

# INFORMATION HANDOUT

For Contract No. 11-421604

At 11-SD-78-13.0/14.1

Identified by

Project ID 1115000142

## ENCROACHMENT PERMITS

[Example Right-Of-Way Permit, City of San Marcos](#)

## MATERIALS INFORMATION

[Structural Section Recommendations](#)

[Geotechnical Design Report](#)

[Revised Hazardous Waste Review](#)

[Water availability letter dated February 1, 2016](#)

[Warranty Bond Form](#)

[Point Index Load/Discontinuity Spacing Index chart](#)

[Read me file for Cross Sections](#)



Permit # \_\_\_\_\_

Permit Expires on \_\_\_\_\_

**\*\* Other Work to Be Performed:**

The approval and/or acceptance of this permit does not guarantee the final acceptance of the work to be performed. The City reserves the right to require, as necessary, additional submittals for work to be performed. By signing this permit the Applicant/PERMITTEE hereby states that they are the authorized person to perform the work and agree to perform work in compliance with all federal, state and local code, as well as any attached conditions.

Sign: \_\_\_\_\_ Date: \_\_\_\_\_

**CONTACT THE FOLLOWING FOURTY EIGHT (48) HOURS PRIOR TO THE BEGIN OF CONSTRUCTION: U.S.A. 1-800-422-4133 & CITY OF SAN MARCOS PUBLIC WORKS DEPARTMENT 760-744-1050 Ext. 3306. THIS PERMIT SHALL BE MAINTAINED AT THE WORK SITE UNTIL ALL WORK HAS BEEN COMPLETED.**

**City Use Only**

Notes: \_\_\_\_\_ Fee: \_\_\_\_\_  Paid Date: \_\_\_\_\_

Date of Approval: \_\_\_\_\_ BY: \_\_\_\_\_ Private Development (Case #): \_\_\_\_\_ City Project (Case #): \_\_\_\_\_

- APPLICANT COPY     INSPECTOR COPY     FILE COPY     FINANCE COPY

Permit # \_\_\_\_\_

Permit Expires on \_\_\_\_\_

## CITY OF SAN MARCOS INSURANCE REQUIREMENTS FOR CONTRACTORS

CONTRACTOR shall obtain and maintain during the entire term of the Agreement the following insurance policies from companies authorized to issue insurance in the State of California:

1. Comprehensive General Liability, including premises-operations, products/completed operations, broad form property damage, bodily injury and blanket contractual liability with the following coverages:
  - \$1,000,000 per person per occurrence;
  - \$2,000,000 annual aggregate combined;
  - \$1,000,000 property damage or bodily injury per occurrence;
  - Cross-liability exclusions prohibited
  - Defense costs shall be in addition to limits of coverage (no “burning limits” coverages)
2. Automobile Liability, including owned, hired, and non-owned vehicles with the following coverages:
  - \$1,000,000 per person per occurrence;
  - \$2,000,000 annual aggregate combined;
  - \$1,000,000 property damage or bodily injury per occurrence;
  - Cross-liability exclusions prohibited
  - Defense costs shall be in addition to limits of coverage (no “burning limits” coverages)
3. Workers’ Compensation insurance in amounts in accordance with statutory requirements.

ENDORSEMENTS shall be obtained so that each policy contains the following provisions, the wording for which shall be to the satisfaction of the City Attorney:

1. Additional Insured. (Not required for Professional Errors and Omissions Liability Insurance, Auto Liability or Workers’ Compensation.)

“City of San Marcos, the San Marcos Redevelopment Agency and their elected and appointed boards, officers, agents and employees are additional insureds with respect to this subject project and contract with City.”

2. Preferred Forms.

- General Liability: CG 2010 11 85, CG 2037 10 01 or equivalent

3. Notice.

“Said policy shall not terminate, nor shall it be canceled or reduced in coverage without thirty (30) days’ written notice to City of San Marcos.”

4. Primary Coverage.

“The policy provides primary coverage to City of San Marcos and its elected and appointed boards, officers, agents and employees. It is not secondary or in any way subordinate to any other insurance or coverage maintained by City of San Marcos.”

5. Waiver of Subrogation.

“We waive any right of recovery we may have against the City of San Marcos and its elected and appointed boards, officers and employees because of payments we make for injury or damages arising or of your ongoing operations or your work done under contract with the City of San Marcos.”

