INFORMATION HANDOUT

For Contract No. 10-0Q8004
At Route 152 and 156

Identified by
Project ID 1000020536

MATERIALS INFORMATION

Revised Geotechnical Design Report for Three Changeable Message Signs, Dated February 29, 2012

Log of Test Borings

ADDED PER ADDENDUM NO. 2 DATED JANUARY 23, 2014

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: MR. RANDY PERKINS
Senior Transportation Engineer
Design Office IV, Technical Support Branch
& Design Constructability Unit

Date: February 29, 2012

Attention: J. Quarshie

File: 04- SCL-152/05-SBT-156
PM Various
10-0Q8001
EFIS 1000020536
3 CMS

From: MENG-HSI HUNG
Transportation Engineer
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

MH

HOOSHMAND NIKOUI
Chief, Branch A
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

H. Nikoui

Subject: Revised Geotechnical Design Report for Three Changeable Message Signs

This report supersedes the "Geotechnical Design Report for Three Changeable Message Signs" dated January 25, 2012 for the above referenced project.

1. INTRODUCTION

This memo is in response to your request, which was transferred to the Office of Geotechnical Design West (OGDW) on May 27, 2011, to provide geotechnical design recommendations for three Changeable Message Signs (CMS), namely, CMS 1, CMS 2, and CMS 3. The proposed CMSs are to be installed within 2.5 miles of the State Route (SR) 152/156 Interchange in Santa Clara (SCL) and San Benito (SBT) counties. The location map of all proposed CMSs are shown in Appendix A. Also, refer to Table 1 for general CMS information.

Table 1 General CMS Information

CMS No.	Route	Direction	Station (PM)	Post Type	Height, ft
CMS 1	SCL 152	EB	19.84	Model 510	24*
CMS 2	SBT 156	EB	R16.69	Model 510	24*
CMS 3	SCL 152	EB	R22.62	Model 500	24*

* Estimated maximum height

2. EXISTING FACILITIES AND PROPOSED IMPROVEMENTS

There is no CMS facilities installed on either SR 152 or SR 156 near the proposed project sites. The need for CMS in this area is mainly to improve the mobility of State highway by displaying estimated travel time and traffic incident reports; thus, provides the motorists with choices during their commutes. Also, CMS provides urgent messages such as Amber Alerts.

3. SCOPE OF WORK

The following tasks were performed for the preparation of this Geotechnical Design Report:

- Review of as-built plans;
- Field geotechnical exploration, including drilling 3 borings at the project site;
- Laboratory testing result on selected samples;
- Geotechnical design analysis; and
- Preparation of this Geotechnical Design Report.

4. PHYSICAL SETTING

4.1 Climate

The site is located south southeast of Gilroy, which has climate that is considered Mediterranean Climate. It is warm during summer when temperatures tend to be in the 70's and cool during winter when temperatures tend to be in the 50's. The warmest month of the year is July with an average maximum temperature of 88.3° Fahrenheit, while the coldest month of the year is December with an average minimum temperature of 38.2° Fahrenheit. The annual average precipitation at Gilroy is 20.60 inches. Winter months tend to be wetter than summer months. The wettest month of the year is January with an average rainfall of 4.30 inches. (Data taken from http://www.idcide.com/weather/ca/gilroy.htm)

4.2 Topography and Drainage

SR 152 within the project limits is predominantly an east-west traveled way located along the boundary between the Santa Clara Valley and the Diablo Range. SR 152 and SR 156 converge at a gap in the Diablo Range where the Hollister Valley meets the Santa Clara Valley. SR 156 runs roughly north-south through the Hollister Valley. The roadways are typically founded on alluvium at the toe of gentle, well-eroded, and mature slopes; however, SR 152 cuts through the rolling hills for a short stretch within the project limits. Elevations along the project alignment range from 160 feet at SR 152 and San Felipe Road in the west to roughly 450 feet as SR 152

climbs east toward SR 156. SR 156 is relatively flat with elevations ranging from 200 feet at the southern end of the project to about 240 feet to the north.

The main drainage near the project area is Pacheco Creek, which flows south out of the northern reach of Hollister Valley and turns west toward San Felipe Lake just south of the San Benito/Santa Clara County line. Pacheco Creek crosses the project north of the SR 156 and Fairview Road interchange.

4.3 Regional Geology and Seismicity

Located within the Coast Range geomorphic province of California, the geology of the region consists of northwest-trending ridges, gently sloping hills, intermontane valleys, and large elongated depressions. The San Andreas Fault system, the most prominent geologic feature in the area, includes the San Andreas Fault as well as numerous splays, including the Hayward, Calaveras, and Quien Sabe Faults, which together take up strain between the northward migrating Pacific plate and the southward (relatively) moving North American plate. The major faults within the system are predominantly right-lateral, strike-slip faults with some compressional component, and these act together to form the prominent ridges and valleys. The San Francisco Bay, a partially filled northwest-trending depression extending from the Santa Clara Valley in the south to the Petaluma Valley in the north, is a direct result of these fault interactions.

Table 2 lists the active faults nearest the project site, their maximum credible earthquake, and the peak bedrock acceleration (PBA) that may be expected during a maximum event.

Table 2 Active Fault Data

CMS No.	FAULT	Distance*	Maximum Credible Earthquake Magnitude**	Maximum Peak Bedrock Acceleration
CMS 1	Calaveras fault zone, Southern section	2.2	7.4	0.43 g
CMS 2	Quien Sabe fault zone	1.0	7.4	0.45 g
	Calaveras fault zone, Southern section	2.9	7.4	0.41 g
CMS 3	Quien Sabe fault zone	2.0	7.4	0.41 g
	Calaveras fault zone, Southern section	4.3	7.4	0.37 g

* Closest portion of the fault measured in miles.
** Moment Magnitude.

5. EXPLORATION

Our office conducted 3 rotary borings, namely, RC-11-001, RC-11-002, and RC-11-003, for the proposed CMSs 1, 2, and 3, respectively, in August 2011. A summary of all borings is shown in Table 3.

Table 3 Summary of Boring Information

Boring ID	Total Depth (ft)	Surface Elevation (ft)	Date of Completion
RC-11-001	37.7	156.6	08/30/2011
RC-11-002	41.3	208.8	08/29/2011
RC-11-003	45.5	264.1	08/31/2011

6. GEOTECHNICAL TESTING

6.1 In-situ Testing

In all borings, Standard Penetration Tests (SPT) were conducted at 5-foot intervals in soil strata, and Pocket Penetrometer (PP) Tests were performed on soil samples showing apparent cohesion. Refer to the LOTB Plans for more information.

6.2 Laboratory Testing

The laboratory testing program consisted of 24 moisture content tests, 4 mechanical (particle size distribution) analyses, 4 Atterberg Limits tests, and 3 corrosion tests. Refer to Appendix B for all test results.

Corrosion studies are conducted in accordance with the requirements of California Test Method No. 643. The Department considers the site to be corrosive to foundation elements if one or more of the following conditions exist for the representative soil samples taken at the site:

> Chloride concentration is greater than or equal to 500 ppm, sulfate concentration is greater than or equal to 2000 ppm, or the pH is 5.5 or less.

Corrosion test results for all 3 borings are shown in Table 4.

Table 4 Summary of Soil Corrosion Tests

Location	SIC Number	Sample Depth (ft)	Min. Resistivity (ohm-cm)	pH
RC-11-001	C SAwad-1	17-20	2823	7.91
RC-11-002	C SAwad-2	10-15	1479	8.10
RC-11-003	C SAwad-3	17-20	2784	8.12

Based on the corrosion test results, the soil at all CMS sites are estimated to be non-corrosive.

7. GEOTECHNICAL CONDITIONS

7.1 Site Geology

The following site geology descriptions are from California Geologic Surveys Geologic Map of the Monterey, 30 ft x 60 ft Quadrangle and Adjacent Areas, California, compiled by David L. Wagner, H. Gary Greene, George J. Saucedo and Cynthia L. Pridmore, 2002.

The CMS signs are to be founded in Holocene Alluvium, described as "unconsolidated, heterogeneous, moderately sorted silt and sand with discontinuous lenses of clay and silty clay".

7.1.1 Lithology

The subsurface consists of fine grained soils (clays and silts) with occasional gravel lenses. Gravels are described as angular to subrounded and are likely derived from the surrounding slopes of Cretaceous sedimentary rock.

7.1.2 Structure

The structure of the three CMS locations is flat, alluvial terrain. Outcrops of bedded sedimentary rocks near CMSs 1 and 2 locations dip to the southwest.

7.1.3 Natural Slope Stability

All the CMS locations are on flatland, so landslides should not be an issue. The landslide potentials are presented on Appendix C.

7.2 Subsurface Soil

Based on the LOTBs, the subsurface soils near each CMS location can be classified as follows:

7.2.1 CMS 1

Boring RC-11-001 was performed approximately at the proposed CMS 1 foundation location. Based on the LOTB of RC-11-001, we estimate that the foundation soil at CMS 1 location consists of sandy lean clay to clayey sand with occasional coarse gravel lenses to 35 feet below ground surface (bgs). Soils are soft to very stiff and medium dense to dense. Cohesive soils have low plasticity. Standard Penetration Test (SPT) blow counts were recorded every 5 feet to a depth of 37.7 feet bgs and have a low of 2 and a high of 61. Refer to the LOTB plans for details.

7.2.2 CMS 2

Boring RC-11-002 was performed approximately 19 feet southwest of the proposed CMS 2 foundation location. Based on the LOTB of RC-11-002, we estimate that the foundation soil consists of approximately 20 feet medium stiff to very stiff sandy lean clay/lean clay underlain by approximately 4 feet of dense well graded gravel with silt and sand. This overlies loose to very dense sandy silt to silty sand with gravel. SPT blow counts recorded every 5 feet to a depth of 41.3 feet bgs and have a low of 5 (23 feet bgs) and a high of 77 (bottom of hole). Refer to the LOTB plans for details.

7.2.3 CMS 3

Boring RC-11-003 was performed approximately 10 feet northwest of the proposed CMS 3 location. Based on the LOTB of RC-11-003, we estimate that the foundation soil at CMS 3 consists of approximately 4 feet of dense silt with sand and gravel overlying approximately 6 feet of very stiff to hard sandy lean clay. This overlies very stiff silt and lean clay to a depth of 18 feet bgs. Below this, is medium dense silty sand/sand with silt with rare gravel to bedrock at approximately 44 feet bgs. SPT blow counts were recorded every 5 feet and have a low of 14 and a high of 44 (refusal at bedrock). Refer to the LOTB plans for details.

7.3 Water

7.3.1 Surface Water

No flooding hazards are present at CMSs 1 and 3, and no data was available for CMS 2. The susceptibility levels are presented on Appendix D. No scour data is available for all proposed CMS locations.

7.3.2 Groundwater

Groundwater levels were measured at RC-11-001, RC-11-002, and RC-11-003 to be about 18.8, 23.3, and 26.7 feet, respectively below the ground surface corresponding to elevations 131.8, 185.5, and 137.4 feet, respectively. It is worth to note that the groundwater level at each CMS site typically fluctuates with the season and correlates with local geology and topography.

7.4 Liquefaction

We estimate that the liquefaction susceptibility of the soil laying approximately from 35 to 40 feet bgs at the CMS 3 site is moderate during a strong earthquake event. However, we judge that the damage to the CMS resulting from liquefaction is insignificant.

7.5 Project Site Seismicity

7.5.1 Ground Motions

The three CMSs could be exposed to strong ground motions as determined by their proximity to active faults. This will be accounted for in the geotechnical design.

7.5.2 Ground Rupture

No active faults cross the proposed CMS locations, so ground rupture is not considered to be a hazard.

8. GEOTECHNICAL RECOMMEDATIONS

The following recommendations are based on the submitted layout and cross section plans, field mapping of the site, subsurface exploration, laboratory test results and foundation analysis. This geotechnical report addresses our foundation recommendations for the CMS project.

8.1 CMS 1

Based on the provided plans and LOTB with the estimated soil parameters from our geotechnical investigation for CMS 1, we recommend that the 4-feet diameter CIDH pile foundation for CMS model 510, as specified in the Caltrans Standard Plans (2010), with a pile depth of 22 feet is sufficient for the proposed CMS 1.

8.2 CMS 2

Based on the provided plans and LOTB with the estimated soil parameters from our geotechnical investigation for CMS 2, we recommend that the 4-feet diameter CIDH pile foundation for CMS model 510, as specified in the Caltrans Standard Plans (2010), with a pile depth of 23 feet is sufficient for the proposed CMS 2.

8.3 CMS 3

Based on the provided plans and LOTB with the estimated soil parameters from our geotechnical investigation for CMS 3, we recommend that the 5-feet diameter CIDH pile foundation for CMS model 500, as specified in the Caltrans Standard Plans (2010), with a pile depth of 24 feet is sufficient for the proposed CMS 3.

9. MATERIAL DISPOSAL

The excavated material generated from the proposed excavation in this project will be the existing embankment, existing roadway pavements, and existing materials from unpaved shoulder excavation. Any excavated material that does not meet the requirements for imported borrow shall become the contractor's property and should be properly disposed outside of State Right-of-Way.

10. CONSTRUCTION CONSIDERATIONS

(1) CIDH piling shall conform to provisions in Section 49-3 "Cast-in-Place Concrete Piling" of Standard Specifications (2010).

(2) Difficult pile installation is anticipated due to the presence of localized zones of groundwater and caving soils. Therefore, the contractor should be prepared.

(3) The contractor has the option of using full-length temporary casing. The use of temporary casing will require that it be removed while the concrete is being placed in order to develop the expected pile capacity and to facilitate the casing removal.

(4) Because of the existing groundwater, the contractor may choose to use a closed system using a concrete pump or a tremie tube to place concrete at the bottom of the holes.

