunset could indicate the adit is being used as a night roost, or it could simply indicate bats in general are feeding more in the area during that period. During the active acoustic survey and periodic checking of the mist net at this adit, it was noticed that the area remained significantly warmer throughout the night than the surrounding areas. This local microclimate may favor increased insect and bat activity in the area as indicated in the bat call records.

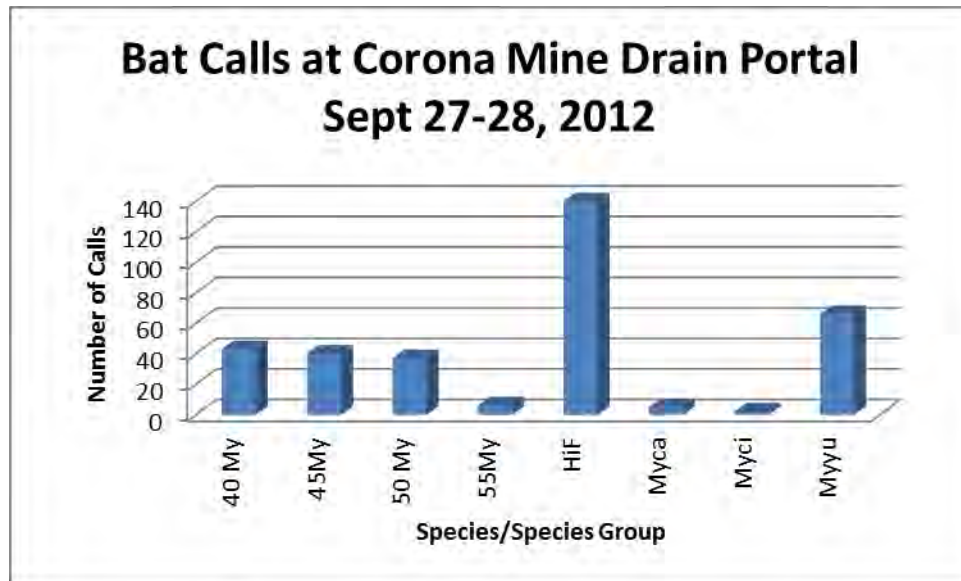


Figure 27. Bat calls recorded at Corona Mine Drain Portal from 6 PM 9/27 until 6 AM 9/28.

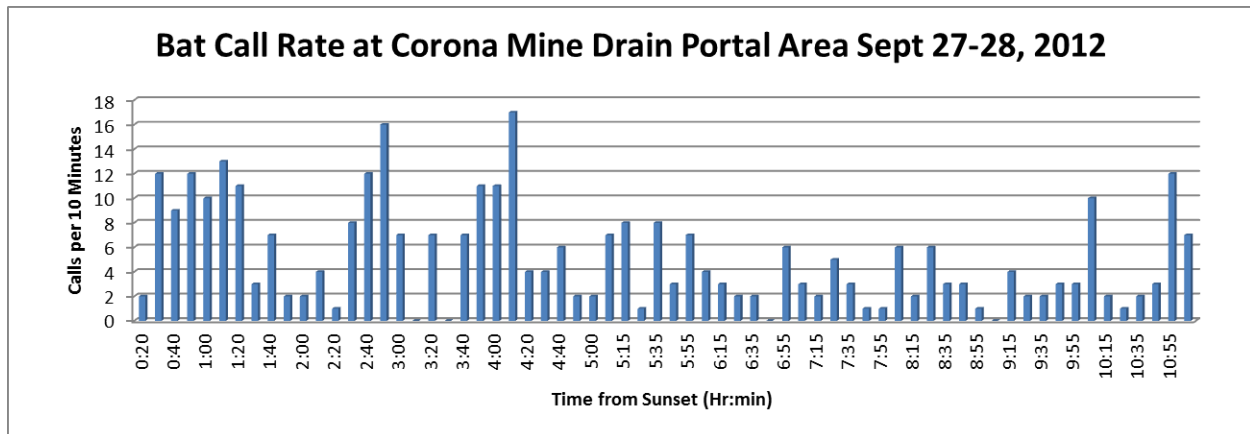


Figure 28. Temporal pattern of bat calls recorded between 6 PM 9/27 and 6AM 9/28 at the Corona Mine Drain Portal.

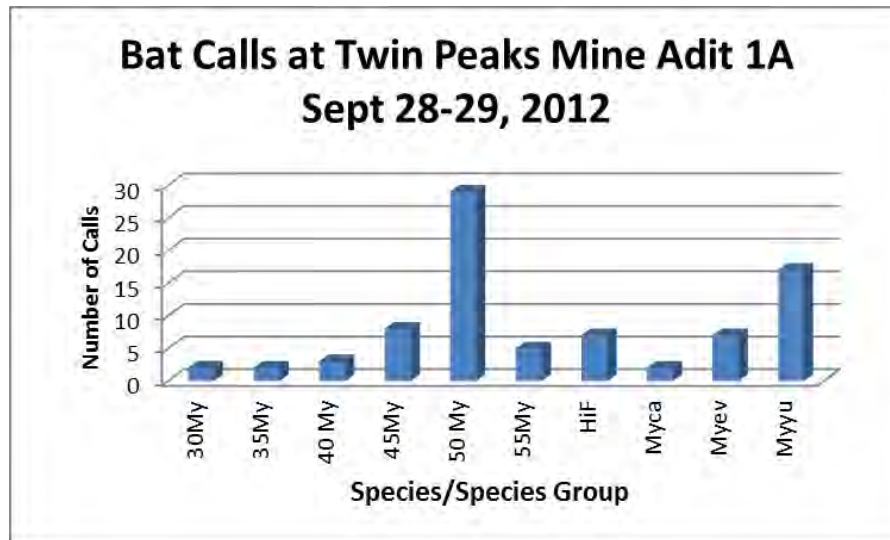


Figure 29. Bat calls recorded at Adit 1A/1B from 6 PM 9/27 until 6 AM 9/28.

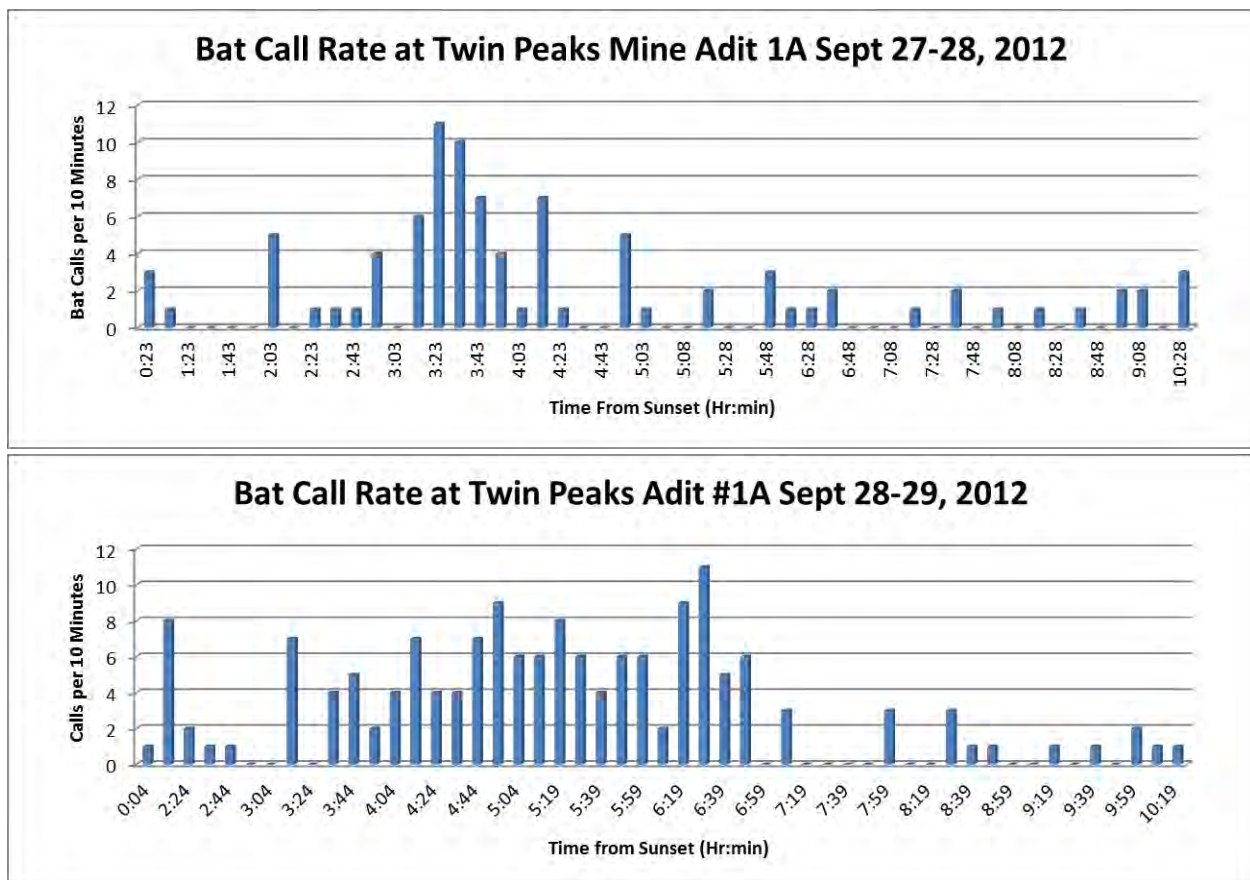
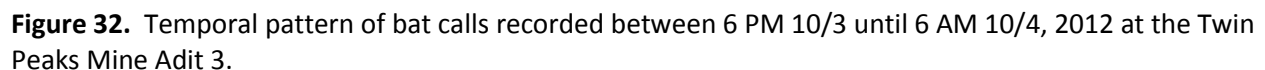


Figure 30. Temporal pattern of bat calls recorded between 9/27- 9/29, 2012 at the Twin Peaks Mine Adits 1A and 1B.

Figure 31 shows the call record for Twin Peaks Adit 3 (Figures 16 and 17). Again Yuma myotis were the most common species recorded. Long-eared myotis (*Myev*) were also recorded here, as well as at Adit 5 nearby, but the numbers of calls recorded throughout the night were low (Figure 32), including at emergence time, indicating the adit does not likely support a bat colony of any significant size. The seasonal nature of water flow in the adit and changing suitability of potential habitat may deter species from establishing a colony there.



Twin Peaks Mine Adit 5

The diversity of bat species detected at Adit 5 was the highest of all the survey locations (Figure 33). However, the overall call rate was low (Figure 33). There was an initial rise in call rate at emergence time, indicating probable use of the adit as a day roost, but the numbers were low suggesting only a few bats were using the mine. The second rise in call numbers at 1.5 hours after sunset suggests night roost use, as does the apparent cyclic pattern of call activity throughout the night.

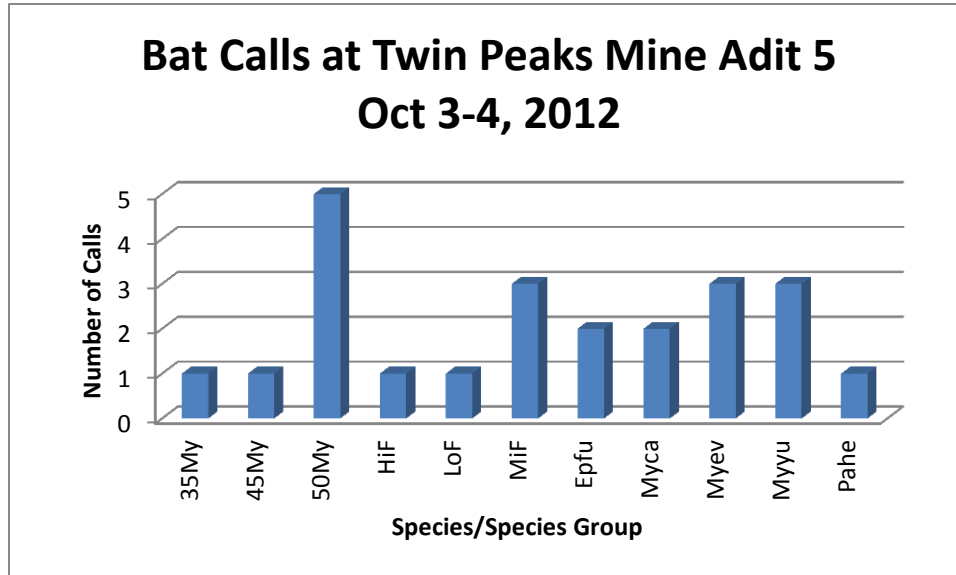


Figure 33. Bat calls recorded at Adit 5 from 6 PM 10/3 until 6 AM 10/4.

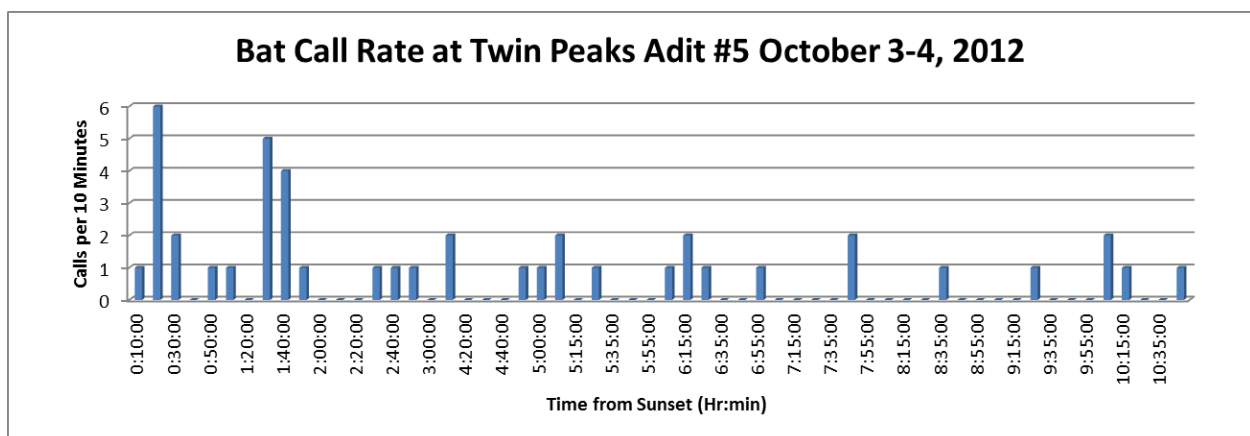


Figure 34. Temporal pattern of bat calls recorded between 6 PM 10/3 until 6 AM 10/4, 2012 at the Twin Peaks Mine Adit 5.

Discussion

The results of this initial survey show that the habitats within the project area and vicinity support a broad diversity of bat species. The combination of large areas of rock outcroppings interspersed within the mixed conifer chaparral provides good foraging and roosting habitats for bats. Many of the abandoned mines in the area also can provide roosting habitat for bats.

Of the eight bat species detected during this survey, all except the western red bat are known to roost in mines (Table A1; Appendix A). The western red bat is a foliage roosting species that roosts primarily in trees, sometimes tall shrubs. The seven mine roosting species also use other roosts, including rock crevices, spaces under bark, tree hollow, cavities in snags, and bridges and buildings.

During this study two Yuma myotis were captured emerging from Twin Peaks Mine Adit 1A, providing a positive use measure for that portal. The bat(s) observed during the day inside the entrance of the same portal could not be identified, but appeared larger than a *Myotis* sp. (E. West, pers. obs.) Generally, bats are not commonly observed near the entrances of mine portals (Navo 2001), but some species, including Townsend's big-eared bats can roost there. This SSC species has been documented within 5 miles of the project site (CNDDDB 2012). It is possible that the bat seen was a big-eared bat due to its size and behavior. However, no calls of this species were recorded any location within the study area, nor were they captured in the mist net set at the entrance of the portal. Other larger species that were recorded included the big brown bat and Brazilian free-tailed bat, suggesting that the bat seen was one of those species. However, the Townsend's big eared bat, often referred to as a "whispering bat" because of its low amplitude call, can at times be difficult to record and may have been missed, particularly if there were only a few individuals using the adit(s).

The results of the passive acoustic monitoring at the adit entrances show call patterns indicative of bat roost emergence behavior at the Corona Mine drain portal, and the Twin Peaks Mine Adit 1A, 5 and possibly 3. However, the call rates are generally low, suggesting low numbers of bats currently using and/or foraging in the near vicinity of the adits at this time of year. Some of the calling is also likely background activity of foraging bats that may or may not be using the adits. Most of the species detected during the study can commute from considerable distances (e.g. 20 miles for the big brown bat; Table A1) so some of the bats recorded may simply be foraging in the vicinity of the adits due to local abundance of food resources.

Recommendations

The results of this study show apparent low levels of bat use of some of the mine adits during the fall. These bats could also potentially use the adits during the winter to hibernate or for wintering roosts. Also, it is possible more bats could use the adits in the spring and summer if they establish maternity roosts and /or other day/night/ migratory roosts. A follow-up spring survey is therefore recommended to assess this potential seasonal use of the adits. This survey should be conducted during a time from March through mid-May before construction begins and include harp trap captures where possible to better measure species presence and use levels at each mine. A follow-up pre-construction survey of

the tree cavities found along the proposed trail is also recommended to be conducted in concert with the spring adit survey.

Should maternity colonies or mine-roosting SSC species (incl. pallid or Townsend's big-eared bats) be found during the spring survey, they should not be disturbed. No construction activities should occur within 100 feet of an active roost. No disturbance areas, if located in close proximity to the proposed construction areas should be clearly marked with highly visible flagging. Occupancy of the roost(s) should be monitored through the summer and fall and when vacated, installation of bat-friendly gates should be considered, particularly if disturbance from future recreational use could occur or public safety is an issue. The design and installation of the gate(s) should be done in consultation with DFG.

Appendix A: Bat Species of the Project Area

Table A1. Conservation status and ecological requirements of bat species with distributional ranges including the Corona Mine and Twin Peaks Mine study area. Species documented at the study sites are underlined and denoted with an asterisk (*). Species codes follow the scientific names.

Species	Status ¹	Habitat	Roosts	Foraging	Home Range
Little brown myotis (<i>Myotis lucifugus</i> ; MYLU)		At higher elevations, often associated with coniferous forests, usually near water.	Day roosts in hollow trees, rock outcrops, buildings and occasionally mines and caves. Often roosts with Yuma myotis in Northern California	Small aquatic insects. Foraging occurs primarily in open areas among vegetation and along water margins.	No Data (ND)
<u>Yuma myotis</u>* (<i>Myotis yumanensis</i> ; MYYU)	BLM:S WBWG:LM	Optimal: open forests and woodlands. Distribution is closely tied to bodies of water, which it uses as foraging sites and sources of drinking water.	Buildings, <u>mines</u> , caves, or crevices, swallow nests and under bridges; Separate, often more open, night roosts may be used. Several thousand females and young may be found in buildings, caves, <u>mines</u> , and under bridges	Small flying insects found over ponds, streams, and stock tanks. May feed with Brazilian free-tailed bats and pallid bats.	ND
<u>Long-eared myotis</u>* (<i>Myotis evotis</i> ; MYEV)	BLM:S WBWG:M	Nearly all brush, woodland, and forest habitats, but coniferous woodlands and forests seem to be preferred.	Buildings, crevices, spaces under bark, and snags. <u>Caves</u> used primarily as night roosts. Nursery colonies of 12-30 individuals found in buildings, crevices, snags, and behind bark.	Beetles, moths, flies, and spiders are caught in flight, gleaned from foliage, or occasionally taken from the ground; Feeds along habitat edges, in open habitats, and over water; capable of hovering	ND
Fringed myotis (<i>Myotis thysanodes</i> ; MYTH)	BLM:S WBWG:H	Pinyon-juniper, valley foothill hardwood and hardwood-conifer, generally at 1300-2200 m (4,000-7,000 ft.).	Up to 200 individuals in caves, <u>mines</u> , buildings, and crevices. Separate day and night roosts may be used.	Beetles, and also on moths, arachnids, and orthopterans. Feeds over streams, lakes, and ponds, over open habitats, and by <u>gleaning</u> from foliage.	ND

Species	Status ¹	Habitat	Roosts	Foraging	Home Range
Long-legged myotis (<i>Myotis volans</i> ; MYVO)	WBWG:H	Woodland and forest habitats above 1200 m (4,000 ft.); Also forages in chaparral, coastal scrub, Great Basin shrub habitats. Uncommon in desert and arid grassland habitats.	Rock crevices, buildings, under tree bark, in snags, <u>mines</u> , and caves. Trees important day roosts; caves and <u>mines</u> used only as night roosts. Nursery colonies with hundreds of individuals usually under bark or in hollow trees, but occasionally in crevices or buildings	Flying insects, primarily moths; fairly low heights 3-5 m (10-15 ft.) over water, close to trees and cliffs, and in openings in woodlands and forests.	ND
California myotis * (<i>Myotis californicus</i> ; MYCA)		All desert, chaparral, woodland, and forest from sea level up through ponderosa pine, mixed conifer, and Jeffrey pine. Prefers rock-walled canyons with open water, open woodlands and forests, or brushy habitats for foraging.	Small maternity colonies are found in crevices in buildings, <u>mines</u> , hollow trees, and other sites. Open spots, especially in human-made structures, are used as night roosts.	Aerial arthropods including moths, midges and other Dipteran, beetles, and spiders. Forages low over the ground or water, and among shrubs and trees, generally below 4 m (13 ft.)	ND
W. small-footed myotis* (<i>Myotis ciliolabrum</i> ; MYCI)	BLM:S WBWG:M	Common bat of arid uplands; wide variety of habitats, primarily in arid wooded and brushy uplands near water. Open stands in forests and woodlands as well as brushy habitats.	Caves, buildings, <u>mines</u> , crevices, and occasionally under bridges and under bark. Maternity colonies of 12-20 individuals found in buildings, caves, and mines.	Moths, flies, beetles, and bugs, among trees and over water; streams, ponds, springs, and stock tanks used for drinking and feeding. May feed and or roost with other bat species.	ND
Silver-haired bat (<i>Lasionycteris noctivagans</i> ; LANO)	WBWG:M	Coastal and montane forests, valley foothill woodlands, pinyon-juniper woodlands, and valley foothill and montane riparian habitats. Primarily a forest dweller.	Hollow trees, snags, buildings, rock crevices, caves, and under bark; Females may form nursery colonies or occur as solitary individuals in dense foliage or hollow trees.	Moths and other soft-bodied insects, also beetles and hard-shelled insects. Feeds less than 6 m (20 ft.) above forest streams, ponds, and open brushy areas.	Foraging range of 46-91 m (150-300 ft.)
Canyon bat * (<i>Parastrellus hesperus</i> ; PAHE)		Common in deserts, arid brush lands, grasslands, and woodlands, and uncommon in conifer forests. Prefers rocky canyon walls and cliffs in arid habitats.	Primarily rock crevices, occasionally in <u>mines</u> and caves, and rarely in buildings. Suitable roosts are most often found in rocky canyons and cliffs.	Wide variety of insects. Feeds at low to moderate heights. Often found foraging over water, in rocky canyons, and along cliff faces.	ND

Species	Status ¹	Habitat	Roosts	Foraging	Home Range
Big brown bat* (<i>Eptesicus fuscus</i> ; EPFU)		Recorded in virtually every North American vegetation type. Prefers to forage over open areas, water sources, or among trees in fairly open stands.	Natural roosting habits are poorly known. Uses buildings and commonly found under bridges. A few records include caves, <u>mines</u> , and trees. Females and young form maternity colonies of 20-300 individuals.	Flying insect and large, hard-shelled prey, such as scarab beetles. Moths are also eaten. Foraging height averages 6-9 m (20-30 ft.) over open habitats; foraging high over trees till dark, after which foraging height is reduced to low heights (to 1 m above ground). Foraging over water usually higher and further from shoreline than smaller myotis.	111 km ² (43 mi ²); may commute up to 32 km (20 mi). Can move 400 km (250 mi) in 4-5 days.
Western red bat * (<i>Lasiurus blossevillei</i> ; LABL)	DFG:SSC USFS:S WBWG:H	Forests and woodlands from sea level up through mixed conifer forests. Not found in desert areas. Prefers edges or habitat mosaics that have trees for roosting and open areas for foraging.	Primarily in trees, less often in shrubs, 0.6-13 m (2-40 ft.) above ground level, often in edge habitats adjacent to streams, fields, or urban areas. Family groups roost together.	Moths, crickets, beetles, and cicadas. Frequently forage in large concentrations; Forages from high above treetops to nearly ground level. Feeds over a wide variety of habitats including grasslands, shrublands, open woodlands and forests, and croplands	Commutes from 0.5-0.9 km (0.3-0.6 mi) from the day roost.
Hoary bat (<i>Lasiurus cinereus</i> ; LACI)	WBWG:M	Most widespread North American bat. Prefers open habitats or habitat mosaics, with access to trees and open areas or habitat edges.	Generally roosts in dense foliage of medium to large trees.	Primarily moths, although various flying insects are taken; Forages with many other bat species.	ND
Spotted bat (<i>Euderma maculatum</i> ; EUMA)	BLM:S DFG:SSC WBWG:H	Foothills, mountains, arid deserts, grasslands and mixed conifer forests of southern California; Prefers sites with roosting areas such as cliffs.	Prefers rock crevices, occasionally found in caves and buildings.	Moths; some beetle consumption. Feeds in flight, over water, and near the ground	ND

Species	Status ¹	Habitat	Roosts	Foraging	Home Range
Pallid bat (<i>Antrozous pallidus</i> ; ANPO)	DFG:SSC BLM:S USFS: S WBWG:H	Locally common species of low elevations; grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting.	Day roosts are in caves, crevices, <u>mines</u> , bridges and occasionally in hollow trees and buildings. Maternity colonies have a dozen to 100 individuals.	Wide variety of insects and arachnids. Forages over open ground, usually 0.5-2.5 m (1.6-8 ft.) above ground level. Gleaning is frequently used, and a few prey are taken aerially.	Forages 0.5-2.5 km (1-3 mi) from day roost.
Brazilian free-tailed bat * (<i>Tadarida brasiliensis</i> ; TABR)		All habitats up through mixed conifer forests, but open habitats such as woodlands, shrublands, and grasslands are preferred.	Requires caves, <u>mine tunnels</u> , crevices, or buildings for roosting and hibernation; Roosts with other species. Very large maternity roosts of thousands of bats commonly found in caves and under bridges.	Small aerial insects, primarily small moths. Forages high, usually at least 30 m (98 ft.) above ground level; found feeding with other species	Commutes up to 65 km (40 mi), or more.
Townsend's big-eared bat (<i>Corynorhinus townsendii</i> ; COTO)	BLM:S <u>DFG:SSC</u> USFS:S WBWG:H	Found in all but subalpine and alpine habitats; most abundant in mesic habitats.	Requires caves, <u>mines</u> , tunnels, buildings, or other human-made structures. May use separate sites for night, day, hibernation, or maternity roosts; Maternity roosts (fewer than 100 individuals) found in caves, tunnels, mines, and buildings;	Small moths are the principal food. Beetles and a variety of soft-bodied insects also are taken. Gleans, and captures prey in the air.	Colonies 16-19 km (10-12 mi) apart. Individuals can travel up to 64 km (40 mi).
Pocketed free-tailed bat (<i>Nyctinomops</i> <i>femorosaccus</i> ; NYFE)	<u>DFG:SSC</u> WBWG:M	Pinyon-juniper woodlands, desert scrub, desert succulent shrub, desert riparian, desert; Prefers rocky desert areas with high cliffs or rock outcrops.	Prefers rock crevices in cliffs as roosting sites; Must drop from the roost to gain flight speed. Maternity roosts in rock crevices, caverns, or buildings.	Gleans insects from brush or trees or feeds along habitat edges.	ND
Western mastiff bat (<i>Eumops perotis</i> ; EPFU)	BLM:S WBWG:H	Open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, annual and perennial grasslands, palm oases, chaparral, desert scrub, and urban.	Crevices in cliff face high buildings, trees, and tunnels; Needs vertical faces to drop off to take flight. Nursery roosts in crevices and buildings; rarely uses night roosts	Feeds primarily (58%) on night-flying insects from ground to tree-level. or greater heights (60 m, 195 ft.).	ND

1. Status: DFG: SSC = Department of Fish and Game Species of Special Concern; USFS: S = US Forest Service Sensitive Species; BLM: S = BLM Sensitive Species; WBWG: L, M, H = Western Bat Working Group Low, Medium and High conservation priority. (See <http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/spanimals.pdf>)

Memorandum

To: Tuleyome
607 North Street
Woodland, CA 95695

From: Jeremey Ashe and Virginia Moran
Burleson Consulting Inc.
950 Glenn Drive, Suite 245
Folsom, CA 95630

Date: 4/19/13

Re: Follow-up Rare Plant Survey for the Corona and Twin Peaks Mine Drainage Treatment Project

Introduction

Burleson Consulting, Inc. (Burleson) prepared this technical memo of findings for the follow-up rare plant survey for the Corona and Twin Peaks Mine Drainage Treatment Project located in Napa County for Tuleyome. The proposed project site is located within Napa County, California in Section 32, Township 10 North, and Range 6 West of the Detert Reservoir Quad of the U.S. Geological Survey (USGS) topographic quadrangle map (Latitude 38.6693°N; Longitude 122.5411°W; UTM 539921 Northing; and UTM 4280179°Easting). The site is located in the northwest corner of Napa County about 1.5 miles south of the Lake County border.

Burleson's biologist Jeremey Ashe and botanist Virginia Moran completed the rare plant survey of the proposed project site on April 3, 2013. The survey was conducted because the bloom period of some special status plants was missed during the original survey conducted in May 2012. The three main site areas surveyed included Upper Corona Mine, Twin Peaks Mine, and the Corona Mine upper pit area (Figures 1 and 2). This technical memo presents methods, results, and recommendations from the survey.

Methods

A list of federal and state special-status plant and wildlife species was developed for the proposed project site using a database search, which included a query of processed data from the California Natural Diversity Database (CNDDB) for the Whispering Pines, Middletown, Jericho Valley, Mount Saint Helena, Detert Reservoir, Aetna Springs, Mark West Springs, Calistoga, and Saint Helena USGS 7.5-minute quadrangles. A list of federally endangered or threatened species was generated by the U.S. Fish and Wildlife Service. A spatial query of the CNDDB was conducted to produce a map of special-status species with known occurrences within 5 miles of the site (Figure 3). Also, a general background and history of the site and list of plants, was reviewed from the report, the Oat Hill Mine Trail in Napa County, prepared by Richard O'Donnell (O'Donnell et al. 2001-2005). Additionally, prior to surveys, rare plant specimens were observed at the Jepson/UC Berkeley herbarium in preparation for the surveys.

On April 3, 2013 targeted species surveys were conducted at the Corona Mine, Twin Peaks Mine, and the Corona Mine upper pit area. The targeted plant species were *Ceanothus confusus* (Ricon Ridge ceanothus), *Ceanothus divergens* (Calistoga ceanothus), *Ceanothus sonomensis* (Sonoma ceanothus), and *Fritillaria pluriflora* (Adobe-lily). All four plant species bloom periods were missed the previous year; therefore these five species were targeted in this survey.

Plant identification was confirmed by keying, consultation with herbarium specimens and databases, and photographic databases (see references cited). Wildlife was also identified by using binoculars and vocalizations.

For the purpose of this investigation, special-status species are defined as plants and wildlife that are legally protected under the State or Federal Endangered Species Act, plants that are considered rare (listed 1-3 but not including plant rank 4) by the California Native Plant Society, species of concern under California Department of Fish and Game, wildlife on special watch lists, and all birds protected under the Migratory Bird Treaty Act.

Additionally, all methods were consistent with the original May 2012 survey (Burleson 2012).

Specific Survey Locations:

Upper Corona Mine

- Approximate Limit of Mine Waste
- Historic Ore Processing Area
- Riparian Area
- Future Fence
- Existing Infiltration Trench
- Settling Basin
- Boiler House Portal
- Possible Wetland

Twin Peaks Mine

- Approximate Limit of Mine Waste
- Existing Infiltration Trench
- Settling Basin
- Future Settling Basin
- Twin Peaks Portal

Corona Mine Upper Pit Area

- Existing Road to Upper Pit Area
- Upper Pit Area

Results:

New Plants Observed: Many plants were in bloom during the survey. Plants that were not identified from last year's survey include *Arctostaphylos stanfordiana*, *Cupressus macnabiana*, *Cupressus sargentii*, *Lomatium marginatum* var. *marginatum*, *Calystegia collina oxyphylla*, *Erythronium multiscapoideum*, and *Fritillaria recurva*. Additionally, two special status plants were observed during this survey. Sonoma Ceanothus (*Ceanothus sonomensis*) was found blooming while *Streptanthus morrisonii* (Morrison's Jewel-flower) was identified by vegetative characteristics and fruit from last year's flowering season.

New Wildlife Observed: No special status wildlife or nests were observed during this survey. Many common species of birds were observed foraging in the project location. Species that were observed for the first time on site were Red-breasted Nuthatch, Nuttall's Woodpecker, Yellow-rumped Warbler, McGillivray's Warbler, and a Willson's Warbler. Other wildlife included sign or tracks of deer, black bear, coyote, and jack rabbit.

Special Status Plants and Wildlife Observed: No special status plants, wildlife, or nests were observed at the Upper Corona Mine/Twin Peaks Mine. Two special status plants were observed in an area above the Corona Mine called the Corona Mine upper pit area. Sonoma Ceanothus was observed growing within and along the existing road leading up to the Corona Mine upper pit area. Sonoma Ceanothus co-occurred with Jepson Ceanothus (*Ceanothus jepsoni*, now includes the subspecies *albiflorus*). Areas where Sonoma Ceanothus occurred are identified as "Existing Road" on Figure 1. Additionally, a population of at least 100 plants of Morrison's Jewel-flowers was observed in the upper pit area. The highest number of plants was observed in the outcrops above an adit. This area is identified as "Morrison's Jewel-flower Population" on Figure 1.

Conclusions and Recommendations

Sonoma Ceanothus was located along the existing road to the Corona Mine upper pit area and Morrison's Jewel-flower both was located within the Corona Mine upper pit area. If this area will be impacted, preconstruction surveys are recommended.

No special status plants were found within the other locations surveyed. The absence of special status plants is not evidence that there are no special status plants within the project foot print. Preconstruction surveys are recommended for impacted areas.

Bloom periods of Pappose tarplant (*Centromadia parryi parryi*), Geysers dichanthelium (*Panicum acuminatum* var. *thermal*), Kentwood Marsh checkerbloom (*Sidalcea oregano valida*), Napa bluecurls (*Trichostema ruygtii*), Marsh checkerbloom (*Sidalcea oregano hydrophila*), and Socrates mine-jewel flower (*Streptanthus brachiatus brachiatus*) all bloom after May. These plants bloom periods were missed during the original May 2012 survey (Burleson, 2012). It is recommended a rare plant survey be conducted during July 2013 for these species.

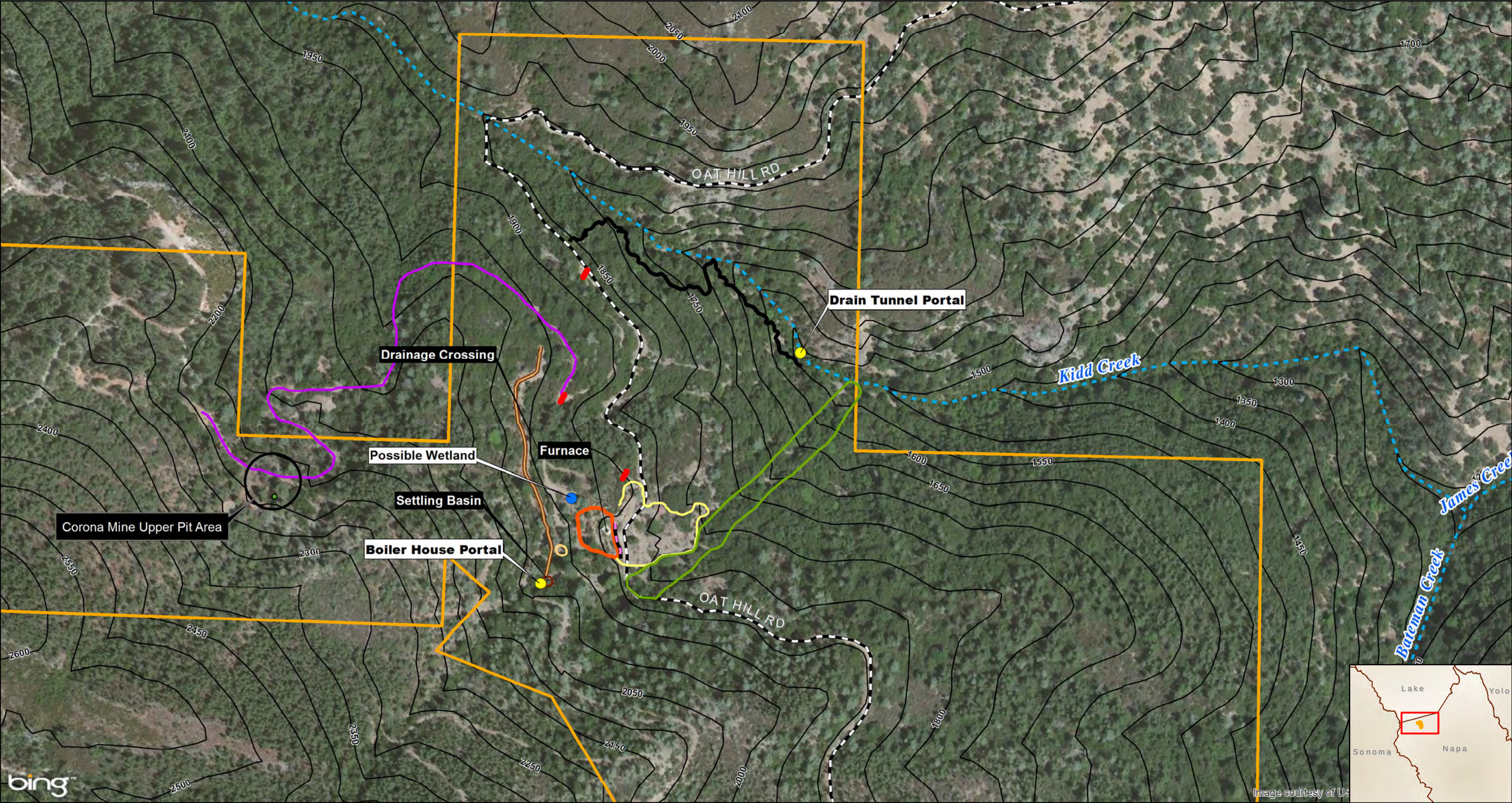
Recommendations from the previous report have not changed for project features that were previously surveyed (Burleson, 2012).

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Legend

John Livermore Property

Historic Ore Processing Area

50ft Contour

Roads

Creeks

Portal

Possible Wetland

Future Gate

Comment

Morrison's Jewel-flower Population

Riparian Area

Existing Road

Existing Path

Future Fence

Future Spoils Storage

Existing Infiltration Trench

Settling Basin

Approximate Limit of Mine Waste

Corona Mine

Figure 1: Corona Mine Survey Features

Source: Bing Maps aerial imagery
web mapping service;
Napa County GIS Department 2011;
Burleson Consulting 2012.

Burleson Consulting, Inc.

