

ADDENDUM  
FIELD INVESTIGATION REPORT  
HYDROLOGY ANALYSIS  
3M REDDING HARD-ROCK AGGREGATE QUARRY  
SHASTA COUNTY, CALIFORNIA

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Prepared for  
Resource Design Technology, Inc.  
January 21, 2010

BROWN AND CALDWELL

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1. INTRODUCTION

This report is addendum to the June 30, 2009 Field Investigation Report summarizing the results of field activities conducted for the Hydrology Assessment at the proposed 3M Hard Rock Aggregate Quarry located in Shasta County, California (Figures 1). The objective of this study is to provide the hydrology data and analyses appropriate for the application package and subsequent review under the California Environmental Quality Act (CEQA). The proposed project is a greenfield quarry site in an area that has not been previously mined. The scope of work conducted for this project is as described in the May 5, 2009 proposal from Brown and Caldwell to Resource Design Technology and included completion of the following four tasks:

Task 1 – Review and compilation of readily available existing data

Task 2 – Drilling and well installation

Task 3 – Surface Water and Groundwater Sampling

Task 4 – Preparation of this report.

The groundwater sampling activities for Task 3 included two rounds of groundwater sampling. Only the first round had been completed for the June 30, 2009 report. This addendum presents the results of the second round of sampling conducted on November 12, 2009. The methods and procedures for collection of these samples are as described in the June 30, 2009 Report. The results and summary of the November 12, 2009 testing are presented in Section 2.0.

As approved by Resource Design on October 21, 2009, this addendum also summarizes the results of an initial field geologic mapping program conducted that will be used for future groundwater supply evaluations that will be conducted at the Site.

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## 2. SECOND ROUND GROUNDWATER SAMPLING RESULTS

This section summarizes the results of the second round of groundwater sampling completed at the proposed 3M quarry. The analytical laboratory reports for this analysis are presented in Appendix A and summarized on Table 2a and 2b. A summary of the field measurements is provided on Table 2c. Wells sampled during the second round are designated B-1 through B-3 and MW-1. The locations of these wells are shown on Figure 2 of the June 30, 2009 report.

As indicated in Section 2.3.2 of the June 30, 2009 Field Investigation Report, samples collected from borings B-2 and B-3 are highly suspect with respect to the nature of the water observed in the borehole. The lack of a significant water column and inability to recharge rapidly may suggest that this water is not necessarily representative of typical groundwater in the vicinity of the boreholes and should be used with caution. These water samples were analyzed to document the water quality of the water that was present for comparison purposes.

As with the first round of groundwater sampling, three of the four borings, B-1, B-2, and MW-1 demonstrate a calcium-bicarbonate water type, as illustrated on Figures 4 and 5 of the June 30 report. Water in borehole B-3 demonstrated a sodium-bicarbonate water type and may not be representative of typical groundwater.

As with the first round of groundwater samples, metals (Table 2a) detected in all four water samples included calcium, magnesium, manganese, and sodium. The sample from B-2 also had low detections, slightly above the detection limits, of aluminum, barium and iron. Aluminum was not detected in the sample collected from this well during the first round. The sample from B-3 also had low detections, slightly above the detection limits of barium, molybdenum, potassium, and vanadium. Low detections of antimony and arsenic were reported for the sample collected from this well during first round.

Other general minerals and anions detected in these samples (Table 2b) include bicarbonate, chloride, and sulfate. The sample from B-2 also contained a low detection, slightly above the detection limit of ammonium and the samples from B-1, B-2, and B-3 had low detections of fluoride. The field parameters (Table 2c) for the groundwater samples had temperatures ranging from 13 to 16 °C, pH ranging from 7.03 to 7.72, and conductivity ranging from 271 to 971 uS/cm. Oxidation reduction potential measurements indicate only slightly oxidizing conditions.

Overall, the samples from B-2 and B-3 had the most variation of sample results between the first and second rounds. This variation may be the results of the lack of a significant water column and inability to recharge rapidly as discussed above and in Section 2.3.2 of the June 30, 2009 report.

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### 3. GEOLOGIC MAPPING

To build upon the knowledge for the project site for future groundwater supply assessments, Brown and Caldwell performed a more detailed assessment of aerial photographs provided in the June 30, 2009 report. The purpose of this assessment was to identify lineations across the site for use in locating geologic features favorable for additional groundwater assessments. Following completion of this assessment, a geologic site investigation was performed on November 13, 2009. The purpose of this investigation was to field check the results of the aerial photograph review and evaluate geologic conditions that could suggest the occurrence of groundwater at the site. These observations included surface mapping of geologic units, fracture and fault orientation and condition mapping, and general hydrologic relationship documentation at the site. The data compiled in this addendum will be used to provide suggested drilling locations for optimizing success of characterization to groundwater conditions as they exist at the site.

#### **3.1 Summary of Hydrogeology/Geology**

As described by Potter et al (1990), the site lies within an area referred to as the eastern Klamath terrane of the eastern Klamath belt. Units within the eastern Klamath terrane include in ascending order the Copley Greenstone, Balaklala Rhyolite, and Kennett Formations. The 1906 USGS geologic map showing these formations in the vicinity of the site is included in Appendix A of the June 30, 2009 report. The 1906 USGS map also indicates a unit in this area referred to as the Bass Mountain Diabase that also consists of greenstone type material.

The Copley Greenstone consists mainly of altered basaltic-andesitic flows, tuffs, and breccias and is estimated to be about 1,800 meters thick. It is overlain by the Balaklala Rhyolite along a contact that is locally gradational. This unit is mostly altered silicic flows, dikes, sills, tuffs, and breccias and is as much as 1,100 meters thick. The Kennett Formation depositionally overlies the Balaklala Rhyolite and consists of a lower part made up of volcanoclastic sandstone to mudstone and siliceous mudstone and siltstone and upper part made up of lenses of limestone inferred to have been deposited by sediment gravity flows. As discussed in the USGS Open-File Report 91-595 (OFR 91-595) (Appendix A of June 30, 2009 report), precious metal deposits have been observed throughout this area. Figure 4 from OFR 91-595 report shows the distribution of identified lode gold deposits.

In 1980, 3M conducted an extensive coring program at the proposed quarry site. A map showing the location of these core holes is included in Appendix A of the June 30, 2009 report. Thirteen of these core logs were provided by 3M and are also included in Appendix A of the June 30, 2009

report. As seen in these core logs, greenstone divided as “greenstone”, “greenstone breccia”, “conglomerate”, and “weathered/broken” is the main rock type identified and was thought to most likely be the Copley Greenstone Unit. As discussed in Section 3.3, based on the results of the field mapping program completed for this addendum, the unit in the area of the soil borings is the Bass Mountain Diabase. A rhyolite unit was identified in one of the core logs provided (R-23-80) from an elevation of approximately 1,146 feet above mean sea level to 1,050 feet above mean sea level. It is not known if this unit is part of the Balaklala Rhyolite. The geologic boring logs produced for this investigation are consistent with the 1980 core logs with the exception that no rhyolite unit was identified. Pyrite mineralization was identified in the 1980 coreholes and boreholes completed for this investigation.

Groundwater was encountered in each of the four boreholes drilled for this investigation. In two of the boreholes, B-2 and B-3, water was not observed in the boreholes up to 4 days after drilling. During the first groundwater sampling event conducted approximately 26 days after drilling, 1 to 2 feet of water was recorded in each of these wells. For well MW-1, water was not recorded immediately after drilling but was recorded the day after. Based on information collected during sampling of MW-1, it was estimated that the recharge rate was significantly less than 1 gallon per minute.

Borehole B-1 was observed during drilling and groundwater sampling to produce minor amounts of groundwater. The groundwater production rate was estimated at 1 to 2 gpm during drilling and was observed at less than 1 gpm during groundwater sampling purging operations. The groundwater purging operated at a flow rate of approximately 2 to 3 gpm and dewatered the well within 45 minutes.

## 3.2 Aerial Photograph Mapping

A visual lineation was performed for the site to attempt to identify linear features which may be present at the site. Lineation studies typically use multiple different visual sources to evaluate the presence of lineations. Lineations can help to identify geologic structural patterns or hydrologic patterns present at the site. These patterns can be interpreted as focal points of water flow pathways and facilitate identification of drilling locations for further hydrologic testing.

This study used readily available spatial data including aerial photographs, USGS topographic maps, digital elevation model (DEM), and LANDSAT images. The DEM was used to visualize landform in three primary figures, slope analysis, aspect analysis, and a contour density analysis. Each of these figures provides some insight to visually evaluate linear features. The figures generated are included in Appendix B.

The mapped lineations were evaluated during the field based geologic mapping. While each remotely mapped lineation was not apparent in the field, the structural features that were identified revealed similar orientations to the remotely mapped lineations. From these relationships confirmation of some general regional structural pattern can help to identify potential controls or pathways of surface water and groundwater movement at the site.

### 3.3 Field Mapping

The results of the field mapping program are summarized on Figure 2. Photographs of the representative rock types are also presented in Appendix C. As seen on Figure 2, the results of the field mapping are generally consistent with the mapping of the USGS (1906) whereby the site is directly underlain by deposits of the Copley Greenstone, Bass Mountain Diabase, and the Kennett Formation. The one discrepancy between the results of this field mapping program and the 1906 map is that the Bass Mountain Diabase was observed over the eastern portion of the property as opposed to the Kennett Formation. Brief descriptions of each of these units as observed in the field are provided below. During the field mapping program, specific areas were marked with a global positioning system (GPS). These points are designated as WP0042 through WP0082 on Figure 2. For descriptive purposes, features shown on Sheet 2, such as “North Pit”, “South Pit”, from a Resource Design January 2009 is also used for reference. A copy of this figure is provided in Appendix D.

**Copley Greenstone:** (Photographs 1 through 8, Appendix C) The Copley Greenstone was observed over the majority of the western portion of the site including all of the proposed North Pit area. In this area it is generally pale green to pale red on weathered surfaces and pale green to darker green in fresh surfaces. Exposed rock services indicate a fine grained matrix with few phenocrysts. At the top of the peak in the area of the proposed North Pit, exposures contain vesicles filled with quartz. Rinds around the quartz fillings are visible using a hand lens within most of the filled vesicles.

Below the area of the top of the proposed North Pit, starting at an elevation of approximately 1,400 feet above mean sea level (feet msl) a shear zone was noted (WP0058 through WP0061, Figure 2). In this area the rock is very hard, black, highly altered and fractured and in some areas drag folds were observed (Photographs 7 and 8). Calcite deposits were also observed within some fractured zones. Small amounts of seepage were observed through some of the fractures near the lower elevations of this area (Photograph 6, Appendix C). The trend of this fault was measured at 90 degrees azimuth (east to west) with an apparent high angle dip.

In areas outside of the shear zone, fractures and joints within the Copley Greenstone are widely spaced and mostly closed. Some fractures were observed with openings up to 0.07 inches (Photographs 2 and 3). Two orientations measured for these fractures were 84 degrees azimuth with a dip of 45 degrees to the northwest and 99 degrees azimuth with a dip of 49 degrees to the southwest. No water seepage was observed in this unit outside of the shear zone.

**Kennett Formation:** (Photographs 9 through 28, Appendix C) The Kennett Formation was observed within the central portion of the site as shown on Figure 2. The proposed Overburden Storage Site, Plant Site, and Stockpiling and Loadout areas are located on this formation (Appendix D). The 1906 USGS map also shows a small outcrop of this unit in the northwest portion of the site. Since this area was not observed during the November 12, 2009 site visit, this outcrop of the Kennett Formation was included on the geologic map produced for this investigation as shown on Figure 2.

In the eastern portion of the Site (WP0049 through WP0053, Figure 2), this formation consists of yellowish brown to reddish brown thinly bedded mudstones with trace amounts of interbedded black chert. Bedding planes are apparent with thicknesses up to 3 inches. The thickness of most

beds are less than 0.5 inches. Surface exposures of the mudstone are friable to moderately well indurated and are slightly to moderately weathered (Photographs 9 and 10). Apparent drag folding near location WP0053 (Photograph 11) suggests faulting in this area. Measured orientations of bedding planes in this area ranged from an azimuth of 229 degrees to 349 degrees with a dip of 37 degrees to 60 degrees to the northeast.

In the central portion of the site (locations WP0054 through WP0057, WP0065, and WP0075 through WP0082) the Kennett Formation consists of well indurated mudstones and black slaty chert beds. Bed thicknesses are up to 1.5 feet. Near location WP0080 folding is observed with fold axis trending at 320 degrees with a 19 degree dip to the north (Photograph 30). Near location WP0057 an excavated area that could be a filled in adit was observed (Photographs 14 through 18). In this area the Kennett Formation consists of a black cherty slate with some quartz veining. Fine grained (only observed using hand lens) pyrite mineralization was also observed. Evidence for groundwater seepage in this area was observed from reddish orange mineral staining on rock surfaces (Photograph 18).

A shear zone within the Kennett formation was observed within stream channels at locations WP0071 to WP0082 (Photographs 26 to 30). In this area, the Kennett Formation consists of a well indurated black cherty slate with minor quartz veining that has been extensively folded and faulted. In this area, the trend of the creeks appears to be in line with the trend of fold axis measured at an azimuth of 320 degrees. The apparent dip of the fold axis near point WP0080 was measured at 19 degrees to the northwest. Water within the creeks was only observed to be flowing in the area of the shear zone. Flow in this area was estimated at approximately 20 gallons per minute. No water was observed flowing in the creek past point WP0082.

In areas outside of the shear zone and area of the apparent adit, fractures are closely spaced and closed or clay filled and are generally developed along bedding planes. Appendix E presents a rose diagram illustrating the attitude of bedding planes for the Kennett Formation. A total of 10 attitudes or orientations were collected. Measurements were recorded as azimuth directions 0 to 359 degrees. A 0 degree measurement is due north and a 180 degree measurement is due south. The average mean orientation of these bedding planes is 242 degrees azimuth. The dip of these planes ranged from 11 degrees to the northwest to 85 degrees to the west.

**Bass Mountain Diabase:** (Photographs 29 to 34, Appendix C) The Bass Mountain Diabase is mapped within the eastern most portion of the site (locations WP0042 to WP0048) and to the north and south of the mapped Kennett Formation. Both the proposed South Pit and Processing Area (Appendix D) appear to be located on this formation.

In surface exposures, the Bass Mountain Diabase is a well indurated fine grained greenstone, brown on surface exposures and green on fresh surfaces. Soils developed within this formation yield a deep red color. Mostly fine, less than 0.5 inches diameter, quartz and plagioclase phenocrysts are apparent throughout this unit and distinguish it from the greenstones of the Copley Greenstone. A large plagioclase phenocryst near location WP0042 is shown on Photograph 29. Photograph 34 shows a limestone xenolith (country rock material) observed near location WP0045.

Fractures and joints within the Bass Mountain Diabase are widely spaced (6 to 10 inches) and open. Many fractures are filled with sediment. Two sets of conjugate fracture patterns were observed in this unit (Appendix E), one with an average trend of about 320 degrees azimuth and another with an

average trend of about 45 degrees azimuth. No water was observed seeping from surface fractures of the Bass Mountain Diabase. However, as discussed in Section 3.1, a small amount of water (generally less than 1 gpm) was produced from well MW-1 and B-1 located in the area of the proposed South Pit.