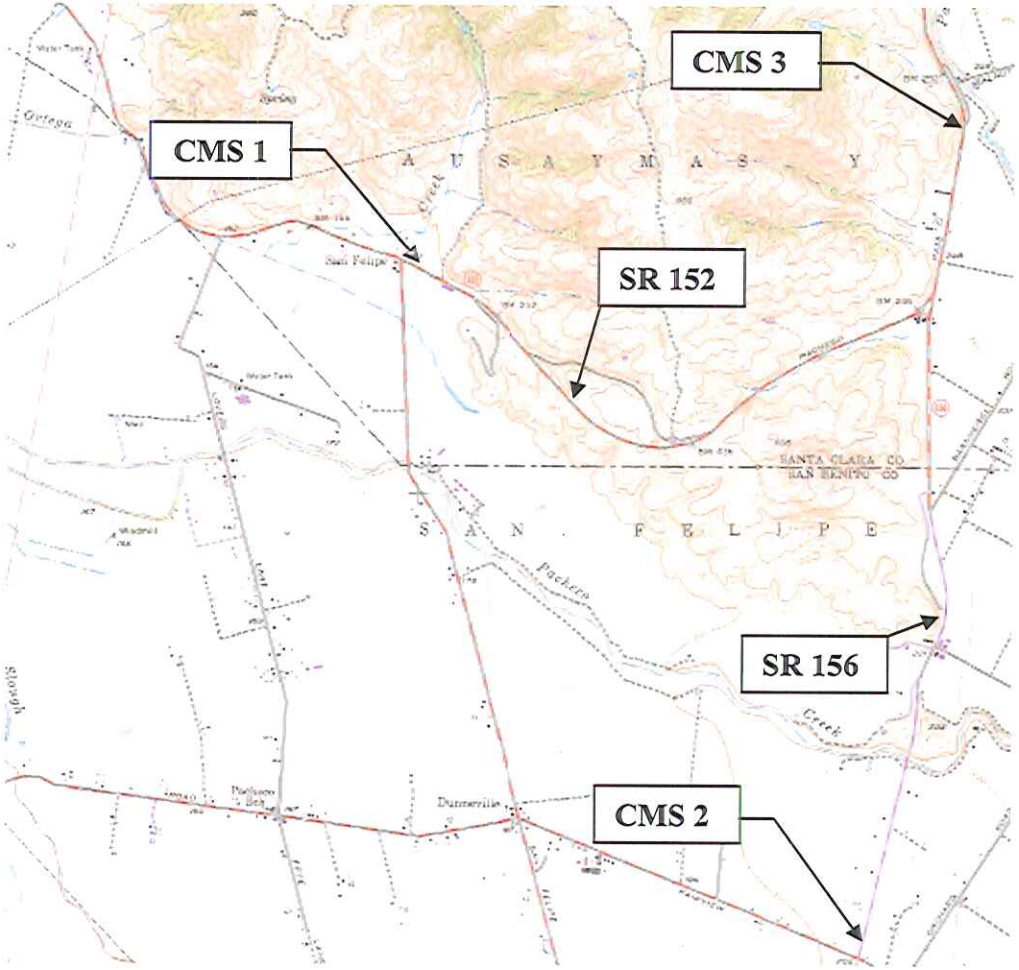
❁ ❁ ❁ ❁ ❁ ❁ ❁

If you have any questions or require further information, please contact Meng-Hsi Hung at (510) 286-7245 or Hooshmand Nikoui, Branch Chief, at (510) 286-4811.

c: TPokrywka, HNikoui, MHung, Daily File, Route File

MHung/mm

APPENDIX A



MAP TAKEN FROM:
USGS MARE ISLAND QUADRANGLE, 1980

SCALE

Not to Scale

Caltrans

DIVISION OF ENGINEERING SERVICES
OFFICE OF GEOTECHNICAL DESIGN WEST

LOCATION MAP

04-SCL-152/05-SBT-156
EA 10-0Q8001 EFIS 1000020536
PM Varies FEBRUARY 2012

APPENDIX A

APPENDIX B

MOISTURE CONTENT DETERMINATION
(CTM 226)

County : SCL/SBT Route : 152 P.M. : E.A.: 10-000020536 10-0Q8001 Job No. :

Limits : R.E. : MENG-HSI HUANG

Date Received : 9-22-11 Date Calculated : 10/10/11

Date Reported : OCT 10 2011 By : TN PAGE : 1of 2

HOLE	SAMPLE	DEPTH	TEST (MC/PI/MA/GRAD)	GROSS WEIGHT Wet	GROSS WEIGHT Dry	TARE Weight	NET WEIGHT Wet	NET WEIGHT Dry	MOISTURE Weight	% Moisture
R-11-001	1	5.0'-6.5'	MC	332.3	298.2	100.7	231.6	197.5	34.1	17.3%
CMS 1	2	10.0'-11.5'	MC,MA,PI	923.7	817.9	100.7	823.0	717.2	105.8	14.8%
	3	15.0'-16.5'	MC	862.9	733.8	98.5	764.4	635.3	129.1	20.3%
	4	20.0'-21.5'	MC,MA,PI	851.3	753.2	99.7	751.6	653.5	98.1	15.0%
	5	25.0'-26.5'	MC	706.9	619.2	100.1	606.8	519.1	87.7	16.9%
	6	30.5'-31.5'	MC	711.4	607.5	100.7	610.7	506.8	103.9	20.5%
	7	35.0'-36.5'	MC	713.5	635.8	101.2	612.3	534.6	77.7	14.5%
R-11-002	1	5.0'-6.5'	MC	771.6	649.2	101.9	669.7	547.3	122.4	22.4%
CMS 2	2	10.0'-11.5'	MC,MA,PI	739.7	600.3	101.9	637.8	498.4	139.4	28.0%
	3	15.0'-16.5'	MC	817.5	682.4	101.6	715.9	580.8	135.1	23.3%
	4	20.0'-21.5'	MC	398.4	353.4	100.8	297.6	252.6	45.0	17.8%
	5	25.0'-26.5'	MC	1059.3	873.1	99.6	959.7	773.5	186.2	24.1%
	6	30.0'-31.5'	MC	858.3	698.5	102.1	756.2	596.4	159.8	26.8%
	7	35.0'-36.5'	MC	784.0	644.3	101.5	682.5	542.8	139.7	25.7%
	8	40.0'-41.5'	MC	735.0	642.4	101.5	633.5	540.9	92.6	17.1%

MC - Moisture Content PI - Plasticity Index MA - Mechanical Analysis
MC Test Only - 230°F Oven; w/ PI and/or MA Tests - 140°F Oven; w/ AC Material - 100°F Oven

MOISTURE CONTENT DETERMINATION
(CTM 226)

County : SCL/SBT Route : 152 P.M. : E.A.: 10-00020536 10-0Q8001 Job No. :

Limits : R.E. : MENG-HSI HUANG

Date Received : 9-22-11 Date Calculated : 10/10/11

Date Reported : OCT 10 2011 By : TN PAGE : 2 of 2

HOLE	SAMPLE	DEPTH	TEST (MC/PI/MA/GRAD)	GROSS WEIGHT Wet	GROSS WEIGHT Dry	TARE Weight	NET WEIGHT Wet	NET WEIGHT Dry	MOISTURE Weight	% Moisture
R-11-003	1	5.0'-6.5'	MC	625.8	567.7	101.0	524.8	466.7	58.1	12.4%
CMS 3	2	10.0'-11.5'	MC	773.3	701.1	100.7	672.6	600.4	72.2	12.0%
	3	15.0'-16.5'	MA,MC,PI	818.3	673.3	101.1	717.2	572.2	145.0	25.3%
	4	20.0'-21.5'	MC	413.1	324.3	99.9	313.2	224.4	88.8	39.6%
	5	25.0'-26.5'	MC	613.6	545.0	100.3	513.3	444.7	68.6	15.4%
	6	30.5'-31.5'	MC	828.5	677.2	100.4	728.1	576.8	151.3	26.2%
	7	35.0'-36.5'	MC	828.1	684.3	100.6	727.5	583.7	143.8	24.6%
	8	40.0'-41.5'	MC	932.6	793.2	101.1	831.5	692.1	139.4	20.1%
	9	45.0'-45 1/3'	MC	468.4	410.7	101.5	366.9	309.2	57.7	18.7%

MC - Moisture Content PI - Plasticity ndex MA - Mechanical Analysis
MC Test Only - 230°F Oven; w/ PI and/or MA Tests - 140°F Oven; w/ AC Material - 100°F Oven

LVALDEZ, DL4, REV. 06-2003

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

REPORT OF TESTS ON SOILS, BASES & SUBBASES

TL-0361 (REV. 1/96)

[redacted] DEPARTMENT OF TRANSPORTATION

SOIL

IFICATION CARD

CARD NUMBER C633251

TEST NO. Misc-001-1C

DATE RECEIVED SEP 22 2011

CALC. BY

APPROVED BY

DATE REPORTED OCT 24 2011

☐ DIS. MAT'LS. ENGR. ☐ TRANS. LAB

☐ RESIDENT ENGINEER

☐

REPORT OF TESTS ON Soil

IF CONTRACT, USE CONTRACT ITEM

SOURCE	CHARGE	EXPENDITURE AUTHORIZATION

SPECIAL DESIGNATION (USE WHEN APPLICABLE)	ACTIVITY OR OBJECT	SUBJOB

GRADING ANALYSIS

SIEVE	AS RECEIVED	RET. CR.	ADJ. OR COMB. GRADE	AS USED	☐ SPECIF. LIMITS ☐ SOUGHT
75 mm					
63 mm					
50 mm					
37.5mm					
25.0 mm					
19.0 mm					
12.5 mm					
9.5 mm					
4.75 mm	100				
2.36 mm	97				
1.18 mm	95				
600 µm	93				
300 µm	86				
150 µm	66				
75 µm	47				
5 µm	25				
1 µm	14				

REMARKS: Moisture % = 14.8

TEST SPECIMEN	A	B	C	D	E
BATCH MASS					
DATE TESTED					
COMPACTOR FOOT PRESSURE kPA					
INITIAL MOISTURE %					
SOAK WATER mL					
WATER ADDED-mL (TOTAL)					
WATER ADDED %					
MOISTURE AT COMPACTION %					
WET. WT. OF BRIQUETTE -gms					
HEIGHT OF BRIQUETTE -mm					
DRY DENSITY OF BRIQ.-kg/m³					
STABILOMETER P_h AT 8900 N-kPa					
DISPLACEMENT					
R-VALUE BY STABILOMETER					
EXUDATION PRES. MPa					
THICK. BY STAB. mm					
EXPANSION DIAL READING-mm					
THICK. BY EXP. PRESS. mm					

TEST RESULTS	SPEC.
LL. 22 P.L. 12 P.I. 10	
CV	

SP. GR. ☐ BULK (OVEN DRY) ☐ BULK (SSD) ☐ APPARENT

	FINE	COARSE
AS REC'D		
CRUSHED		

REL. COMPACTION DATA	IN PLACE	OPTIMUM
DENSITY		
MOISTURE		
% REL. COMP.		
SPEC.		

SURFACE		
BASE		
SUBBASE		
	S.E.	AS REC'D.
		CRUSHED
		COMBINED
	LART	GRADE 100 REV.
		500 REV.
GRAVEL EQUIVALENT FACTOR	DUR.	D_i
TRAFFIC INDEX		D_o
R VALUE EXUDATION PRESSURE	% CRUSHED PARTICLES	
EXPANSION PRESSURE	% MOISTURE BY O.D.	
AT EQUILIBRIUM SPEC.		

INDICATED MINIMUM THICKNESS OF COVER FOR ABOVE CONDITIONS - m

DISTRICT 4 LABORATORY
325 SAN BRUNO AVENUE
SAN FRANCISCO, CA 94103

RICHARD CHAN
DISTRICT MATERIALS ENGINEER
BRANCH CHIEF, MATERIALS B

☒ PRELIMINARY TESTS
☐ PROCESS TESTS
☐ ACCEPTANCE TESTS
☐ INDEPENDENT ASSURANCE TESTS
☐ SPECIAL TESTS

SAMPLE SENT TO:
☐ HDQTRS. LAB
☐ BRANCH LAB
☒ DIST. LAB
☐ SHIPMENT AUTHORIZED

FIELD NO. M1SC-001-1C

DIST. LAB NO.

LOT NO.

P.O. OR REQ. NO.

Misc-001-1C

SEP 22 2011

SAMPLE OF Soil

FOR USE IN OMS Foundation (CMS1)

SAMPLE FROM R-11-001 ID#2

DEPTH 10-11½ FB

LOCATION OF SOURCE SCL 152

THIS SAMPLE IS SHIPPED IN (NO. CONTAINERS)	AND IS ON E OF A GROUP OF	SAMPLES REPRESENTING (TONS, GALS, BBLS, STA, ETC.)

OWNER OR MANUFACTURER

TOTAL QUANTITY AVAILABLE	TEST RESULTS DESIRED ☐ NORMAL ☐ PRIORITY	DATE NEEDED 10/21/11

REMARKS MC, MA, PI

(Need in 1 month)

COVER ADDITIONAL INFORMATION WITH LETTER

DATE SAMPLEED 08/30/11

BY mhung TITLE TE (Civil)

DIST, CO, RTE, PM 04-SCL-152-PM

LIMITS

CONT. NO. 10-0Q8001 (1000020536-1)

FED. NO. 240-80

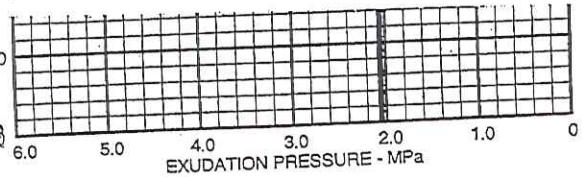
RES. ENGR. OR SUPT. Meng-Hsi Hung

ADDRESS 111 Grand Ave., Oakland, CA

CONTRACTOR (510)286-7245

Menghsi_hung@dot.ca.gov

MAIL TO SAME DESTINATION AS SAMPLE



STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

REPORT OF TESTS ON SOILS, BASES & SUBBASES

TL-0361 (REV. 1/96)

[redacted] DEPARTMENT OF TRANSPORTATION
LOCATION CARD — CARD NUMBER C633254

TEST NO. Misc-001-2C

DATE RECEIVED SEP 22 2011

APPROVED BY

CALC. BY

DATE REPORTED OCT 24 2011

☐ DIS. MAT'LS. ENGR. ☐ TRANS. LAB
☐ RESIDENT ENGINEER

☒ PRELIMINARY TESTS
☐ PROCESS TESTS
☐ ACCEPTANCE TESTS
☐ INDEPENDENT ASSURANCE TESTS
☐ SPECIAL TESTS

SAMPLE SENT TO:
☐ HDQTRS. LAB
☐ BRANCH LAB
☒ DIST. LAB

FIELD NO. Misc-001-2C
INSP. LAB NO.
LOT NO.
SHIPMENT NO.
AUTHORIZATION NO.