Path: S:\GIS\Projects\Corona - Twin Peaks Mine\ISMND\Figure 3 - Corona Mine ISMND Revised Draft.mxd

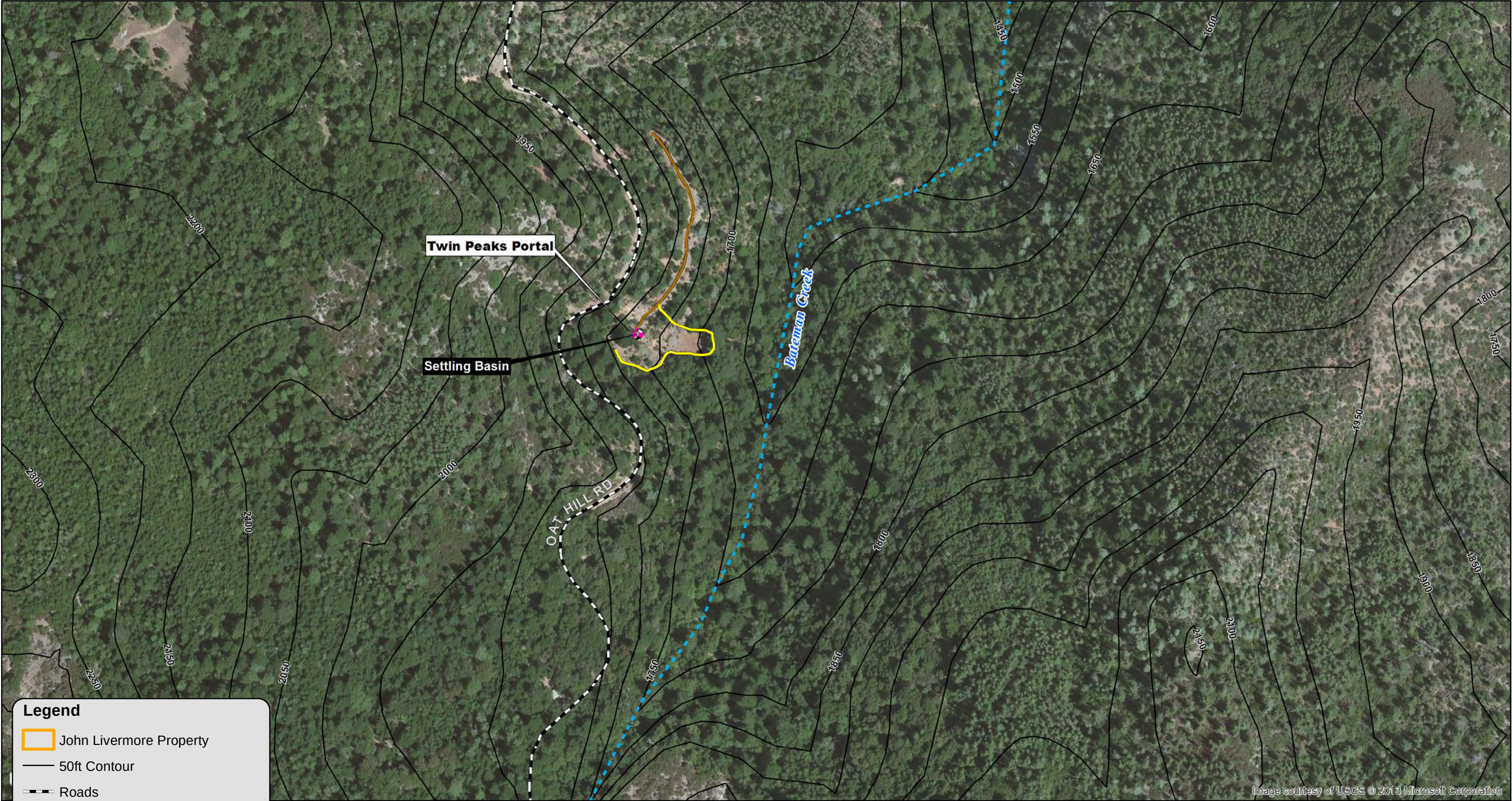


Image courtesy of USGS © 2013 Microsoft Corporation

Legend

 John Livermore Property

 50ft Contour

 Roads

 Creeks

 Twin Peaks Portal

 Future Settling Basin

 Approximate Limit of Mine Waste

 Existing Infiltration Ditch





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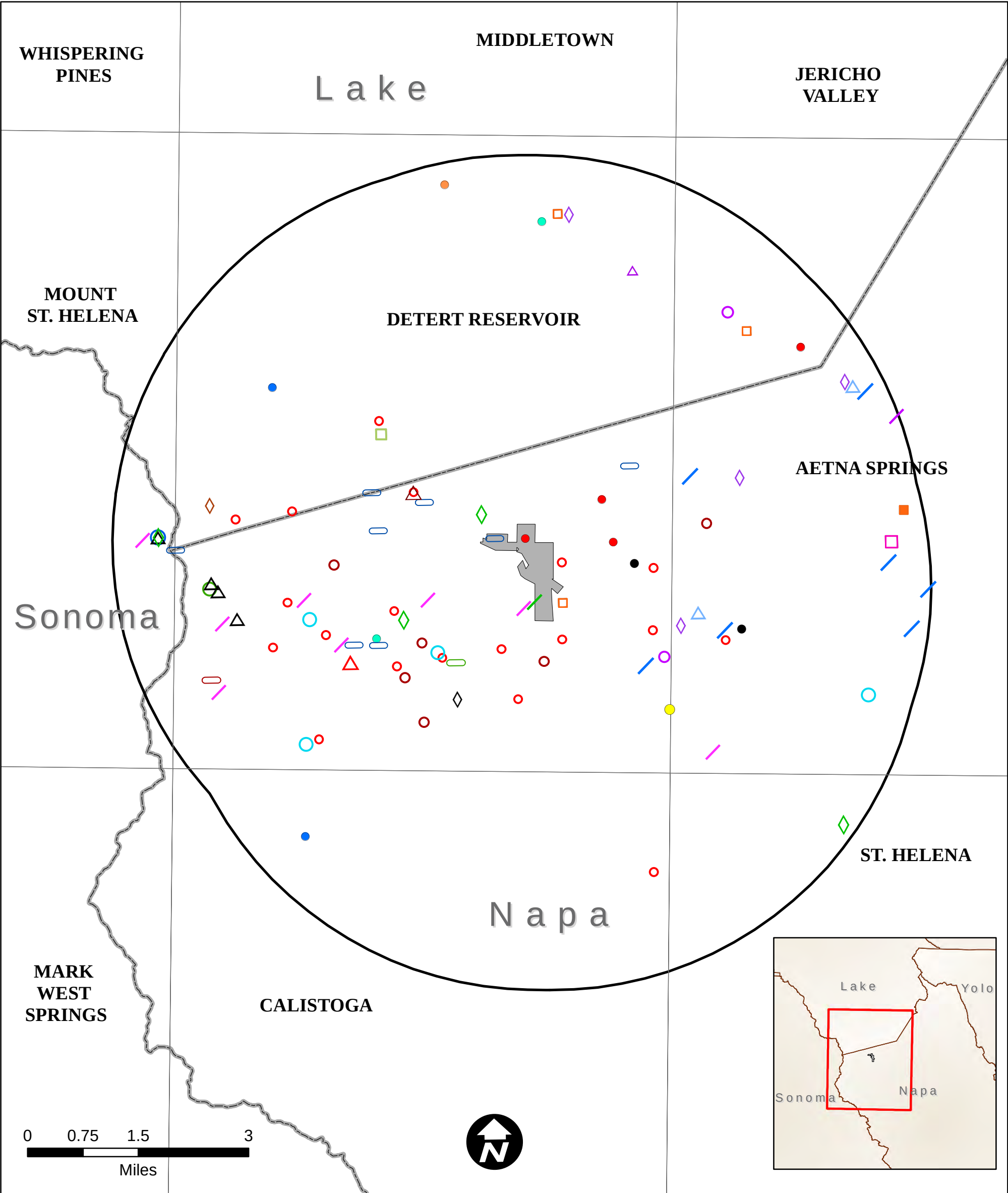
Feet

Twin Peaks Mine

Figure 2: Twin Peaks Survey Features

Source: Bing Maps aerial imagery
web mapping service;
Napa County GIS Department 2011;
Burleson Consulting 2012.

 Burleson Consulting, Inc.



Corona Mine & Twin Peaks Mine

Source: California Natural Diversity Database
Biogeographic Data Branch
Department of Fish and Game 2012;
Napa County GIS Department 2010.

Burleson Consulting, Inc.

Legend

 John Livermore Property

 5 Mile Buffer

CNDDDB - Native Plant Society

 Cobb Mountain lupine

 Colusa layia

 Calistoga ceanothus

 Greene's narrow-leaved daisy

 Hall's harmonia

 Jepson's leptosiphon

 Jepson's milk-vetch

 Konocti manzanita

 Marin County navarretia

 Napa bluecurls

 Napa false indigo

 Rincon Ridge ceanothus

 Santa Lucia dwarf rush

 Socrates Mine jewel-flower

 Sonoma beardtongue

 Sonoma ceanothus

 Tehama County western flax

 adobe-lily

 bent-flowered fiddleneck

 early jewel-flower

 green jewel-flower

 marsh checkerbloom

 narrow-anthered brodiaea

 two-carpellate western flax

 woolly meadowfoam

CNDDDB - DFG

 Townsend's big-eared bat

 foothill yellow-legged frog

 pallid bat

 purple martin

 tricolored blackbird

 western pond turtle

Figure 3
Species of Special Concern

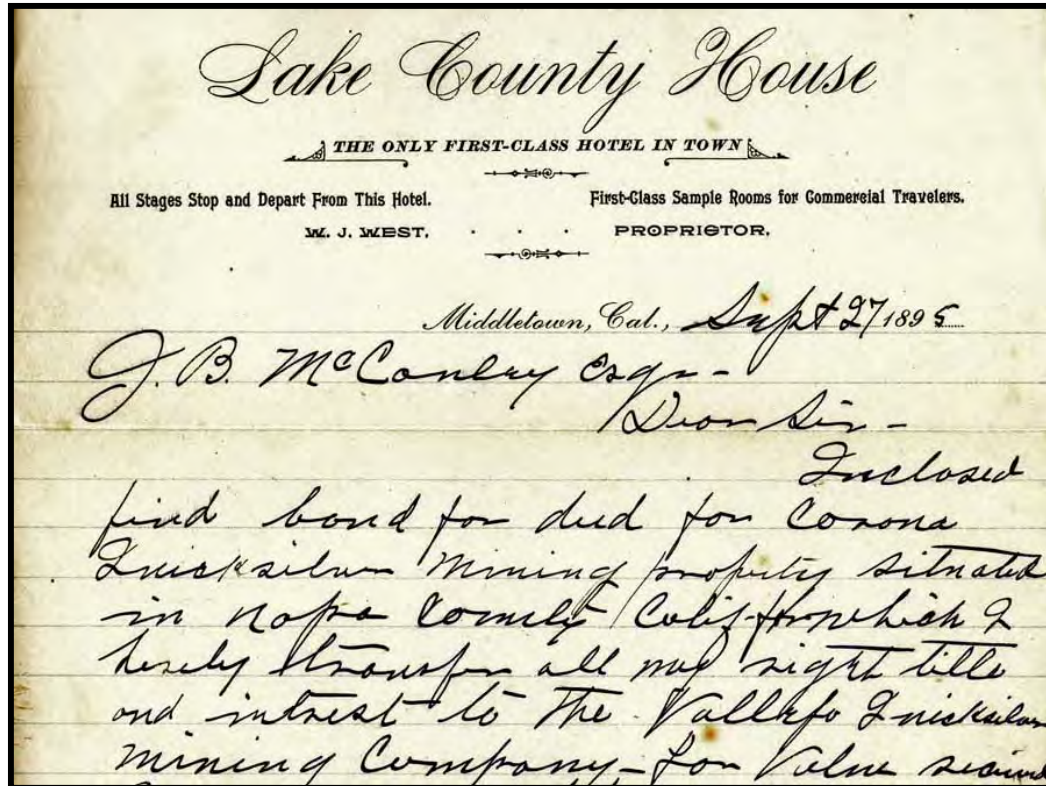


ARCHAEOLOGICAL
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**CULTURAL RESOURCE EVALUATION OF
THE CORONA AND TWIN PEAKS MINES, NAPA COUNTY
APN 115-018-013**



Prepared at the request of:

Tuleyome
607 North Street
Woodland, CA 95695

Prepared by:

John W. Parker, Ph.D., RPA
USGS Quad: Detert Reservoir 7.5'
August 30, 2012

THIS VERSION CONTAINS NO RESOURCE LOCATION INFORMATION AND CAN BE RELEASED FOR
PUBLIC USE.

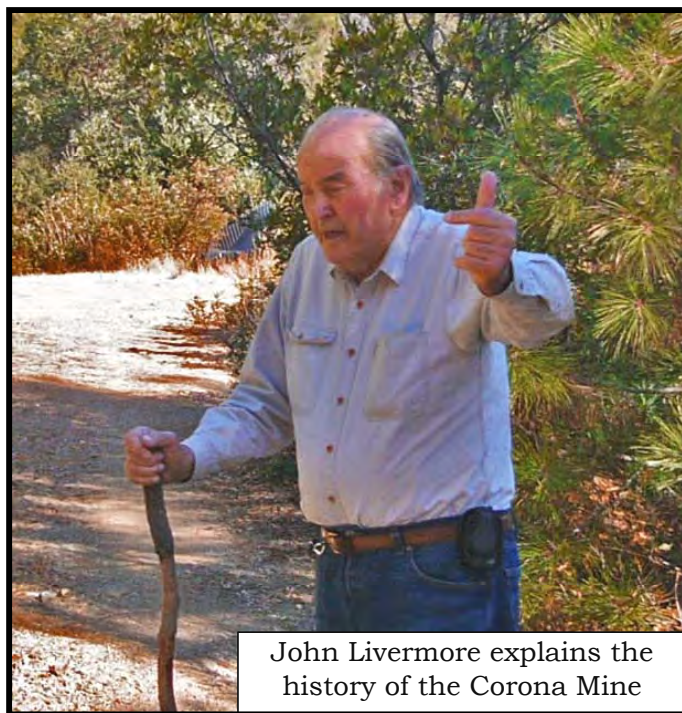
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Acknowledgements

Many people provided their knowledge, time, and talents to make this study possible. Special thanks must be given to John Livermore and Justin Smith for their interest in preserving the history of the project area. Sylvia Marciano and Bev Barns of Calistoga's Sharpsteen Museum and Alexandria Brown of the Napa County Historical Society are to be commended for their research assistance. Jeff Parady (Pope Valley Garage) is appreciated for the leads he provided and his interest in local mine history.

Without the dedication and hard work of the staff and directors of Tuleyome Inc., this project would not have happened. Finally, I would like to thank my wife, Cheyanne, for her excellent field work in the face of steep slopes, poison oak, bears, and wild dogs. She also needs to be commended for her patience and advice as I worked on the report.



John Livermore explains the history of the Corona Mine

SUMMARY

On April 24th, Sara Husby-Good requested that the author conduct a cultural resource investigation of the Corona and Twin Peaks mine sites and associated historic resources situated in the James Creek watershed, Napa County. The purpose of the investigation was to map, describe, and evaluate archaeological and historical sites and features prior to a planned mine site cleanup project. Archaeological Research was also asked to assist the mine site cleanup specialists in designing a plan that would avoid impacts to significant historic resources.

This investigation included an extensive review of published and unpublished historical documents, maps, photographs, and the field inspection of ~53 acres. This work discovered six historic sites (containing at least 37 definable features), one combination historic/prehistoric site, and one isolated prehistoric feature. Six of the cultural resources appear to be significant as defined under the California Environmental Quality Act (CEQA). Four of these sites exist within the immediate project area.

The historic resources making up the Corona and Twin Peaks mine sites provide an excellent example of the initial development and continual refinement of hard rock cinnabar mining and mercury processing as it existed in the California Coast Range between 1870 and 1970. In addition to mining-related engineering features, extensive residential deposits were discovered containing materials that can provide information important in reconstructing the personal lives of the mine owners and workers throughout this period.

Cutting through the project area is Oat Hill Road. This wagon road has been recognized by many researchers as a significant transportation route linking Napa and Lake Counties and providing access to one of the most productive mercury mining regions in California (E Clampus Vitus 1998).

It is recommended that the mine site cleanup plan be designed to avoid the significant cultural resources reported herein. In places where resources cannot be avoided, it will be necessary to mitigate impacts through the recovery and analysis of the historic information they contain (see page 44, "Land Use Planning Recommendations").

INTRODUCTION AND BACKGROUND

The fieldwork carried out as part of this study was conducted by John and Cheyanne Parker. Dr. Parker holds a Ph.D. in Archaeology, and is a Registered Professional Archaeologist. Cheyanne has 15 years of archaeological field and lab experience. The fieldwork took place between May 18 and 30, 2012.

The proposed project will require a local discretionary permit indicating that the California Environmental Quality Act (CEQA) applies to the project. Therefore,

this cultural resource evaluation was written to comply with the requirements set forth in CEQA (sec. 21083.2). This report follows the outline for identification of cultural resources as presented in the “Archaeological Resource Management Reports (ARMR): Recommended Contents and Format” (State of California 1990).

The project area consisted of mostly steep terrain located south of Kidd Creek and west of Bateman Creek on the northeast slope of Mt. St. Helena.

The property is depicted on the Detert Reservoir 7.5' USGS topographic map as existing in Sections 32 and 33, T10N, R6W and Section 4, T9N, R6W.

Map Removed

Natural Setting

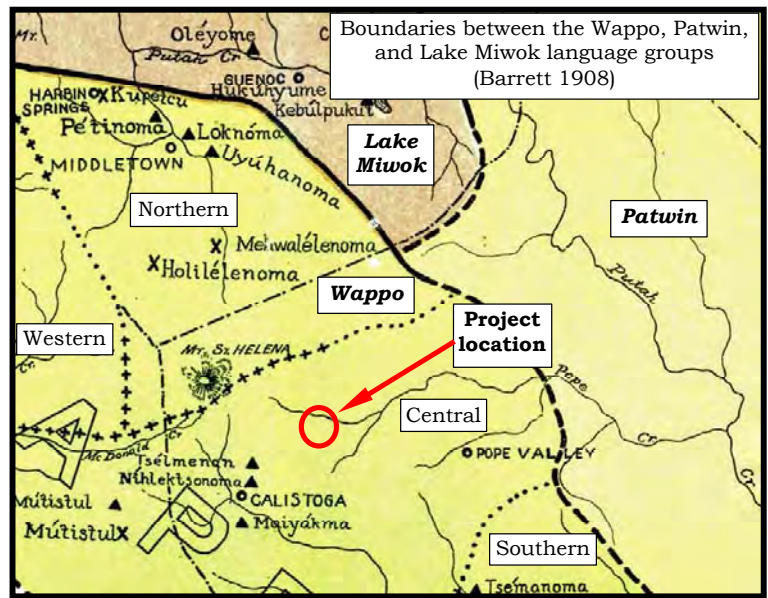
The project area consists of steep rugged terrain along the north slope of Mt. St. Helena in the Mayacmas Mountains. Soils within the project are a mix of those derived from the volcanic bedrock making up much of Mt. St. Helena and the Palisades and those derived from the serpentine bedrock that makes up much of the Franciscan Formation in the area. These soils support a mixed coniferous/hardwood forest with patches of chaparral and occasional meadows.

Springs are evident throughout the area.

Historically, the project area had been used for hunting and mining. The latter included extensive logging of timber in the immediate watershed for use in the mines and ore processing.

Prehistoric Background

Prior to European arrival, the project area was within the Central Wappo tribal territory. Their territory encompassed the northern Napa River drainage to a point just south of Glass Mountain. It also included the upper reaches of the Pope Creek drainage east of Mt. St. Helena (Barrett 1908, Sawyer 1978).



Wappo villages were located along major streams and rivers. The mountainous project area would not have been suitable for permanent villages or camps. However, the project area was certainly used for resource procurement; involving both plant gathering and hunting.

It is possible that the project area may have been used by the nearby Lake Miwok and Patwin people for casual hunting and resource gathering.

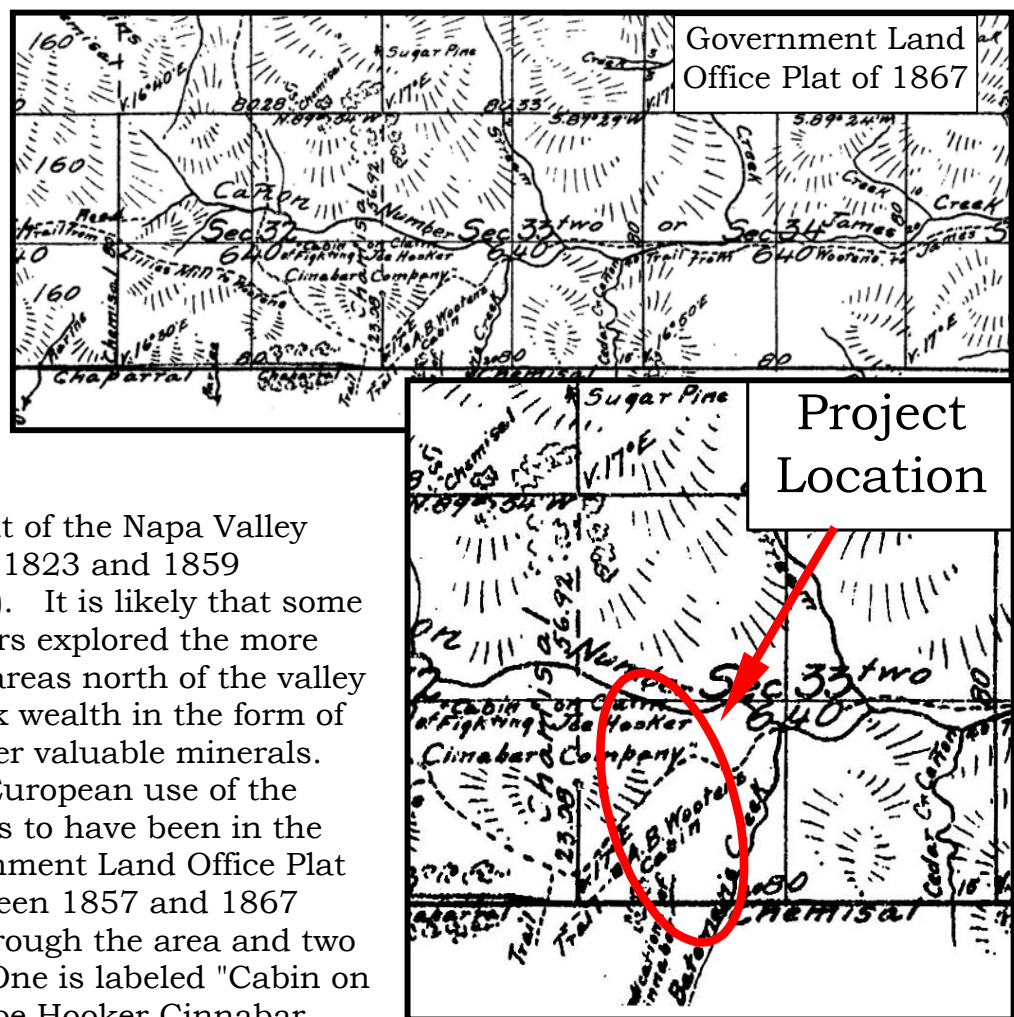
A review of the 1908 tribal map indicates that many Wappo village names ended with the suffix "onoma". In fact, the county name "Sonoma" is a word that is likely derived from a Wappo term "C^ho-nóma" meaning abandon village (Sawyer 1978).

During 40-years of research in the Clear Lake Basin, the author discovered that the oldest known evidence of human occupation dates to between 14,000 and 20,000 years ago (Parker 2008:58). Though the origins of the Wappo are unknown, it is likely that people were using the Napa Valley and Mt. St. Helena resources during this time period. The Wappo language has been attributed to the Yukian language family. Both Fredrickson (1973) and Heizer (1953) suggest that the Wappo language likely branched off from the other Yukian languages about 4,000 years ago.

Historic Background

Early Days (1823-1867)

The exploration and early settlement of the Napa Valley took place between 1823 and 1859 (Verardo et al 1986). It is likely that some of these early settlers explored the more remote wilderness areas north of the valley hoping to find quick wealth in the form of gold, silver and other valuable minerals. The first recorded European use of the project area appears to have been in the 1850's. The Government Land Office Plat Map prepared between 1857 and 1867 shows two trails through the area and two "cabin" locations. One is labeled "Cabin on Claim of Fighting Joe Hooker Cinnabar



Company" and the other is "A.B. Wooten's Cabin". The trails through the area are labeled "Trail from Wooten's to James" and "Trail from Lillie's Mill to Wooten's".

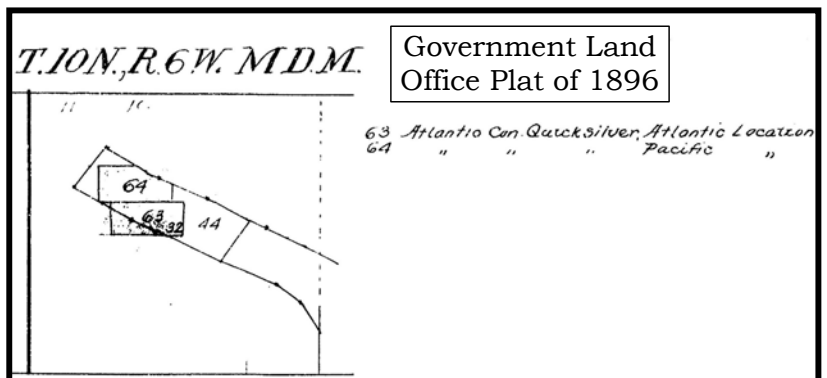
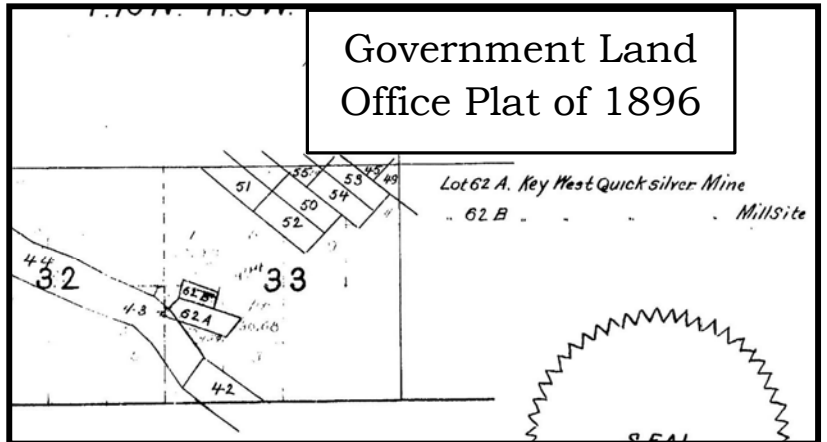
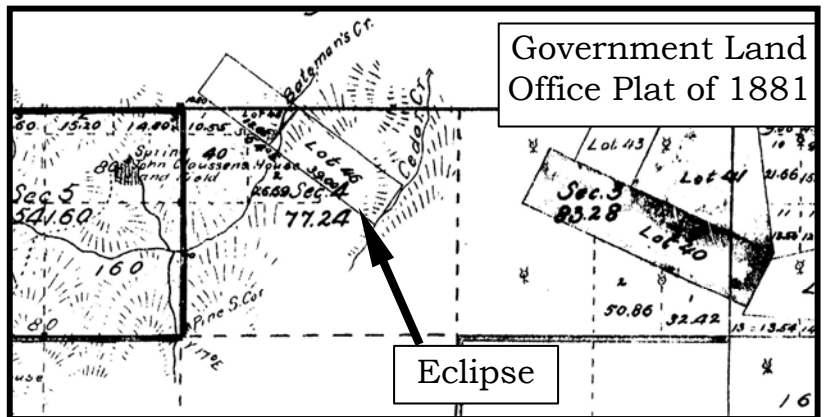
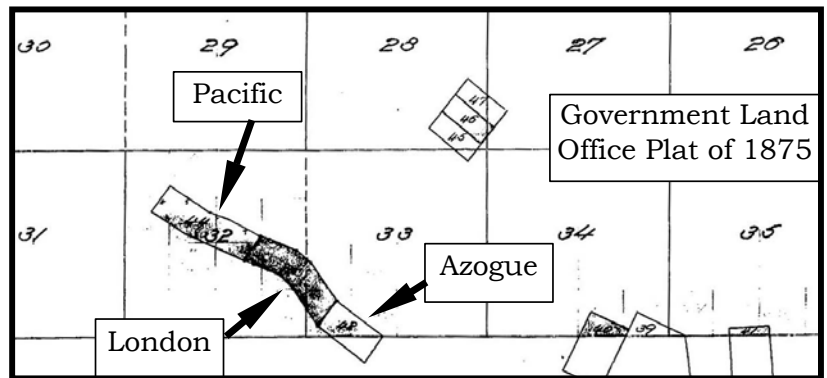
Lillie's Mill was a mill operated by the Lillie family on St. Helena Creek at the base of the north slope of Mt. St. Helena (Stanton 2010:56).

Early Mine Claims (1860-1896)

By 1860, the area was known as the Mammoth Ledge Mining District (Livermore 2012). The first recorder of the district was J.T. Edwards and the first claims staked were the Azogue, London, and Pacific Quicksilver Claims in 1861 (see attached Plat Map). J.P. James became the official recorder in 1861 and miners filed their claim notices on the side of a cabin owned by Jones in the vicinity of the Twin Peaks mine. The area became known as Jonesville (Livermore 2012).

In 1862, early claims in the area of the Azogue were taken over by the Mercury Mining Company (where the Twin Peaks Mine now sits). Further southeast of the Azogue was the Eclipse Quicksilver claim (depicted on the 1881 Government Land Office Plat).

In 1893, the Oat Hill Road was completed connecting Napa and Lake Counties.

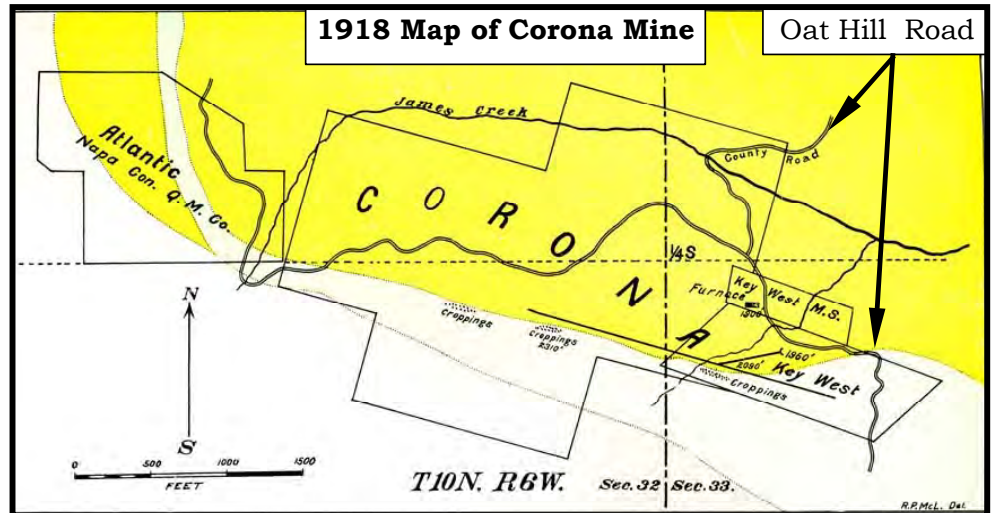


The 1896 map shows the Pacific Quicksilver Claim split into an Atlantic Location and a Pacific Location. Also depicted is a claim establishing the Key West Quicksilver Mine and Mill Site at the location of the present-day Corona Mine.

Corona Mine (1895-1970)

In September 1895, H.C. Davey transferred the deed to the Corona, Cinnabar, Lake, Hardtack, North Side, San Juan, and St. James mining claims along with 90,000 shares in Corona Mining Company stock to the Vallejo Quicksilver Mining Company, 409

Carolina Street, Vallejo (see letter on cover page). James B. McCauley was president of the Vallejo Quicksilver Mining Company and H.C. Davey was given the position of superintendent. At that time, the only improvements listed on the property were "a good trail almost wide enough for a wagon road... Also a house, blacksmith shop, etc." of a value "not less than \$1,000." (Wilson 189?). The Vallejo Quicksilver Mining Company operated the Corona Mine from 1895 until 1906. Work at the mine stopped due to a heavy winter that overwhelmed the pumps used to keep the mine dry (Bradley 1918:81, Davey 1895, Williams 1895).

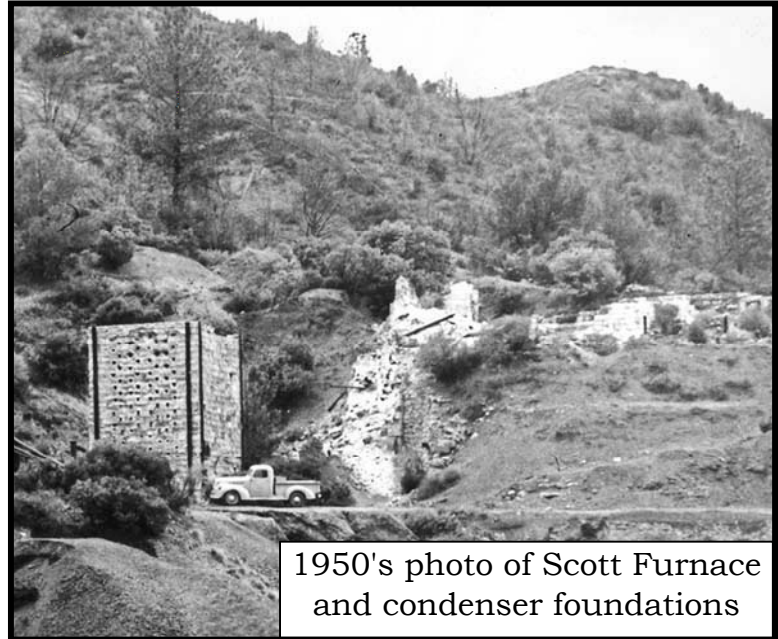


In 1890, prior to opening the Corona Mine, McCauley had partnered with John H. Brennan, establishing a bottling works in Vallejo known as McCauley & Brennan "Mc & B". In 1901, the company built a new bottling plant on Main Street and the tracks of the Southern Pacific railroad. This new plant was named the St. Louis Bottling Works. The business bottled various mineral waters and controlled the general distribution for Rainier beer (Gregory 1912). It is likely that much of the funding needed to set up the St. Louis Bottling Works came from Corona Mine profits. McCauley moved on to establish the Calso Water Company in San Francisco (S.F. Directory 1928).



It is reported that a "20-ton fine-ore furnace" was constructed at the Corona in 1896. In 1901, stockholders voted to construct the 50-ton capacity Scott Furnace that is still standing (Ingle nd.).

Though he never worked the mine again, McCauley owned the Corona until his death in 1943. He leased out the claim to various individuals and companies to be worked and it appears that the mine was worked in 1911, 1916, and 1939-44 (mindat.org, Gould 1929).

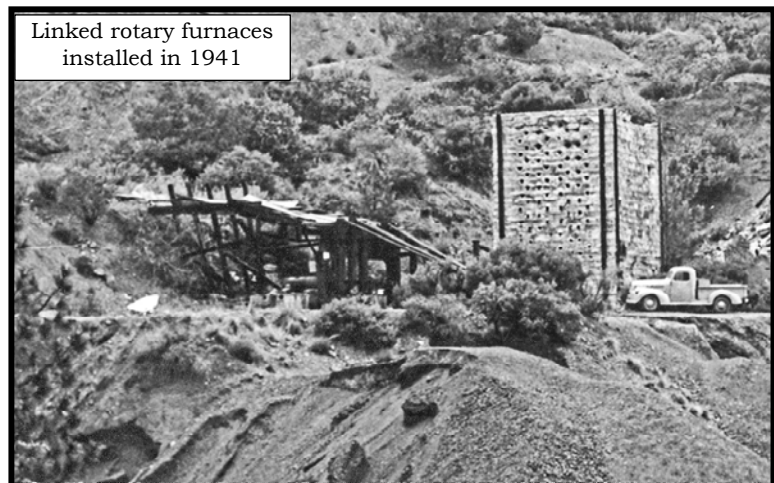


1950's photo of Scott Furnace and condenser foundations

It appears that between 1928 and 1930, McCauley spent \$80,000 to \$85,000 to have the drain tunnel excavated to take care of the drainage problem in the mine. Before any ore could be processed, the price of mercury had declined and no further work was conducted. The mine did not open again until late 1939 when it was leased to Flynn and Shelby. They removed material from existing mine dumps, furnace residue and surface areas. They retorted the material in a "D" retort several miles away (Ingle nd.). They took \$13,000 from the mine in 2 years.

In 1941, the Corona was subleased by a group headed by Mr. Tuttle. This group installed the small linked rotary furnaces and condensing system located just south of the Scott Furnace. They also made \$13,000 to \$14,000 by processing old ore from the mine dumps before losing their lease.

It appears that Don Emerson obtained the mine from the McCauley estate and owned it until it was purchased by John Livermore in 1995 (Smith 2012).



Linked rotary furnaces installed in 1941

Hugh C. Ingle, Jr. leased and operated the Corona Mine from 1957 to 1972 (Swent 2000). In a published interview, Ingle indicates that he began exploring the mine in 1957. In 1963 and 1964 he installed a Gould rotary furnace and other

processing equipment that he bought from other nearby mines. A drop in the price of mercury stopped the operation. Work started up again in 1968 and he worked the mine until 1972. This involved two new ore bodies that were mined both underground and as open pits.

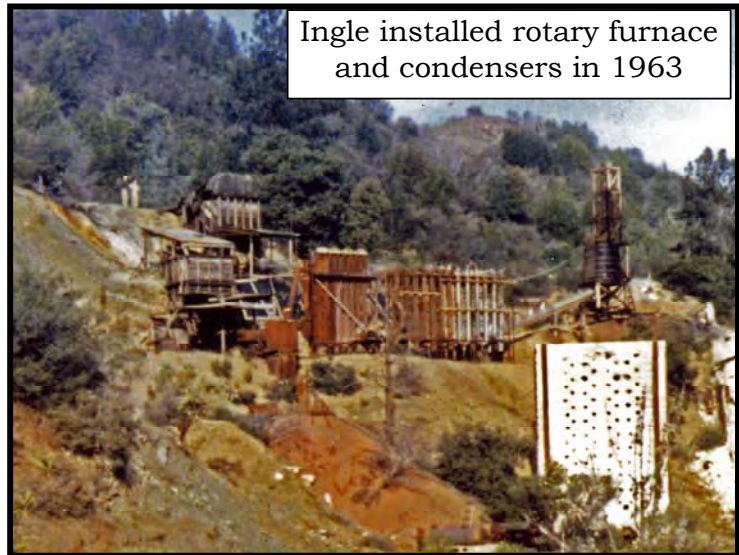
During his time at the Corona, Ingle also used his rotary furnace to process ore trucked to the site from the New Almaden Mine area in the Santa Clara Valley. He also cleaned out and processed material from the Scott Furnace condensers.

Twin Peaks Mine (1904-1943)

Though the Azogue Quicksilver Claim was filed in 1861, many changes in claim ownership and location took place over the years. Small operations came and went, producing only a few flasks of mercury.

In 1904, Hamlin W. and Edward L. Herrick staked the Twin Peaks claims over older claims that had lapsed. Herrick sold the Twin Peaks claim to Louis Douglas Fay in 1915 (Livermore 2012). By 1917, Fay had produced 275 flasks of mercury (Bradley 1918:91). During this period, the ore was being obtained from both the upper and lower adit levels. Two "D" retorts were being used to process the ore.

The next report of Twin Peaks operation is in 1942, when Fay installed a 60-ton rotary furnace before discovering that no new ore was available. Fay sub-leased the Corona, reopened several areas of the mine and trucked ore to the Twin Peaks furnace. They produced \$48,000 in mercury before stopping operations in 1943 (Livermore 2012).



Ingle installed rotary furnace and condensers in 1963



Plaque on rock at mine area near Oat Hill Mine Road



PREFIELD RESEARCH

Prior to the field inspection, the author conducted background research at the California Historical Resource Inventory System office (CHRIS), Sonoma State University. Additional background research was conducted at the Sharpsteen Museum, Calistoga; the Napa County Historical Society Research Library, Napa; and John Livermore's personal collection of historical documents.

The CHRIS research revealed that a small portion of the project area had been inspected and a historic resource recorded. This was the main processing area of the Corona Mine (P-28-1534) recorded by Mike Newland in 2008.

Though not affected by the current project, four additional archaeological features had been recorded within a 1-mile radius of the project area. Two obsidian flakes had been recorded NE of the main Corona processing area and two sections of wagon road with wheel ruts in solid rock had been recorded NE and SE of the main Corona processing area (P-1486). These were recorded as part of a Timber Management Plan for Montesol (Gill 2007).

The Oat Hill Extension Mine site was recorded NW of the Corona processing area as P-28-1429. This was recorded as part of a BLM land exchange plan. The report indicates that the site was "relatively intact and has integrity of design". The report states, "National Register Criterion "C" is probably applicable as an example of a complete, small, family run mercury mining operation." (Lloyd et al 2007:9)

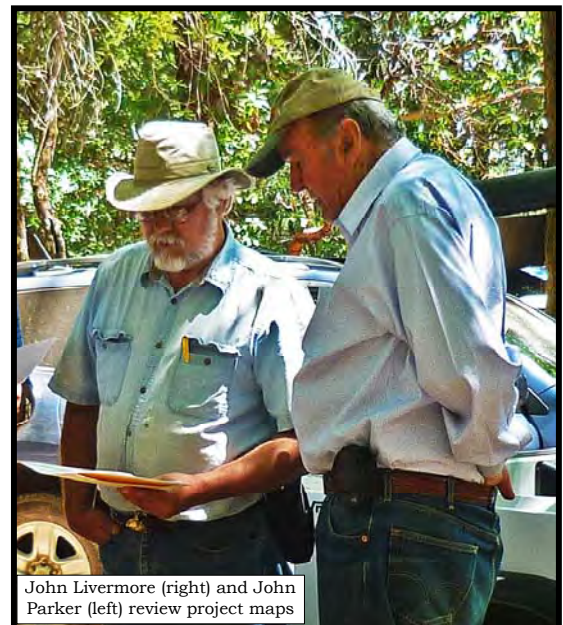
FIELD INSPECTION

The field inspection included a surface walkover of the ore processing and residential areas of both the Corona and Twin Peaks Mines. In addition, historic plat maps indicated two residences in the vicinity. Those areas were also inspected for historic features and materials.

Wherever terrain and vegetation allowed, all areas were walked and the ground inspected in transects spaced 3 to 5 meters apart.

Most of the project area was densely vegetated and covered with a thin layer of leaf litter.

When necessary, a trowel was used to clear through this layer to examine the mineral soil. In all areas, rodent dirt piles, open areas, cut and erosion banks, as well as the root balls of downed trees were carefully examined for evidence of buried cultural materials.



RESULTS

During the field inspection, one combination historic/prehistoric site, one isolated prehistoric feature and six historic sites were observed and recorded. A portion of one of the historic sites (P-28-1534) had already been recorded in 2008 by Mike Newland of the Sonoma State University Anthropology Studies Center. The current inspection expands on the work started by Mr. Newland.

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Prehistoric Resources

During the field inspection, one prehistoric site and one isolated prehistoric feature were recorded.

Prehistoric Site (P-28-1654)

The site consists of a moderate scatter of obsidian flakes. The site is situated on a partly sloping, partly level terrace.