### 3.4 Summary and Recommendations

The mapping program was conducted to provide an initial knowledge base for future groundwater supply assessments that may be conducted at the site. The results of this program indicate that three geologic formations underlie the site, the Copley Greenstone, Kennett Formation, and Bass Mountain Diabase. The Copley Greenstone and Bass Mountain Diabase are altered fine grained volcanic rock. The Bass Mountain Diabase is younger than the Copley Greenstone and can be distinguished in the field from this unit by the presence of abundant phenocrysts. A xenolith of limestone observed in the Bass Mountain Diabase suggesting deposition after known local limestone units supports the younger age of this unit from the Copley Greenstone. The proposed South Pit of the future quarry will be within the Bass Mountain Diabase whereas the North Pit will be completed in an area underlain by the Copley Greenstone.

Water within both of the greenstone units would occur within fractures. Fractures within the Copley Greenstone were widely spaced and closed and no water was observed within fractures except in the area of shearing. In the shear zone area, water was observed seeping from fractures. Although surface fractures developed within the Bass Mountain Diabase are open, no water was observed seeping from this unit across the site. However, wells completed in this unit in the area of the proposed South Pit produced water at or less than 1 gpm. The wells completed in this area were at elevations above significant recharge zones and would not be expected to contain a significant amount of water. The Bass Mountain Diabase in the eastern area of the site is within areas that could contain significant recharge zones if fractures remain open at depth.

The Kennett Formation across the site consists of thinly bedded mudstones and black cherty slates. Within the mudstones fractures are developed along bedding planes, closed, and no water was observed seeping in these areas. In the middle portion of the site, a shear zone exists within the Kennett Formation with the development of open fractures. Water or evidence of water seeping was observed in these areas. Water within creek areas was only noted to flow in the shear area of the Kennett Formation. It is known that two wells drilled for the Mountain Gate Water District within a shear zone area of this formation produce up to 220 gallons per minute.

Based on this information, it is recommended that if exploration wells are drilled for assessing the potential water supply in this area that they be drilled in the following areas:

- One test well drilled in the area of the Kennett Formation shear zone where water was observed during drilling.
- One test well drilled in the eastern portion of the Bass Mountain Diabase where open fractures were observed in bedrock outcrops and the area could receive significant recharge from higher elevations. The Mountain Gate Water District reported that an unsuccessful test hole was drilled within the Bass Mountain Diabase.

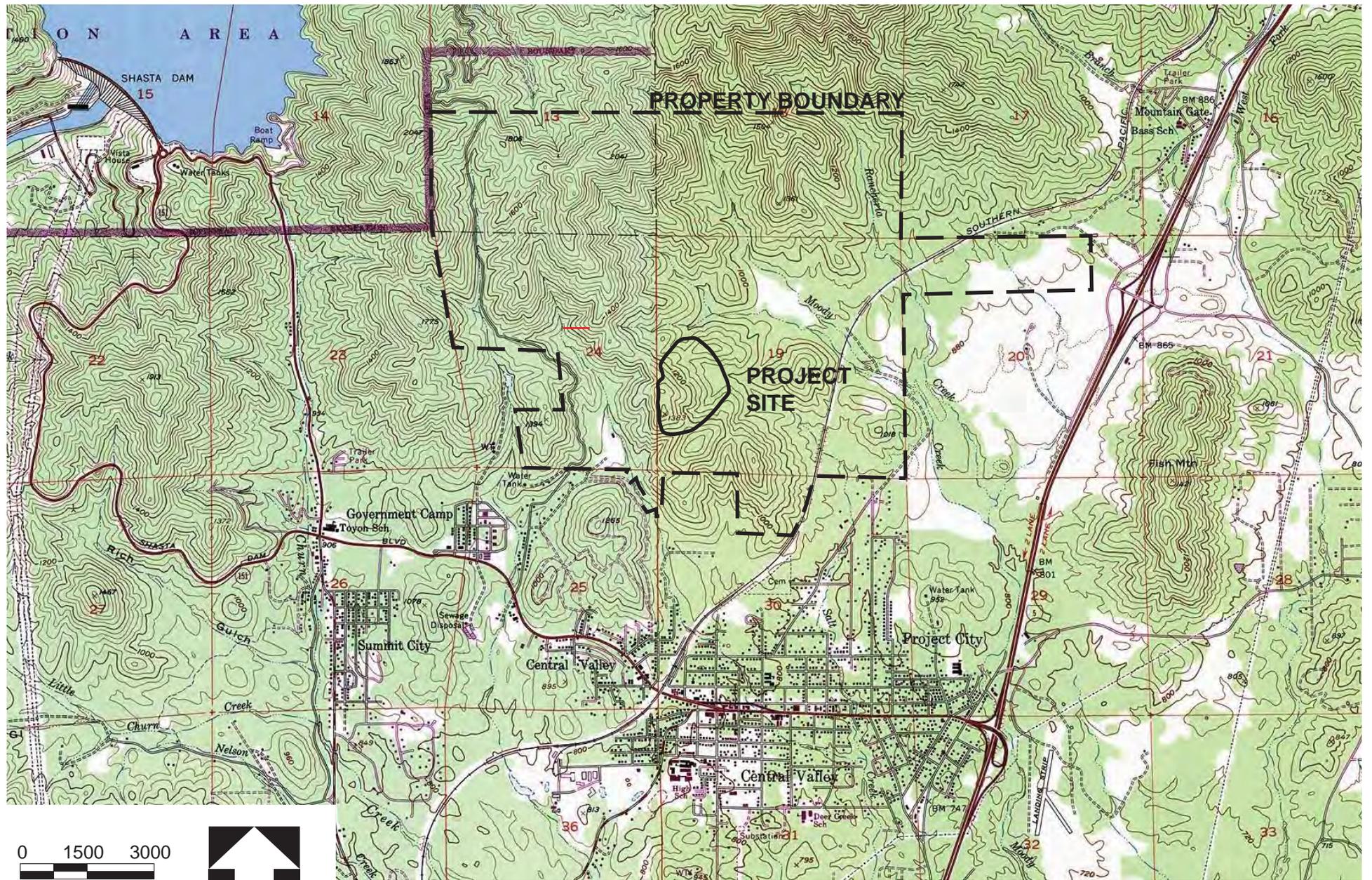
Due to the limited nature of the mapping program completed for this investigation, it is also recommended that further mapping be conducted along additional reaches of the creek areas where water was observed to be flowing during the summer months.

## FIGURES

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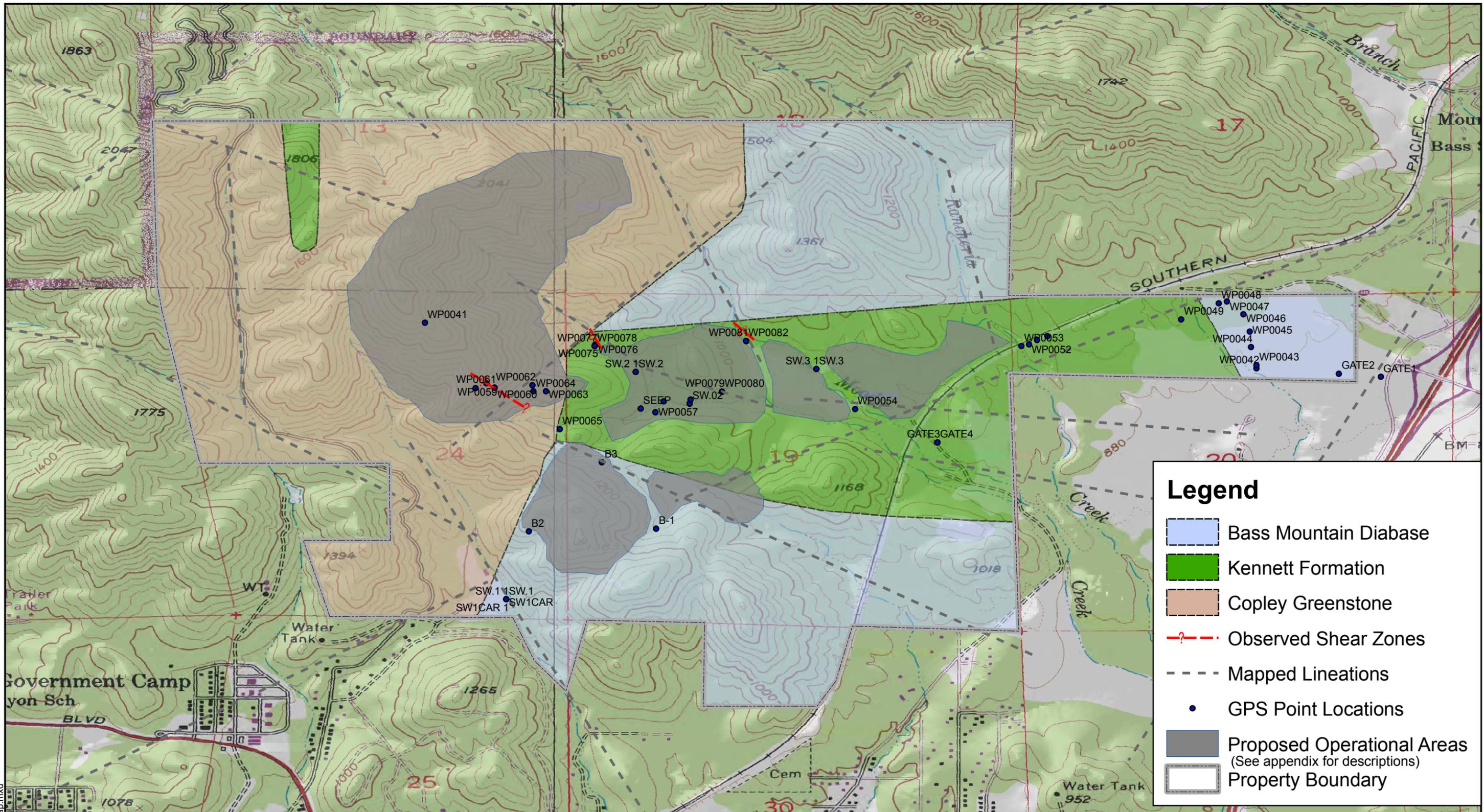
Figure 1. Vicinity Map

Figure 2. Geologic Map and Lincation Assessment



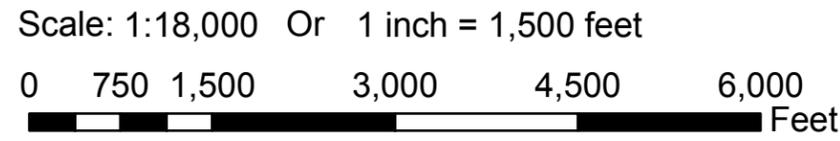
Source: National Geographic TOPO!

<b>BROWN AND CALDWELL</b>	DATE	6-30-09	3M Quarry, Shasta, California	FIGURE
	PROJECT	137108-003		



### Legend

- Bass Mountain Diabase
- Kennett Formation
- Copley Greenstone
- Observed Shear Zones
- Mapped Lineations
- GPS Point Locations
- Proposed Operational Areas  
(See appendix for descriptions)
- Property Boundary



Note:  
Base map adapted from USGS 1:24000 Scale Topographic Map.

SITE	Proposed 3M Quarry Moody Creek, CA	
TITLE	Geologic Map and Lineation Assessment	
<b>BROWN AND CALDWELL</b>	PROJECT	137108
	DATE	1/21/2010
	Figure	2

FILE: S:\MoodyCreek\Maps\Geomap.mxd

## TABLES

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Table 1. Summary of Well Construction Details

Table 2. Summary of Analytical and Field Parameter Results

**Table 1. Summary of Well Construction Details  
Proposed Moody Creek Quarry, Shasta County, California**

<i>Location Name</i>	<i>Sample Date</i>	<i>Total Depth (ft)</i>	<i>Conductor Interval (ft. msl)</i>	<i>Open Interval (ft. msl)</i>	<i>Screen Length (ft)</i>	<i>Depth To Water (ft)</i>	<i>Height of water in Well (ft)</i>	<i>Estimated Surface Elevation (ft. msl)</i>	<i>Estimated Water Surface Elevation (ft. msl)</i>	<i>Notes</i>
B-1	5/27/2009	49.80	1115 - 1095	1095 - 1065	20	17.95	31.85	1115	1097.05	~1 gpm recharge rate
<b>B-1</b>	<b>11/11/2009</b>	50.15	1115 - 1095	1095 - 1065	20	25.34	24.81	1115	1089.66	~1 gpm recharge rate
B-2	5/27/2009	49.95	1150 - 1130	1130 - 1100	20	48.03	1.92	1150	1101.97	Water likely condensate
<b>B-2</b>	<b>11/11/2009</b>	50.30	1150 - 1130	1130 - 1100	20	48.04	2.26	1150	1101.96	Water likely condensate
B-3	5/27/2009	49.90	1200 - 1180	1180 - 1150	20	48.82	1.08	1200	1151.18	Water likely condensate
<b>B-3</b>	<b>11/11/2009</b>	50.25	1150 - 1130	1130 - 1100	20	44.3	5.95	1150	1105.70	Water likely condensate
MW-1	5/26/2009	99.70	1200 - 1180	1180 - 1100	20	22.86	76.84	1200	1177.14	<1 gpm recharge rate
<b>MW-1</b>	<b>11/11/2009</b>	100.16	1200 - 1180	1180 - 1100	20	24.64	75.52	1200	1175.36	<1 gpm recharge rate

Note:

ft = Feet

ft. msl = Feet above mean sea level

gpm = gallons per minute

Table 2a: Summary of Analytical Results - Metals  
Proposed Moody Creek Quarry, Shasta County, California