SEP 22 2011

Misc-001-2C

SAMPLE OF Soil
FOR USE IN CMS Foundation (CMS1)
SAMPLE FROM R-11-001 IDA #
DEPTH 20 - 21 1/2'
LOCATION OF SOURCE SCL152

THIS SAMPLE IS SHIPPED IN (NO. CONTAINERS)
AND IS ON E OF A GROUP OF
SAMPLES REPRESENTING (TONS, GALS, BDLS, STA. ETC.)
OWNER OR MANUFACTURER
TOTAL QUANTITY AVAILABLE
TEST RESULTS DESIRED ☐ NORMAL ☐ PRIORITY
DATE NEEDED 10/21/11
REMARKS MC, MA, PI
(Need in 1 month.)
results
COVER ADDITIONAL INFORMATION WITH LETTER
DATE SAMPLEED 08/30/11
BY M Hung
TITLE TE (Civil)
DIST, CO, RTE, PM 04-SCL-152
LIMITS
CONT. NO. 16-0Q8001 (1000020536-1)
FED. NO. >46 80
RES. ENGR. OR SUPT. Meng-Hsi Hung
ADDRESS 111 Grand Ave., Oakland
CONTRACTOR (510) 286-7245
meng hsi-hung@dot.ca.gov

MAIL TO SAME DESTINATION AS SAMPLE

GRADING ANALYSIS

SIEVE	AS RECEIVED	RET. CR.	ADJ. OR COMB. GRADE	AS USED	☐ SPECIF. LIMITS ☐ SOUGHT
75 mm					
63 mm					
50 mm					
37.5mm					
25.0 mm					
19.0 mm					
12.5 mm					
9.5 mm					
4.75 mm	100				
2.36 mm	99				
1.18 mm	97				
600 µm	95				
300 µm	88				
150 µm	75				
75 µm	61				
5 µm	31				
1 µm	24				

REMARKS: Moisture % = 15.0

REPORT OF TESTS ON: Soil

IF CONTRACT, USE CONTRACT ITEM

SOURCE	CHARGE	EXPENDITURE AUTHORIZATION

SPECIAL DESIGNATION (USE WHEN APPLICABLE)	ACTIVITY OR OBJECT	SUBJOB

TEST SPECIMEN	A	B	C	D	E
BATCH MASS					
DATE TESTED					
COMPACTOR FOOT PRESSURE kPA					
INITIAL MOISTURE %					
SOAK WATER mL					
WATER ADDED-mL (TOTAL)					
WATER ADDED %					
MOISTURE AT COMPACTION %					
WET. WT. OF BRIQUETTE -gms					
HEIGHT OF BRIQUETTE -mm					
DRY DENSITY OF BRIQ.-kg/m³					
STABILOMETER P_H AT 8900 N-kPa					
DISPLACEMENT					
R-VALUE BY STABILOMETER					
EXUDATION PRES. MPa					
THICK, BY STAB. mm					
EXPANSION DIAL READING-mm					
THICK, BY EXP. PRESS. mm					

TEST RESULTS — SPEC.
LL. 24 P.L. 11 P.I. 13
CV

SP. GR. ☐ BULK (OVEN DRY) ☐ BULK (SSD) ☐ APPARENT

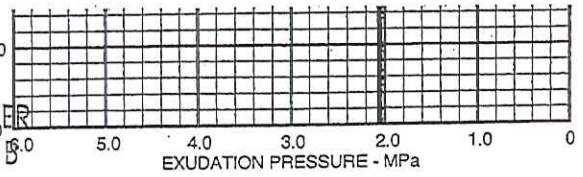
	FINE	COARSE
AS REC'D		
CRUSHED		

REL. COMPACTION DATA

	IN PLACE	OPTIMUM
DENSITY		
MOISTURE		
% REL. COMP.		
SPEC.		

SURFACE			
BASE			
SUBBASE			
	S.E.	AS REC'D.	
		CRUSHED	
		COMBINED	
	LART	GRADE 100 REV.	
		500 REV.	
GRAVEL EQUIVALENT FACTOR			
TRAFFIC INDEX	DUR.	D_1	
R VALUE EXUDATION PRESSURE		D_2	
EXPANSION PRESSURE		% CRUSHED PARTICLES	
AT EQUILIBRIUM SPEC.		% MOISTURE BY O.D.	

INDICATED MINIMUM THICKNESS OF COVER FOR ABOVE CONDITIONS - m



DISTRICT 4 LABORATORY
325 SAN BRUNO AVENUE
SAN FRANCISCO, CA 94103

RICHARD CHAN
DISTRICT MATERIALS ENGINEER
BRANCH CHIEF, MATERIALS B

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

REPORT OF TESTS ON SOILS, BASES & SUBBASES

TL-0361 (REV. 1/96)

[redacted] DEPARTMENT OF TRANSPORTATION SOIL CLASSIFICATION CARD CARD NUMBER C633252

TEST NO.	DATE RECEIVED	APPROVED BY	
Misc-001-9C	SEP 22 2011		☐ DIS. MAT'LS. ENGR. ☐ TRANS. LAB
	CALC. BY	DATE REPORTED OCT 24 2011	☐ RESIDENT ENGINEER
			☐

☒ PRELIMINARY TESTS ☐ PROCESS TESTS ☐ ACCEPTANCE TESTS ☐ INDEPENDENT ASSURANCE TESTS ☐ SPECIAL TESTS

SAMPLE SENT TO: ☐ HDQTRS. LAB ☐ BRANCH LAB ☐ DIST. LAB ☐ SHIPMENT AUTHORIZATION

FIELD NO. Misc-001-9C

LOT NO.

P.O. OR REQ.

SEP 22 2011

Misc-001-9C

GRADING ANALYSIS

SIEVE	AS RECEIVED	RET. CR.	ADJ. OR COMB. GRADE	AS USED	☐ SPECIF. LIMITS ☐ SOUGHT
75 mm					
63 mm					
50 mm					
37.5mm					
25.0 mm					
19.0 mm					
12.5 mm					
9.5 mm					
4.75 mm	100				
2.36 mm	100				
1.18 mm	100				
600 µm	99				
300 µm	99				
150 µm	98				
75 µm	96				
5 µm	58				
1 µm	34				

REMARKS: Moisture % = 28.2 %

REPORT OF TESTS ON: Soil

IF CONTRACT, USE CONTRACT ITEM

SOURCE	CHARGE	EXPENDITURE AUTHORIZATION

SPECIAL DESIGNATION (USE WHEN APPLICABLE)	ACTIVITY OR OBJECT	SUBJOB

TEST SPECIMEN	A	B	C	D	E
BATCH MASS					
DATE TESTED					
COMPACTOR FOOT PRESSURE kPA					
INITIAL MOISTURE %					
SOAK WATER mL					
WATER ADDED-mL (TOTAL)					
WATER ADDED %					
MOISTURE AT COMPACTION %					
WET. WT. OF BRIQUETTE -gms					
HEIGHT OF BRIQUETTE -mm					
DRY DENSITY OF BRIQ.-kg/m³					
STABILOMETER P_H AT 8900 N-kPa					
DISPLACEMENT					
R-VALUE BY STABILOMETER					
EXUDATION PRES. MPa					
THICK, BY STAB. mm					
EXPANSION DIAL READING-mm					
THICK, BY EXP. PRESS. mm					

TEST RESULTS: LL. 50 P.L. 22 P.I. 28 CV

SPEC.

SP. GR. ☐ BULK (OVEN DRY) ☐ BULK (SSD) ☐ APPARENT

	FINE	COARSE
AS REC'D		
CRUSHED		

			SPEC.
SURFACE	S.E.	AS REC'D.	
BASE		CRUSHED	
SUBBASE		COMBINED	
	LART GRADE	100 REV.	
		500 REV.	
GRAVEL EQUIVALENT FACTOR			
TRAFFIC INDEX	DUR.	D_1	
R VALUE EXUDATION PRESSURE		D_0	
R VALUE EXPANSION PRESSURE	% CRUSHED PARTICLES		
R VALUE AT EQUILIBRIUM SPEC.	% MOISTURE BY O.D.		

INDICATED MINIMUM THICKNESS OF COVER FOR ABOVE CONDITIONS - m

REL. COMPACTION DATA

	IN PLACE	OPTIMUM
DENSITY		
MOISTURE		
% REL. COMP.		
SPEC.		

SAMPLE OF Soil

FOR USE IN CMS Foundation (CMS2)

SAMPLE FROM R-11-002 ID#2

DEPTH (0-1) ft

LOCATION OF SOURCE EB SBT-156

THIS SAMPLE IS SHIPPED IN (NO. CONTAINERS)	AND IS ON E OF A GROUP OF	SAMPLES REPRESENTING (TONS, GALS, BBLS, STA, ETC.)

OWNER OR MANUFACTURER

TOTAL QUANTITY AVAILABLE	TEST RESULTS DESIRED ☐ NORMAL ☐ PRIORITY	DATE NEEDED
		10/11/11

REMARKS MC, MA, PI

(Need Results in 1 mo.)

COVER ADDITIONAL INFORMATION WITH LETTER

DATE SAMPLEED 08/29/11

BY M Hung TITLE TE (Civil)

DIST, CO, RTE, PM 10-SBT-156-PM

LIMITS

CONT. NO. 10-008001 (10000020536-1)

FED. NO. 240-88

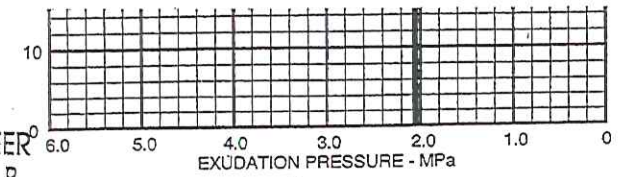
RES. ENGR. OR SUPT. Meng-Hsi Hung

ADDRESS 111 Grand Ave. Oakland, CA

CONTRACTOR 510-286-7245

menghsi_hung@dot.ca.gov

MAIL TO SAME DESTINATION AS SAMPLE



DISTRICT 4 LABORATORY
325 SAN BRUNO AVENUE
SAN FRANCISCO, CA 94103

RICHARD CHAN
DISTRICT MATERIALS ENGINEER
BRANCH CHIEF, MATERIALS B

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

REPORT OF TESTS ON SOILS, BASES & SUBBASES

TL-0361 (REV. 1/96)

[redacted] DEPARTMENT OF TRANSPORTATION
FICATION CARD CARD NUMBER C 633253

TEST NO. Misc-001-4c | DATE RECEIVED SEP 22 2011 | APPROVED BY | ☐ DIS. MAT'LS. ENGR. ☐ TRANS. LAB ☐ RESIDENT ENGINEER ☐

CALC. BY | DATE REPORTED OCT 24 2011

REPORT OF TESTS ON: Soil

IF CONTRACT, USE CONTRACT ITEM

SOURCE	CHARGE	EXPENDITURE AUTHORIZATION

SPECIAL DESIGNATION (USE WHEN APPLICABLE)	ACTIVITY OR OBJECT	SUBJOB

GRADING ANALYSIS

SIEVE	AS RECEIVED	RET. CR.	ADJ. OR COMB. GRADE	AS USED	☐ SPECIF. LIMITS ☐ SOUGHT
75 mm					
63 mm					
50 mm					
37.5mm					
25.0 mm					
19.0 mm					
12.5 mm					
9.5 mm					
4.75 mm	100				
2.36 mm	99				
1.18 mm	99				
600 µm	98				
300 µm	97				
150 µm	93				
75 µm	86				
5 µm	37				
1 µm	20				

TEST SPECIMEN	A	B	C	D	E
BATCH MASS					
DATE TESTED					
COMPACTOR FOOT PRESSURE kPA					
INITIAL MOISTURE %					
SOAK WATER mL					
WATER ADDED-mL (TOTAL)					
WATER ADDED %					
MOISTURE AT COMPACTION %					
WET. WT. OF BRIQUETTE -gms					
HEIGHT OF BRIQUETTE -mm					
DRY DENSITY OF BRIQ.-kp/m³					
STABILOMETER P_H AT 8900 N-kPa					
DISPLACEMENT					
R-VALUE BY STABILOMETER					
EXUDATION PRES. MPa					
THICK, BY STAB. mm					
EXPANSION DIAL READING-mm					
THICK, BY EXP. PRESS. mm					

REMARKS: Moisture % = 25.2%

TEST RESULTS	SPEC.
LL 31 P.L. 17 P.I. 14	
CV	

SP. GR. ☐ BULK (OVEN DRY) ☐ BULK (SSD) ☐ APPARENT

	FINE	COARSE
AS REC'D		
CRUSHED		

SURFACE	S.E.	AS REC'D.
BASE		CRUSHED
SUBBASE		COMBINED
	LART	GRADE 100 REV.
		500 REV.
GRAVEL EQUIVALENT FACTOR	DUR.	D_1
TRAFFIC INDEX		D_0
R VALUE EXUDATION PRESSURE	% CRUSHED PARTICLES	
EXPANSION PRESSURE	% MOISTURE BY O.D.	
AT EQUILIBRIUM SPEC.		