The area contains chipped obsidian, as well as historic structural depressions, structural artifacts, and cultural material covering an area 88 meters EW by 24 meters NS.

Several obsidian flakes (from both Napa and Borax Lake sources) were discovered on the surface. These appeared to represent thinning and retouch work suggesting that the creation and maintenance of hunting and butchering tools had taken place at this location.



Isolated Bedrock Mortar (P-28-1657)

An isolated bedrock mortar is located within the Oat Hill Road alignment.

An examination of surrounding areas failed to turn up any other cultural material.



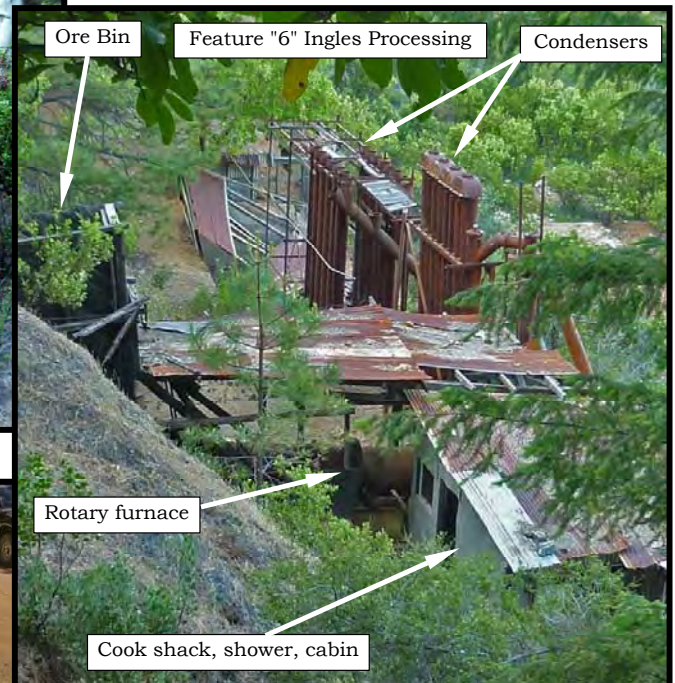
Historic Resources

Corona Mine and Residential Site (P-28-1534 and 1654)

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- | | |
|---|---------------------------------|
| 1. Ore Car Incline | 5. WWII Roller Furnace |
| 2. Lower Corona Drain adit | 6. Hugh Ingle's processing area |
| 3. Scott Furnace | 7. Boiler House Portal |
| 4. Upper Scott Furnace support structures | 8. 1956 Ford dump truck |

The Archaeological Site Record filed by Mike Newland provides a detailed description of many of the ore processing features that make up the Corona Mine (**Features 3 through 7** on the Corona Mine Processing Features Map). With the exception of a few minor alignment changes to the 1941 rotary furnace footings and the addition of the Scott Furnace condenser area, the Newland map is still the best representation of the processing area. No additional information is needed.



Features 1 and 2 represent an ore car incline track used to provide access from Oat Hill Road to the Corona drain adit (sometimes called the "Lower Corona" or "drain tunnel"). This adit was developed between 1928 and 1930 to fix the flooding problem in the mine. It involved tunneling westward toward the mine. The ore car track allowed the waste rock to be removed and dumped downstream.



Feature 8 is a 1956 Ford dump truck that had run off Oat Hill Road and ended up in a ravine. This truck was most likely lost during the Ingle mine operation (1957-1972).



Map Removed

- | | | |
|-------------------|---------------------|--------------------------|
| A. Flat | F. Water Pipe House | K. Can House flat |
| B. Well House | G. Dining Hall | L. No Name House terrace |
| C. Saw House | H. Possible House | M. Pampas House feature |
| D. Stairway House | I. Cabin Ruin | N. Spring House |
| E. Flask House | J. Heater House | O. Spring Box |
| | | P. Dining Hall refuse |

Residential Features "A" and "B" (P-28-1654)

Feature "A" is a partly sloping, partly level terrace.

The area contains structural depressions, structural artifacts, and cultural material covering an area 88 meters EW by 24 meters NS.



Time-sensitive artifacts observed suggest that the area was used between 1890 and 1916.



The Well House feature (**Feature "B"**) consists of a level terrace measuring 7 meters NS by 3 meters EW.

At the southwest corner of the terrace is a shallow rock-lined well measuring 30-40 cm in diameter. The depth was not measured.

An old road/trail extends northwest from the Well House terrace.

Though no time sensitive artifacts were discovered, the terrace contains a wood-burning stove part, window glass, and stoneware fragments suggesting the location of a cabin.



Residential Features "C", "D", "E", "F", "G", and "P" (P-28-1534)

These features are contiguous and sometimes overlapping making up an extensive residential area.

This area contains at least 5 terraced or natural bench areas that contain household refuse and structural remains.

Feature "C" (Saw House feature) consists of a level terrace measuring 19 meters NS by 17 meters EW. A pile of natural and dressed stone is at the southeast edge of the terrace suggesting the remains of a fireplace. Encased in a tree at the SE edge of the rock pile is a 2-man buck saw.

An old road/trail extends north from the terrace. A historic refuse scatter extends 32 meters north of the terrace and 26 meters south of the terrace. Time sensitive artifacts suggest that this feature was in use between 1897 and 1915. There may have also been a brief period of use just before 1930 (when the Drain Tunnel was being dug).



Feature "D" (Stairway House) is a level terrace measuring 29 meters NS by 10 meters EW. A dressed stone and wood timber stairway (evidenced by pairs of steel retaining pipes in the ground) provided access.

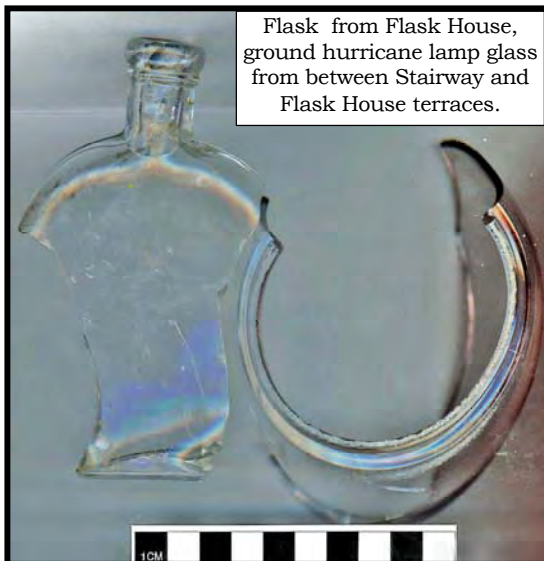
Structural remains include a rectangular area dug out of the slope (2.8 meters wide) which may have served as a root cellar and parts from a wood-burning cook stove (Patented 1870).

Time sensitive artifacts suggest that this feature was in use between 1897 and 1915. There may have also been a brief period of use just before 1930 (when the Drain Tunnel was being dug).

Features "E" and "F" (Flask House and Water Pipe House) are two small terraces between Feature "D" and Feature "G". The Flask House feature is a level terrace measuring 13 meters NS by 8 meters EW.

The Water Pipe House feature is a level terrace measuring 12 meters NS by 2.5 meters EW just upslope of the Flask House feature.

Both contain household materials. Feature "F" contains a wood-burning stove part and water pipe suggesting a structure. Though few time-sensitive artifacts were found, those observed suggested use sometime between 1880 and 1914.



Feature "P" is an extensive sheet trash deposit containing an abundance of broken dishes, serving bowls, and food containers suggesting that it originated from a dining hall (most likely Feature "G" located immediately upslope).

Feature "G" (Dining Hall terrace) covers an area 60 meters NS by 32 meters EW.

A portion of the feature appears to have been disturbed by trenching. A pile of bricks just below the trench suggests the location of a fireplace.

Time sensitive artifacts from both features "G" and "P" suggest use between 1890 and 1915. There may have also been a brief period of use just before 1930 (when the Drain Tunnel was being dug).



Residential Features "H", "I", "J", "K", "L", "M", "N", and "O" (P-28-1534)

These features are contiguous and sometimes overlapping making up an extensive residential area.

This area has at least 7 terraced or natural bench areas that contain household refuse and structural remains.

Feature "H" is a level area that may have been the location of a structure; however, dense vegetation prevented a detailed examination.

Feature "I" the Cabin Ruin is a collapsed structure on a level terrace. The cabin was built on stone foundation piers, wire nails were used throughout, corrugated roofing, propane stove, running water, probably hot water heater, regular porcelain flush toilet and cone-top beer can were observed.



Although some early glass is on the ground around the area (1887-1915), most material is from the 1940's and later, suggesting that this cabin was in use during the WWII phase of mine operations. It may have been used by the Ingle family between 1955 and 1970. This suggestion is supported by an interview with Hugh Ingle in which he states,

"Vince Yracibil had a little pipe retort behind his cabin.
His cabin is that old one over here. (Swent 2000)."

Feature "J" the Heater House flat has little cultural material except for a gas heater. The heater suggests that this cabin flat was likely in use during the WWII phase of mine operations and may have been used by the Ingle family while they were operating the Corona mine between 1955 and 1970. This may be where Vince Yracibil's "little pipe retort" was located.

Feature "K" the Can House flat is a small terrace 5 meters in diameter and covered with rusted cans. On the



southern edge of the terrace is the top part of a wood cook stove.

Feature "L" the No Name House terrace is a non-descript terrace.

Feature "M" the Pampas House feature consists of a cleared terrace area. It has pieces of a wood-burning cook stove, enameled cookware, brick, glass, water pipe, and stoneware fragments.

Time sensitive artifacts from Feature "M" suggest use between 1880 and 1914.

Feature "N" the Spring House was a small level area containing glass and stoneware fragments.

Feature "O" the Spring Box consists of a cemented stone catchment with a pipe extending down-slope. A narrow trail leads to the spring box. The trail is rock lined in some places. A tubular kerosene lamp piece made by the C.T. Ham Mfg. Co. (1886 to 1915) was discovered along the trail (Kirkman 2010).



Twin Peaks Mine and Historic Residential Site (P-28-1656)

Map Removed

- | | |
|----------------|-----------------------------------|
| 1. Sealed adit | 5. Open adit |
| 2. Open adit | 6. Condenser/processing structure |
| 3. Open adit | 7. General processing area |
| 4. Open adit | 8. Tailings and waste rock piles |

Five mine adits were observed during the field inspection of the Twin Peaks Mine area (Features 1 through 5). The northern-most adit is caved in, however the other 4 remain open.

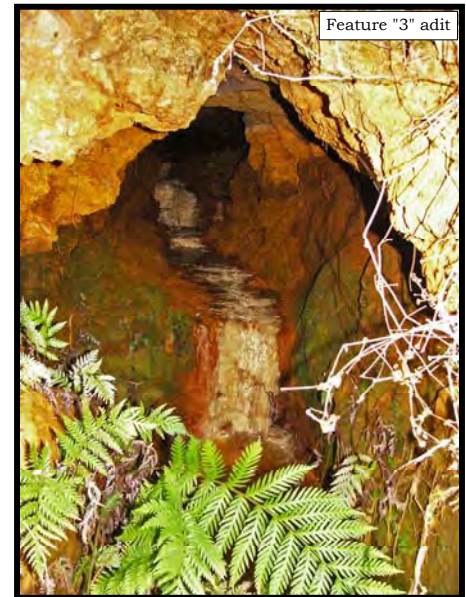
Feature "1" Adit appears to have been closed by a landslide, however, an ore-car rail protrudes from the loose rock and a large waste rock tailing area extends down slope.

Feature "2" Adit is hidden behind trees, this adit is still open.

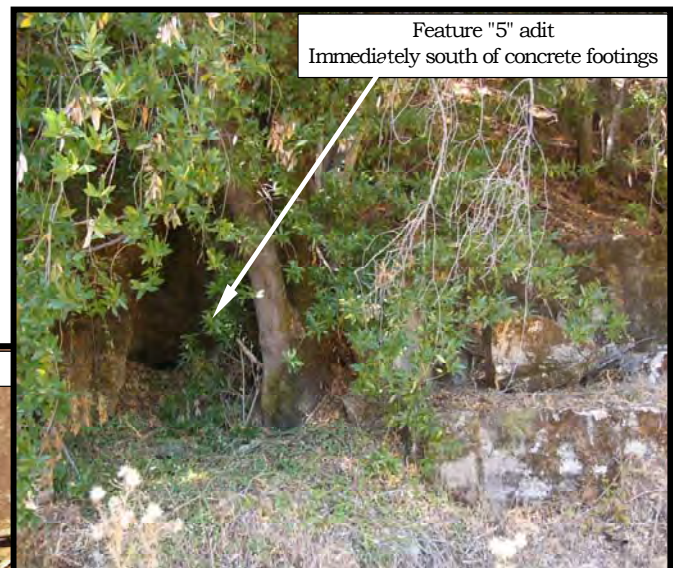


Feature "3" Adit is the mine opening that is draining water.

Feature "4" Adit is mostly closed.



Feature "5" Adit is an open adit.



Feature "6" Concrete Footings include slabs and walls stepped into the side of the hill running a distance of 13 meters NS. It is believed that these footings held the condenser system associated with the rotary furnace.



Feature "7" General Processing Area contains the footings and rotary furnace structure. The structure and footings measure 16.8 meters EW by 3.2 meters NS. The feature includes the condenser hood, engine footing, and engine block.

Feature "8" Tailings & Waste-rock Piles extend down slope from Adit "1" and Adits "3", "4", and "5". Both deposits contain historic artifacts.



Map Removed

- A. Residential Refuse Deposit
- B. Residential Refuse Deposit
- C. Developed Spring Area

- D. Residential Area
- E. Developed Road or Trail

Features "A" and "B" are historic residential refuse areas. Both contain historic and recent household discards including metal, glass, and ceramics. Feature "B" covers an area 20 meters NS by 90 meters EW.

Historic materials include a metal cable-driven ore box, canning jar lids and fragments, ceramics, both historic (1880's) and recent (1980's) glassware. Materials appear to represent residential discards from the historic mining period.

Feature "C" Developed Spring is located in a fairly level draw. It is used for equipment and material storage.



Feature "D" Probable Historic

Residential Area is a large level area. At the time of the field inspection, the area was swept clean and only a few pieces of historic material were observed.

In 1867, this spot was at the confluence of 3 major trails through the mountains. The trail from A.B. Wooten's Cabin to James Place, the trail from Lillie's Mill to Wooten's Cabin, and the trail to the Cabin of Joe Hooker. In 1893, Napa County completed the Oat Hill Road, providing stage coach and wagon access to the newly developing mines as well as a free link between Napa and Lake Counties.



The year-round water supply, would have provided a welcome rest stop after the dusty horse or wagon ride out of Napa Valley. The location was important enough to blast the side of the adjacent cliff to create the road bed.

It is likely that the area has been the location of one or more cabins since the 1860's. It is also likely that Twin Peaks miners had cabins at the site in 1904.

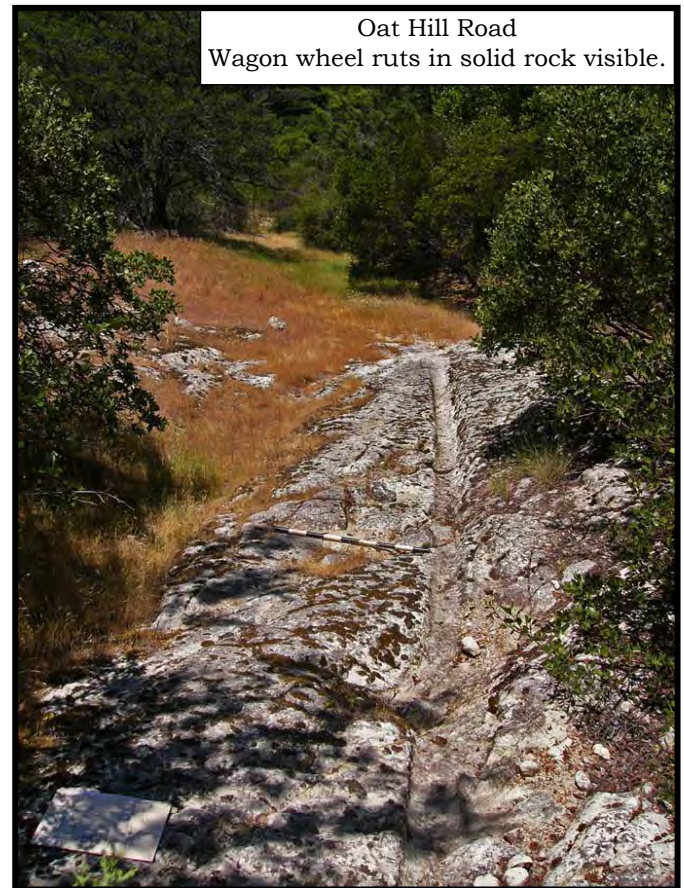
Feature "E" Old Trail The developed trail segment is an average of 2 meters wide and 63 meters long. The trail appears to be on an alignment that would have traveled to James Creek and on to James Place or the Aetna Mine as noted on historic maps.



Oat Hill Road (P-28-1658)

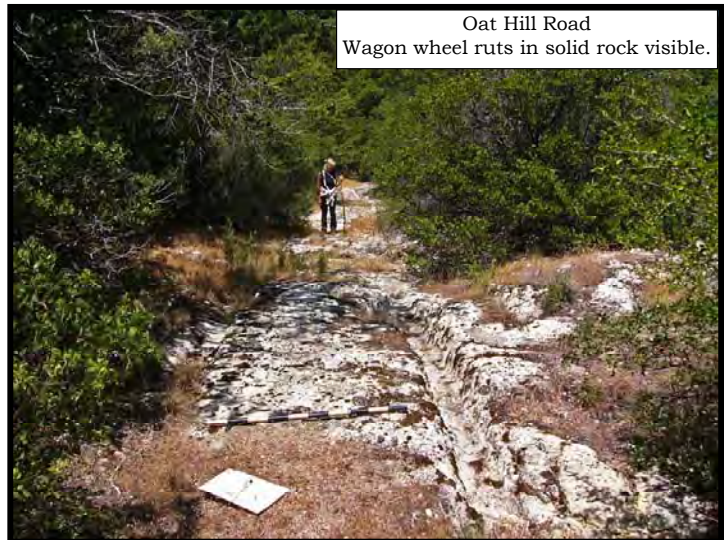
Completed in 1893, the Oat Hill Road cuts through the entire project area. Between 1893 and 1924, it was the only free wagon road between Napa and Lake County over Mt. St. Helena. The only other road over the mountain was the Lawley Toll Road (completed in 1867). Once the Oat Hill Road was finished, it was the road of choice for those who could not afford the toll road fees (Stanton 2010:46).

Though today it is impassable in some places, the Oat Hill Road still provides a sense of the history of wagon and horse travel through the region. Years of steel-rimmed wagon wheels, heavily laden with mine supplies, ore, and passengers have cut ruts in the road's solid rock base. In some places, the road had to be blasted out of the side of near vertical cliff faces.



Wheel rut grooves in the rock are spaced 120 to 130cm apart, are up to 20cm deep, and 20 to 40cm wide.

Chunks of cinnabar ore ,dropped from freight wagons, can be found along the road alignment. Some rock dislodged during the blasting for road construction fell into Bateman Creek at the base of a waterfall, creating a small swimming hole.



Oat Hill Road
Wagon wheel ruts in solid rock visible.



Blasted rock from Oat Hill Road
construction created swimming hole.



Oat Hill Road supported by
dressed stone wall.



Oat Hill Road
Road bed blown out of solid rock cliff.

**HOOKER'S CABIN (P-28-695), WEST CORONA (P-28-1655),
AND WOOTEN'S CABIN (P-28-1653)**

Map Removed

Joe Hooker's Cabin Site (P-28-695)

The 1867 Government Plat map depicts the location of a "Cabin on Claim of Fighting Joe Hooker Cinnabar Company". Historic materials from the proper time period are scattered around a small flat measuring 64 meters NS by 60 meters EW. Hooker's cabin and claim appear to have existed about 10 years before any other mining claims were filed and mapped on the Government Plats in the area.

Structural materials include brick and a door hinge. Household materials include metal (cans and cast iron), glass, and stoneware.

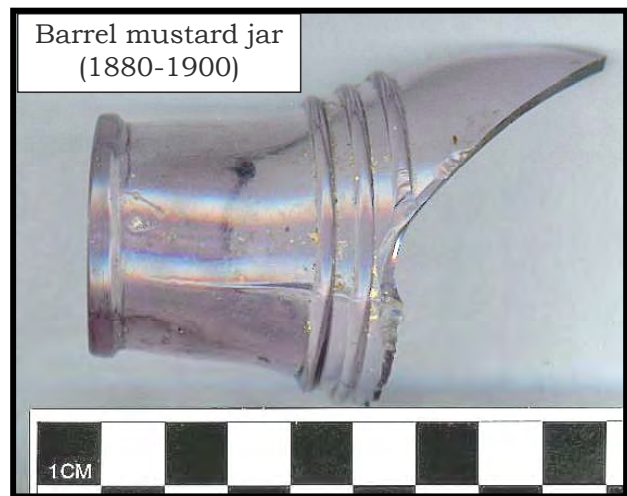


This Johnson Brothers stoneware makers mark was used between 1883 and 1913 (Godden 1991:355).



A Peruvian Bitters bottle fragment was discovered representing manufacture between 1871 and 1891 (Wichmann 1999:93).





West Corona Mine Site (P-28-1655)

The West Corona includes two open adits and an ore loader.

Feature "1" Rock Adit is an open adit (caved in a short distance inside the opening) situated at the base of a large rock. The adit has a door and frame made with wire nails.

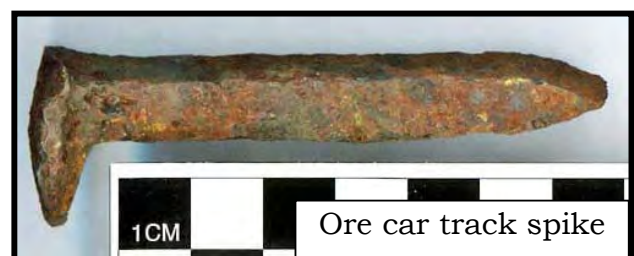


Feature "2" Open Adit is dug into the side of a large excavated pit.



The **Feature "3" Ore Loader** consists of a level area containing a large loading bin made of telephone poles. A linear cleared path appears to extend down slope to the loader. Down slope and to the east of the loader are large waste rock piles.

All the West Corona Mine features appear to represent operations from the 1940's or later.



Wooten's Cabin Site (P-28-1653)

The 1867 Government Land Office Plat map depicts A.B. Wooten's Cabin. An examination of the area did not turn up any historic artifacts, however two rock alignments were observed and recorded. One is a rock/boulder alignment in the tree line. The alignment is 1 to 2 boulders wide and 21.2 meters long. Half of the alignment is oriented NS and the northern half of the alignment is angled to the NW.



The other feature appears to be a corner marker or foundation remnant of stacked stones creating a right-angle.

Dense vegetation and ground cover prevented a detailed examination of the area and it is likely that additional historic features and artifacts exist.



CONCLUSIONS

Legal Framework

Under the California Environmental Quality Act (CEQA), historic resources require a “mandatory finding of significance”¹. CEQA stipulates that only impacts to “unique” or “significant” historic resources² need be addressed during the environmental review and project planning process³. Not all old sites are considered “unique” or “significant” historic resources.

CEQA relies on the California Register of Historic Resources to determine what is a “Unique” or “Significant” historic resource⁴.

According to the California Register, a resource is determined “significant” if it meets one of the following criteria:

- A. Is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage;
- B. Is associated with the lives of persons important in our past;
- C. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic value; or
- D. Has yielded, or may be likely to yield, information important in history or prehistory⁵.

Most archaeological sites will be determined “significant” under item “D” as long as they have maintained their integrity over the years.

If an historic resource can be avoided during construction, no further cultural resource work need take place following the initial field inspection. If disturbance to a historic resource can’t be avoided, it becomes necessary to determine whether the resource is “significant”. It is possible that surface observations

¹ Sec. 15065 [a]

² Archaeological resources are considered a subset of “historical resources”.

³ Sec. 21083.2

⁴ Sec. 15064.5 a

⁵ Pub. Res. Code Sec. 5024.1, Title 14 CCR, Sec. 4852

made during the initial field inspection can be used to determine if a resource is significant.

When a significant archaeological site is involved, CEQA requires that the permitting agency first consider project alternatives, which will allow the “resources to be preserved in place and left in an undisturbed state”⁶. The following alternatives are listed in CEQA to accomplish this goal:

1. The project shall be designed to “avoid archaeological sites.” (CEQA sec. 21083.2 (b1))
2. The project shall protect the resource by “deeding archaeological sites into a permanent conservation easement.” (Sec. 21083.2 (b2))
3. The project shall protect the resource by “Capping or covering the archaeological sites with a layer of soil before building on the sites.” (Sec. 21083.2 (b3)) This should be followed by the filing of a deed restriction preventing any future owners from excavating beneath the fill soil.
4. The project shall protect the resource by “Planning parks, greenspace, or other open space to incorporate archaeological sites.” (Sec. 21083.2 (b4))

CEQA goes on to say that, as a last resort, archaeological sites that cannot be preserved in place shall be mitigated through the excavation and analysis of the “scientifically consequential information from or about the resource”⁷.

⁶ CEQA sec. 21083.2 [b]

⁷ CEQA sec. 15126.4 [c]

Resource Significance

The following table outlines significance recommendations for each resource based on background research, surface observations, and the legal framework listed above. An expanded discussion of each resource is presented below.

<i>Resource</i>	<i>Significance Determination</i>	<i>California Register Criteria Used</i>	<i>Land Use Planning Recommendation</i>
P-28-1654 Prehistoric and Historic Site	significant	D	avoidance
P-28-1657 Isolated Bedrock Mortar	not significant	n/a	n/a
P-28-1534 Corona Mine Processing and Residential Site	significant	A, B, C, D	avoidance
P-28-1656 Twin Peaks Mine Processing and Residential Site	likely significant	A, D	avoidance
P-28-1658 Oat Hill Road	significant	A, C	avoidance
P-28-695 Joe Hooker's Cabin Site	significant	A, D	avoidance
P-28-1655 West Corona Mine Site	undetermined	n/a	n/a
P-28-1653 Wooten Cabin Site	likely significant	A, D	avoidance

P-28-1654 Prehistoric and Historic Site (significant)

The prehistoric site consists of a dense scatter of Napa and Borax Lake obsidian chips. These materials suggest that the location served as a seasonal resource collection and hunting camp. An analysis of the types of flakes found at the site can shed light on the range of tool making activities and types of tools that were manufactured. This information can be used to determine what resources were being targeted by the site's inhabitants. Quantifying the amount of obsidian from the various sources represented⁸ can shed light on tribal movement as well as prehistoric trade and exchange networks. Obsidian is uniquely suited to dating⁹, allowing a determination of the time period(s) that the site was in use.

This site has the potential for addressing several research questions important to the ongoing study of Wappo, Patwin, and Lake Miwok prehistory. It appears to

⁸ Either visually or through X-ray fluorescence.

⁹ Using hydration measurements and calibration based on source flow.

meet criterion "D" as a historic resource "likely to yield information important in history or prehistory."

The historic component of this site contains at least two residential features that appear to be associated with the early mining activities at the Corona Mine. See discussion of Corona Processing and Residential Site below.

P-28-1657 Isolated Bedrock Mortar (non-significant)

Though outside the project area, this isolated bedrock mortar appears to be the remains of a hopper mortar. Though there may be an associated prehistoric site in the vicinity, none was observed during the field inspection. By recording the isolated mortar in this report, the information about its location and physical attributes have been documented. Further analysis would not likely provide additional information important in prehistory.

This isolated resource is not likely to yield additional information important in history or prehistory.

P-28-1534 Corona Processing and Residential Site (significant)

In use from 1895 through 1972, the Corona Mine has one of the longest mining histories in the region. During its period of operation, many changes occurred in both the cinnabar mining process and in the mercury extraction process. These changes have left their mark on the ground, from the use of the stone and brick Scott Furnace in 1901, to the tube and "D" retorts, and the Gould and Cottrell rotary furnaces of the 1930's and 40's. This gives the Corona the distinction of still containing examples of most of the mercury mining and processing innovations that took place over a 100-year period.

The fact that the Corona was not the biggest producer of mercury in California probably contributed to the preservation of these earlier technologies on the ground. Had it been a bigger producer, the remains of the earlier technologies would likely have been destroyed to make way for increased and more efficient production. The fact that the mine had very few owners and that it was located in an isolated area also contributed to its unique preservation.

The mining of cinnabar and processing of mercury is an event that "made a significant contribution to the broad patterns of California's history". As such, historic mines of this type are considered significant resources under Criterion "A" of the California Register of Historic Resources.

The fact that the Corona was owned by James McCauley, a prominent Vallejo and later San Francisco businessman (founder of the Calso Water Company), indicates that the site is "associated with the lives of persons important in our past" as listed in Criterion "B" of the California Register of Historic Resources.

The wide range of processing features at the Corona correspond to the technological advances that took place over the years. This indicates that the site meets Criterion "C" of the California Register as containing "distinctive characteristics of a type, period, region, or method of construction".

A study of the Corona processing features has the potential for "yielding, information important in history or prehistory", indicating that the site meets Criterion "D" of the California Register of Historic Resources.

As with the processing features, the Corona residential features span the 100-year period that the mine was in use. Most of these residential features appear to be intact and contain significant amounts of cultural material.

During the earliest period of mine operation, it is likely that the workers represented a wide range of recent immigrants to California (and to the U.S.). During this period, workers tasks, and even living quarters, were often segregated based on ethnicity (Johnston 2004:179). By the late 1800's, most mercury mines had a two-tiered work force of white managers and immigrant workers. Andrew Johnston argues that the camps at such mines "are best understood as sets of distinct racialized landscapes, tied to specific overlapping racial and ethnic groups." He suggests that the camps are the sum of these racialized landscapes (Johnston 2004:259).

It is important to note that the Corona's early residential features were divided geographically into two distinct "camps". Did these two distinct "camps" correspond to a segregated work force of managers vs. workers or did these two distinct residential areas correspond to different periods of mine operation? Such questions can only be addressed by studying the archaeological materials at the site.

The later periods of mine operation (1941 and 1950's-60's) were conducted by small operators. In the case of the 1950's Ingle operation, it was mostly a family-run business. It is hypothesized that residential needs would have been completely different under these circumstances.

A study of Corona residential features would be "likely to yield information important in history" as defined in Criterion "D" of the California Register of Historic Resources.

P-28-1656 Twin Peaks Processing and Residential Site (likely significant)

As with the Corona Mine, the Twin Peaks Mine represents a fairly long period of use, spanning 39 years from 1904 until 1943. During that time, "D" retorts were used as was a large Cottrell rotary furnace. Much of the 1940's processing hardware and foundations still exist.

The Twin Peaks Mine was part of an event that "made a significant contribution to the broad patterns of California's history". As such, historic mines of this type are considered significant resources under Criterion "A" of the California Register of Historic Resources.

The residential areas near the Twin Peaks Mine were not as distinct and well preserved as those in the vicinity of the Corona Mine. This was likely due to recent activity that may have recycled, reused, and removed some structural features and artifacts. However, there is a well established sheet-trash deposit that appears to contain the habitation debris of early Twin Peaks miners. It is possible that this deposit also represents earlier activities, such as the location of Jonestown, related to the intersection of three major historic trails at this location in the 1860's.

As nothing is known about the early activities along the three historic trails or the possibility of a traveler's stop-over in the area, any cultural feature that may contain information about this early period of travel would be considered significant under Criterion "D" of the California Register of Historic Resources.

P-28-1658 Oat Hill Road (significant)

Oat Hill Road was the only free wagon route connecting Napa and Lake Counties over Mt. St. Helena from 1893 to 1924. In addition to providing through traffic, it provided an essential connection between the railhead in Calistoga and the mercury mining areas north of Mt. St. Helena. This enabled heavy equipment, personnel, and supplies to be brought into the mining areas. It also allowed unprocessed ore and mercury flasks to be brought out of the area.

Today, much of the Oat Hill Road has the look and feel that it did during its heyday. This is due primarily to two events that rendered the road obsolete so it was not widened, improved, or paved for modern car travel:

1. The Lawley toll road over Mt. St. Helena became a free public highway in 1924,
2. The large mine operations along Oat Hill Road ended.

In many places, Oat Hill Road was blasted out of solid rock. In some places, its solid rock base still holds the scars of years of travel by steel-rimmed wagon wheels.

Because the Oat Hill Road is associated with events that made a significant contribution to the broad patterns of California's history and embodies the distinctive characteristics of a period and method of construction, it should be considered a "significant" historic resource based on Criterion "A" and "C" of the California Register of Historic Resources.

P-28-695 Joe Hooker's Cabin Site (significant)

Though outside the project area, the Hooker cabin site represents one of the earliest European settlements in the area. It is listed as a mining claim under the heading "Fighting Joe Hooker Cinnabar Company". The location contains historic residential materials from the period, indicating that a study of the site may shed some light on the activities that took place there.

The fact that it is listed as one of the earliest European settlements in the area indicates that it is part of an event (the early European settlement of the region) that "made a significant contribution to the broad patterns of California's history". As such, the Hooker cabin site should be considered a significant resource under Criterion "A" of the California Register of Historic Resources. It may also be considered a significant resource under Criterion "D" as it is likely to yield information important in the study of the history of the region.

P-28-1655 West Corona Mine Site (undetermined)

Though outside the project area, the West Corona Mine Site features appear to represent only the most recent mine activities conducted during the Ingle mining operation (1957-72). The Ingle operation is much better represented at the main Corona processing area. The West Corona features do not appear to add new or additional information to that available at the main Corona processing area. If, however, the West Corona area contains features related to the Joe Hooker era of mine use, then those features of the West Corona should be deemed historically significant.

As the West Corona Site is outside of the currently proposed project location, it is unlikely that any impacts will occur. No further studies are warranted at this time.

P-28-1653 A.B. Wooten's Cabin Site (likely significant)

Though outside the project area, the Wooten cabin location represents one of the earliest European settlements in the area. It is listed as "A.B. Wooten's Cabin" on the 1867 Government Land Office Plat map. The location contains rock alignments that may represent residential use of the area from this early period. The location may contain other cultural materials that were not observed due to heavy ground cover.

The fact that it is listed as one of the earliest European settlements in the area indicates that it is part of an event (the early European settlement of the region) that "made a significant contribution to the broad patterns of California's history". As such, the Wooten cabin site should be considered a significant resource under Criterion "A" of the California Register of Historic Resources. It may also be considered a significant resource under Criterion "D" as likely to yield information important in the study of the history of the region.

Land Use Planning Recommendations

This study recorded Six historic resources that appear to be significant as defined by the California Public Resources Code (5024.1, Title 14 CCR, Sect. 4852) and CEQA. Four of these resources are in the immediate vicinity of the proposed project. In addition, one historic resource (outside the proposed project area) was not evaluated for significance and one isolated prehistoric feature (also outside the proposed project area) was determined not to be significant.

In order to preserve the significant resources in place¹⁰, it is recommended that ground disturbance activities avoid encroaching on those cultural resource areas.

If disturbance of all or part of a significant resource becomes necessary, the following recommendations are made:

1. It is recommended that a qualified archaeologist be retained to assist in the engineering design of the ground disturbance activity in an effort to minimize resource damage. To assist in avoidance and accidental impacts, those resources located immediately adjacent to project activities will be protected from those activities by temporary fencing.
2. It is recommended that the archaeologist be provided the time and funding necessary to recover and analyze the information contained in those portions of the resource that will be damaged prior to project construction as outlined in CEQA sec. 15126.4 [c].
3. It is recommended that the archaeologist be retained to monitor any ground disturbing impacts when they occur, and be given the authority to redirect those activities to other locations in the event that significant artifacts or features are encountered which require scientific mapping and recovery.

No human remains are known to exist within or near the project area. If human remains are encountered, all work in the immediate vicinity of the discovery will be suspended and procedures outlined in the Health and Safety Code (Sec. 7050.5) and Pub. Res. Code (Sec. 5097.98 and 5097.99) shall be followed. Work within the area encompassed by the human remains will not resume until all actions required by the Health and Safety Code and Public Resources Code have been completed to the satisfaction of the Napa County Planning Division.

¹⁰ as outlined in CEQA sec. 21083.2 [b]

If followed, these recommendations will mitigate cultural resources to a level of "no significant impact" thereby allowing the approval of a "Mitigated Negative Declaration" for this project.

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Attachment D

OPERATIONS MAINTENANCE AND MONITORING PLAN (OUTLINE)

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11.0 REFERENCES

CORONA AND TWIN PEAKS MINE DRAINAGE TREATMENT PROJECT

**DEPARTMENT OF FISH AND WILDLIFE
ECOSYSTEM RESTORATION PROGRAM GRANT**

ERP Grant #: E1183005

**California Water Code, Chapter 5.7
Remediation Work Plan**

Prepared For:
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Folsom, California 95630

Remediation Work Plan

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1.0 Identification of the Remediating Agency

Division 7, Chapter 5.7 of the California Water Code was enacted by the California legislature to protect the public and waterways of the state from discharges at abandoned mine sites. The Legislature found that thousands of abandoned mines in California may contain waste including acid rock drainage that has a devastating effect on aquatic life and has degraded some major California water bodies, §13397(a)(1); complete elimination of acid rock drainage is not currently possible because acid rock drainage production can continue for centuries after mine abandonment and is difficult to control, §13397(a)(2); Cleanup of this waste for protection of the public and waterways of the state should be facilitated by limiting the financial responsibility for that cleanup, §13397(a)(3); and public agencies or private parties who are not otherwise legally responsible for the abandoned mined lands are reluctant to remediate abandoned mined lands without assurance that they will be responsible only for completion of the remedial work they undertake, §13397(a)(4).

Chapter 5.7 includes in the definition of a remediating agency at §13397.5(f) “... *any public agency, or private individual or entity acting under a cooperative agreement with a public agency, that prepares and submits a remediation plan in accordance with this section...*” Tuleyome is a non-profit volunteer organization focused on protecting the wild and agricultural heritage of the Inner Coastal Range and Western Sacramento Valley for current and future generations. Tuleyome is interested in addressing wastes at the Corona and Twin Peaks mines sufficiently to allow safe public access so that a regional trail system can be completed through the area. Tuleyome recognizes the need to address acid rock drainage at abandoned mined lands in general, and has determined that there may be a way to identify a long-term solution to acid rock drainage at the Corona Mine and thereby contribute to protection of water quality in an impaired waterway (James Creek).

Tuleyome is neither an owner nor an operator and does not have control over the Corona or Twin Peaks mine sites or any of the adits or tunnels. Tuleyome is not legally responsible for, has no financial interest in, nor has participated in any mining (including exploration) associated with the Corona or Twin Peaks mine sites. Tuleyome has prepared this remediation plan in accordance with Chapter 5.7 §13398.3 and seeks to become a remediating agency at the Corona and Twin Peaks mines to facilitate implementation of this remediation plan without incurring additional responsibility. Tuleyome maintains offices at 607 North Street, Woodland, California 95695. Bob Schneider is a Senior Policy Director at Tuleyome, and is the Project Lead, (530) 350-2599, bschneider@tuleyome.org. Sarah Husby-Good is the Executive Director of Tuleyome.

2.0 Identification of Abandoned Mined Lands that are the Subject of the Remediation Work Plan

Figure 1 shows the project location, and Figure 2 shows the mine locations.

The Corona and Twin Peaks Mines are inactive mercury mines within the East Mayacmas Mercury District (Yates and Hilpert, 1946). The project is located on lands owned by the Corona and Twin Peaks

Historical Association, LLC. The project area comprises 32 acres of mining disturbed lands within a larger 8-parcel holding of 328.8 acres in northern Napa County. The property is located along Oat Hill Mine Road and includes Napa County Assessor's Parcel Numbers (APNs) 016-020-035, 016-020-026, 016-020-020, 016-020-027, 016-020-023, 018-010-006, 018-010-007, and 018-010-009. Corona Mine is in the northern portion of the project area and project features are predominantly located on parcels with APNs 016-020-035 and 016-020-020, and 016-020-026. Twin Peaks Mine is located in the southern portion of John Livermore's holdings and project features are predominantly located on parcels with APNs 018-010-006 and 018-010-007. Figure 3 shows the mines and parcel boundaries.

The sites are at an elevation of about 1,900 feet and the topography is relatively steep and forested. The mines are located about 0.75 miles apart along the Oat Hill Road. The sites are on contiguous parcels consisting of about 32 acres.

The Corona and Twin Peaks mercury mines are located in the East Mayacmas Mercury Mining District. Mining began at the Corona Mine in 1895 and continued through 1906. The Corona Mine was intermittently worked during 1941 to 1943, and was explored further in 1956 (US Bureau of Mines 1965). About 5,000 flasks of mercury were reportedly produced from the Corona Mine. About 2 miles of underground mine workings were reportedly developed at the Corona Mine.

The Twin Peaks Mine was operated from 1902 to 1907, 1915 to 1918, and 1941 to 1943 with a production of 200 flasks of mercury (US Bureau of Mines 1965). About 4,200 feet of underground mine workings were reportedly developed at the Twin Peaks Mine.

Waste rock and tailings piles are present at the Corona and Twin Peaks mines (Figure 4). The property owner has implemented best management practices including revegetation and diversion of runoff away from these mine wastes to reduce erosion and drainage formation. However, improvements to the vegetative cover and runoff controls are necessary at both sites to further reduce erosion and drainage.