Location Name	Sample Date	Aluminum (µg/L)	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Calcium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Iron (µg/L)	Lead (µg/L)	Magnesium (µg/L)	Manganese (µg/L)	Mercury (µg/L)	Molybdenum (µg/L)	Nickel (µg/L)	Potassium (µg/L)	Selenium (µg/L)	Silver (µg/L)	Sodium (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)
B-1	5/27/2009	<50	<5.0	<5.0	<20	<5.0	<10	<b>28000</b>	<10	<20	<10	<100	<5.0	<b>8800</b>	<b>31</b>	<0.20	<20	<20	<1000	<5.0	<10	<b>5700</b>	<1.0	<5.0	<20
B-1 (Dup-1)	5/27/2009	<50	<5.0	<5.0	<20	<5.0	<10	<b>30000</b>	<10	<20	<10	<100	<5.0	<b>9100</b>	<b>26</b>	<0.20	<20	<20	<1000	<5.0	<10	<b>5800</b>	<1.0	<5.0	<20
<b>B-1</b>	<b>11/12/2009</b>	<50	<5.0	<5.0	<20	<5.0	<10	<b>38000</b>	<10	<20	<10	<100	<5.0	<b>11000</b>	<b>24</b>	<0.20	<20	<20	<1000	<5.0	<10	<b>6300</b>	<1.0	<5.0	<20
B-2	5/27/2009	<50	<5.0	<5.0	<b>38</b>	<5.0	<10	<b>77000</b>	<10	<20	<10	<b>150</b>	<5.0	<b>30000</b>	<b>150</b>	<0.20	<20	<20	<1000	<5.0	<10	<b>34000</b>	<1.0	<5.0	<20
<b>B-2</b>	<b>11/12/2009</b>	<b>240</b>	<5.0	<5.0	<b>36</b>	<5.0	<10	<b>72000</b>	<10	<20	<10	<b>730</b>	<5.0	<b>23000</b>	<b>660</b>	<0.20	<20	<20	<1000	<5.0	<10	<b>130000</b>	<1.0	<5.0	<20
B-3	5/27/2009	<50	<b>8.1</b>	<b>6.2</b>	<20	<5.0	<10	<b>15000</b>	<10	<20	<10	<100	<5.0	<b>7700</b>	<b>25</b>	<0.20	<b>35</b>	<20	<b>1900</b>	<5.0	<10	<b>190000</b>	<1.0	<b>7.0</b>	<20
<b>B-3</b>	<b>11/12/2009</b>	<50	<5.0	<5.0	<b>32</b>	<5.0	<10	<b>67000</b>	<10	<20	<10	<100	<5.0	<b>30000</b>	<b>140</b>	<0.20	<b>25</b>	<20	<b>1100</b>	<5.0	<10	<b>74000</b>	<1.0	<b>9.4</b>	<20
MW-1	5/27/2009	<50	<5.0	<5.0	<20	<5.0	<10	<b>48000</b>	<10	<20	<10	<100	<5.0	<b>15000</b>	<b>81</b>	<0.20	<20	<20	<1000	<5.0	<10	<b>8500</b>	<1.0	<5.0	<20
<b>MW-1</b>	<b>11/12/2009</b>	<50	<5.0	<5.0	<20	<5.0	<10	<b>66000</b>	<10	<20	<10	<100	<5.0	<b>18000</b>	<b>140</b>	<0.20	<20	<20	<1000	<5.0	<10	<b>8900</b>	<1.0	<b>6.8</b>	<20

Note:  
mg/L = milligrams per liter  
µmhos/cm = micromhos per centimeter

**Table 2b: Summary of Analytical Results - Non-Metals**  
**Proposed Moody Creek Quarry, Shasta County, California**

<i>Location</i>	<i>Sample</i>	<i>Alkalinity, Bicarbonate as CaCO3</i>	<i>Alkalinity, Carbonate as CaCO3</i>	<i>Alkalinity, Hydroxide as CaCO3</i>	<i>Alkalinity, Total as CaCO3</i>	<i>Ammonia as Nitrogen, Total</i>	<i>Bromide</i>	<i>Chloride</i>	<i>Flouride</i>	<i>Hardness as CaCO3</i>	<i>Nitrate as N</i>	<i>Nitrite as N</i>	<i>Sulfate</i>	<i>TDS</i>
<i>Name</i>	<i>Date</i>	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>
B-1	5/27/2009	120	<5.0	<5.0	120	<0.10	<0.10	1.1	<0.10	100	<0.50	<0.10	4.1	140
B-1 (Dup-1)	5/27/2009	110	<5.0	<5.0	110	<0.10	<0.10	1.1	<0.10	100	<0.50	<0.10	4.1	140
<b>B-1</b>	<b>11/12/2009</b>	<b>140</b>	<5.0	<5.0	<b>140</b>	<0.10	<0.10	<b>1.0</b>	<b>0.10</b>	<b>140</b>	<0.50	<0.10	<b>5.7</b>	<b>160</b>
B-2	5/27/2009	350	<5.0	<5.0	350	<0.10	<0.10	3.4	<0.10	310	<0.50	<0.10	29	440
<b>B-2</b>	<b>11/12/2009</b>	<b>430</b>	<5.0	<5.0	<b>430</b>	<b>0.19</b>	<0.10	<b>4.4</b>	<b>0.11</b>	<b>260</b>	<0.50	<0.10	<b>120</b>	<b>580</b>
B-3	5/27/2009	420	<5.0	<5.0	420	<b>0.14</b>	<0.10	<b>5.4</b>	<b>0.18</b>	<b>43</b>	<0.50	<0.10	<b>73</b>	<b>700</b>
<b>B-3</b>	<b>11/12/2009</b>	<b>380</b>	<5.0	<5.0	<b>380</b>	<0.10	<0.10	<b>2.3</b>	<b>0.14</b>	<b>270</b>	<0.50	<0.10	<b>64</b>	<b>450</b>
MW-1	5/27/2009	190	<5.0	<5.0	190	<0.10	<0.10	1.2	<0.10	180	<0.50	<0.10	3.3	210
<b>MW-1</b>	<b>11/12/2009</b>	<b>250</b>	<5.0	<5.0	<b>250</b>	<0.10	<0.10	<b>1.2</b>	<0.10	<b>230</b>	<0.50	<0.10	<b>5.2</b>	<b>250</b>

Note:

mg/L = milligrams per liter

µmhos/cm = micromhos per centimeter

**Table 2c. Summary of Field Water Quality Measurements  
Proposed Moody Creek Quarry, Shasta County, California**

<i>Water Type</i>	<i>Location Name</i>	<i>Sample Date</i>	<i>Temperature (°C)</i>	<i>Conductivity (uS/cm)</i>	<i>pH (pH units)</i>	<i>Oxidation Reduction Potential (mV)</i>
<b>Surface Water</b>	SW-1	3/30/2009	14.24	149	7.65	69
	SW-2	3/30/2009	14.62	200	7	95
	SW-3	3/30/2009	12.9	145	6.99	100
<b>Ground-Water</b>	B-1	5/27/2009	17.8	210	8.14	-42
	<b>B-1</b>	<b>11/12/2009</b>	13.0	271	7.03	128
	B-2	5/27/2009	18.7	650	7.74	4
	<b>B-2</b>	<b>11/12/2009</b>	14.0	971	7.14	84
	B-3	5/27/2009	22.5	573.8	8.29	-30
	<b>B-3</b>	<b>11/12/2009</b>	15.6	815	7.24	40
	MW-1	5/27/2009	18.6	351	6.19	40
	<b>MW-1</b>	<b>11/12/2009</b>	14.1	464	7.72	85

Notes:

°C = Degrees Celcius

uS/cm = Microseimens per centimeter

mV = millivolts

## APPENDIX A

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Field Records and Analytical Reports

# CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

November 19, 2009

**CLS Work Order #: CSK0546**  
**COC #: 109429**

Joseph Turner  
Brown & Caldwell-Rancho Cordova  
10540 White Rock Rd. Suite 180  
Rancho Cordova, CA 95670

**Project Name: Moody Creek**

Enclosed are the results of analyses for samples received by the laboratory on 11/13/09 09:30. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

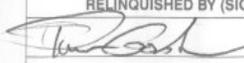


James Liang, Ph.D.  
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

# CALIFORNIA LABORATORY SERVICES

Brown & Caldwell-Rancho Cordova 10540 White Rock Rd. Suite 180 Rancho Cordova, CA 95670	Project: Moody Creek Project Number: 137108 Project Manager: Joseph Turner	CLS Work Order #: CSK0546 COC #: 109429
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CLS - Labs		CHAIN OF CUSTODY		ANALYSIS REQUESTED		GEOTRACKER:			
<b>REPORT TO:</b> NAME AND ADDRESS TIM GODWIN - BROWN & CALDWELL 10540 White Rock Rd. #180 Rancho Cordova, CA 95670 PROJECT MANAGER JOE TURNER (916) 853-5334 PROJECT NAME MOODY CREEK SAMPLED BY TIM GODWIN JOB DESCRIPTION GROUNDWATER SAMPLING SITE LOCATION MOODY CREEK QUARRY		<b>CLIENT JOB NUMBER</b> 137108 <b>DESTINATION LABORATORY*</b> <input checked="" type="checkbox"/> CLS (916) 638-7301 3249 FITZGERALD RD. RANCHO CORDOVA, CA. 95742 <input type="checkbox"/> OTHER		<b>CLS ID No.:</b> CSK 0546 <b>LOG NO.</b> 109429 <b>PRESERVATIVES</b> METALS (60.10/60.20/7470)* ALKALINITY (TOTAL/CARBONATE) TDS (60.1) ANIONS HARDNESS (130.2)		<b>EDF REPORT</b> <input type="checkbox"/> YES <input type="checkbox"/> NO <b>GLOBAL ID:</b> _____ <b>COMPOSITE:</b> _____ <b>FIELD CONDITIONS:</b> _____ <b>TURN AROUND TIME</b> <input type="checkbox"/> 1 DAY <input type="checkbox"/> 2 DAY <input type="checkbox"/> 5 DAY <input type="checkbox"/> 10 DAY <b>SPECIAL INSTRUCTIONS</b> _____ <b>OR</b> <b>ALT. ID:</b> _____			
DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	NO.	TYPE	1 DAY	2 DAY	5 DAY	10 DAY
4/12/09	10:20	B-1	H <sub>2</sub> O	2	1-16 Poly 1-500ml Poly			X	
	11:00	B-2						X	
	11:30	B-3						X	
	12:00	MW-1						X	
*Metals include: Ag, Al, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Mg, Mn, Ni, K, Na, Zn, Sb, As, Pb, Se, Tl, V, Mo **Anions include: Fluoride, Chloride, Bromide, NO <sub>3</sub> , NO <sub>2</sub> , NH <sub>4</sub> , Ammonia as N, Sulfate Metals 500ml Poly w/ HNO <sub>3</sub> Field Filtered w/ 0.45µm filter									
<b>RELINQUISHED BY (SIGN)</b> 		<b>PRINT NAME / COMPANY</b> TIM GODWIN / BROWN & CALDWELL		<b>DATE / TIME</b> 11/12/09 1430		<b>RECEIVED BY (SIGN)</b> _____		<b>PRINT NAME / COMPANY</b> _____	
<b>SUSPECTED CONSTITUENTS</b>		<b>PRESERVATIVES:</b> (1) HCL (2) HNO <sub>3</sub> (3) COLD (4) NaOH (5) H <sub>2</sub> SO <sub>4</sub> (6) Na <sub>2</sub> S <sub>2</sub> O <sub>5</sub> (7) =		<b>INVOICE TO:</b> _____ <b>PO #</b> _____ <b>QUOTE #</b> _____					
<b>REC'D AT LAB BY:</b> _____		<b>DATE / TIME:</b> 13		<b>CONDITIONS / COMMENTS:</b> _____					

LAB ORIGIN

# CALIFORNIA LABORATORY SERVICES

Brown & Caldwell-Rancho Cordova 10540 White Rock Rd. Suite 180 Rancho Cordova, CA 95670	Project: Moody Creek Project Number: 137108 Project Manager: Joseph Turner	CLS Work Order #: CSK0546 COC #: 109429
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## CHANGE OF STATUS

Lab Job No.: CSK0546

Name: CSK0546

Sample(s) Were Received: 11/13 Original Date Due: 11/20

Joe Turner/Turner of B+C was called  
(Client Contacted) (Company)

on 11/16/09 at 10:52  
(Date) (Time)

... and requested the following

Please add Hg to metals

Additional time requested for additional work: Same  
a. Burkett 11/16/09 10:53  
(Signature) (Date)

Update lab job database and file folder by: \_\_\_\_\_

H:\Alyssam\samprecchangeofstat.DOC

# CALIFORNIA LABORATORY SERVICES

Brown & Caldwell-Rancho Cordova 10540 White Rock Rd. Suite 180 Rancho Cordova, CA 95670	Project: Moody Creek Project Number: 137108 Project Manager: Joseph Turner	CLS Work Order #: CSK0546 COC #: 109429
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## Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>B-1 (CSK0546-01) Water    Sampled: 11/12/09 10:20    Received: 11/13/09 09:30</b>									
<b>Total Alkalinity</b>	<b>140</b>	5.0	mg/L	1	CS08638	11/13/09	11/13/09	SM2310B	
<b>Bicarbonate as CaCO3</b>	<b>140</b>	5.0	"	"	"	"	"	"	
Carbonate as CaCO3	ND	5.0	"	"	"	"	"	"	
Hydroxide as CaCO3	ND	5.0	"	"	"	"	"	"	
Ammonia as N	ND	0.10	"	"	CS08656	11/16/09	11/16/09	SM4500-NH3C	
Bromide	ND	0.10	"	"	CS08607	11/13/09	11/13/09	EPA 300.0	
<b>Chloride</b>	<b>1.0</b>	0.50	"	"	"	"	"	"	
<b>Fluoride</b>	<b>0.10</b>	0.10	"	"	"	"	"	"	
<b>Total Hardness as CaCO3</b>	<b>140</b>	1.0	"	"	CS08594	11/13/09	11/16/09	SM 2340B	
Nitrate as N	ND	0.50	"	"	CS08607	11/13/09	11/13/09	EPA 300.0	
Nitrite as N	ND	0.10	"	"	"	"	"	"	
<b>Sulfate as SO4</b>	<b>5.7</b>	0.50	"	"	"	"	"	"	
<b>Total Dissolved Solids</b>	<b>160</b>	10	"	"	CS08685	11/17/09	11/18/09	SM2540C	
<b>B-2 (CSK0546-03) Water    Sampled: 11/12/09 11:00    Received: 11/13/09 09:30</b>									
<b>Total Alkalinity</b>	<b>430</b>	5.0	mg/L	1	CS08638	11/13/09	11/13/09	SM2310B	
<b>Bicarbonate as CaCO3</b>	<b>430</b>	5.0	"	"	"	"	"	"	
Carbonate as CaCO3	ND	5.0	"	"	"	"	"	"	
Hydroxide as CaCO3	ND	5.0	"	"	"	"	"	"	
<b>Ammonia as N</b>	<b>0.19</b>	0.10	"	"	CS08656	11/16/09	11/16/09	SM4500-NH3C	
Bromide	ND	0.10	"	"	CS08607	11/13/09	11/13/09	EPA 300.0	
<b>Chloride</b>	<b>4.4</b>	0.50	"	"	"	"	"	"	
<b>Fluoride</b>	<b>0.11</b>	0.10	"	"	"	"	"	"	
<b>Total Hardness as CaCO3</b>	<b>260</b>	1.0	"	"	CS08594	11/13/09	11/16/09	SM 2340B	
Nitrate as N	ND	0.50	"	"	CS08607	11/13/09	11/13/09	EPA 300.0	
Nitrite as N	ND	0.10	"	"	"	"	"	"	
<b>Sulfate as SO4</b>	<b>120</b>	5.0	"	10	"	"	11/16/09	"	
<b>Total Dissolved Solids</b>	<b>580</b>	10	"	1	CS08685	11/17/09	11/18/09	SM2540C	