INDICATED MINIMUM THICKNESS OF COVER FOR ABOVE CONDITIONS - m

REL. COMPACTION DATA

	IN PLACE	OPTIMUM
DENSITY		
MOISTURE		
% REL. COMP.		
SPEC.		

DISTRICT 4 LABORATORY
325 SAN BRUNO AVENUE
SAN FRANCISCO, CA 94103

RICHARD CHAN
DISTRICT MATERIALS ENGINEER
BRANCH CHIEF, MATERIALS B

☒ PRELIMINARY TESTS ☐ PROCESS TESTS ☐ ACCEPTANCE TESTS ☐ INDEPENDENT ASSURANCE TESTS ☐ SPECIAL TESTS

SAMPLE SENT TO: ☐ HDQTRS. LAB ☐ BRANCH LAB ☐ DIST. LAB ☐ TRANSPORTATION LAB ☐ AUTHORIZATION NO.

FIELD NO. Misc-001-4c
DIST. LAB NO.
LOT NO.
P.O. OR REQ.

SEP 22 2011

Misc-001-4c

SAMPLE OF Soil
FOR USE IN CMS Foundation (CMS3)

SAMPLE FROM R-11-003, ID#3

DEPTH 5 - 16½'
LOCATION OF SOURCE EB SCL 152

THIS SAMPLE IS SHIPPED IN (NO. CONTAINERS)	AND IS ON E OF A GROUP OF	SAMPLES REPRESENTING (TONS, CALS, BBLS, STA, ETC.)
OWNER OR MANUFACTURER		

TOTAL QUANTITY AVAILABLE	TEST RESULTS DESIRED ☐ NORMAL ☐ PRIORITY	DATE NEEDED 10/21/11

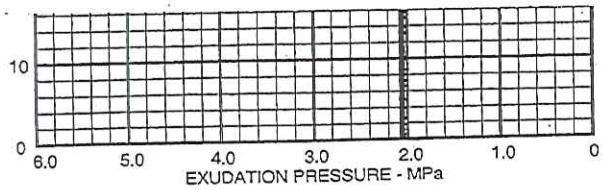
REMARKS MC, MA, PI

(Need Results in 1 mo.)

COVER ADDITIONAL INFORMATION WITH LETTER
DATE SAMPLEED 8/31/11
BY MHung TITLE TE (Civil)
DIST, CO, RTE, PM 04-SCL-152
LIMITS

CONT. NO. 10-0Q8001 (10000020536-1)
FED. NO. 240-80
RES. ENGR. OR SUPT. Meng-Hsi Hung
ADDRESS 111 Grand Ave., Oakland, CA
CONTRACTOR 510-286-7245
menghsi-hung@dot.ca.gov

MAIL TO SAME DESTINATION AS SAMPLE



TEST NO. 7948 – 1P

BILLED

DATE RECEIVED

CALC. BY SEP 09 2011 APPROVED BY

DATE REPORTED OCT 13 2011

☐ DISTRICT DIRECTOR ☐ TRANS. LAB.
☐ DIS. MAT LS ENGR. ☐ PAV'T. SECTION
☐ RESIDENT ENGINEER ☐ ACCOUNTING
☐ CONSTRUCTION ☐

ATTACH FORM DOT-TL-101 HERE

EXPANSION PRESSURE CHART

STATE OF CALIFORNIA · DEPARTMENT OF TRANSPORTATION
SAMPLE IDENTIFICATION CARD
TL-0101 (REV. 10/97)

CARD NUMBER CSAwad-1

GRADING ANALYSIS

SIEVE	AS RECEIVED	RET. CR.	ADJ. OR COMB. GRADE	AS USED	SPECIF. LIMITS ☐ SPECIF. SOUGHT ☐
3					
2½					
2					
1½					
1					
¾					
½					
⅜					
4					
8					
16					
30					
50					
100					
200					
5μ					
1μ					

GRADING AS USED WAS OBTAINED AS FOLLOWS:

% BY WT.	% BY VOL.	TEST NO.	DESCRIPTION

Resistivity = 2823 ohm-cm

REMARKS:

P_H = 7.97

SURFACE

BASE

SUBBASE

GRAVEL EQUIVALENT FACTOR

TRAFFIC INDEX

R VALUE: EXUDATION PRESSURE

EXPANSION PRESSURE

AT EQUILIBRUM SPEC.

INDICATED MINIMUM THICKNESS OF COVER

REPORT OF TESTS ON

Foundation Soil for Corrosion

IF CONTRACT, USE CONTRACT ITEM

SOURCE	CHARGE	EXPENDITURE AUTHORIZATION

SPECIAL DESIGNATION (USE WHEN APPLICABLE)	ACTIVITY OR OBJECT	AMOUNT

TEST SPECIMEN	A	B	C	D	E
DATE TESTED					
COMPACTOR FOOT PRESSURE P.S.I.					
INITIAL MOISTURE %					
SOAK WATER ML					
WATER ADDED–ML (TOTAL)					
WATER ADDED %					
MOISTURE AT COMPACTION %					
WET WT. OF BRIQUETTE–GMS					
HEIGHT OF BRIQUETTE–INCHES					
DRY DENSITY OF BRIQ. – # CU. FT.					
STABILOMETER P_H AT 2000 LBS.					
DISPLACEMENT					
R–VALUE BY STABILOMETER					
EXUDATION PRES. P.S.I.					
THICK. BY STAB. FEET					
EXPANSION DIAL READING					
THICK. BY EXP. PRESS. FEET					
R–VALUE BY EXPANSION					

TEST RESULTS

		SPEC.
LL. P.L P.I.		
CV		
S.E AS REC'D.		
S.E CRUSHED		
S.E COMBINED		
LART GRADE 100 REV.		
LART GRADE 500 REV.		
DUR D_f		
DUR D_i		
% CRUSHED PARTICLES		

SP. GR. ☐ BULK (OVEN DRY) ☐ BULK (SSD) ☐ APPARENT

	FINE	COARSE
AS REC'D.		
CRUSHED		

REL. COMPACTION DATA

	IN PLACE	OPTIMUM
DENSITY		
MOISTURE		
% REL. COMP.		
SPEC.		

DISTRICT 4 LABORATORY
325 SAN BRUNO AVENUE
SAN FRANCISCO, CA 94103

SAMPLE SENT TO: ☐ HDQTRS. LAB ☐ BRANCH LAB ☐ DIST. LAB

☐ PRELIMINARY TESTS
☐ PROCESS TESTS
☐ ACCEPTANCE TESTS
INDEPENDENT ASSURANCE TESTS ☐ DIST. LAB ☐ TRANS. LAB
☐ SPECIAL TESTS

FIELD NO.
DIST. LAB NO.
LOT NO.
SHIPMENT NO.
P.O. OR REQ. NO.
AUTHORIZATION NO.

SAMPLE OF Soil
FOR USE IN Foundation
SAMPLE FROM R-11-001 CMS1 (17-20)
DEPTH
LOCATION OF SOURCE Native Soil

THIS SAMPLE IS SHIPPED IN (NO. CONTAINERS)
AND IS ONE OF A GROUP OF
SAMPLES REPRESENTING (TONS, GALS, UDLS, STA. ETC.)
OWNER OR MANUFACTURER
TOTAL QUANTITY AVAILABLE
TEST RESULTS DESIRED ☑ NORMAL ☐ PRIORITY
DATE NEEDED 12-7-11
REMARKS Corrosion

COVER ADDITIONAL INFORMATION WITH LETTER
DATE SAMPLEED
BY S. Awad TITLE T.E.
DIST, CO, RTE, PM 04-SCL-152-PM var
LIMITS 04-0Q800
CONT. NO.
FED. NO.
RES. ENGR. OR SUPT. S. Awad
ADDRESS (510) 622-5443
CONTRACTOR 111 Grand Ave, Oakland

MAIL TO SAME DESTINATION AS SAMPLE

EXUDATION PRESSURE (PSI)

TEST NO. 7948 - 2P

BILLED

DATE RECEIVED

CALC. BY _____ APPROVED BY _____

DATE REPORTED SEP 09 2011 OCT 13 2011

☐ DISTRICT DIR☐ ☐ TRANS. LAB.
☐ DIS. MAT LS☐ ☐ PAV'T. SECTION
☐ RESIDENT ENGINEER ☐ ACCOUNTING
☐ CONSTRUCTION ☐

ATTACH FORM DOT-TL-101 HERE

EXPANSION PRESSURE CHA

2.0
1.8

STATE OF CALIFORNIA · DEPARTMENT OF TRANSPORTATION
SAMPLE IDENTIFICATION CARD
TL-0101 (REV. 10/97)

CARD NUMBER C-S Awad-2

☐ PRELIMINARY TESTS
☐ PROCESS TESTS
☐ ACCEPTANCE TESTS
INDEPENDENT ASSURANCE TESTS
☐ DIST. LAB
☐ TRANS. LAB
☐ SPECIAL TESTS

SAMPLE SENT TO:
☐ HDQTRS. LAB
☐ BRANCH LAB
☐ DIST. LAB

FIELD NO.
DIST. LAB NO.
LOT NO.
SHIPMENT NO.
P.O. OR REQ. NO.
AUTHORIZATION NO.

SAMPLE OF Soil
FOR USE IN Foundation
SAMPLE FROM R-11-002 CMS2 (10'-15'
DEPTH
LOCATION OF SOURCE Native Soil

THIS SAMPLE IS SHIPPED IN (NO. CONTAINERS)
AND IS ON E OF A GROUP OF
SAMPLES REPRESENTING (TONS, CALS, BDLS, STA, ETC.)
OWNER OR MANUFACTURER
TOTAL QUANTITY AVAILABLE
TEST RESULTS DESIRED ☒ NORMAL ☐ PRIORITY
DATE NEEDED 4/24/11
REMARKS Corrosion

COVER ADDITIONAL INFORMATION WITH LETTER
DATE SAMPLEED
BY S. Awad TITLE T.E
DIST, CO, RTE, PM 04-SCL-152-PM Var
LIMITS 04-0C9 2001
CONT. NO.
FED. NO.
RES. ENGR. OR SUPT. S. Awad
ADDRESS (510) 622-5443
CONTRACTOR 111 Grand Ave, Oakland

MAIL TO SAME DESTINATION AS SAMPLE

GRADING ANALYSIS

SIEVE	AS RECEIVED	RET. CR.	ADJ. OR COMB. GRADE	AS USED	SPECIF. LIMITS SOUGHT ☐
3					
2½					
2					
1½					
1					
¾					
½					
⅜					
4					
8					
16					
30					
50					
100					
200					
5μ					
1μ					

GRADING AS USED WAS OBTAINED AS FOLLOWS:

% BY WT.	% BY VOL.	TEST NO.	DESCRIPTION

REPORT OF TESTS ON Foundation Soil for Corrosion

IF CONTRACT, USE CONTRACT ITEM

SOURCE	CHARGE	EXPENDITURE AUTHORIZATION

SPECIAL DESIGNATION (USE WHEN APPLICABLE)	ACTIVITY OR OBJECT	AMOUNT

TEST SPECIMEN	A	B	C	D	E
DATE TESTED					
COMPACTOR FOOT PRESSURE P.S.I.					
INITIAL MOISTURE %					
SOAK WATER ML					
WATER ADDED-ML (TOTAL)					
WATER ADDED %					
MOISTURE AT COMPACTION %					
WET WT. OF BRIQUETTE-GMS					
HEIGHT OF BRIQUETTE-INCHES					
DRY DENSITY OF BRIQ. - # CU. FT.					
STABILOMETER P_H AT 2000 LBS.					
DISPLACEMENT					
R-VALUE BY STABILOMETER					
EXUDATION PRES. P.S.I.					
THICK. BY STAB. FEET					
EXPANSION DIAL READING					
THICK. BY EXP. PRESS. FEET					
R-VALUE BY EXPANSION					

Resistivity = 1479 ohm-cm

REMARKS:
Resistivity = 1479 Ω-cm
= 1479 Ω-cm
PH = 8.10

TEST RESULTS			SPEC.
LL.	P.L	P.I.	
CV			
S.E	AS REC'D.		
	CRUSHED		
	COMBINED		
LART	GRADE	100 REV.	
		500 REV.	
DUR	D_f		
	D_t		
% CRUSHED PARTICLES			

SURFACE PH = 8.10
BASE
SUBBASE
GRAVEL EQUIVALENT FACTOR
TRAFFIC INDEX

R VALUE
EXUDATION PRESSURE
EXPANSION PRESSURE
AT EQUILIBRUM SPEC.

INDICATED MINIMUM THICKNESS OF COVER FOR ABOVE CONDITIONS (FEET)

SP. GR. ☐ BULK (OVEN DRY) ☐ BULK (SSD) ☐ APPARENT

	FINE	COARSE
AS REC'D.		
CRUSHED		

REL. COMPACTION DATA

	IN PLACE	OPTIMUM
DENSITY		
MOISTURE		
% REL. COMP.		
SPEC.		

EXUDATION PRESSURE (PSI)

DISTRICT 4 LABORATORY
325 SAN BRUNO AVENUE
SAN FRANCISCO, CA 94103

TEST NO. 7948 - 3P

BILLED

DATE RECEIVED SEP 09 2011

CALC. BY _____ APPROVED BY _____

DATE REPORTED OCT 13 2011

☐ DISTRICT DIRECTOR ☐ TRANS. LAB.
☐ DIS. MAT LS[illegible] ☐ PAV'T. SECTION
☐ RESIDENT ENGINEER ☐ ACCOUNTING
☐ CONSTRUCTION ☐

ATTACH FORM DOT-TL-101 HERE

EXPANSION PRESSURE CHART

20

GRADING ANALYSIS

SIEVE	AS RECEIVED	RET. CR.	ADJ. OR COMB. GRADE	AS USED	SPECIF. LIMITS SOUGHT ☐
3					
2½					
2					
1½					
1					
¾					
½					
⅜					
4					
8					
16					
30					
50					
100					
200					
5μ					
1μ					

GRADING AS USED WAS OBTAINED AS FOLLOWS:

% BY WT. | % BY VOL. | TEST NO. | DESCRIPTION

Resistivity = 2784 ohm-cm

REMARKS:

PH = 8.12

SURFACE

BASE

SUBBASE

GRAVEL EQUIVALENT FACTOR

TRAFFIC INDEX

R VALUE: EXUDATION PRESSURE

EXPANSION PRESSURE

AT EQUILIBRUM SPEC.