The Boiler House Adit, and the Corona Drain Tunnel at the Corona Mine, and the Twin Peaks Adit at the Twin Peaks Mine are each point sources for mine drainage. The property owner previously constructed infiltration trenches that collect drainage from the Boiler House Adit, and Twin Peaks Adit. These infiltration trenches prevent contact of the mine drainage with mine wastes and prevent discharge of mine drainage to surface waters. The drainage infiltrates into the soil and bedrock at each site. Drainage from the Corona Drain Tunnel discharges directly to Kidd Creek.

The features to be addressed by Tuleyome include installing a pilot scale system to reduce the metal loading from the Corona Drain Tunnel, consolidation of mine waste, improvements to runoff controls, enhancing revegetation of waste rock and tailings at the Boiler House Adit and Twin Peaks Adit, and improvements to the existing infiltration trenches at the Boiler House Adit and Twin Peaks Adit.

3.0 Identification of the Waters of the State Affected by the Abandoned Mined Lands

Kidd Creek traverses the northern portion of the property and Bateman Creek traverses the southern portion of the property. Both creeks meet at a confluence to the east of the property forming James Creek. Kidd Creek drains the Corona Mine area, and Bateman Creek drains the Twin Peaks Mine area. James Creek originates at the confluence of Bateman and Kidd Creeks located about 0.25 miles downstream from the Corona Mine, and about 0.35 miles downstream from the Twin Peaks Mine.

James Creek is a tributary to Pope Creek that enters Lake Berryessa, a sport fishery and source of drinking water about 13 miles downstream from the Sites. The affected surface waters are Kidd Creek, Bateman Creek, James Creek, and Pope Creek. James Creek is included on California's 303(d) list as impaired for mercury and nickel.

4.0 Description of the Physical Conditions at the Abandoned Mined Lands That are Causing Adverse Water Quality Impacts

Sampling of drainage at the Corona Drain Tunnel by Regional Board staff in 1997 identified iron and nickel in the drainage and Kidd Creek downstream from the tunnel that were elevated above water quality criteria. A 2002 technical report concluded that nickel concentrations downstream from Twin Peaks Mine periodically exceeded the chronic aquatic life water quality criterion (MFG 2002). Results from field investigations completed during 2003 and 2004 by the US Geological Survey, and EnviroGeo during 2007 documented that the Corona and Twin Peaks mines release iron, sulfate, nickel, and mercury to the James Creek watershed (USGS 2007, EnviroGeo 2007).

Mine wastes that include waste rock and calcined tailings at both of the mine sites are present on steep slopes adjacent to seasonal drainages (surface water runoff occurs only during and immediately after rain events). Metals and salts present in the mine wastes could be mobilized to surface water through erosion and transport downhill, and/or through dissolution of soluble materials and transport in runoff to surface water. Existing systems to control potential transport of contaminants from mine wastes to surface water at the sites are described below.

The Boiler House Adit discharges mine drainage at about 5 to 50 gpm. Drainage flow varies seasonally with rainfall and the observed peak flow was 80 gpm based on observations since 2003. Boiler House Adit drainage pH varies from about 4.8 standard units (SU) to 6.8 SU and contains iron (4.7 mg/L to 14 mg/L) and nickel (3.2 mg/L to 3.5 mg/L) above water quality criteria. Boiler House Adit drainage has been effectively controlled by diversion to an infiltration trench since 1998 (see below). Existing systems to control Boiler House Adit drainage are described below.

The Twin Peaks Adit discharges mine drainage at about 2 to 35 gpm. Drainage flow varies seasonally with rainfall and the observed peak flow was 60 gpm based on observations since 2003. Twin Peaks Adit drainage pH varies from about 4 SU to 7 SU and contains iron (0.4 mg/L to 9 mg/L) and nickel (1.2 mg/L to 1.5 mg/L) above water quality criteria. Existing systems to control Twin Peaks Adit drainage are described below.

Corona Drain Tunnel discharges about 25 gpm to 60 gpm seasonally with 100 gpm peaks during extreme rain years based on observations since 2003. Corona Drain Tunnel pH varies from about 3 SU to 6 SU and contains iron (62 mg/L to 130 mg/L) and nickel (4.0 mg/L to 5.4 mg/L) above water quality criteria. Proposed systems to reduce metal loading from the Corona Drain Tunnel drainage are described below.

5.0 Description of the Practices Proposed to Reduce, Control, Mitigate, or Eliminate the Adverse Water Quality Impacts

Practices to reduce, control, mitigate or eliminate the adverse water quality impacts at Corona and Twin Peaks mine sites are described for existing and proposed systems. The property owner has implemented existing systems to reduce and eliminate adverse water quality impacts resulting from discharge of drainage from the Boiler House and Twin Peaks adits, and resulting from interaction of mine drainage with mine waste at the sites. Tuleyome is proposing to enhance these existing systems and to complete a pilot scale subsurface chemical amendment system to reduce metal loading from the Corona Drain Tunnel.

5.1 Existing Systems

Existing systems are the best management practices (BMP) used to reduce potential impacts from mine waste piles at the Twin Peaks and Corona mines, and the infiltration trenches used to control mine drainage at the Twin Peaks and Boiler House adits. These existing systems are present at the sites and are not managed or controlled by Tuleyome.

5.1.1 Best Management Practices

BMPs implemented at the Corona mine include diversion of seasonal surface water flows away from mine waste, use of swales and check dams to slow runoff velocity and minimize sediment transport, grading to control the flow of water and minimize erosion, and establishing native plant cover on exposed surfaces. The best management practices are consistent with provisions of Title 27, Chapter 7, Subchapter 1. Mining Waste Management describing precipitation and drainage controls (§22490(h)).

Run-on Diversion. Figure 5 shows the Corona Mine including locations of pre-diversion drainage flow and the current run-on diversion system and the Corona Drain Tunnel. Prior to diversion of run-on, seasonal flow originating uphill from the Boiler House Adit flowed across waste rock and tailings, contributing to erosion and off-site transport of mine waste, and creation of mine drainage. The existing diversion system consists of an unlined channel that directs surface water through a 'trash rack' and into a culvert which prevents contact of the water with the waste rock. The culvert discharges to the original drainage course located south of the tailings pile.

Figure 6 shows the Twin Peaks mine including the locations of pre-diversion drainage flow and the current run-on diversion system. Before diversion, runoff from the slopes above the site flowed across the calcine tailings contributing to erosion and off-site transport and creation of mine drainage. The existing diversion system consists of a subsurface pipe that separates runoff from the mine waste and conducts it to the north edge of the tailings where the water flows into a natural drainage to Bateman Creek, minimizing contact with the tailings.

The existing run-on diversion systems prevent contact of run-on with waste rock and tailings. This has minimized the amount of mine drainage created at the sites and reduced the erosion and transport of waste rock and tailings from the site.

Erosion Controls. Erosion controls at the Corona Mine consist of berms at the top of the waste rock and grading of the road through the tailings pile (Figure 5). Berms at the top of the waste rock interrupt sheet flow and direct the water away from the waste rock and onto nearby forested slopes. Prior to creation of the berms, this water flowed onto the waste rock contributing to erosion and creation of drainage. The road through the tailings was regraded to direct water away from the seasonal drainage south of the tailings and into the rock lined swale. Prior to regrading, runoff from the road entered the seasonal drainage. The berms help to control erosion by directing water away from the waste rock. The regraded road surface protects underlying tailings from erosion and directs runoff to the rock lined swale.

Erosion controls at the Twin Peaks mine consist of benches on the mine waste, and berms and water bars (Figure 6). The benches slow the velocity of sheet flow and disperse the flow resulting in settling of sediment on the benches, and reduction of erosion and transport. The berms are located at the down slope edge of the bench and direct sheet flow away from the loose slope on tailings. The water bar directs runoff from an old haul road away from the tailings.

Run-off Controls. Run-off controls consist of a rock lined swale and check dams installed within the tailings pile at the Corona Mine. The swale collects run-off from the tailings and the check dams slow the runoff to allow settling of suspended particles. Prior to construction of the swale, runoff from the tailings flowed overland to adjacent drainages and down slope. This overland flow allowed erosion and transport of tailings to Kidd Creek. The swale extends along the middle of the tailings pile and conducts runoff to a settling basin at the toe of the tailings pile (Figure 5). The swale and check dams reduce erosion and transport of tailings by intercepting the overland flow and providing for settling of suspended particles at the check dams.

Revegetation. Revegetation at the Corona and Twin Peaks mines consists of plantings of locally collected seeds from native grasses, forbs, shrubs, and trees that grow on the mine waste and along the infiltration trenches. Some surfaces on waste rock and tailings (other than roads), and some slopes are revegetated with native shrubs, grasses, and trees. Revegetation stabilizes the soil helping to prevent erosion and off-site transport of mine waste. The plants also transpire water reducing the quantity of drainage that is generated. Plants were initially irrigated using an irrigation system. This irrigation system remains in place and can support additional revegetation efforts if necessary.

Plants established along infiltration trenches help to stabilize soils used to make the trench, and transpire water.

5.1.2 Infiltration Trenches

Infiltration trenches are used to prevent overland flow of mine drainage at the Boiler House Adit, and Twin Peaks Adit (Figure 5 and 6). Prior to trench construction, drainage from each of the adits flowed across and through mine waste. The trenches receive all of the drainage at each of the sites and prevent

contact of the mine drainage with waste rock or tailings. Infiltration of the drainage through native soil and rock also prevents overland flow of the mine drainage to surface water. Drainage is intercepted at the mouth of each adit and routed through a pipeline into the trench at each site. Multiple valves and check dams within each trench are used to direct drainage into specific trench segments to allow maintenance, if necessary, while continuing to control the drainage. The infiltration trenches comprise Group B mine waste management units in accordance with Title 27, Chapter 7, Subchapter 1. Mining Waste Management (§22480).

Trench characteristics are summarized in the table below.

Location	Length (feet)	Depth (feet)	Bedrock	Drainage Flow (gallons per minute)
Boiler House Adit	435	3 to 4	Sandstone	5 to 50
Twin Peaks Adit	600	2 to 3	Serpentine	2 to 35

Monitoring wells are present adjacent to the Corona infiltration trench (Figure 4 inset). The wells were constructed by drilling to the depth of refusal (7.5 to 15 feet below ground surface), installing a perforated polyvinylchloride well screen at the lower 5 feet threaded to a blank casing, and backfilling the borehole to the surface. Groundwater is measured within only three of the wells (MW-3, MW-5, and MW-7) during the winter months despite their close proximity to the infiltration trench. In addition to monitoring wells, the slopes below the infiltration trench are periodically inspected for signs of seepage (aquatic vegetation, vigorous vegetation during the dry season, and wet or moist soil). One seasonal seep has been observed downhill from the Corona infiltration trench. This seep dries up during the annual summer drought. Lack of groundwater in the monitoring wells, and lack of persistent moisture on the slopes below the infiltration trench is herein interpreted as evidence that the acid rock drainage infiltrates to bedrock beneath the infiltration trench. Infiltrating water from the Corona trench is expected to ultimately migrate to the Corona Drain Tunnel (the drain tunnel crosses under the Corona trench about 430 feet beneath the trench bottom) along foliation and fractures of the intervening rock. Thus, any impacts of the infiltrating water are detectable in the drain tunnel drainage.

Monitoring wells are not present at the Twin Peaks infiltration trench. However, the slopes below the infiltration trench are periodically inspected for signs of seepage (aquatic vegetation, vigorous vegetation during the dry season, and wet or moist soil). No evidence for seepage from the Twin Peaks infiltration trench has been observed and the acid rock drainage is considered to infiltrate to bedrock beneath the infiltration trench. Infiltrating water beneath the Twin Peaks infiltration trench is expected to ultimately seep to Bateman Creek down slope from the infiltration trench via foliation and fractures in the intervening rock. Thus, monitoring of water quality in Bateman Creek up and downstream from the Twin Peaks Mine would detect any impacts of the infiltrating water.

5.2 Proposed Systems

Proposed systems are installation of a pilot system to implement subsurface chemical amendment with the goal of reducing the metal load from Corona Drain Tunnel drainage; consolidation of mine waste, revegetation of remaining bare slopes within the calcine tailings piles at Corona and Twin Peaks Mines,

and replumbing of the infiltration trenches at the Boiler House and Twin Peaks adits to provide for more effective and efficient management of variable flows over time, and for management of iron-rich precipitates if necessary.

5.2.1 Mine Waste Consolidation and Stabilization

Consolidation of mine waste will involve moving about 200 cubic yards of mine waste at the Corona calcine pile from its current location to an area within the main pile (Figure 5). This action will reduce the area of mine waste at the site, directly reducing the area of the material available to generate drainage by about 3,000 square feet. Stabilization will include grading up to 100 cubic yards of mine waste at the Twin Peaks mine to reduce the surface area, minimize traffic related disturbances of the mine waste, and stabilize the slope (Figure 6). The areas disturbed by consolidation and stabilization will be then be revegetated as part of the project.

5.2.2 Revegetation

Revegetation will include soil amendment and planting native grasses, shrubs, and forbs propagated from locally collected seed. Revegetation is expected to reduce the amount of erosion from the waste rock and calcined tailings piles, and decrease the amount of infiltration thereby reducing the production of drainage from the mine waste. Minimizing erosion and the amount of the drainage will improve water quality in Kidd and James creeks by preventing the associated sediment and metals (including nickel and mercury) from entering the surface water.

Revegetation efforts will include evaluating soil conditions that limit plant growth. Such conditions present at the sites include excess acidity, compaction, excess drainage and seasonal dryness, and miscellaneous nutrient imbalances. Potential treatments to address these conditions will include neutralization of acidity, mechanical de-compaction using either hand held power tools or heavy equipment as appropriate for the site, introduction of finer soil materials or deep rooting conduits for dry areas, and low rates of nutrient amendment appropriate for supporting native plants and limiting weed growth. Treatments will be applied on an as-needed basis recognizing the natural, modest fertility character of the site in general. Plants that actively transpire larger amounts of soil moisture will be a priority for establishment. On steeper slopes at or near the angle of repose, special care will be taken to deeply inject soil amendments with minimal surface disturbance, typically not much more than a foot path for access. Deep placement of amendments (as needed) helps establish woody shrubs that increase the structural stability of the site and cover a larger area of the bare surface as their canopy matures. Appropriate treatments are generated based on ambient acidity, moisture retention and nutrient conditions.

5.2.3 Improvements to Existing Infiltration Trenches

Improvements to the existing infiltration trenches at the Boiler House and Twin Peaks portals will consist of installing settling basins to facilitate effective solids management, re-plumbing the distribution systems at each site, and improving vegetation at each trench. Re-plumbing will allow more effective operations under seasonal changes in flow, improved level controls between trench reaches, and facilitate isolating separate reaches of each trench for maintenance such as widening and sloping trench bottoms. Improved vegetation along the infiltration trenches will increase stability of slopes below the

trenches, and increase the amount of water that is transpired. In addition, access to the trenches will be improved to increase worker safety. Diversion of runoff from slopes above the trenches would also be completed at locations where concentrated flow enters the trenches.

5.2.4 Subsurface Chemical Amendment

Subsurface chemical amendment, if determined to be effective at the Corona Mine, would identify a method to substantially reduce the metal loading from the Corona Drain Tunnel through introduction of chemicals to change the chemical environment and prevent mobilization of metals at the source. Effectiveness of this technique at Corona Mine would be determined through performance of a tracer study and subsequent pilot scale operations. The tracer study would use the travel time and concentration of a non-toxic tracer released at the source area and detected in Corona Drain Tunnel drainage to evaluate chemical dosing rates for subsurface chemical amendment. This pilot study would be performed in the subsurface at the site (in-situ).

The tracer study would be performed by first advancing bore-holes to the vicinity of underground mine workings at the level of the Boiler House Adit, and a stope (mine void) located beneath Tunnel No. 1. The Boiler House Adit level is referred to as the '1,853' level on site mine maps based on the elevation of the tunnel. A significant ore body and stope (void created during mining) associated with the 1,853 level are shown on mine maps and cross sections (Figure 7). The bore hole would be advanced at an angle from the ground surface using a drilling technique that will allow identification of the geologic materials encountered during drilling. The location of the drill bit would be monitored during drilling, and the borehole length will be compared to projected distances from the surface location to the ore body and stopes. The goal of advancing the borehole would be to encounter saturated mineralized rock, complete the borehole to allow application of tracers, and later application of sodium hydroxide and ethanol to amend subsurface chemical conditions. At least two boreholes are currently envisioned advancing 250 feet and 400 feet to two different targets in the subsurface.

The boreholes would be converted into cased remediation wells for use in applying subsurface chemical amendments during pilot scale and future full scale operations. Pilot scale operations would allow evaluation of the chemical dosing rates, design, and operation of the full scale chemical delivery system. While short term (about 60 to 90 days), pilot scale operations (if successful) are expected to provide longer term improvement in water quality by initially precipitating metals, and then impeding oxidation of the sulfide minerals beyond the duration of the pilot operations. Metal bearing precipitates are anticipated to remain within the fractures and foliation through which groundwater currently migrates. The goal of the pilot study is not so much to precipitate metals, but instead to prevent metal mobilization via amending the subsurface chemical environment. Substantial intermediate improvement of water quality could be attained through the pilot activities via armoring of some reactive sites within the source area for the drainage. Substantial long term improvement of water quality could be then attained via longer term implementation of the technique. The duration of water quality improvements expected from the subsurface chemical pilot scale dosing is uncertain without the quantitative results from the tracer study.

The chemical used for the initial tracer study will be detergent that contains a brightener chemical, disodium diaminostilbene disulfonate, which will be released into the borehole and measured in the outfall at the Corona Mine Drain Tunnel Portal. This chemical is reported to be stable under acidic conditions, and is detectable using the analytical technique fluorescence spectroscopy (fluorometry). If the tracer chemical is detected in the outfall discharge at the Corona Drain Tunnel Portal within a residence time of about one day, then the addition of an organic lipid, such as ethanol, will be used to stimulate the growth of sulfate-reducing bacteria within the mine. Ideally, if the reducing conditions can be established within the mine, the metals will be removed by the sulfate reduction and sulfide precipitation. This would be the preferred method to precipitate metals because metal sulfides have a low solubility at near-neutral pH. However, if the tracer test indicates a longer residence time before the tracer chemical is detected in the Corona Drain Tunnel Portal discharge, then this condition would not be considered adequate for sulfate-reducing bacteria and the pH will be reduced using sodium hydroxide. This would then increase the availability of sulfide for precipitation. Even if sulfate-reducing conditions using ethanol cannot be established, the majority of metals (95% plus) would still be precipitated by hydroxide precipitation with the addition of sodium hydroxide. Therefore, the following parameters will be measured in the discharge at the Corona Drain Tunnel Portal: tracer chemical in detergent solution, metals, pH, sulfate, alkalinity, oxidation-reduction potential, and organics (organic lipids or ethanol).

Jar tests in which sodium hydroxide was used to neutralize drain tunnel drainage were performed and identified that metals were precipitated and the pH raised to circum-neutral (TKT 2013). The application rate for any chemicals used to amend subsurface chemical conditions will be carefully estimated based on the results of the tracer study, and site water chemistry. This will be done to minimize the likelihood for mobilizing metals such as manganese that may be present naturally within the subsurface or creating extreme chemical conditions such as elevated pH. Monitoring of drain tunnel discharge during and after the pilot test would also provide for direct measurement of any metals mobilized by the pilot test or presence of extreme chemical conditions.

5.2.5 Implementation Plan

Construction will occur in phases including mobilization, site preparation, mine waste, consolidation at the Corona Mine, expanding the revegetated area at each site, re-plumbing of infiltration trenches, site restoration, and demobilization. Construction will occur in accordance with a site management plan and site safety plan that are provided as components of the implementation plan outlined in Attachment I. The implementation plan will also identify mitigation measures necessary to avoid significant impacts to the environment. Construction equipment will include, but not be limited to, a bulldozer, backhoe, dump truck, loader, all-terrain vehicle, drill rig, and standard pickup truck. Other equipment will include a compact concrete mixer, hydro-mulcher, and welder.

5.2.6 Operation and Maintenance Plan

Operations will consist of commissioning, shake down operations, and routine operations and maintenance. Operations will begin as construction ends with infiltration system commissioning.

Commissioning activities will consist of leak testing the new plumbing at each infiltration trench, confirming that valves and control structures along the trenches are functioning as intended, and verifying that water is infiltrating to the subsurface beneath the trenches.

Shake down operations will consist of a three week period during which daily observations of the pipeline, and infiltration trenches will be made to confirm system operations.

Routine operations will consist of those periodic activities necessary to ensure that the infiltration systems operate as intended. Routine operation and maintenance activities are anticipated to commence about one month after construction is complete. The Operation and Maintenance (OMM) Plan will be prepared after shake down operations are completed. Routine operations are anticipated to consist of periodic visual inspections of the pipeline and trenches, and periodic flow adjustments at the valves along each trench in response to changing flow conditions. Maintenance activities are anticipated to consist of semi-annual pipeline clean out, quarterly inspection and debris clearing along the trenches, and monthly monitoring of slopes below the infiltration trenches.

5.3 Implementation Schedule

Project construction is planned to begin in Fall 2013 and requires about 9 months with completion expected by Summer 2014. The project will be completed in eight overlapping phases, estimated as follows: (1) minor grading of roads to ensure safe passage of vehicles and equipment (September 2013); (2) improving existing infiltration systems (September to August 2013); (3) consolidating mine waste and grading (September 2013); revegetation (March through October); (4) installing bat-friendly gates on portals and adits, and installing fences around upper Corona Mine ore processing area and furnace (June 2014); (5) completing surface drainage work to stabilize and divert water before the rainy season (September to November 2013, and 2014 as warranted); (6) Revegetation (September 2013 to June 2014); Completing and evaluating a tracer test, then designing and implementing an appropriate subsurface chemical amendment study at the Coronal Drain Tunnel (September 2013 to March 2014); (8) providing erosion control (September 2013 to June 2014).

6.0 Analysis Demonstrating That Implementation is Expected to Cause Substantial Improvement in Water Quality for the Identified Waters

The baseline condition for assessing substantial improvement in water quality for Kidd Creek and James Creek is the current condition. Current conditions are evaluated with respect to the features addressed by this remediation work plan: consolidation and revegetation of mine waste, control of drainage at the Coronal Drain Tunnel, and improvements to existing systems.

6.1 Mine Waste Consolidation and Stabilization

This project includes consolidation of mine waste at the waste rock and calcined tailings present at the Corona and Twin Peaks mines. The mine waste piles are considered to be existing mining units in accordance with Title 27, Chapter 7 §22470. Total and leachable metal concentrations available for mine waste at the Corona and Twin Peaks mines are summarized in Table 1. Total concentrations of

metals in waste rock and tailings at the Corona and Twin Peaks mines are below the total threshold limit concentration (TTLC) for all metals except mercury. Mercury is present above the 20 mg/kg TTLC in each of the four waste rock and tailings samples (250 mg/kg to 840 mg/kg total mercury). Soluble threshold limit concentration (STLC) criteria for waste classification are also compared with California waste extraction test (WET) extract analyses in Table 1. All WET metals results are reported below the STLC criteria for mine waste in extracts from Corona and Twin Peaks mine waste. Distilled water (DI) WET extract metal analyses are also summarized in Table 1 and compared with retardation factors estimated using site specific soil properties and the VZCOMML model. The quotient of the DI WET extract metal concentrations to the retardation factors for each metal is less than water quality criteria, thus, the mine wastes are not expected to yield leachate concentrations that would threaten groundwater quality (the mine wastes are not a designated waste).

Results of acid base accounting show that waste rock at the Corona Mine, and calcined tailing at the Twin Peaks Mine have a low potential to generate acidic leachate (Acid neutralization potential (ANP):Acid generation potential (AGP) > 1). The calcined tailings at the Corona Mine have a ANP:AGP of about 0.5 and could generate acid drainage.

Based on the mine waste characterization information presented above, the mine waste may be classified as Group B mine waste as defined in California Code of Regulations (CCR) Title 27, without taking any other factors into consideration. Per Section 22480(C) of CCR Title 27, which pertains to the management of mining waste, mine waste classification should also consider concentration of hazardous constituents, acid generating potential, and properties of the waste that make it readily containable by less stringent measures. While the mine wastes at the Corona and Twin Peaks mines contain total mercury above the TTLC, this mercury is relatively stable, does not contribute to leachate that exceeds hazardous waste criteria, and does not leach mercury or other constituents at concentrations that would threaten water quality under site conditions. Thus, so long as the mine wastes are protected from erosion and transport to surface waters, they would not pose a threat to water quality. Because the mercury and other constituents pose a low threat to water quality under site conditions, so long as erosion and transport of the material to surface water is prevented, they could be considered as Group C waste. Potential threats to water quality from mine wastes at the Corona and Twin Peaks mines are readily containable by measures that are less stringent than those required for Group B waste. Mine wastes at the Corona and Twin Peaks mines should continue to be managed as Group C waste in mine waste units under Title 27.

Consolidation of mine waste will involve moving about 200 cubic yards of mine waste at the Corona calcine pile (Figure 3) from its current location to an area within the main pile. This action will reduce the area of mine waste at the site, directly reducing the area of the material available to generate drainage by about 3,000 square feet. Stabilization will include grading up to 100 cubic yards of mine waste at the Twin Peaks mine to reduce the surface area, minimize traffic related disturbances of the mine waste, and stabilize the slope. The areas disturbed by consolidation and stabilization will then be revegetated as part of the project.

6.2 Revegetation

Current conditions of the waste rock and tailings piles at each site include areas that are devoid of vegetation. Such bare areas are subject to erosion that can lead to off-site migration of metal laden particulates in air and water, and high rates of infiltration that can lead to creation of metal laden drainage. Existing data collected by USGS (2007) and EnviroGeo (2007) show that metal laden particulates are present in sediment downstream from the Corona and Twin Peaks mines. Data collected by USGS (2007) and EnviroGeo (2007) also showed that drainage from the calcined tailings was capable of transporting metals including mercury and nickel off site.

Minimizing erosion and the amount of the drainage will improve water quality in Kidd and James creeks by preventing the associated sediment and metals (including nickel and mercury) from entering the surface water. Increasing the amount of vegetative cover will also minimize the creation of airborne dust from the mine waste piles.

6.3 Improvements to Existing Infiltration Trenches

Improvements to the existing infiltration trenches at the Boiler House and Twin Peaks portals will consist of re-plumbing the distribution systems at each site, and improving vegetation at each trench. Re-plumbing will allow more effective operations under seasonal changes in flow, and facilitate isolating separate reaches of each trench for maintenance. Improved vegetation along the infiltration trenches will increase stability of slopes below the trenches, and increase the amount of water that is transpired.

6.4 Subsurface Chemical Amendment

Subsurface chemical amendment, if determined to be effective at the Corona Mine, would identify a method to reduce the metal loading from the Corona Drain Tunnel through introduction of chemicals (sodium hydroxide, ethanol, inoculum containing sulfide reducing bacteria) to prevent mobilization of acid and metals at the source. Effectiveness of this technique at Corona Mine would be determined through performance of a tracer study and subsequent pilot scale operations. The tracer study would be performed after drilling and constructing cased remediation wells. The remediation wells would be advanced to allow application of chemical amendments directly to the acid and metal sources (ore bodies and stopes) as shown on existing mine maps. The tracer study would use the travel time and concentration of a non-toxic tracer released at the source area and detected in Corona Drain Tunnel drainage to evaluate chemical dosing rates for subsurface chemical amendment.

The pilot scale operations would allow evaluation of the chemical dosing rates, design, and operation of the full scale chemical delivery system. While short term (about 60 to 90 days) the pilot operations (if successful) are expected to provide longer term improvement in water quality by precipitation of metals, and reducing oxidation of the sulfide minerals during the study. Substantial intermediate improvement of water quality could be attained through pilot operations via potential armoring of some reactive sites within the source area for the drainage. Substantial long term improvement of water quality could be then attained via longer term implementation of the technique. The duration of water quality improvements expected from pilot scale subsurface chemical amendment is uncertain without the quantitative results from the tracer study.

7.0 Description of Monitoring or Other Assessment Activities to be Undertaken to Evaluate the Success of the Proposed Practices

Monitoring and assessment activities include ongoing baseline monitoring, maintenance activities necessary to sustain the proposed practices, and assessment to evaluate project success. These project components are described below. Activities to evaluate project success consist of surface water and biota monitoring, system maintenance, and assessment of monitoring results. Baseline conditions are being evaluated through pre-construction sampling along Kidd and Bateman Creeks, and of mine drainage at the Boiler House and Twin Peaks Adits.

Monitoring activities will include continued collection and analysis of samples along Kidd and Bateman Creeks and from the adits, as well as monitoring necessary to ensure the function of the project components as described in the OMM plan. Monitoring is intended to comply with Title 27 requirements, and is anticipated to include analysis of for total metals, water quality parameters (pH, specific conductance, oxidation reduction potential, temperature), major ions, and chemicals introduced to the subsurface (sodium hydroxide and ethanol).

7.1 Baseline Conditions

Baseline conditions for the project are based on mapping and photos of mine wastes and associated best management practices, results of monthly surface water sampling and laboratory analysis at Corona and Twin Peaks during 2012-2013, and biosentinel monitoring completed during 2012. Baseline conditions include bare slopes on mine waste (Attachment III), sparse vegetation along the infiltration trenches, and measureable increase in metal concentrations in Kidd Creek downstream from the Corona Drain Tunnel, and increase in metal concentrations in Bateman Creek downstream from the Twin Peaks tailings. Baseline surface water monitoring results collected through monthly sampling and analysis of surface water at the site will be graphically and quantitatively compared with post implementation monitoring results to assess improvements. Attachment III contains photographs of the bare slopes on calcines at Twin Peaks, and sparsely vegetated areas on Calcines at Corona. Periodic (seasonal) photos will be taken from the same locations to provide for qualitative and quantitative comparisons of revegetation success. The ongoing revegetation efforts have provided significant information regarding plants and associated practices to support vegetation efforts and test plots are not anticipated to be necessary as part of this project.

7.2 Monitoring Activities

Monitoring activities will consist of periodic inspections of the sites, comparison of successive vegetation surveys as revegetation of mine wastes progresses, quarterly surface water sampling, and biosentinel monitoring at James Creek. Surface water monitoring would be performed in accordance with waste discharge requirements under Title 27.

Monitoring of subsurface chemical amendment will also include daily to weekly sampling for up to 3 months after injection to assess the benefits of subsurface chemical amendment. This monitoring is anticipated to include analysis of for total metals, water quality parameters (pH, specific conductance,

oxidation reduction potential, temperature), major ions, and chemicals introduced to the subsurface (sodium hydroxide and ethanol).

Monitoring will be performed in accordance with the OMM plan to be prepared after re-plumbing of the existing trenches is completed, and after operation of the pilot subsurface chemical amendment system.

7.3 Maintenance Activities

Maintenance activities will include inspection of the mining units and adjustments to other project systems in accordance with the OMM plan. Maintenance activities at the infiltration trenches are anticipated to include inspection and maintenance of erosion control best management practices, cleanout of pipes, valve adjustment, and solids management. Maintenance of the BMPs is anticipated to include inspections, sediment removal, and minor repairs. Maintenance of revegetation is anticipated to include limited watering (if necessary) during the first two years to support establishment of the plants.

7.4 Assessment Procedures

Assessment procedures will include quantitative comparisons of baseline and post project metal concentrations in water, associated load estimates, comparisons of baseline and post project biosentinal monitoring results, and qualitative comparisons of baseline and post project photographs to document revegetation progress.

8.0 Budget and Identified Funding to Pay for the Implementation Plan

In 2011, Tuleyome was awarded a three-year, \$1.5 million dollar grant by the California Department of Fish and Game's (now Fish and Wildlife) Ecosystem Restoration Program to address drainage waters from the Corona and Twin Peaks Mines in northwest Napa County.

9.0 Remediation Goals and Objectives

Remediation goals and objectives are to consolidate mine waste, revegetate mine waste piles, improve the operational flexibility of the infiltration trenches, and identify and design a method to substantially reduce metal loading from the Corona Drain Tunnel to Kidd Creek. These goals are described below.

9.1 Mine Waste Consolidation Units and Stabilization

Consolidation into existing mine waste units will result in reducing the area covered in mine waste, and in which mine drainage is generated. Stabilization reduces the likelihood for traffic related disturbance of the mine waste. Pre- and post- consolidation maps of mine waste will be compared to document the reduction in area covered by mine waste.

9.2 Revegetation of Mining Units

Current conditions include slopes devoid of vegetation at Twin Peaks, and slopes covered with sparse grasses at Corona and Twin Peaks. Increased vegetative cover will be documented through annual

surveys and comparison of photographs. The goal of revegetation is to establish plants on bare slopes, and increase coverage on sparsely vegetated areas.

Erosion of mine waste occurs along the north side of the Corona calcines under current conditions. Erosion would be reduced by implementing BMPs including emplacing straw wattles and erecting rock check dams to retain sediment on site. Efficacy of the BMPs will be assessed through inspection of the wattles and check dams for accumulated sediment. Photographs and maintenance logs detailing the removal and disposition of accumulated sediment will be used to document effectiveness. Sediment will be placed within the mine waste units at locations that will prevent erosion and transport off site, and to encourage establishment of vegetation. The goal is to prevent off site transport of mine waste.

9.3 Improvements to Existing Infiltration Trenches

The current distribution piping within the infiltration trenches was assembled in an ad-hoc manner as the trenches were lengthened, and before consistent operations were identified based on observation of how the systems function. Re-plumbing of the infiltration trenches will improve system reliability by supporting increased ability to isolate specific trench reaches for maintenance while maintaining flow control. The goal is to allow operational changes to be made in response to changing flow conditions, and maintenance requirements while maintaining control of the drainage.

9.4 Subsurface Chemical Amendment

The ultimate goal is to achieve a significant improvement in water quality through reducing metal loading from the Corona Drain tunnel to Kidd Creek. This project will implement a pilot test that will directly measure any benefits attained through introducing chemicals to the source of acid drainage to precipitate metals and interfere with sulfide oxidation processes. The study will generate monitoring data that will allow calculation of the percent metal load reduction through comparison of pre-, during- and post study drainage analytical results and flow measurements. These calculated load reductions would then be used as the basis for design of an implementable subsurface chemical amendment program, and identification of performance goals for full scale implementation of the system.

Precipitates created during subsurface chemical amendment are anticipated to accumulate and be retained within the subsurface, at or near the location where they form.

10.0 Contingency Plans

Contingencies are associated with each of the proposed systems as described below.

10.1 Mine Waste Consolidation Units

If mine waste at a consolidation area is found to be significantly more extensive than can be addressed in the project, any remaining disturbed surfaces on mine waste would be protected using best management practices to prevent run-on and erosion. The disturbed surface would also be revegetated to provide for long term protection from erosion.

10.2 Revegetation

If initial plantings do not succeed, alternative plant varieties will be used in an attempt to increase the amount of vegetation. In addition, the reasons for lack of success will be evaluated and amendments to the revegetation program will be made to encourage subsequent vegetation attempts. Amendments to the plan could include selection of alternate species, limited use of irrigation to help establish plants, and a change to the soil amendments used. Performance standards for revegetation are described in Section 9.2 above.

10.3 Improvements to Existing Infiltration Trenches

Existing plumbing will remain in service to the extent practical so that new plumbing can be tested before entering service. This will be done to prevent the loss of control of mine drainage during replumbing.

10.4 Subsurface Chemical Amendment

A tracer study is necessary to assess the chemical dose rate to be used in the study of subsurface chemical amendment. If the tracer study does not result in positive detection of the tracer, then a connection from the tracer release location and the drain tunnel will not have been established. This could lead to concerns regarding the ultimate fate of the tracer, and inability to conduct pilot scale operations.

The Corona Mine is not located within a groundwater basin used to supply drinking water. The Corona Drain Tunnel was constructed to capture groundwater at the Corona Mine and discharge the captured groundwater to Kidd Creek. Any tracer released within the Corona Mine will be subject to the following potential fates:

- 1) Capture by groundwater flowing to the Corona Drain Tunnel and discharge to Kidd Creek.
- 2) Retention in the geologic materials that occur between the release point and the Corona Drain Tunnel.
- 3) Destructive chemical reactions with the minerals present along the flow path from the release point to the Corona Drain Tunnel.

The tracer to be used will be detergent that contains a brightener chemical, disodium diaminostilbene disulfonate. This substance is non-toxic and is widely used to assess potential discharges from septic systems and water treatment plants to surface water throughout California. If the tracer is not detected in Corona Drain Tunnel drainage, no adverse impact to water quality is anticipated, but pilot operation of the subsurface chemical amendment system will not be performed.

If the tracer is detected in Corona Drain Tunnel drainage, no adverse impact to water quality is anticipated, and the resulting information will be used to plan the subsurface chemical amendment pilot operations.

Pilot operations will include the release of chemicals (sodium hydroxide and ethanol) at rates to be determined based on results of the tracer test, and tracer concentrations measured in drainage. These chemicals will be applied at rates estimated to be sufficient to react with minerals in the drainage source

July 8, 2013

area and result in consumption of the chemicals. The application rates will be determined in part based on the results of the tracer test, and in part on the results of bench scale neutralization tests performed as part of earlier treatability studies using Corona drain tunnel discharge (TKT 2012). The quantities of chemicals anticipated to be used will be small in relation to the volume of drainage discharged from the Corona Drain Tunnel, and are intended to be consumed in chemical reactions along the flow path from the remediation wells to the Corona Drain Tunnel. Thus, discharge of the chemicals to Kidd Creek at concentrations that would impact water quality will be avoided. Drainage from the Corona Drain Tunnel will be monitored for the applied chemicals, metals, and pH to assess the improvements to water quality due to subsurface chemical amendment. This monitoring data would also be used to confirm that no significant impact to water quality is caused by pilot operations.

If the tracer study is not successful, or the pilot operations do not improve water quality sufficiently, then alternate actions at downstream and off-property locations would be evaluated. Such evaluations would assess availability of off property lands for use in treating mine drainage using semi-passive and active neutralization technologies.

11.0 Description of Remediation Agencies Legal Right to Enter and Conduct Remedial Activities

Tuleyome has entered into an access agreement with Corona and Twin Peaks Historical Association, LLC, the property owner. The access agreement grants Tuleyome the legal right to enter the site for the purpose of conducting the remedial activities described herein. A copy of the access agreement is provided in Attachment IV.

12.0 Signature of Authorized Representative of the Remediating Agency



Sara Husby-Good, Executive Director, Tuleyome

13.0 Identification of Pollutants to be addressed by the Remediation Work Plan.

Pollutants addressed by this remediation work plan include mercury, nickel, and sediment. Available site specific information for these pollutants are described in Sections 3 and 4 above.

Implementing this remediation work plan will improve treatment of toxic mine drainage discharging in the Bay-Delta watershed. This project will address the Ecosystem Restoration Program's goal to "Improve and/or maintain water and sediment quality conditions that fully support healthy and diverse

aquatic ecosystems in the Bay-Delta estuary and watershed; and eliminate, to the extent possible, toxic impacts to aquatic organisms, wildlife, and people.”

Continuous discharges of drainage water from the two adits are slightly acidic with high concentrations of iron and nickel, and some mercury in the suspended solids. Drainages from the Twin Peaks and the Upper Corona adits have been improved to the point where they no longer discharge into the creek. However, the current improvements are not ideal—difficult to maintain and clogging with iron precipitate. This project will develop and implement a reliable, long-term, maintainable solution for both dissolved nickel and for solids.

