GEOCON
CONSULTANTS, INC.
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. S9175-06-02
December 10, 2010

Mr. Ricardo Meza
RGP Planning & Development Services
8921 Research Drive
Irvine, California 92618

Subject: RIDDLE SURFACE MINE
ENVIRONMENTAL IMPACT REPORT
STANISLAUS COUNTY, CALIFORNIA
SOILS, GEOLOGIC, AND GEOHAZARDS EVALUATION

Dear Mr. Meza:

In accordance with your request and our proposal dated December 20, 2006, we have performed this Soils, Geologic, and Geohazards Evaluation for the proposed Riddle Surface Mine in western Stanislaus County, California. The project area consists of two sites totaling approximately 436 acres to be developed as a sand and gravel surface mine and materials processing plant.

The accompanying report presents our findings, conclusions, and recommendations regarding the soils, geologic, and geohazard aspects of the site as they affect the proposed project.

Please contact us should you have any questions concerning the contents of this report or if we may be of further service.

Sincerely,

GEOCON CONSULTANTS, INC.

David W. Bieber, CEG, CHG, PGP
Senior Geologist

PROFESSIONAL GEOLOGIST
8/31/12
DAVID W. BIEBER
No. 2092
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

Robert G. Nixon, PE, GE
Senior Engineer

REGISTERED PROFESSIONAL ENGINEER
ROBERT G. NIXON
No. 2573
Exp. 12/31/11
GEOTECHNICAL
STATE OF CALIFORNIA

(4) Addressee

TABLE OF CONTENTS

SOILS, GEOLOGIC, AND GEOHAZARDS EVALUATION Page

FIGURES

SOILS, GEOLOGIC, AND GEOHAZARDS EVALUATION

1.0 INTRODUCTION

We have performed this Soils, Geologic, and Geohazards Evaluation for the proposed Riddle Surface Mine (the Site) located in western Stanislaus County, California, in accordance with our Proposal No. S9175-06-02, dated December 20, 2006.

1.1 Project Location

The Site consists of two separate areas: a North Site and a South Site. The North Site encompasses approximately 315 acres designated as Assessor's Parcel Numbers (APN) 026-020-033 and 026-020-034. The South Site encompasses approximately 121 acres designated as APN 026-020-032. The Site is located east of Interstate 5, southwest of the intersection of West Stuhr Road and Eastin Road. The approximate location of the Site is shown on the Vicinity Map, Figure 1.

1.2 Purpose

The purpose of our scope of services was to provide soils, geologic, and geohazards information in support of the preparation of environmental documentation required by the California Environmental Quality Act (CEQA).

2.0 SITE AND PROJECT DESCRIPTION

The Site consists of three parcels totaling approximately 436 acres. Site grades range from Elevation 145 feet above mean sea level (MSL) near the western site perimeter to Elevation 126 MSL near the eastern site perimeter. The Site is primarily used for agricultural production. Agriculturally related site improvements include two farm worker residences in the southeast corner of the North Site, two farm worker residences in the northeast portion of the South Site, and infrastructure related to water supply and agricultural water runoff. The residences and related infrastructure will be removed as part of the project. The Site is bordered by agricultural land on the north, west, east, and south. An almond processing plant and orchard are located adjacent to and north of the North Site. A tomato processing plant and tomato field are located adjacent to and west of the South Site. Additionally, the Frank B. Marks and Son Rock Plant and a Cemex Ready-Mix Plant sand and gravel mining complex is located approximately one-half mile northwest of the Site, adjacent to Orestimba Creek. The approximate boundaries of the Site are shown on the Site Plan, Figure 2.

The proposed project will consist of a sand and gravel surface mine and materials processing plant. Calaveras Materials Inc. (CMI), the project proponent, proposes to mine the Site for aggregate material. Mining on the North Site is proposed to a depth of 130 feet below ground surface (bgs) and on the South Site to 70 feet bgs. CMI anticipates that approximately 62 million tons of aggregate material will be mined from the Site. We understand that mining operations will not operate simultaneously on the North Site and the South Site.