INDICATED MINIMUM THICKNESS OF COVER FOR ABOVE CONDITIONS (FEET)

REPORT OF TESTS ON

Foundation Soil for Corrosion.

IF CONTRACT, USE CONTRACT ITEM

SOURCE	CHARGE	EXPENDITURE AUTHORIZATION

SPECIAL DESIGNATION (USE WHEN APPLICABLE)	ACTIVITY OR OBJECT	AMOUNT

TEST SPECIMEN	A	B	C	D	E
DATE TESTED					
COMPACTOR FOOT PRESSURE P.S.I.					
INITIAL MOISTURE %					
SOAK WATER ML					
WATER ADDED—ML (TOTAL)					
WATER ADDED %					
MOISTURE AT COMPACTION %					
WET WT. OF BRIQUETTE—GMS					
HEIGHT OF BRIQUETTE—INCHES					
DRY DENSITY OF BRIQ. – # CU. FT.					
STABILOMETER P_H AT 2000 LBS.					
DISPLACEMENT					
R-VALUE BY STABILOMETER					
EXUDATION PRES. P.S.I.					
THICK. BY STAB. FEET					
EXPANSION DIAL READING					
THICK. BY EXP. PRESS. FEET					
R-VALUE BY EXPANSION					

TEST RESULTS

		SPEC.
LL. P.L P.I.		
CV		
S.E	AS REC'D.	
	CRUSHED	
	COMBINED	
LART	GRADE 100 REV.	
	500 REV.	
OUR	D_f	
	D_t	
% CRUSHED PARTICLES		

SP. GR. ☐ BULK (OVEN DRY) ☐ BULK (SSD) ☐ APPARENT

	FINE	COARSE
AS REC'D.		
CRUSHED		

REL. COMPACTION DATA

	IN PLACE	OPTIMUM
DENSITY		
MOISTURE		
% REL. COMP.		
SPEC.		

DISTRICT 4 LABORATORY
325 SAN BRUNO AVENUE
SAN FRANCISCO, CA 94103

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
SAMPLE IDENTIFICATION CARD CARD NUMBER: C SAwad-3
TL-0101 (REV. 10/97)

☐ PRELIMINARY TESTS
☐ PROCESS TESTS
☐ ACCEPTANCE TESTS
INDEPENDENT ASSURANCE TESTS
☐ DIST. LAB
☐ TRANS. LAB
☐ SPECIAL TESTS

SAMPLE SENT TO:
☐ HDQTRS. LAB
☐ BRANCH LAB
☐ DIST. LAB

FIELD NO.
DIST. LAB NO.
LOT NO.
SHIPMENT NO.
P.O. OR REQ. NO.
AUTHORIZATION NO.

SAMPLE OF Soil
FOR USE IN Foundation
SAMPLE FROM R-11-003 CMS3 (17-20')
DEPTH
LOCATION OF SOURCE Native Soil

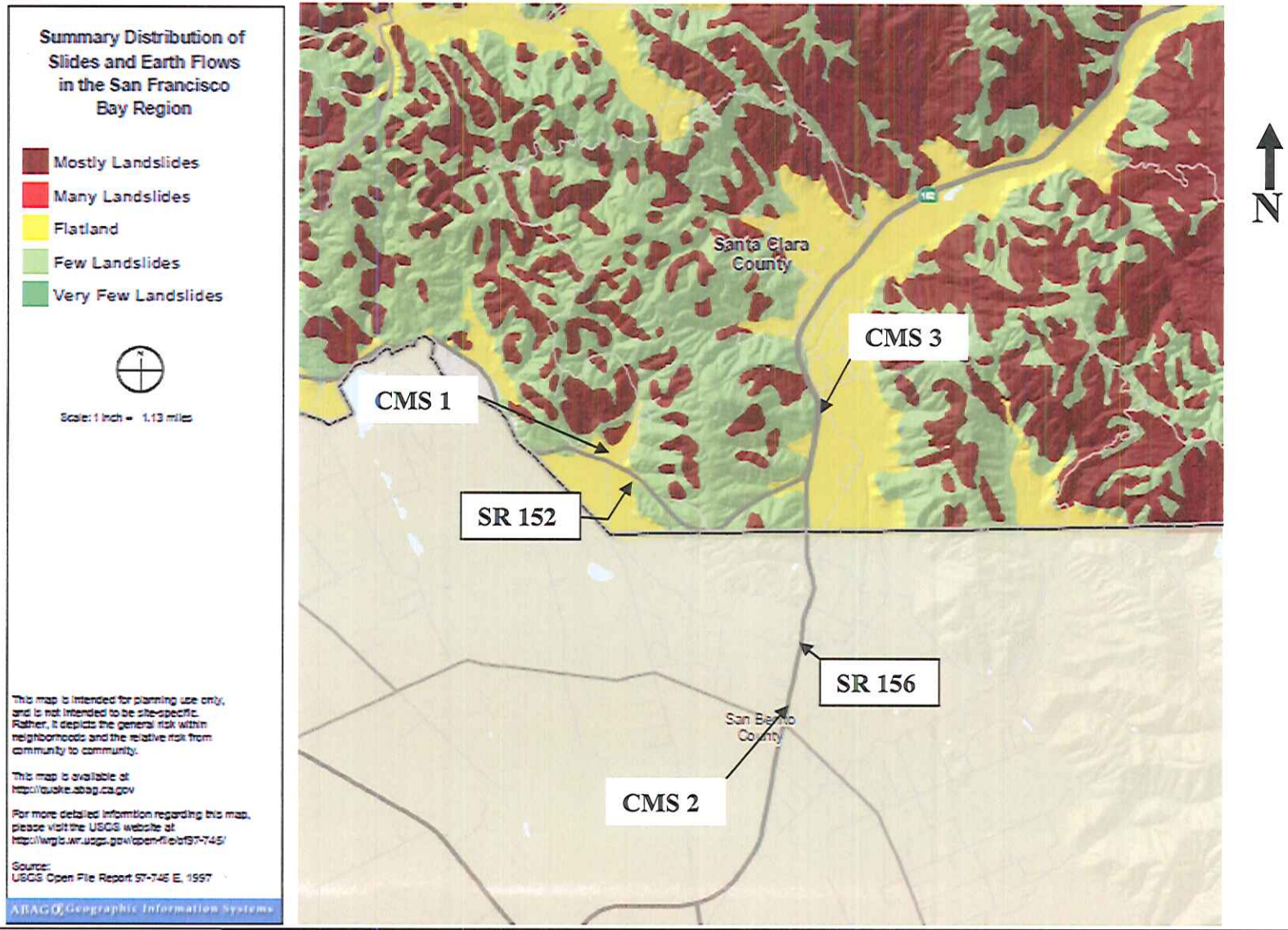
THIS SAMPLE IS SHIPPED IN (NO. CONTAINERS)
AND IS ON E OF A GROUP OF
SAMPLES REPRESENTING (TONS, GALS, BBLS, STA ETC.)
OWNER OR MANUFACTURER
TOTAL QUANTITY AVAILABLE
TEST RESULTS DESIRED ☐ NORMAL ☐ PRIORITY
DATE NEEDED 9/27/11
REMARKS

COVER ADDITIONAL INFORMATION WITH LETTER
DATE SAMPLEED
BY S. Awad TITLE T.E
DIST, CO, RTE, PM 04-SCl-152-PM Var
LIMITS 04-0G8001
CONT. NO.
FED. NO.
RES. ENGR. OR SUPT. S. Awad
ADDRESS (510) 622-5443
CONTRACTOR 111 Grand Ave, Oakland

MAIL TO SAME DESTINATION AS SAMPLE

EXUDATION PRESSURE (PSI)

APPENDIX C



MAP TAKEN FROM:
USGS MARE ISLAND QUADRANGLE, 1980

SCALE

Not to Scale

Caltrans

Engineering Service Center
DIVISION OF ENGINEERING SERVICES
OFFICE OF GEOTECHNICAL SERVICES
GEOTECHNICAL DESIGN BRANCH (WEST) – BRANCH B

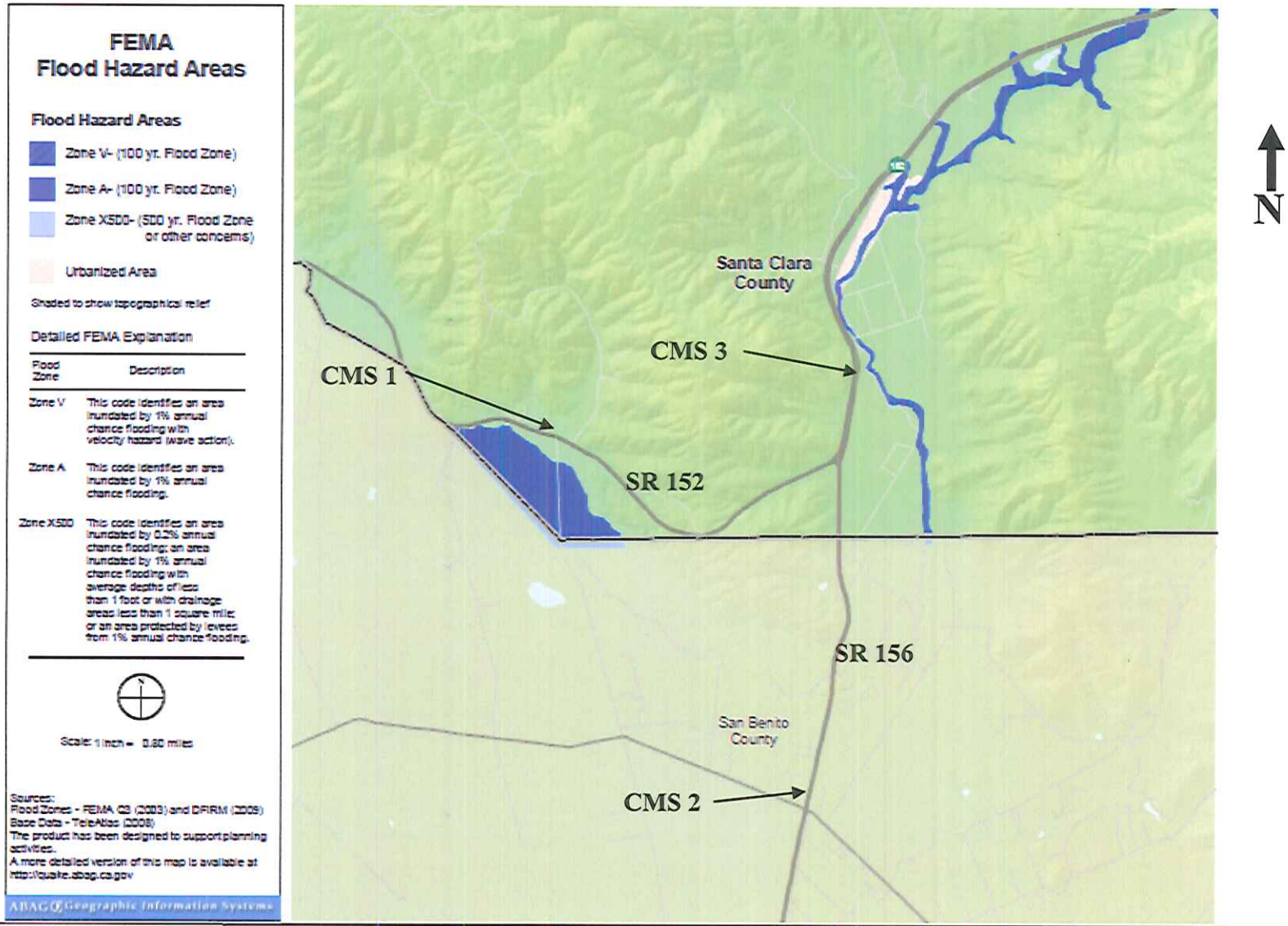
LANDSLIDE MAP

04-SCL-152/156 EFIS 1000020536

PM Varies FEBRUARY 2012

APPENDIX C

APPENDIX D



MAP TAKEN FROM:
USGS MARE ISLAND QUADRANGLE, 1980

SCALE

Not to Scale

Caltrans

Engineering Service Center
DIVISION OF ENGINEERING SERVICES
OFFICE OF GEOTECHNICAL SERVICES
GEOTECHNICAL DESIGN BRANCH (WEST) – BRANCH B

FLOOD ZONE MAP

04-SCL152 / SBT156
PM Varies

EFIS 1000020536

FEBRUARY 2012

APPENDIX D

LOG OF TEST BORINGS

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
05	SBt	156	R16.69		

REGISTERED CIVIL ENGINEER 02-13-12

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Meng-Hsi Hung No. 69739 Exp. 6-30-12 CIVIL STATE OF CALIFORNIA

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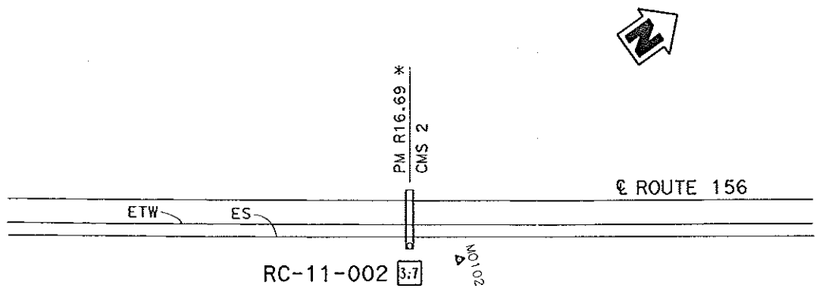
This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging, Classification, & Presentation Manual (2010 Edition).

