Addendum 2
Field Investigation Report
Hydrology Analysis
3M Redding Hard-Rock
Aggregate Quarry
Shasta County, California

Prepared for
Resource Design Technology, Inc.
May 24, 2011

Addendum 2
Field Investigation Report Hydrology Analysis
3M Redding Hard-Rock Aggregate Quarry
Shasta County, California

Prepared for

Resource Design Technology, Inc.

May 24, 2011

Brown AND Caldwell

10540 White Rock Road, Suite 180

Rancho Cordova, California 95670

Table of Contents

List of Figures 1-1
1. Introduction 1-1
2. Additional Geologic Mapping 2-1
3. Summary and Recommendations 3-1

List of Figures

Figure 1. Site Location Map 1-2
Figure 2. Geologic Map and Recommended Test Well Locations 1-3

Section 1

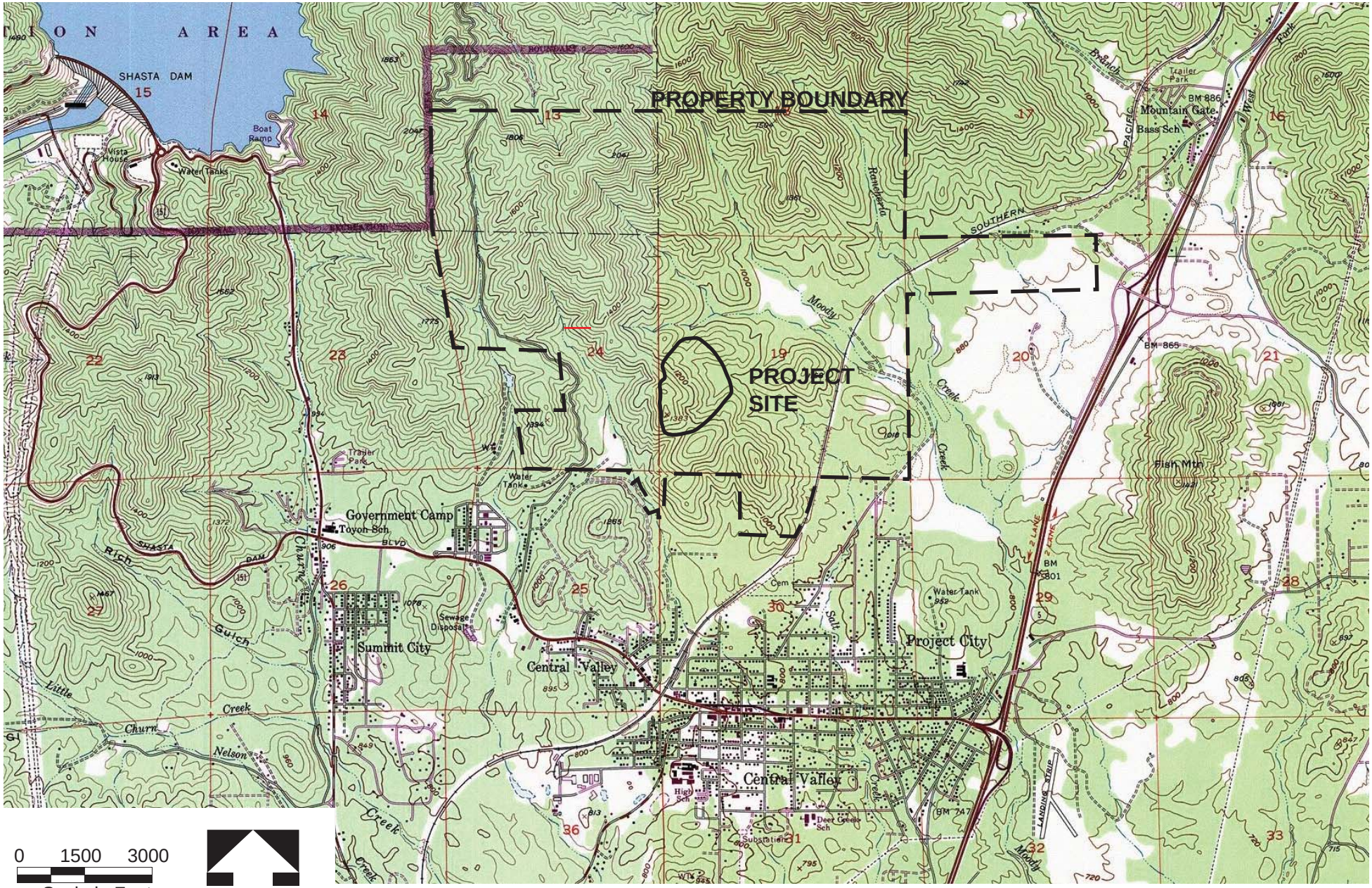
Introduction

This report is the second 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 and 2). The objective of the study discussed in this addendum is to complete the geologic field