3.0 SCOPE OF SERVICES

We performed the following scope of services for this evaluation:

- Reviewed published documents, geologic maps and other geological and geotechnical literature pertaining to the Site and surrounding area to aid in evaluating geologic conditions and geologic hazards that may be present. The documents reviewed are listed in Section 9.0 of this report.
- Reviewed aerial photographs of the Site to aid in evaluating geologic conditions and hazards.
- Performed a site reconnaissance to assess the site geology and observe features identified in the literature and air photo evaluation for the Site. The client was responsible for obtaining permission to enter the Site prior to our visit.
- Prepared this report presenting our findings, conclusions, and recommendations regarding soils, geologic, and geohazards as they affect the proposed project.

4.0 SITE GEOLOGY AND SOILS

4.1 Site Geology

Information concerning the geologic conditions in proximity to the Site was obtained from a review of the *Preliminary Geologic Map of the San Jose 30X60-Minute Quadrangle, California* (United States Geological Survey, 1999). We supplemented the published information with data from a subsurface geologic investigation of the site we performed in November 2006 for the project proponent.

The Site is located along the west side of the southern portion of the Great Valley Geomorphic Province, more commonly referred to as the San Joaquin Valley. The valley is a broad lowlands bounded by the Sierra Nevada to the east and the Coast Ranges to the west. The San Joaquin Valley has been filled with a thick sequence of sedimentary deposits of Jurassic to recent age. A review of the geologic map indicates that the Site is underlain by Holocene and Upper Pleistocene undifferentiated alluvial fan deposits. According to the literature sources reviewed, these deposits consist of silt, sand, and gravel deposits of the paleo Orestimba Creek.

Subsurface geology of the sites consists of soil deposited over well-sorted to clayey/silty gravels. Gravelly sand to silt was generally encountered below the gravels. The primary lithologies of the gravel clasts observed during the subsurface investigation included (in approximate order of abundance) metasandstone, chert, greenstone, quartz, and andesite.

4.2 Site Hydrology and Hydrogeology

Naturally occurring surface water was not observed on the Site. Drainage of onsite irrigation water is accomplished by natural surface drainage and stormwater runoff drains in the northeast and southeast corners of the Site.

Two domestic water supply wells are located on the North Site. One well is located in the southeast

corner of the North Site near the farm worker residences. The other well is located near the western boundary of the North Site. Agricultural irrigation water is supplied by the Del Puerto Irrigation District.

Our subsurface investigation consisted of drilling twelve borings in the North Site and eight borings in the South Site in November 2006. At that time, we encountered groundwater at approximate depths between 60 and 110 feet. Four of the borings in the North Site and one in the South Site drilled during the November 2006 investigation were converted to groundwater monitoring wells. It should be noted that fluctuations in the level of groundwater may occur due to variations in rainfall, temperature, and other factors. Depth to groundwater can also vary significantly due to localized pumping, irrigation practices, and seasonal fluctuations. Therefore, it is possible that actual groundwater levels may be higher or lower than the levels noted, depending on those factors.

4.3 Geologic Hazards

4.3.1 Ground Rupture

Based on our Site reconnaissance and review of geologic maps and reports, the Site is not located on any known active fault traces. In addition, the Site is not contained within an Alquist-Priolo Earthquake Fault Zone (formerly referred to as a Special Studies Zone). Therefore, it is our opinion that the risk of fault surface rupture on the Site is low, or of "No impact" for CEQA purposes.

4.3.2 Seismic Shaking

In order to determine the distance of known active faults within 50 miles of the Site, we used the computer program *EQFAULT*, (Version 3, Blake, 2000). *EQFAULT* is a common program for performing a fault search, and a 50-mile radius is commonly used because seismic attenuation is generally sufficient to minimize damage to most structures at distances greater than 50 miles. Principal references used within *EQFAULT* in selecting faults to be included are Jennings (1975), Anderson (1984) and Wesnousky (1986). The results are summarized in Table 4.3.