# CALIFORNIA LABORATORY SERVICES

Brown & Caldwell-Rancho Cordova 10540 White Rock Rd. Suite 180 Rancho Cordova, CA 95670	Project: Moody Creek Project Number: 137108 Project Manager: Joseph Turner	CLS Work Order #: CSK0546 COC #: 109429
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## Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>B-3 (CSK0546-05) Water    Sampled: 11/12/09 11:30    Received: 11/13/09 09:30</b>									
<b>Total Alkalinity</b>	<b>380</b>	5.0	mg/L	1	CS08638	11/13/09	11/13/09	SM2310B	
<b>Bicarbonate as CaCO3</b>	<b>380</b>	5.0	"	"	"	"	"	"	
Carbonate as CaCO3	ND	5.0	"	"	"	"	"	"	
Hydroxide as CaCO3	ND	5.0	"	"	"	"	"	"	
Ammonia as N	ND	0.10	"	"	CS08656	11/16/09	11/16/09	SM4500-NH3C	
Bromide	ND	0.10	"	"	CS08607	11/13/09	11/13/09	EPA 300.0	
<b>Chloride</b>	<b>2.3</b>	0.50	"	"	"	"	"	"	
<b>Fluoride</b>	<b>0.14</b>	0.10	"	"	"	"	"	"	
<b>Total Hardness as CaCO3</b>	<b>270</b>	1.0	"	"	CS08594	11/13/09	11/16/09	SM 2340B	
Nitrate as N	ND	0.50	"	"	CS08607	11/13/09	11/13/09	EPA 300.0	
Nitrite as N	ND	0.10	"	"	"	"	"	"	
<b>Sulfate as SO4</b>	<b>64</b>	2.5	"	5	"	"	11/16/09	"	
<b>Total Dissolved Solids</b>	<b>450</b>	10	"	1	CS08685	11/17/09	11/18/09	SM2540C	
<b>MW-1 (CSK0546-07) Water    Sampled: 11/12/09 12:00    Received: 11/13/09 09:30</b>									
<b>Total Alkalinity</b>	<b>250</b>	5.0	mg/L	1	CS08638	11/13/09	11/13/09	SM2310B	
<b>Bicarbonate as CaCO3</b>	<b>250</b>	5.0	"	"	"	"	"	"	
Carbonate as CaCO3	ND	5.0	"	"	"	"	"	"	
Hydroxide as CaCO3	ND	5.0	"	"	"	"	"	"	
Ammonia as N	ND	0.10	"	"	CS08656	11/16/09	11/16/09	SM4500-NH3C	
Bromide	ND	0.10	"	"	CS08607	11/13/09	11/13/09	EPA 300.0	
<b>Chloride</b>	<b>1.2</b>	0.50	"	"	"	"	"	"	
Fluoride	ND	0.10	"	"	"	"	"	"	
<b>Total Hardness as CaCO3</b>	<b>230</b>	1.0	"	"	CS08594	11/13/09	11/16/09	SM 2340B	
Nitrate as N	ND	0.50	"	"	CS08607	11/13/09	11/13/09	EPA 300.0	
Nitrite as N	ND	0.10	"	"	"	"	"	"	
<b>Sulfate as SO4</b>	<b>5.2</b>	0.50	"	"	"	"	"	"	
<b>Total Dissolved Solids</b>	<b>250</b>	10	"	"	CS08685	11/17/09	11/18/09	SM2540C	

# CALIFORNIA LABORATORY SERVICES

Brown & Caldwell-Rancho Cordova 10540 White Rock Rd. Suite 180 Rancho Cordova, CA 95670	Project: Moody Creek Project Number: 137108 Project Manager: Joseph Turner	CLS Work Order #: CSK0546 COC #: 109429
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## Metals (Dissolved) by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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**B-1 (Field Filtered) (CSK0546-02) Water    Sampled: 11/12/09 10:20    Received: 11/13/09 09:30**

Mercury	ND	0.20	µg/L	1	CS08732	11/18/09	11/18/09	EPA 7470A	
Aluminum	ND	50	"	"	CS08641	11/13/09	11/14/09	EPA 6010B	
Barium	ND	20	"	"	"	"	"	"	
Beryllium	ND	5.0	"	"	"	"	"	"	
Cadmium	ND	10	"	"	"	"	"	"	
<b>Calcium</b>	<b>3800</b>	1000	"	"	"	"	"	"	
Chromium	ND	10	"	"	"	"	"	"	
Cobalt	ND	20	"	"	"	"	"	"	
Copper	ND	10	"	"	"	"	"	"	
Iron	ND	100	"	"	"	"	"	"	
<b>Magnesium</b>	<b>11000</b>	1000	"	"	"	"	"	"	
<b>Manganese</b>	<b>24</b>	20	"	"	"	"	"	"	
Molybdenum	ND	20	"	"	"	"	"	"	
Nickel	ND	20	"	"	"	"	"	"	
Potassium	ND	1000	"	"	"	"	"	"	
Silver	ND	10	"	"	"	"	"	"	
<b>Sodium</b>	<b>6300</b>	1000	"	"	"	"	"	"	
Zinc	ND	20	"	"	"	"	"	"	
Vanadium	ND	4.0	"	"	CS08653	11/16/09	11/16/09	EPA 7000/6020	
Antimony	ND	6.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Lead	ND	5.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	

**B-2 (Field Filtered) (CSK0546-04) Water    Sampled: 11/12/09 11:00    Received: 11/13/09 09:30**

Mercury	ND	0.20	µg/L	1	CS08732	11/18/09	11/18/09	EPA 7470A	
<b>Aluminum</b>	<b>240</b>	50	"	"	CS08641	11/13/09	11/14/09	EPA 6010B	
<b>Barium</b>	<b>36</b>	20	"	"	"	"	"	"	
Beryllium	ND	5.0	"	"	"	"	"	"	
Cadmium	ND	10	"	"	"	"	"	"	
<b>Calcium</b>	<b>72000</b>	1000	"	"	"	"	"	"	

# CALIFORNIA LABORATORY SERVICES

Brown & Caldwell-Rancho Cordova 10540 White Rock Rd. Suite 180 Rancho Cordova, CA 95670	Project: Moody Creek Project Number: 137108 Project Manager: Joseph Turner	CLS Work Order #: CSK0546 COC #: 109429
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## Metals (Dissolved) by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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### B-2 (Field Filtered) (CSK0546-04) Water Sampled: 11/12/09 11:00 Received: 11/13/09 09:30

Chromium	ND	10	µg/L	1	CS08641	"	11/14/09	EPA 6010B	
Cobalt	ND	20	"	"	"	"	"	"	
Copper	ND	10	"	"	"	"	"	"	
<b>Iron</b>	<b>730</b>	100	"	"	"	"	"	"	
<b>Magnesium</b>	<b>23000</b>	1000	"	"	"	"	"	"	
<b>Manganese</b>	<b>660</b>	20	"	"	"	"	"	"	
Molybdenum	ND	20	"	"	"	"	"	"	
Nickel	ND	20	"	"	"	"	"	"	
Potassium	ND	1000	"	"	"	"	"	"	
Silver	ND	10	"	"	"	"	"	"	
<b>Sodium</b>	<b>130000</b>	1000	"	"	"	"	"	"	
Zinc	ND	20	"	"	"	"	"	"	
Vanadium	ND	4.0	"	"	CS08653	11/16/09	11/16/09	EPA 7000/6020	
Antimony	ND	6.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Lead	ND	5.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	

### B-3 (Field Filtered) (CSK0546-06) Water Sampled: 11/12/09 11:30 Received: 11/13/09 09:30

Mercury	ND	0.20	µg/L	1	CS08732	11/18/09	11/18/09	EPA 7470A	
Aluminum	ND	50	"	"	CS08641	11/13/09	11/14/09	EPA 6010B	
<b>Barium</b>	<b>32</b>	20	"	"	"	"	"	"	
Beryllium	ND	5.0	"	"	"	"	"	"	
Cadmium	ND	10	"	"	"	"	"	"	
<b>Calcium</b>	<b>67000</b>	1000	"	"	"	"	"	"	
Chromium	ND	10	"	"	"	"	"	"	
Cobalt	ND	20	"	"	"	"	"	"	
Copper	ND	10	"	"	"	"	"	"	
Iron	ND	100	"	"	"	"	"	"	
<b>Magnesium</b>	<b>30000</b>	1000	"	"	"	"	"	"	
<b>Manganese</b>	<b>140</b>	20	"	"	"	"	"	"	

# CALIFORNIA LABORATORY SERVICES

Brown & Caldwell-Rancho Cordova 10540 White Rock Rd. Suite 180 Rancho Cordova, CA 95670	Project: Moody Creek Project Number: 137108 Project Manager: Joseph Turner	CLS Work Order #: CSK0546 COC #: 109429
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## Metals (Dissolved) by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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### B-3 (Field Filtered) (CSK0546-06) Water Sampled: 11/12/09 11:30 Received: 11/13/09 09:30

<b>Molybdenum</b>	<b>25</b>	20	µg/L	1	CS08641	"	11/14/09	EPA 6010B	
Nickel	ND	20	"	"	"	"	"	"	
<b>Potassium</b>	<b>1100</b>	1000	"	"	"	"	"	"	
Silver	ND	10	"	"	"	"	"	"	
<b>Sodium</b>	<b>74000</b>	1000	"	"	"	"	"	"	
Zinc	ND	20	"	"	"	"	"	"	
Antimony	ND	6.0	"	"	CS08653	11/16/09	11/16/09	EPA 7000/6020	
<b>Vanadium</b>	<b>9.4</b>	4.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Lead	ND	5.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	

### MW-1 (Field Filtered) (CSK0546-08) Water Sampled: 11/12/09 12:00 Received: 11/13/09 09:30

Mercury	ND	0.20	µg/L	1	CS08732	11/18/09	11/18/09	EPA 7470A	
Aluminum	ND	50	"	"	CS08641	11/13/09	11/14/09	EPA 6010B	
Barium	ND	20	"	"	"	"	"	"	
Beryllium	ND	5.0	"	"	"	"	"	"	
Cadmium	ND	10	"	"	"	"	"	"	
<b>Calcium</b>	<b>66000</b>	1000	"	"	"	"	"	"	
Chromium	ND	10	"	"	"	"	"	"	
Cobalt	ND	20	"	"	"	"	"	"	
Copper	ND	10	"	"	"	"	"	"	
Iron	ND	100	"	"	"	"	"	"	
<b>Magnesium</b>	<b>18000</b>	1000	"	"	"	"	"	"	
<b>Manganese</b>	<b>140</b>	20	"	"	"	"	"	"	
Molybdenum	ND	20	"	"	"	"	"	"	
Nickel	ND	20	"	"	"	"	"	"	
Potassium	ND	1000	"	"	"	"	"	"	
Silver	ND	10	"	"	"	"	"	"	
<b>Sodium</b>	<b>8900</b>	1000	"	"	"	"	"	"	
Zinc	ND	20	"	"	"	"	"	"	

# CALIFORNIA LABORATORY SERVICES

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Brown & Caldwell-Rancho Cordova  
10540 White Rock Rd. Suite 180  
Rancho Cordova, CA 95670

Project: Moody Creek  
Project Number: 137108  
Project Manager: Joseph Turner

**CLS Work Order #: CSK0546**  
COC #: 109429

## Metals (Dissolved) by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>MW-1 (Field Filtered) (CSK0546-08) Water    Sampled: 11/12/09 12:00    Received: 11/13/09 09:30</b>									
<b>Vanadium</b>	<b>6.8</b>	4.0	µg/L	1	CS08653	11/16/09	11/16/09	EPA 7000/6020	
Antimony	ND	6.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Lead	ND	5.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	

# CALIFORNIA LABORATORY SERVICES

Brown & Caldwell-Rancho Cordova 10540 White Rock Rd. Suite 180 Rancho Cordova, CA 95670	Project: Moody Creek Project Number: 137108 Project Manager: Joseph Turner	CLS Work Order #: CSK0546 COC #: 109429
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## Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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### Batch CS08594 - 6010A/No Digestion

**Blank (CS08594-BLK1)** Prepared: 11/12/09 Analyzed: 11/16/09

Total Hardness as CaCO3	ND	1.0	mg/L							
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**LCS (CS08594-BS1)** Prepared: 11/12/09 Analyzed: 11/16/09

Total Hardness as CaCO3	71.8	1.0	mg/L	66.2		108	80-120			
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**LCS Dup (CS08594-BSD1)** Prepared: 11/12/09 Analyzed: 11/16/09

Total Hardness as CaCO3	70.1	1.0	mg/L	66.2		106	80-120	2	20	
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**Matrix Spike (CS08594-MS1)** Source: CSK0408-01 Prepared: 11/12/09 Analyzed: 11/16/09

Total Hardness as CaCO3	272	1.0	mg/L	66.2	227	69	75-125			QM-7
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**Matrix Spike Dup (CS08594-MSD1)** Source: CSK0408-01 Prepared: 11/12/09 Analyzed: 11/16/09

Total Hardness as CaCO3	269	1.0	mg/L	66.2	227	63	75-125	1	25	QM-7
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### Batch CS08607 - General Prep

**Blank (CS08607-BLK1)** Prepared & Analyzed: 11/13/09

Fluoride	ND	0.10	mg/L							
Sulfate as SO4	ND	0.50	"							
Chloride	ND	0.50	"							
Bromide	ND	0.10	"							
Nitrite as N	ND	0.10	"							
Nitrate as N	ND	0.50	"							

**LCS (CS08607-BS1)** Prepared & Analyzed: 11/13/09

Bromide	2.01	0.10	mg/L	2.00		100	80-120			
Fluoride	2.00	0.10	"	2.00		100	80-120			
Sulfate as SO4	4.85	0.50	"	5.00		97	80-120			
Chloride	1.88	0.50	"	2.00		94	80-120			
Nitrate as N	0.469	0.50	"	0.451		104	80-120			
Nitrite as N	0.612	0.10	"	0.610		100	80-120			

# CALIFORNIA LABORATORY SERVICES

Brown & Caldwell-Rancho Cordova 10540 White Rock Rd. Suite 180 Rancho Cordova, CA 95670	Project: Moody Creek Project Number: 137108 Project Manager: Joseph Turner	CLS Work Order #: CSK0546 COC #: 109429
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## Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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### Batch CS08607 - General Prep

#### LCS Dup (CS08607-BSD1)

Prepared: 11/13/09 Analyzed: 11/14/09

Chloride	1.91	0.50	mg/L	2.00		95	80-120	1	20	
Bromide	2.05	0.10	"	2.00		102	80-120	2	20	
Fluoride	2.05	0.10	"	2.00		102	80-120	3	20	
Sulfate as SO4	4.94	0.50	"	5.00		99	80-120	2	20	
Nitrite as N	0.615	0.10	"	0.610		101	80-120	0.5	20	
Nitrate as N	0.477	0.50	"	0.451		106	80-120	2	20	

#### Matrix Spike (CS08607-MS1)

Source: CSK0546-01

Prepared & Analyzed: 11/13/09

Bromide	2.01	0.10	mg/L	2.00	ND	101	75-125			
Chloride	2.86	0.50	"	2.00	1.02	92	75-125			
Fluoride	2.02	0.10	"	2.00	0.103	96	75-125			
Sulfate as SO4	10.7	0.50	"	5.00	5.66	102	75-125			
Nitrate as N	0.607	0.50	"	0.451	0.190	93	80-120			
Nitrite as N	0.608	0.10	"	0.610	ND	100	75-125			

#### Matrix Spike Dup (CS08607-MSD1)

Source: CSK0546-01

Prepared & Analyzed: 11/13/09

Bromide	2.06	0.10	mg/L	2.00	ND	103	75-125	2	25	
Fluoride	2.05	0.10	"	2.00	0.103	97	75-125	1	25	
Chloride	2.89	0.50	"	2.00	1.02	94	75-125	1	25	
Sulfate as SO4	10.9	0.50	"	5.00	5.66	104	75-125	1	25	
Nitrite as N	0.622	0.10	"	0.610	ND	102	75-125	2	25	
Nitrate as N	0.615	0.50	"	0.451	0.190	94	80-120	1	20	