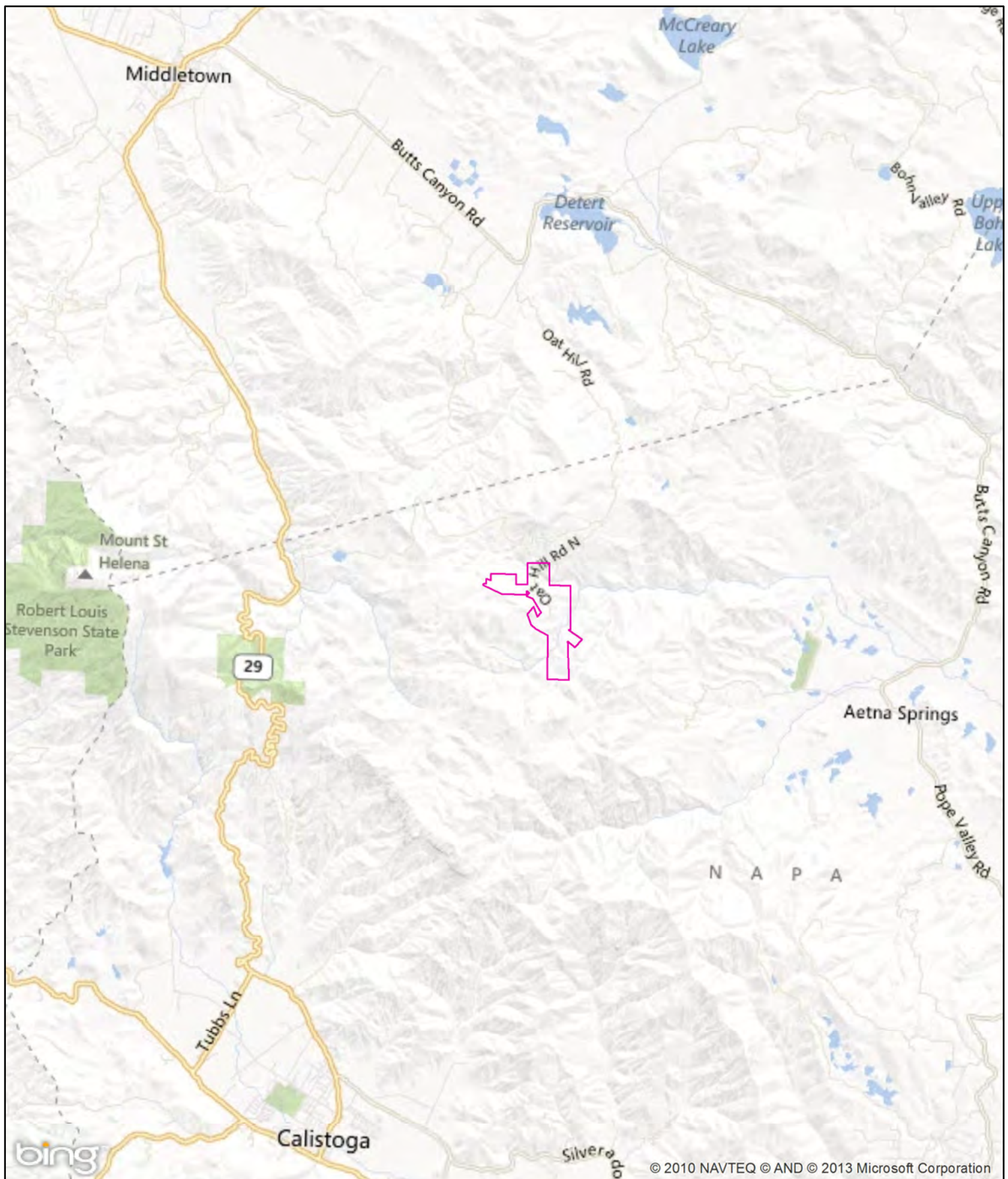
This mining legacy contributes to the state’s listing as impaired of James Creek (nickel and mercury), Lake Berryessa (mercury), and lower Putah Creek (mercury and boron). James Creek has been identified as prime trout habitat. A fish consumption advisory is posted for Lake Berryessa and for lower Putah Creek because of fish mercury contamination. Lower Putah Creek is a Wild Trout stream and drains into the Yolo Bypass, a nationally recognized fish rearing, wildlife habitat, farming, and flood control area with some of the highest mercury concentrations in the Bay-Delta.

14.0 References Cited

- EnviroGeo. 2007. Mercury Speciation and Transport from the Twin Peaks and Corona Mines to James Creek, March 2007. October 21.
- MFG. 2002. Technical Report: Former Twin Peaks Mine, Napa County, California. August 16.
- TKT. 2012. April-May Bench Testing Report Twin Peaks and Corona Mine. June.
- US Geological Survey. 2007. Open File Report 2007-1132: Mercury at the Oat Hill Extension Mine and James Creek, Napa County, California: Tailings, Sediment, Water, and Boata, 2003-2004.

Figures

(7 Pages)



Legend

 John Livermore Property



0 0.5 1 2
Miles



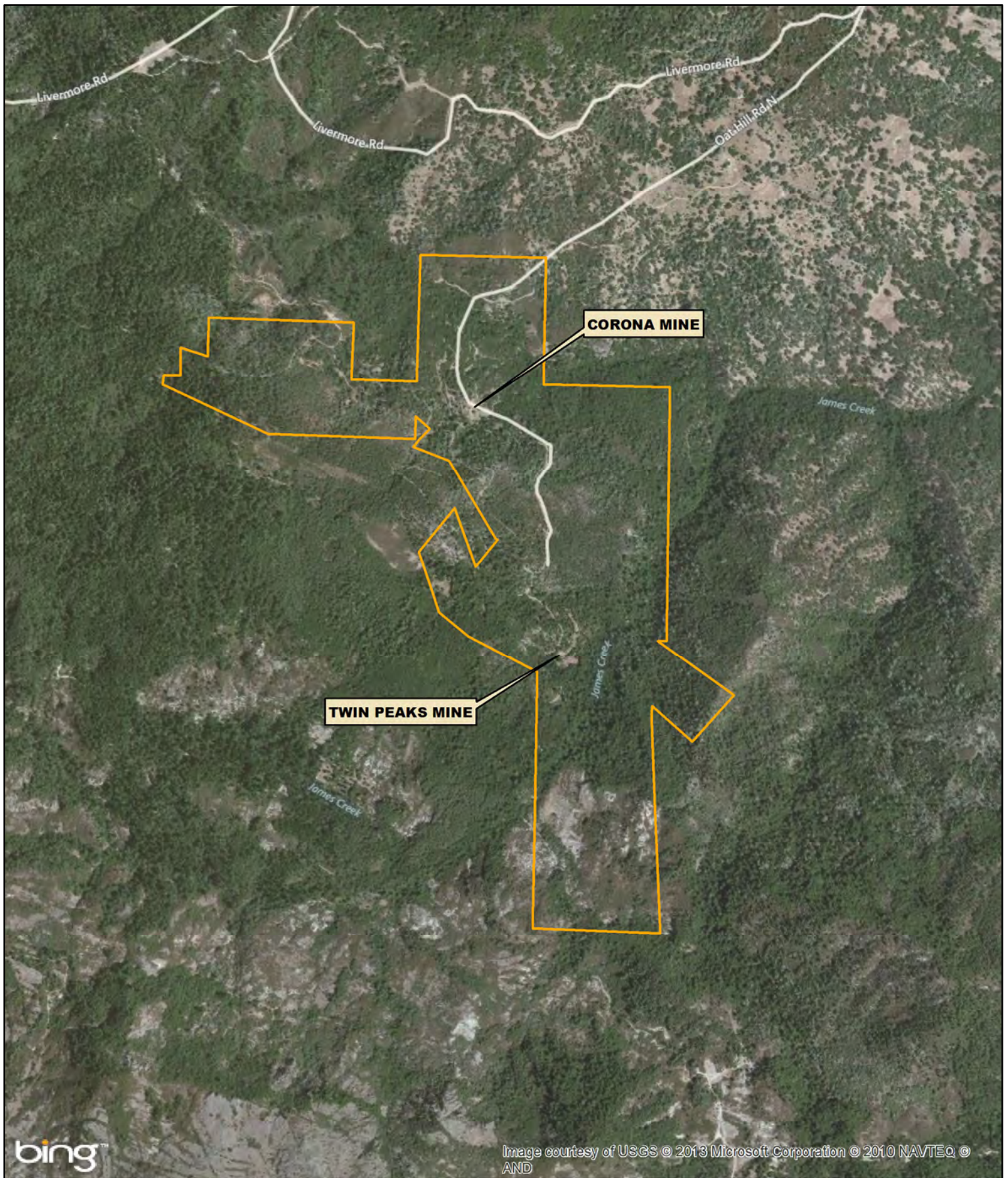
Corona Mine & Twin Peaks Mine

Figure 1 - Site Location

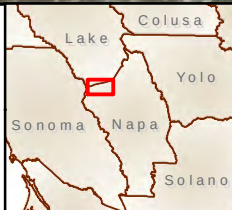
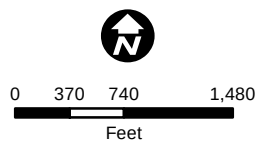
Source: Bing Maps roadways web mapping service;
Napa County GIS Department 2012.



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Legend
 John Livermore Property

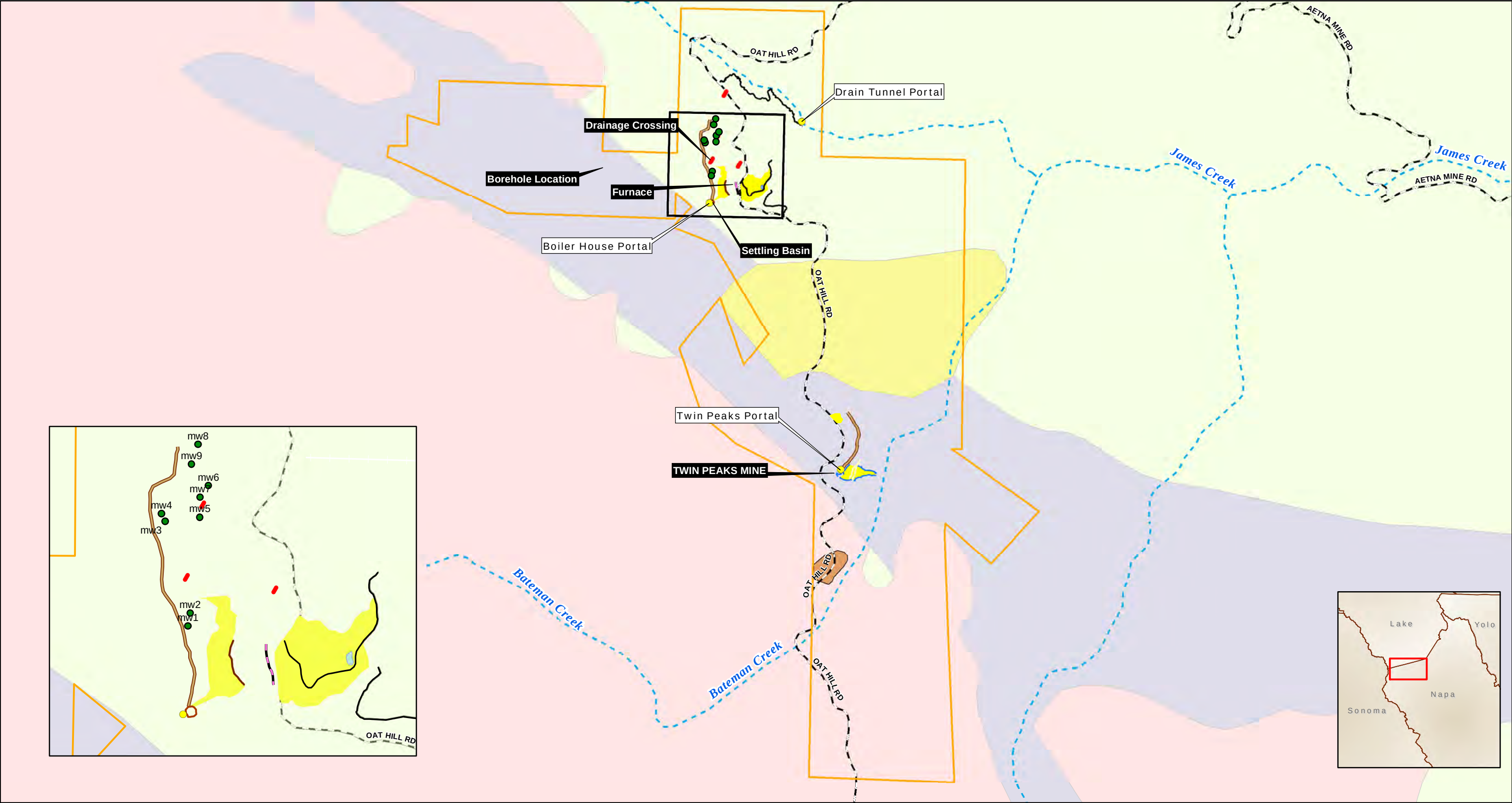


Corona Mine & Twin Peaks Mine

Figure 2 - Vicinity Map

Source: Bing Maps aerial web mapping service;
 Napa County GIS Department 2012.

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Legend

John Livermore Property

Roads

Creeks

Portal

Future Gate

Monitoring Wells

Bench

Existing Path

Timber Wall

Drainage

Existing Path

Existing Rail Track Line

Future Fence

Existing Infiltration Trench

Settling Basin

Geologic Types

Jsp - Great Valley Complex serpentinite

KJfs - Franciscan Complex sedimentary rocks

Qsl - Hillslope Deposits

Tpmv - Sonoma Volcanic rocks

Settling Basin

Hunters Camp

Mine Waste

Corona & Twin Peaks Mine

Figure 4- Site Features

Source: Bing Maps aerial imagery
web mapping service; USGS 2012;
Napa County GIS Department 2011;
Burleson Consulting 2012.

Burleson Consulting, Inc.

Path: S:\GIS\Projects\Corona - Twin Peaks Mine\Remediation Plan\Figure 4 - Site Features.mxd





50ft Contour

Roads

Creeks

Stabilization

Revegetation

Existing Infiltration Trench

Settling Basin

Approximate Limit of Mine Waste

Pre Diversion Drainage

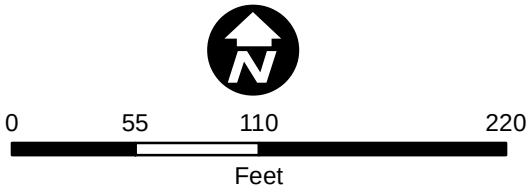
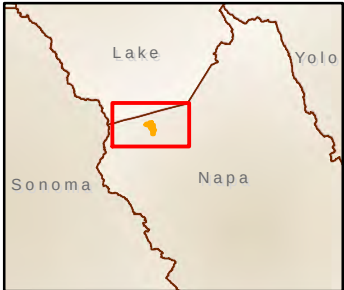
BMP

Post Diversion Inlet

Post Diversion Outlet

Adit

Portal



Twin Peaks Mine

Figure 6: Project Features

Source: Bing Maps aerial imagery
web mapping service;
Napa County GIS Department 2011;
Burleson Consulting 2012.

Burleson Consulting, Inc.

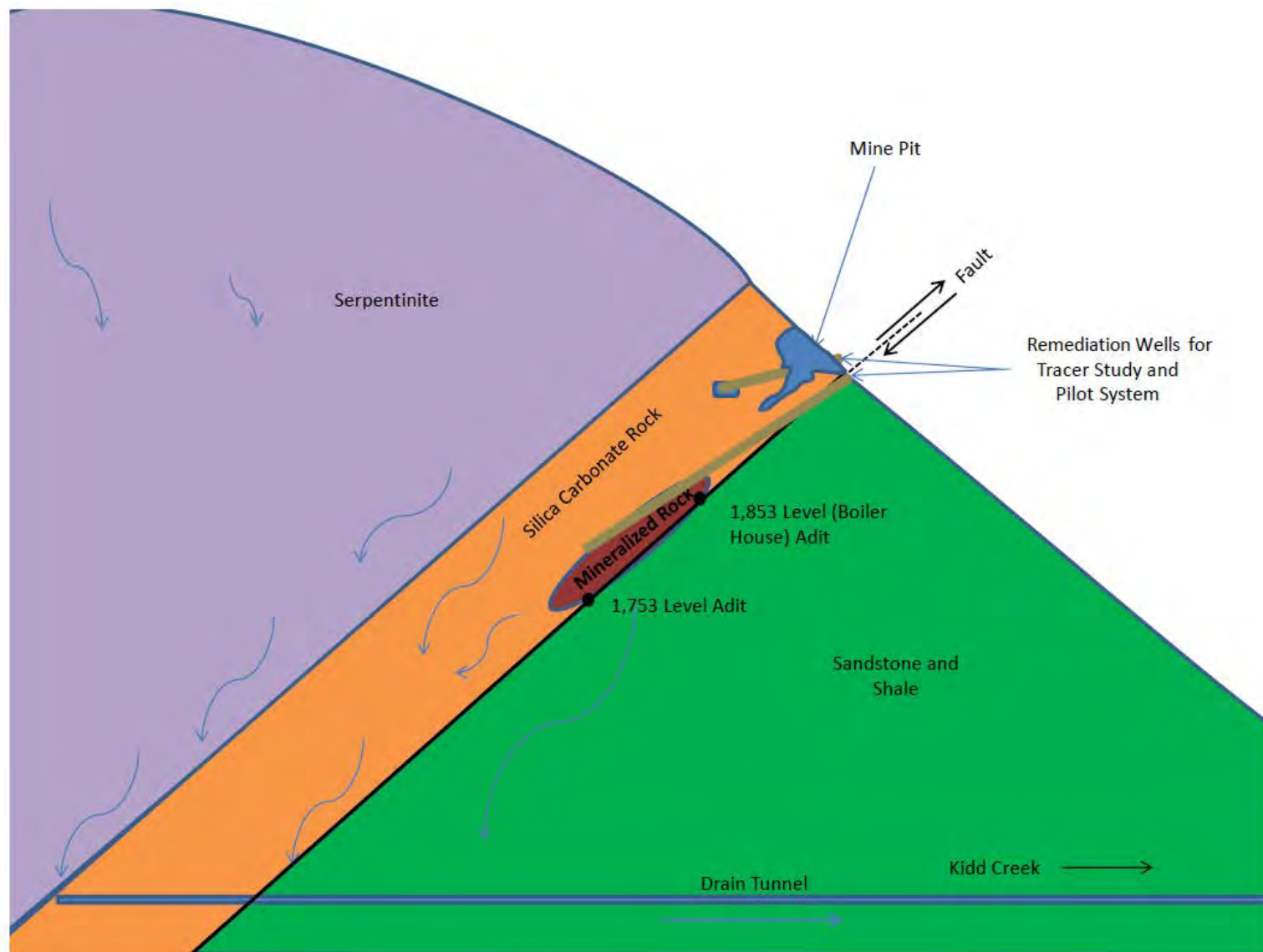


Figure 7

**Corona Mine Diagrammatic
Cross Section**



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TABLES

Table 1: Mine Waste Analytical Results, Corona and Twin Peaks Mercury Mines

Total Metals																
Sample No.	Location	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Thallium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
TP	Twin Peaks Calcines	0.24	12.87	0.20	0.04	194.44	80.12	23.99	1.80	840.00	1235.88	0.00	0.01	0.01	18.50	46.70
UCWR	Corona Waste Rock	0.48	54.62	0.53	0.05	317.27	33.64	26.21	3.25	250.00	440.09	0.00	0.03	0.03	42.35	60.37
UCCT	Corona Calcines	0.42	29.53	0.27	0.03	282.48	28.72	24.06	2.79	350.00	467.79	0.00	0.03	0.03	39.62	87.41
UCCTDUP	Corona Calcines Dup	0.25	21.92	0.18	0.01	183.62	14.05	19.29	2.13	NA	221.75	0.00	0.01	0.01	24.66	62.15
pgg duplicate UCCT	Corona Calcines Dup	0.44	39.17	0.37	0.02	259.57	27.55	24.14	2.40	260.00	336.96	0.00	0.00	0.03	39.21	49.17
Total Threshold Limit Concentration (mg/kg)																
		500	10,000	75	100	2500 (VI 500)	8,000	2,500	1,000	20	2,000	100	500	700	2,400	5,000
California Waste Extraction Test (WET) Metals																
Sample No.	Location	Arsenic mg/L	Barium mg/L	Beryllium mg/L	Cadmium mg/L	Chromium mg/L	Cobalt mg/L	Copper mg/L	Lead mg/L	Mercury mg/L	Nickel mg/L	Selenium mg/L	Silver mg/L	Thallium mg/L	Vanadium mg/L	Zinc mg/L
TP	Twin Peaks Calcines	0.0055	0.161	0.002	0.0005	0.9665	1.9025	0.198	0.01	0.0039	15.55	0.0525	0	0	0.0815	0.2615
UCWR	Corona Waste Rock	0.0115	0.6475	0.009	0.001	1.372	0.965	0.233	0.0435	0.0046	8.005	0.049	0.0005	0.0005	0.2005	0.5055
UCCT	Corona Calcines	0.005	0.495	0.004	0	1.1405	0.3795	0.09	0.0295	0.0023	3.6905	0.054	0	0.0005	0.1505	0.1865
UCCTDUP	Corona Calcines Dup	0.0045	0.436	0.0035	0.0005	0.8225	0.3215	0.1005	0.023	0.0023	2.745	0.029	0.0005	0.0005	0.119	0.1965
Soluble Threshold Limit Concentration (mg/L)																
		5	100	1	1	5 (VI 5)	80	25	5	0.2	20	1	5	7	24	250
Distilled Water Waste Extraction Test (DI WET) Metals																
Sample No.	Location	Arsenic ug/L	Barium ug/L	Beryllium ug/L	Cadmium ug/L	Chromium ug/L	Cobalt ug/L	Copper ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Selenium ug/L	Silver ug/L	Thallium ug/L	Vanadium ug/L	Zinc ug/L
TP	Twin Peaks Calcines	1.29	55.43	0.46	0.07	188.6	40.14	95.11	3.81	7.624293	1,865	1.58	0	0.03	7.72	12.74
UCWR	Corona Waste Rock	0.73	67.08	0.55	0.16	193.7	28.88	24.33	3.97	5.312791	1,123	2.36	0	0.02	9.13	29.51
UCCT	Corona Calcines	0.22	44.26	0.22	0.04	65.38	31.28	11.23	3.07	0.278291	606.4	0	0	0.02	2.44	13.73
UCCTDUP	Corona Calcines Dup	0.11	19.32	0.1	0.02	21.05	18.81	3.1	0.78	0.038291	260	0	0	0.01	0.77	8.31
Retardation (unitless)																
		230	242	4,653	443	10,600,278	60	148	1,591	307	54	325	531	419	5,890	366

Attachments

- I Implementation Work Plan Outline**
- II Operations, Maintenance, and Monitoring Plan Outline**
- III Mine Waste Revegetation Reference Photographs**
- IV Access Agreement**

**ATTACHMENT I
IMPLEMENTATION PLAN OUTLINE**

ACRONYMS AND ABBREVIATIONS

INTRODUCTION

1.1 LOCATION AND BACKGROUND

1.2 SITE HISTORY

1.3 PREVIOUS INVESTIGATIONS AND RESPONSES

1.4 PURPOSE

2.0 SITE MANAGEMENT PLAN

2.1 KEY PERSONNEL

2.2 COMMUNICATIONS

2.2.1 Operational Communications

2.2.2 Emergency Communications

2.3 SITE SAFETY

2.4 SITE ACCESS AND SECURITY

2.5 SITE PREPARATION, USE, MAINTENANCE, AND PERMITS

2.6 EQUIPMENT AND MATERIALS

2.7 DECONTAMINATION PROCEDURES

2.8 PROJECT SCHEDULE

3.0 REMEDIATION ACTIVITIES

3.1 MOBILIZATION AND SITE PREPARATION

3.2 SUBSURFACE CHEMICAL AMMENDMENT TREATABILITY STUDY

3.2.1 TRACER STUDY

3.2.2 TREATABILITY STUDY

3.3.3 FULL SCALE DESIGN

3.3 CONSOLIDATING/STABILIZING MINE WASTE

3.4 REVEGETATION

**ATTACHMENT I
IMPLEMENTATION PLAN OUTLINE**

- 3.5 SITE STABILIZATION
- 3.6 DEMOBILIZATION
- 3.7 FINAL SITE WALK
- 4.0 CONSTRUCTION QUALITY ASSURANCE PLAN
 - 4.1 CONSTRUCTION COORDINATION AND DELINEATION
 - 4.2 CONSTRUCTION DOCUMENTATION
- 5.0 REFERENCES

ATTACHMENT II
OPERATIONS MAINTENANCE AND MONITORING PLAN OUTLINE
(2 Pages)

1.0 INTRODUCTION

1.2 OM&M Goal and Objectives

1.3 O&M Personnel Roles and Responsibilities

1.3.1 Coordinator

1.4 O&M Cost Estimates

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2.1 Location

2.2 Site Background

2.2 Site Conditions

3.0 SUMMARY OF ENGINEERING CONTROLS

3.1 Best Management Practices

3.2 Revegetation

3.3 Consolidation

3.4 Subsurface Chemical Amendment

4.0 TRAINING

4.1 Hazard Awareness Training Requirements

4.2 Erosion Control Training Requirements

4.3 Vegetation Monitoring Training Requirements

4.4 Surface Water Monitoring Training Requirements

5.0 O&M INSPECTIONS

5.1 Periodic Inspections

5.2 Inspections for Unplanned Events

5.3 Annual Inspections

6.0 ANNUAL REVIEW

7.0 INTRUSIVE WORK ACTIVITIES

7.1 Intrusive Work

7.2 Standard Operating ProcedureS (SOP)

7.3 Health and Safety Requirements

8.0 REPORTING AND RECORD-KEEPING

8.1 Reporting Requirements

8.2 Annual Inspection Summary Reports

8.3 Annual Review Reports

8.4 Notification Timeframes

8.5 Record-Keeping and Retention

9.0 SITE ACCESS

10.0 VARIANCE, MODIFICATION OR TERMINATION OF O&M PLAN

10.1 O&M Plan Variance

10.2 O&M Plan Modifications

10.3 Termination of O&M Plan

11.0 REFERENCES

***Attachment III
Corona and Twin Peaks Vegetation
Reference Photographs***

(3 Pages)

Attachment III
Corona and Twin Peaks Vegetation
Reference Photographs

Photo Number	Photo Description	Photo
B-4	Sparsely vegetated slopes on calcines at Corona Mine, view to east February 22, 2011	
B-5	Sparsely vegetated slopes on calcines at Corona Mine, view to northeast February 22, 2011	

Attachment III
Corona and Twin Peaks Vegetation
Reference Photographs

Photo Number	Photo Description	Photo
TP-1	Slope devoid of vegetation at Twin Peaks. View to northeast. April 19, 2012	
TP-2	Slope devoid of vegetation at Twin Peaks. View to southwest. April 19, 2012	

Attachment III
Corona and Twin Peaks Vegetation
Reference Photographs

Photo Number	Photo Description	Photo
TP-3	Slope devoid of vegetation at Twin Peaks. View to east. April 19, 2012	

Attachment IV

Access Agreement

JOHN LIVERMORE
1755 E. Plumb Ln. #170
Reno, NV 89502
775-786-9955
April 16, 2012

Mr. Bob Schneider
Senior Policy Director
Tuleyome, Inc.
607 North St.
Woodland, CA 95616

Dear Bob:

Enclosed is a signed copy of the Access Agreement for Corona and Twin Peaks.

I have received certificates of insurance from three of the eleven subcontractors and will be interested to find out just what they will be doing. I understand Professor Slotton has already started work on biological uptake in James Creek.

Best regards.


J.S. Livermore

Cc: Sam Livermore

NONEXCLUSIVE TEMPORARY ACCESS LICENSE

THIS NONEXCLUSIVE TEMPORARY ACCESS LICENSE AGREEMENT ("**Agreement**") is entered into, effective as of February 1, 2012, by and between **JOHN S. LIVERMORE**, an individual whose address is c/o Public Resource Associates, 1755 E. Plumb Lane, #170, Reno, NV 89502-3683, tel: (775) 223-9292, email: jslivermore@hughes.net ("**JSL**"), and **TULEYOME, INC.**, a California nonprofit public benefit corporation whose address is 607 North Street, Woodland, CA 95616, and whose primary point of contact is Bob Schneider, Senior Policy Director, tel: 530-304-6215, email: bschneider@tuleyome.org ("**Tuleyome**").

RECITALS

A. JSL is the current fee owner of that certain real property located in the County of Napa, State of California, as more particularly shown on the map attached hereto as **Exhibit A** (the "**JSL Property**").

B. Tuleyome has been awarded grants under the Ecosystem Restoration Program administered by the California Department of Fish & Game to undertake a voluntary mine cleanup project identified as the Corona and Twin Peaks Mine Drainage Treatment Project ("**Project**").

C. To implement the Project, Tuleyome needs temporary access along the road identified as the Oat Hill Mine Road ("**Road**") across property owned by Montesol Company and then across portions of the JSL Property to gain access to the Project site which is also located on the JSL Property ("**Project Site**"), all as indicated on Exhibit A.

D. JSL is willing to grant to Tuleyome and its employees and agents, and specified other parties and their employees and agents with whom Tuleyome may enter into contracts to implement the Project ("**Permitted Parties**"), a temporary license for ingress and egress to and from the Project Site from the date of this License for the duration of the Project ("**License Term**"), subject to the terms and conditions of this License.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereby agree as follows:

LICENSE

1. Grant of License. JSL hereby grants to Tuleyome a nonexclusive temporary license for use of the Project Site, and over the Road for the purposes of ingress and egress to and from the Project Site, by the Permitted Parties during the License Term ("**License**").

2. **Access.** Access under the License may be controlled and restricted pursuant to such protocols as JSL may reasonably establish and communicate to Tuleyome in writing from time to time for the protection of JSL, the JSL Property and the Road, including without limitation the following initial controls and restrictions:

(a) No Permitted Parties other than Tuleyome shall be granted or allowed access under the License unless and until they have been specifically identified, in writing or orally to be promptly followed by a writing (including email), to JSL or a designated agent of JSL ("**Designated Agent**"), and unless and until each such Permitted Party has agreed in writing to be bound by the terms and conditions of the License as set forth in this Agreement. For this purpose, Justin Smith (jsoathill@gmail.com; Home Mobile: (707) 486-6367; Other Phone: (707) 987-9420) is hereby designated JSL's agent.

(b) Access for Permitted Parties shall be limited to purposes of use of the Project Site and ingress and egress to the Project Site directly related to the planning, execution and monitoring of the Project, and not for any other purposes (such as hiking, wood cutting, hunting or any other personal recreation).

(c) Access to the Road and other property owned by JSL is partially controlled by a lockable gate, shown as the "**Table Rock Gate**" on Exhibit A. Tuleyome shall, and Permitted Parties may be, given the combination, keys, gate codes or other means of access through the Table Rock Gate, but the Table Rock Gate shall be kept closed and locked at such times as JSL may specify from time to time. JSL reserves the right to change the combinations, keys, gate codes, and other means of access following reasonable notice to Tuleyome, in which case JSL will provide Tuleyome with replacement combinations, keys, gate codes or other devices to permit continued use of the License by Permitted Parties.

(d) JSL may install and maintain additional gates and/or other security device on the Road or elsewhere on the JSL Property at his sole cost, provided JSL provides Tuleyome with the combinations, keys, access codes, or other means for gaining access through such gates or devices to the extent necessary to permit continued access under the terms of the License.

(e) Permitted Parties shall make reasonable efforts to provide JSL or his Designated Agent at least forty eight (48) hours prior notice of their intent to access the Project Site along the Road, identifying the Permitted Parties and number and type(s) of vehicles to be expected. Any issues relating to the logistics of access under the License shall be coordinated with the Designated Agent.

(f) Access to and use of the Project Site shall be limited to access by foot or by vehicles appropriate for the Road and the Project Site so as to minimize rutting or other damage to the Road or the JSL Property, or the stranding of vehicles unsuitable for the terrain. Access during and following periods of heavy rain may be limited or prohibited by JSL or the Designated Agent if travel along the Road or access to the project Site during such periods, particularly involving heavy vehicles or transporting

supplies or equipment, may be reasonably expected to result in damage to the Road or the JSL Property.

(g) Parking along the Road or elsewhere on JSL Property in a manner that does not permit the ability of other vehicles to pass along the Road shall not be permitted, except in emergency situations or on a temporary basis when unavoidable.

(h) Use of the Road and the Project Site, all access under the License and this Agreement, the Project, and the work in connection with the Project all shall be undertaken and performed in full compliance with all applicable federal, state and local laws and ordinances.

3. Maintenance and Repair Costs. During the License Term, Tuleyome shall maintain, and shall cause the Permitted Parties to maintain, the Road (including related drainage ditches and culverts) in substantially the same condition and state of repair as of the date of this Agreement, normal wear and tear excepted. Tuleyome shall, or shall cause such Permitted Party as it may designate to, pay or reimburse JSL for any reasonable costs incurred for the maintenance and repair of the Road during the License Term, except for maintenance and repair costs required due to the negligence, willful misconduct or abuse of the Road by JSL or his employees or agents, or by other third parties who may have access along the Road through permission or license from JSL.

4. Impairment; Alterations. Tuleyome agrees not to take, or permit any Permitted Party or other party to take, any action in connection with the Project or access under the License that would impair the value, condition or use of the Road or the JSL Property, except to the extent necessary to execute the Project. Tuleyome shall not, and shall not allow any Permitted Party to, make any alterations, modifications or improvements to the Road without the prior written consent of JSL, or any alterations, modifications or improvements to the Project Site except as expressly contemplated by the Project design or as otherwise approved in writing by JSL.

5. No Warranties. The parties acknowledge that (a) the Road is an unpaved, rural and rough road located in steep terrain on private property, and that is not maintained by any federal, state or local agency and does not comply with the road design and safety standards that would apply to a public road, and (b) the Project Site is located in rough and steep terrain. JSL makes no representation or warranty, express or implied, regarding the safety or adequacy of the Road or the Project Site or the purposes for which the License is granted hereunder, and Tuleyome acknowledges that it is not relying upon any statements, representations or warranties made by Montesol or its employees or agents to that effect.

6. Indemnification. Tuleyome shall indemnify, hold harmless, defend and protect JSL and his employees, agents, successors and assigns against and from any and all loss, claim, cost, liability, damage, injury, death, or expense, including, without limitation, reasonable attorneys' fees (collectively, "**Damages**"), resulting from, arising out of or in any way connected with use of the Road, the Project Site, the access provided under this

Agreement, the Project, any breach of the License or this Agreement, or any other activities, actions or failures to act, by Tuleyome, any Permitted Party or their respective employees, agents, contractors, subcontractors, invitees, successors or assigns, except for any such Damages resulting solely from the active gross negligence or willful misconduct of JSL or his employees or agents.

7. Insurance.

(a) Tuleyome shall obtain and maintain during the License Term the following insurance coverages:

- Worker's Compensation (and Employer's Liability Insurance) — as required by applicable state statute.
- Commercial General Liability — \$1,000,000 per occurrence for bodily injury, including death and property damage, and \$2,000,000 in the aggregate.
- Automobile Liability — minimum of \$1,000,000 combined single limit for bodily injury and property damage.
- Professional Liability (E&O) and Professional Pollution Liability and Contractors' Pollution Liability — \$1,000,000 each claim and in the aggregate.

(b) All such insurance shall be on an incurrence basis, and shall be placed with a company or companies reasonably satisfactory to Montesol. Such insurance shall insure against all liability of Tuleyome and its employees and agents arising out of and in connection with use of the Road, the Project Site, the License, the Project and performance by Tuleyome of the indemnity provisions of Section 6, all as provided for in this Agreement, and shall be primary as respects JSL such that any insurance maintained by JSL shall be excess of and non-contributory with that of Tuleyome. Each such policy shall provide that it shall not be cancelled or changed in coverage or scope except upon at least thirty (30) days prior written notice to JSL. Certificates of insurance, showing JSL and his employees and agents as additional named insureds shall be delivered to JSL promptly following execution of this Agreement and upon reasonable request periodically thereafter during the License Term.

(c) In addition to the above insurance requirements, Licensee shall include all Permitted Parties as additional named insureds under its policies, or shall require all Permitted Parties to provide all insurance coverages as described above and certificates of insurance evidencing the same.

8. Property Taxes. All real property taxes and assessments for the JSL Property, the Road and the Project Site shall be borne by JSL; provided that Tuleyome shall pay, or shall cause the appropriate Permitted Party to pay, any fees, costs, assessments or

increases in property taxes imposed on JSL, the JSL Property, the Project Site or the Road in connection with or as a result of the Project or any related actions of any Permitted Party.

9. Term. This Agreement shall continue in full force and effect during the License Term, unless this Agreement is amended, modified or terminated by an agreement executed and delivered by the parties hereto.

10. No Public Dedications; No Recording. Nothing in this Agreement is intended to be or shall be deemed or construed to be a gift or dedication of any portion of the Road, the Project Site or any other portion of the JSL Property to Tuleyome or any other party for any public use or nonprofit benefit purpose (unless and until any such gift or dedication is implemented by separate agreement). This Agreement shall not be recorded.

11. No Third Party Beneficiaries. This Agreement is only for the benefit of the parties hereto and their successors-in-interest or permitted assigns as set forth in this Agreement. No other person or entity or property shall be entitled to rely hereon, receive any benefit herefrom or enforce any provision hereof against any party hereto (or the permitted assigns of Tuleyome or successors-in-title to JSL, respectively).

12. Notices. Any notice required or permitted to be given under this Agreement shall be in writing (which may include electronic means) and shall be deemed to have been delivered when received by personal delivery or electronically, or on the date two days after being deposited by registered or certified mail, postage prepaid, return receipt requested, or with Federal Express or a comparable courier, and addressed as set forth above (or such other address or email contact as either party may specify to the other by notice meeting the conditions of this Section 12).

13. Binding Effect; No Assignment; Governing Law. This Agreement and all covenants and restrictions contained herein shall, to the fullest extent permitted by law and equity and without regard to technical classifications or designations, be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns. Without the prior written consent of JSL, Tuleyome may not assign its rights or benefits under this Agreement to any third party, except to Permitted Parties to the extent provided herein, or with the prior written consent of JSL or his successor-in-title to the JSL Property. This Agreement shall be governed and construed in accordance with the laws of the State of California.

14. Severability. If any one or more of the provisions contained in this Agreement is for any reason held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any other provisions of this Agreement, and this Agreement shall be construed as if such invalid, illegal or unenforceable provision had never been contained in this Agreement.

15. Construction. The parties acknowledge that each party and its counsel have reviewed this Agreement and that the normal rule of construction to the effect that any ambiguities are to be resolved against the drafting party shall not be employed in the interpretation of this Agreement or any amendments or exhibits.

16. Attorneys' Fees. In the event that either party to this Agreement shall bring legal action in order to enforce any of its provisions, the prevailing party shall be entitled to recover from the other party the reasonable attorneys' fees and costs incurred by the prevailing party in enforcing its rights under this Agreement.

17. Entire Agreement. This Agreement, including the recitals and the attached Exhibit A, constitutes the entire agreement between the parties with respect to the grant of the License and all matters to the License and use of the Road and the Project Site.

18. Amendments. This Agreement may be amended, modified or supplemented only by a written document executed by all of the parties hereto.

19. Counterparts. This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

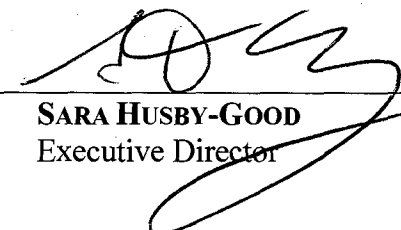
IN WITNESS WHEREOF, the parties have executed this Nonexclusive Temporary Access License Agreement effective as of the date first above written.

"JSL"


JOHN S. LIVERMORE

"TULEYOME"

TULEYOME, INC.
a California nonprofit public benefit corporation

By: 
SARA HUSBY-GOOD
Executive Director

This is a topographic map of the Monticello, Idaho area. The map shows the Snake River flowing through the region, with several towns and settlements marked, including Monticello, Elgin, and Dams. The map also displays various property boundaries, some of which are highlighted with thick black lines. Key features include the 'Monticello Property' and 'Project Site' labels, as well as the 'Snake River' and 'Dams' labels. The map includes contour lines indicating elevation and a grid system for location reference.

Gois, Vanessa

From: Livermore, Sam
Sent: Tuesday, April 10, 2012 12:22 PM
To: 'Sara Husby-Good'; 'BobSchneider'; 'Bob Schneider'; 'Stephen McCord'; 'JOHN S. LIVERMORE'
Cc: jennifer@bensonneff.com; linda@bensonneff.com; Gois, Vanessa
Subject: Access Licenses

Package of Access Licenses received:

- I have signed for Montesol and am sending one signed copy back to Bob's attention at Tuleyome
- The package also included John's Access Licenses, so I am sending both copies to John in Reno for his signature, and he can then forward one copy to Bob at Tuleyome

Ok everyone?

Samuel M. Livermore

101 California Street ♦ 5th Floor
San Francisco, CA 94111-5800
Direct: 415-693-2113 ♦ Fax: 415-693-2222 ♦ eFax: 415-276-5743
Email: slivermore@cooley.com
Bio: www.cooley.com/slivermore ♦ Web: www.cooley.com

From: jennifer@bensonneff.com [mailto:jennifer@bensonneff.com]
Sent: Monday, April 09, 2012 10:23 AM
To: Livermore, Sam; linda@bensonneff.com; 'Sara Husby-Good'
Cc: 'BobSchneider'; 'Bob Schneider'; 'Stephen McCord'; 'JOHN S. LIVERMORE'
Subject: RE: Certificate of Insurance for Norman B. Livermore & Sons, on behalf of McCord Environmental

Sam:

We did received the package and will messenger it over with Wednesday's check run. If you need it today, I can messenger it over now.

Regards,
Jennifer A. Uy
Benson & Neff, CPA's
1 Post St., Suite 2150
San Francisco, CA 94104
Direct: (415) 705-5629
Fax: (415) 705-5633

From: Livermore, Sam [mailto:slivermore@cooley.com]
Sent: Monday, April 09, 2012 10:08 AM
To: 'linda@bensonneff.com'; jennifer@bensonneff.com; Sara Husby-Good (sdhusby@tuleyome.org)
Cc: BobSchneider (bschneider@tuleyome.org); Bob Schneider; Stephen McCord; JOHN S. LIVERMORE
Subject: RE: Certificate of Insurance for Norman B. Livermore & Sons, on behalf of McCord Environmental

Linda and Jennifer – did the signed access agreements perhaps get mailed to you?

Sara – do you remember where you mailed them? Perhaps to just John?

Samuel M. Livermore

101 California Street ♦ 5th Floor

San Francisco, CA 94111-5800

Direct: 415-693-2113 ♦ Fax: 415-693-2222 ♦ eFax: 415-276-5743

Email: slivermore@cooley.com

Bio: www.cooley.com/slivermore ♦ Web: www.cooley.com

From: Bob Schneider [<mailto:verve2006@comcast.net>]

Sent: Monday, April 09, 2012 9:53 AM

To: Stephen McCord

Cc: Livermore, Sam; Sara Husby-Good (sdhusby@tuleyome.org); BobSchneider (bschneider@tuleyome.org)

Subject: Re: Certificate of Insurance for Norman B. Livermore & Sons, on behalf of McCord Environmental

They were signed and mailed a week or two ago. Bob

Sent from my iPhone

On Apr 9, 2012, at 9:31 AM, Stephen McCord <sam@mccenv.com> wrote:

No problem. You (and John) should be getting certificates from all subs over the next several days.