TABLE 4.3
REGIONAL ACTIVE FAULTS

Fault Name	Distance From Site (miles)	Maximum Moment Magnitude (M_W)
Great Valley, Segment 8	1.5	6.6
Great Valley, Segment 7	9.4	6.7
Ortigalita	11.4	6.9
Great Valley, Segment 9	16.4	6.6
Greenville	24.4	6.9
Calaveras (So. Of Calaveras Res)	30.3	6.2
Quien Sabe	32.1	6.4
Hayward (SE Extension)	35.4	6.4
Great Valley, Segment 6	36.7	6.7
Sargent	37.5	6.8
Great Valley, Segment 10	40.6	6.4
Calaveras (No. of Calaveras Res)	40.9	6.8
Hayward (Total Length)	40.9	7.1
Hayward (South)	40.9	6.9
San Andreas (Pajaro)	41.8	6.8
San Andreas (1906)	41.8	7.9
San Andreas (Creeping)	42.2	6.5
San Andreas (Santa Cruz Mtn.)	42.6	7.0
Monte Vista – Shannon	42.6	6.8
Zayante – Vergeles	42.8	6.8
Foothills Fault System	43.6	6.5

The results of the *EQFAULT* query indicate that the Great Valley Fault, Segment 8 is the closest source of potential ground motion at the Site. The California Geological Survey maintains a web-based computer model that estimates probabilistic seismic ground motions for any location within California. The computer model estimates the "Design Basis Earthquake" ground motion, which is defined as the Peak Ground Acceleration (PGA) with a 10% chance of exceedance in 50 years (475-year return period). For an alluvial soil type, the estimated PGA at the Site is approximately 0.4g (1.0g is the acceleration due to gravity at the earth's surface).

While listing PGA is useful for comparison of potential effects of fault activity in a region, other considerations are important in seismic design, including frequency and duration of motion and soil conditions underlying the Site. The Site could be subjected to ground shaking in the event of a major earthquake along the faults mentioned above or other area faults. However, the seismic risk at the Site

is not considered to be significantly greater than that of other sites in the region. In our opinion, the risk to persons on the Site due to strong seismic ground shaking is a "Less than significant impact with mitigation." The required mitigation is that slopes and structures be properly engineered for the site conditions.

4.3.3 Seismic Related Ground Failure

Liquefaction

Liquefaction of granular soils can be caused by strong vibratory motion due to earthquakes. Soils that are highly susceptible to liquefaction are medium- to fine-grained, loose, granular and saturated at depths of less than 50 feet below the ground surface. The liquefaction of soils causes surface distress, loss of bearing capacity, and settlement of structures that are founded on the soils. During our previous investigation on the Site, we found that materials underlying it are coarse-grained deposits interbedded with and confined by cohesive units and that groundwater was deeper than 50 feet below the ground surface. Based on the predicted seismic accelerations, and soil and groundwater conditions encountered at the Site, we believe that liquefaction potential is low on the Site. Therefore, it is our opinion that the risk of liquefaction on the Site is one of "No impact."

Lurch Cracking and Lateral Spreading

Lurch cracking and lateral spreading are processes that result in free face failures during a seismic event. No significant free faces were observed at the Site. Therefore, it is our opinion that the potential for lurch cracking and lateral spreading is very low for the Site in its current condition. However, the proposed cut slopes for the open-pit mining area of the Site may be susceptible to lurch cracking and lateral spreading during seismic events. In our opinion, the risk to persons on the Site during and after mining due to lurch cracking and lateral spreading will be a "Less than significant impact with mitigation." The required mitigation is that slopes be properly engineered for the site conditions. Additionally, as long as the required mitigations are followed, it is our opinion that the risk due to lurch cracking or lateral spreading to persons on adjacent properties during and after mining is insignificant.

Seismic Settlement

Due to the well-drained and generally consolidated nature of the observed geologic materials on the Site, the risk of seismic settlement at the Site is anticipated to be low. Therefore, it is our opinion that the risk of seismic settlement on the Site is one of "No impact."

4.3.4 Slope Stability and Landslides

The Site is generally level to gently sloping, and slopes potentially subject to failure were not observed. The currently stable conditions may be changed by slope alterations due to cuts or fills, and changes to drainage patterns. In general, it is our opinion that the potential for landsliding or slope failure on the Site in its current condition is very low.

