

FOR CONTRACT NO.: 03-1F6004

INFORMATION HANDOUT

GEOTECHNICAL DESIGN REPORT

**PRELIMINARY SITE INVESTIGATION TRANSMITTAL,
dated October 6, 2011**

ROUTE: 03-ED-193-23.4

Memorandum

*Flex your power!
Be energy efficient!*

To: MR. MOHAMMAD U. SADIQ
Senior Transportation Engineer
District 3
North Region Division of Engineering
Design Branch S6

Date: January 27, 2012
File: 03-ED-193-PM 23.3/23.5
03-1F6001
0300020566
Reconstruction of Embankment
Slope with Gabion Wall

From: DEPARTMENT OF TRANSPORTATION
Division of Engineering Services
Geotechnical Services

Subject: Geotechnical Design Report

INTRODUCTION

As requested, the Office of Geotechnical Design - North (OGDN) of Geotechnical Services is providing a limited geotechnical evaluation for the gabion wall proposed for the subject embankment reconstruction project located on State Route (SR) 193 around PM 23.45, in El Dorado County.

Scope of work

The scope of our work included performing a literature and historical review in an effort to obtain geological and geotechnical data pertaining to the subject site that could provide insight into the design and construction of the proposed gabion wall. The historical review included searching Caltrans intranet as-built and geotechnical report records from the Bridge Inspection Records Information System (BIRIS), the Document Retrieval System (DRS), and the Digital Archive of Geotechnical Data (GeoDOG) databases

Based on the request from Design Branch S6, a subsurface exploration and testing program (as required by Caltrans Bridge Design Specifications Article 5.3, August 2004) has been specifically omitted from the OGDN scope of work. Our field investigation was limited to visual observations made during a site visit by an OGDN engineer and bulk sampling of near-surface materials, followed by engineering analysis and preparation of this report summarizing our findings, conclusions and recommendations.

Proposed Structure

Based on the request from the North Region Division of Engineering, Design Branch S6, the project proposes to repair a failed embankment utilizing a gabion wall for a length along the roadway of approximately 200 feet, just north of a cross-culvert at PM 23.46 on Route 193 in El Dorado County. According to Design Branch S6, the proposed gabion wall will utilize Standard Gabion Sizes presented on the 2010 Caltrans Standard Plan No. D100A, and will be configured as diagramed in Figure A of Plate No. 1. The proposed wall will roughly mimic the existing gabion wall nearby at PM 23.2 (see “Background” section, below) which has a maximum retained height of 6 feet. However, design Branch S6 has indicated that the proposed wall will extend as high as 7.5 feet. Therefore, we propose that a Letter Code D, E and/or F Standard Gabion Size (per Plan No. D100A) be placed at the top where needed as diagramed in Figure B of Plate No. 1, attached.

According to the Caltrans Digital Photolog Viewer, Roadview Explorer 2.0 (http://onramp.dot.ca.gov/photolog/roadview_index.htm), the subject site is located at latitude and longitude coordinates of 38.7742378° North and 120.8205823° West (these coordinates are the basis for obtaining data in this report available through GIS related information sources).

Background

Project Site PM 23.4

Director’s Order Request (“DOR”) – Funds Request (EA 03-2F100, dated Nov. 3, 2010, Reference No. 13) identifies the subject location (PM 23.45) as “Location 1”, and indicates this location to have received removal and replacement of asphalt concrete as a temporary repair of 2 inches of pavement differentials as a result of slide movement related to storm events. The DOR Funds Request further states that Location 1 was previously identified as needing a retaining wall system and was programmed to make permanent repairs as part of a Minor A Project in the 11/12 fiscal year. Pictures of the pavement failure are presented in the DOR – Funds Request (attached as Appendix A) and depict a shallow slip-out of embankment materials extending a maximum of roughly 2.5 feet into the travel way. Based on the Caltrans intranet search, no as-built, geotechnical, or other records were available for the project location.

Existing Gabion Wall – PM 23.2

Review of As Built plans for the existing gabion wall at PM 23.2 (Contract No. 03-0A1104) indicate the wall was constructed in 1999 to a maximum height of 6 feet (with no

front face batter) and a length of 65 feet. No indication was apparent on the plans that foundation improvement to the subgrade beneath the wall was performed as part of the wall construction. Based on the Caltrans intranet search, no geotechnical related records were available for the existing gabion wall location.

FINDINGS

Geology

The project site lies within the Western Metamorphic Belt, a geologic terrane on the westerly portion of the Sierra Nevada Geomorphic Province. The Western Metamorphic Belt can be described as a northerly trending belt composed of a wide variety of metamorphic and igneous rocks. These rocks were emplaced on the western edge of North America through convergent plate-tectonism (colliding of earth's crustal plates) that occurred from about 100 million to more than 300 million years ago (Paleozoic and Mesozoic Eras), and have been variously deformed by several episodes of folding and faulting. According to the California Geologic Survey (CGS) "Generalized Geologic Map of El Dorado County, California" (Scale 1:100,000, Reference No. 3), the immediate site of the proposed wall is located atop the Mesozoic rocks of the Mariposa Formation. The Mariposa formation is described by the CGS as dark gray slate with subordinate tuff, graywacke and conglomerate.

Naturally Occurring Asbestos (NOA)

The California Geologic Survey (CGS) Open File Report (OFR) 2000-002 titled "Areas More Likely to Contain Natural Occurrences of Asbestos in Western El Dorado County, California" indicates the project site to be within "areas that probably do not contain asbestos". CGS OFR 2000-002 states that these areas generally have little or no serpentinite, ultramafic rocks or related soils, and in general, asbestos rarely occurs in these areas except in or near fault zones. Based on published geologic mapping, observations of geologic conditions made during site visits and the distance of the site from mapped faults (see "Faulting/Seismicity", below),) OGDN confirms that the above criteria are valid for the project site.

Faulting/Seismicity

The Caltrans ARS Online web tool (http://10.160.173.178/shake2/shake_index2.php) indicates that the closest "active" fault (ruptured within past 700,000 years and meeting Caltrans criteria for inclusion per Reference No. 12) to the site is the Bear Mountains fault zone (Rescue fault section) at a distance of approximately 7.1 miles westerly of the

project site. The fault is indicated to be a “normal” fault type capable of generating a Maximum Movement Magnitude (Mmax) of 6.5. According to the Alquist-Priolo Earthquake Fault Zone Maps available through the California Geologic Survey (Reference No. 14), El Dorado County is not an “affected county”; hence, the site is not within an Alquist-Priolo Earthquake Fault Zone. No faults are known to extend close to or on the project site. Based on fault mapping of the area provided by the CGS (Scale 1:100,000, Reference No. 4), the closest inactive fault trace is roughly 0.2 miles east of the project site and is associated with the Melones Fault Zone.

Bridge Design Specifications (BDS, Reference No. 9) Section 5.2.2.3 indicates that seismic forces applied for overall stability shall be based on a horizontal seismic acceleration coefficient, k_h , equal to one-third of the expected peak acceleration at the site as defined in the Caltrans Seismic Hazard Map. According to the 2007 Caltrans Deterministic PGA Map (Reference No. 10), a peak ground acceleration (PGA) of 0.20g would be applicable to the site for a $V_{s30}=2,500$ ft/sec (760 m/sec, for soft bedrock). Therefore, a k_h of 0.07g was utilized for seismic design for overall stability (see Table No. 1, below). The effects of earthquake induced ground motions on the proposed retaining wall external stability (excluding overall stability) was not considered in design as the proposed wall does not support an installation for which there is a “low tolerance” for failure (per BDS Article 5.5.4).

Field Investigation

Project Site (PM 23.4)

At the proposed gabion wall location, SR 193 has a pavement width of roughly 21 feet with little to no width for shoulders. The adjacent, uphill (left) terrain was noted to be composed of an approximately 15 to 20 feet high 0.5H:1V cutslope comprised of slate rock materials (see photographs, Plate No. 3, attached). Embankment materials downhill (right) were noted to be sloped at roughly 1.5H:1V (also confirmed by Design S6 topography data). The embankment materials appeared to be composed of excavated slate rock derived from local roadway cuts; The embankment slope extended to a maximum of roughly 50 feet vertically down from roadway level. Indications of slumping, sagging, cracks or other signs of failures were not visible on the embankment slope. No rock outcroppings were observed locally, downhill of the roadway. Hand probing of the embankment materials within 7 feet below roadway elevation was accomplished repeatedly to the full length of the hand probe (roughly 3 feet), suggesting the presence of loose, near-surface materials; below 7 feet from roadway grade the materials were resistant to hand probing, suggesting materials may have been cast on the slope or loosely placed during the DOR repair. The patched pavement area of the

roadway was absent of any significant signs of distress. A bulk sample was obtained of the near-surface embankment materials, and was retrieved from select locations and composited for laboratory testing. Site description comments in this section were based on a site visit made on August 25, 2011.

Existing Gabion Wall Site (PM 23.2)

The existing gabion wall site appeared to have been constructed as indicated on the As Built project plans (see “Background” section). Embankment materials downhill, below the toe of the wall extended for about 30 feet vertically and were noted to be sloped at roughly 1.3H:1V (see photographs, Plate No. 4). The roadway pavement area behind the wall did not have any indications of post construction pavement patches. No significant distress was noted in the pavement; however, a minor (less than 3/16 inch width) longitudinal crack appears to have developed behind the heel of the wall.

Laboratory Testing

Bulks samples collected during our site investigation were brought to the Transportation Laboratory, composited and submitted for select testing. Laboratory testing include corrosion testing of soils (CTM 643). Sulfate content (CTM 471) and chloride content (CTM 422) testing was not performed per the 2003 Caltrans Corrosion Guidelines which states “...soil and water are not tested for chlorides and sulfates if the minimum resistivity is greater than 1,000 ohm-cm because a minimum resistivity greater than 1,000 ohm-cm indicates that the chloride and sulfate contents are low (i.e., low corrosion potential).” Laboratory testing also included triaxial shear strength testing (ASTM D 4767) of specimens remolded to 90 percent relative compaction as determined by CTM 216. Laboratory testing results are attached as Appendix C.