### Batch CS08638 - General Preparation

#### Blank (CS08638-BLK1)

Prepared & Analyzed: 11/13/09

Total Alkalinity	ND	5.0	mg/L							
Bicarbonate as CaCO3	ND	5.0	"							
Carbonate as CaCO3	ND	5.0	"							
Hydroxide as CaCO3	ND	5.0	"							

# CALIFORNIA LABORATORY SERVICES

Brown & Caldwell-Rancho Cordova 10540 White Rock Rd. Suite 180 Rancho Cordova, CA 95670	Project: Moody Creek Project Number: 137108 Project Manager: Joseph Turner	CLS Work Order #: CSK0546 COC #: 109429
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## Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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### Batch CS08638 - General Preparation

Duplicate (CS08638-DUP1)	Source: CSK0546-01			Prepared & Analyzed: 11/13/09						
Total Alkalinity	146	5.0	mg/L		143			2	20	
Bicarbonate as CaCO3	146	5.0	"		143			2	20	
Carbonate as CaCO3	ND	5.0	"		ND				20	
Hydroxide as CaCO3	ND	5.0	"		ND				20	

### Batch CS08656 - General Preparation

Blank (CS08656-BLK1)				Prepared & Analyzed: 11/16/09						
Ammonia as N	ND	0.10	mg/L							
LCS (CS08656-BS1)				Prepared & Analyzed: 11/16/09						
Ammonia as N	0.439	0.10	mg/L	0.500		88	80-120			
LCS Dup (CS08656-BSD1)				Prepared & Analyzed: 11/16/09						
Ammonia as N	0.439	0.10	mg/L	0.500		88	80-120	0	25	
Matrix Spike (CS08656-MS1)	Source: CSK0479-01			Prepared & Analyzed: 11/16/09						
Ammonia as N	0.488	0.10	mg/L	0.500	ND	98	75-125			
Matrix Spike Dup (CS08656-MSD1)	Source: CSK0479-01			Prepared & Analyzed: 11/16/09						
Ammonia as N	0.488	0.10	mg/L	0.500	ND	98	75-125	0	25	

### Batch CS08685 - General Preparation

Blank (CS08685-BLK1)				Prepared: 11/17/09 Analyzed: 11/18/09						
Total Dissolved Solids	ND	10	mg/L							

# CALIFORNIA LABORATORY SERVICES

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Brown & Caldwell-Rancho Cordova 10540 White Rock Rd. Suite 180 Rancho Cordova, CA 95670	Project: Moody Creek Project Number: 137108 Project Manager: Joseph Turner	CLS Work Order #: CSK0546 COC #: 109429
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## Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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### Batch CS08685 - General Preparation

<b>Duplicate (CS08685-DUP1)</b>	<b>Source: CSK0535-01</b>		Prepared: 11/17/09		Analyzed: 11/18/09					
Total Dissolved Solids	384	10	mg/L		370			4	20	

# CALIFORNIA LABORATORY SERVICES

Brown & Caldwell-Rancho Cordova 10540 White Rock Rd. Suite 180 Rancho Cordova, CA 95670	Project: Moody Creek Project Number: 137108 Project Manager: Joseph Turner	CLS Work Order #: CSK0546 COC #: 109429
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## Metals (Dissolved) by EPA 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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### Batch CS08641 - EPA 3010A

#### Blank (CS08641-BLK1)

Prepared: 11/13/09 Analyzed: 11/14/09

Aluminum	ND	50	µg/L							
Barium	ND	20	"							
Beryllium	ND	5.0	"							
Cadmium	ND	10	"							
Calcium	ND	1000	"							
Chromium	ND	10	"							
Cobalt	ND	20	"							
Copper	ND	10	"							
Iron	ND	100	"							
Magnesium	ND	1000	"							
Manganese	ND	20	"							
Molybdenum	ND	20	"							
Nickel	ND	20	"							
Potassium	ND	1000	"							
Silver	ND	10	"							
Sodium	ND	1000	"							
Zinc	ND	20	"							

#### LCS (CS08641-BS1)

Prepared: 11/13/09 Analyzed: 11/14/09

Aluminum	2640	50	µg/L	2500	106	80-120
Barium	1910	20	"	2000	96	80-120
Beryllium	48.6	5.0	"	50.0	97	80-120
Cadmium	51.0	10	"	50.0	102	80-120
Calcium	10000	1000	"	10000	100	80-120
Chromium	201	10	"	200	101	80-120
Cobalt	490	20	"	500	98	80-120
Copper	244	10	"	250	97	80-120
Iron	1110	100	"	1000	111	80-120
Magnesium	11900	1000	"	12000	99	80-120
Manganese	493	20	"	500	98	80-120
Molybdenum	481	20	"	500	96	80-120

# CALIFORNIA LABORATORY SERVICES

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Brown & Caldwell-Rancho Cordova 10540 White Rock Rd. Suite 180 Rancho Cordova, CA 95670	Project: Moody Creek Project Number: 137108 Project Manager: Joseph Turner	CLS Work Order #: CSK0546 COC #: 109429
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## Metals (Dissolved) by EPA 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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### Batch CS08641 - EPA 3010A

#### LCS (CS08641-BS1)

Prepared: 11/13/09 Analyzed: 11/14/09

Nickel	498	20	µg/L	500		100	80-120			
Potassium	9640	1000	"	10000		96	80-120			
Silver	28.3	10	"	25.0		113	80-120			
Sodium	11800	1000	"	10000		118	80-120			
Zinc	510	20	"	500		102	80-120			

#### LCS Dup (CS08641-BSD1)

Prepared: 11/13/09 Analyzed: 11/14/09

Aluminum	2620	50	µg/L	2500		105	80-120	1	20	
Barium	1900	20	"	2000		95	80-120	0.9	20	
Beryllium	47.9	5.0	"	50.0		96	80-120	2	20	
Cadmium	52.4	10	"	50.0		105	80-120	3	20	
Calcium	9940	1000	"	10000		99	80-120	0.9	20	
Chromium	200	10	"	200		100	80-120	0.9	20	
Cobalt	484	20	"	500		97	80-120	1	20	
Copper	242	10	"	250		97	80-120	0.7	20	
Iron	1090	100	"	1000		109	80-120	1	20	
Magnesium	11700	1000	"	12000		98	80-120	2	20	
Manganese	488	20	"	500		98	80-120	0.9	20	
Molybdenum	477	20	"	500		95	80-120	0.8	20	
Nickel	499	20	"	500		100	80-120	0.1	20	
Potassium	9460	1000	"	10000		95	80-120	2	20	
Silver	27.4	10	"	25.0		110	80-120	3	20	
Sodium	11800	1000	"	10000		118	80-120	0.5	20	
Zinc	505	20	"	500		101	80-120	1	20	

#### Matrix Spike (CS08641-MS1)

Source: CSK0463-01

Prepared: 11/13/09 Analyzed: 11/14/09

Aluminum	2960	50	µg/L	2500	392	103	75-125			
Barium	1890	20	"	2000	28.9	93	75-125			
Beryllium	47.1	5.0	"	50.0	ND	94	75-125			
Cadmium	51.0	10	"	50.0	ND	102	75-125			
Calcium	22200	1000	"	10000	13000	92	75-125			
Chromium	194	10	"	200	ND	97	75-125			

CA DOHS ELAP Accreditation/Registration Number 1233

# CALIFORNIA LABORATORY SERVICES

Brown & Caldwell-Rancho Cordova 10540 White Rock Rd. Suite 180 Rancho Cordova, CA 95670	Project: Moody Creek Project Number: 137108 Project Manager: Joseph Turner	CLS Work Order #: CSK0546 COC #: 109429
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## Metals (Dissolved) by EPA 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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### Batch CS08641 - EPA 3010A

Matrix Spike (CS08641-MS1)	Source: CSK0463-01			Prepared: 11/13/09		Analyzed: 11/14/09			
Cobalt	552	20	µg/L	500	80.1	94	75-125		
Copper	237	10	"	250	ND	95	75-125		
Iron	23000	100	"	1000	22900	3	75-125		QM-4X
Magnesium	16100	1000	"	12000	4680	95	75-125		
Manganese	861	20	"	500	400	92	75-125		
Molybdenum	472	20	"	500	ND	94	75-125		
Nickel	578	20	"	500	100	96	75-125		
Potassium	15800	1000	"	10000	6480	93	75-125		
Silver	26.7	10	"	25.0	ND	107	75-125		
Sodium	41400	1000	"	10000	31100	103	75-125		
Zinc	1050	20	"	500	573	95	75-125		

Matrix Spike (CS08641-MS2)	Source: CSK0535-01			Prepared: 11/13/09		Analyzed: 11/14/09			
Aluminum	2630	50	µg/L	2500	ND	105	75-125		
Barium	2120	20	"	2000	227	95	75-125		
Beryllium	49.3	5.0	"	50.0	ND	99	75-125		
Cadmium	46.7	10	"	50.0	ND	93	75-125		
Calcium	54400	1000	"	10000	44700	97	75-125		
Chromium	225	10	"	200	25.4	100	75-125		
Cobalt	482	20	"	500	ND	96	75-125		
Copper	245	10	"	250	3.30	97	75-125		
Iron	1080	100	"	1000	ND	108	75-125		
Magnesium	50800	1000	"	12000	39000	98	75-125		
Manganese	483	20	"	500	ND	97	75-125		
Molybdenum	476	20	"	500	ND	95	75-125		
Nickel	489	20	"	500	ND	98	75-125		
Potassium	11200	1000	"	10000	1660	96	75-125		
Silver	25.3	10	"	25.0	ND	101	75-125		
Sodium	61200	1000	"	10000	49400	118	75-125		
Zinc	522	20	"	500	22.2	100	75-125		

# CALIFORNIA LABORATORY SERVICES

Brown & Caldwell-Rancho Cordova 10540 White Rock Rd. Suite 180 Rancho Cordova, CA 95670	Project: Moody Creek Project Number: 137108 Project Manager: Joseph Turner	CLS Work Order #: CSK0546 COC #: 109429
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## Metals (Dissolved) by EPA 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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### Batch CS08641 - EPA 3010A

Matrix Spike Dup (CS08641-MSD1)	Source: CSK0463-01			Prepared: 11/13/09	Analyzed: 11/14/09					
Aluminum	3010	50	µg/L	2500	392	105	75-125	2	25	
Barium	1930	20	"	2000	28.9	95	75-125	2	25	
Beryllium	48.5	5.0	"	50.0	ND	97	75-125	3	25	
Cadmium	50.2	10	"	50.0	ND	100	75-125	2	25	
Calcium	22600	1000	"	10000	13000	96	75-125	2	25	
Chromium	202	10	"	200	ND	101	75-125	4	25	
Cobalt	559	20	"	500	80.1	96	75-125	1	25	
Copper	242	10	"	250	ND	97	75-125	2	25	
Iron	23400	100	"	1000	22900	48	75-125	2	25	QM-4X
Magnesium	16400	1000	"	12000	4680	98	75-125	2	25	
Manganese	877	20	"	500	400	95	75-125	2	25	
Molybdenum	479	20	"	500	ND	96	75-125	2	25	
Nickel	589	20	"	500	100	98	75-125	2	25	
Potassium	16100	1000	"	10000	6480	96	75-125	2	25	
Silver	27.7	10	"	25.0	ND	111	75-125	4	25	
Sodium	42200	1000	"	10000	31100	111	75-125	2	25	
Zinc	1060	20	"	500	573	98	75-125	2	25	

Matrix Spike Dup (CS08641-MSD2)	Source: CSK0535-01			Prepared: 11/13/09	Analyzed: 11/14/09					
Aluminum	2570	50	µg/L	2500	ND	103	75-125	2	25	
Barium	2060	20	"	2000	227	92	75-125	3	25	
Beryllium	48.1	5.0	"	50.0	ND	96	75-125	2	25	
Cadmium	47.3	10	"	50.0	ND	95	75-125	1	25	
Calcium	53000	1000	"	10000	44700	83	75-125	3	25	
Chromium	219	10	"	200	25.4	97	75-125	3	25	
Cobalt	473	20	"	500	ND	95	75-125	2	25	
Copper	239	10	"	250	3.30	94	75-125	3	25	
Iron	1070	100	"	1000	ND	107	75-125	2	25	
Magnesium	49400	1000	"	12000	39000	87	75-125	3	25	
Manganese	473	20	"	500	ND	95	75-125	2	25	
Molybdenum	464	20	"	500	ND	93	75-125	3	25	

# CALIFORNIA LABORATORY SERVICES

Brown & Caldwell-Rancho Cordova 10540 White Rock Rd. Suite 180 Rancho Cordova, CA 95670	Project: Moody Creek Project Number: 137108 Project Manager: Joseph Turner	CLS Work Order #: CSK0546 COC #: 109429
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## Metals (Dissolved) by EPA 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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### Batch CS08641 - EPA 3010A

Matrix Spike Dup (CS08641-MSD2)	Source: CSK0535-01			Prepared: 11/13/09		Analyzed: 11/14/09				
Nickel	481	20	µg/L	500	ND	96	75-125	2	25	
Potassium	10900	1000	"	10000	1660	92	75-125	3	25	
Silver	23.5	10	"	25.0	ND	94	75-125	7	25	
Sodium	59300	1000	"	10000	49400	99	75-125	3	25	
Zinc	518	20	"	500	22.2	99	75-125	0.9	25	

### Batch CS08653 - EPA 3020A

Blank (CS08653-BLK1)	Prepared & Analyzed: 11/16/09									
Antimony	ND	6.0	µg/L						80-120	
Vanadium	ND	4.0	"						80-120	
Arsenic	ND	5.0	"							
Lead	ND	5.0	"							
Selenium	ND	5.0	"							

LCS (CS08653-BS1)	Prepared & Analyzed: 11/16/09									
Vanadium	110	4.0	µg/L	100		110	80-120			
Antimony	108	6.0	"	100		108	80-120			
Arsenic	107	5.0	"	100		107	80-120			
Lead	106	5.0	"	100		106	80-120			
Selenium	107	5.0	"	100		107	80-120			

LCS Dup (CS08653-BSD1)	Prepared & Analyzed: 11/16/09									
Antimony	113	6.0	µg/L	100		113	80-120	4	20	
Vanadium	113	4.0	"	100		113	80-120	3	20	
Arsenic	111	5.0	"	100		111	80-120	3	20	
Lead	108	5.0	"	100		108	80-120	2	20	
Selenium	112	5.0	"	100		112	80-120	5	20	

# CALIFORNIA LABORATORY SERVICES

Brown & Caldwell-Rancho Cordova 10540 White Rock Rd. Suite 180 Rancho Cordova, CA 95670	Project: Moody Creek Project Number: 137108 Project Manager: Joseph Turner	CLS Work Order #: CSK0546 COC #: 109429
---	--	--

## Metals (Dissolved) by EPA 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

### Batch CS08653 - EPA 3020A

Matrix Spike (CS08653-MS1)		Source: CSK0546-02			Prepared & Analyzed: 11/16/09					
Vanadium	109	4.0	µg/L	100	ND	109	80-120			
Antimony	108	6.0	"	100	ND	108	80-120			
Arsenic	106	5.0	"	100	1.37	104	75-125			
Lead	106	5.0	"	100	ND	106	75-125			
Selenium	104	5.0	"	100	1.48	102	75-125			