Based on the Riddle Surface Mine Project Description prepared by RGP, we understand that mining cuts will include near-vertical slopes up to 30 feet high adjacent to mined benches, and that reclamation will include 2:1 (horizontal to vertical) slopes and 12-foot-wide benches every 30 vertical feet (maximum) for slopes around the reclaimed open-pit mining area.

In our opinion, the risk to persons on the Site due to lack of slope stability is a "Less than significant impact with mitigation." The required mitigation is that slopes be properly engineered for the site conditions.

4.4 Soils and Erosion

Based on a review of the United States Department of Agriculture (USDA) National Resource Conservation Service (NRCS) Web Soil Survey (WSS), three soil types are present on the Site. Site soils indicated by the NRCS WWS generally consist of the Vernalis clay loam, Zacharias gravelly clay loam, and Elsalado fine sandy loam. These soils reportedly have low plasticity and slight erosion potential at the current slope. The soils observed during the field reconnaissance are consistent with those mapped on the USDA inventory. Therefore, it is our opinion that the risk of substantial soil erosion or loss of topsoil on the Site is "Less than significant."

4.5 Project-induced Ground Failure

As previously stated the Site is generally level to gently sloping. In its current condition the risk of project-induced landsliding, lateral spreading, subsidence, liquefaction, or collapse is negligible.

The currently stable conditions may be changed by slope alterations due to cuts, fills, or changes to drainage patterns. However, we understand that mining cuts will include near-vertical slopes up to 30 feet high adjacent to mined benches, and that reclamation will include 2:1 (horizontal to vertical) slopes and 12-foot-wide benches every 30 vertical feet (maximum) for slopes around the reclaimed open-pit mining area. In our opinion, the risk to persons on the Site due to project-induced ground failure is a "Less than significant impact with mitigation." The required mitigation is that slopes be properly engineered for the site conditions.

4.6 Expansive Soils

As previously stated, there are three soil types mapped on the Site; Vernalis clay loam, Zacharias gravelly clay loam, and Elsalado fine sandy loam. These soils reportedly have low plasticity and low linear extensibility. Therefore, it is our opinion that the risk due to expansive soils on the Site is one of "No impact."

4.7 Geologic Limitations to Onsite Wastewater Disposal

As previously stated, there are three soil types mapped on the Site; Vernalis clay loam, Zacharias gravelly clay loam, and Elsalado fine sandy loam. These soils reportedly have slow percolation rates

ranging from less than 0.6 inch per hour up to approximately 2.0 inches per hour. In our opinion, the risk of the Site not being able to support onsite wastewater disposal for the proposed project is "Less than significant impact with mitigation." The required mitigation is that onsite wastewater treatment systems be properly engineered for the site conditions.

5.0 GEOLOGIC RESOURCES

As part of our geological assessment, we reviewed the Site for geologic resources other than aggregate. Based on the observed site conditions, and review of the geological maps for the area, economic deposits of precious or base metals are not expected to underlie the Site. Commercial deposits of oil and gas are not known to occur on the Site or in the immediate vicinity.

6.0 GEOTECHNICAL REVIEW

We are not aware of a design-level geotechnical investigation and report having been prepared for the project. We prepared a mineral resource evaluation for the Site in the spring of 2007, which included subsurface investigation and limited geotechnical testing. Based on our site reconnaissance, subsurface investigation, literature review, and current understanding of the proposed development, there are no apparent geotechnical considerations unique to the Site beyond those normally required for a project of this type in the area.

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 Geologic Hazards

No known active faults were identified on or in the immediate vicinity of the Site. Based on our computer model estimate the PGA for the Site with a 10% chance of exceedance in 50 years (475-year return period) is approximately 0.4g. An acceleration of 0.4 g is typically accompanied by moderate to severe ground shaking, but can be mitigated for by following established building practices. The seismic risk at the Site pre-project and during the life of the project is not considered to be significantly greater than that for existing facilities in the area. The State of California regulates development in California through a variety of tools that reduce or mitigate potential hazards from earthquakes or other geologic hazards. The California Building Code (CBC), Unreinforced Masonry Building Law, Alquist-Priolo Earthquake Fault Zoning Act and the State of California Seismic Hazards Mapping Act govern development in potentially seismically active areas. The CBC contains provisions to safeguard against major structural failures or loss of life caused by earthquakes or other geologic hazards. As such, and based on our review of the Site, mitigations for seismic considerations beyond those specified in the local building codes are not required.