Analysis

The minimum live load surcharge for “vehicular loading” of 0.240 ksf (per Caltrans BDS Article 5.5.5.10.5) was applied in the travel way for all analyses performed. Caltrans Standard Specifications 2010, Article 72-16.02G indicates that rock-filled gabions must have a unit weight of at least 110 pcf. For a typical gabion fill porosity of 30%, this roughly corresponds to a gabion stone unit weight of 157 pcf. Initially, a slope stability limit equilibrium method (LEM) of analysis (per SlopeW software, Reference No. 11) was performed on the existing site conditions utilizing approximated, generalized strength parameters; the analysis yielded a minimum factor of safety (FS) of 1.34. Subsequently, a LEM analysis was performed for the highest proposed wall configuration and yielded a minimum FS of 1.34 for overall stability (see Plate No. 2). In accordance

with Article 5.10.2 of Caltrans BDS Section 5, the proposed gabion wall configuration was analyzed to determine if the criteria is met for external stability of prefabricated modular walls. The gabion wall software “GawacWin 2003” provided by Maccaferri, Inc. (Reference No. 7) was utilized to check the external stability criteria, the results of which are presented as Appendix B, attached. The GawacWin output indicates a “maximum allowable stress on the foundation” of around 4,589 psf. However, limited literature is provided on the method of derivation of this value. Therefore, in accordance with Caltrans BDS Sections 4 and 5, the bearing capacity of the proposed wall foundation was analyzed based on a modified form of the general bearing capacity equation to account for the effects of the adjacent ground surface slope. Additionally, the bearing capacity was checked utilizing Shields’ 1990 Method (Reference Nos. 1 and 2). Based on an applied normal force of 6,770 lbs per foot of wall and an eccentricity of 0.56 feet (from GawacWin output), the equivalent uniform bearing pressure applied by the wall is 1,387 psf. The resulting FS against bearing failure was found to be 3.1 and 3.2 per the BDS and Shields methods, respectively. A summary of the wall stability analyses results are presented in Table No. 1, below.

Table No. 1. Stability Analysis Results

Failure Mode	Analysis Source	BDS 5 Article	BDS 5 Stability Criteria	FS Results
Overall Stability (Static Loads)	SlopeW	5.2.2.3	$FS \geq 1.3$	FS = 1.34
Overall Stability (Seismic Loads $k_h = 0.07g$)			$FS \geq 1.0$	FS = 1.19
Sliding	GawacWin 2003	5.10.2	$FS_{SL} \geq 1.5$	$FS_{SL} = 2.41$
Overturning			$FS_{OT} \geq 2.0$	$FS_{OT} = 3.85$
Maximum Eccentricity			$e_{max} \leq B/6$	$e_{max} = 0.56' < 1'$
Bearing Capacity	Caltrans BDS & Shields Method, 1990 (FHWA-FLP-94-006)		$FS \geq 3.0$	FS = 3.1 and 3.2

CONCLUSIONS & RECOMMENDATIONS

Based on the findings of the proposed wall analysis, and the apparent successful performance of the nearby gabion wall of similar configuration, the proposed gabion wall appears acceptable as proposed. Although both the referenced existing and proposed gabion walls do not meet the minimum embedment depth and minimum berm width requirements for prefabricated modular walls (BDS Article 5.10.1), the integrity of the proposed wall would likely not be compromised due to the relatively small proposed wall height and inherent flexibility of gabion structures. This flexible attribute is noted in the FHWA “Retaining Wall Design Guide” (Reference No. 1):

“Of all of the flexible gravity structures, gabion walls typically require the least amount of foundation preparation, and they can sustain the greatest amount of differential settlement without serious distress.”

Based on the loose near-surface materials encountered on the down-hill slope adjacent to the roadway (see “Field Investigation” section above), OGDN recommends the sub-excavation of materials below the outer, “toe” portion of the wall to a depth of at least 18 inches below the base of the proposed wall as diagramed in Figure B of Plate No. 1 attached. The sub-excavated materials should be replaced with “Structure Backfill” in accordance with the 2010 Caltrans Standard Specifications, Article 19-3.03E.

Corrosion

The USDA Web Soil Survey (Reference No. 15) indicates materials in the vicinity of the site to have a “high” rating for corrosion of steel. Based on the results of the corrosion testing (see Plate C-1), the site is considered “non-corrosive” to foundation elements per the 2003 Caltrans Corrosion Guidelines. However, these guidelines indicate that the “Gabion Mesh Corrosion” document (Reference No. 5) should be referred to for assistance regarding the corrosion evaluation and mitigation measures for gabions. In accordance with this document, OGDN has determined that the proposed site does not meet any of the indicators for “corrosive and severe exposures”, and anticipates that the proposed facility generally meets the “well-drained soil and/or dry soil conditions” criteria for “Category 2” exposure. Therefore, PVC coating is not anticipated to be required as the 0.80 oz/square foot zinc coating (per the 2010 Caltrans Standard Specifications Article 72-16.02B) should be adequate to achieve the intended service life.

Construction Considerations

Naturally Occurring Asbestos (NOA)

As discussed in the “Findings” section of this report, OGDN confirms that the project site generally meets the criteria for “areas that probably do not contain asbestos”, as defined in the CGS OFR 2000-002. In consideration for the potential presence of Naturally Occurring Asbestos (NOA) materials, the North Region Hazardous Material Officer should be contacted to determine if the project has the need for Airborne Toxic Control Measures (ATCMs) during project construction

If any conceptual changes are made during final project design, the Office of Geotechnical Design North should review those changes to determine if these foundation recommendations are still applicable.

If you have any questions or comments, please call Mark Hagy at (916) 227-1077 or Douglas Brittsan at (916) 227-1079.

MARK HAGY, P.E., G.E.
Transportation Engineer
Office of Geotechnical Design North, Branch C



c: Doug Brittsan
Najed Dakak - D02 – Proj. Mgmt.
Struct. Const. RE Pending File
DES OE, Office of PS&E
DME
GS Corporate
OGDN File

Attachments: References
Plate No. 1: Gabion Wall Figures
Plate No. 2: Overall Stability
Plate No. 3: Photographs
Plate No. 4: Photographs
Appendix A: Director’s Order Request- Funds Request, ED 193 PM 23.45-23.75
Appendix B: GawacWin 2003 Results
Appendix C: Laboratory Testing Results
Plate No. C-1. Corrosion Test Results
Plate No. C-2. Compaction Test Results
Plate Nos. C-3a & C-3b. Consolidated Undrained Triaxial Test Results

REFERENCES

1. FHWA (1994) “Retaining Wall Design Guide”, FHWA Technical Report No. FHWA-FLP-94-006, dated September 1994.
2. USDA (1998) “Application of Methods for Estimating the Bearing capacity of Spread Footings in Bridge Approach Fills”, Engineering Technical Note No. 1, U.S. Dept. of Agriculture, Natural Resources Conservation Service, dated November 1998.
3. CGS (2000) “Areas More Likely to Contain Natural Occurrences of Asbestos in Western El Dorado County, California”, California Dept. of Conservation, Division of Mines and Geology, Open-File Report 2000-002, dated 2000.
4. CGS (2001) “Mineral Land Classification of El Dorado County, California”, California Department of Conservation, California Geologic Survey, CGS Open-File Report 2000-03, by Lawrence L. Busch, Plate 1 Map Scale 1: 100,000, June 2001.
5. Caltrans (2001) “Gabion Mesh Corrosion – Field Study of Test Panels and Full-Scale Facilities”, Report No. FHWA-CA-TL-99-23, Study No. F93TL02 S, 2nd Edition, dated November 2001.
6. Caltrans (2003) “Corrosion Guidelines”, Corrosion Technology Branch, Materials Engineering and Testing Services, Caltrans, Version 1.0, September 2003.
7. Maccaferri, Inc. (2003) GawacWin 2003 software, licensed to Caltrans, supplied by Maccaferri, INC. (USA), Copyright 1997/2003, Persio L. A. Barros, GCP Engenharia, Brasil, obtained at <http://www.maccaferri-canada.com/Software.aspx>.
8. Caltrans (2003) “Bridge Design Specifications, Section 4 –Foundations”, dated November 2003.
9. Caltrans (2004) “Bridge Design Specifications, Section 5 –Retaining Walls”, dated August 2004.
10. Caltrans (2007) “2007 Caltrans Deterministic PGA Map”, M. Merriam, Division of Engineering Services, and T. Shantz, Division of Research & Innovation, Caltrans, from http://dap3.dot.ca.gov/shake_stable/references/Deterministic_PGA_Map_8-12-09.pdf.
11. GEOSLOPE International Ltd (2007) SLOPE/W software, GeoStudio 2007, Version 7.17, Build 4921, copyright 1991-2010.
12. Caltrans (2009) “Development of the Caltrans Deterministic PGA Map and Caltrans ARS Online”, M. Merriam, Geotechnical Services, and T. Shantz, Division of Research &

Innovation, Caltrans, from

http://dap3.dot.ca.gov/shake_stable/references/Deterministic_PGA_Map_and_ARS_Online_Report_071409.pdf.

13. Caltrans (2010) “Director’s Order Request-Funds Request”, ED 193 PM 23.45-23.75, EA 03-2F100, incident date October 24, 2010, signed November 3, 2010.
14. CGS (2011) “Alquist-Priolo Earthquake Fault Zone Maps”, obtained from California Geologic Survey at http://www.quake.ca.gov/gmaps/ap/ap_maps.htm.
15. USDS (2011) “USDA Web Soil Survey”, <http://websoilsurvey.nrcs.usda.gov/app/>.USGS