Sara Husby should have mailed you a signed copy of the access agreement. I'm cc'ing her and Bob to check on that.

Stephen

530-220-3165

From: Livermore, Sam [<mailto:slivermore@cooley.com>]

Sent: Monday, April 09, 2012 9:25 AM

To: Brittany Stoker; Stephen McCord

Cc: JOHN S. LIVERMORE

Subject: RE: Certificate of Insurance for Norman B. Livermore & Sons, on behalf of McCord Environmental

Thanks both!

Stephen – I don't recall seeing the signed access agreements yet – do you know their status?

Thanks. Sam

Samuel M. Livermore

101 California Street ♦ 5th Floor

San Francisco, CA 94111-5800

Direct: 415-693-2113 ♦ Fax: 415-693-2222 ♦ eFax: 415-276-5743

Email: slivermore@cooley.com

Bio: www.cooley.com/slivermore ♦ Web: www.cooley.com

From: Brittany Stoker [mailto:brittany@purvesinsurance.com]

Sent: Monday, April 09, 2012 9:06 AM

To: Livermore, Sam

Cc: Stephen McCord

Subject: Certificate of Insurance for Norman B. Livermore & Sons, on behalf of McCord Environmental

Good morning,

Please see attached certificate of insurance for Stephen McCord, McCord Environmental. Please let me know if you have any questions. Thank you!

Brittany Stoker

Purves & Associates

500 4th Street

Davis, CA 95616

P: 530-756-5561

F: 530-756-4641

LICENSE # 0f76105

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IRS Circular 230 disclosure: To ensure compliance with requirements imposed by the IRS, we inform you that any U.S. federal tax advice contained in this communication (including any attachment) is not intended or written by us to be used, and cannot be used, (i) by any taxpayer for the purpose of avoiding tax penalties under the Internal Revenue Code or (ii) for promoting, marketing or recommending to another party any transaction or matter addressed herein.

NONEXCLUSIVE TEMPORARY ACCESS LICENSE

THIS NONEXCLUSIVE TEMPORARY ACCESS LICENSE AGREEMENT ("**Agreement**") is entered into, effective as of February 1, 2012, by and between **NORMAN B. LIVERMORE & SONS**, a California general partnership dba Montesol Company whose address is c/o Benson & Neff, One Post Street, Suite 2150, San Francisco, CA 94104-5206, and whose primary point of contact is Samuel M. Livermore, Managing Partner, tel: 415-693-2113, email: slivermore@cooley.com ("**Montesol**"), and **TULEYOME, INC.**, a California nonprofit public benefit corporation whose address is 607 North Street, Woodland, CA 95616, and whose primary point of contact is Bob Schneider, Senior Policy Director, tel: 530-304-6215, email: bschneider@tuleyome.org ("**Tuleyome**").

RECITALS

A. Montesol is the current fee owner of that certain real property located in the County of Napa, State of California, as more particularly shown on the map attached hereto as **Exhibit A** (the "**Montesol Property**").

B. Tuleyome has been awarded grants under the Ecosystem Restoration Program administered by the California Department of Fish & Game to undertake a voluntary mine cleanup project identified as the Corona and Twin Peaks Mine Drainage Treatment Project ("**Project**").

C. To implement the Project, Tuleyome needs temporary access across the Montesol Property along the road identified as the Oat Hill Mine Road ("**Road**") to gain access to the Project site ("**Project Site**") located on the property of John S. Livermore ("**JSL**"), all as indicated on Exhibit A.

D. Montesol is willing to grant to Tuleyome and its employees and agents, and specified other parties and their employees and agents with whom Tuleyome may enter into contracts to implement the Project ("**Permitted Parties**"), a temporary license for ingress and egress to and from the Project Site from the date of this License for the duration of the Project ("**License Term**"), subject to the terms and conditions of this License.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereby agree as follows:

LICENSE

1. Grant of License. Montesol hereby grants to Tuleyome a nonexclusive temporary license over the Road for the purposes of ingress and egress to and from the Project Site by the Permitted Parties during the License Term ("**License**").

2. **Access.** Access under the License may be controlled and restricted pursuant to such protocols as Montesol may reasonably establish and communicate to Tuleyome in writing from time to time for the protection of Montesol and its partners, employees and agents, the Montesol Property and the Road, including without limitation the following initial controls and restrictions:

(a) No Permitted Parties other than Tuleyome shall be granted or allowed access under the License unless and until they have been specifically identified, in writing or orally to be promptly followed by a writing (including email), to the Managing Partner of Montesol or a designated agent of Montesol ("**Designated Agent**"), and unless and until each such Permitted Party has agreed in writing to be bound by the terms and conditions of the License as set forth in this Agreement. For this purpose, Justin Smith (jsoathill@gmail.com; Home Mobile: (707) 486-6367; Other Phone: (707) 987-9420) is hereby designated Montesol's agent.

(b) Access for Permitted Parties shall be limited to purposes of ingress and egress directly related to the planning, execution and monitoring of the Project, and not for any other purposes (such as hiking, wood cutting, hunting or any other personal recreation).

(c) Access to the Road and other property owned by Montesol is controlled by a locked gate, shown as the "**Yellow Gate**" on Exhibit A. Tuleyome shall, and Permitted Parties may be, given the combination, keys, gate codes or other means of access through the Yellow Gate, but the Yellow Gate shall be kept closed and locked at all times. Montesol reserves the right to change the combinations, keys, gate codes, and other means of access following reasonable notice to Tuleyome, in which case Montesol will provide Tuleyome with replacement combinations, keys, gate codes or other devices to permit continued use of the License by Permitted Parties.

(d) Montesol may install and maintain additional gates and/or other security device on the Road at its sole cost, provided Montesol provides Tuleyome with the combinations, keys, access codes, or other means for gaining access through such gates or devices as necessary to permit continued access under the terms of the License.

(e) Permitted Parties shall make reasonable efforts to provide Montesol or its Designated Agent at least forty eight (48) hours prior notice of their intent to access the Project Site along the Road, identifying the Permitted Parties and number and type(s) of vehicles to be expected. Any issues relating to the logistics of access under the License shall be coordinated with the Designated Agent.

(f) Access shall be limited to travel by foot or by vehicles appropriate for the Road so as to minimize rutting or other damage to the Road, or the stranding of vehicles unsuitable for the terrain. Access during and following periods of heavy rain may be limited or prohibited by Montesol or the Designated Agent if travel along the Road during such periods, particularly involving heavy vehicles or transporting supplies or equipment, may be reasonably expected to result in damage to the Road.

(g) Parking along the Road or elsewhere on Montesol Property shall not be permitted, except in emergency situations

(h) Use of the Road, all access under the License and this Agreement, the Project, and the work in connection with the Project all shall be undertaken and performed in full compliance with all applicable federal, state and local laws and ordinances.

3. Maintenance and Repair Costs. During the License Term, Tuleyome shall maintain, and shall cause the Permitted Parties to maintain, the Road (including related drainage ditches and culverts) in substantially the same condition and state of repair as of the date of this Agreement, normal wear and tear excepted. Tuleyome shall, or shall cause such Permitted Party as it may designate to, pay or reimburse Montesol for any reasonable costs incurred for the maintenance and repair of the Road during the License Term, except for maintenance and repair costs required due to the negligence, willful misconduct or abuse of the Road by Montesol or its employees or agents, or by other third parties who may have access along the Road through permission or license from Montesol.

4. Impairment; Alterations. Tuleyome agrees not to take, or permit any Permitted Party or other party to take, any action in connection with the Project or access under the License that would impair the value, condition or use of the Road or the Montesol Property. Tuleyome shall not, and shall not allow any Permitted Party to, make any alterations, modifications or improvements to the Road without the prior written consent of Montesol.

5. No Warranties. The parties acknowledge that the Road is an unpaved, rural and rough road located in steep terrain on private property, and that is not maintained by any federal, state or local agency and does not comply with the road design and safety standards that would apply to a public road. Montesol makes no representation or warranty, express or implied, regarding the safety or adequacy of the Road for the purposes for which the License is granted hereunder, and Tuleyome acknowledges that it is not relying upon any statements, representations or warranties made by Montesol or its employees or agents to that effect.

6. Indemnification. Tuleyome shall indemnify, hold harmless, defend and protect Montesol and its partners, employees, agents, successors and assigns against and from any and all loss, claim, cost, liability, damage, injury, death, or expense, including, without limitation, reasonable attorneys' fees (collectively, "**Damages**"), resulting from, arising out of or in any way connected with use of the Road, the access provided under this Agreement, the Project, any breach of the License or this Agreement, or any other activities, actions or failures to act, by Tuleyome, any Permitted Party or their respective employees, agents, contractors, subcontractors, invitees, successors or assigns, except for any such Damages resulting solely from the active gross negligence or willful misconduct of Montesol or its employees or agents.

7. Insurance.

(a) Tuleyome shall obtain and maintain during the License Term the following insurance coverages:

- Worker's Compensation (and Employer's Liability Insurance) — as required by applicable state statute.
- Commercial General Liability — \$1,000,000 per occurrence for bodily injury, including death and property damage, and \$2,000,000 in the aggregate.
- Automobile Liability — minimum of \$1,000,000 combined single limit for bodily injury and property damage.
- Professional Liability (E&O) and Professional Pollution Liability and Contractors' Pollution Liability — \$1,000,000 each claim and in the aggregate.

(b) All such insurance shall be on an incurrence basis, and shall be placed with a company or companies reasonably satisfactory to Montesol. Such insurance shall insure against all liability of Tuleyome and its employees and agents arising out of and in connection with use of the Road, the License, the Project and performance by Tuleyome of the indemnity provisions of Section 6, all as provided for in this Agreement, and shall be primary as respects Montesol such that any insurance maintained by Montesol shall be excess of and non-contributory with that of Tuleyome. Each such policy shall provide that it shall not be cancelled or changed in coverage or scope except upon at least thirty (30) days prior written notice to Montesol. Certificates of insurance, showing Montesol and its partners, employees and agents as additional named insureds shall be delivered to Montesol promptly following execution of this Agreement and upon reasonable request periodically thereafter during the License Term.

(c) In addition to the above insurance requirements, Licensee shall include all Permitted Parties as additional named insureds under its policies, or shall require all Permitted Parties to provide all insurance coverages as described above and certificates of insurance evidencing the same.

8. Property Taxes. All real property taxes and assessments for the Montesol Property and the Road shall be borne by Montesol; provided that Tuleyome shall pay, or shall cause the appropriate Permitted Party to pay, any fees, costs, assessments or increases in property taxes imposed on Montesol, the Montesol Property or the Road in connection with or as a result of the Project or any related actions of any Permitted Party.

9. Term. This Agreement shall continue in full force and effect during the License Term, unless this Agreement is amended, modified or terminated by an agreement executed and delivered by the parties hereto.

10. No Public Dedications; No Recording. Nothing in this Agreement is intended to be or shall be deemed or construed to be a gift or dedication of any portion of the Road or any other portion of the Montesol Property to Tuleyome or any other party for any public use or nonprofit benefit purpose. This Agreement shall not be recorded.

11. No Third Party Beneficiaries. This Agreement is only for the benefit of the parties hereto and their successors-in-interest or permitted assigns as set forth in this Agreement. No other person or entity or property shall be entitled to rely hereon, receive any benefit herefrom or enforce any provision hereof against any party hereto (or the permitted assigns of Tuleyome or successors-in-title to Montesol, respectively).

12. Notices. Any notice required or permitted to be given under this Agreement shall be in writing (which may include electronic means) and shall be deemed to have been delivered when received by personal delivery or electronically, or on the date two days after being deposited by registered or certified mail, postage prepaid, return receipt requested, or with Federal Express or a comparable courier, and addressed as set forth above (or such other address or email contact as either party may specify to the other by notice meeting the conditions of this Section 11).

13. Binding Effect; No Assignment; Governing Law. This Agreement and all covenants and restrictions contained herein shall, to the fullest extent permitted by law and equity and without regard to technical classifications or designations, be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns. Without the prior written consent of Montesol, Tuleyome may not assign its rights or benefits under this Agreement to any third party, except to Permitted Parties to the extent provided herein, or with the prior written consent of Montesol or its successor-in-title to the Montesol Property. This Agreement shall be governed and construed in accordance with the laws of the State of California.

14. Severability. If any one or more of the provisions contained in this Agreement is for any reason held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any other provisions of this Agreement, and this Agreement shall be construed as if such invalid, illegal or unenforceable provision had never been contained in this Agreement.

15. Construction. The parties acknowledge that each party and its counsel have reviewed this Agreement and that the normal rule of construction to the effect that any ambiguities are to be resolved against the drafting party shall not be employed in the interpretation of this Agreement or any amendments or exhibits.

16. Attorneys' Fees. In the event that either party to this Agreement shall bring legal action in order to enforce any of its provisions, the prevailing party shall be entitled to recover from the other party the reasonable attorneys' fees and costs incurred by the prevailing party in enforcing its rights under this Agreement.

17. Entire Agreement. This Agreement, including the recitals and the attached Exhibit A, constitutes the entire agreement between the parties with respect to the grant of the License and all matters to the License and use of the Road.

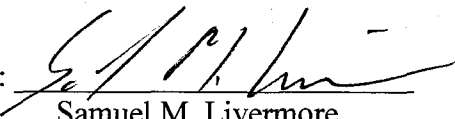
18. Amendments. This Agreement may be amended, modified or supplemented only by a written document executed by all of the parties hereto.

19. Counterparts. This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties have executed this Nonexclusive Temporary Access License Agreement effective as of the date first above written.

"MONTESOL"

NORMAN B. LIVERMORE & SONS,
a California general partnership, dba Montesol Company

By: 
Samuel M. Livermore
Managing Partner

"TULEYOME"

TULEYOME, INC.
a California nonprofit public benefit corporation

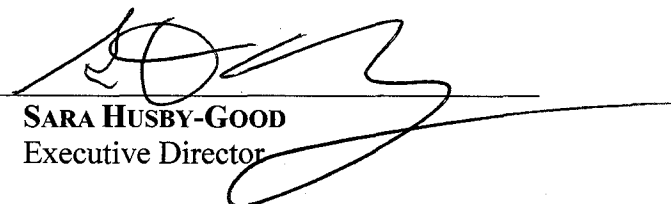
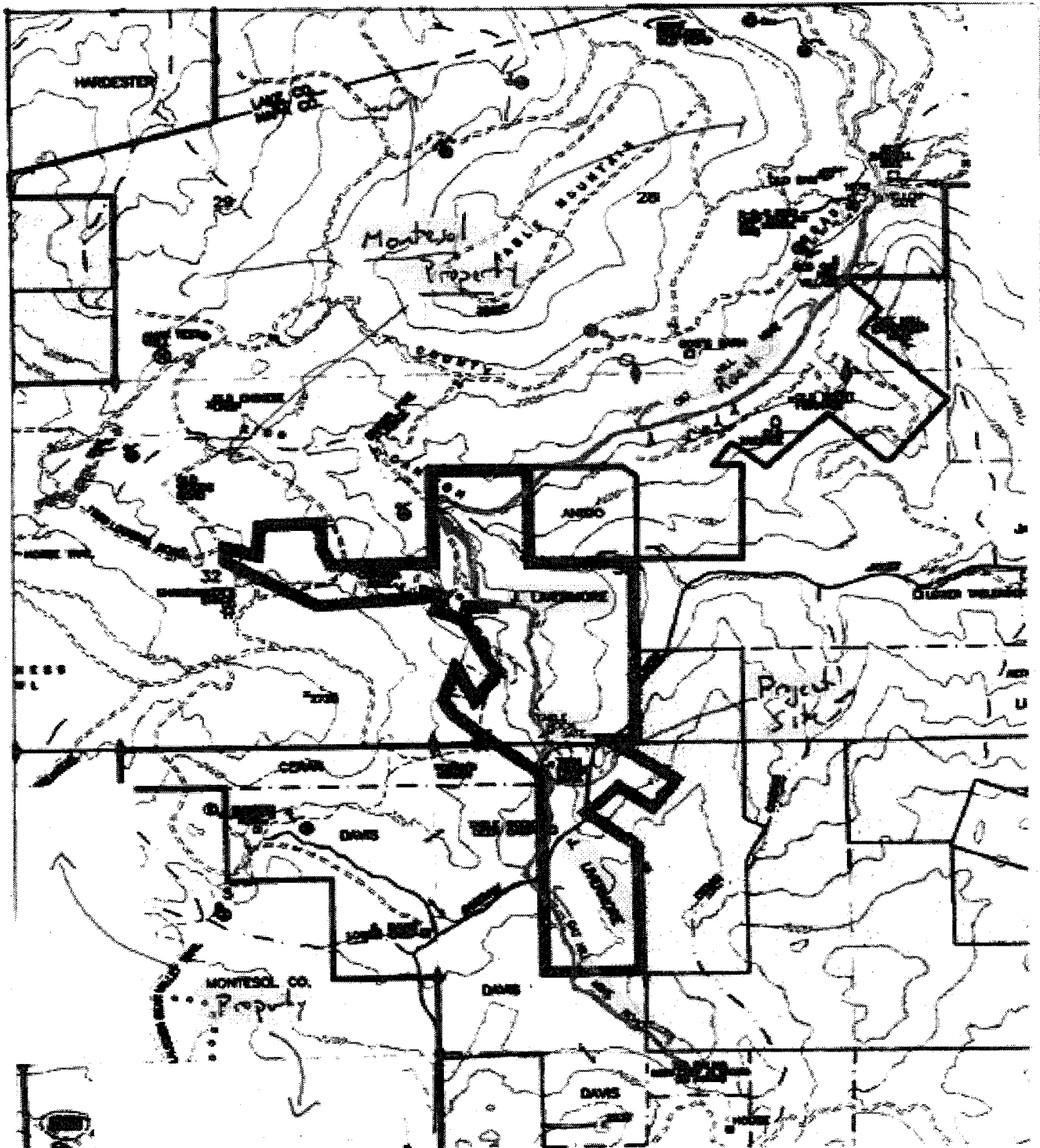
By: 
SARA HUSBY-GOOD
Executive Director

EXHIBIT A
To
NONEXCLUSIVE ACCESS LICENSE AGREEMENT



CORONA AND TWIN PEAKS MINE DRAINAGE TREATMENT PROJECT

**DEPARTMENT OF FISH AND WILDLIFE
ECOSYSTEM RESTORATION PROGRAM GRANT**

ERP Grant #: E1183005

**California Water Code, Chapter 5.7
Remediation Work Plan**

Prepared For:
Tuleyome, Inc.
607 North Street
Woodland, California 95695

Prepared By:
Burleson Consulting, Inc.
950 Glenn Drive, Suite 245
Folsom, California 95630

Remediation Work Plan

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1.0 Identification of the Remediating Agency

Division 7, Chapter 5.7 of the California Water Code was enacted by the California legislature to protect the public and waterways of the state from discharges at abandoned mine sites. The Legislature found that thousands of abandoned mines in California may contain waste including acid rock drainage that has a devastating effect on aquatic life and has degraded some major California water bodies, §13397(a)(1); complete elimination of acid rock drainage is not currently possible because acid rock drainage production can continue for centuries after mine abandonment and is difficult to control, §13397(a)(2); Cleanup of this waste for protection of the public and waterways of the state should be facilitated by limiting the financial responsibility for that cleanup, §13397(a)(3); and public agencies or private parties who are not otherwise legally responsible for the abandoned mined lands are reluctant to remediate abandoned mined lands without assurance that they will be responsible only for completion of the remedial work they undertake, §13397(a)(4).

Chapter 5.7 includes in the definition of a remediating agency at §13397.5(f) “... *any public agency, or private individual or entity acting under a cooperative agreement with a public agency, that prepares and submits a remediation plan in accordance with this section...*” Tuleyome is a non-profit volunteer organization focused on protecting the wild and agricultural heritage of the Inner Coastal Range and Western Sacramento Valley for current and future generations. Tuleyome is interested in addressing wastes at the Corona and Twin Peaks mines sufficiently to allow safe public access so that a regional trail system can be completed through the area. Tuleyome recognizes the need to address acid rock drainage at abandoned mined lands in general, and has determined that there may be a way to identify a long-term solution to acid rock drainage at the Corona Mine and thereby contribute to protection of water quality in an impaired waterway (James Creek).

Tuleyome is neither an owner nor an operator and does not have control over the Corona or Twin Peaks mine sites or any of the adits or tunnels. Tuleyome is not legally responsible for, has no financial interest in, nor has participated in any mining (including exploration) associated with the Corona or Twin Peaks mine sites. Tuleyome has prepared this remediation plan in accordance with Chapter 5.7 §13398.3 and seeks to become a remediating agency at the Corona and Twin Peaks mines to facilitate implementation of this remediation plan without incurring additional responsibility. Tuleyome maintains offices at 607 North Street, Woodland, California 95695. Bob Schneider is a Senior Policy Director at Tuleyome, and is the Project Lead, (530) 350-2599, bschneider@tuleyome.org. Sarah Husby-Good is the Executive Director of Tuleyome.

2.0 Identification of Abandoned Mined Lands that are the Subject of the Remediation Work Plan

Figure 1 shows the project location, and Figure 2 shows the mine locations.

The Corona and Twin Peaks Mines are inactive mercury mines within the East Mayacmas Mercury District (Yates and Hilpert, 1946). The project is located on lands owned by the Corona and Twin Peaks

Historical Association, LLC. The project area comprises 32 acres of mining disturbed lands within a larger 8-parcel holding of 328.8 acres in northern Napa County. The property is located along Oat Hill Mine Road and includes Napa County Assessor's Parcel Numbers (APNs) 016-020-035, 016-020-026, 016-020-020, 016-020-027, 016-020-023, 018-010-006, 018-010-007, and 018-010-009. Corona Mine is in the northern portion of the project area and project features are predominantly located on parcels with APNs 016-020-035 and 016-020-020, and 016-020-026. Twin Peaks Mine is located in the southern portion of John Livermore's holdings and project features are predominantly located on parcels with APNs 018-010-006 and 018-010-007. Figure 3 shows the mines and parcel boundaries.

The sites are at an elevation of about 1,900 feet and the topography is relatively steep and forested. The mines are located about 0.75 miles apart along the Oat Hill Road. The sites are on contiguous parcels consisting of about 32 acres.

The Corona and Twin Peaks mercury mines are located in the East Mayacmas Mercury Mining District. Mining began at the Corona Mine in 1895 and continued through 1906. The Corona Mine was intermittently worked during 1941 to 1943, and was explored further in 1956 (US Bureau of Mines 1965). About 5,000 flasks of mercury were reportedly produced from the Corona Mine. About 2 miles of underground mine workings were reportedly developed at the Corona Mine.

The Twin Peaks Mine was operated from 1902 to 1907, 1915 to 1918, and 1941 to 1943 with a production of 200 flasks of mercury (US Bureau of Mines 1965). About 4,200 feet of underground mine workings were reportedly developed at the Twin Peaks Mine.

Waste rock and tailings piles are present at the Corona and Twin Peaks mines (Figure 4). The property owner has implemented best management practices including revegetation and diversion of runoff away from these mine wastes to reduce erosion and drainage formation. However, improvements to the vegetative cover and runoff controls are necessary at both sites to further reduce erosion and drainage.

The Boiler House Adit, and the Corona Drain Tunnel at the Corona Mine, and the Twin Peaks Adit at the Twin Peaks Mine are each point sources for mine drainage. The property owner previously constructed infiltration trenches that collect drainage from the Boiler House Adit, and Twin Peaks Adit. These infiltration trenches prevent contact of the mine drainage with mine wastes and prevent discharge of mine drainage to surface waters. The drainage infiltrates into the soil and bedrock at each site. Drainage from the Corona Drain Tunnel discharges directly to Kidd Creek.

The features to be addressed by Tuleyome include installing a pilot scale system to reduce the metal loading from the Corona Drain Tunnel, consolidation of mine waste, improvements to runoff controls, enhancing revegetation of waste rock and tailings at the Boiler House Adit and Twin Peaks Adit, and improvements to the existing infiltration trenches at the Boiler House Adit and Twin Peaks Adit.

3.0 Identification of the Waters of the State Affected by the Abandoned Mined Lands

Kidd Creek traverses the northern portion of the property and Bateman Creek traverses the southern portion of the property. Both creeks meet at a confluence to the east of the property forming James Creek. Kidd Creek drains the Corona Mine area, and Bateman Creek drains the Twin Peaks Mine area. James Creek originates at the confluence of Bateman and Kidd Creeks located about 0.25 miles downstream from the Corona Mine, and about 0.35 miles downstream from the Twin Peaks Mine.

James Creek is a tributary to Pope Creek that enters Lake Berryessa, a sport fishery and source of drinking water about 13 miles downstream from the Sites. The affected surface waters are Kidd Creek, Bateman Creek, James Creek, and Pope Creek. James Creek is included on California's 303(d) list as impaired for mercury and nickel.

4.0 Description of the Physical Conditions at the Abandoned Mined Lands That are Causing Adverse Water Quality Impacts

Sampling of drainage at the Corona Drain Tunnel by Regional Board staff in 1997 identified iron and nickel in the drainage and Kidd Creek downstream from the tunnel that were elevated above water quality criteria. A 2002 technical report concluded that nickel concentrations downstream from Twin Peaks Mine periodically exceeded the chronic aquatic life water quality criterion (MFG 2002). Results from field investigations completed during 2003 and 2004 by the US Geological Survey, and EnviroGeo during 2007 documented that the Corona and Twin Peaks mines release iron, sulfate, nickel, and mercury to the James Creek watershed (USGS 2007, EnviroGeo 2007).

Mine wastes that include waste rock and calcined tailings at both of the mine sites are present on steep slopes adjacent to seasonal drainages (surface water runoff occurs only during and immediately after rain events). Metals and salts present in the mine wastes could be mobilized to surface water through erosion and transport downhill, and/or through dissolution of soluble materials and transport in runoff to surface water. Existing systems to control potential transport of contaminants from mine wastes to surface water at the sites are described below.

The Boiler House Adit discharges mine drainage at about 5 to 50 gpm. Drainage flow varies seasonally with rainfall and the observed peak flow was 80 gpm based on observations since 2003. Boiler House Adit drainage pH varies from about 4.8 standard units (SU) to 6.8 SU and contains iron (4.7 mg/L to 14 mg/L) and nickel (3.2 mg/L to 3.5 mg/L) above water quality criteria. Boiler House Adit drainage has been effectively controlled by diversion to an infiltration trench since 1998 (see below). Existing systems to control Boiler House Adit drainage are described below.

The Twin Peaks Adit discharges mine drainage at about 2 to 35 gpm. Drainage flow varies seasonally with rainfall and the observed peak flow was 60 gpm based on observations since 2003. Twin Peaks Adit drainage pH varies from about 4 SU to 7 SU and contains iron (0.4 mg/L to 9 mg/L) and nickel (1.2 mg/L to 1.5 mg/L) above water quality criteria. Existing systems to control Twin Peaks Adit drainage are described below.

Corona Drain Tunnel discharges about 25 gpm to 60 gpm seasonally with 100 gpm peaks during extreme rain years based on observations since 2003. Corona Drain Tunnel pH varies from about 3 SU to 6 SU and contains iron (62 mg/L to 130 mg/L) and nickel (4.0 mg/L to 5.4 mg/L) above water quality criteria. Proposed systems to reduce metal loading from the Corona Drain Tunnel drainage are described below.

5.0 Description of the Practices Proposed to Reduce, Control, Mitigate, or Eliminate the Adverse Water Quality Impacts

Practices to reduce, control, mitigate or eliminate the adverse water quality impacts at Corona and Twin Peaks mine sites are described for existing and proposed systems. The property owner has implemented existing systems to reduce and eliminate adverse water quality impacts resulting from discharge of drainage from the Boiler House and Twin Peaks adits, and resulting from interaction of mine drainage with mine waste at the sites. Tuleyome is proposing to enhance these existing systems and to complete a pilot scale subsurface chemical amendment system to reduce metal loading from the Corona Drain Tunnel.

5.1 Existing Systems

Existing systems are the best management practices (BMP) used to reduce potential impacts from mine waste piles at the Twin Peaks and Corona mines, and the infiltration trenches used to control mine drainage at the Twin Peaks and Boiler House adits. These existing systems are present at the sites and are not managed or controlled by Tuleyome.

5.1.1 Best Management Practices

BMPs implemented at the Corona mine include diversion of seasonal surface water flows away from mine waste, use of swales and check dams to slow runoff velocity and minimize sediment transport, grading to control the flow of water and minimize erosion, and establishing native plant cover on exposed surfaces. The best management practices are consistent with provisions of Title 27, Chapter 7, Subchapter 1. Mining Waste Management describing precipitation and drainage controls (§22490(h)).

Run-on Diversion. Figure 5 shows the Corona Mine including locations of pre-diversion drainage flow and the current run-on diversion system and the Corona Drain Tunnel. Prior to diversion of run-on, seasonal flow originating uphill from the Boiler House Adit flowed across waste rock and tailings, contributing to erosion and off-site transport of mine waste, and creation of mine drainage. The existing diversion system consists of an unlined channel that directs surface water through a 'trash rack' and into a culvert which prevents contact of the water with the waste rock. The culvert discharges to the original drainage course located south of the tailings pile.

Figure 6 shows the Twin Peaks mine including the locations of pre-diversion drainage flow and the current run-on diversion system. Before diversion, runoff from the slopes above the site flowed across the calcine tailings contributing to erosion and off-site transport and creation of mine drainage. The existing diversion system consists of a subsurface pipe that separates runoff from the mine waste and conducts it to the north edge of the tailings where the water flows into a natural drainage to Bateman Creek, minimizing contact with the tailings.

The existing run-on diversion systems prevent contact of run-on with waste rock and tailings. This has minimized the amount of mine drainage created at the sites and reduced the erosion and transport of waste rock and tailings from the site.

Erosion Controls. Erosion controls at the Corona Mine consist of berms at the top of the waste rock and grading of the road through the tailings pile (Figure 5). Berms at the top of the waste rock interrupt sheet flow and direct the water away from the waste rock and onto nearby forested slopes. Prior to creation of the berms, this water flowed onto the waste rock contributing to erosion and creation of drainage. The road through the tailings was regraded to direct water away from the seasonal drainage south of the tailings and into the rock lined swale. Prior to regrading, runoff from the road entered the seasonal drainage. The berms help to control erosion by directing water away from the waste rock. The regraded road surface protects underlying tailings from erosion and directs runoff to the rock lined swale.

Erosion controls at the Twin Peaks mine consist of benches on the mine waste, and berms and water bars (Figure 6). The benches slow the velocity of sheet flow and disperse the flow resulting in settling of sediment on the benches, and reduction of erosion and transport. The berms are located at the down slope edge of the bench and direct sheet flow away from the loose slope on tailings. The water bar directs runoff from an old haul road away from the tailings.

Run-off Controls. Run-off controls consist of a rock lined swale and check dams installed within the tailings pile at the Corona Mine. The swale collects run-off from the tailings and the check dams slow the runoff to allow settling of suspended particles. Prior to construction of the swale, runoff from the tailings flowed overland to adjacent drainages and down slope. This overland flow allowed erosion and transport of tailings to Kidd Creek. The swale extends along the middle of the tailings pile and conducts runoff to a settling basin at the toe of the tailings pile (Figure 5). The swale and check dams reduce erosion and transport of tailings by intercepting the overland flow and providing for settling of suspended particles at the check dams.

Revegetation. Revegetation at the Corona and Twin Peaks mines consists of plantings of locally collected seeds from native grasses, forbs, shrubs, and trees that grow on the mine waste and along the infiltration trenches. Some surfaces on waste rock and tailings (other than roads), and some slopes are revegetated with native shrubs, grasses, and trees. Revegetation stabilizes the soil helping to prevent erosion and off-site transport of mine waste. The plants also transpire water reducing the quantity of drainage that is generated. Plants were initially irrigated using an irrigation system. This irrigation system remains in place and can support additional revegetation efforts if necessary.

Plants established along infiltration trenches help to stabilize soils used to make the trench, and transpire water.

5.1.2 Infiltration Trenches

Infiltration trenches are used to prevent overland flow of mine drainage at the Boiler House Adit, and Twin Peaks Adit (Figure 5 and 6). Prior to trench construction, drainage from each of the adits flowed across and through mine waste. The trenches receive all of the drainage at each of the sites and prevent

contact of the mine drainage with waste rock or tailings. Infiltration of the drainage through native soil and rock also prevents overland flow of the mine drainage to surface water. Drainage is intercepted at the mouth of each adit and routed through a pipeline into the trench at each site. Multiple valves and check dams within each trench are used to direct drainage into specific trench segments to allow maintenance, if necessary, while continuing to control the drainage. The infiltration trenches comprise Group B mine waste management units in accordance with Title 27, Chapter 7, Subchapter 1. Mining Waste Management (§22480).

Trench characteristics are summarized in the table below.

Location	Length (feet)	Depth (feet)	Bedrock	Drainage Flow (gallons per minute)
Boiler House Adit	435	3 to 4	Sandstone	5 to 50
Twin Peaks Adit	600	2 to 3	Serpentine	2 to 35

Monitoring wells are present adjacent to the Corona infiltration trench (Figure 4 inset). The wells were constructed by drilling to the depth of refusal (7.5 to 15 feet below ground surface), installing a perforated polyvinylchloride well screen at the lower 5 feet threaded to a blank casing, and backfilling the borehole to the surface. Groundwater is measured within only three of the wells (MW-3, MW-5, and MW-7) during the winter months despite their close proximity to the infiltration trench. In addition to monitoring wells, the slopes below the infiltration trench are periodically inspected for signs of seepage (aquatic vegetation, vigorous vegetation during the dry season, and wet or moist soil). One seasonal seep has been observed downhill from the Corona infiltration trench. This seep dries up during the annual summer drought. Lack of groundwater in the monitoring wells, and lack of persistent moisture on the slopes below the infiltration trench is herein interpreted as evidence that the acid rock drainage infiltrates to bedrock beneath the infiltration trench. Infiltrating water from the Corona trench is expected to ultimately migrate to the Corona Drain Tunnel (the drain tunnel crosses under the Corona trench about 430 feet beneath the trench bottom) along foliation and fractures of the intervening rock. Thus, any impacts of the infiltrating water are detectable in the drain tunnel drainage.

Monitoring wells are not present at the Twin Peaks infiltration trench. However, the slopes below the infiltration trench are periodically inspected for signs of seepage (aquatic vegetation, vigorous vegetation during the dry season, and wet or moist soil). No evidence for seepage from the Twin Peaks infiltration trench has been observed and the acid rock drainage is considered to infiltrate to bedrock beneath the infiltration trench. Infiltrating water beneath the Twin Peaks infiltration trench is expected to ultimately seep to Bateman Creek down slope from the infiltration trench via foliation and fractures in the intervening rock. Thus, monitoring of water quality in Bateman Creek up and downstream from the Twin Peaks Mine would detect any impacts of the infiltrating water.

5.2 Proposed Systems

Proposed systems are installation of a pilot system to implement subsurface chemical amendment with the goal of reducing the metal load from Corona Drain Tunnel drainage; consolidation of mine waste, revegetation of remaining bare slopes within the calcine tailings piles at Corona and Twin Peaks Mines,

and replumbing of the infiltration trenches at the Boiler House and Twin Peaks adits to provide for more effective and efficient management of variable flows over time, and for management of iron-rich precipitates if necessary.

5.2.1 Mine Waste Consolidation and Stabilization

Consolidation of mine waste will involve moving about 200 cubic yards of mine waste at the Corona calcine pile from its current location to an area within the main pile (Figure 5). This action will reduce the area of mine waste at the site, directly reducing the area of the material available to generate drainage by about 3,000 square feet. Stabilization will include grading up to 100 cubic yards of mine waste at the Twin Peaks mine to reduce the surface area, minimize traffic related disturbances of the mine waste, and stabilize the slope (Figure 6). The areas disturbed by consolidation and stabilization will be then be revegetated as part of the project.

5.2.2 Revegetation

Revegetation will include soil amendment and planting native grasses, shrubs, and forbs propagated from locally collected seed. Revegetation is expected to reduce the amount of erosion from the waste rock and calcined tailings piles, and decrease the amount of infiltration thereby reducing the production of drainage from the mine waste. Minimizing erosion and the amount of the drainage will improve water quality in Kidd and James creeks by preventing the associated sediment and metals (including nickel and mercury) from entering the surface water.

Revegetation efforts will include evaluating soil conditions that limit plant growth. Such conditions present at the sites include excess acidity, compaction, excess drainage and seasonal dryness, and miscellaneous nutrient imbalances. Potential treatments to address these conditions will include neutralization of acidity, mechanical de-compaction using either hand held power tools or heavy equipment as appropriate for the site, introduction of finer soil materials or deep rooting conduits for dry areas, and low rates of nutrient amendment appropriate for supporting native plants and limiting weed growth. Treatments will be applied on an as-needed basis recognizing the natural, modest fertility character of the site in general. Plants that actively transpire larger amounts of soil moisture will be a priority for establishment. On steeper slopes at or near the angle of repose, special care will be taken to deeply inject soil amendments with minimal surface disturbance, typically not much more than a foot path for access. Deep placement of amendments (as needed) helps establish woody shrubs that increase the structural stability of the site and cover a larger area of the bare surface as their canopy matures. Appropriate treatments are generated based on ambient acidity, moisture retention and nutrient conditions.

5.2.3 Improvements to Existing Infiltration Trenches

Improvements to the existing infiltration trenches at the Boiler House and Twin Peaks portals will consist of installing settling basins to facilitate effective solids management, re-plumbing the distribution systems at each site, and improving vegetation at each trench. Re-plumbing will allow more effective operations under seasonal changes in flow, improved level controls between trench reaches, and facilitate isolating separate reaches of each trench for maintenance such as widening and sloping trench bottoms. Improved vegetation along the infiltration trenches will increase stability of slopes below the

trenches, and increase the amount of water that is transpired. In addition, access to the trenches will be improved to increase worker safety. Diversion of runoff from slopes above the trenches would also be completed at locations where concentrated flow enters the trenches.

5.2.4 Subsurface Chemical Amendment

Subsurface chemical amendment, if determined to be effective at the Corona Mine, would identify a method to substantially reduce the metal loading from the Corona Drain Tunnel through introduction of chemicals to change the chemical environment and prevent mobilization of metals at the source. Effectiveness of this technique at Corona Mine would be determined through performance of a tracer study and subsequent pilot scale operations. The tracer study would use the travel time and concentration of a non-toxic tracer released at the source area and detected in Corona Drain Tunnel drainage to evaluate chemical dosing rates for subsurface chemical amendment. This pilot study would be performed in the subsurface at the site (in-situ).

The tracer study would be performed by first advancing bore-holes to the vicinity of underground mine workings at the level of the Boiler House Adit, and a stope (mine void) located beneath Tunnel No. 1. The Boiler House Adit level is referred to as the '1,853' level on site mine maps based on the elevation of the tunnel. A significant ore body and stope (void created during mining) associated with the 1,853 level are shown on mine maps and cross sections (Figure 7). The bore hole would be advanced at an angle from the ground surface using a drilling technique that will allow identification of the geologic materials encountered during drilling. The location of the drill bit would be monitored during drilling, and the borehole length will be compared to projected distances from the surface location to the ore body and stopes. The goal of advancing the borehole would be to encounter saturated mineralized rock, complete the borehole to allow application of tracers, and later application of sodium hydroxide and ethanol to amend subsurface chemical conditions. At least two boreholes are currently envisioned advancing 250 feet and 400 feet to two different targets in the subsurface.

The boreholes would be converted into cased remediation wells for use in applying subsurface chemical amendments during pilot scale and future full scale operations. Pilot scale operations would allow evaluation of the chemical dosing rates, design, and operation of the full scale chemical delivery system. While short term (about 60 to 90 days), pilot scale operations (if successful) are expected to provide longer term improvement in water quality by initially precipitating metals, and then impeding oxidation of the sulfide minerals beyond the duration of the pilot operations. Metal bearing precipitates are anticipated to remain within the fractures and foliation through which groundwater currently migrates. The goal of the pilot study is not so much to precipitate metals, but instead to prevent metal mobilization via amending the subsurface chemical environment. Substantial intermediate improvement of water quality could be attained through the pilot activities via armoring of some reactive sites within the source area for the drainage. Substantial long term improvement of water quality could be then attained via longer term implementation of the technique. The duration of water quality improvements expected from the subsurface chemical pilot scale dosing is uncertain without the quantitative results from the tracer study.

The chemical used for the initial tracer study will be detergent that contains a brightener chemical, disodium diaminostilbene disulfonate, which will be released into the borehole and measured in the outfall at the Corona Mine Drain Tunnel Portal. This chemical is reported to be stable under acidic conditions, and is detectable using the analytical technique fluorescence spectroscopy (fluorometry). If the tracer chemical is detected in the outfall discharge at the Corona Drain Tunnel Portal within a residence time of about one day, then the addition of an organic lipid, such as ethanol, will be used to stimulate the growth of sulfate-reducing bacteria within the mine. Ideally, if the reducing conditions can be established within the mine, the metals will be removed by the sulfate reduction and sulfide precipitation. This would be the preferred method to precipitate metals because metal sulfides have a low solubility at near-neutral pH. However, if the tracer test indicates a longer residence time before the tracer chemical is detected in the Corona Drain Tunnel Portal discharge, then this condition would not be considered adequate for sulfate-reducing bacteria and the pH will be reduced using sodium hydroxide. This would then increase the availability of sulfide for precipitation. Even if sulfate-reducing conditions using ethanol cannot be established, the majority of metals (95% plus) would still be precipitated by hydroxide precipitation with the addition of sodium hydroxide. Therefore, the following parameters will be measured in the discharge at the Corona Drain Tunnel Portal: tracer chemical in detergent solution, metals, pH, sulfate, alkalinity, oxidation-reduction potential, and organics (organic lipids or ethanol).