These soils on the Site reportedly have low plasticity and slight erosion potential at the current topographic slopes. Based on the anticipated subsurface materials and proposed reclamation slope angles, the slopes will be globally stable pursuant to standard Surface Mining and Reclamation Act (SMARA) reclamation practices if proper engineering, construction, revegetation and erosion control measures are incorporated into the project. The potential for liquefaction and lateral spreading does not appear to pose a significant risk to the Site in its current condition. The cut slopes for the open-pit mining area of the Site may be susceptible to lurch cracking and lateral spreading during seismic events if not properly constructed. However, the risk from lurch cracking and lateral spreading during seismic events to persons and property on the Site or adjacent properties should be insignificant if the pit slopes are properly designed and constructed. Pit and reclamation slope global stability are not anticipated to be geologic constraints for the Site. Temporary excavations should be performed in accordance with applicable Occupational Safety and Health Administration Division of Industrial Safety and Mine Safety and Health Administration requirements.

The project will include mining to depths ranging from approximately 70 to 130 feet bgs. Once groundwater is encountered, wet mining methods will be employed to extract the aggregate. Therefore, significant dewatering operations are not anticipated.

7.2 Geotechnical Review

Based on our site reconnaissance, subsurface investigation, literature review, and current understanding of the proposed development, there are no apparent geotechnical considerations unique to the Site beyond those normally required for a project of this type in the area.

7.3 Drainage

Adequate drainage is imperative to reduce the potential for erosion or differential soil movement. The Mining Permit and Reclamation Plan provided to us by the client depict pre-mining operations and proposed conditions during mining and reclaimed mine site topography. Based on our review of the Mining Permit and Reclamation Plan and our observations of the Site, the Site currently slopes at approximately ¼ to ½-percent to the east, with water being captured and controlled by an existing system of surface drains and ditches. During mining and after reclamation, most of the Site will drain internally to the pits on each of the two areas. Water not entering the pits will continue to drain to the existing system of surface drains and ditches. In our opinion, the project as proposed will have no significant impacts on drainage outside of the pit area.

8.0 LIMITATIONS

The analyses, conclusions, and recommendations contained in this report are based on site conditions as they existed at the time of our site reconnaissance. This report is applicable only for the project and Site studied. Opinions presented herein are based on the referenced published and unpublished documents and limited field reconnaissance.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

Our professional services were performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geological and geotechnical engineering principles and practices used in the Site area at this time. No warranty is provided, either express or implied.

9.0 REFERENCES

To aid in the preparation of this report, the following documents were reviewed:

Calaveras Materials Inc., *Mining Permit & Reclamation Plan, Riddle Surface Mine*, 2010.

California Department of Water Resources, Central District Groundwater Levels, http://wdl.water.ca.gov/gw/, 2006.

California Geological Survey, *Aggregate Availability in California*, Map Sheet 52, 2002.

California Geological Survey, *California Geomorphic Provinces*, CGS Note 36, 2002.