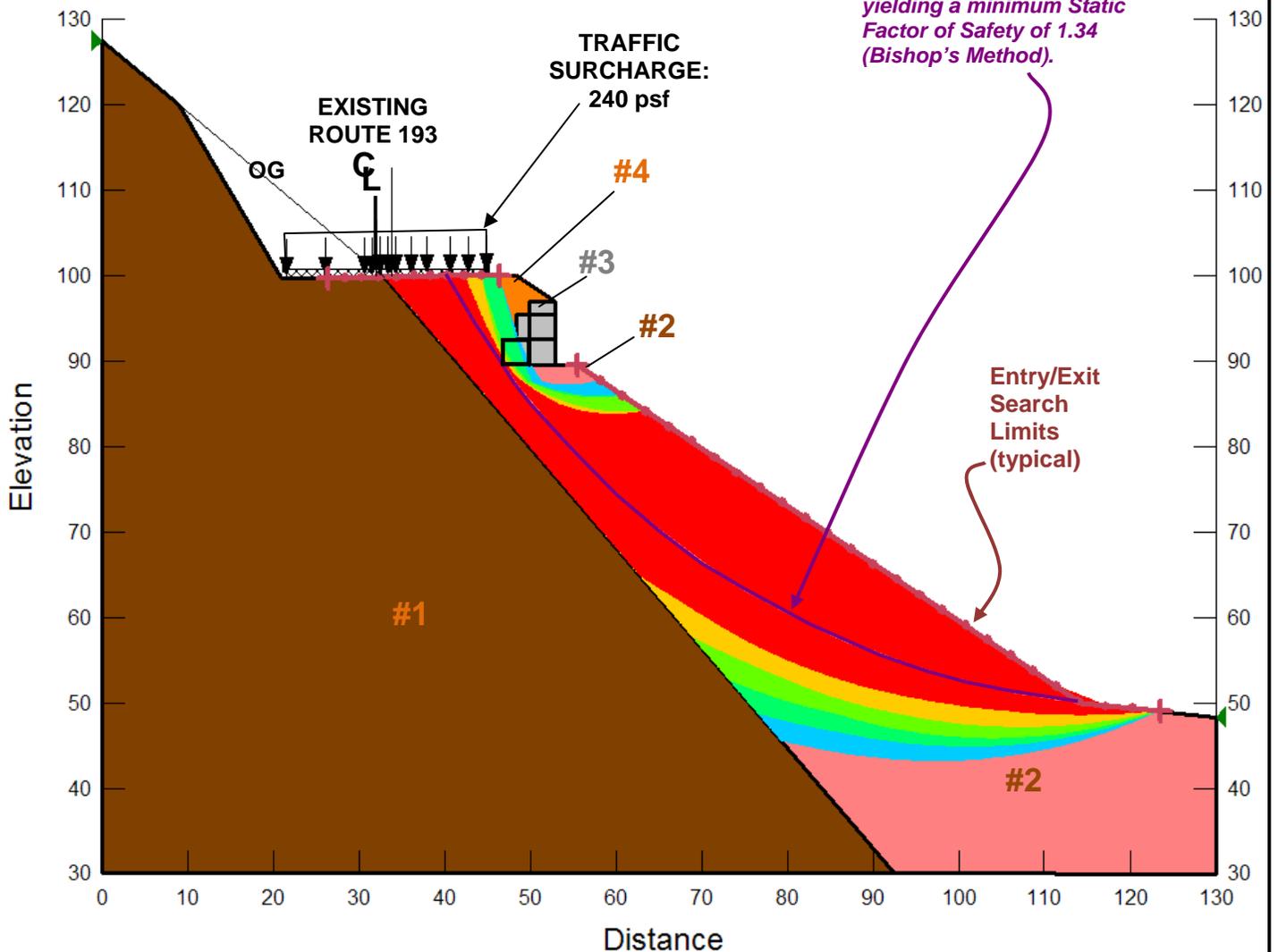
**#1 – SLATE
BEDROCK**
Impenetrable

**#2 – EMBANKMENT
(composed of locally
derived slate
materials):**
 $\gamma = 125$ pcf
 $\phi' = 33^\circ$
 $c' = 150$ psf

**#3 – GABION
BASKET FILL:**
 $\gamma = 110$ pcf
 $\phi = 60^\circ$
 $c = 5000$ psf
(Relatively
Impenetrable)

**#4 – WALL
BACKFILL:**
 $\gamma = 125$ pcf
 $\phi = 35^\circ$
 $c = 0$ psf

Safety Map Range of Factor of Safety	
1.34 to 1.39	
1.39 to 1.44	
1.44 to 1.49	
1.49 to 1.54	
1.54 to 1.59	



APPROXIMATE SCALE : 1" = 20 feet
(vertical = horizontal)



NOTE:

Wall configuration and ground surface elevations based on elevations presented in "Layout", Sheet L-1 provided by the Caltrans North Region Division of Engineering, Design Branch S6, and on OGDN field measurements on August 25, 2011.



CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design -
North

EA: 03-1F6001

Date: January 2012

OVERALL STABILITY

**03-ED-193 PM 23.3-23.5
GABION WALL
GEOTECHNICAL DESIGN REPORT**

Plate
No. 2



Photo No. 1. Project site vantage point view from easterly direction (photo taken on 8-25-11).



Photo No. 2. Project site viewing from southeasterly direction; Note pavement patch (photo taken on 8-25-11).



Photo No. 3. Project site viewing from northwesterly direction; Note PM 23.46 paddle marker (photo taken on 8-25-11).



CALTRANS
 Division of Engineering Services
 Geotechnical Services
 Office of Geotechnical Design - North

EA: 03-1F6001

Date: January 2012

**PHOTOGRAPHS
 PROJECT SITE
 PM 23.4**

**03-ED-193 PM 23.3-23.5
 GABION WALL
 GEOTECHNICAL DESIGN REPORT**

Plate
 No. 3



Photo No. 4. Existing gabion wall (PM 23.2) site; vantage point view from southwesterly direction (photo taken on 8-25-11).



Photo No. 5. Existing gabion wall (PM 23.2) viewing from easterly direction (photo taken on 8-25-11).

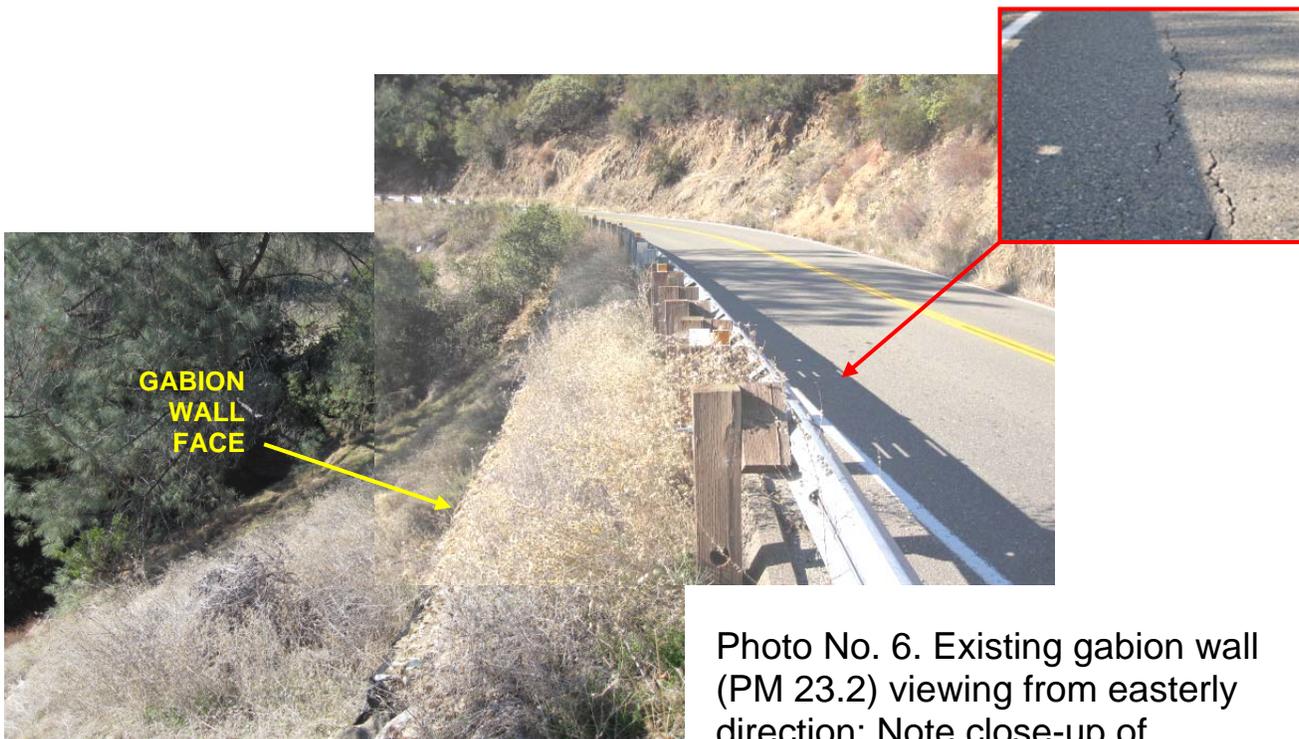


Photo No. 6. Existing gabion wall (PM 23.2) viewing from easterly direction; Note close-up of longitudinal pavement cracking (photo taken on 8-25-11).



CALTRANS
 Division of Engineering Services
 Geotechnical Services
 Office of Geotechnical Design - North

EA: 03-1F6001

Date: January 2012

**PHOTOGRAPHS
 EXISTING GABION WALL
 PM 23.2**

**03-ED-193 PM 23.3-23.5
 GABION WALL
 GEOTECHNICAL DESIGN REPORT**

Plate
 No. 4

03-1F6001

ED 193 PM 23.3-23.5

APPENDIX A

Director's Order Request- Funds Request,

ED 193 PM 23.45-23.75

Director's Order Request - Funds Request

MTC-0130 REV (1/2010)

Proposed Contract Method
Force Acct (ELB)

Use this form:

- 1) to request exemption from State Contract Act for projects over \$250,000
- 2) all G-11 Supplementals
- 3) approval for emergency Equipment Rental over \$250,000
- 4) Supplemental Director's Orders
- 5) Day Labor > \$25,000
- 6) out of scope change orders.