Jar tests in which sodium hydroxide was used to neutralize drain tunnel drainage were performed and identified that metals were precipitated and the pH raised to circum-neutral (TKT 2013). The application rate for any chemicals used to amend subsurface chemical conditions will be carefully estimated based on the results of the tracer study, and site water chemistry. This will be done to minimize the likelihood for mobilizing metals such as manganese that may be present naturally within the subsurface or creating extreme chemical conditions such as elevated pH. Monitoring of drain tunnel discharge during and after the pilot test would also provide for direct measurement of any metals mobilized by the pilot test or presence of extreme chemical conditions.

5.2.5 Implementation Plan

Construction will occur in phases including mobilization, site preparation, mine waste, consolidation at the Corona Mine, expanding the revegetated area at each site, re-plumbing of infiltration trenches, site restoration, and demobilization. Construction will occur in accordance with a site management plan and site safety plan that are provided as components of the implementation plan outlined in Attachment I. The implementation plan will also identify mitigation measures necessary to avoid significant impacts to the environment. Construction equipment will include, but not be limited to, a bulldozer, backhoe, dump truck, loader, all-terrain vehicle, drill rig, and standard pickup truck. Other equipment will include a compact concrete mixer, hydro-mulcher, and welder.

5.2.6 Operation and Maintenance Plan

Operations will consist of commissioning, shake down operations, and routine operations and maintenance. Operations will begin as construction ends with infiltration system commissioning.

Commissioning activities will consist of leak testing the new plumbing at each infiltration trench, confirming that valves and control structures along the trenches are functioning as intended, and verifying that water is infiltrating to the subsurface beneath the trenches.

Shake down operations will consist of a three week period during which daily observations of the pipeline, and infiltration trenches will be made to confirm system operations.

Routine operations will consist of those periodic activities necessary to ensure that the infiltration systems operate as intended. Routine operation and maintenance activities are anticipated to commence about one month after construction is complete. The Operation and Maintenance (OMM) Plan will be prepared after shake down operations are completed. Routine operations are anticipated to consist of periodic visual inspections of the pipeline and trenches, and periodic flow adjustments at the valves along each trench in response to changing flow conditions. Maintenance activities are anticipated to consist of semi-annual pipeline clean out, quarterly inspection and debris clearing along the trenches, and monthly monitoring of slopes below the infiltration trenches.

5.3 Implementation Schedule

Project construction is planned to begin in Fall 2013 and requires about 9 months with completion expected by Summer 2014. The project will be completed in eight overlapping phases, estimated as follows: (1) minor grading of roads to ensure safe passage of vehicles and equipment (September 2013); (2) improving existing infiltration systems (September to August 2013); (3) consolidating mine waste and grading (September 2013); revegetation (March through October); (4) installing bat-friendly gates on portals and adits, and installing fences around upper Corona Mine ore processing area and furnace (June 2014); (5) completing surface drainage work to stabilize and divert water before the rainy season (September to November 2013, and 2014 as warranted); (6) Revegetation (September 2013 to June 2014); Completing and evaluating a tracer test, then designing and implementing an appropriate subsurface chemical amendment study at the Coronal Drain Tunnel (September 2013 to March 2014); (8) providing erosion control (September 2013 to June 2014).

6.0 Analysis Demonstrating That Implementation is Expected to Cause Substantial Improvement in Water Quality for the Identified Waters

The baseline condition for assessing substantial improvement in water quality for Kidd Creek and James Creek is the current condition. Current conditions are evaluated with respect to the features addressed by this remediation work plan: consolidation and revegetation of mine waste, control of drainage at the Coronal Drain Tunnel, and improvements to existing systems.

6.1 Mine Waste Consolidation and Stabilization

This project includes consolidation of mine waste at the waste rock and calcined tailings present at the Corona and Twin Peaks mines. The mine waste piles are considered to be existing mining units in accordance with Title 27, Chapter 7 §22470. Total and leachable metal concentrations available for mine waste at the Corona and Twin Peaks mines are summarized in Table 1. Total concentrations of

metals in waste rock and tailings at the Corona and Twin Peaks mines are below the total threshold limit concentration (TTLC) for all metals except mercury. Mercury is present above the 20 mg/kg TTLC in each of the four waste rock and tailings samples (250 mg/kg to 840 mg/kg total mercury). Soluble threshold limit concentration (STLC) criteria for waste classification are also compared with California waste extraction test (WET) extract analyses in Table 1. All WET metals results are reported below the STLC criteria for mine waste in extracts from Corona and Twin Peaks mine waste. Distilled water (DI) WET extract metal analyses are also summarized in Table 1 and compared with retardation factors estimated using site specific soil properties and the VZCOMML model. The quotient of the DI WET extract metal concentrations to the retardation factors for each metal is less than water quality criteria, thus, the mine wastes are not expected to yield leachate concentrations that would threaten groundwater quality (the mine wastes are not a designated waste).

Results of acid base accounting show that waste rock at the Corona Mine, and calcined tailing at the Twin Peaks Mine have a low potential to generate acidic leachate (Acid neutralization potential (ANP):Acid generation potential (AGP) > 1). The calcined tailings at the Corona Mine have a ANP:AGP of about 0.5 and could generate acid drainage.

Based on the mine waste characterization information presented above, the mine waste may be classified as Group B mine waste as defined in California Code of Regulations (CCR) Title 27, without taking any other factors into consideration. Per Section 22480(C) of CCR Title 27, which pertains to the management of mining waste, mine waste classification should also consider concentration of hazardous constituents, acid generating potential, and properties of the waste that make it readily containable by less stringent measures. While the mine wastes at the Corona and Twin Peaks mines contain total mercury above the TTLC, this mercury is relatively stable, does not contribute to leachate that exceeds hazardous waste criteria, and does not leach mercury or other constituents at concentrations that would threaten water quality under site conditions. Thus, so long as the mine wastes are protected from erosion and transport to surface waters, they would not pose a threat to water quality. Because the mercury and other constituents pose a low threat to water quality under site conditions, so long as erosion and transport of the material to surface water is prevented, they could be considered as Group C waste. Potential threats to water quality from mine wastes at the Corona and Twin Peaks mines are readily containable by measures that are less stringent than those required for Group B waste. Mine wastes at the Corona and Twin Peaks mines should continue to be managed as Group C waste in mine waste units under Title 27.

Consolidation of mine waste will involve moving about 200 cubic yards of mine waste at the Corona calcine pile (Figure 3) from its current location to an area within the main pile. This action will reduce the area of mine waste at the site, directly reducing the area of the material available to generate drainage by about 3,000 square feet. Stabilization will include grading up to 100 cubic yards of mine waste at the Twin Peaks mine to reduce the surface area, minimize traffic related disturbances of the mine waste, and stabilize the slope. The areas disturbed by consolidation and stabilization will then be revegetated as part of the project.

6.2 Revegetation

Current conditions of the waste rock and tailings piles at each site include areas that are devoid of vegetation. Such bare areas are subject to erosion that can lead to off-site migration of metal laden particulates in air and water, and high rates of infiltration that can lead to creation of metal laden drainage. Existing data collected by USGS (2007) and EnviroGeo (2007) show that metal laden particulates are present in sediment downstream from the Corona and Twin Peaks mines. Data collected by USGS (2007) and EnviroGeo (2007) also showed that drainage from the calcined tailings was capable of transporting metals including mercury and nickel off site.

Minimizing erosion and the amount of the drainage will improve water quality in Kidd and James creeks by preventing the associated sediment and metals (including nickel and mercury) from entering the surface water. Increasing the amount of vegetative cover will also minimize the creation of airborne dust from the mine waste piles.

6.3 Improvements to Existing Infiltration Trenches

Improvements to the existing infiltration trenches at the Boiler House and Twin Peaks portals will consist of re-plumbing the distribution systems at each site, and improving vegetation at each trench. Re-plumbing will allow more effective operations under seasonal changes in flow, and facilitate isolating separate reaches of each trench for maintenance. Improved vegetation along the infiltration trenches will increase stability of slopes below the trenches, and increase the amount of water that is transpired.

6.4 Subsurface Chemical Amendment

Subsurface chemical amendment, if determined to be effective at the Corona Mine, would identify a method to reduce the metal loading from the Corona Drain Tunnel through introduction of chemicals (sodium hydroxide, ethanol, inoculum containing sulfide reducing bacteria) to prevent mobilization of acid and metals at the source. Effectiveness of this technique at Corona Mine would be determined through performance of a tracer study and subsequent pilot scale operations. The tracer study would be performed after drilling and constructing cased remediation wells. The remediation wells would be advanced to allow application of chemical amendments directly to the acid and metal sources (ore bodies and stopes) as shown on existing mine maps. The tracer study would use the travel time and concentration of a non-toxic tracer released at the source area and detected in Corona Drain Tunnel drainage to evaluate chemical dosing rates for subsurface chemical amendment.

The pilot scale operations would allow evaluation of the chemical dosing rates, design, and operation of the full scale chemical delivery system. While short term (about 60 to 90 days) the pilot operations (if successful) are expected to provide longer term improvement in water quality by precipitation of metals, and reducing oxidation of the sulfide minerals during the study. Substantial intermediate improvement of water quality could be attained through pilot operations via potential armoring of some reactive sites within the source area for the drainage. Substantial long term improvement of water quality could be then attained via longer term implementation of the technique. The duration of water quality improvements expected from pilot scale subsurface chemical amendment is uncertain without the quantitative results from the tracer study.

7.0 Description of Monitoring or Other Assessment Activities to be Undertaken to Evaluate the Success of the Proposed Practices

Monitoring and assessment activities include ongoing baseline monitoring, maintenance activities necessary to sustain the proposed practices, and assessment to evaluate project success. These project components are described below. Activities to evaluate project success consist of surface water and biota monitoring, system maintenance, and assessment of monitoring results. Baseline conditions are being evaluated through pre-construction sampling along Kidd and Bateman Creeks, and of mine drainage at the Boiler House and Twin Peaks Adits.

Monitoring activities will include continued collection and analysis of samples along Kidd and Bateman Creeks and from the adits, as well as monitoring necessary to ensure the function of the project components as described in the OMM plan. Monitoring is intended to comply with Title 27 requirements, and is anticipated to include analysis of for total metals, water quality parameters (pH, specific conductance, oxidation reduction potential, temperature), major ions, and chemicals introduced to the subsurface (sodium hydroxide and ethanol).

7.1 Baseline Conditions

Baseline conditions for the project are based on mapping and photos of mine wastes and associated best management practices, results of monthly surface water sampling and laboratory analysis at Corona and Twin Peaks during 2012-2013, and biosentinel monitoring completed during 2012. Baseline conditions include bare slopes on mine waste (Attachment III), sparse vegetation along the infiltration trenches, and measureable increase in metal concentrations in Kidd Creek downstream from the Corona Drain Tunnel, and increase in metal concentrations in Bateman Creek downstream from the Twin Peaks tailings. Baseline surface water monitoring results collected through monthly sampling and analysis of surface water at the site will be graphically and quantitatively compared with post implementation monitoring results to assess improvements. Attachment III contains photographs of the bare slopes on calcines at Twin Peaks, and sparsely vegetated areas on Calcines at Corona. Periodic (seasonal) photos will be taken from the same locations to provide for qualitative and quantitative comparisons of revegetation success. The ongoing revegetation efforts have provided significant information regarding plants and associated practices to support vegetation efforts and test plots are not anticipated to be necessary as part of this project.

7.2 Monitoring Activities

Monitoring activities will consist of periodic inspections of the sites, comparison of successive vegetation surveys as revegetation of mine wastes progresses, quarterly surface water sampling, and biosentinel monitoring at James Creek. Surface water monitoring would be performed in accordance with waste discharge requirements under Title 27.

Monitoring of subsurface chemical amendment will also include daily to weekly sampling for up to 3 months after injection to assess the benefits of subsurface chemical amendment. This monitoring is anticipated to include analysis of for total metals, water quality parameters (pH, specific conductance,

oxidation reduction potential, temperature), major ions, and chemicals introduced to the subsurface (sodium hydroxide and ethanol).

Monitoring will be performed in accordance with the OMM plan to be prepared after re-plumbing of the existing trenches is completed, and after operation of the pilot subsurface chemical amendment system.

7.3 Maintenance Activities

Maintenance activities will include inspection of the mining units and adjustments to other project systems in accordance with the OMM plan. Maintenance activities at the infiltration trenches are anticipated to include inspection and maintenance of erosion control best management practices, cleanout of pipes, valve adjustment, and solids management. Maintenance of the BMPs is anticipated to include inspections, sediment removal, and minor repairs. Maintenance of revegetation is anticipated to include limited watering (if necessary) during the first two years to support establishment of the plants.

7.4 Assessment Procedures

Assessment procedures will include quantitative comparisons of baseline and post project metal concentrations in water, associated load estimates, comparisons of baseline and post project biosentinal monitoring results, and qualitative comparisons of baseline and post project photographs to document revegetation progress.

8.0 Budget and Identified Funding to Pay for the Implementation Plan

In 2011, Tuleyome was awarded a three-year, \$1.5 million dollar grant by the California Department of Fish and Game's (now Fish and Wildlife) Ecosystem Restoration Program to address drainage waters from the Corona and Twin Peaks Mines in northwest Napa County.

9.0 Remediation Goals and Objectives

Remediation goals and objectives are to consolidate mine waste, revegetate mine waste piles, improve the operational flexibility of the infiltration trenches, and identify and design a method to substantially reduce metal loading from the Corona Drain Tunnel to Kidd Creek. These goals are described below.

9.1 Mine Waste Consolidation Units and Stabilization

Consolidation into existing mine waste units will result in reducing the area covered in mine waste, and in which mine drainage is generated. Stabilization reduces the likelihood for traffic related disturbance of the mine waste. Pre- and post- consolidation maps of mine waste will be compared to document the reduction in area covered by mine waste.

9.2 Revegetation of Mining Units

Current conditions include slopes devoid of vegetation at Twin Peaks, and slopes covered with sparse grasses at Corona and Twin Peaks. Increased vegetative cover will be documented through annual

surveys and comparison of photographs. The goal of revegetation is to establish plants on bare slopes, and increase coverage on sparsely vegetated areas.

Erosion of mine waste occurs along the north side of the Corona calcines under current conditions. Erosion would be reduced by implementing BMPs including emplacing straw wattles and erecting rock check dams to retain sediment on site. Efficacy of the BMPs will be assessed through inspection of the wattles and check dams for accumulated sediment. Photographs and maintenance logs detailing the removal and disposition of accumulated sediment will be used to document effectiveness. Sediment will be placed within the mine waste units at locations that will prevent erosion and transport off site, and to encourage establishment of vegetation. The goal is to prevent off site transport of mine waste.

9.3 Improvements to Existing Infiltration Trenches

The current distribution piping within the infiltration trenches was assembled in an ad-hoc manner as the trenches were lengthened, and before consistent operations were identified based on observation of how the systems function. Re-plumbing of the infiltration trenches will improve system reliability by supporting increased ability to isolate specific trench reaches for maintenance while maintaining flow control. The goal is to allow operational changes to be made in response to changing flow conditions, and maintenance requirements while maintaining control of the drainage.

9.4 Subsurface Chemical Amendment

The ultimate goal is to achieve a significant improvement in water quality through reducing metal loading from the Corona Drain tunnel to Kidd Creek. This project will implement a pilot test that will directly measure any benefits attained through introducing chemicals to the source of acid drainage to precipitate metals and interfere with sulfide oxidation processes. The study will generate monitoring data that will allow calculation of the percent metal load reduction through comparison of pre-, during- and post study drainage analytical results and flow measurements. These calculated load reductions would then be used as the basis for design of an implementable subsurface chemical amendment program, and identification of performance goals for full scale implementation of the system.

Precipitates created during subsurface chemical amendment are anticipated to accumulate and be retained within the subsurface, at or near the location where they form.

10.0 Contingency Plans

Contingencies are associated with each of the proposed systems as described below.

10.1 Mine Waste Consolidation Units

If mine waste at a consolidation area is found to be significantly more extensive than can be addressed in the project, any remaining disturbed surfaces on mine waste would be protected using best management practices to prevent run-on and erosion. The disturbed surface would also be revegetated to provide for long term protection from erosion.

10.2 Revegetation

If initial plantings do not succeed, alternative plant varieties will be used in an attempt to increase the amount of vegetation. In addition, the reasons for lack of success will be evaluated and amendments to the revegetation program will be made to encourage subsequent vegetation attempts. Amendments to the plan could include selection of alternate species, limited use of irrigation to help establish plants, and a change to the soil amendments used. Performance standards for revegetation are described in Section 9.2 above.

10.3 Improvements to Existing Infiltration Trenches

Existing plumbing will remain in service to the extent practical so that new plumbing can be tested before entering service. This will be done to prevent the loss of control of mine drainage during replumbing.

10.4 Subsurface Chemical Amendment

A tracer study is necessary to assess the chemical dose rate to be used in the study of subsurface chemical amendment. If the tracer study does not result in positive detection of the tracer, then a connection from the tracer release location and the drain tunnel will not have been established. This could lead to concerns regarding the ultimate fate of the tracer, and inability to conduct pilot scale operations.

The Corona Mine is not located within a groundwater basin used to supply drinking water. The Corona Drain Tunnel was constructed to capture groundwater at the Corona Mine and discharge the captured groundwater to Kidd Creek. Any tracer released within the Corona Mine will be subject to the following potential fates:

- 1) Capture by groundwater flowing to the Corona Drain Tunnel and discharge to Kidd Creek.
- 2) Retention in the geologic materials that occur between the release point and the Corona Drain Tunnel.
- 3) Destructive chemical reactions with the minerals present along the flow path from the release point to the Corona Drain Tunnel.

The tracer to be used will be detergent that contains a brightener chemical, disodium diaminostilbene disulfonate. This substance is non-toxic and is widely used to assess potential discharges from septic systems and water treatment plants to surface water throughout California. If the tracer is not detected in Corona Drain Tunnel drainage, no adverse impact to water quality is anticipated, but pilot operation of the subsurface chemical amendment system will not be performed.

If the tracer is detected in Corona Drain Tunnel drainage, no adverse impact to water quality is anticipated, and the resulting information will be used to plan the subsurface chemical amendment pilot operations.

Pilot operations will include the release of chemicals (sodium hydroxide and ethanol) at rates to be determined based on results of the tracer test, and tracer concentrations measured in drainage. These chemicals will be applied at rates estimated to be sufficient to react with minerals in the drainage source

July 8, 2013

area and result in consumption of the chemicals. The application rates will be determined in part based on the results of the tracer test, and in part on the results of bench scale neutralization tests performed as part of earlier treatability studies using Corona drain tunnel discharge (TKT 2012). The quantities of chemicals anticipated to be used will be small in relation to the volume of drainage discharged from the Corona Drain Tunnel, and are intended to be consumed in chemical reactions along the flow path from the remediation wells to the Corona Drain Tunnel. Thus, discharge of the chemicals to Kidd Creek at concentrations that would impact water quality will be avoided. Drainage from the Corona Drain Tunnel will be monitored for the applied chemicals, metals, and pH to assess the improvements to water quality due to subsurface chemical amendment. This monitoring data would also be used to confirm that no significant impact to water quality is caused by pilot operations.

If the tracer study is not successful, or the pilot operations do not improve water quality sufficiently, then alternate actions at downstream and off-property locations would be evaluated. Such evaluations would assess availability of off property lands for use in treating mine drainage using semi-passive and active neutralization technologies.

11.0 Description of Remediation Agencies Legal Right to Enter and Conduct Remedial Activities

Tuleyome has entered into an access agreement with Corona and Twin Peaks Historical Association, LLC, the property owner. The access agreement grants Tuleyome the legal right to enter the site for the purpose of conducting the remedial activities described herein. A copy of the access agreement is provided in Attachment IV.

12.0 Signature of Authorized Representative of the Remediating Agency



Sara Husby-Good, Executive Director, Tuleyome

13.0 Identification of Pollutants to be addressed by the Remediation Work Plan.

Pollutants addressed by this remediation work plan include mercury, nickel, and sediment. Available site specific information for these pollutants are described in Sections 3 and 4 above.

Implementing this remediation work plan will improve treatment of toxic mine drainage discharging in the Bay-Delta watershed. This project will address the Ecosystem Restoration Program's goal to "Improve and/or maintain water and sediment quality conditions that fully support healthy and diverse

aquatic ecosystems in the Bay-Delta estuary and watershed; and eliminate, to the extent possible, toxic impacts to aquatic organisms, wildlife, and people.”

Continuous discharges of drainage water from the two adits are slightly acidic with high concentrations of iron and nickel, and some mercury in the suspended solids. Drainages from the Twin Peaks and the Upper Corona adits have been improved to the point where they no longer discharge into the creek. However, the current improvements are not ideal—difficult to maintain and clogging with iron precipitate. This project will develop and implement a reliable, long-term, maintainable solution for both dissolved nickel and for solids.

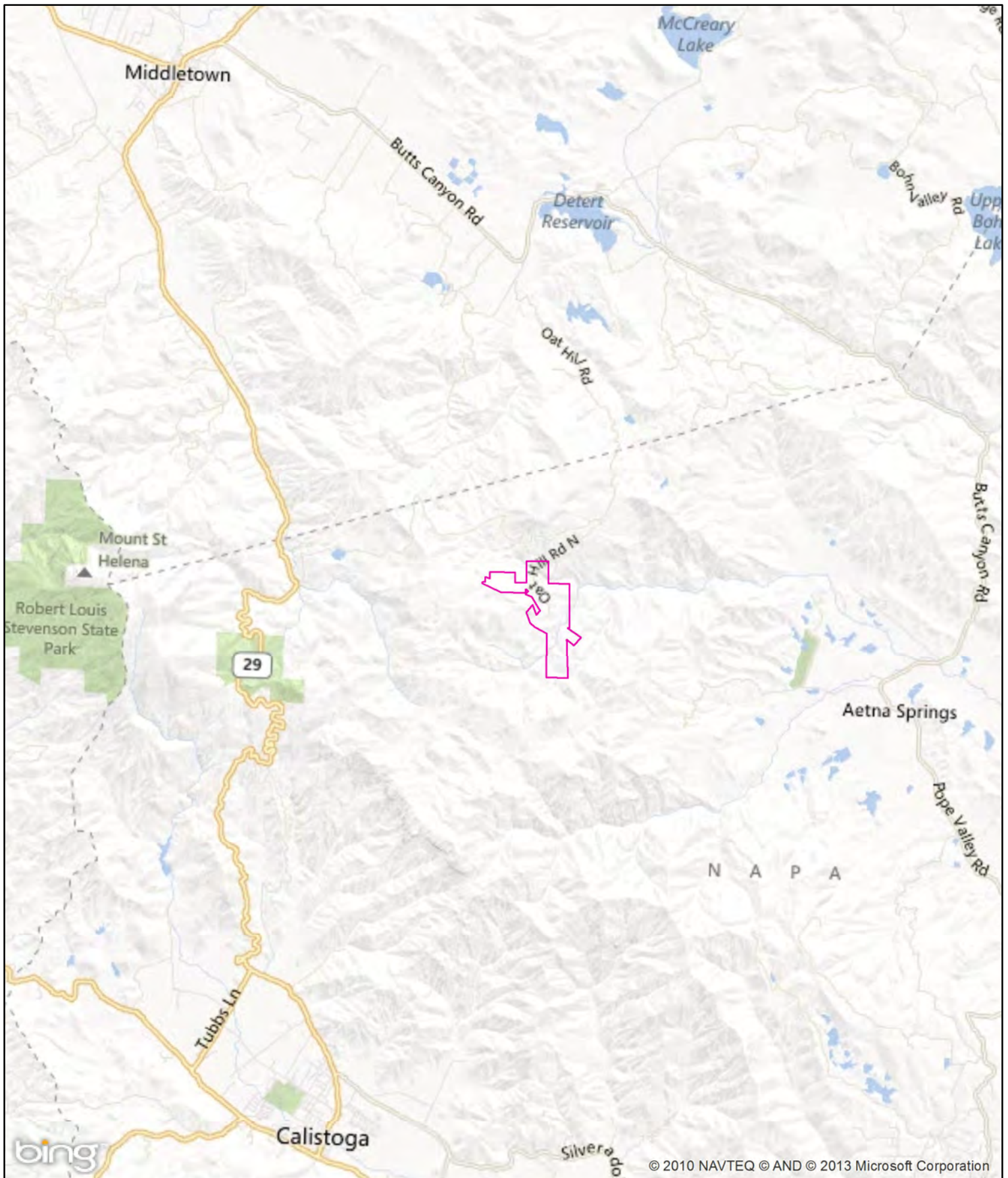
This mining legacy contributes to the state’s listing as impaired of James Creek (nickel and mercury), Lake Berryessa (mercury), and lower Putah Creek (mercury and boron). James Creek has been identified as prime trout habitat. A fish consumption advisory is posted for Lake Berryessa and for lower Putah Creek because of fish mercury contamination. Lower Putah Creek is a Wild Trout stream and drains into the Yolo Bypass, a nationally recognized fish rearing, wildlife habitat, farming, and flood control area with some of the highest mercury concentrations in the Bay-Delta.

14.0 References Cited

- EnviroGeo. 2007. Mercury Speciation and Transport from the Twin Peaks and Corona Mines to James Creek, March 2007. October 21.
- MFG. 2002. Technical Report: Former Twin Peaks Mine, Napa County, California. August 16.
- TKT. 2012. April-May Bench Testing Report Twin Peaks and Corona Mine. June.
- US Geological Survey. 2007. Open File Report 2007-1132: Mercury at the Oat Hill Extension Mine and James Creek, Napa County, California: Tailings, Sediment, Water, and Boata, 2003-2004.

Figures

(7 Pages)



Legend

 John Livermore Property



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Miles



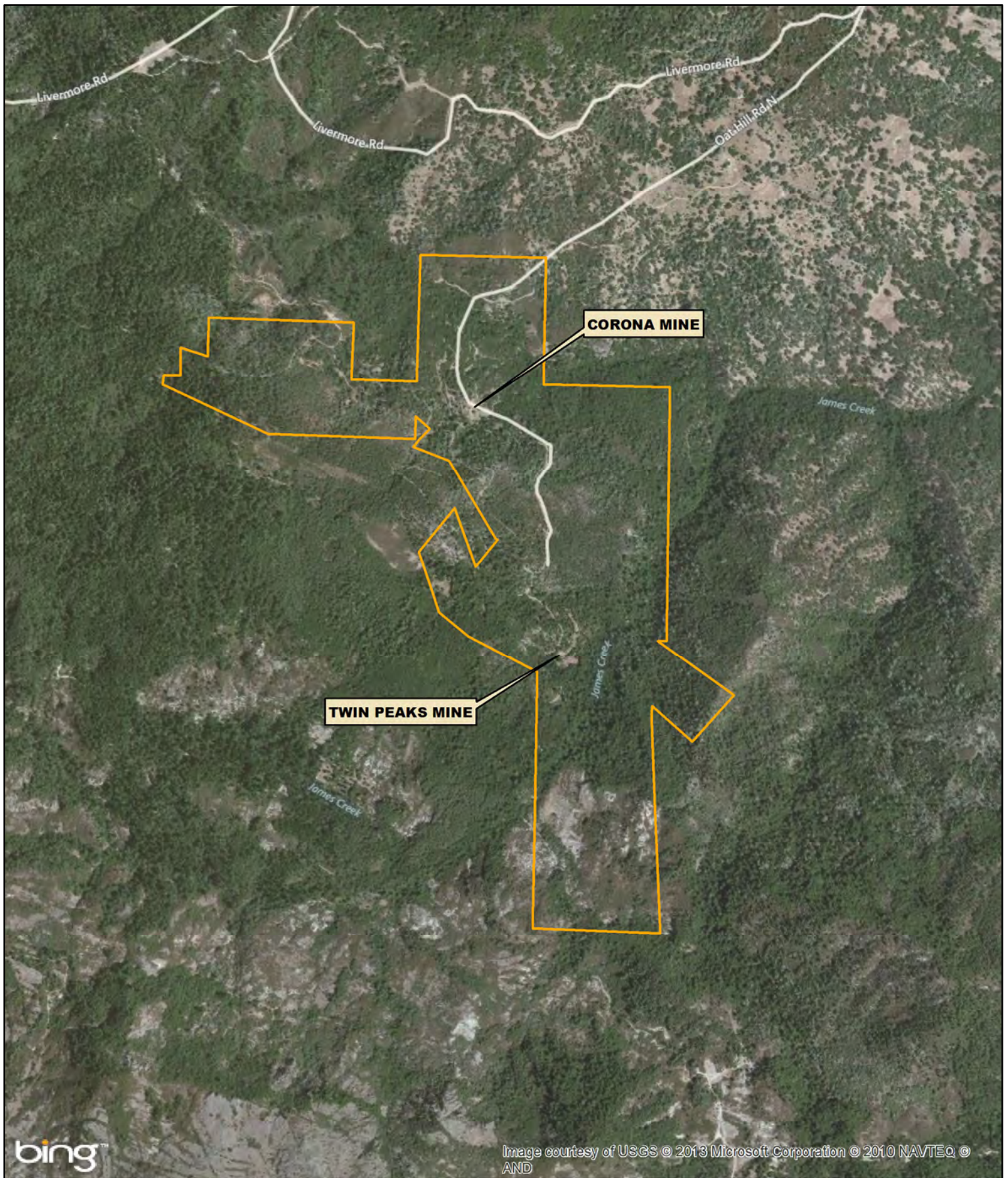
Corona Mine & Twin Peaks Mine

Figure 1 - Site Location

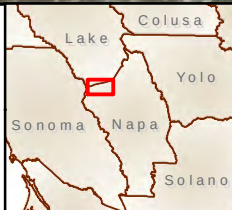
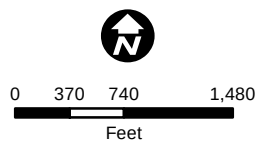
Source: Bing Maps roadways web mapping service;
Napa County GIS Department 2012.



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 John Livermore Property

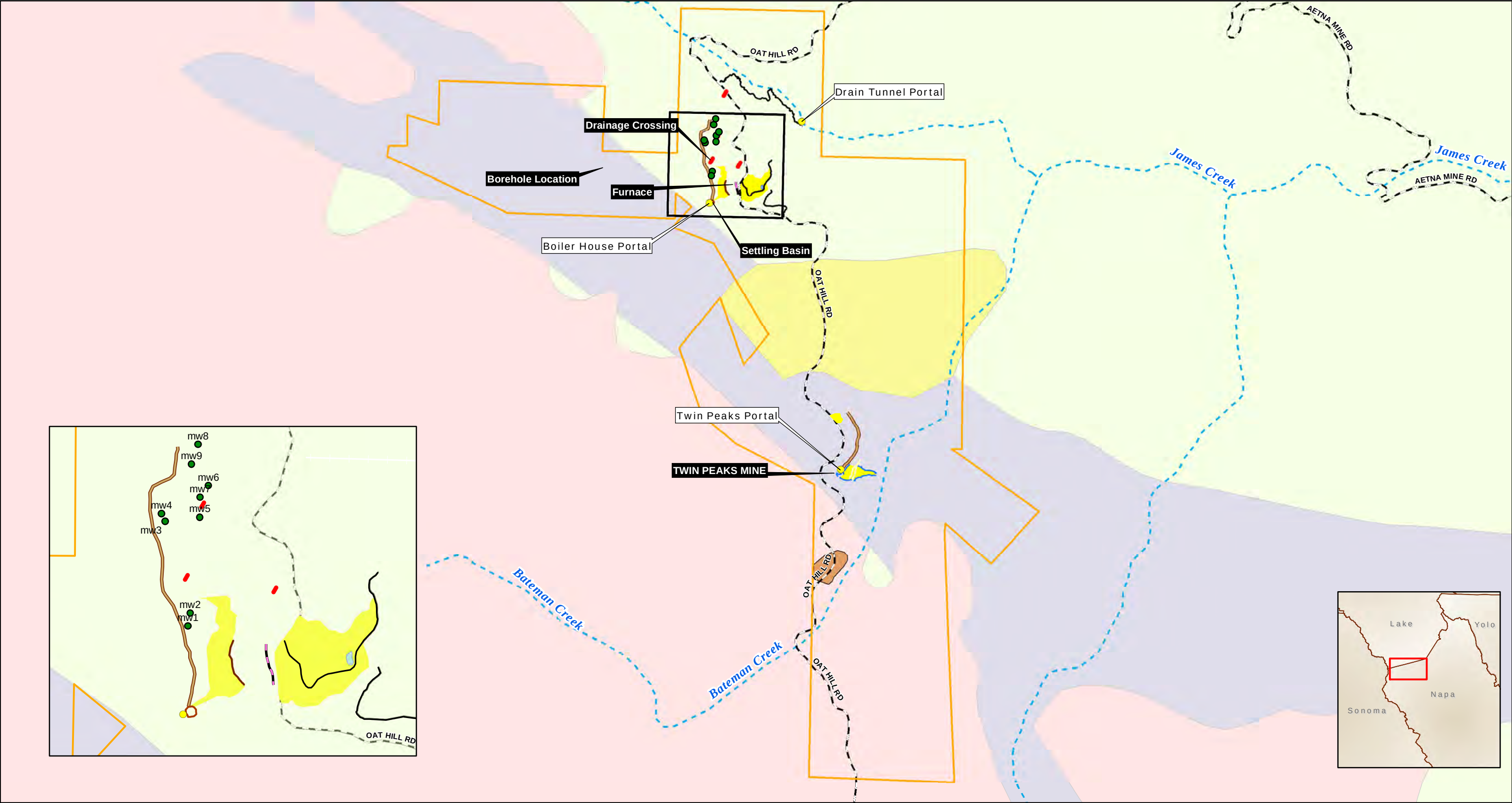


Corona Mine & Twin Peaks Mine

Figure 2 - Vicinity Map

Source: Bing Maps aerial web mapping service;
 Napa County GIS Department 2012.

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Legend

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Roads

Creeks

Portal

Future Gate

Monitoring Wells

Bench

Existing Path

Timber Wall

Drainage

Existing Path

Existing Rail Track Line

Future Fence

Existing Infiltration Trench

Settling Basin

Settling Basin

Hunters Camp

Mine Waste

Geologic Types

Jsp - Great Valley Complex serpentinite

KJfs - Franciscan Complex sedimentary rocks

Qsl - Hillslope Deposits

Tpmv - Sonoma Volcanic rocks

Corona & Twin Peaks Mine

Figure 4- Site Features

Source: Bing Maps aerial imagery
web mapping service; USGS 2012;
Napa County GIS Department 2011;
Burleson Consulting 2012.

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Path: S:\GIS\Projects\Corona - Twin Peaks Mine\Remediation Plan\Figure 4 - Site Features.mxd



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Roads

Creeks

Culvert

Existing Check Dam

Proposed Check Dam

Future Settling Basin

Future Fence

Existing Trench

BMP

Drainage

Pre Diversion Drainage

Existing Road

Timber Wall

Material To Be Consolidated

Consolidation Area & Revegetated

Revegetation

Settling Basin

Mine Waste

Corona Mine

Figure 5: Project Features

Source: Bing Maps aerial imagery
web mapping service;
Napa County GIS Department 2011;
Burleson Consulting 2012.

Burleson Consulting, Inc.

Path: S:\GIS\Projects\Corona - Twin Peaks Mine\Remediation Plan\Figure 5-Project Features.mxd



50ft Contour

Roads

Creeks

Stabilization

Revegetation

Existing Infiltration Trench

Settling Basin

Approximate Limit of Mine Waste

Pre Diversion Drainage

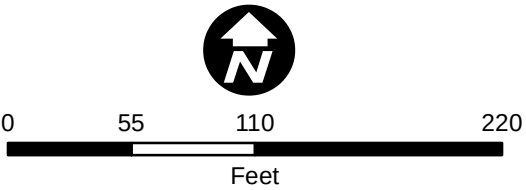
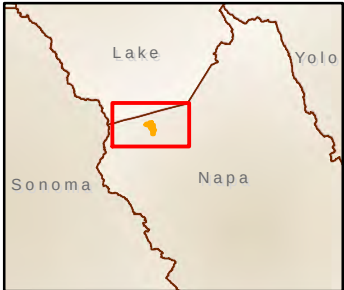
BMP

Post Diversion Inlet

Post Diversion Outlet

Adit

Portal



Twin Peaks Mine

Figure 6: Project Features

Source: Bing Maps aerial imagery
web mapping service;
Napa County GIS Department 2011;
Burleson Consulting 2012.

Burleson Consulting, Inc.