Matrix Spike Dup (CS08653-MSD1)		Source: CSK0546-02			Prepared & Analyzed: 11/16/09					
Antimony	108	6.0	µg/L	100	ND	108	80-120	0.009	20	
Vanadium	109	4.0	"	100	ND	109	80-120	0.3	20	
Arsenic	105	5.0	"	100	1.37	104	75-125	0.6	25	
Lead	106	5.0	"	100	ND	106	75-125	0.2	25	
Selenium	102	5.0	"	100	1.48	101	75-125	1	25	

### Batch CS08732 - EPA 7470A

Blank (CS08732-BLK1)		Prepared & Analyzed: 11/18/09								
Mercury	ND	0.20	µg/L							

LCS (CS08732-BS1)		Prepared & Analyzed: 11/18/09								
Mercury	5.55	0.20	µg/L	5.00		111	75-125			

LCS Dup (CS08732-BSD1)		Prepared & Analyzed: 11/18/09								
Mercury	4.78	0.20	µg/L	5.00		96	75-125	15	25	

Matrix Spike (CS08732-MS1)		Source: CSK0410-01			Prepared & Analyzed: 11/18/09					
Mercury	4.76	0.20	µg/L	5.00	ND	95	75-125			

# CALIFORNIA LABORATORY SERVICES

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11/19/09 13:45

Brown & Caldwell-Rancho Cordova  
10540 White Rock Rd. Suite 180  
Rancho Cordova, CA 95670

Project: Moody Creek  
Project Number: 137108  
Project Manager: Joseph Turner

**CLS Work Order #: CSK0546**  
COC #: 109429

## Metals (Dissolved) by EPA 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

### Batch CS08732 - EPA 7470A

Matrix Spike Dup (CS08732-MSD1)

Source: CSK0410-01

Prepared & Analyzed: 11/18/09

Mercury	5.98	0.20	µg/L	5.00	ND	120	75-125	23	25	
---------	------	------	------	------	----	-----	--------	----	----	--

# CALIFORNIA LABORATORY SERVICES

Page 20 of 20

11/19/09 13:45

Brown & Caldwell-Rancho Cordova  
10540 White Rock Rd. Suite 180  
Rancho Cordova, CA 95670

Project: Moody Creek  
Project Number: 137108  
Project Manager: Joseph Turner

**CLS Work Order #: CSK0546**  
COC #: 109429

## Notes and Definitions

- QM-7 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
- QM-4X The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

Date Checked	Checked By	Job Number	By	Date	Calc. No.	Sheet No.
		137108	TG	11/11/09		1
Project			Subject			
Moody Creek Quarry			GW Sampling			

Well	Time	DTW	ID
B-1	1334	25.34	50.15
B-2	1343	48.04	50.30
B-3	1357	44.30	<del>44.30</del> 50.25
MW-1	1410	24.64	100.16

MW-1 BEG Purge 14:17 @ 2 gpm  
 AREA = 0.19625 ft<sup>2</sup>      i.47 gal/ft.  
 Height H<sub>2</sub>O = 100.16 - 24.64 = 75.52  
 Volume = 75.52 × 0.19625 = 14.82 ft<sup>3</sup> = 111 gallons

DTW	gals	time	pH	temp. °C	COND(µS)	ORP MV
	0	1417				
	18	1431	8.46	14.5	520	116
42.65	30	1437	7.53	14.2	465.6	95
	42	1449	7.43	14.1	460.3	84
59.00	60	1506	7.50	14.4	459.2	73
75.85	85	MAX DEPTH of pump capacity				
		Bailed down to 88.75' bgs				

### 111

Date Checked	Checked By	Job Number	By	Date	Calc. No.	Sheet No.
		137108	TC	11/12/09		1
Project			Subject			
Moody Creek Quarry			GW Sampling			

920 Setup at B-1

DTW 25.37

Area =  $0.19625 \text{ ft}^2$

Length =  $50 - 25.37 = 24.63 \text{ ft}$

Volume =  $4.83 \text{ ft} = 36 \text{ gallons}$

3 VOLUMES = 109 gallons

TIME	Vol	DTW	pH	TEMP(°C)	COND(µS)	ORP(mV)
917	5	25.37				
925	12	30.06	7.27	12.5	363.0	132
934	24	34.09	7.22	12.9	263.3	134
942	36	38.50	7.10	13.0	263.0	132
951	48	43.51	7.03	13.0	271	128

Pumped Dry ~ 60 gallons removed allowing recovery to collect sample.

Sample Time 10:20

	pH	TEMP(°C)	COND.(µS)	ORP(mV)
B-2	7.14	14.0	971	84
B-3	7.24	15.6	815	40
MW-1	7.72	14.1	464	85

References/Notes

#### REPORT TO:

NAME AND ADDRESS

137108  
 DESTINATION LABORATORY  
 CLS (916) 638-7301  
 3249 FITZGERALD RD.  
 RANCHO CORDOVA, CA.  
 95742

137108  
 DESTINATION LABORATORY

CLS (916) 638-7301  
 3249 FITZGERALD RD.  
 RANCHO CORDOVA, CA.  
 95742

OTHER

PROJECT NAME

10540 White Rock Rd. #180  
 Rancho Cordova, CA 95670  
 PROJECT MANAGER  
 JAMES LUTER  
 (916) 853-5334  
 PROJECT NAME  
 MOODY CREEK  
 SAMPLED BY  
 TIM GORWIN  
 JOB DESCRIPTION  
 GROUNDWATER SURVEY

SITE LOCATION

Moody Creek Riprap

DATE

TIME

SAMPLE IDENTIFICATION

MATRIX

CONTAINER NO.

TYPE

#### PRESERVATIVES

METALS (6010/6020/7470)\*  
 Alkalinity (Total/CARB/bicarb)  
 TDS (160.1)  
 ANIONS\*\*  
 HARDNESS (130.2)

#### ANALYSIS REQUESTED

GEOTRACKER:  YES  NO  
 EDF REPORT  YES  NO  
 GLOBAL ID: \_\_\_\_\_

COMPOSITE:

FIELD CONDITIONS:

TURN AROUND TIME

1 DAY   
 2 DAY   
 5 DAY   
 10 DAY

SPECIAL INSTRUCTIONS

OR

ALT. ID:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	TYPE
4/2/09		B-1	H2O	2	1-LI PLASTIC
		B-2			
		B-3			
		MU-1			

\* Metals include: Ag, Al, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Ni, Mn, Ni, K, Na, Zn, Sb, As, Pb, Se, Tl, V, Mo  
 \*\* Anions include: Fluoride, Chloride, Bromide, Nitrate, Nitrite, Sulfate, Sulfide

Metals secondary/NO<sub>3</sub> Field Filtered w/0.45µm filter

SUSPECTED CONSTITUENTS

PRESERVATIVES:

(1) HCL  
 (2) HNO<sub>3</sub>

(3) COLD  
 (4) NaOH

(5) H<sub>2</sub>SO<sub>4</sub>  
 (6) Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>

(7) =

RELINQUISHED BY (SIGN)

PRINT NAME / COMPANY

DATE / TIME

RECEIVED BY (SIGN)

PRINT NAME / COMPANY

Tim Gorwin / Browns Creek  
 11/21/09 1430

RECORD AT LAB BY:

DATE / TIME:

CONDITIONS / COMMENTS:

SHIPPED BY:

FED X 10015843-4

UPS

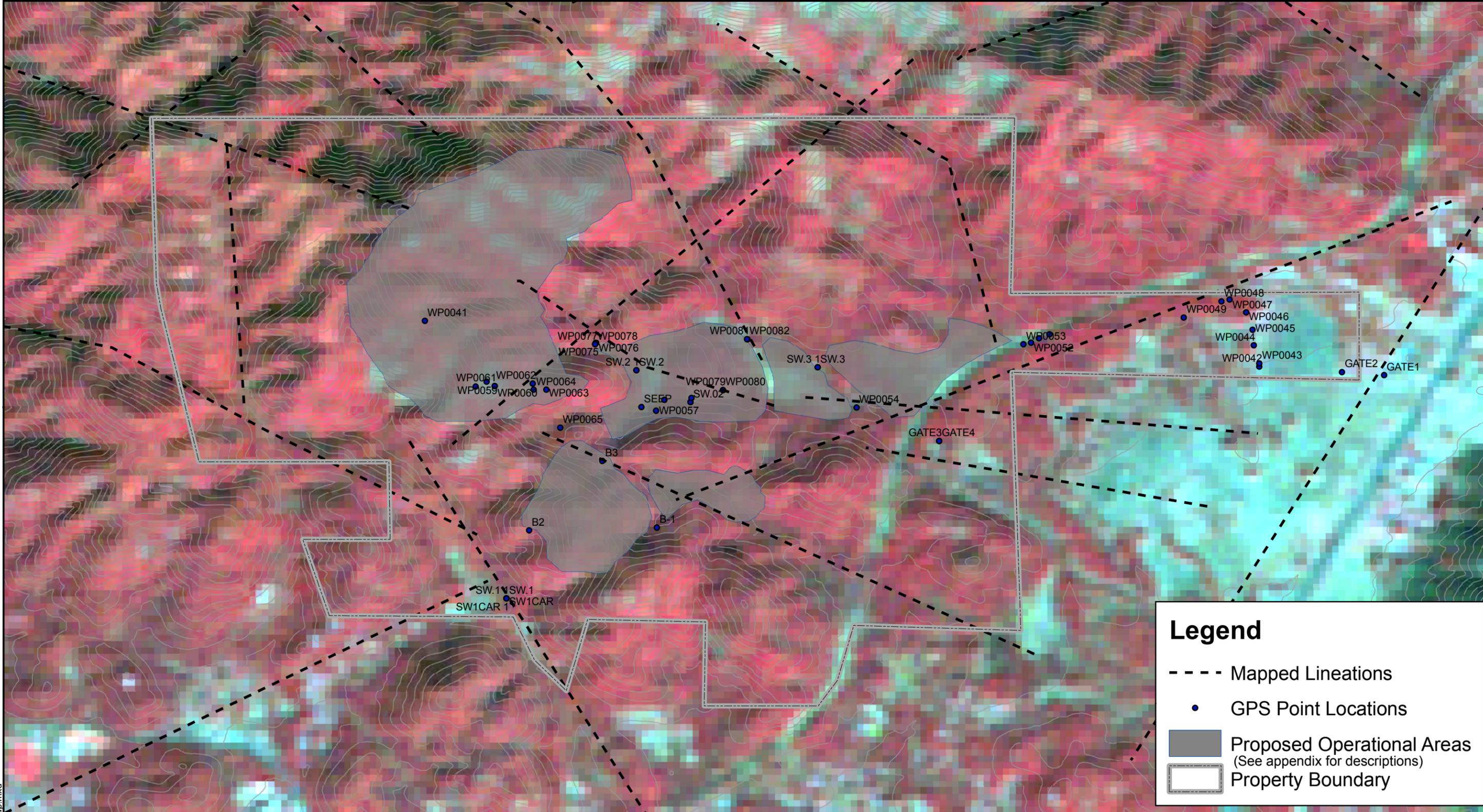
OTHER

AIR BILL #

## APPENDIX B

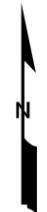
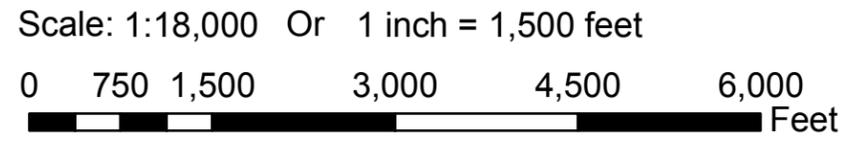
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### Lincation Assessment



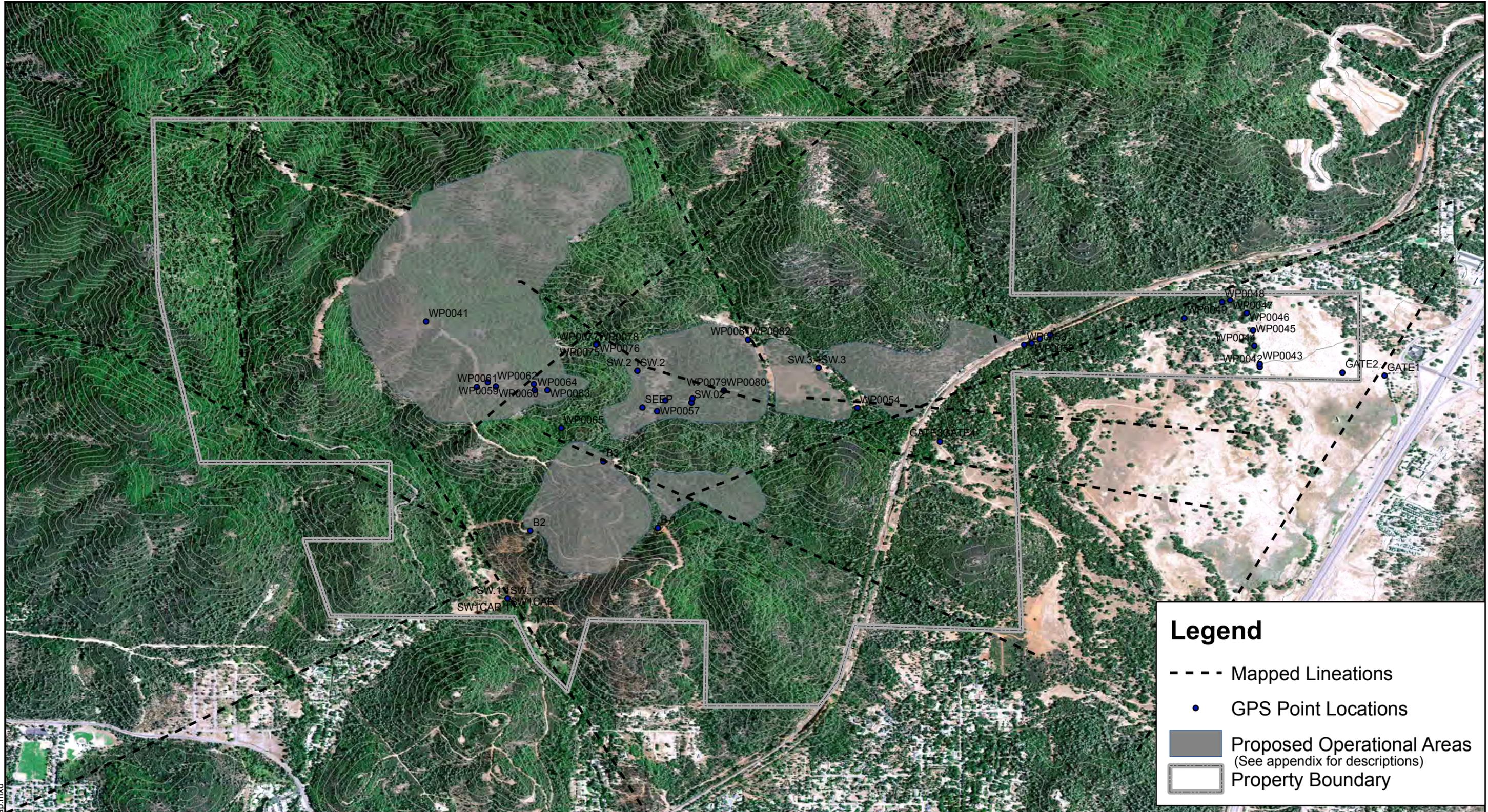
**Legend**

- - - Mapped Lineations
- GPS Point Locations
- Proposed Operational Areas (See appendix for descriptions)
- Property Boundary