1. Date and Location of Incident or Problem

District 03	Route 193	PM [Back] 23.45	PM [Ahead] 23.75	Incident Date (MM/DD/YYYY) 10/24/2010
County ED	Route, 2nd	PM [2nd]	PM [2nd]	Bridge Number

2. Damage and Mobility

Damage or Incident: Has Occurred	Severity Road - Portion of Lane Lost
Cause of Failure Washout	Traffic Restrictions Road Open Lane Restrictions

3. Contract Information

Contractor Name (Required for Force Account) TBD				<input type="checkbox"/> Small Business
				<input checked="" type="checkbox"/> To Be Determined (IB and ELB)
EA (1st 5 Characters) 2F100	Working Days 20	A. Contract Amount \$300,000.00	B. <input type="checkbox"/> Check if order to include authority for R/W Capital. If Yes,	Total Request (A + B) \$300,000.00

If a Supplemental, enter dates and amounts of prior Director's Orders

4. Project Information, Funding and Legal Authority

Project Schedule		Funding	
(Informal Bid)	Advertise Date	Which Request? <input checked="" type="checkbox"/> Use This Request <input type="checkbox"/> See Separate Funds Request <input type="checkbox"/> \$0	
	Bid Open Date	Long Description In El Dorado County near Kelsey, from 2.7 miles east of Kelsey to 0.8 mile west of South Fork American River	
(All Contracts)	Award Date 11/08/2010	Work Description At Location 1 (PM 23.45): replace failed pavement. At Location 2 (PM 23.75): place retaining system and replace pavement.	
	Begin Work Date 11/10/2010	Program Code 20.10.201.130 Major Damage (Emer Open)	
	Acceptance Date 12/01/2010	PPNO (See Instructions on PPNO numbers) 100% SHA 042T	
Permits? Not Needed		Proposed Allocation: <input checked="" type="checkbox"/> G-11 or Other Delegation <input type="checkbox"/> CTC Vote <input type="checkbox"/> Maintenance (HM)	
RAW? Not Needed		FHWA ER Funding: <input type="checkbox"/> Yes, DAF Approved <input type="checkbox"/> Anticipated <input checked="" type="checkbox"/> None	
Major Damage Coordinator / Construction Senior		ER Classification: <input type="checkbox"/> EO <input type="checkbox"/> PR <input checked="" type="checkbox"/> Not Applicable	
Major Damage Coordinator Daniel Ferchaud		Performance Indicator 2 Locations	
Construction Senior Luis Rivas		Is or Will Be In FTIP? <input type="checkbox"/> YES <input type="checkbox"/> NO	
Legal Authority (Select one): PCC 10122(a) Failure or Threat of Failure of Transportation Facility			

Director's Order Request - Funds Request

MTC-0130 REV (1/2010)

District	EA
03	2F100

5. Justification

NEW PROJECTS: Discuss 1) the damage or problem 2) proposed solution 3) scope of work, listing the major items of work and 4) explain why normal contract procedures are not satisfactory. **SUPPLEMENTALS:** Discuss for each that apply, 1) how the scope, cost or severity of the problem have changed 2) scope of work of additional work, listing major items of new work 3) summary of current financial status of the project and 4) explain why performing the additional work by normal contract procedures is not appropriate.

The Director's Order is requested to allow the use of an emergency limited bid contract to undertake emergency action at two locations on Highway 193. On 10/24/2010, a significant storm event dumped over 4 inches of rain in the area within a 24 hour period causing the damage as described below

Location 1 (PM 23.45), This section of highway was previously identified as needing a retaining wall system due to slide movement. A Minor A Project is currently programmed to make permanent repairs in the 11/12 fiscal year. The recent storm has accelerated the earth movement and created uneven pavements in the travel lane. The eastbound lane currently exhibits pavement differentials of about 2" in elevation. The proposed removal and replacement of the existing asphalt concrete is only a temporary repair until the programmed permanent repairs can be constructed.

At Location 2 (PM 23.75), the cut slope has failed and plugged an existing cross culvert. The storm water traveled across highway and washed out the embankment and undercutting the pavement. On October 26, 2010, a Geotech field reviewed the site and recommended that a gabion wall be installed and pavement replaced.

The cost of the proposed scope of the work is expected not-to-exceed \$300,000.

Standard bidding and informal bidding were considered but rejected. The longer bid and award times would incur too much risk of additional pavement failure and the potential for road closure.

The emergency limited bid contract is necessary to prevent the possible loss or impairment of life, property or essential services.

6. District Director Signature

DISTRICT DIRECTOR SIGNATURE

Steve E. Kurljantsev for Jody Jones

DATE

11/3/10

Director's Order Request - Funds Request

MTC-0130 REV (1/2010)

District 03	EA 2F100
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7. Headquarters Approval

- Pursuant to your authority under Section 10122(a) of the Public Contract Code,
 - Pursuant to your authority under Section 10122(c) of the Public Contract Code,
 - Pursuant to your authority under Section 10122(d) of the Public Contract Code,
 - Pursuant to your authority under Section 10255 of the Public Contract Code,
 - Pursuant to the Director's Order Guidelines for Supplemental Directors Orders,
- you are requested to authorize performance by emergency contract procedures.

for *Patricia-Louise Dickerson*
Tony Tavares

11/4/10

Chief, Division of Maintenance
APPROVED:

Date

FOR *[Signature]*

11/4/10

Cindy McKim
DIRECTOR

BY _____

Check if verbal approval given. Date of verbal ____/____/____ BY _____

CONCURRENCE

[Signature] *11/3/10*
Major Damage Engineer

[Signature]
Major Damage Office Chief, or
Division of Construction Chief (CCO
only)

[Signature] *10/3/10*
Allocation Method 6-11
Div of Programming Vote HM

[Signature] *11/3/10*
Legal Division

Director's Order Request - Funds Request

MTC-0130 REV (1/2010)

District
03

EA
2F100

8. Photo Page



Location 1: Ed-193 PM 23.45. embankment settlement and pavement failure



Location 2: ED-193 PM 23.75 Plugged culvert from cut slope failure.

Director's Order Request - Funds Request

MTC-0130 REV (1/2010)

District	EA
03	2F100

8. Photo Page



Location2: ED-193 PM 23.75 Plugged culvert results in pavement undermining



Location 2: ED-193 PM 23.75 Cones placed within travel way to let public know

03-1F6001

ED 193 PM 23.3-23.5

APPENDIX B

GawacWin 2003 Results

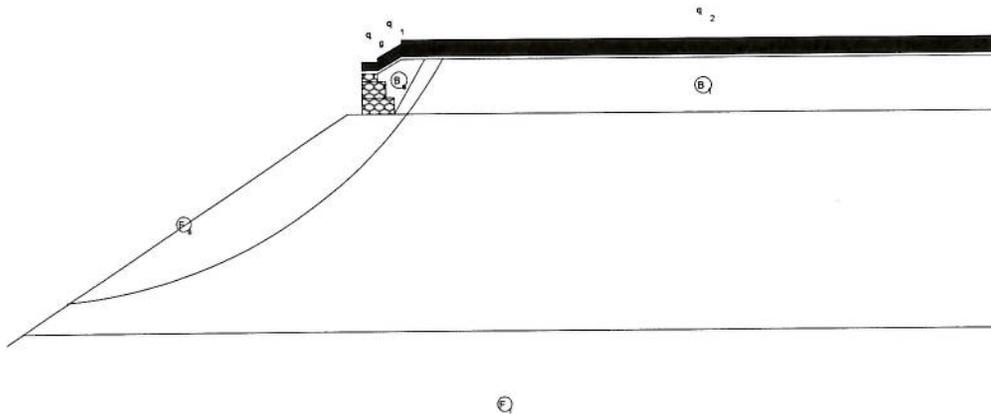
Program released in license to: Caltrans

Project: ED 193 PM 23.4

File: ED193pm23 phi33c150LLfinal

Date: 1/25/2012

+



SOIL DATA

Soil	γ lb/ft ³	c lb/ft ²	ϕ deg	Soil	γ lb/ft ³	c lb/ft ²	ϕ deg
B _s	125.00	0.00	35.00	F _s	125.00	150.00	33.00
B ₁	125.00	150.00	33.00	F ₁	125.00	1000.00	33.00

LOADS

Load	Value lb/ft ²	Load	Value lb/ft ²
q _g	120.00		
q ₁	180.00		
q ₂	240.00		

STABILITY CHECKS

Sliding Safety Coefficient	2.41	Base normal stress (left)	1764.57lb/ft ²
Overturning Safety Coefficient	3.85	Base normal stress (right)	492.23lb/ft ²
Overall Stability Safety Coefficient	1.36	Max. allowable stress	4589.04lb/ft ²

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Project: ED 193 PM 23.4

File: ED193pm23 phi33c150LLfinal

Date: 1/25/2012

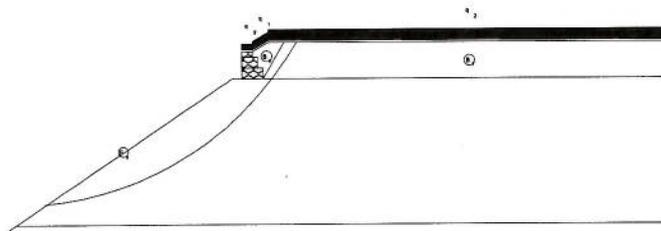
INPUT DATA

Wall data

Wall batter : 0.00 deg
 Rockfill unit weight : 157.00 lb/ft³
 Porosity of gabions : 30.00 %
 Geotextile in the backfill : Yes
 Friction reduction : 10.00 %
 Geotextile on the base : No
 Friction reduction : %
 Mesh and the wire diam.: : 8x10, ø 2.70 mm

Layer	Length ft	Width ft	Offset ft
1	6.00	3.00	-
2	4.50	3.00	0.00
3	3.00	1.50	0.00

+



Inclination of Stretch 1 : 29.00 deg
 Length of stretch 1 : 4.50 ft
 Inclination of Stretch 2 : 0.00 deg
 Soil unit weight : 125.00 lb/ft³
 Soil friction angle : 35.00 deg
 Soil cohesion : 0.00 lb/ft²

Additional Backfill Layers

Layer	Initial height ft	Incl. angle deg	Unit weight lb/ft ³	Cohesion lb/ft ²	Friction angle deg
1	0.00	60.00	125.00	150.00	33.00

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Project: ED 193 PM 23.4

File: ED193pm23 phi33c150LLfinal

Date: 1/25/2012

Foundation data

Top surface height : 0.00 ft
 Top surface init. length : 2.70 ft
 Top surface incl. angle : 33.70 deg
 Soil unit weight : 125.00 lb/ft³
 Soil friction angle : 33.00 deg
 Soil cohesion : 150.00 lb/ft²
 Foundation allowable pressure : lb/ft²
 Water table height : ft

Additional Foundation Layers

Layer	Depth ft	Unit weight lb/ft ³	Cohesion lb/ft ²	Friction angle deg
1	40.00	125.00	1000.00	33.00

Water profile data

Initial height : ft
 Inclination of the 1st stretch : deg
 Length of the 1st stretch : ft
 Inclination of the 2nd stretch : deg
 Length of the 2nd stretch : ft

Loads data

Distributed loads on backfill
 First stretch : 180.00 lb/ft²
 Second stretch : 240.00 lb/ft²

Distributed loads on wall
 Load : 120.00 lb/ft²

Line loads on backfill

Load 1 : lb/ft Distance from wall face : ft
 Load 2 : lb/ft Distance from wall face : ft
 Load 3 : lb/ft Distance from wall face : ft

Line load on wall

Load : lb/ft Distance from wall face : ft

Seismic action data

Horizontal coefficient : Vertical coefficient :