Permit # \_\_\_\_\_

Permit Expires on \_\_\_\_\_

Failure to comply with insurance requirements under this Agreement shall be a material breach of this Agreement.

Permit # \_\_\_\_\_

Permit Expires on \_\_\_\_\_

## Attachment

### Standard Conditions

The City issues permission by way of integration of the following conditions with the referenced permit to conduct operations in the City of San Marcos right of way at the locations indicated on the attached permit contingent upon compliance with applicable conditions listed herein, but not limited to the following:

- Locate and protect utilities situated in the work zone.
- No access or work shall be performed within the City right-of-way without the full knowledge of the assigned City Inspector who shall be given not less than 48 hours advance notice of the initiation of permitted use at (760) 744-1050 Ext. 3332 as stated on the permit.
- At least 48 hours prior to starting work, **Underground Service Alert (USA)** shall be notified for location of underground utilities at 1-800-422-4133. The proposed dig area must be pre-marked in white paint prior to contacting (USA).
- 48-hour advance notice prior to start and completion of work. Operations not to start before 7:00 AM. Work in right of way prohibited on City holidays and weekends.
- No work shall proceed on any roadway without first consulting the City inspector for verification of valid work times.
- PERMITTEE responsible for removal of paint and other indicators used for utility alignment mark out.
- Protect all improvements adjacent to the site; restoration of the affected areas to pre-construction condition. Repairs to the streets, driveways and sidewalks damaged or demolished by your PERMITTEE or PERMITTEE's agent shall conform to SDRSD Specifications and City of San Marcos specifications to the satisfaction of the City Engineer or his duly authorized representative.
- All trenching and backfill within the roadway unless otherwise stated shall comply with the City of San Marcos Backfill Ordinance.
- Where appropriate, sidewalk placement/ replacement to include placement of root barriers between trees and the sidewalk.
- Concrete shall be placed at a minimum of 5 1/2" thickness for sidewalks at driveway access.
- Use reasonable care to protect pedestrians and vehicles passing the work zone. If damage occurs, applicant to hold the City harmless and to accept responsibility at their expense for each occurrence.
- Safe access to residences and businesses in the area shall be maintained at all times.
- All traffic control within the construction area shall be subject to an approved traffic control plan and shall be flagged and barricaded to the satisfaction of the City Inspector in compliance with the "SDRSD", latest edition. In the event that the Inspector determines proper traffic control is not in place, all work shall cease and PERMITTEE authorizes the City Engineer or his duly authorized representative to order, on the rental basis, such traffic control devices as shall be necessary and proper to protect the public safety and further agrees to pay any and all costs and charges that the City may incur in providing said traffic control.
- Traffic control plans not adhering to SDRSD shall be prepared by a licensed traffic engineer or certified traffic Control Company.
- Permitted works shall be constructed in accordance with the City specifications and approved plans subject to inspection and approval by the City Engineer or his duly authorized representative. Certification for all materials and work, including compaction tests, shall be furnished by the applicant upon request by the City Inspector. Any compaction testing shall be paid for by the PERMITTEE. Certification shall be made by a certified testing agency or firm acceptable to the City.
- Maintain two-way traffic at all times. Neither parking nor thru traffic shall be interrupted nor prohibited unless specifically authorized by the City Engineer on an approved plan for traffic control.
- All excavations in existing pavement shall be saw cut to neat lines and AC replacement shall be made to the satisfaction of the City Engineer or his duly authorized representative.
- Two sack sand-cement slurry backfill shall be required when tunneling under curb and gutter or other improvements not designated for removal.
- Roadways shall be clean and free of all obstructions and completely open to traffic at the end of each working day.
- Sufficient advance notice of service interruptions to customers must be provided.
- Restoration of survey monuments dislodged or destroyed during construction. PERMITTEE must have a licensed land surveyor restore the monuments.
- All work covered by this permit shall be performed by a contractor possessing a valid California contractor's license of the appropriate class.