NOTE: 1. PP=unconfined compressive strength (tsf) as measured by pocket penetrometer.

2. * - PM, approximate.

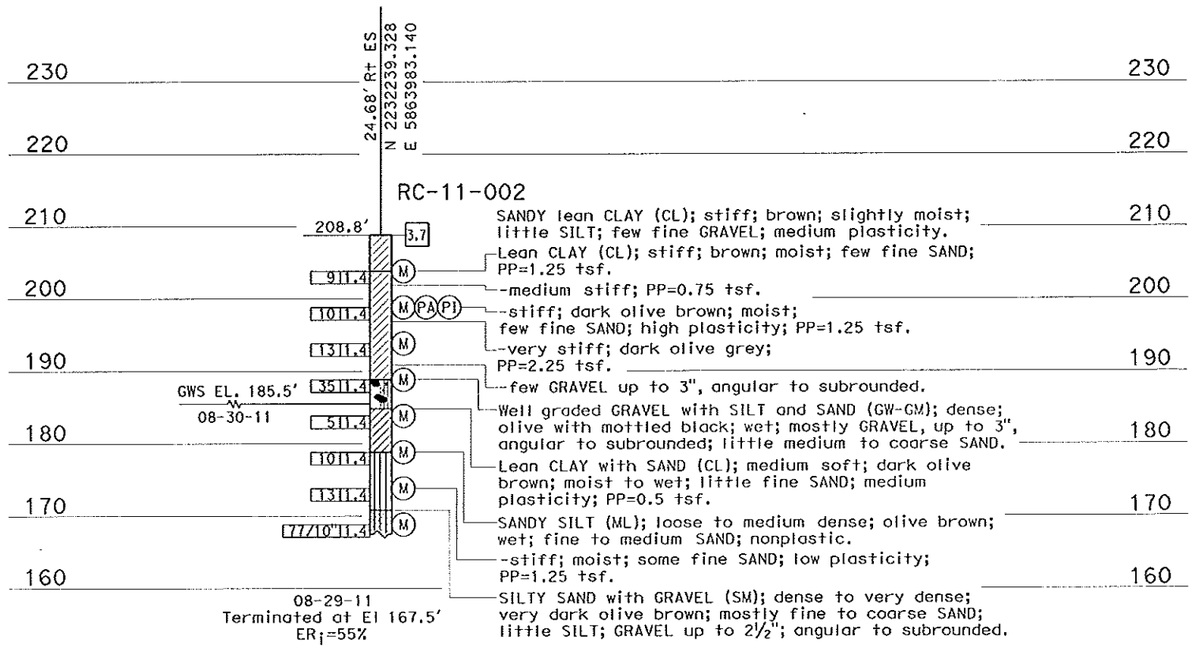
BENCH MARK

M0102
Datum: H=NAD 83-92
V=NAVD 88
Spike
15.54' Rt ES Line
N 2232274.975
E 5863982.711
Elev. 208.927



PLAN

1"=50'



SANDY lean CLAY (CL); stiff; brown; slightly moist; little SILT; few fine GRAVEL; medium plasticity.

Lean CLAY (CL); stiff; brown; moist; few fine SAND; PP=1.25 tsf.

-medium stiff; PP=0.75 tsf.

-stiff; dark olive brown; moist; few fine SAND; high plasticity; PP=1.25 tsf.

-very stiff; dark olive grey; PP=2.25 tsf.

-few GRAVEL up to 3", angular to subrounded.

Well graded GRAVEL with SILT and SAND (GW-GM); dense; olive with mottled black; wet; mostly GRAVEL, up to 3", angular to subrounded; little medium to coarse SAND.

Lean CLAY with SAND (CL); medium soft; dark olive brown; moist to wet; little fine SAND; medium plasticity; PP=0.5 tsf.

SANDY SILT (ML); loose to medium dense; olive brown; wet; fine to medium SAND; nonplastic.

-stiff; moist; some fine SAND; low plasticity; PP=1.25 tsf.

SILTY SAND with GRAVEL (SM); dense to very dense; very dark olive brown; mostly fine to coarse SAND; little SILT; GRAVEL up to 2½"; angular to subrounded.

PROFILE

VER. 1"=10'

ENGINEERING SERVICES		GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES OFFICE OF GEOTECHNICAL DESIGN BRANCH	BRIDGE NO. / POST MILES R16.69	CMS FOUNDATION LOG OF TEST BORINGS 1 of 3
FUNCTIONAL SUPERVISOR NAME: H. Nikoui	DRAWN BY: M. Reynolds 10/11 CHECKED BY: R. Nashed	FIELD INVESTIGATION BY: M. Hung				

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3660
PROJECT NUMBER & PHASE: 10000205361 CONTRACT NO.: 10008001

DISREGARD PRINTS BEARING EARLIER REVISION DATES

FILE => 1000800p01CMS2.dgn

PLOTTED => 09:08 TIME PLOTTED => 18-JUL-2012 DATE PLOTTED => 0116907

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
05	SBt	156	R16.69		

REGISTERED CIVIL ENGINEER 02-13-12 DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Meng-Hsi Hung No. 69739 Exp. 6-30-12 CIVIL STATE OF CALIFORNIA

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REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL (2010)

CEMENTATION

Description	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

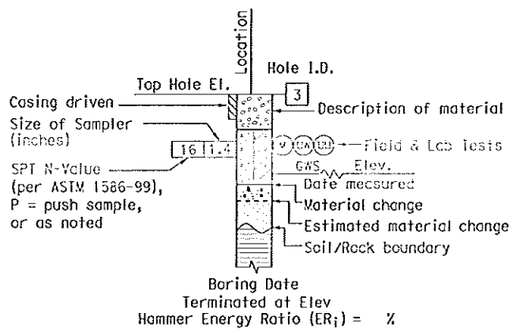
BOREHOLE IDENTIFICATION

Symbol	Hole Type	Description
Size	A	Auger Boring (hollow or solid stem bucket)
Size	R RW RC P	Rotary drilled boring (conventional) Rotary drilled with self-casing wire-line Rotary core with continuously-sampled, self-casing wire-line Rotary percussion boring (air)
Size	R	Rotary drilled diamond core
Size	HD HA	Hand driven (1-inch soil tube) Hand Auger
●	D	Dynamic Cone Penetration Boring
▲	CPT	Cone Penetration Test (ASTM D 5778)
⬚	O	Other (note on LOTB)

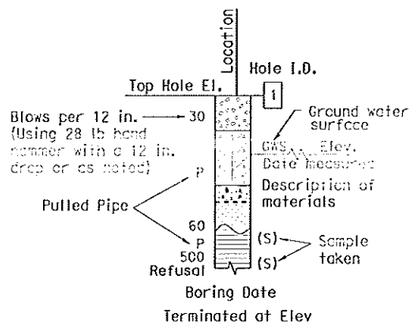
Note: Size in inches.

CONSISTENCY OF COHESIVE SOILS

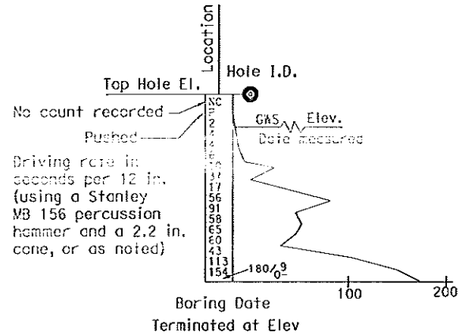
Description	Shear Strength (tsf)	Pocket Penetrometer Measurement, PP, (tsf)	Torvane Measurement, TV, (tsf)	Vane Shear Measurement, VS, (tsf)
Very Soft	Less than 0.12	Less than 0.25	Less than 0.12	Less than 0.12
Soft	0.12 - 0.25	0.25 - 0.5	0.12 - 0.25	0.12 - 0.25
Medium Stiff	0.25 - 0.5	0.5 - 1	0.25 - 0.5	0.25 - 0.5
Stiff	0.5 - 1	1 - 2	0.5 - 1	0.5 - 1
Very Stiff	1 - 2	2 - 4	1 - 2	1 - 2
Hard	Greater than 2	Greater than 4	Greater than 2	Greater than 2



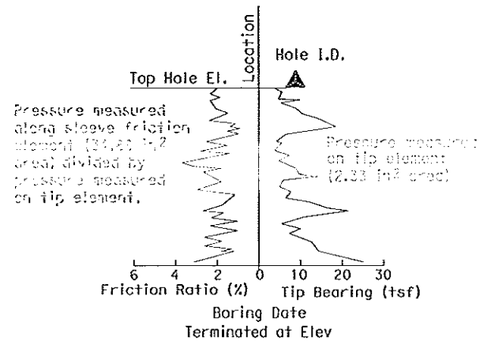
ROTARY BORING



HAND BORING



DYNAMIC CONE PENETRATION BORING



CONE PENETRATION TEST (CPT) BORING

ENGINEERING SERVICES	GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES OFFICE OF GEOTECHNICAL DESIGN BRANCH	BRIDGE NO. / POST MILE R16.69	CMS FOUNDATION LOG OF TEST BORINGS 2 of 3
	PREPARED BY: M. Reynolds 10/11				

GS LOTB SOIL LEGEND

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3660
PROJECT NUMBER & PHASE: 10000205361 CONTRACT NO.: 10008001

DISREGARD PRINTS BEARING EARLIER REVISION DATES

FILE => 1000800p02CMS2.dgn

REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL (2010)

GROUP SYMBOLS AND NAMES

Graphic/Symbol	Group Names	Graphic/Symbol	Group Names
GW	Well-graded GRAVEL Well-graded GRAVEL with SAND	CL	Lean CLAY Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY SANDY lean CLAY with GRAVEL GRAVELLY lean CLAY GRAVELLY lean CLAY with SAND
GP	Poorly-graded GRAVEL Poorly-graded GRAVEL with SAND		
GW-GM	Well-graded GRAVEL with SILT Well-graded GRAVEL with SILT and SAND	CL-ML	SILTY CLAY SILTY CLAY with SAND SILTY CLAY with GRAVEL SANDY SILTY CLAY SANDY SILTY CLAY with GRAVEL GRAVELLY SILTY CLAY GRAVELLY SILTY CLAY with SAND
GW-GC	Well-graded GRAVEL with CLAY (or SILTY CLAY) Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		
GP-GM	Poorly-graded GRAVEL with SILT Poorly-graded GRAVEL with SILT and SAND	ML	SILT SILT with SAND SILT with GRAVEL SANDY SILT SANDY SILT with GRAVEL GRAVELLY SILT GRAVELLY SILT with SAND
GP-GC	Poorly-graded GRAVEL with CLAY (or SILTY CLAY) Poorly-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		
GM	SILTY GRAVEL SILTY GRAVEL with SAND	OL	ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
GC	CLAYEY GRAVEL CLAYEY GRAVEL with SAND		
GC-GM	SILTY, CLAYEY GRAVEL SILTY, CLAYEY GRAVEL with SAND	OL	ORGANIC SILT ORGANIC SILT with SAND ORGANIC SILT with GRAVEL SANDY ORGANIC SILT SANDY ORGANIC SILT with GRAVEL GRAVELLY ORGANIC SILT GRAVELLY ORGANIC SILT with SAND
SW	Well-graded SAND Well-graded SAND with GRAVEL		
SP	Poorly-graded SAND Poorly-graded SAND with GRAVEL	CH	Fat CLAY Fat CLAY with SAND Fat CLAY with GRAVEL SANDY fat CLAY SANDY fat CLAY with GRAVEL GRAVELLY fat CLAY GRAVELLY fat CLAY with SAND
SW-SM	Well-graded SAND with SILT Well-graded SAND with SILT and GRAVEL		
SW-SC	Well-graded SAND with CLAY (or SILTY CLAY) Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)	MH	Elastic SILT Elastic SILT with SAND Elastic SILT with GRAVEL SANDY elastic SILT SANDY elastic SILT with GRAVEL GRAVELLY elastic SILT GRAVELLY elastic SILT with SAND
SP-SM	Poorly-graded SAND with SILT Poorly-graded SAND with SILT and GRAVEL		
SP-SC	Poorly-graded SAND with CLAY (or SILTY CLAY) Poorly-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)	OH	ORGANIC fat CLAY ORGANIC fat CLAY with SAND ORGANIC fat CLAY with GRAVEL SANDY ORGANIC fat CLAY SANDY ORGANIC fat CLAY with GRAVEL GRAVELLY ORGANIC fat CLAY GRAVELLY ORGANIC fat CLAY with SAND
SM	SILTY SAND SILTY SAND with GRAVEL		
SC	CLAYEY SAND CLAYEY SAND with GRAVEL	OH	ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC elastic SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
SC-SM	SILTY, CLAYEY SAND SILTY, CLAYEY SAND with GRAVEL		
PT	PEAT	OL/OH	ORGANIC SOIL ORGANIC SOIL with SAND ORGANIC SOIL with GRAVEL SANDY ORGANIC SOIL SANDY ORGANIC SOIL with GRAVEL GRAVELLY ORGANIC SOIL GRAVELLY ORGANIC SOIL with SAND
	COBBLES COBBLES and BOULDERS BOULDERS		

FIELD AND LABORATORY TESTING

- (C) Consolidation (ASTM D 2435)
- (CL) Collapse Potential (ASTM D 5333)
- (CP) Compaction Curve (CTM 216)
- (CR) Corrosivity Testing (CTM 643, CTM 422, CTM 417)
- (CU) Consolidated Undrained Triaxial (ASTM D 4767)
- (DS) Direct Shear (ASTM D 3080)
- (EI) Expansion Index (ASTM D 4829)
- (M) Moisture Content (ASTM D 2216)
- (OC) Organic Content-% (ASTM D 2974)
- (P) Permeability (CTM 220)
- (PA) Particle Size Analysis (ASTM D 422)
- (PI) Plasticity Index (AASHTO T 90) Liquid Limit (AASHTO T 89)
- (PL) Point Load Index (ASTM D 5731)
- (PM) Pressure Meter
- (R) R-Value (CTM 301)
- (SE) Sand Equivalent (CTM 217)
- (SG) Specific Gravity (AASHTO T 100)
- (SL) Shrinkage Limit (ASTM D 427)
- (SW) Swell Potential (ASTM D 4546)
- (UC) Unconfined Compression-Soil (ASTM D 2166) Unconfined Compression-Rock (ASTM D 2938)
- (UU) Unconsolidated Undrained Triaxial (ASTM D 2850)
- (UW) Unit Weight (ASTM D 4767)