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Project: ED 193 PM 23.4

File: ED193pm23 phi33c150LLfinal

Date: 1/25/2012

STABILITY ANALYSIS RESULTS

Active and Passive Thrust

Active Thrust	:	3369.08 lb/ft
Point of application ref. to X axis	:	4.85 ft
Point of application ref. to Y axis	:	2.88 ft
Direction of the thrust ref. to X axis	:	53.30 deg
Passive Thrust	:	0.00 lb/ft
Point of application ref. to X axis	:	0.00 ft
Point of application ref. to Y axis	:	0.00 ft
Direction of the thrust ref. to X axis	:	0.00 deg

Sliding

Normal force on the base	:	6770.42 lb/ft
Point of application ref. to X axis	:	2.44 ft
Point of application ref. to Y axis	:	0.00 ft
Shear force on the base	:	2013.38 lb/ft
Resisting force on the base	:	4846.76 lb/ft
Sliding Safety Coefficient	:	2.41

Overturning

Overturning Moment	:	5797.05 lb/ft x ft
Restoring Moment	:	22291.28 lb/ft x ft
Overturning Safety Coefficient	:	3.85

Stresses Acting on Foundation

Eccentricity	:	0.56 ft
Normal stress on outer border	:	1764.57 lb/ft ²
Normal stress on inner border	:	492.23 lb/ft ²
Max. allowable stress on the foundation	:	4589.04 lb/ft ²

 Program released in license to: Caltrans

Project: ED 193 PM 23.4

File: ED193pm23 phi33c150LLfinal

Date: 1/25/2012

Overall Stability

Initial distance at pivot leftside : ft
 Initial distance at pivot rightside : ft
 Initial depth referred to base : ft
 Max depth allowed in calculation : ft
 Center of the arch referred to X axis : -62.47 ft
 Center of the arch referred to Y axis : 54.89 ft
 Radius of the arch : 89.80 ft
 Number of search surfaces : 107
Overall Stability Safety Coefficient : 1.36

Internal Stability

Layer	H ft	N lb/ft	T lb/ft	M lb/ft x ft	τ_{Max} lb/ft ²	τ_{All} lb/ft ²	σ_{Max} lb/ft ²	σ_{All} lb/ft ²
1	4.50	3339.07	945.75	6721.16	210.17	914.43	829.43	11883.94
2	1.50	954.64	163.32	1472.37	54.44	837.38	309.48	

03-1F6001

ED 193 PM 23.3-23.5

APPENDIX C

Laboratory Testing Results

Plate No. C-1. Corrosion Test Results

Plate No. C-2. Compaction Test Results

Plate No. C-3a. Consolidated Undrained Triaxial Test Results (Total Stress)

Plate No. C-3b. Consolidated Undrained Triaxial Test Results (Effective Stress)

Division of Engineering Services
 Materials Engineering and Testing Services
 Corrosion And Structural Concrete Field Investigation Branch
 Report Date: 1/10/2012
 Reported By: Mifkovic, Michael

TEST SUMMARY REPORT - Soil/Water

Bridge Name:
 Bridge Number:
 EA No.: **03-1F6001**
 EFIS No.: **0300020566**
 Dist/Co/Rte/PM or KP: **03 / ED / 193 / 23.4**

SIC Number (TL101)	Sample Location	Sample Type	Sample Depth	Minimum Resistivity ¹ (ohm-cm)	pH ²	Chloride Content ³ (ppm)	Sulfate Content ⁴ (ppm)
C835551	GRAB SAMPLE	SOIL	SURFACE/ BULK A	9702	5.88		

This site is not corrosive to foundation elements (see note below for MSE wall backfill).

Note: For MSE wall structure backfill material, minimum resistivity must be 2000 ohm-cm or greater, pH must be between 5.5 and 10.0, chloride content must not be greater than 250 ppm, and sulfate content must not be greater than 500 ppm.

^{1,2}CTM 643, ³CTM 422, ⁴CTM 417



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 Geotechnical Services
 Office of Geotechnical Design -
 North

EA: 03-1F6001

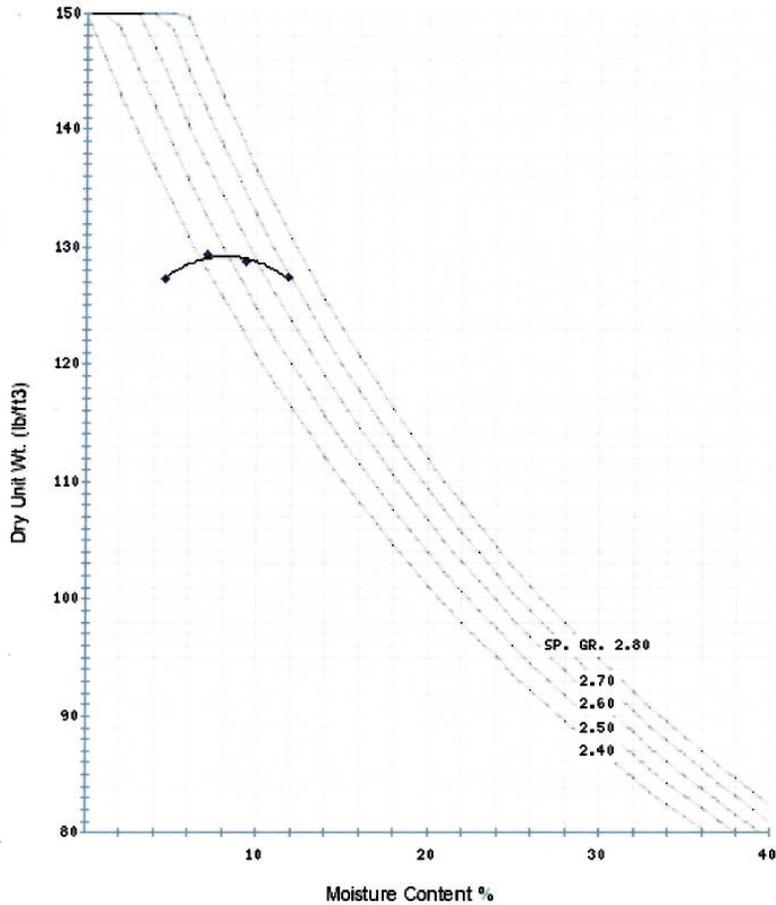
Date: January 2012

CORROSION TEST RESULTS

**03-ED-193 PM 23.3-23.5
 GABION WALL
 GEOTECHNICAL DESIGN REPORT**

Plate
 No. C-1

Moisture Density Curves



Division of Engineering Services
Geotechnical Laboratory

Dist-EA: 03-1F6001
Dist-Co-Rte-PM: ED-193-23.4/
Sample ID: Bulk_A
GI Tracking No.: 11-117

Maximum Dry Density: 129.3 pcf
Optimum Moisture: 8.2 %
Moisture (as Received): 3.5 %
Approved: January 3, 2012

Trial No.	Moisture Adjustment	Tamper Reading	Wet + Tare Weight (g)	Dry + Tare Weight (g)	Tare (g)	Moisture Content (%)	Dry Unit Weight (pcf)
1	50	9.50	2892	2797	742	4.6	127.2
2	100	9.35	2947	2801	744	7.1	129.4
3	150	9.40	3049	2856	799	9.4	128.7
4	200	9.50	3071	2829	771	11.8	127.4
5							
6							

Soil Description : SILTY CLAY AND GRAVEL



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Geotechnical Services
Office of Geotechnical Design - North

EA: 03-1F6001

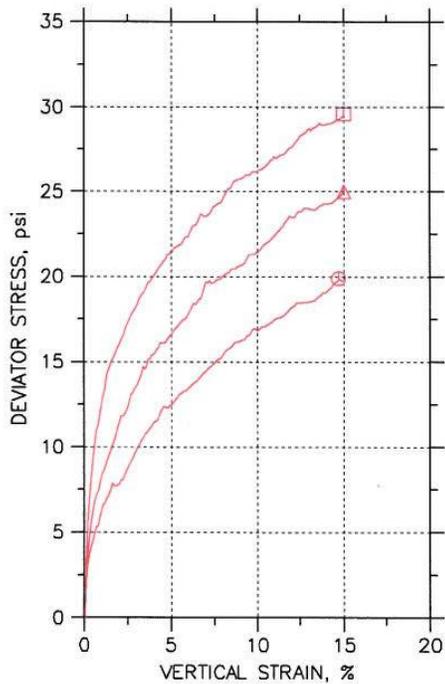
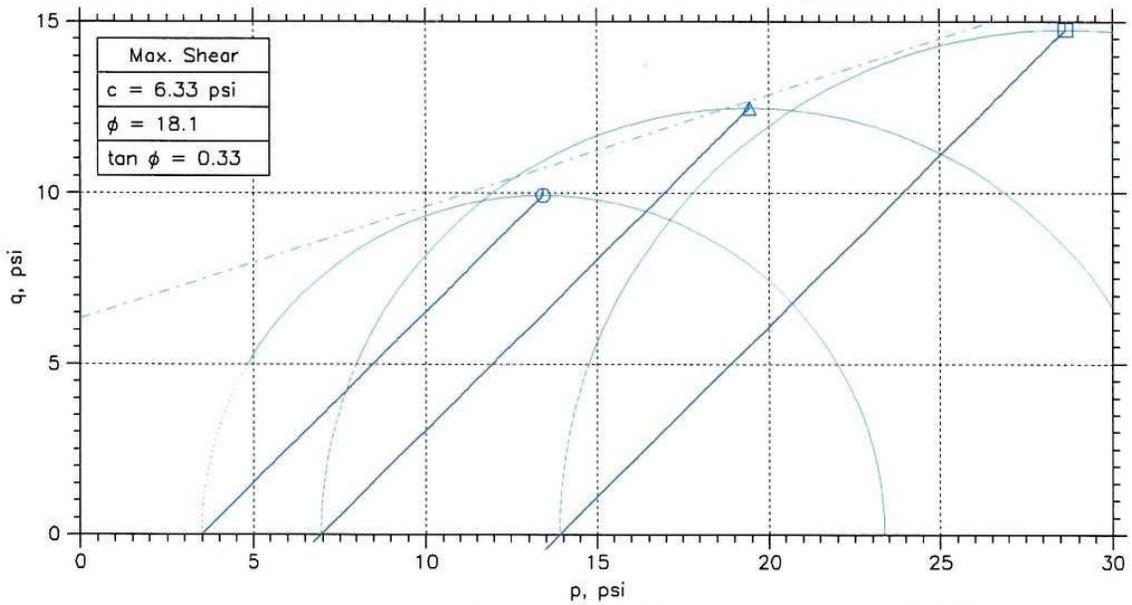
Date: January 2012

COMPACTION TEST RESULTS
(CTM 216)

03-ED-193 PM 23.3-23.5
GABION WALL
GEOTECHNICAL DESIGN REPORT

Plate
No. C-2

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	⊙	△	□	
Sample No.	1	2	3	
Test No.	C12-01A	C12-01B	C12-01C	
Depth				
Initial	Diameter, in	2.8	2.8	2.8
	Height, in	6	6	6
	Water Content, %	8.2	7.8	7.6
	Dry Density, pcf	116.5	117.1	117.3
	Saturation, %	47.5	46.0	45.3
	Void Ratio	0.474	0.466	0.463
Before Shear	Water Content, %	18.1	17.7	17.5
	Dry Density, pcf	114.7	115.4	115.9
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.497	0.487	0.481
	Back Press., psi	102.	102.	102.
Ver. Eff. Cons. Stress, psi	3.474	6.946	13.89	
Shear Strength, psi	9.933	12.48	14.76	
Strain at Failure, %	14.7	15	15	
Strain Rate, %/min	0.1	0.1	0.1	
B-Value	0.95	0.94	0.94	
Implied Specific Gravity	2.75	2.75	2.75	
Liquid Limit	---	---	---	
Plastic Limit	---	---	---	

	Project: ED 193 Gabion Wall		
	Location: 03-ED-193-23.4		
	Project No.: 03-1F6001		
	Boring No.: Bulk A		
	Sample Type: REMOLD		
	Description: Remolded to 90% RC @ Max Dry Density w/o Gravel Correction		
Remarks: GL NO. 11-117 .			