reconnaissance for the site and select a drilling location for a water supply test well. The results of the initial geologic field reconnaissance were presented in our February 9, 2010 Addendum to the Field Investigation Report. Based on the information provided in this report, it was 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. This formation is reported to have produced water for a supply well completed by the community of Mountain Gate.
- One test well drilled in the eastern portion of the Bass Mountain Diabase where open fractures were observed in bedrock outcrops within area that could receive significant recharge from higher elevations.

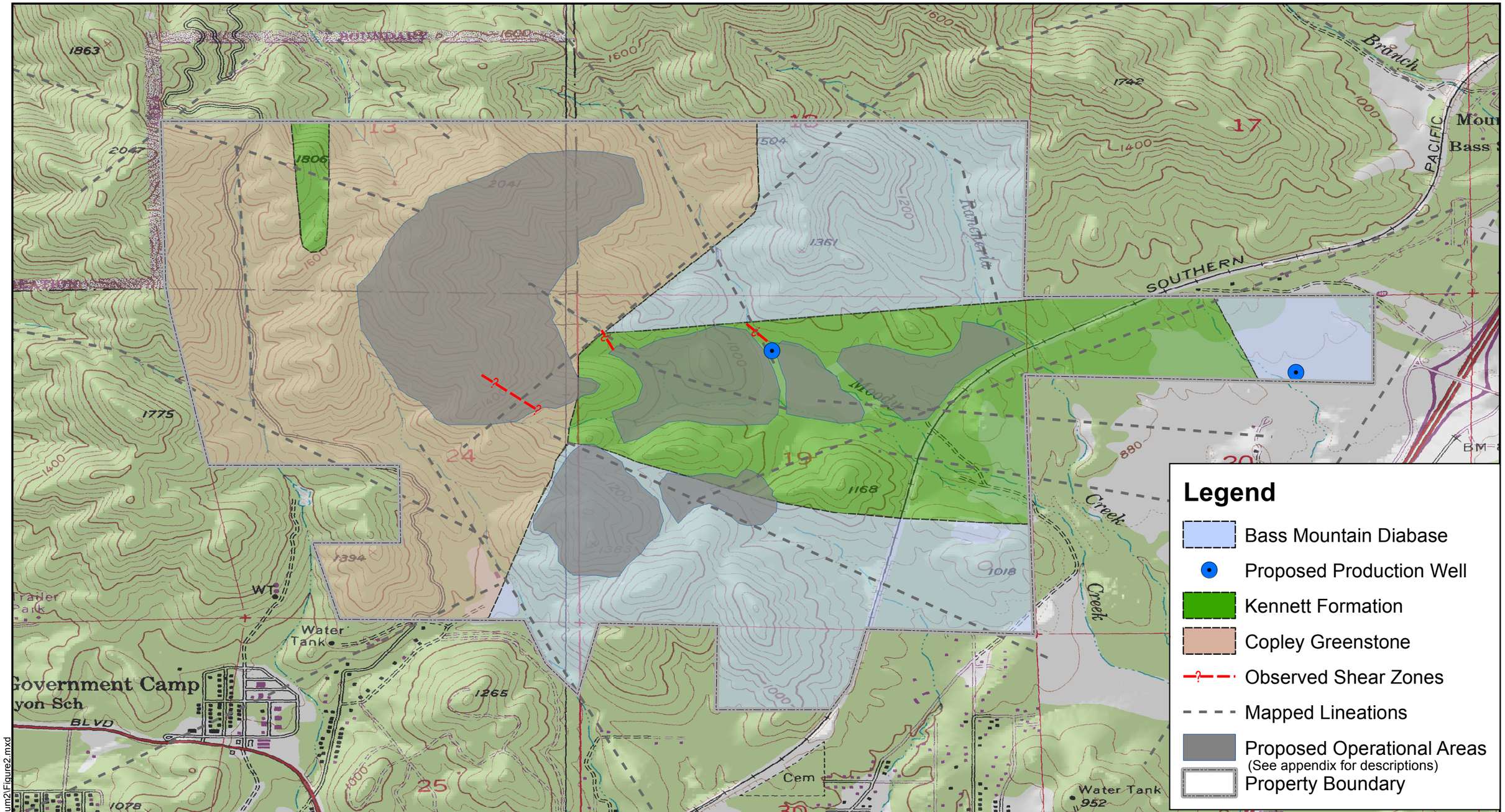
Due to the limited nature of the mapping program completed for this investigation, it was also recommended that further mapping be conducted along additional reaches of the creek areas where water was observed to be flowing during the summer months.

