

# **INFORMATION HANDOUT**

**For Contract No. 11-076704**

**At 11-Imp-5708**

**Identified by**

**Project ID 1100000035**

## **MATERIALS INFORMATION**

Summary of Foundation Recommendation Reports

Water Source Information

**M e m o r a n d u m***Flex your power!  
Be energy efficient!*

**To:** MR. SEAN SAMUEL  
Branch Chief  
Office of Transportation Architecture  
Structure Design Services and Earthquake Engineering  
Division of Engineering Services

**Date:** September 3, 2009

**File:** 11-Imp-L5708  
11-076701  
El Centro M.S.

**From:** DEPARTMENT OF TRANSPORTATION  
DIVISION OF ENGINEERING SERVICES  
Geotechnical Services  
Office of Geotechnical Design South 2

**Subject:** Foundation Report

The Office of Transportation Architecture has requested a final foundation report for the construction of the El Centro Maintenance Station near the intersection of East Ross Road and Dogwood Road in the city of El Centro, Imperial County.

The recommendations provided in this report are based on the Request for Final Foundation Report dated January 9, 2009, and the borings completed from May 5 to May 6 of 2009. Also, the foundation report dated October 2006 completed for the adjacent San Diego Gas and Electric facility prepared by Landmark Consultants, Inc. (2006), has been reviewed.

**Project Description/History**

The site is currently undeveloped but roughly graded with minor amounts of fill used for leveling.

All elevations referenced in this report are based on an existing metal sewer cap adjacent to the property.

**Geology**

El Centro is within the Imperial Valley portion of the Salton Trough. The Trough encompasses the Coachella, Imperial, and Mexicali valleys. Nonmarine and alluvial sediments are present in large areas. Basement rock consists of Mesozoic granite. Drainage is into the Salton Sea.

The investigation showed the presence of silts and clays. Ancient lakebed and shoreline sediments appear to underlie the area investigated for this report. These sediments are

assumed to be late Pleistocene to Holocene lacustrine deposits associated with ancient Lake Cahuilla. The Log of Test Borings will be forwarded when completed.

### **Ground Water**

Ground water was encountered during the investigation at very shallow depths, as shallow as 7 feet below grade. This may vary seasonally and with recent rainfall totals. It is likely to be regionally perched water with elevation dependant on recent rainfall, flow in the adjacent channel, and possibly localized irrigation, either by saturation of adjacent properties or drawdown by pumping of adjacent properties.

### **Seismic Data Evaluation**

The controlling fault for the proposed site is the Brawley-Imperial/W Fault, which is located approximately 3.5 miles to the northeast. This is a strike slip fault with a MCE of 7.0 and corresponding estimated Peak Ground Acceleration of 0.5g. The site is not considered prone to surface rupture due to fault movement since there are no known faults projecting towards or passing through the project site. The faulting and seismicity information provided above is based on the 1996 Caltrans California Seismic Hazard Map and 1997 Geomatrix Attenuation Relationship.

### **Recommended ARS**

For preliminary design purposes, the soil profile at this site is classified as Type E as defined in Table 1613.5.2 of the 2007 California Building Code. The recommended Acceleration Response Spectrum (ARS) is attached and was prepared by Dr. Mohammad Islam.

### **Lateral Loading**

The allowable passive bearing pressure is 300 lbs/ft<sup>2</sup>/ft for compacted clayey silt fill. The coefficient of friction for compacted clayey silt fill is 0.45.

### **Corrosion**

\* Testing at the adjacent San Diego Gas and Electric (2006) property by Landmark Consultants, Inc., for San Diego Gas and Electric indicate corrosive soil due to chloride and sulfate concentrations. The conditions at the Caltrans site indicate the soil to be corrosive due to its high chloride content only. Attached is the lab report for the Caltrans site.

### **Liquefaction**

Due to the cohesive nature of the majority of the underlying sediments, liquefaction is not anticipated. The non-plastic silt layers present do not appear to be laterally extensive, nor

of a significant thickness to be a concern for liquefaction.

**Settlement**

Settlement induced by the construction is expected. With the given loads overall settlement should be less than one inch while the differential settlement should be less than a half inch.