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations



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 Division of Engineering Services
 Geotechnical Services
 Office of Geotechnical Design - North

EA: 03-1F6001

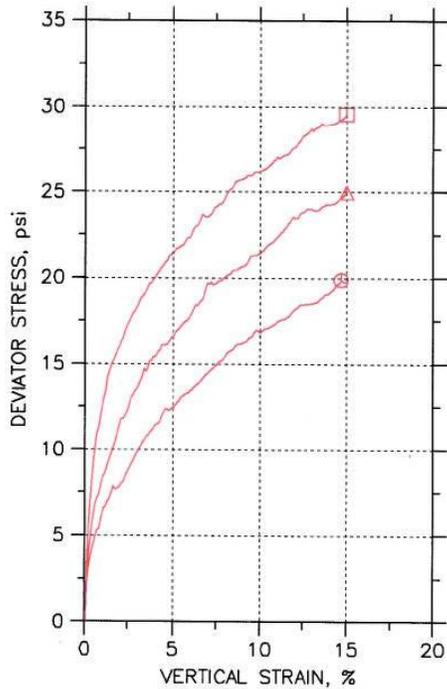
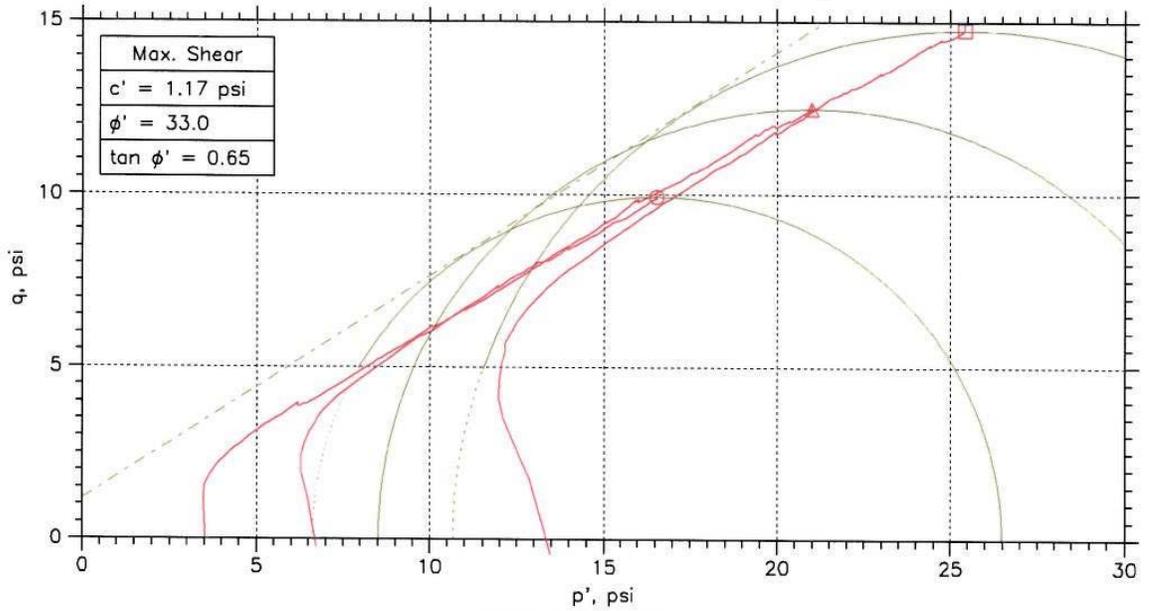
Date: January 2012

**CONSOLIDATED UNDRAINED
 TRIAXIAL TEST RESULTS
 (TOTAL STRESS)**

**03-ED-193 PM 23.3-23.5
 GABION WALL
 GEOTECHNICAL DESIGN REPORT**

Plate
 No. C-3a

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	○	△	□	
Sample No.	1	2	3	
Test No.	C12-01A	C12-01B	C12-01C	
Depth				
Initial	Diameter, in	2.8	2.8	2.8
	Height, in	6	6	6
	Water Content, %	8.2	7.8	7.6
	Dry Density, pcf	116.5	117.1	117.3
	Saturation, %	47.5	46.0	45.3
Before Shear	Void Ratio	0.474	0.466	0.463
	Water Content, %	18.1	17.7	17.5
	Dry Density, pcf	114.7	115.4	115.9
	Saturation*, %	100.0	100.0	100.0
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	B-Value	0.95	0.94	0.94
	Implied Specific Gravity	2.75	2.75	2.75
	Liquid Limit	---	---	---
	Plastic Limit	---	---	---

	Project: ED 193 Gabion Wall	
	Location: 03-ED-193-23.4	
	Project No.: 03-1F6001	
	Boring No.: Bulk A	
	Sample Type: REMOLD	
	Description: Remolded to 90% RC @ Max Dry Density w/o Gravel Correction	
Remarks: GL NO. 11-117.	 4/20/12	

Phase calculations based on start and end of test.
 * Saturation is set to 100% for phase calculations

State of California
Memorandum

Business, Transportation and Housing Agency

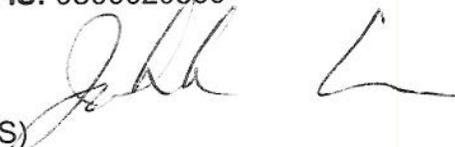
To: Huan Cung
Project Engineer
Design S6

Date: October 6, 2011

File: 03-ED-193
PM: 24.3/24.5
Minor A Slope Repair

EA: 03-1F6000
EFIS: 0300020566

From: Jason Lee, P.E.
Office of Environmental Engineering Office – South (OEES)



Subject: Preliminary Site Investigation (PSI) Transmittal

Per your request, OEES performed a PSI for the above referenced project on State Route 193 in El Dorado County. The PSI, dated September 26, 2011, " Naturally Occurring Asbestos Survey Letter Report, State Route 193, Post Mile 23.3 to 23.5, El Dorado County, California", was prepared for Caltrans by Geocon Consultants, Inc.

Based on the report, the soil generated within the project limit can be reused or disposed of without restrictions with regards to NOA. None of the samples submitted for analysis from the site were reported to contain asbestos at or above the regulatory threshold of 0.25% by the PLM method.

Thank you for your effort and time. If there are any significant changes to the proposed project, please contact OEES as soon as possible so the impact of the changes and further action, if any, can be assessed. If you have any questions, please call me at (530) 741-4494.

cc: File



Project No. S9300-06-174
September 26, 2011

Mr. Jason Lee
California Department of Transportation – District 3
Environmental Engineering Office
703 B Street
P.O. Box 911
Marysville, California 95901

Subject: NATURALLY OCCURRING ASBESTOS SURVEY LETTER REPORT
STATE ROUTE 193, POST MILE 23.3 TO 23.5
EL DORADO COUNTY, CALIFORNIA
CONTRACT NO. 03A1368, TASK ORDER NO. 174, EA 03-1F6000

Dear Mr. Lee:

In accordance with California Department of Transportation (Caltrans) Contract No. 03A1368 and Task Order (TO) No. 174, Geocon Consultants, Inc. is submitting this letter report with results for a naturally occurring asbestos (NOA) survey conducted for embankment repairs within a portion of the State Route (SR) 193 corridor in El Dorado County, California. This report outlines the procedures and methods employed by Geocon to complete the survey.

PROJECT LOCATION AND PROPOSED IMPROVEMENTS

The project is located along the SR-193 right-of-way between Post Mile (PM) 23.3 and PM 23.5 north of Placerville. A failing embankment is located at approximately PM 23.4 on the southbound side of the highway. Caltrans plans to construct a gabion wall in the failing embankment area and anticipates that excess soil will be generated during construction. The approximate project location is depicted on the Vicinity Map, Figure 1.

PURPOSE

The purpose of the scope of services performed for TO No. 174 was to evaluate whether NOA-containing soil or rock is present at the site. The investigative results will be used by Caltrans to inform construction contractors of whether potentially NOA-containing soil and/or rock is present within the project boundaries for health, safety and disposal purposes. Accordingly, Caltrans requested a survey of the site to provide data regarding the presence of NOA-containing soil or rock within the project limits.

BACKGROUND

Construction activities proposed by Caltrans will require the disturbance of soil and rock on the project site. Geologic mapping by the California Geological Survey (CGS) depicts a fault and ultramafic rock formations east of the site. The alteration of ultramafic rock can lead to the formation of NOA minerals. If not managed, disturbance of NOA during construction activities may potentially pose an inhalation risk to the health of construction personnel.

PROJECT SCOPE

Outlined below is a summary of the scope of services performed by Geocon under TO No. 174.

Pre-field Activities

- Participated in a Task Order Meeting via email during August 2011. Caltrans Task Order Manager Jason Lee and Geocon representative John Pfeiffer participated in the meeting. The purpose of the Task Order Meeting was to identify and discuss the project boundaries and conditions and the Task Order scope of services.
- Reviewed geological maps and studies of the general project area for information on the potential presence of NOA.
- Retained the services of EMSL Analytical Inc. (EMSL), a Caltrans-approved and California-certified analytical laboratory, to perform the asbestos analyses of samples.