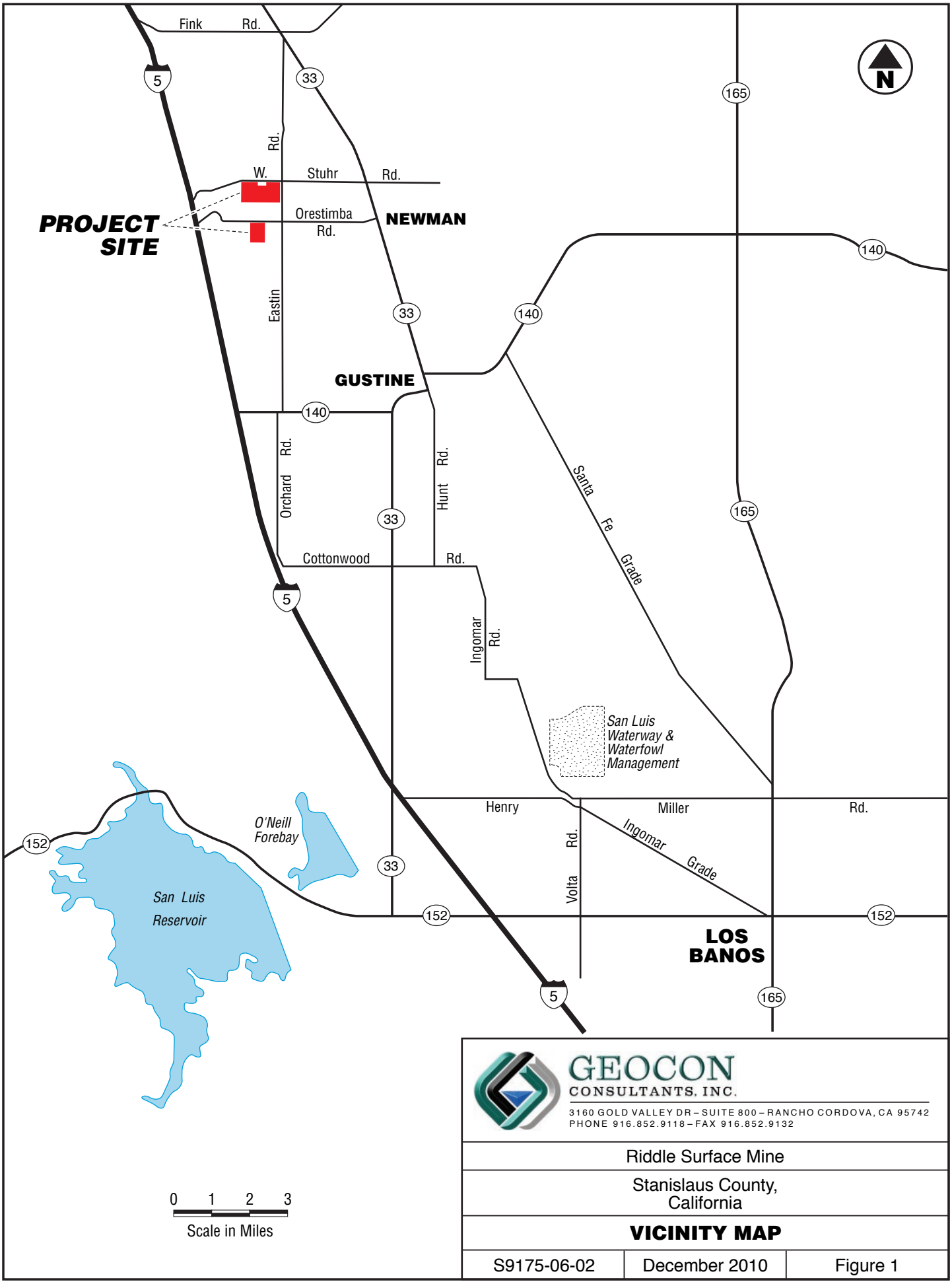
Geocon Consultants, Inc., *Mineral Resource Evaluation Report, 3030 Orestimba Road and 26281 & 26863 Eastin Road, Newman, California*, 2007.

Munger Map Book, *California and Alaska Oil and Gas Fields*, 41st Edition, August, Kay R. Munger, publ., 2001.

RGP Planning and Development Services, *Riddle Surface Mine Project Description Information*, 2010.

United States Department of Agriculture, Soil Conservation Service, Online *Soil Survey*, 2008.

United States Geological Survey, *Preliminary Geologic Map of the San Jose 30X60 Quadrangle*, California, 1999.



GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR – SUITE 800 – RANCHO CORDOVA, CA 95742
PHONE 916.852.9118 – FAX 916.852.9132

Riddle Surface Mine

Stanislaus County, California

VICINITY MAP

S9175-06-02	December 2010	Figure 1

LEGEND:

RA-1 Approximate Monitoring Well Location

RC-1 Approximate Boring Location

0 1,200

Approx. Scale in Feet

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR – SUITE 800 – RANCHO CORDOVA, CA 95742
PHONE 916.852.9118 – FAX 916.852.9132

Riddle Surface Mine

Stanislaus County, California

SITE PLAN

S9175-06-02	December 2010	Figure 2