SITE		Proposed 3M Quarry Moody Creek, CA	
TITLE			
LANDSAT Based Lineation Assessment			
BROWN AND CALDWELL	PROJECT	137108	Figure B6
	DATE	1/21/2010	

FILE: S:\MoodyCreek\Maps\Geomap.mxd

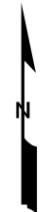


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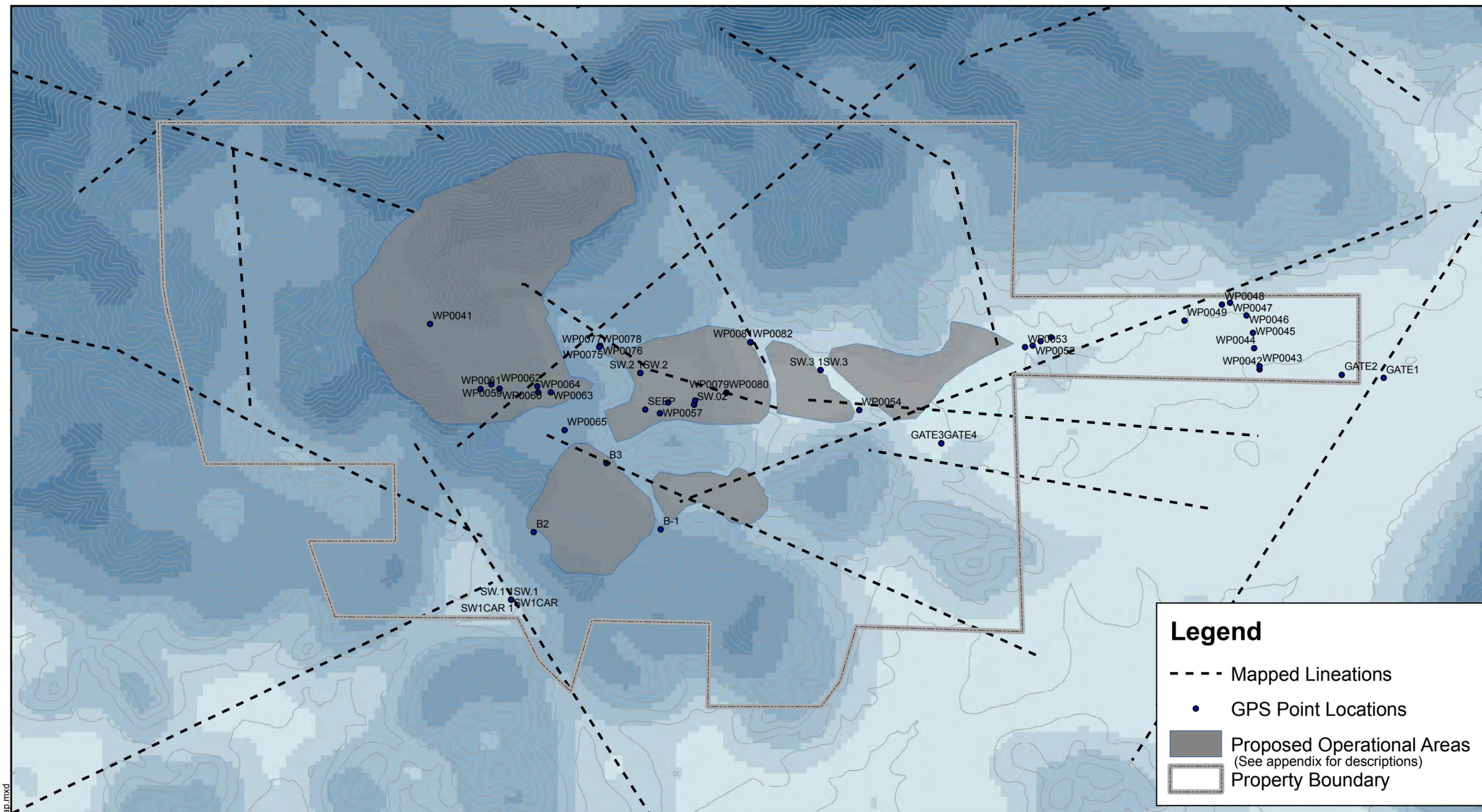
- - - Mapped Lineations
- GPS Point Locations
- Proposed Operational Areas (See appendix for descriptions)
- Property Boundary

Scale: 1:18,000 Or 1 inch = 1,500 feet

0 750 1,500 3,000 4,500 6,000 Feet



SITE		Proposed 3M Quarry Moody Creek, CA	
TITLE		2008 Aerial Photo Lineation Assessment	
BROWN AND CALDWELL	PROJECT	137108	Figure B1
	DATE	1/21/2010	

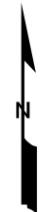


**Legend**

- - - Mapped Lineations
- GPS Point Locations
- Proposed Operational Areas (See appendix for descriptions)
- Property Boundary

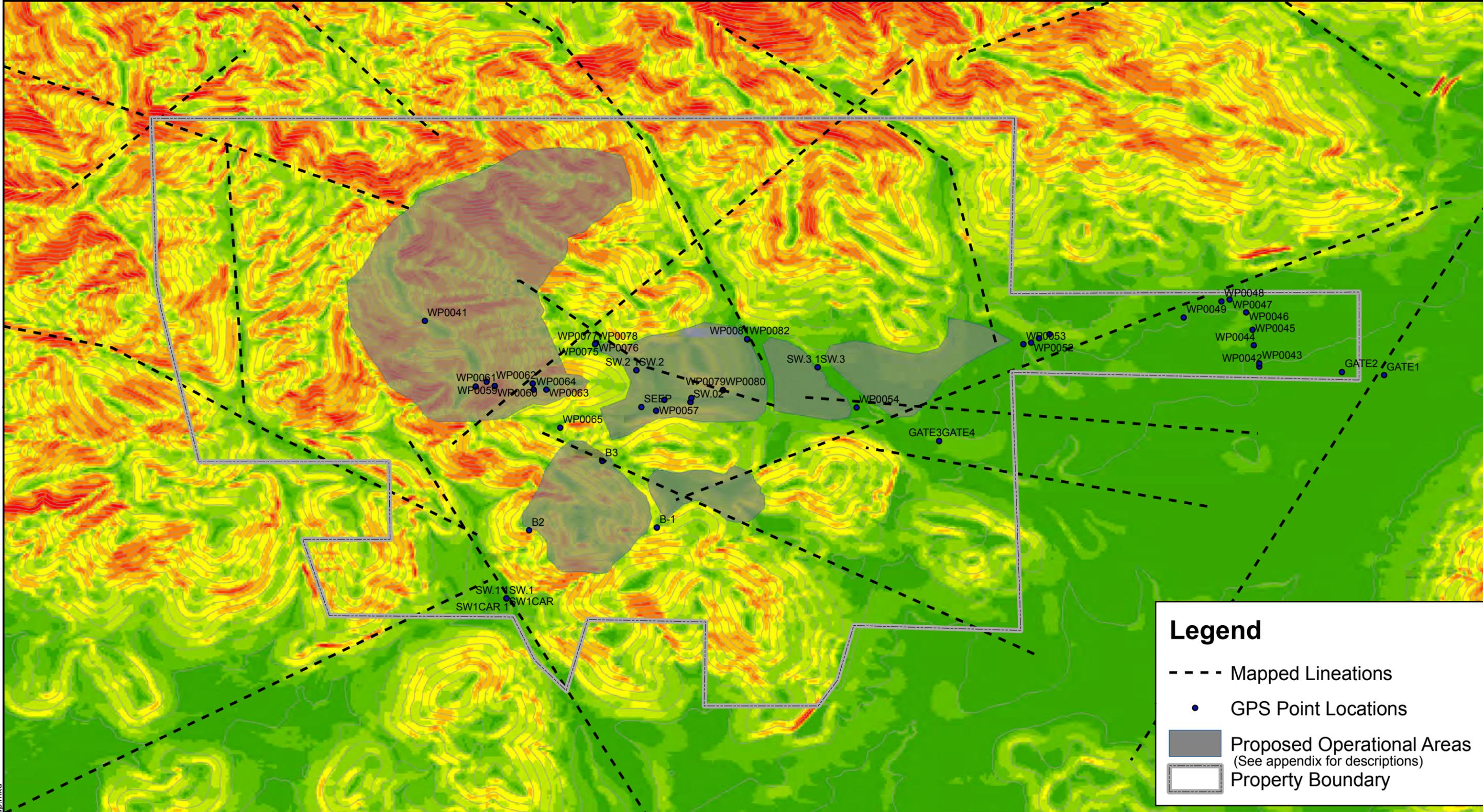
Scale: 1:18,000 Or 1 inch = 1,500 feet

0 750 1,500 3,000 4,500 6,000 Feet



SITE		Proposed 3M Quarry Moody Creek, CA	
TITLE			
Contour Density Lineation Assessment			
BROWN AND CALDWELL	PROJECT	137108	Figure B5
	DATE	1/21/2010	

FILE: S:\MoodyCreek\Maps\Geomap.mxd

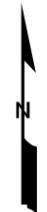


**Legend**

- - - Mapped Lineations
- GPS Point Locations
- Proposed Operational Areas (See appendix for descriptions)
- ▭ Property Boundary

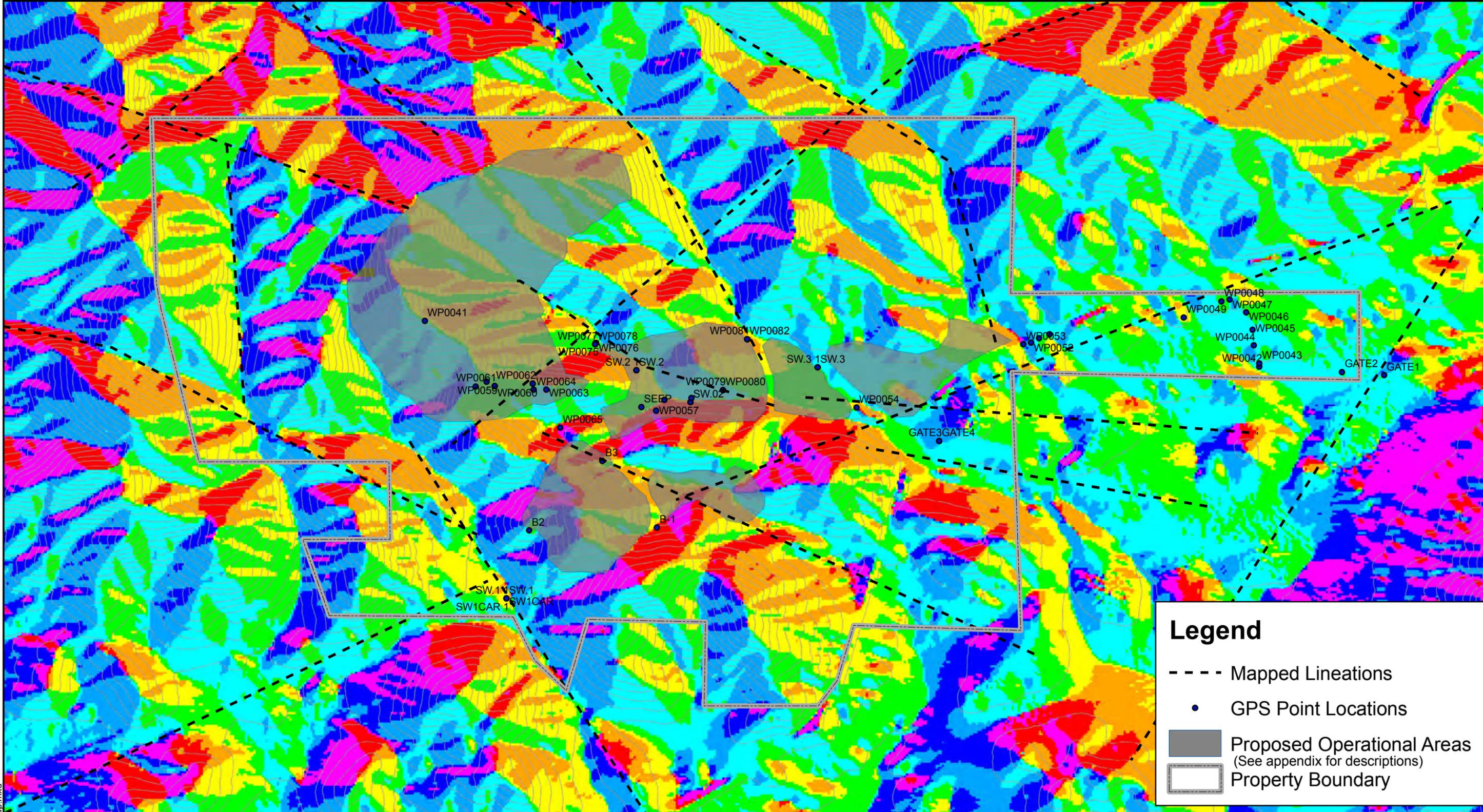
Scale: 1:18,000 Or 1 inch = 1,500 feet

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SITE	Proposed 3M Quarry Moody Creek, CA	
TITLE	Slope Lineation Assessment	
BROWN AND CALDWELL	PROJECT	137108
	DATE	1/21/2010
		Figure B3