**Subgrade Modulus K**

Following our recommendations, the subgrade modulus K is estimated to be approximately 100 lbs/in<sup>3</sup>. This was determined by general characteristics of the soil being a recompacted clayey sediment. Without specific footing dimensions, and/or plate load tests, which are unrealistic to perform for these types of structures, this value can only be approximated. The approximation was derived by using the table presented in "Foundation Analysis and Design", by Joseph E. Bowles, 1988.

**Foundation Recommendations**

The Office of Transportation Architecture has requested an investigation concerning the utilization of spread footings.

The field investigation was of a limited extent. It is probable, despite the fact that this is not shown in the "Log of Test Borings", that cobbles and gravel may be encountered at any depth of excavation. Cobbles encountered during excavation are to be removed.

Table 1 Foundation Design Recommendations for Spread Footings

Location	Type of Footing	Minimum Footing Embedment Depth	Minimum Width	Ultimate Bearing	Allowable Bearing
Maintenance Office (Sheet ST1-1)	Continuous	2 feet below grade	24 inches	6000 psf	2000 psf
Special Programs (Sheet ST2-1)	Continuous	2 feet below grade	24 inches	6000 psf	2000 psf
Herbicide /Fertilizer Storage (Sheet ST3-1)	Continuous	2 feet below grade	24 inches	6000 psf	2000 psf
Wash Rack (Sheet ST4-1)	Square	Slab on grade	-	See following Slab on Grade Discussion	See following Slab on Grade Discussion
Covered Equipment Parking (Sheet ST5-1)	Square	Slab on grade	-	See following Slab on Grade Discussion	See following Slab on Grade Discussion
Covered Trash Material Bins (Sheet ST6-1)	Continuous	2 feet below grade	24 inches	6000 psf	2000 psf
Covered Storage (Sheet ST7-1)	Continuous	2 feet below grade	24 inches	6000 psf	2000 psf

Warehouse (Sheet ST8-1)	Continuous	2 feet below grade	24 inches	6000 psf	2000 psf
Regional Office (Sheet ST9-1)	Continuous	2 feet below grade	24 inches	6000 psf	2000 psf
Subshop /Equipment (Sheet ST10-1)	Continuous	2 feet below grade	24 inches	6000 psf	2000 psf
Fuel Island (Sheet ST11-1)	Continuous	2 feet below grade	24 inches	6000 psf	2000 psf

<sup>1</sup>This table is only applicable if the following remedial foundation work is utilized.

Due to the weak nature of the underlying soil, and the shallowness of the groundwater, remedial foundation work will be necessary. All continuous footing widths should be a minimum of 24 inches in width. Remedial foundation treatment will need to consist of over excavation below footing grade and replacing these soils with structure backfill compacted to 95% R.C. per ASTM D1557. The excavation and recompaction shall extend five feet beyond the building limits and to a minimum depth of 3 feet below existing grade or 3 feet below the footings, whichever is deeper. Quality control should be practiced to ensure that the bottom of the footing excavation is level and clear of any loose debris. Should any large rock, concrete, rebar or other objects, be found in (not consistent with Standard Specifications) at the bottom of excavation elevations, the contractor should be prepared to remove, and replace them with granular material at 95 percent RC or lean concrete. Competent soils exposed at the bottom of the excavated areas are to be scarified to a minimum depth of 12 inches. These soils are to be moisture conditioned if necessary and compacted to at least 95 percent of the maximum dry density. Due to the proximity of ground water, if the bottom of the excavation is wet, the geotechnical professional shall inspect the excavation to determine the amount of granular material necessary to be added to the first 12 inches of recompacted soil to achieve proper compaction.

Slab-on-grade floors should be underlain by free-draining gravel or crushed rock to act as a capillary moisture break. The slab subgrades must not be allowed to dry and should remain near optimum moisture content. In areas where movement of moisture vapor through the slab would be detrimental to its intended use, installation of a vapor barrier (e.g., visqueen) should be considered. Concentrated flows from roof downspouts or area drains should be collected and conducted away from the structure foundations. As settling is not an issue, these structures do not need only have structure backfill placed one foot below the rock or gravel.