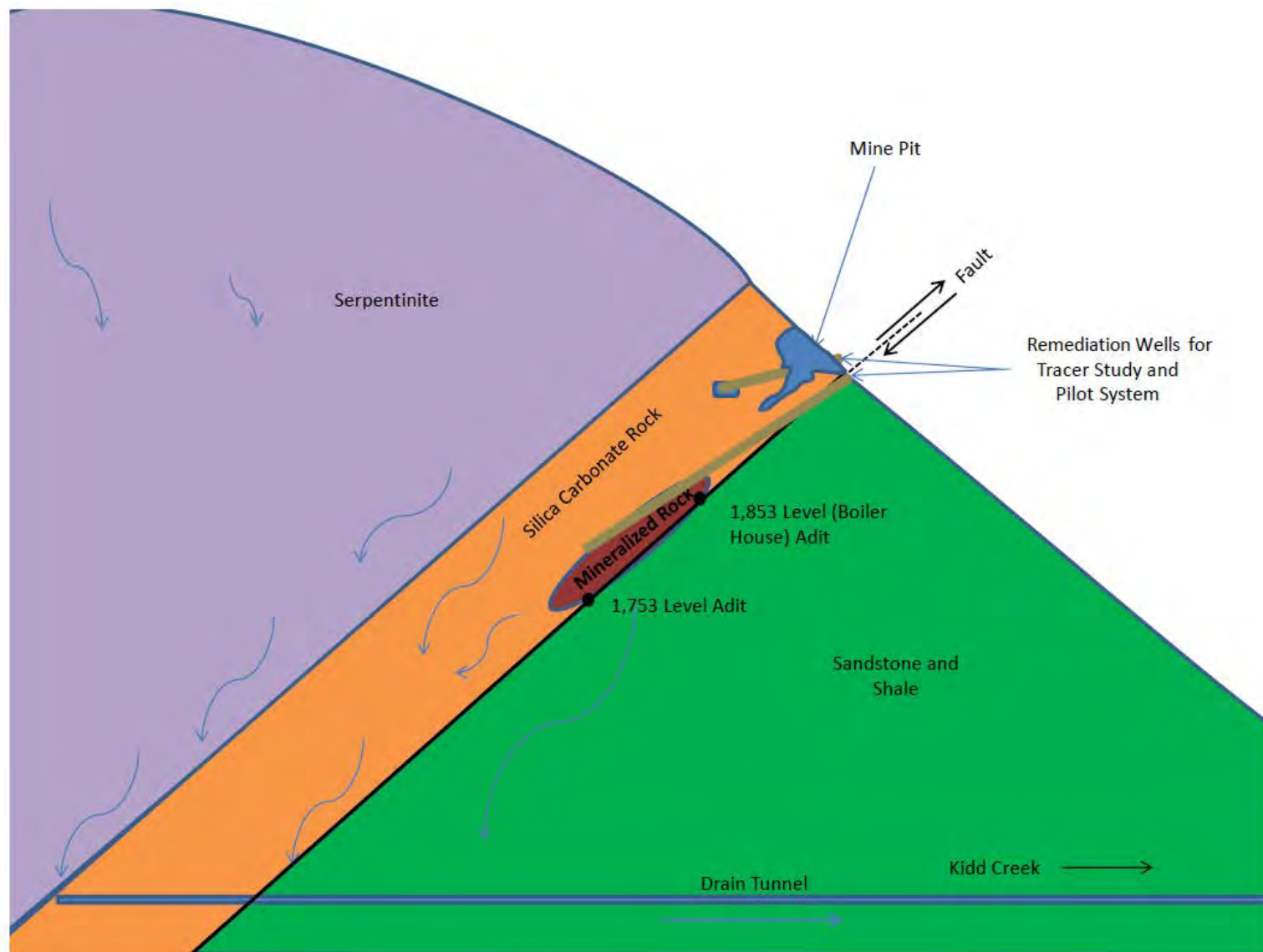


Figure 7

**Corona Mine Diagrammatic
Cross Section**



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TABLES

Table 1: Mine Waste Analytical Results, Corona and Twin Peaks Mercury Mines

Total Metals																
Sample No.	Location	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Thallium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
TP	Twin Peaks Calcines	0.24	12.87	0.20	0.04	194.44	80.12	23.99	1.80	840.00	1235.88	0.00	0.01	0.01	18.50	46.70
UCWR	Corona Waste Rock	0.48	54.62	0.53	0.05	317.27	33.64	26.21	3.25	250.00	440.09	0.00	0.03	0.03	42.35	60.37
UCCT	Corona Calcines	0.42	29.53	0.27	0.03	282.48	28.72	24.06	2.79	350.00	467.79	0.00	0.03	0.03	39.62	87.41
UCCTDUP	Corona Calcines Dup	0.25	21.92	0.18	0.01	183.62	14.05	19.29	2.13	NA	221.75	0.00	0.01	0.01	24.66	62.15
pgg duplicate UCCT	Corona Calcines Dup	0.44	39.17	0.37	0.02	259.57	27.55	24.14	2.40	260.00	336.96	0.00	0.00	0.03	39.21	49.17
Total Threshold Limit Concentration (mg/kg)																
		500	10,000	75	100	2500 (VI 500)	8,000	2,500	1,000	20	2,000	100	500	700	2,400	5,000
California Waste Extraction Test (WET) Metals																
Sample No.	Location	Arsenic mg/L	Barium mg/L	Beryllium mg/L	Cadmium mg/L	Chromium mg/L	Cobalt mg/L	Copper mg/L	Lead mg/L	Mercury mg/L	Nickel mg/L	Selenium mg/L	Silver mg/L	Thallium mg/L	Vanadium mg/L	Zinc mg/L
TP	Twin Peaks Calcines	0.0055	0.161	0.002	0.0005	0.9665	1.9025	0.198	0.01	0.0039	15.55	0.0525	0	0	0.0815	0.2615
UCWR	Corona Waste Rock	0.0115	0.6475	0.009	0.001	1.372	0.965	0.233	0.0435	0.0046	8.005	0.049	0.0005	0.0005	0.2005	0.5055
UCCT	Corona Calcines	0.005	0.495	0.004	0	1.1405	0.3795	0.09	0.0295	0.0023	3.6905	0.054	0	0.0005	0.1505	0.1865
UCCTDUP	Corona Calcines Dup	0.0045	0.436	0.0035	0.0005	0.8225	0.3215	0.1005	0.023	0.0023	2.745	0.029	0.0005	0.0005	0.119	0.1965
Soluble Threshold Limit Concentration (mg/L)																
		5	100	1	1	5 (VI 5)	80	25	5	0.2	20	1	5	7	24	250
Distilled Water Waste Extraction Test (DI WET) Metals																
Sample No.	Location	Arsenic ug/L	Barium ug/L	Beryllium ug/L	Cadmium ug/L	Chromium ug/L	Cobalt ug/L	Copper ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Selenium ug/L	Silver ug/L	Thallium ug/L	Vanadium ug/L	Zinc ug/L
TP	Twin Peaks Calcines	1.29	55.43	0.46	0.07	188.6	40.14	95.11	3.81	7.624293	1,865	1.58	0	0.03	7.72	12.74
UCWR	Corona Waste Rock	0.73	67.08	0.55	0.16	193.7	28.88	24.33	3.97	5.312791	1,123	2.36	0	0.02	9.13	29.51
UCCT	Corona Calcines	0.22	44.26	0.22	0.04	65.38	31.28	11.23	3.07	0.278291	606.4	0	0	0.02	2.44	13.73
UCCTDUP	Corona Calcines Dup	0.11	19.32	0.1	0.02	21.05	18.81	3.1	0.78	0.038291	260	0	0	0.01	0.77	8.31
Retardation (unitless)																
		230	242	4,653	443	10,600,278	60	148	1,591	307	54	325	531	419	5,890	366

Attachments

- I Implementation Work Plan Outline**
- II Operations, Maintenance, and Monitoring Plan Outline**
- III Mine Waste Revegetation Reference Photographs**
- IV Access Agreement**

**ATTACHMENT I
IMPLEMENTATION PLAN OUTLINE**

ACRONYMS AND ABBREVIATIONS

INTRODUCTION

1.1 LOCATION AND BACKGROUND

1.2 SITE HISTORY

1.3 PREVIOUS INVESTIGATIONS AND RESPONSES

1.4 PURPOSE

2.0 SITE MANAGEMENT PLAN

2.1 KEY PERSONNEL

2.2 COMMUNICATIONS

2.2.1 Operational Communications

2.2.2 Emergency Communications

2.3 SITE SAFETY

2.4 SITE ACCESS AND SECURITY

2.5 SITE PREPARATION, USE, MAINTENANCE, AND PERMITS

2.6 EQUIPMENT AND MATERIALS

2.7 DECONTAMINATION PROCEDURES

2.8 PROJECT SCHEDULE

3.0 REMEDIATION ACTIVITIES

3.1 MOBILIZATION AND SITE PREPARATION

3.2 SUBSURFACE CHEMICAL AMMENDMENT TREATABILITY STUDY

3.2.1 TRACER STUDY

3.2.2 TREATABILITY STUDY

3.3.3 FULL SCALE DESIGN

3.3 CONSOLIDATING/STABILIZING MINE WASTE

3.4 REVEGETATION

**ATTACHMENT I
IMPLEMENTATION PLAN OUTLINE**

- 3.5 SITE STABILIZATION
- 3.6 DEMOBILIZATION
- 3.7 FINAL SITE WALK
- 4.0 CONSTRUCTION QUALITY ASSURANCE PLAN
 - 4.1 CONSTRUCTION COORDINATION AND DELINEATION
 - 4.2 CONSTRUCTION DOCUMENTATION
- 5.0 REFERENCES

ATTACHMENT II
OPERATIONS MAINTENANCE AND MONITORING PLAN OUTLINE
(2 Pages)

1.0 INTRODUCTION

1.2 OM&M Goal and Objectives

1.3 O&M Personnel Roles and Responsibilities

1.3.1 Coordinator

1.4 O&M Cost Estimates

2.0 SITE DESCRIPTION

2.1 Location

2.2 Site Background

2.2 Site Conditions

3.0 SUMMARY OF ENGINEERING CONTROLS

3.1 Best Management Practices

3.2 Revegetation

3.3 Consolidation

3.4 Subsurface Chemical Amendment

4.0 TRAINING

4.1 Hazard Awareness Training Requirements

4.2 Erosion Control Training Requirements

4.3 Vegetation Monitoring Training Requirements

4.4 Surface Water Monitoring Training Requirements

5.0 O&M INSPECTIONS

5.1 Periodic Inspections

5.2 Inspections for Unplanned Events

5.3 Annual Inspections

6.0 ANNUAL REVIEW

7.0 INTRUSIVE WORK ACTIVITIES

7.1 Intrusive Work

7.2 Standard Operating ProcedureS (SOP)

7.3 Health and Safety Requirements

8.0 REPORTING AND RECORD-KEEPING

8.1 Reporting Requirements

8.2 Annual Inspection Summary Reports

8.3 Annual Review Reports

8.4 Notification Timeframes

8.5 Record-Keeping and Retention

9.0 SITE ACCESS

10.0 VARIANCE, MODIFICATION OR TERMINATION OF O&M PLAN

10.1 O&M Plan Variance

10.2 O&M Plan Modifications

10.3 Termination of O&M Plan

11.0 REFERENCES

***Attachment III
Corona and Twin Peaks Vegetation
Reference Photographs***

(3 Pages)

Attachment III
Corona and Twin Peaks Vegetation
Reference Photographs

Photo Number	Photo Description	Photo
B-4	Sparsely vegetated slopes on calcines at Corona Mine, view to east February 22, 2011	
B-5	Sparsely vegetated slopes on calcines at Corona Mine, view to northeast February 22, 2011	

Attachment III
Corona and Twin Peaks Vegetation
Reference Photographs

Photo Number	Photo Description	Photo
TP-1	Slope devoid of vegetation at Twin Peaks. View to northeast. April 19, 2012	
TP-2	Slope devoid of vegetation at Twin Peaks. View to southwest. April 19, 2012	

Attachment III
Corona and Twin Peaks Vegetation
Reference Photographs

Photo Number	Photo Description	Photo
TP-3	Slope devoid of vegetation at Twin Peaks. View to east. April 19, 2012	

Attachment IV

Access Agreement

JOHN LIVERMORE
1755 E. Plumb Ln. #170
Reno, NV 89502
775-786-9955
April 16, 2012

Mr. Bob Schneider
Senior Policy Director
Tuleyome, Inc.
607 North St.
Woodland, CA 95616

Dear Bob:

Enclosed is a signed copy of the Access Agreement for Corona and Twin Peaks.

I have received certificates of insurance from three of the eleven subcontractors and will be interested to find out just what they will be doing. I understand Professor Slotton has already started work on biological uptake in James Creek.

Best regards.


J.S. Livermore

Cc: Sam Livermore

NONEXCLUSIVE TEMPORARY ACCESS LICENSE

THIS NONEXCLUSIVE TEMPORARY ACCESS LICENSE AGREEMENT ("**Agreement**") is entered into, effective as of February 1, 2012, by and between **JOHN S. LIVERMORE**, an individual whose address is c/o Public Resource Associates, 1755 E. Plumb Lane, #170, Reno, NV 89502-3683, tel: (775) 223-9292, email: jslivermore@hughes.net ("**JSL**"), and **TULEYOME, INC.**, a California nonprofit public benefit corporation whose address is 607 North Street, Woodland, CA 95616, and whose primary point of contact is Bob Schneider, Senior Policy Director, tel: 530-304-6215, email: bschneider@tuleyome.org ("**Tuleyome**").

RECITALS

A. JSL is the current fee owner of that certain real property located in the County of Napa, State of California, as more particularly shown on the map attached hereto as **Exhibit A** (the "**JSL Property**").

B. Tuleyome has been awarded grants under the Ecosystem Restoration Program administered by the California Department of Fish & Game to undertake a voluntary mine cleanup project identified as the Corona and Twin Peaks Mine Drainage Treatment Project ("**Project**").

C. To implement the Project, Tuleyome needs temporary access along the road identified as the Oat Hill Mine Road ("**Road**") across property owned by Montesol Company and then across portions of the JSL Property to gain access to the Project site which is also located on the JSL Property ("**Project Site**"), all as indicated on Exhibit A.

D. JSL is willing to grant to Tuleyome and its employees and agents, and specified other parties and their employees and agents with whom Tuleyome may enter into contracts to implement the Project ("**Permitted Parties**"), a temporary license for ingress and egress to and from the Project Site from the date of this License for the duration of the Project ("**License Term**"), subject to the terms and conditions of this License.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereby agree as follows:

LICENSE

1. Grant of License. JSL hereby grants to Tuleyome a nonexclusive temporary license for use of the Project Site, and over the Road for the purposes of ingress and egress to and from the Project Site, by the Permitted Parties during the License Term ("**License**").

2. **Access.** Access under the License may be controlled and restricted pursuant to such protocols as JSL may reasonably establish and communicate to Tuleyome in writing from time to time for the protection of JSL, the JSL Property and the Road, including without limitation the following initial controls and restrictions:

(a) No Permitted Parties other than Tuleyome shall be granted or allowed access under the License unless and until they have been specifically identified, in writing or orally to be promptly followed by a writing (including email), to JSL or a designated agent of JSL ("**Designated Agent**"), and unless and until each such Permitted Party has agreed in writing to be bound by the terms and conditions of the License as set forth in this Agreement. For this purpose, Justin Smith (jsoathill@gmail.com; Home Mobile: (707) 486-6367; Other Phone: (707) 987-9420) is hereby designated JSL's agent.

(b) Access for Permitted Parties shall be limited to purposes of use of the Project Site and ingress and egress to the Project Site directly related to the planning, execution and monitoring of the Project, and not for any other purposes (such as hiking, wood cutting, hunting or any other personal recreation).

(c) Access to the Road and other property owned by JSL is partially controlled by a lockable gate, shown as the "**Table Rock Gate**" on Exhibit A. Tuleyome shall, and Permitted Parties may be, given the combination, keys, gate codes or other means of access through the Table Rock Gate, but the Table Rock Gate shall be kept closed and locked at such times as JSL may specify from time to time. JSL reserves the right to change the combinations, keys, gate codes, and other means of access following reasonable notice to Tuleyome, in which case JSL will provide Tuleyome with replacement combinations, keys, gate codes or other devices to permit continued use of the License by Permitted Parties.

(d) JSL may install and maintain additional gates and/or other security device on the Road or elsewhere on the JSL Property at his sole cost, provided JSL provides Tuleyome with the combinations, keys, access codes, or other means for gaining access through such gates or devices to the extent necessary to permit continued access under the terms of the License.

(e) Permitted Parties shall make reasonable efforts to provide JSL or his Designated Agent at least forty eight (48) hours prior notice of their intent to access the Project Site along the Road, identifying the Permitted Parties and number and type(s) of vehicles to be expected. Any issues relating to the logistics of access under the License shall be coordinated with the Designated Agent.

(f) Access to and use of the Project Site shall be limited to access by foot or by vehicles appropriate for the Road and the Project Site so as to minimize rutting or other damage to the Road or the JSL Property, or the stranding of vehicles unsuitable for the terrain. Access during and following periods of heavy rain may be limited or prohibited by JSL or the Designated Agent if travel along the Road or access to the project Site during such periods, particularly involving heavy vehicles or transporting

supplies or equipment, may be reasonably expected to result in damage to the Road or the JSL Property.

(g) Parking along the Road or elsewhere on JSL Property in a manner that does not permit the ability of other vehicles to pass along the Road shall not be permitted, except in emergency situations or on a temporary basis when unavoidable.

(h) Use of the Road and the Project Site, all access under the License and this Agreement, the Project, and the work in connection with the Project all shall be undertaken and performed in full compliance with all applicable federal, state and local laws and ordinances.

3. Maintenance and Repair Costs. During the License Term, Tuleyome shall maintain, and shall cause the Permitted Parties to maintain, the Road (including related drainage ditches and culverts) in substantially the same condition and state of repair as of the date of this Agreement, normal wear and tear excepted. Tuleyome shall, or shall cause such Permitted Party as it may designate to, pay or reimburse JSL for any reasonable costs incurred for the maintenance and repair of the Road during the License Term, except for maintenance and repair costs required due to the negligence, willful misconduct or abuse of the Road by JSL or his employees or agents, or by other third parties who may have access along the Road through permission or license from JSL.

4. Impairment; Alterations. Tuleyome agrees not to take, or permit any Permitted Party or other party to take, any action in connection with the Project or access under the License that would impair the value, condition or use of the Road or the JSL Property, except to the extent necessary to execute the Project. Tuleyome shall not, and shall not allow any Permitted Party to, make any alterations, modifications or improvements to the Road without the prior written consent of JSL, or any alterations, modifications or improvements to the Project Site except as expressly contemplated by the Project design or as otherwise approved in writing by JSL.

5. No Warranties. The parties acknowledge that (a) the Road is an unpaved, rural and rough road located in steep terrain on private property, and that is not maintained by any federal, state or local agency and does not comply with the road design and safety standards that would apply to a public road, and (b) the Project Site is located in rough and steep terrain. JSL makes no representation or warranty, express or implied, regarding the safety or adequacy of the Road or the Project Site or the purposes for which the License is granted hereunder, and Tuleyome acknowledges that it is not relying upon any statements, representations or warranties made by Montesol or its employees or agents to that effect.

6. Indemnification. Tuleyome shall indemnify, hold harmless, defend and protect JSL and his employees, agents, successors and assigns against and from any and all loss, claim, cost, liability, damage, injury, death, or expense, including, without limitation, reasonable attorneys' fees (collectively, "**Damages**"), resulting from, arising out of or in any way connected with use of the Road, the Project Site, the access provided under this

Agreement, the Project, any breach of the License or this Agreement, or any other activities, actions or failures to act, by Tuleyome, any Permitted Party or their respective employees, agents, contractors, subcontractors, invitees, successors or assigns, except for any such Damages resulting solely from the active gross negligence or willful misconduct of JSL or his employees or agents.

7. Insurance.

(a) Tuleyome shall obtain and maintain during the License Term the following insurance coverages:

- Worker's Compensation (and Employer's Liability Insurance) — as required by applicable state statute.
- Commercial General Liability — \$1,000,000 per occurrence for bodily injury, including death and property damage, and \$2,000,000 in the aggregate.
- Automobile Liability — minimum of \$1,000,000 combined single limit for bodily injury and property damage.
- Professional Liability (E&O) and Professional Pollution Liability and Contractors' Pollution Liability — \$1,000,000 each claim and in the aggregate.

(b) All such insurance shall be on an incurrence basis, and shall be placed with a company or companies reasonably satisfactory to Montesol. Such insurance shall insure against all liability of Tuleyome and its employees and agents arising out of and in connection with use of the Road, the Project Site, the License, the Project and performance by Tuleyome of the indemnity provisions of Section 6, all as provided for in this Agreement, and shall be primary as respects JSL such that any insurance maintained by JSL shall be excess of and non-contributory with that of Tuleyome. Each such policy shall provide that it shall not be cancelled or changed in coverage or scope except upon at least thirty (30) days prior written notice to JSL. Certificates of insurance, showing JSL and his employees and agents as additional named insureds shall be delivered to JSL promptly following execution of this Agreement and upon reasonable request periodically thereafter during the License Term.

(c) In addition to the above insurance requirements, Licensee shall include all Permitted Parties as additional named insureds under its policies, or shall require all Permitted Parties to provide all insurance coverages as described above and certificates of insurance evidencing the same.

8. Property Taxes. All real property taxes and assessments for the JSL Property, the Road and the Project Site shall be borne by JSL; provided that Tuleyome shall pay, or shall cause the appropriate Permitted Party to pay, any fees, costs, assessments or

increases in property taxes imposed on JSL, the JSL Property, the Project Site or the Road in connection with or as a result of the Project or any related actions of any Permitted Party.

9. Term. This Agreement shall continue in full force and effect during the License Term, unless this Agreement is amended, modified or terminated by an agreement executed and delivered by the parties hereto.

10. No Public Dedications; No Recording. Nothing in this Agreement is intended to be or shall be deemed or construed to be a gift or dedication of any portion of the Road, the Project Site or any other portion of the JSL Property to Tuleyome or any other party for any public use or nonprofit benefit purpose (unless and until any such gift or dedication is implemented by separate agreement). This Agreement shall not be recorded.

11. No Third Party Beneficiaries. This Agreement is only for the benefit of the parties hereto and their successors-in-interest or permitted assigns as set forth in this Agreement. No other person or entity or property shall be entitled to rely hereon, receive any benefit herefrom or enforce any provision hereof against any party hereto (or the permitted assigns of Tuleyome or successors-in-title to JSL, respectively).

12. Notices. Any notice required or permitted to be given under this Agreement shall be in writing (which may include electronic means) and shall be deemed to have been delivered when received by personal delivery or electronically, or on the date two days after being deposited by registered or certified mail, postage prepaid, return receipt requested, or with Federal Express or a comparable courier, and addressed as set forth above (or such other address or email contact as either party may specify to the other by notice meeting the conditions of this Section 12).

13. Binding Effect; No Assignment; Governing Law. This Agreement and all covenants and restrictions contained herein shall, to the fullest extent permitted by law and equity and without regard to technical classifications or designations, be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns. Without the prior written consent of JSL, Tuleyome may not assign its rights or benefits under this Agreement to any third party, except to Permitted Parties to the extent provided herein, or with the prior written consent of JSL or his successor-in-title to the JSL Property. This Agreement shall be governed and construed in accordance with the laws of the State of California.

14. Severability. If any one or more of the provisions contained in this Agreement is for any reason held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any other provisions of this Agreement, and this Agreement shall be construed as if such invalid, illegal or unenforceable provision had never been contained in this Agreement.

15. Construction. The parties acknowledge that each party and its counsel have reviewed this Agreement and that the normal rule of construction to the effect that any ambiguities are to be resolved against the drafting party shall not be employed in the interpretation of this Agreement or any amendments or exhibits.

16. Attorneys' Fees. In the event that either party to this Agreement shall bring legal action in order to enforce any of its provisions, the prevailing party shall be entitled to recover from the other party the reasonable attorneys' fees and costs incurred by the prevailing party in enforcing its rights under this Agreement.

17. Entire Agreement. This Agreement, including the recitals and the attached Exhibit A, constitutes the entire agreement between the parties with respect to the grant of the License and all matters to the License and use of the Road and the Project Site.

18. Amendments. This Agreement may be amended, modified or supplemented only by a written document executed by all of the parties hereto.

19. Counterparts. This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties have executed this Nonexclusive Temporary Access License Agreement effective as of the date first above written.

"JSL"


JOHN S. LIVERMORE

"TULEYOME"

TULEYOME, INC.
a California nonprofit public benefit corporation

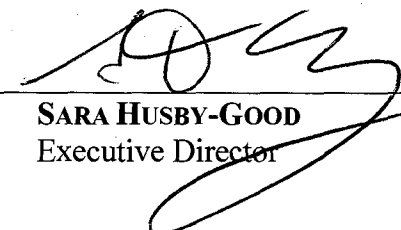
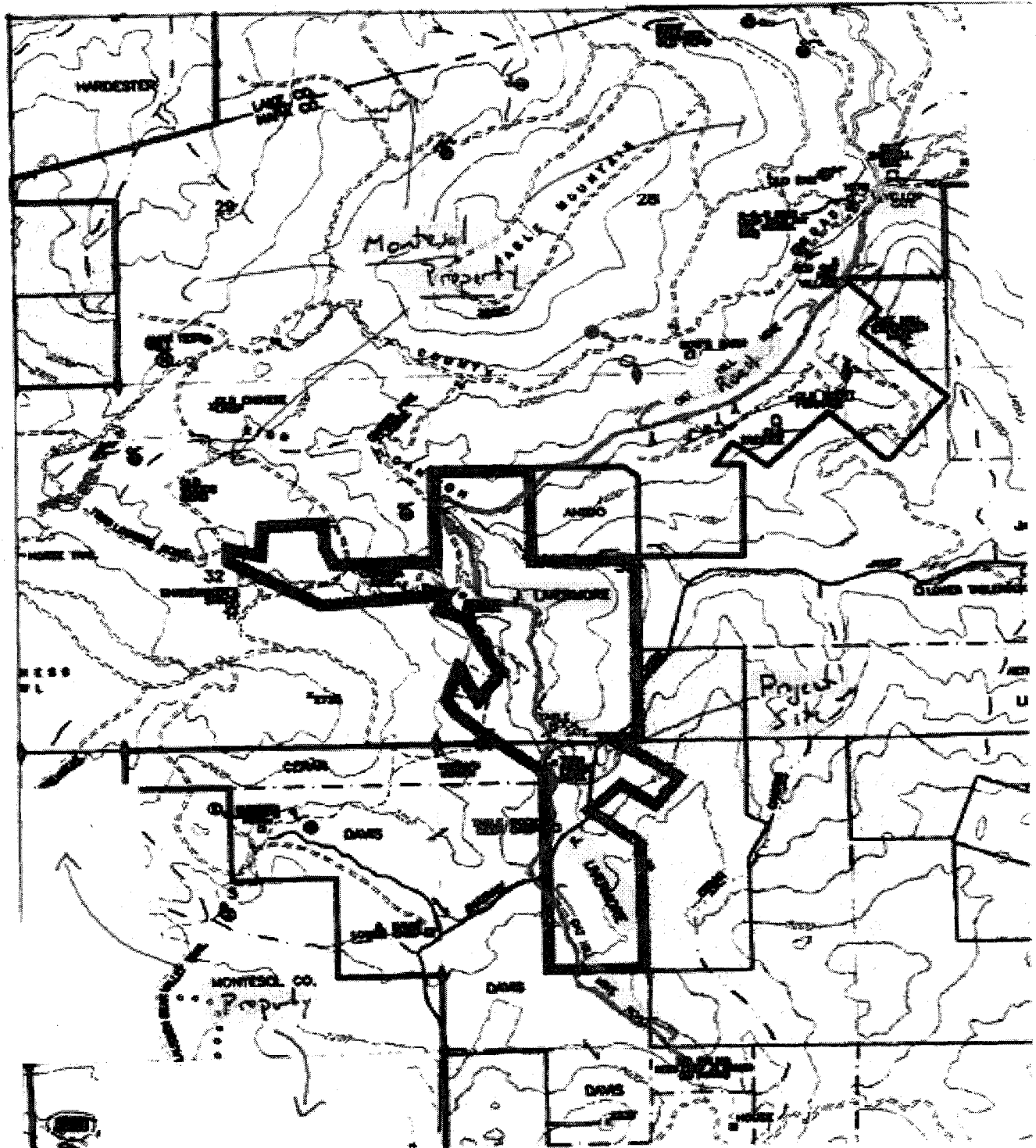
By: 
SARA HUSBY-GOOD
Executive Director

EXHIBIT A
To
NONEXCLUSIVE ACCESS LICENSE AGREEMENT



Gois, Vanessa

From: Livermore, Sam
Sent: Tuesday, April 10, 2012 12:22 PM
To: 'Sara Husby-Good'; 'BobSchneider'; 'Bob Schneider'; 'Stephen McCord'; 'JOHN S. LIVERMORE'
Cc: jennifer@bensonneff.com; linda@bensonneff.com; Gois, Vanessa
Subject: Access Licenses

Package of Access Licenses received:

- I have signed for Montesol and am sending one signed copy back to Bob's attention at Tuleyome
- The package also included John's Access Licenses, so I am sending both copies to John in Reno for his signature, and he can then forward one copy to Bob at Tuleyome

Ok everyone?

Samuel M. Livermore

101 California Street ♦ 5th Floor
San Francisco, CA 94111-5800
Direct: 415-693-2113 ♦ Fax: 415-693-2222 ♦ eFax: 415-276-5743
Email: slivermore@cooley.com
Bio: www.cooley.com/slivermore ♦ Web: www.cooley.com

From: jennifer@bensonneff.com [mailto:jennifer@bensonneff.com]
Sent: Monday, April 09, 2012 10:23 AM
To: Livermore, Sam; linda@bensonneff.com; 'Sara Husby-Good'
Cc: 'BobSchneider'; 'Bob Schneider'; 'Stephen McCord'; 'JOHN S. LIVERMORE'
Subject: RE: Certificate of Insurance for Norman B. Livermore & Sons, on behalf of McCord Environmental

Sam:

We did received the package and will messenger it over with Wednesday's check run. If you need it today, I can messenger it over now.

Regards,
Jennifer A. Uy
Benson & Neff, CPA's
1 Post St., Suite 2150
San Francisco, CA 94104
Direct: (415) 705-5629
Fax: (415) 705-5633

From: Livermore, Sam [mailto:slivermore@cooley.com]
Sent: Monday, April 09, 2012 10:08 AM
To: 'linda@bensonneff.com'; jennifer@bensonneff.com; Sara Husby-Good (sdhusby@tuleyome.org)
Cc: BobSchneider (bschneider@tuleyome.org); Bob Schneider; Stephen McCord; JOHN S. LIVERMORE
Subject: RE: Certificate of Insurance for Norman B. Livermore & Sons, on behalf of McCord Environmental

Linda and Jennifer – did the signed access agreements perhaps get mailed to you?

Sara – do you remember where you mailed them? Perhaps to just John?

Samuel M. Livermore

101 California Street ♦ 5th Floor

San Francisco, CA 94111-5800

Direct: 415-693-2113 ♦ Fax: 415-693-2222 ♦ eFax: 415-276-5743

Email: slivermore@cooley.com

Bio: www.cooley.com/slivermore ♦ Web: www.cooley.com

From: Bob Schneider [<mailto:verve2006@comcast.net>]

Sent: Monday, April 09, 2012 9:53 AM

To: Stephen McCord

Cc: Livermore, Sam; Sara Husby-Good (sdhusby@tuleyome.org); BobSchneider (bschneider@tuleyome.org)

Subject: Re: Certificate of Insurance for Norman B. Livermore & Sons, on behalf of McCord Environmental

They were signed and mailed a week or two ago. Bob

Sent from my iPhone

On Apr 9, 2012, at 9:31 AM, Stephen McCord <sam@mccenv.com> wrote:

No problem. You (and John) should be getting certificates from all subs over the next several days.

Sara Husby should have mailed you a signed copy of the access agreement. I'm cc'ing her and Bob to check on that.

Stephen

530-220-3165

From: Livermore, Sam [<mailto:slivermore@cooley.com>]

Sent: Monday, April 09, 2012 9:25 AM

To: Brittany Stoker; Stephen McCord

Cc: JOHN S. LIVERMORE

Subject: RE: Certificate of Insurance for Norman B. Livermore & Sons, on behalf of McCord Environmental

Thanks both!

Stephen – I don't recall seeing the signed access agreements yet – do you know their status?

Thanks. Sam

Samuel M. Livermore

101 California Street ♦ 5th Floor

San Francisco, CA 94111-5800

Direct: 415-693-2113 ♦ Fax: 415-693-2222 ♦ eFax: 415-276-5743

Email: slivermore@cooley.com

Bio: www.cooley.com/slivermore ♦ Web: www.cooley.com

From: Brittany Stoker [mailto:brittany@purvesinsurance.com]

Sent: Monday, April 09, 2012 9:06 AM

To: Livermore, Sam

Cc: Stephen McCord

Subject: Certificate of Insurance for Norman B. Livermore & Sons, on behalf of McCord Environmental

Good morning,

Please see attached certificate of insurance for Stephen McCord, McCord Environmental. Please let me know if you have any questions. Thank you!

Brittany Stoker

Purves & Associates

500 4th Street

Davis, CA 95616

P: 530-756-5561

F: 530-756-4641

LICENSE # 0f76105

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IRS Circular 230 disclosure: To ensure compliance with requirements imposed by the IRS, we inform you that any U.S. federal tax advice contained in this communication (including any attachment) is not intended or written by us to be used, and cannot be used, (i) by any taxpayer for the purpose of avoiding tax penalties under the Internal Revenue Code or (ii) for promoting, marketing or recommending to another party any transaction or matter addressed herein.

NONEXCLUSIVE TEMPORARY ACCESS LICENSE

THIS NONEXCLUSIVE TEMPORARY ACCESS LICENSE AGREEMENT ("**Agreement**") is entered into, effective as of February 1, 2012, by and between **NORMAN B. LIVERMORE & SONS**, a California general partnership dba Montesol Company whose address is c/o Benson & Neff, One Post Street, Suite 2150, San Francisco, CA 94104-5206, and whose primary point of contact is Samuel M. Livermore, Managing Partner, tel: 415-693-2113, email: slivermore@cooley.com ("**Montesol**"), and **TULEYOME, INC.**, a California nonprofit public benefit corporation whose address is 607 North Street, Woodland, CA 95616, and whose primary point of contact is Bob Schneider, Senior Policy Director, tel: 530-304-6215, email: bschneider@tuleyome.org ("**Tuleyome**").

RECITALS

A. Montesol is the current fee owner of that certain real property located in the County of Napa, State of California, as more particularly shown on the map attached hereto as **Exhibit A** (the "**Montesol Property**").

B. Tuleyome has been awarded grants under the Ecosystem Restoration Program administered by the California Department of Fish & Game to undertake a voluntary mine cleanup project identified as the Corona and Twin Peaks Mine Drainage Treatment Project ("**Project**").

C. To implement the Project, Tuleyome needs temporary access across the Montesol Property along the road identified as the Oat Hill Mine Road ("**Road**") to gain access to the Project site ("**Project Site**") located on the property of John S. Livermore ("**JSL**"), all as indicated on Exhibit A.

D. Montesol is willing to grant to Tuleyome and its employees and agents, and specified other parties and their employees and agents with whom Tuleyome may enter into contracts to implement the Project ("**Permitted Parties**"), a temporary license for ingress and egress to and from the Project Site from the date of this License for the duration of the Project ("**License Term**"), subject to the terms and conditions of this License.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereby agree as follows:

LICENSE

1. Grant of License. Montesol hereby grants to Tuleyome a nonexclusive temporary license over the Road for the purposes of ingress and egress to and from the Project Site by the Permitted Parties during the License Term ("**License**").

2. **Access.** Access under the License may be controlled and restricted pursuant to such protocols as Montesol may reasonably establish and communicate to Tuleyome in writing from time to time for the protection of Montesol and its partners, employees and agents, the Montesol Property and the Road, including without limitation the following initial controls and restrictions:

(a) No Permitted Parties other than Tuleyome shall be granted or allowed access under the License unless and until they have been specifically identified, in writing or orally to be promptly followed by a writing (including email), to the Managing Partner of Montesol or a designated agent of Montesol ("**Designated Agent**"), and unless and until each such Permitted Party has agreed in writing to be bound by the terms and conditions of the License as set forth in this Agreement. For this purpose, Justin Smith (jsoathill@gmail.com; Home Mobile: (707) 486-6367; Other Phone: (707) 987-9420) is hereby designated Montesol's agent.

(b) Access for Permitted Parties shall be limited to purposes of ingress and egress directly related to the planning, execution and monitoring of the Project, and not for any other purposes (such as hiking, wood cutting, hunting or any other personal recreation).

(c) Access to the Road and other property owned by Montesol is controlled by a locked gate, shown as the "**Yellow Gate**" on Exhibit A. Tuleyome shall, and Permitted Parties may be, given the combination, keys, gate codes or other means of access through the Yellow Gate, but the Yellow Gate shall be kept closed and locked at all times. Montesol reserves the right to change the combinations, keys, gate codes, and other means of access following reasonable notice to Tuleyome, in which case Montesol will provide Tuleyome with replacement combinations, keys, gate codes or other devices to permit continued use of the License by Permitted Parties.

(d) Montesol may install and maintain additional gates and/or other security device on the Road at its sole cost, provided Montesol provides Tuleyome with the combinations, keys, access codes, or other means for gaining access through such gates or devices as necessary to permit continued access under the terms of the License.

(e) Permitted Parties shall make reasonable efforts to provide Montesol or its Designated Agent at least forty eight (48) hours prior notice of their intent to access the Project Site along the Road, identifying the Permitted Parties and number and type(s) of vehicles to be expected. Any issues relating to the logistics of access under the License shall be coordinated with the Designated Agent.

(f) Access shall be limited to travel by foot or by vehicles appropriate for the Road so as to minimize rutting or other damage to the Road, or the stranding of vehicles unsuitable for the terrain. Access during and following periods of heavy rain may be limited or prohibited by Montesol or the Designated Agent if travel along the Road during such periods, particularly involving heavy vehicles or transporting supplies or equipment, may be reasonably expected to result in damage to the Road.

(g) Parking along the Road or elsewhere on Montesol Property shall not be permitted, except in emergency situations

(h) Use of the Road, all access under the License and this Agreement, the Project, and the work in connection with the Project all shall be undertaken and performed in full compliance with all applicable federal, state and local laws and ordinances.

3. Maintenance and Repair Costs. During the License Term, Tuleyome shall maintain, and shall cause the Permitted Parties to maintain, the Road (including related drainage ditches and culverts) in substantially the same condition and state of repair as of the date of this Agreement, normal wear and tear excepted. Tuleyome shall, or shall cause such Permitted Party as it may designate to, pay or reimburse Montesol for any reasonable costs incurred for the maintenance and repair of the Road during the License Term, except for maintenance and repair costs required due to the negligence, willful misconduct or abuse of the Road by Montesol or its employees or agents, or by other third parties who may have access along the Road through permission or license from Montesol.

4. Impairment; Alterations. Tuleyome agrees not to take, or permit any Permitted Party or other party to take, any action in connection with the Project or access under the License that would impair the value, condition or use of the Road or the Montesol Property. Tuleyome shall not, and shall not allow any Permitted Party to, make any alterations, modifications or improvements to the Road without the prior written consent of Montesol.

5. No Warranties. The parties acknowledge that the Road is an unpaved, rural and rough road located in steep terrain on private property, and that is not maintained by any federal, state or local agency and does not comply with the road design and safety standards that would apply to a public road. Montesol makes no representation or warranty, express or implied, regarding the safety or adequacy of the Road for the purposes for which the License is granted hereunder, and Tuleyome acknowledges that it is not relying upon any statements, representations or warranties made by Montesol or its employees or agents to that effect.

6. Indemnification. Tuleyome shall indemnify, hold harmless, defend and protect Montesol and its partners, employees, agents, successors and assigns against and from any and all loss, claim, cost, liability, damage, injury, death, or expense, including, without limitation, reasonable attorneys' fees (collectively, "**Damages**"), resulting from, arising out of or in any way connected with use of the Road, the access provided under this Agreement, the Project, any breach of the License or this Agreement, or any other activities, actions or failures to act, by Tuleyome, any Permitted Party or their respective employees, agents, contractors, subcontractors, invitees, successors or assigns, except for any such Damages resulting solely from the active gross negligence or willful misconduct of Montesol or its employees or agents.

7. Insurance.

(a) Tuleyome shall obtain and maintain during the License Term the following insurance coverages:

- Worker's Compensation (and Employer's Liability Insurance) — as required by applicable state statute.
- Commercial General Liability — \$1,000,000 per occurrence for bodily injury, including death and property damage, and \$2,000,000 in the aggregate.
- Automobile Liability — minimum of \$1,000,000 combined single limit for bodily injury and property damage.
- Professional Liability (E&O) and Professional Pollution Liability and Contractors' Pollution Liability — \$1,000,000 each claim and in the aggregate.

(b) All such insurance shall be on an incurrence basis, and shall be placed with a company or companies reasonably satisfactory to Montesol. Such insurance shall insure against all liability of Tuleyome and its employees and agents arising out of and in connection with use of the Road, the License, the Project and performance by Tuleyome of the indemnity provisions of Section 6, all as provided for in this Agreement, and shall be primary as respects Montesol such that any insurance maintained by Montesol shall be excess of and non-contributory with that of Tuleyome. Each such policy shall provide that it shall not be cancelled or changed in coverage or scope except upon at least thirty (30) days prior written notice to Montesol. Certificates of insurance, showing Montesol and its partners, employees and agents as additional named insureds shall be delivered to Montesol promptly following execution of this Agreement and upon reasonable request periodically thereafter during the License Term.

(c) In addition to the above insurance requirements, Licensee shall include all Permitted Parties as additional named insureds under its policies, or shall require all Permitted Parties to provide all insurance coverages as described above and certificates of insurance evidencing the same.

8. Property Taxes. All real property taxes and assessments for the Montesol Property and the Road shall be borne by Montesol; provided that Tuleyome shall pay, or shall cause the appropriate Permitted Party to pay, any fees, costs, assessments or increases in property taxes imposed on Montesol, the Montesol Property or the Road in connection with or as a result of the Project or any related actions of any Permitted Party.

9. Term. This Agreement shall continue in full force and effect during the License Term, unless this Agreement is amended, modified or terminated by an agreement executed and delivered by the parties hereto.

10. No Public Dedications; No Recording. Nothing in this Agreement is intended to be or shall be deemed or construed to be a gift or dedication of any portion of the Road or any other portion of the Montesol Property to Tuleyome or any other party for any public use or nonprofit benefit purpose. This Agreement shall not be recorded.

11. No Third Party Beneficiaries. This Agreement is only for the benefit of the parties hereto and their successors-in-interest or permitted assigns as set forth in this Agreement. No other person or entity or property shall be entitled to rely hereon, receive any benefit herefrom or enforce any provision hereof against any party hereto (or the permitted assigns of Tuleyome or successors-in-title to Montesol, respectively).

12. Notices. Any notice required or permitted to be given under this Agreement shall be in writing (which may include electronic means) and shall be deemed to have been delivered when received by personal delivery or electronically, or on the date two days after being deposited by registered or certified mail, postage prepaid, return receipt requested, or with Federal Express or a comparable courier, and addressed as set forth above (or such other address or email contact as either party may specify to the other by notice meeting the conditions of this Section 11).

13. Binding Effect; No Assignment; Governing Law. This Agreement and all covenants and restrictions contained herein shall, to the fullest extent permitted by law and equity and without regard to technical classifications or designations, be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns. Without the prior written consent of Montesol, Tuleyome may not assign its rights or benefits under this Agreement to any third party, except to Permitted Parties to the extent provided herein, or with the prior written consent of Montesol or its successor-in-title to the Montesol Property. This Agreement shall be governed and construed in accordance with the laws of the State of California.

14. Severability. If any one or more of the provisions contained in this Agreement is for any reason held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any other provisions of this Agreement, and this Agreement shall be construed as if such invalid, illegal or unenforceable provision had never been contained in this Agreement.

15. Construction. The parties acknowledge that each party and its counsel have reviewed this Agreement and that the normal rule of construction to the effect that any ambiguities are to be resolved against the drafting party shall not be employed in the interpretation of this Agreement or any amendments or exhibits.

16. Attorneys' Fees. In the event that either party to this Agreement shall bring legal action in order to enforce any of its provisions, the prevailing party shall be entitled to recover from the other party the reasonable attorneys' fees and costs incurred by the prevailing party in enforcing its rights under this Agreement.

17. Entire Agreement. This Agreement, including the recitals and the attached Exhibit A, constitutes the entire agreement between the parties with respect to the grant of the License and all matters to the License and use of the Road.

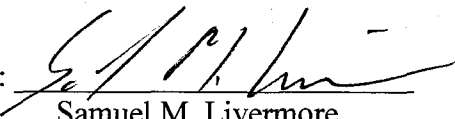
18. Amendments. This Agreement may be amended, modified or supplemented only by a written document executed by all of the parties hereto.

19. Counterparts. This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties have executed this Nonexclusive Temporary Access License Agreement effective as of the date first above written.

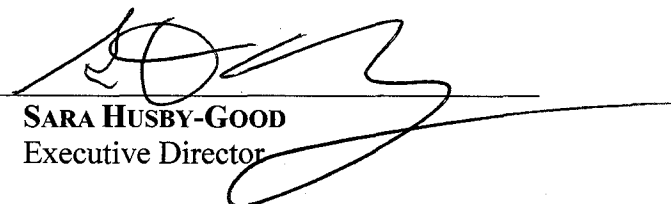
"MONTESOL"

NORMAN B. LIVERMORE & SONS,
a California general partnership, dba Montesol Company

By: 
Samuel M. Livermore
Managing Partner

"TULEYOME"

TULEYOME, INC.
a California nonprofit public benefit corporation

By: 
SARA HUSBY-GOOD
Executive Director