FILE: S:\MoodyCreek\Maps\Geomap.mxd

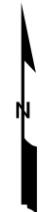


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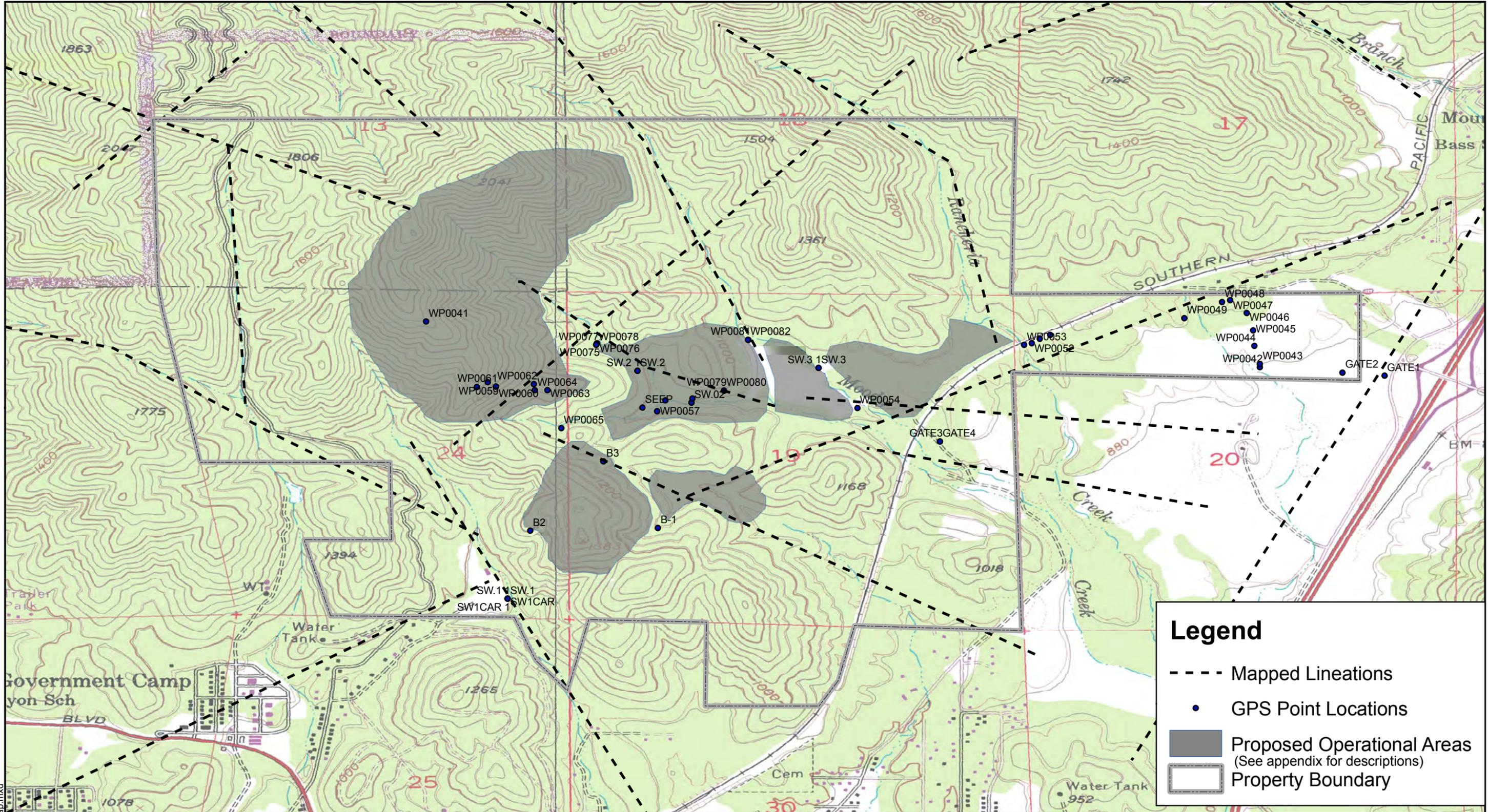
- - - Mapped Lineations
- GPS Point Locations
- Proposed Operational Areas (See appendix for descriptions)
- Property Boundary

Scale: 1:18,000 Or 1 inch = 1,500 feet

0 750 1,500 3,000 4,500 6,000 Feet

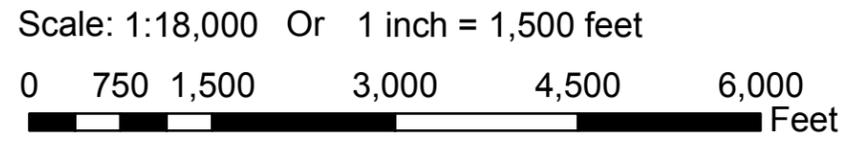


SITE		Proposed 3M Quarry Moody Creek, CA	
TITLE		Slope Aspect Lineation Assessment	
<b>BROWN AND CALDWELL</b>	PROJECT	137108	Figure B4
	DATE	1/21/2010	



### Legend

- Mapped Lineations
- GPS Point Locations
- Proposed Operational Areas (See appendix for descriptions)
- Property Boundary



SITE		Proposed 3M Quarry Moody Creek, CA	
TITLE			
USGS Topographic Lineation Assessment			
<b>BROWN AND CALDWELL</b>	PROJECT	137108	Figure B2
	DATE	1/21/2010	

FILE: S:\MoodyCreek\Maps\Geomap.mxd

## APPENDIX C

---

Field Mapping Photos

**Photographs 1 through 8 – Copley Greenstone**



Photograph 1 – Outcrop near proposed North Pit



Photograph 2 – As for Photograph 1

**Photographs 1 through 8 – Copley Greenstone**



Photograph 3 – As for Photograph 1



Photograph 4 – Shear Zone area, Slickenside present

**Photographs 1 through 8 – Copley Greenstone**



Photograph 5 – Shear Zone – Water Seepage



Photograph 6 – As for Photograph 5

**Photographs 1 through 8 – Copley Greenstone**



Photograph 7 – Shear Zone – Drag Folding



Photograph 8 – As for Photograph 7.

**Photographs 9 through 28 – Kennett Formation**



Photograph 9 – Kennett Formation – Mudstone



Photograph 10 – As above

**Photographs 9 through 28 – Kennett Formation**



Photograph 11 – Kennett Formation – Drag Folding, eastern portion of Site.



Photograph 12 – As above.

**Photographs 9 through 28 – Kennett Formation**



Photograph 13 – As above.



Photograph 14 – Kennett Formation, Black Cherty Slate

**Photographs 9 through 28 – Kennett Formation**



Photograph 15 – Kennett Formation. Water Seepage Visible



Photograph 16 – Kennett Formation.

**Photographs 9 through 28 – Kennett Formation**



Photograph 17 – Kennett Formation – Banded Chert.



Photograph 18 – Kennett Formation – Mudstone.

**Photographs 9 through 28 – Kennett Formation**



Photograph 19 – Excavation area – Kennett Formation.



Photograph 20 – As above

**Photographs 9 through 28 – Kennett Formation**



Photograph 21 – Close up of excavate material. Alteration apparent.



Photograph 22 – As above.

**Photographs 9 through 28 – Kennett Formation**



Photograph 23 – Adit area with evidence of water seepage.



Photograph 24 – Kennett Formation Shear Zone – Water Flowing in Creek.

**Photographs 9 through 28 – Kennett Formation**



Photograph 25 – As above. Evidence of folding in this area.



Photograph 26 – As above. Water Flowing in area.

**Photographs 9 through 28 – Kennett Formation**



Photograph 27 – As above.



Photograph 28 – As above.

**Photographs 29 through 34 – Bass Mountain Diabase**



Photograph 29 – Bass Mountain Diabase. Large Plagioclase Phenocryst visible.



Photograph 30 – Bass Mountain Diabase – Typical Outcrop in eastern area of site.

**Photographs 29 through 34 – Bass Mountain Diabase**



Photograph 31 – As above.



Photograph 32 – As above.

**Photographs 29 through 34 – Bass Mountain Diabase**



Photograph 33 – As above with typical jointing visible.

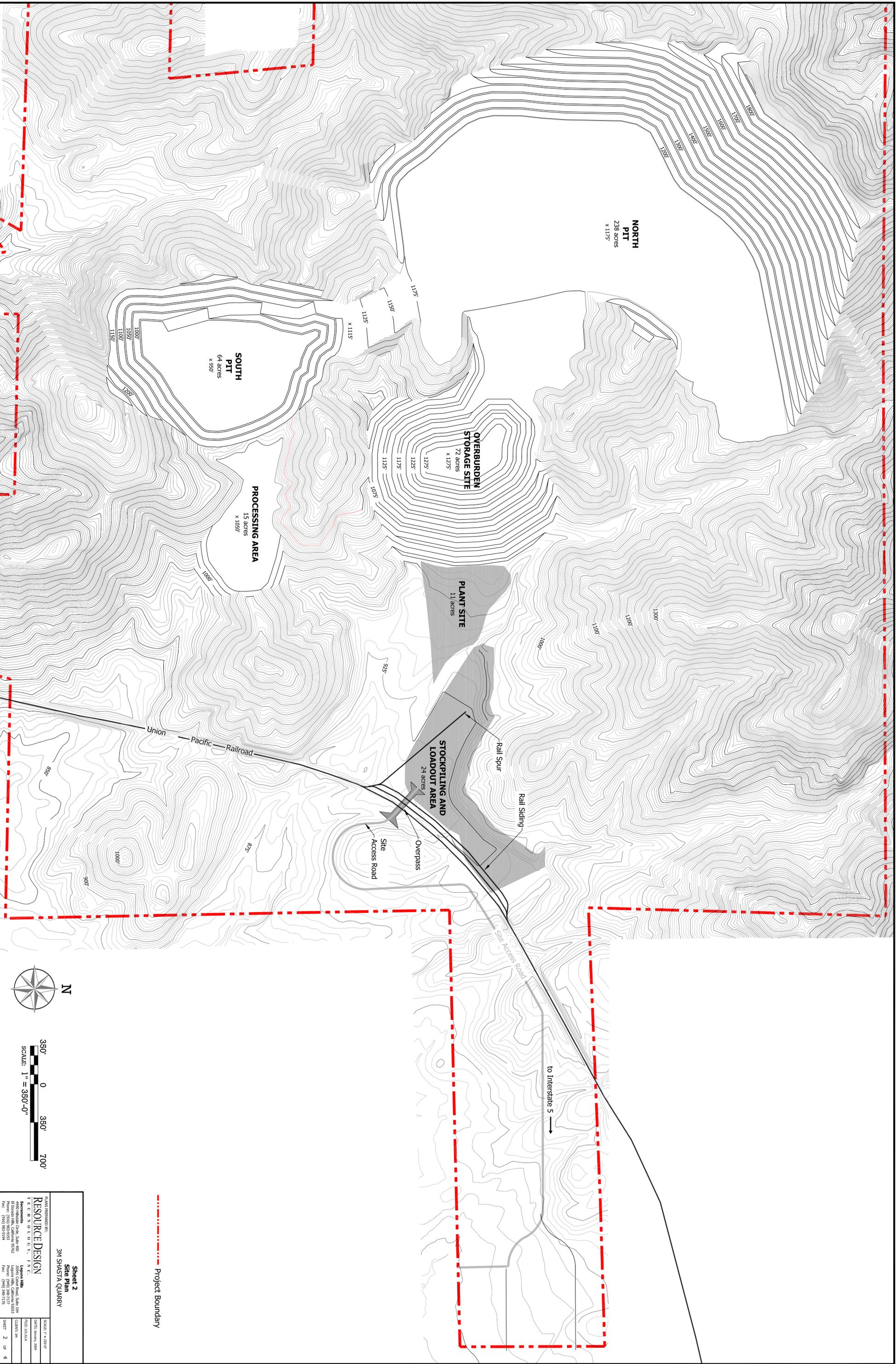


Photograph 34 – Bass Mountain Diabase with Xenolith (country rock) of limestone.

## APPENDIX D

---

Proposed Quarry Plan



----- Project Boundary

**Sheet 2**  
**Site Plan**  
**3M SHASTA QUARRY**

PLANS PREPARED BY:  
**RESOURCE DESIGN**  
 TECHNICAL SERVICES, INC.  
 Sacramento  
 4990 Hillside Circle, Suite 400  
 Phone: (916) 862-9191  
 Fax: (916) 862-9194

Lapuna Hill  
 26241 Cedar Road, Suite 104  
 Phone: (916) 382-7172  
 Fax: (916) 382-7176

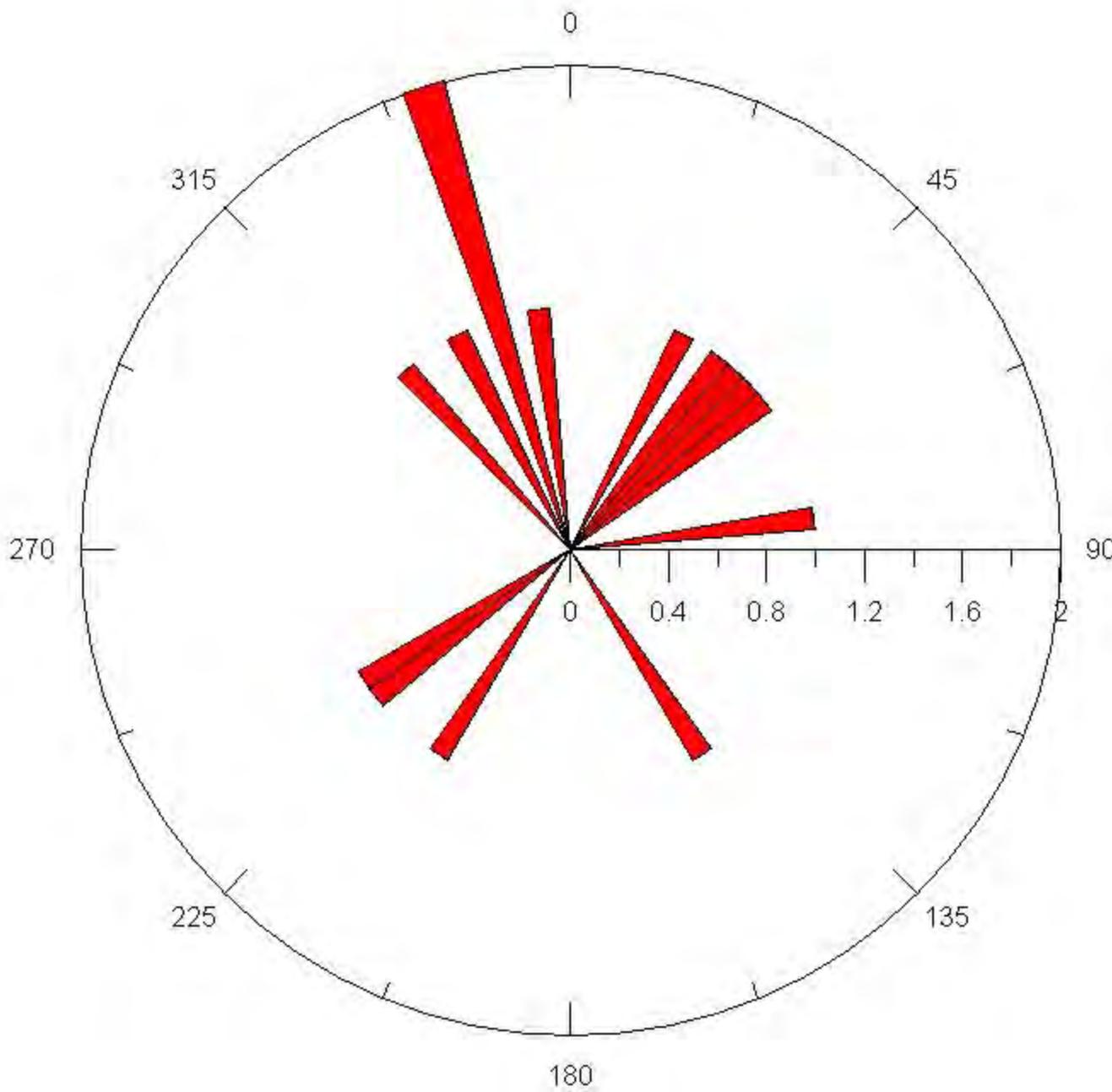
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 CLIENT: 3M  
 SHEET 2 OF 4

## APPENDIX E

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Rose Plots

Bass Mountain Diabase  
Number of values 15  
Minimum 27  
Maximum 352  
Mean 187.7



# Kennett Formation Bedding Planes

Number of values 10  
Minimum 150  
Maximum 349  
Mean 242.8