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
05	SBt	156	R16.69		

02-13-12
REGISTERED CIVIL ENGINEER DATE

Meng-Hsi Hung No. 69739 Exp 6-30-12 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

PLANS APPROVAL DATE

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APPARENT DENSITY OF COHESIONLESS SOILS

Description	SPT N_{60} (Blows / 12 in.)
Very Loose	0 - 5
Loose	5 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	Greater than 50

MOISTURE

Description	Criteria
Dry	No discernable moisture
Moist	Moisture present, but no free water
Wet	Visible free water

PERCENT OR PROPORTION OF SOILS

Description	Criteria
Trace	Particles are present but estimated to be less than 5%
Few	5% - 10%
Little	15% - 25%
Some	30% - 45%
Mostly	50% - 100%

PARTICLE SIZE

Description		Size (in.)
Boulder		Greater than 12
Cobble		3 - 12
Gravel	Coarse	3/4 - 3
	Fine	1/5 - 3/4
Sand	Coarse	1/16 - 1/5
	Medium	1/64 - 1/16
	Fine	1/300 - 1/64
Silt and Clay		Less than 1/300

ENGINEERING SERVICES	GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES OFFICE OF GEOTECHNICAL DESIGN BRANCH	BRIDGE NO. / POST MILE R16.69	CMS FOUNDATION LOG OF TEST BORINGS 3 of 3
	PREPARED BY: M. Reynolds 10/11				

GS LOTB SOIL LEGEND

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3660 PROJECT NUMBER & PHASE: 10000205361 CONTRACT NO.: 10008001

DISREGARD PRINTS BEARING EARLIER REVISION DATES → REVISION DATES | SHEET | OF

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DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
04	SCl	152	19.84,R22.62		

02-13-12
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

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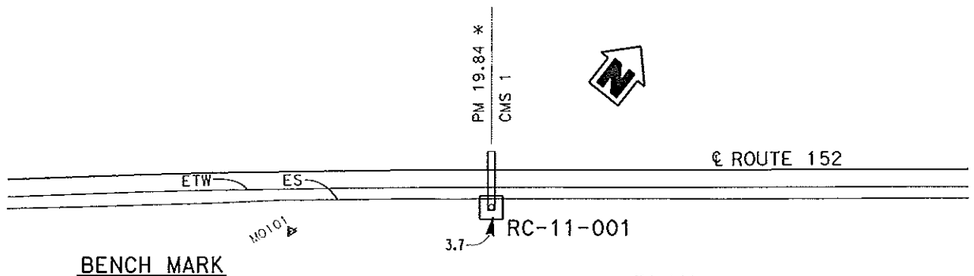
REGISTERED PROFESSIONAL ENGINEER
Meng-Hsi Hung
No. 69739
Exp. 6-30-12
CIVIL
STATE OF CALIFORNIA

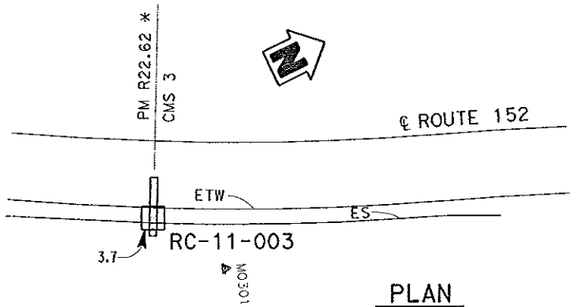
This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging, Classification, & Presentation Manual (2010 Edition).

NOTE: 1. PP=unconfined compressive strength (tsf) as measured by pocket penetrometer.

2. * - PM, approximate.



PLAN
1"=50'

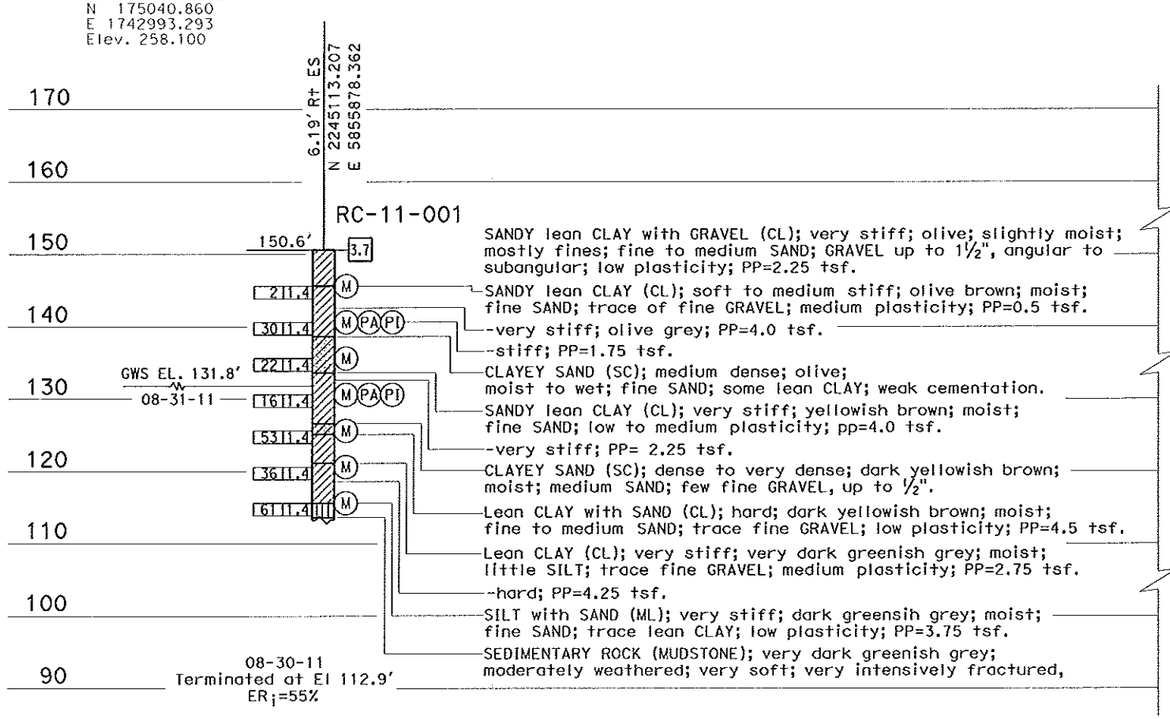


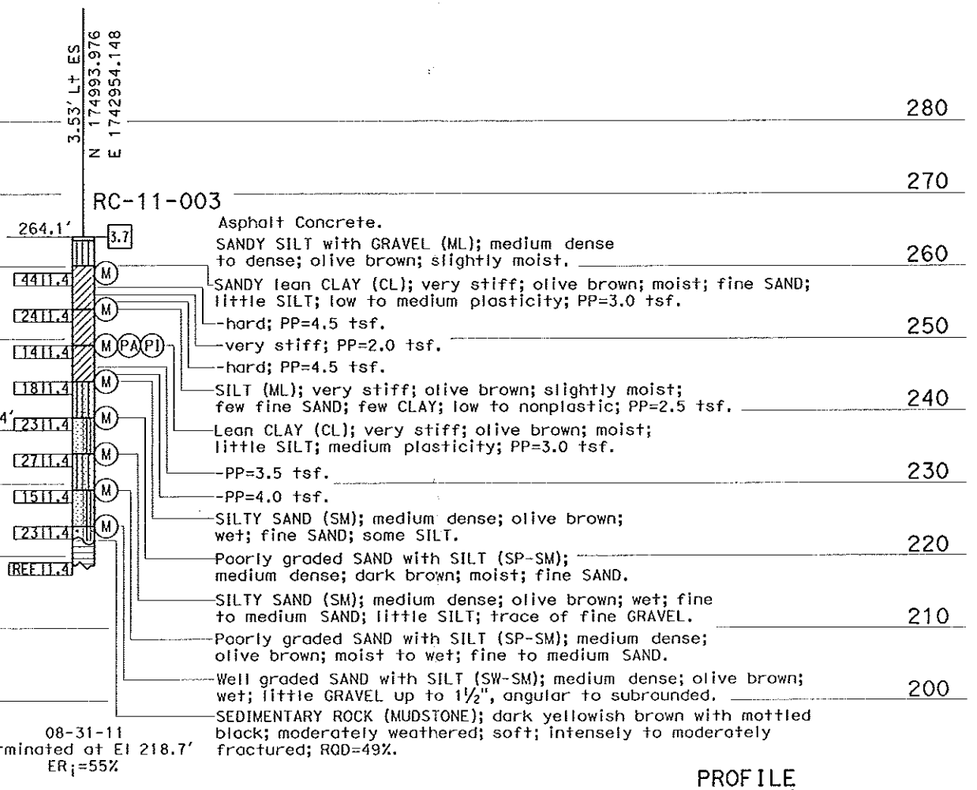
PLAN
1"=50'

BENCH MARK

MO101
Datum: H=NAD 83-92
V=Assumed
Iron Pipe with Plastic Plug
21.433' Rt ES Line
N 2245179.662
E 5855750.845
Elev. 150.028'

MO301
Datum: H=NAD 27
V=NAVD 88
1"x2" Stake
30.328' Rt ES Line
N 175040.860
E 1742993.293
Elev. 258.100





PROFILE

VER. 1"=10'

ENGINEERING SERVICES		GEOTECHNICAL SERVICES		STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES OFFICE OF GEOTECHNICAL DESIGN BRANCH	BRIDGE NO.	CMS FOUNDATION
FUNCTIONAL SUPERVISOR	DRAWN BY: M. Reynolds 10/11	FIELD INVESTIGATION BY: M. Hung				POST MILES 19.84, R22.62	LOG OF TEST BORINGS 1 of 4
NAME: H. Nikoui	CHECKED BY: R. Nashed						

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3660
PROJECT NUMBER & PHASE: 10000205361 CONTRACT NO.: 10008001

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES			SHEET	OF

FILE = 1000600b01CMS1&3.dgn

DATE PLOTTED => 18-JUL-2012 TIME PLOTTED => 09:08

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
04	SCI	152	19.84,R22.62		

REGISTERED CIVIL ENGINEER 02-13-12 DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Meng-Hsi Hung No. 69739 Exp. 6-30-12 CIVIL STATE OF CALIFORNIA

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REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL (2010)

CEMENTATION

Description	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

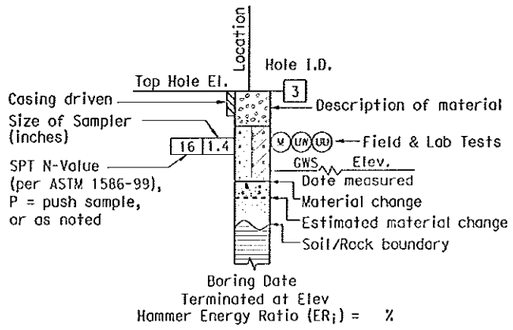
BOREHOLE IDENTIFICATION

Symbol	Hole Type	Description
Size	A	Auger Boring (hollow or solid stem bucket)
Size	R RW RC P	Rotary drilled boring (conventional) Rotary drilled with self-casing wire-line Rotary core with continuously-sampled, self-casing wire-line Rotary percussion boring (air)
Size	R	Rotary drilled diamond core
Size	HD HA	Hand driven (1-inch soil tube) Hand Auger
●	D	Dynamic Cone Penetration Boring
▲	CPT	Cone Penetration Test (ASTM D 5778)
⬚	O	Other (note on LOTB)

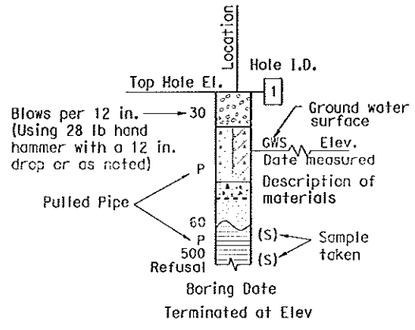
Note: Size in inches.