Permit # \_\_\_\_\_

Permit Expires on \_\_\_\_\_

- The City does not permit storage of either materials or equipment in the City right of way unless authorized by City Engineer or his duly authorized representative. Contractor will remove equipment and materials from the right of way at the close of business each day, unless specifically permitted.
- Suitable control and legal disposal of water residuals, debris and excavated materials generated by construction operations according to Best Management Practice standards and Storm Water Management Requirements. See San Marcos Municipal Code Chapter 14.15
  - a) Materials and debris associated with performance of work shall be covered.
  - b) Use of devices to prevent run-off from materials, debris container and portable toilets. Should the PERMITTEE not satisfactorily implement these measures the City may fine the offender and/or remove the offensive materials at the offender's expense.
  - c) No disposal of unauthorized non-stormwater discharges into the storm drains.
  - d) Protect drains inlets adjacent and downstream of the work zone from receiving sediments and pollutants.
  - e) Clean the work zone as needed, but at least once daily.
  - f) Install devices to hinder the transport of sediment off-site.
- Any surface improvements damaged, undermined, tunneled under, or removed by the contractor's operations shall be replaced unless otherwise specified by the plans or approved by the City Engineer.
- All concrete work shall be transit mixed and conforming to the Standard Specifications for Public Works Construction, Latest Edition, Section 201, and approved by the City Engineer or his duly authorized representative.
- Trenching for installations across any intersecting roadway open to traffic shall be progressive. Not more than half of the width of a traveled roadway shall be disturbed at one time and the remaining width shall be kept open to traffic by bridging or backfilling.
- Where street dimensions and State Health Services Department regulations allow, all pipes and conduits laid parallel to the roadway shall be placed at least five (5) feet from the edge of the pavement or graded traveled roadway, unless otherwise authorized in writing by the City Engineer. The shallowest portion of any pipeline or other facility shall be installed not less than thirty (30) inches below the roadway surface.
- Where street dimensions and State Health Services Department regulations allow, all pipes and conduits laid parallel to existing utilities shall maintain a minimum separation of three feet measured from the nearest edge of the facility. Any deviation from this requirement is not allowed unless approved by the City Engineer or his duly authorized representative.
- All excavated material shall be placed away from the improved portion of the roadway. After the work has been completed or work has terminated for the day, all excess material, including excess excavation, shall be removed from the right-of-way. The roadway shall be left in neat and orderly condition to the satisfaction of the City Inspector.
- All roadside drainage ditches shall be restored to true grades and the intake and outlet ends at all culverts shall be left free from all excess materials and debris.
- All approaches to private driveways and intersecting roads and streets shall be kept open to traffic at all times, unless otherwise approved by the City Engineer.
- Clay and earth which adhere to the paved surface of the roadway shall be removed by hand scraping and sweeping, or by any other method which will leave a clean non-skid surface without impairing, injuring or loosening the surface.
- PERMITTEE shall comply with any and all directives issued by the City Engineer or his duly authorized representative in order to prevent dust or other materials from becoming a nuisance or annoyance.
- Temporary patching of trench is required on lateral cuts in surfaced streets immediately after backfilling. After completion of the refilling and compacting of the backfill material in the excavation as specified and the removal of the obstruction, the PERMITTEE shall promptly replace with temporary or permanent patching material or repair any portion of the highway surface removed or damaged by the excavation, obstruction or construction operations to the satisfaction of the City Engineer, and as specified elsewhere herein, or the City Engineer may, at his option, elect to do the surfacing or repairing himself with the PERMITTEE bearing the cost of such work. Temporary patching material may be left in place for up to 30 days, but must be continually maintained.
- If, after the refilling of an excavation the PERMITTEE fails or refuses to resurface or repair that portion of the surface of the roadway damaged by him, or if the City Engineer has elected to do such resurfacing or repairing the City Engineer shall cause the repair to occur and the PERMITTEE shall be charged with the cost thereof computed by the City Engineer.
- When shoring is required, an engineered detail drawing will be required for approval by the City Engineer. All OSHA regulations shall be met.
- This permit may be immediately revoked for reasons in the best interest of the City for violation of permit conditions or for the creation of a nuisance upon notice given by the City Engineer or his authorized representative. In the event of such revocation, applicant shall immediately cease all operations and restore City right-of-way as directed by the City Engineer or his duly authorized representative. After notification, City may take full possession of the area. Applicant shall pay to

Permit # \_\_\_\_\_

Permit Expires on \_\_\_\_\_

the City any and all costs involved in the event restoration of City property or removals of any items installed by the applicant are necessary by the City.