Field Activities

Naturally Occurring Asbestos

John Pfeiffer, a California Certified Engineering Geologist (CEG 2372) with experience in the assessment of NOA, conducted the survey to identify potentially NOA-containing geological units within the project limits. A total of twelve distributed samples were collected from hand-excavated soil sampling locations on the site. The individual sample locations were chosen in the field by the Geocon Geologist based on field observations, discussion with the Caltrans Task Order Manager, and safety considerations. All twelve of the samples were collected from the planned repair area below the southbound side of the roadway. The approximate sample locations are depicted on the Site Plan, Figure 2.

At four locations within the repair area (SB1 through SB4), we collected samples from fill material at positions 3 feet, 6 feet, and 9 feet, respectively, downslope from the shoulder of southbound SR-193. After removing approximately 12 inches of surficial material, the soil samples were collected directly from the excavation and placed into resealable plastic bags for field homogenization. Each soil sample bag was marked with a unique sample identification number, the TO number, and the date and time the sample was collected. The samples were delivered to EMSL for asbestos analysis under chain-of-custody (COC) protocol. The sample locations were backfilled with excess soil from the sampling.

Quality Assurance/Quality Control Procedures

Quality assurance/quality control procedures were performed during the field exploration activities. These procedures included decontamination of sampling equipment before use, collection of each sample using new disposable gloves, and providing COC documentation for each sample submitted to the laboratory. The soil sampling equipment was cleansed prior to use by double rinse with deionized water. Soil and rock types from each sample location were noted on the field project log.

Laboratory Analyses

The soil samples were submitted to EMSL for asbestos fiber analysis by California Air Resources Board (CARB) Method 435 using polarized light microscopy (PLM), with confirmation analysis of 10% of the samples (two samples) via CARB Method 435 using transmission electron microscopy

(TEM) analysis. The CARB 435 preparation includes milling the sample to a minus 200-mesh size, which also homogenizes the sample. The analytical sensitivity of the PLM and TEM analyses were 0.25% and 0.1% by area, respectively. The samples were analyzed via PLM on a one-week turnaround time and then TEM confirmation analyses were performed on a three-day turnaround time.

FIELD OBSERVATIONS AND INVESTIGATIVE RESULTS

Site Geology

We reviewed the *Generalized Geologic Map of El Dorado County, California* (Plate 1 in CGS Open-File Report 2000-03: Mineral Land Classification of El Dorado County, California) for information on the geologic units on the site. The rock units underlying the site are mapped as Mesozoic metasedimentary rocks of the Mariposa Formation. A branch of the Melones Fault Zone is depicted approximately ¼-mile west of the project area.

The map *Asbestos Review Areas, Western Slope, County of El Dorado, State of California* (El Dorado County Environmental Management, 2005) does not depict the site as an asbestos review area.

John Pfeiffer performed the geologic assessment of the outcrops visible on the site. The observed geology was generally consistent with that depicted on the referenced geologic map. The bedrock exposures observed in cut slopes on the site appeared to be comprised of highly to moderately weathered metasedimentary rock (slate). The fill material below the southbound lane was observed to consist of similar metasedimentary rock. The samples submitted for laboratory analysis consisted of a representative mix of weathered metasedimentary rock fragments and associated residual soil. Materials and features indicative of a geological environment conducive to the formation of NOA were not observed at the site. Photographs of the project area are presented in Photograph Nos. 1 through 4.

Asbestos Analytical Results

The samples were analyzed by EMSL for asbestos by PLM and TEM using the CARB 435 method. None of the samples from the site were reported to contain asbestos at or above the laboratory reporting limit. A summary of asbestos analytical results is presented on Table 1. A copy of the laboratory report and COC documentation is attached to this report.

CONCLUSIONS AND RECOMMENDATIONS

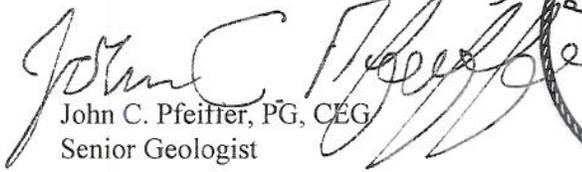
The mapped and observed geology at the site are not indicative of a geologic environment where NOA minerals are likely to occur. None of the samples submitted for analysis from the site were reported to contain asbestos at or above the regulatory threshold of 0.25% by the PLM method. Since geologic conditions conducive to the formation of NOA were not observed on the site and the laboratory did not report asbestos in the samples, engineering controls to minimize the aerial dispersion of NOA are not required for operations in the project area, and soils generated from the site during construction can be reused or disposed of without restrictions with regards to NOA.

The contents of this report reflect the views of Geocon Consultants, Inc., who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

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

Sincerely,

GEOCON CONSULTANTS, INC.

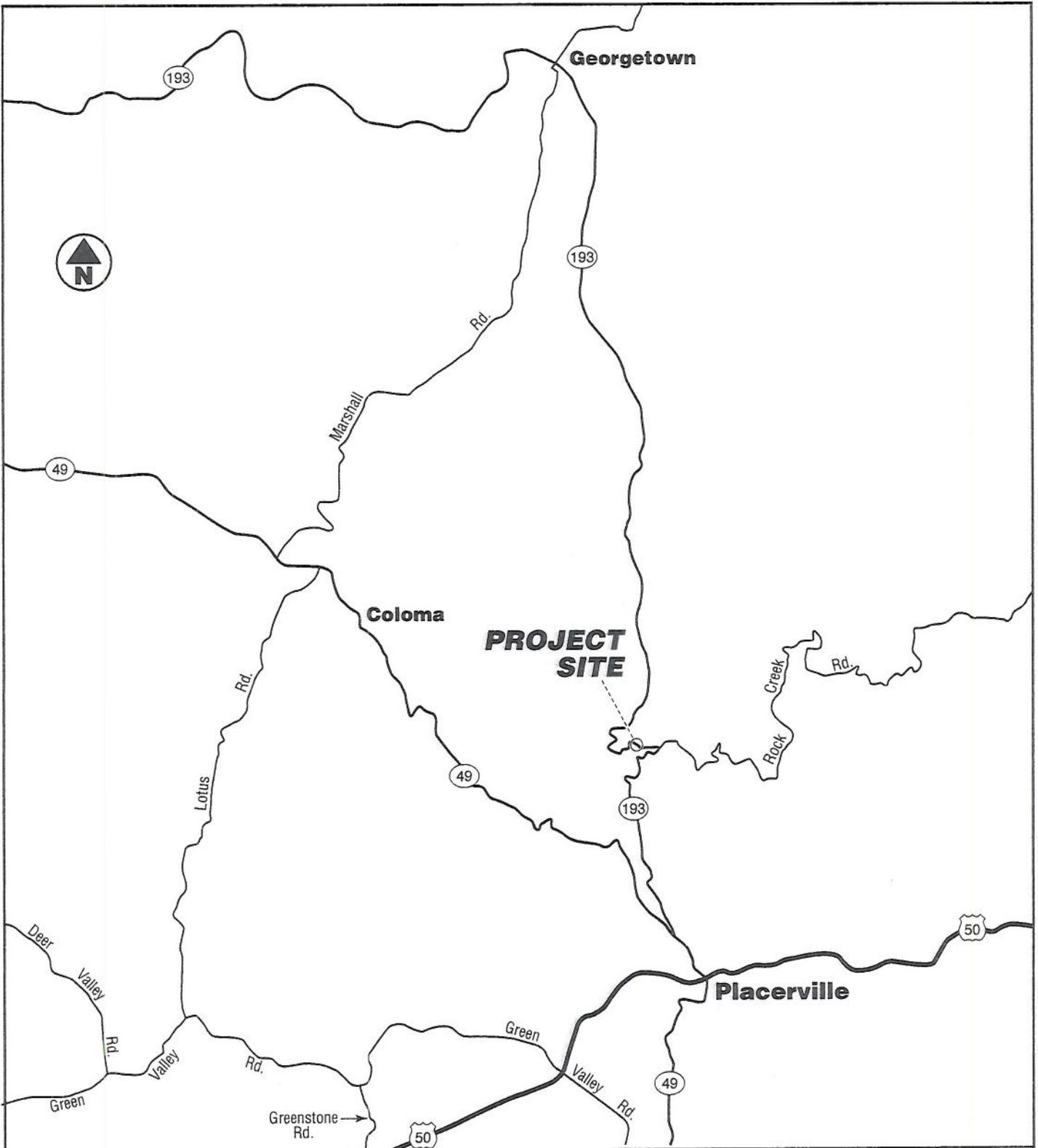

John C. Pfeiffer, PG, CEG
Senior Geologist




John E. Juhrend, PE, CEG
Principal

(5 + 3 on CD) Addressee

- Attachments: Figure 1, Vicinity Map
Figure 2, Site Plan
Photograph Nos. 1 through 4
Table 1, Summary of NOA Analytical Results
Asbestos Analytical Results and Chain-of-custody Documentation



GEOCON
CONSULTANTS, INC.

3160 GOLD VALLEY DR - SUITE 800 - RANCHO CORDOVA, CA 95742
PHONE 916.852.9118 - FAX 916.852.9132

State Route 193 PM 24.3 - 24.5

El Dorado County,
California

VICINITY MAP

GEOCON Proj. No. S9300-06-174

Task Order No. 174

September 2011

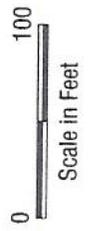
Figure 1





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 GEOCON CONSULTANTS, INC. 3160 GOLD VALLEY DR - SUITE 800 - RANCHO CORDOVA, CA 95742 PHONE 916.852.9118 - FAX 916.852.9132		State Route 193 PM 24.3 - 24.5	
El Dorado County, California		SITE PLAN	
GEOCON Proj. No. S9300-06-174		Task Order No. 174	
September 2011		Figure 2	



LEGEND:
 SB1-3 ● Approximate Soil Sample Location



Photo No. 1 View looking to the southeast at SR-193 in the project area.



Photo No. 2 Typical exposure of weathered slate (Mariposa Formation) in the project area.

PHOTOS NO. 1 & 2



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State Route 193 PM 24.3 - 24.5

GEOCON Proj. No. S9300-06-174

El Dorado County, California

Task Order No. 174

September 2011



Photo No. 3 View of sample collection area downslope of southbound lane of SR-193.



Photo No. 4 View of sample SB3-6 collection location, which is typical for the project.