CONSISTENCY OF COHESIVE SOILS

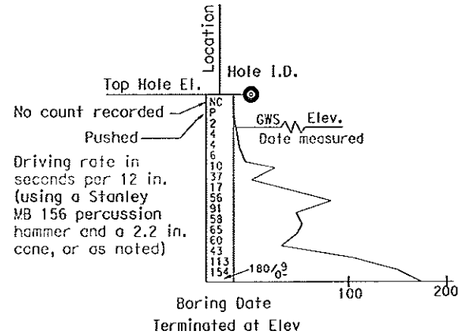
Description	Shear Strength (tsf)	Pocket Penetrometer Measurement, PP, (tsf)	Torvane Measurement, TV, (tsf)	Vane Shear Measurement, VS, (tsf)
Very Soft	Less than 0.12	Less than 0.25	Less than 0.12	Less than 0.12
Soft	0.12 - 0.25	0.25 - 0.5	0.12 - 0.25	0.12 - 0.25
Medium Stiff	0.25 - 0.5	0.5 - 1	0.25 - 0.5	0.25 - 0.5
Stiff	0.5 - 1	1 - 2	0.5 - 1	0.5 - 1
Very Stiff	1 - 2	2 - 4	1 - 2	1 - 2
Hard	Greater than 2	Greater than 4	Greater than 2	Greater than 2



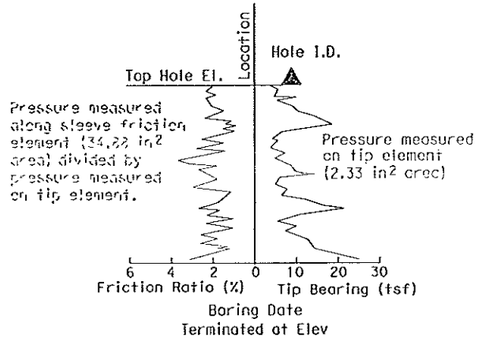
ROTARY BORING



HAND BORING



DYNAMIC CONE PENETRATION BORING



CONE PENETRATION TEST (CPT) BORING

ENGINEERING SERVICES	GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES OFFICE OF GEOTECHNICAL DESIGN BRANCH	BRIDGE NO. / POST MILE 19.84, R22.62	CMS FOUNDATION LOG OF TEST BORINGS 2 of 4
	PREPARED BY: M. Reynolds 10/11				

GS LOTB SOIL LEGEND

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3660
PROJECT NUMBER & PHASE: 10000205361 CONTRACT NO.: 10008001

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES SHEET OF

FILE => 10008000p02CMS183.dgn

USERNAME => s116907 DATE PLOTTED => 18-JUL-2012 TIME PLOTTED => 09:08

REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL (2010)

GROUP SYMBOLS AND NAMES

Graphic/Symbol	Group Names	Graphic/Symbol	Group Names
GW	Well-graded GRAVEL Well-graded GRAVEL with SAND	CL	Lean CLAY Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY SANDY lean CLAY with GRAVEL GRAVELLY lean CLAY GRAVELLY lean CLAY with SAND
GP	Poorly-graded GRAVEL Poorly-graded GRAVEL with SAND		
GW-GM	Well-graded GRAVEL with SILT Well-graded GRAVEL with SILT and SAND	CL-ML	SILTY CLAY SILTY CLAY with SAND SILTY CLAY with GRAVEL SANDY SILTY CLAY SANDY SILTY CLAY with GRAVEL GRAVELLY SILTY CLAY GRAVELLY SILTY CLAY with SAND
GW-GC	Well-graded GRAVEL with CLAY (or SILTY CLAY) Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		
GP-GM	Poorly-graded GRAVEL with SILT Poorly-graded GRAVEL with SILT and SAND	ML	SILT SILT with SAND SILT with GRAVEL SANDY SILT SANDY SILT with GRAVEL GRAVELLY SILT GRAVELLY SILT with SAND
GP-GC	Poorly-graded GRAVEL with CLAY (or SILTY CLAY) Poorly-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		
GM	SILTY GRAVEL SILTY GRAVEL with SAND	OL	ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
GC	CLAYEY GRAVEL CLAYEY GRAVEL with SAND		
GC-GM	SILTY, CLAYEY GRAVEL SILTY, CLAYEY GRAVEL with SAND	OL	ORGANIC SILT ORGANIC SILT with SAND ORGANIC SILT with GRAVEL SANDY ORGANIC SILT SANDY ORGANIC SILT with GRAVEL GRAVELLY ORGANIC SILT GRAVELLY ORGANIC SILT with SAND
SW	Well-graded SAND Well-graded SAND with GRAVEL		
SP	Poorly-graded SAND Poorly-graded SAND with GRAVEL	CH	Fat CLAY Fat CLAY with SAND Fat CLAY with GRAVEL SANDY fat CLAY SANDY fat CLAY with GRAVEL GRAVELLY fat CLAY GRAVELLY fat CLAY with SAND
SW-SM	Well-graded SAND with SILT Well-graded SAND with SILT and GRAVEL		
SW-SC	Well-graded SAND with CLAY (or SILTY CLAY) Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)	MH	Elastic SILT Elastic SILT with SAND Elastic SILT with GRAVEL SANDY elastic SILT SANDY elastic SILT with GRAVEL GRAVELLY elastic SILT GRAVELLY elastic SILT with SAND
SP-SM	Poorly-graded SAND with SILT Poorly-graded SAND with SILT and GRAVEL		
SP-SC	Poorly-graded SAND with CLAY (or SILTY CLAY) Poorly-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)	CH	ORGANIC fat CLAY ORGANIC fat CLAY with SAND ORGANIC fat CLAY with GRAVEL SANDY ORGANIC fat CLAY SANDY ORGANIC fat CLAY with GRAVEL GRAVELLY ORGANIC fat CLAY GRAVELLY ORGANIC fat CLAY with SAND
SM	SILTY SAND SILTY SAND with GRAVEL		
SC	CLAYEY SAND CLAYEY SAND with GRAVEL	OH	ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC elastic SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
SC-SM	SILTY, CLAYEY SAND SILTY, CLAYEY SAND with GRAVEL		
PT	PEAT	OL/OH	ORGANIC SOIL ORGANIC SOIL with SAND ORGANIC SOIL with GRAVEL SANDY ORGANIC SOIL SANDY ORGANIC SOIL with GRAVEL GRAVELLY ORGANIC SOIL GRAVELLY ORGANIC SOIL with SAND
	COBBLES COBBLES and BOULDERS BOULDERS		

FIELD AND LABORATORY TESTING

- (C) Consolidation (ASTM D 2435)
- (CL) Collapse Potential (ASTM D 5333)
- (CP) Compaction Curve (CTM 216)
- (CR) Corrosivity Testing (CTM 643, CTM 422, CTM 417)
- (CU) Consolidated Undrained Triaxial (ASTM D 4767)
- (DS) Direct Shear (ASTM D 3080)
- (EI) Expansion Index (ASTM D 4829)
- (M) Moisture Content (ASTM D 2216)
- (OC) Organic Content-% (ASTM D 2974)
- (P) Permeability (CTM 220)
- (PA) Particle Size Analysis (ASTM D 422)
- (PI) Plasticity Index (AASHTO T 90)
Liquid Limit (AASHTO T 89)
- (PL) Point Load Index (ASTM D 5731)
- (PM) Pressure Meter
- (R) R-Value (CTM 301)
- (SE) Sand Equivalent (CTM 217)
- (SG) Specific Gravity (AASHTO T 100)
- (SL) Shrinkage Limit (ASTM D 427)
- (SW) Swell Potential (ASTM D 4546)
- (UC) Unconfined Compression-Soil (ASTM D 2166)
Unconfined Compression-Rock (ASTM D 2938)
- (UU) Unconsolidated Undrained Triaxial (ASTM D 2850)
- (UW) Unit Weight (ASTM D 4767)

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO	TOTAL SHEETS
04	SCI	152	19.84,R22.62		

02-13-12
REGISTERED CIVIL ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER
Meng-Hsi Hung
No. 69739
Exp 6-30-12
CIVIL
STATE OF CALIFORNIA

PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

APPARENT DENSITY OF COHESIONLESS SOILS

Description	SPT N_{60} (blows / 12 in.)
Very Loose	0 - 5
Loose	5 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	Greater than 50

MOISTURE

Description	Criteria
Dry	No discernable moisture
Moist	Moisture present, but no free water
Wet	Visible free water

PERCENT OR PROPORTION OF SOILS

Description	Criteria
Trace	Particles are present but estimated to be less than 5%
Few	5% - 10%
Little	15% - 25%
Some	30% - 45%
Mostly	50% - 100%

PARTICLE SIZE

Description		Size (in.)
Boulder		Greater than 12
Cobble		3 - 12
Gravel	Coarse	3/4 - 3
	Fine	1/5 - 3/4
Sand	Coarse	1/16 - 1/5
	Medium	1/64 - 1/16
	Fine	1/300 - 1/64
Silt and Clay		Less than 1/300

ENGINEERING SERVICES	GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES OFFICE OF GEOTECHNICAL DESIGN BRANCH	BRIDGE NO. / POST MILE	CMS FOUNDATION LOG OF TEST BORINGS 3 of 4
	PREPARED BY: M. Reynolds 10/11			9.84, R22.62	

GS LOTB SOIL LEGEND

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3660
PROJECT NUMBER & PHASE: 10000205361 CONTRACT NO.: 10008001

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES				SHEET	OF

FILE = \\10008[illegible]\g03\MS183.dgn

USERNAME = s116907 DATE PLOTTED = 16-JUL-2012
LOTTED => 09:08

REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL (2010)

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
04	SCI	152	19.84,R22.62		

02-13-12
REGISTERED CIVIL ENGINEER DATE

Meng-Hsi Hung No. 69739 Exp 6-30-12 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

PLANS APPROVAL DATE

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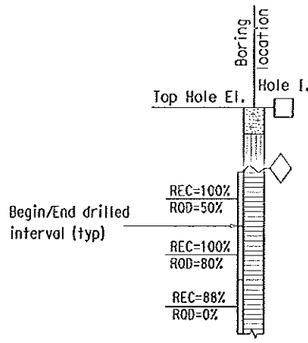
PERCENT CORE RECOVERY (REC) & ROCK QUALITY DESIGNATION (RQD)

$$REC = \frac{\sum \text{Length of the recovered core pieces (in.)}}{\text{Total length of core run (in.)}} \times 100\%$$

$$RQD = \frac{\sum \text{Length of intact core pieces} \geq 4 \text{ in.}}{\text{Total length of core run (in.)}} \times 100\%$$

RQD^{X} Indicates soundness criteria not met.



BEDDING SPACING

Description	Thickness / Spacing
Massive	Greater than 10 ft
Very Thickly Bedded	3 ft - 10 ft
Thickly Bedded	1 ft - 3 ft
Moderately Bedded	4 in. - 1 ft
Thinly Bedded	1 in. - 4 in.
Very Thinly Bedded	1/4 in. - 1 in.
Laminated	Less than 1/4 in.

LEGEND OF ROCK MATERIALS

- IGNEOUS ROCK
- SEDIMENTARY ROCK
- METAMORPHIC ROCK

ROCK HARDNESS

Description	Criteria
Extremely Hard	Cannot be scratched with a pocketknife or sharp pick. Can only be chipped with repeated heavy hammer blows.
Very Hard	Cannot be scratched with a pocketknife or sharp pick. Breaks with repeated heavy hammer blows.
Hard	Can be scratched with a pocketknife or sharp pick with difficulty (heavy pressure). Breaks with heavy hammer blows.
Moderately Hard	Can be scratched with pocketknife or sharp pick with light or moderate pressure. Breaks with moderate hammer blows.
Moderately Soft	Can be grooved 1/16 in. deep with a pocketknife or sharp pick with moderate or heavy pressure. Breaks with light hammer blow or heavy manual pressure.
Soft	Can be grooved or gouged easily by a pocketknife or sharp pick with light pressure, can be scratched with fingernail. Breaks with light to moderate manual pressure.
Very Soft	Can be readily indented, grooved or gouged with fingernail, or carved with a pocketknife. Breaks with light manual pressure.

FRACTURE DENSITY

Description	Observed Fracture Density
Unfractured	No fractures.
Very Slightly Fractured	Core lengths greater than 3 ft.
Slightly Fractured	Core lengths mostly from 1 to 3 ft.
Moderately Fractured	Core lengths mostly from 4 in. to 1 ft.
Intensely Fractured	Core lengths mostly from 1 to 4 in.
Very Intensely Fractured	Mostly chips and fragments.

WEATHERING DESCRIPTORS FOR INTACT ROCK

Description	Diagnostic Features					General Characteristics
	Chemical Weathering-Discoloration and/or Oxidation		Mechanical Weathering-Grain Boundary Conditions (Disaggregation) Primarily for Granitics and Some Coarse-Grained Sediments	Texture and Leaching		
	Body of Rock	Fracture Surfaces		Texture	Leaching	
Fresh	No discoloration, not oxidized.	No discoloration or oxidation.	No separation, intact (tight).	No change	No leaching	Hammer rings when crystalline rocks are struck.
Slightly Weathered	Discoloration or oxidation is limited to surface of, or short distance from, fractures; some feldspar crystals are dull.	Minor to complete discoloration or oxidation of most surfaces.	No visible separation, intact (tight).	Preserved	Minor leaching of some soluble minerals.	Hammer rings when crystalline rocks are struck. Body of rock not weakened.
Moderately Weathered	Discoloration or oxidation extends from fractures usually throughout; Fe-Mg minerals are "rusty," feldspar crystals are "cloudy."	All fracture surfaces are discolored or oxidized.	Partial separation of boundaries visible.	Generally preserved	Soluble minerals may be mostly leached.	Hammer does not ring when rock is struck. Body of rock is slightly weakened.
Intensely Weathered	Discoloration or oxidation throughout; all feldspars and Fe-Mg minerals are altered to clay to some extent; or chemical alteration produces in-situ disaggregation, see grain boundary conditions.	All fracture surfaces are discolored or oxidized, surfaces friable.	Partial separation, rock is friable; in semiarid conditions granitics may be disaggregated.	Texture altered by chemical disintegration (hydration, argillation).	Soluble minerals may be complete.	Dull sound when struck with hammer, usually can be broken with moderate to heavy manual pressure or by light hammer blow without reference to planes of weakness such as incipient or hairline fractures, or veinlets. Rock is significantly weakened.
Decomposed	Discolored or oxidized throughout, but resistant minerals such as quartz may be unaltered; all feldspars and Fe-Mg minerals are completely altered to clay.		Complete separation of grain boundaries (disaggregated).	Resembles a soil, partial or complete remnant rock structure may be preserved; leaching of soluble minerals usually complete.		Can be granulated by hand. Resistant minerals such as quartz may be present as "stringers" or "dikes."

ENGINEERING SERVICES	GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES OFFICE OF GEOTECHNICAL DESIGN BRANCH	BRIDGE NO. / POST MILE 19.84, R22.62	CMS FOUNDATION LOG OF TEST BORINGS 4 of 4
	PREPARED BY: M. Reynolds 10/11				

GS L018 SOIL LEGEND

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3660
PROJECT NUMBER & PHASE: 10000205361 CONTRACT NO.: 10008001
FILE => 1000800p04CMS183.dgn

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES					SHEET	OF

USERNAME => 0116907 DATE PLOTTED => 18-0CT-2012 TIME PLOTTED => 09:06