- This permit may become void in the event the use permitted is not started within sixty (60) calendar days from the date of issuance or in the event the permitted use is abandoned for a period exceeding sixty (60) calendar days after construction has begun. In such event, it shall be necessary to obtain a new permit and pay additional fees. Upon commencement of work, all operations, including cleanup and restoration of City right-of-way, shall be completed within the time limit specified by the permit.
- The PERMITTEE guarantees all work constructed, installed, and effected under this permit for a period of one year from the date of final acceptance. Any repairs required during the guarantee period shall be made at the expense of the PERMITTEE. At the option of the City Engineer, repair work may be performed by either the PERMITTEE or the City.
- PERMITTEE agrees to indemnify and hold the City and City's elected and appointed officers, officials, employees and agents harmless from, and against any and all liabilities, claims, demands, causes of action, losses, damages and costs, including all costs of defense thereof, arising out of, or in any manner connected directly or indirectly with, any acts or omissions of PERMITTEE or PERMITTEE'S agents, employees, subcontractors, officials, officers or representatives in connection with this permit. Upon demand, PERMITTEE shall, at its own expense, defend City and City's elected and appointed officers, officials, employees and agents, from and against any and all such liabilities, claims, demands, causes of action, losses, damages and costs. The PERMITTEE shall reimburse the City for all costs, attorneys' fees, expenses and liabilities incurred with respect to any litigation in which the PERMITTEE is obligated to indemnify, defend and hold harmless the City pursuant to this permit. PERMITTEE'S obligation herein does not extend to liabilities, claims, demands, and causes of action, losses, damages or costs that arise out of the City's intentional wrongful acts, City's violations of law, or the City's sole active negligence. This section shall not be limited by any provision of insurance coverage the PERMITTEE may have in effect, or may be required to obtain and maintain, during the term of this permit. This section shall survive the expiration or termination of this permit.
- PERMITTEE shall obtain, and during the term of this permit shall maintain insurance compliant with the attached insurance requirements for contractors.
- PERMITTEE agrees that it shall be his responsibility to provide the contractor, subcontractor or any other agent responsible for construction of permitted works within the City right-of-way, with a copy of the permit including these standard conditions and a complete set of approved plans. The permit, plans and all other related and approved item necessary for safe and successful operations shall be available at the permit site whenever work is in progress.

Permit # \_\_\_\_\_

Permit Expires on \_\_\_\_\_

## Right-Of-Way Permit

APPLICATION TO PERFORM WORK WITHIN CITY RIGHT OF WAY

### Schedule of Fees

Name of Applicant:			Issuance Fee:	\$
Address:			Inspection Fee:	\$
Phone:			TOTAL	

Installation	Length	width	Description	Fee
Grading				
Residential Driveway				
Commercial Driveway				
Curb & Cutter				
Sidewalk				
Pavement				
Utility Installation				
Overhead Installation				
Construction Fence				
Monitoring Well Installation				
Retaining Walls				
SD Box				
Meter Pedestal				
Trench				
Tree Trimming				
Tree Removal or installation				
Insurance	Yes ( )	NO ( )		
Insurance on file	Yes ( )	NO ( )		

# Memorandum

To : OSCAR AGUILAR (MS 255)  
Project Engineer  
Design

Date: August 20, 2015

File: 11-SD-78  
PM 13.2/14.1  
EA 11-42160k  
EFIS 1115000142

From : DEPARTMENT OF TRANSPORTATION - DISTRICT 11  
ROADBED ENGINEERING SECTION

Subject: STRUCTURAL SECTION RECOMMENDATIONS (addendum)

In accordance with your request, structural sections for road widening and reconstruction are submitted for your review.

## Mainlines (Outside)

TI = 12.5 (20yr.)  
Rv = 40

### Alternative 1

0.20' RHMA-G  
0.45' HMA  
1.20' AB-Class II

### Alternative 2

0.65' HMA  
1.20' AB-Class II

## Shoulders (Outside)

TI = 8.0 (20yr.)  
Rv = 40

### Alternative 1

0.20' RHMA-G  
0.20' HMA  
0.70' AB-Class II

### Alternative 2

0.40' HMA  
0.70' AB-Class II

## Design Notes

1. According to the Highway Design Manual, Section 600, when shoulders are 5' or less in width, the structural section of the adjacent ramp traveled way will be extended to the outer edge of shoulder.
2. For HMA-A and RHMA-G lifts between 0.15 ft. and 0.20 ft., the recommended aggregate grading for HMA-A and RHMA-G is 1/2 in. maximum graduation.
3. For HMA-A and RHMA-G lifts greater than 0.20 ft., the recommended aggregate grading for HMA-A and RHMA-G is 3/4 in. maximum graduation.
4. PG 70-10 binder should be used in this climate region.