The scope of services developed for this project is based on the above recommendations to conduct further mapping along additional reaches of the creek areas and on the March 14, 2011 email correspondence from Dr. Andrew Kopania of EMKO Environmental.



Source: National Geographic TOPO!

BROWN AND CALDWELL	DATE 6-30-09 PROJECT 137108-003	3M Quarry, Shasta, California Site Location Map	FIGURE 1



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

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

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

N

SITE	Proposed 3M Quarry Moody Creek, CA
TITLE	Geologic Map and Recommended Test Well Locations
BROWN AND CALDWELL	PROJECT 140910
	DATE 5/23/2011
	Figure 2

FILE: S:\MoodyCreek\Maps\Addendum2\Figure2.mxd

Section 2

Additional Geologic Mapping

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. Figure 3 from Addendum 1 shows the portion of the 1906 USGS geologic map overlain over the site and adjacent areas. As seen on this Figure, 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 volcaniclastic 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 (Appendix A of June 30, 2009 report), precious metal deposits have been observed throughout this area. Figure 4 from this report shows the distribution of identified lode gold deposits.

The results of the initial field mapping program are summarized on Plate 1 in Addendum 1. As seen on Plate 1, 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 initial 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. During this additional mapping effort, it was also noted that the small sliver of Kennett Formation noted in the 1906 USGS map did not occur in the northwest corner of the site.

The results of the additional mapping effort confirmed the results of the initial mapping and no changes were made to the shear zones on Plate 1. Additional orientations of fractures measured during this site were consistent with those reported in the February 9, 2010 addendum report (Appendix E of February 2010 report).

As part of the site visit for this investigation, Mr. Ted Ogilvie of Diamond Core Drilling reviewed the selected drill location for access issues at the Bas Mountain Diabase site. During this site visit, Mr. Ogilvie indicated that a well he drilled at a nearby trailer park was completed in the same formation and produced water between 100 to 200 gallons per minute.

Section 3

Summary and Recommendations

The additional mapping program was conducted along additional reaches of the creek areas where water was observed to be flowing during the summer months and was not observed during the initial mapping program. Based on this additional mapping program, no significant changes were made to the geologic map presented in the February 10, 2010 Addendum Report. However, based on conversations with Mr. Ted Ogilvie of Diamond Core Drilling, supply wells producing significant water have been drilled in the Bass Mountain Diabase in the Mountain Gate area. Based on this report and to avoid the necessity to cross over the railroad tracks for access, it is recommended that the initial test well be drilled within the Bass Mountain Diabase at the approximate location shown on Figure 2. Our recommended location for a well for the Kennett Formation, if access over the railroad tracks is provided, is also shown on this figure.