PHOTOS NO. 3 & 4



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PHONE 916.852.9118 - FAX 916.852.9132

State Route 193 PM 24.3 - 24.5

GEOCON Proj. No. S9300-06-174

El Dorado County, California

Task Order No. 174

September 2011

TABLE 1
SUMMARY OF NOA ANALYTICAL RESULTS
CALTRANS TASK ORDER NO. 174, EA 03-1F6000
STATE ROUTE 193 POST MILE 23.3-23.5
EL DORADO COUNTY, CALIFORNIA

SAMPLE I.D.	SAMPLE DATE	ANALYTICAL METHOD	ASBESTOS %	ASBESTOS TYPE
SB1-3	9/8/2011	PLM	ND	None Reported
SB1-6	9/8/2011	PLM	ND	None Reported
SB1-9	9/8/2011	PLM	ND	None Reported
SB2-3	9/8/2011	PLM	ND	None Reported
SB2-6	9/8/2011	PLM	ND	None Reported
SB2-9	9/8/2011	PLM	ND	None Reported
SB2-9	9/8/2011	TEM	ND	None Reported
SB3-3	9/8/2011	PLM	ND	None Reported
SB3-6	9/8/2011	PLM	ND	None Reported
SB3-9	9/8/2011	PLM	ND	None Reported
SB4-3	9/8/2011	PLM	ND	None Reported
SB4-6	9/8/2011	PLM	ND	None Reported
SB4-6	9/8/2011	TEM	ND	None Reported
SB4-9	9/8/2011	PLM	ND	None Reported

Notes: PLM = Polarized Light Microscopy
TEM = Transmission Electron Microscopy
NOA = Naturally occurring asbestos
ND = Not detected



EMSL Analytical, Inc

2235 Polvorosa Ave , Suite 230, San Leandro, CA 94577

Phone: (510) 895-3675 Fax: (510) 895-3680 Email: sanleandrolab@emsl.com

Attn: John Pfeiffer
Geocon Consultants, Inc.
3160 Gold Valley Drive
Suite 800
Rancho Cordova, CA 95742

Customer ID: GECN80
Customer PO: TO-174
Received: 09/09/11 9:00 AM
EMSL Order: 091110222

Fax: (916) 852-9132 Phone: (916) 852-9118
Project: S9300-06-174 / TO-174

EMSL Proj: S9300-06-**
Analysis Date: 9/15/2011

Test Report: PLM Analysis of Bulk Samples for Asbestos via EPA 600/R-93/116 Method with CARB 435 Prep (Milling) Level A for 0.25% Target Analytical Sensitivity

Table with 7 columns: Sample, Description, Appearance, % Fibrous, % Non-Fibrous, Asbestos % Type. Rows include samples SB1-3, SB1-6, SB1-9, SB2-3, SB2-6, SB2-9, SB3-3, SB3-6, SB3-9.

Initial report from 09/15/2011 18:21:53

Analyst(s)

Adam C. Fink (5)
Jorge Leon (7)

Baojia Ke, Laboratory Manager
or other approved signatory

This report relates only to the samples listed above and may not be reproduced except in full, without EMSL's written approval. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. EMSL is not responsible for sample collection activities or method limitations. Some samples may contain asbestos fibers below the resolution limit of PLM. EMSL recommends that samples reported as none detected or less than the limit of detection undergo additional analysis via TEM. Samples received in good condition unless otherwise noted.
Samples analyzed by EMSL Analytical, Inc San Leandro, CA



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Project: **S9300-06-174 / TO-174**

EMSL Proj: S9300-06-**
Analysis Date: 9/15/2011

Test Report: PLM Analysis of Bulk Samples for Asbestos via EPA 600/R-93/116 Method with CARB 435 Prep (Milling) Level A for 0.25% Target Analytical Sensitivity

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
SB4-3 091110222-0010		Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	None Detected
SB4-6 091110222-0011		Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	None Detected
SB4-9 091110222-0012		Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	None Detected

Initial report from 09/15/2011 18:21:53

Analyst(s)

Adam C. Fink (5)
Jorge Leon (7)

Baojia Ke, Laboratory Manager
or other approved signatory

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Samples analyzed by EMSL Analytical, Inc San Leandro, CA

EMSL Analytical, Inc.

2235 Polvorosa Drive, Suite 230, San Leandro, CA 94577 ♦ (510) 895-3675 ♦ sanleandrolab@emsl.com



Client: Geocon Consultants, Inc.
3160 Glod Valley Drive
Suite 800
Rancho Cordova, CA 95742
Attention: John Pfeiffer
Fax: 916-852-9132
Project: S9300-06-174/TO-174

EMSL Reference: 091110222

Date Received: 09/09/11
Date Analyzed: 09/18/11
Date Reported: 09/18/11

Asbestos Analysis of Bulk Samples via Modified EPA 600/R-93/116 Method Utilizing Analytical Electron Microscopy (Section 2.5.5.2) with CARB 435 Prep (Milling) Level B for 0.1% Target Analytical Sensitivity

<i>Client Sample ID</i>	<i>EMSL Sample ID</i>	<i>Asbestos Type(s)</i>	<i># of Asbestos Structures Detected</i>	<i>Analytical Sensitivity %</i>	<i>Asbestos Weight %</i>	<i>Comments</i>
SB2-9	091110222-006	None Detected	None Detected	0.1	<0.1	
SB4-6	091110222-0011	None Detected	None Detected	0.1	<0.1	

Analysts

Baojia Ke (2)

A handwritten signature in black ink, appearing to be "Baojia Ke", written over a horizontal line.

Approved EMSL Signatory

EMSL maintains liability limited to cost of analysis. This method requires the laboratory to analyze the sample until the first fiber found compromises 5% of the total mass. Due to the size and mass of different asbestos fibers, the analytical sensitivity will vary between samples and may prevent the laboratory from achieving the target sensitivity on all samples. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL is not responsible for sample collection activities or analytical method limitations. Interpretation and use of results are the responsibility of the client.



Asbestos Lab Services Chain of Custody

EMSL Order Number (Lab Use Only):

091110222

San Leandro, CA
 Suite 230
 2235 Polaris Ave
 San Leandro, CA 94577
 PHONE (510) 950-4575
 FAX (510) 275-3680

Company: Geocon Consultants, Inc.
 Street: 3160 Gold Valley Drive, Suite 800
 City/State/Zip: Rancho Cordova, CA 95742
 Report To (Name): John Pfeiffer
 Telephone: (916) 852-9118
 Project Name/Number: S9300-06-174

EMSL-Bill to: Same Different
 If Bill to is Different note instructions in Comments**
 Third Party Billing requires written authorization from third party

Fax:
 Email Address: Pfeiffer@geoconinc.com

Please Provide Results: Email Purchase Order: **TO-174** State Samples Taken: CA

Turnaround Time (TAT) Options* - Please Check
 3 Hour 6 Hour 24 Hour 48 Hour 72 Hour 96 Hour 1 Week 2 Week

*For TEM Air 3 hours/6 hours, please call ahead to schedule. There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.

<p>PCM - Air</p> <input type="checkbox"/> NIOSH 7400 <input type="checkbox"/> w/ OSHA 8hr. TWA <p>PLM - Bulk (reporting limit)</p> <input type="checkbox"/> PLM EPA 600/R-93/116 (<1%) <input type="checkbox"/> PLM EPA NOB (<1%) <p>Point Count</p> <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) <input type="checkbox"/> Point Count w/Gravimetric <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) <input type="checkbox"/> NYS 198.1 (friable in NY) <input type="checkbox"/> NYS 198.6 NOB (non-friable-NY) <input type="checkbox"/> NIOSH 9002 (<1%)	<p>TEM - Air <input type="checkbox"/> 4-4.5hr TAT (AHERA only)</p> <input type="checkbox"/> AHERA 40 CFR, Part 763 <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II <input type="checkbox"/> ISO 10312 <p>TEM - Bulk</p> <input type="checkbox"/> TEM EPA NOB <input type="checkbox"/> NYS NOB 198.4 (non-friable-NY) <input type="checkbox"/> Chatfield SOP <input type="checkbox"/> TEM Mass Analysis-EPA 600 sec. 2.5 <p>TEM - Water: EPA 100.2 Fibers >10µm <input type="checkbox"/> Waste <input type="checkbox"/> Drinking All Fiber Sizes <input type="checkbox"/> Waste <input type="checkbox"/> Drinking</p>	<p>TEM- Dust</p> <input type="checkbox"/> Microvac - ASTM D 5755 <input type="checkbox"/> Wipe - ASTM D6480 <input type="checkbox"/> Carpet Sonication (EPA 600/J-93/167) <p>Soil/Rock/Vermiculite</p> <input checked="" type="checkbox"/> PLM CARB 435 - A (0.25% sensitivity) <input type="checkbox"/> PLM CARB 435 - B (0.1% sensitivity) <input type="checkbox"/> TEM CARB 435 - B (0.1% sensitivity) <input type="checkbox"/> TEM CARB 435 - C (0.01% sensitivity) <input type="checkbox"/> EPA Protocol (Semi-Quantitative) <input type="checkbox"/> EPA Protocol (Quantitative) <p>Other:</p> <input type="checkbox"/>
--	--	---

Check For Positive Stop - Clearly Identify Homogenous Group

Samplers Name: John Pfeiffer Samplers Signature: John Pfeiffer

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
SBI-3	brown, silty sand w/fine gravel		9/8/11 0845
SB2-6			0850
SBI-9			0900
SB2-3			0910
SB2-6			0920
SB2-9			0930
SB3-3			0945
SB3-6			0955

Client Sample # (s): Total # of Samples: **12**

Relinquished (Client): John Pfeiffer Date: 9/8/11 Time: 15:00

Received (Lab): PA Date: 9/9/11 Time: 0900

Comments/Special Instructions: For positive results (per sample) via PLM CARB 435, perform confirmation via TEM CARB 435 Level B and provide photo documentation of morphology.



Asbestos Lab Services Chain of Custody

EMSL Order Number (Lab Use Only):

091110222

San Leandro, CA
Suite 239
7235 Polverisa Ave
San Leandro, CA 94577
PHONE (510) 898-5671
FAX (510) 898-9880

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
SB3-9	brown, silty sand w/ fine gravel		9/8/11 1005
SB4-3	↓		1010
SB4-6			1020
SB4-9	↓		1025

Comments/Special Instructions: For positive results (per sample) via PLM CARB 435, perform confirmation via TEM CARB 435 Level B and provide photo documentation of morphology.

RECEIVED SEP 09 2011
Alene 0900fa