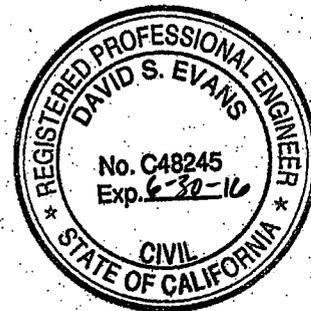
If you have questions with regards to this memorandum, contact J. Scandore at 858-467-4069 or D. Evans at 858-467-4056.



John Scandore  
M & R Eng. Assoc.  
Roadbed/Corrosion Section



David Evans  
Assoc. Trans. Engineer (Reg.)  
Pavement Section





# **GEOTECHNICAL DESIGN REPORT**

**STATE ROUTE 78 AUXILARY LANE**

**11-SD-78/PM R12.91/ R14.24**

**EA 11-421601  
PID 1115000142**

**June 10, 2016**

**Prepared By:**

**OFFICE OF GEOTECHNICAL DESIGN-SOUTH BRANCH B  
7177 OPPORTUNITY ROAD  
SAN DIEGO, CA 92111**



# Memorandum

*Serious drought.  
Help save water!*

**To:** Mr. Ed Hajj  
Design Manager  
District 11 Design

**Date:** June 10, 2016

**File:** 11-SD-78-(PM) R12.91-R 14.24  
PID 1115000142  
EA 11-421601

**From:** MIKE FORDHAM  
Transportation Engineer  
Office of Geotechnical Design – South, Branch B

**Subject:** Geotechnical Design Report for State Route 78 Auxiliary Lanes Project

The Office of Geotechnical Design-South (OGDS) has prepared this Geotechnical Design Report (GDR) for State Route 78 (SR78) Auxiliary Lanes Project. The project extends from Twin Oaks Valley Road to Woodland Parkway/Barham Drive in the City of San Marcos, in San Diego County, California. This GDR was prepared in accordance with the guidelines set forth in the *Caltrans: Guidelines for Preparing Geotechnical Design Report (GDR), Version 1.3, December 2006*. The GDR documents the prevailing site conditions and provides specific recommendations for the project features. The report defines the geotechnical conditions as evaluated from field investigations data and used in the geotechnical analyses and design. This report provides recommendations for project design and construction.

Please ensure that this GDR is included in the District Resident Engineer (RE) Pending File. OGDS staff will be available for further assistance. Should you have any questions or comments regarding this report, please contact Mike Fordham at (858) 467-3290 or Brian Hinman at (858) 467- 4051.



Mike Fordham P.E.  
Transportation Engineer (Civil)  
Office of Geotechnical Design - South



Brian Hinman P.E.  
Senior Transportation Engineer (Civil)  
Office of Geotechnical Design - South



June 10, 2016

Geotechnical Design Report  
State Route 78 Auxiliary Lanes  
EA 11-421601/PID 1115000142

**CC:**

Karen Jewel	District Project Manager
Dave Evans	District Materials Engineer
Tom Guerrini	Design Engineer
Geotechnical Archive	Geodog ( <a href="http://10.160.173.158/">http://10.160.173.158/</a> )

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Point Index Load/Discontinuity Spacing Index

## 1.0 INTRODUCTION

This Geotechnical Design Report (GDR) has been prepared by the Office of Geotechnical Design-South (OGDS) Branch B to address the geotechnical design considerations for State Route 78 (SR-78) Auxiliary Lanes Project, from Twin Oaks Valley Drive to Woodland Parkway/Barham Drive in the City of San Marcos, in San Diego County, California hereafter referred to as the project. Figure 1 depicts the project location and aerial photograph of the project site.

The project includes the construction of two auxiliary lanes, one eastbound and one westbound. The project features and locations are depicted in Figure 2A through Figure 2D.

The project is encompassed by the much larger SR-78 Widening and High Occupancy Vehicle (HOV) Lane Project, (EA 11-2T2411/EFIS 1112000152), between PM 0.6 and 13.2 therefore, this GDR is applicable to the segment of the SR-78 Widening and High Occupancy Vehicle Lane Project that coincides with the project limits.