The site is considered to have low to medium swelling potential. If expansive soils are not taken into account in foundation design, then the backfill shall consist of 3 feet of granular soil, placed in 6 inch lifts, compacted to 95 percent maximum density, placed below the slab.

All final grades are to have a positive gradient away from foundations. Water is not to be allowed to pond on or immediately adjacent to foundations.

**General Notes:**

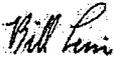
Recommendations are based on the foundation load data provided by Structure Design.

**Construction Considerations**

Obstructions, consisting partially of fill material, are likely to be encountered while excavating through the overlying fill. Fill is likely to consist of soils and debris.

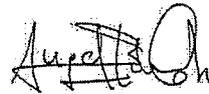
Trenching below 8 feet will likely require dewatering.

If you have any questions or need additional information, please call Bill Levine at 916-227-0505 or Angel Perez-Cobo at 916-227-7167.



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Bill Levine  
Engineering Geologist  
Geotechnical Design-South 2  
Design Branch A

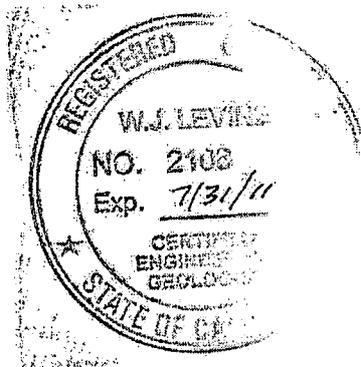


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Angel Perez-Cobo  
Senior Engineer  
Geotechnical Design-South 2  
Design Branch A

cc: APerez-Cobo  
R.E. Pending File  
Specs. & Estimates  
Proj Mgmt  
BLevine  
File

Attachment:  
ARS Curve





<Rudy\_C\_Lopez@dot.ca.gov>

To: <Bill\_Levine@dot.ca.gov>

06/12/2009 12:48 PM

cc

bcc

Subject: Corrosion Test Summary Report - Soil, EA: 11-076701  
(Corr. #s.CR090223-CR090224)

Division of Engineering Services  
Materials Engineering and Testing Services  
Corrosion Technology Branch  
Report Date: 6/12/2009  
Reported By: Lopez, Rudy

### CORROSION TEST SUMMARY REPORT - Soil/Water

Bridge Name:

Bridge Number:

EA No.: 11-076701

Dist/Co/Rte/PM or KP: 11 / IMP / /

SIC Number (TL101)	Sample Location	Sample Type	Sample Depth	Minimum Resistivity <sup>1</sup> (ohm-cm)	pH <sup>2</sup>	Chloride Content <sup>3</sup> (ppm)	Sulfate Content <sup>4</sup> (ppm)
C640673	EL CENTRO MS	SOIL	A-09-005-00 7	114	7.39	5300	1100
C640672	EL CENTRO M.S.	SOIL	BORING A-09-001-00 4	478	7.16	6200	1400

This site is corrosive (see note below for MSE wall backfill).

Controlling corrosion parameters are as follows:

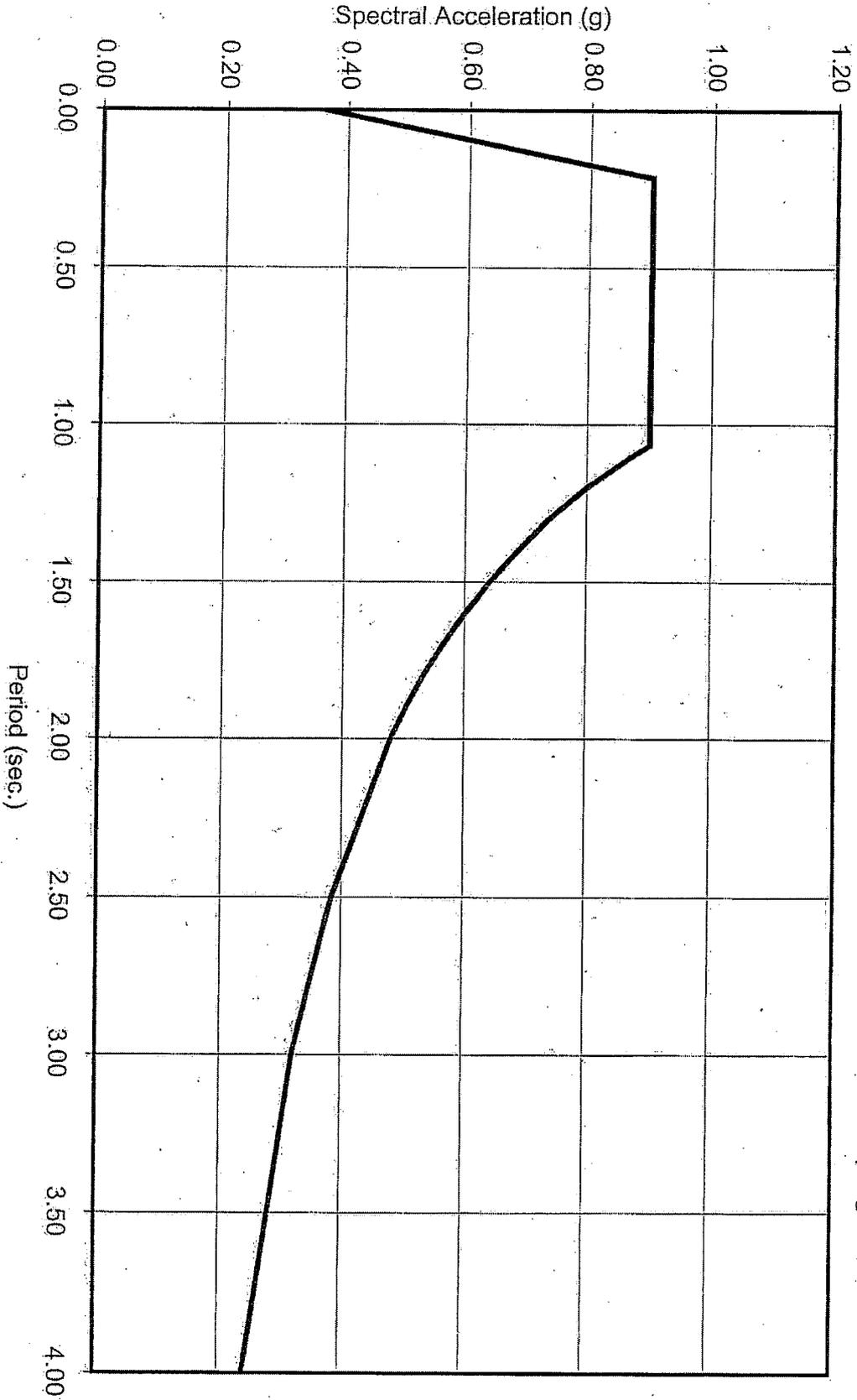
- 7.16 pH
- 6200 ppm Chloride
- 1400 ppm Sulfate

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.

UBC (2007) Design ARS for El Centro MS

Soil Profile Type = E

Damping = 5%





November 5, 2013

Caltrans  
Mr. Hasan Daabas, P.E, Project manager  
District 11  
4050 Taylor Street, M.S 221  
San Diego, CA 92243

Re: Water Availability for New Caltrans El Centro Maintenance Station

Dear Mr. Daabas,

We have reviewed your request for concurrence of adequate terminal waster storage capacity from the City of El Centro to serve the new El Centro Maintenance Facility located at 1102 Montenegro Way. This letter is to confirm that there is adequate capacity to serve your facility.

Should you have any further questions, please do not hesitate to contact me at (760) 337-5182 or email me at [acampos@cityofelcentro.org](mailto:acampos@cityofelcentro.org)

Sincerely,

A handwritten signature in blue ink, appearing to read "Abraham Campos". The signature is stylized and fluid.

Abraham Campos, PE  
Senior Engineer

AC/ld

***Department of Public Works • Engineering Division***

***1275 Main Street, El Centro, CA 92243 (760) 337-5182 Fax (760) 337-3856***