The purpose of this GDR is to document subsurface geotechnical conditions, provide engineering evaluation of site conditions, and provide recommendations relevant to the design and construction of the project features. This report establishes a geotechnical baseline to be used in assessing the existence and scope of changed site conditions. The geotechnical information, evaluation, recommendations, and advisories contained in this GDR supersede any information that may have been previously conveyed through correspondences or documents concerning the project features addressed herein.

This GDR is based on site reconnaissance, research of archived resources, subsurface exploration, and engineering analyses. This GDR was prepared in accordance with the guidelines set forth in the *Caltrans: Guidelines for Preparing Geotechnical Design Report (GDR), Version 1.3, December 2006*.

A District Preliminary Geotechnical Report (DPGR) was not prepared for this project, because of the aggressive project schedule.

## 2.0 EXISTING FACILITIES AND PROPOSED IMPROVEMENT

State Route 78 is located in Northern San Diego County and is a major east-west connector between Interstate-5 (I-5) and Interstate-15 (I-15). SR-78 connects coastal north county cities to inland north county cities.

Traffic weaving improvements are needed to alleviate current and projected traffic conflicts. This project is anticipated to reduce conflicts between merging and diverging traffic.

Project layout plans, profile plans, and cross sections were provided by Caltrans District 11 Design. All units referenced in this document are United States (U.S) Customary units, unless otherwise noted. All elevations referenced in this report are in feet and referenced to the NAVD88 vertical datum. Unless otherwise noted, all Stations are referenced to the "SD-78" Line.

### 2.1 Existing Facilities

The existing facilities encompassed by the proposed project include two overcrossings (OC), graded slopes, underground utilities, highway drainage units, and six (6) portland cement concrete all-purpose lanes. Eastbound and westbound lanes are separated by a concrete median barrier.

Cut slopes along the project alignment have a typical slope inclination of two horizontal to one vertical (2H: 1V). Cut slopes within the project limits expose moderately strong Granitic formation.

Existing fill slopes have a typical inclination of two horizontal to one vertical (2H: 1V) with a maximum height of approximately ten-feet (10ft). Fill slopes appear to be composed of material derived from nearby alluvium deposits.

Natural slopes do not exist within the project alignment.

The land use adjacent to the project is moderately to densely developed residential, light commercial and industrial facilities.

Utilities present within the limits of the project include underground sewer, gas, and electrical.

## **2.2 Proposed Improvements**

Proposed improvements include the addition of two auxiliary lanes, cut slopes and overhead signs. To minimize right of way impacts the construction of one cast-in-place (CIP) retaining walls is necessary to accommodate a portion of one of the proposed auxiliary lanes. The project layout plans and the proposed improvements are depicted on Figure 2A through Figure 2D. Further details and discussion of the CIP retaining wall is presented in Section 8.4.

## **3.0 PERTINENT REPORTS AND INVESTIGATIONS**

Pertinent reports and investigations utilized in the preparation of this GDR include:

- Caltrans, (September 1991), *Memorandum Cut Slope Investigation*, 11-SD-78, PM 12.9, 11-14702K.
- Caltrans, (February 1999), *Memorandum Foundation Recommendations For Retaining Walls At SR78/Twin Oaks Valley Road*, 11-SD-78, PM 12.9/13.9, 11-147021.
- Caltrans, (September 2013), *Structure Preliminary Geotechnical Report for Retaining Wall at Twin Oaks Valley Road OC*, 11-SD-78, PM 12.91, 11-2T241K.
- Caltrans, (September 2013), *Structure Preliminary Geotechnical Report for Woodland Parkway UC (Replace)*, 11-SD-78, PM 14.24, 11-2T241K.

Additional references and memorandum utilized in the preparation of this report are described in Section 15.0.

## **4.0 PHYSICAL SETTING**

The following section describes the physical setting of the project including: the climate; topography and drainage; man-made and natural features of engineering and construction significance; regional geology and seismicity; and soil survey mapping.

### **4.1 Climate**

San Diego has a Mediterranean to semi-arid climate that is characterized by warm, dry summers and mild winters with some rain. San Diego has mild, mostly dry weather with approximately two hundred (200) days above seventy degrees Fahrenheit (70°F). The extended summer and dry period lasts from May to October. Temperatures are mild to warm in the summer. High temperatures during the summer range between seventy and seventy-eight degrees Fahrenheit (70-78°F). Low temperatures during summer range between fifty-five and sixty-six degrees Fahrenheit (55–66°F). Temperatures exceed ninety degrees Fahrenheit (90°F) approximately four days a year. Temperatures are mild with periods of moderate to heavy precipitation. High temperatures during the winter range between sixty-six and seventy degrees Fahrenheit (66–70°F). Low temperatures during winter range between fifty and fifty-six degrees Fahrenheit (50–56°F). Winter is the rainy period and lasts from November to April. On average there are approximately ten-inches (10in) of rainfall in San Diego annually. However precipitation may range from three-inches (3.0in) to thirty-inches (30.0in) during any given year.

### **4.2 Topography & Drainage**

Rolling hills and broad valleys characterizes the project site topography. SR-78 is constructed on an east/west trending through cut of low granitic hills and on embankment fill placed over lowlands. The elevation of SR-78 at the project site ranges from approximately five hundred seventy–feet (570ft) to six hundred forty-feet (640ft) above Mean Sea Level (MSL). The freeway gradient is flat to moderate.

Within the project limits highway drainage is managed through the use of overside drains, curb and gutter, and earthen lined channels.

### **4.3 Man-made and Natural Features of Engineering and Construction Significance**

Ancient landslides, deep compressible soils, waterways, and massive adjoining structures are examples of natural and man-made features that often present unusual engineering and construction challenges for freeway projects. No man-made or natural features that would present an unusual engineering or construction challenge were found to exist within the project limits.

### **4.4 Regional Geology and Seismicity**

The project site lies within the coastal plain of the Peninsular Range Geomorphic Province of California. The Peninsular Ranges are a group of mountain ranges that extend nine hundred-miles (900mi) from the Transverse Ranges and the Los Angeles Basin in Southern California to the southern tip of Mexico's Baja California. The Peninsular Range is dominated by Mesozoic granitic rock (Wikipedia 1).

The closest regional active fault to the project site is the Elsinore Fault (Julian Section). The Elsinore Fault (Julian Section) is located approximately sixteen-miles (16mi) to the east and running on a north-northwest trend to the project site. Data pertaining to the regional active faults are included in Table 1.

### **4.5 Soil Survey Mapping**

The Soil Survey of San Diego Area, California prepared by U.S. Department of Agriculture, Soil Conservation Service and Forest Service (Web Soil Survey) indicates that the project alignment is underlain by three soil units. The most predominant soil units within the project limits are: Placentia sandy loam, 2 to 9percent slopes (PeC) and Vista coarse sandy loam, 9 to 15 percent slopes (VsD). The results of the Web Soil Survey are presented in the Appendix.

## **5.0 EXPLORATION**

A surface investigation was conducted to help characterize the site conditions present within the project alignment such as the quality of artificial fills, rippability of formational rock, and other conditions that could impact the design or construction of the proposed project features.

### **5.1 Drilling and Sampling**

Drilling was not conducted specifically for this project. Archival borings for the Twin Oaks Valley Road and Woodland Parkway bridges combine with the exposed geology within the cut slopes provided sufficient subsurface data. The as built LOTB are presented in the appendix.

### **5.2 Geologic Mapping**

The project site geologic overview map is presented in Figure 3A – Figure 3E. The geologic map is a portion of the *California Department of Conservation Division of Mines and Geology, Geologic Maps of Oceanside 30'x60' Quadrangle, Tan and Kennedy, 2005, Digital Preparation by Kelley, Bouard, Alvarez, and Watson*. The map depicts an overview of the geologic formations present at the project site and surrounding area.

### **5.3 Geophysical Studies**

A seismic refraction survey was conducted by the Office of Geotechnical Design South to characterize the existing formational rock and its rippability characteristics. The results of the survey are presented in the appendix.

### **5.4 Instrumentation**

No instrumentation was utilized for the preparation of this GDR.

## 5.5 Exploration Notes

No potentially hazardous waste was identified during this study.

## 6.0 GEOTECHNICAL TESTING

The sections below describe the in-situ and laboratory testing program performed for the proposed project.

### 6.1 In Situ Testing

A seismic refraction survey was conducted to determine the soundness and excavation properties of the in-situ rock present within the project limits.

### 6.2 Laboratory Testing

No laboratory testing was conducted.

## 7.0 GEOTECHNICAL CONDITIONS

The following section describes geotechnical conditions that will affect the project.

### 7.1 Site Geology

The project site is comprised of granitic rock bounded to the east and west by Alluvium/colluvium deposits. Engineered fill was utilized to construct the approach and departure fills for the Twin Oaks Valley Road and Woodland Parkway interchanges. A geologic overview map is presented in Figure 3A – Figure 3E.

#### 7.1.1 Lithology

The geologic units at the project site may generally be described as follows:

- *Artificial Fill (Q<sub>afe</sub>, Q<sub>afn</sub>):* Fill soils derived from local materials. These soils have been placed as either engineered or non-engineered fills and may contain abundant boulder sized rock.
- *Alluvium (Q<sub>al</sub>, Q<sub>al<sub>w</sub></sub>):* Alluvium comprised of very loose to medium dense silt, sand, and gravel with localized deposits of sandy clay and clayey sand.

The majority of the Alluvium located along the proposed project alignment is located within the Twin Oaks Valley Road Interchange. A small finger of alluvium underlies the ramps at Woodland Parkway. The alluvial deposits within the project limits range in thickness from ten-feet (10ft) to twenty five-feet (25ft).

- *Colluvium (Q<sub>c</sub>):* Colluvium is comprised of clayey, silty, sandy, gravelly slope wash derived from highly weathered granitics. The colluvium may contain localized accumulations of boulder sized material in a soil matrix. These soils may be weakly to moderately cemented.
- *Regolith (Q<sub>r</sub>):* Regolith is a mantle of mixed soil and weathered rock that covers coherent bedrock. In the project location regolith occurs as a reddish, orangish, yellowish gray, and/or gray deposit overlying granitic bedrock. It is comprised of loose to moderately coherent clays, sands, gravels, and boulders. The regolith transitions gradationally into granitic bedrock.
- *Granitic Rock of the Southern California Batholith (K<sub>g</sub>, K<sub>i</sub>, K<sub>t</sub>, K<sub>cc</sub>):* The Cretaceous aged granitic rock occurs extensively throughout the region and comprises the regional bedrock. These rocks vary from decomposed to fresh, from very soft to extremely strong, and from slightly fractured to very intensely fracture. Locally the rock exhibits foliation and a gneissic texture. Some of the area mapped as rock along the existing cut appears to be disturbed by antecedent construction activities. This disturbed rock is comprised of very angular cobbles and boulders in a soil matrix and contains large open voids which occur in the space between nested cobbles and boulders.

### 7.1.2 Structure

The geologic structure of the site is consistent with that of the regional geologic structure. The alluvium is comprised of moderately flat lying floodplain deposits. The granitic rock displays fractures, joints, and weathered horizons. A minimum of four joint sets are visible within the limited areas of exposed rock along the existing cut slopes within the project limits. The four joint sets trends are as follows:

- F1:  $35^\circ \leq \text{Dip} \leq 79^\circ$  @  $002^\circ$  to  $350^\circ$
- F2:  $36^\circ \leq \text{Dip} \leq 81^\circ$  @  $290^\circ$  to  $310^\circ$
- F3:  $60^\circ \leq \text{Dip} \leq 70^\circ$  @  $055^\circ$  to  $075^\circ$
- F4:  $35^\circ \leq \text{Dip} \leq 78^\circ$  @  $170^\circ$  to  $185^\circ$

A summary of the discontinuities is presented in the appendix.

The discontinuities are planar to planar stepped, rough to very smooth joint surfaces. The discontinuity spacing varies by location and depth (one-inch up to ten-feet), as does joint aperture (tight to wide), and joint fillings (clean to thickly-filled).

No faults have been mapped within or crossing the project alignment.

### 7.1.3 Natural Slope Stability

The freeway traverses through a moderately well-developed area. Natural or unaltered slopes do not exist within Caltrans right-of-way, near the project area. Natural slopes with regional proximity to the project alignment demonstrate an overall slope inclination of approximately one horizontal to one vertical (1H:1V) with slopes as steep as one horizontal to four vertical (1H:4V).

During the project field review and literature review no landslides were identified within the project limits.

## 7.2 Subsurface Conditions

The following sections describe the relevant geotechnical conditions that impact project design and excavations.

### 7.2.1 Soil and Rock

The project is founded on engineered embankment and granitic rock. The embankment is generally thin and was derived from nearby cuts in decomposed granitic rock, alluvium, and colluvium. Small, hard granitic boulders were observed within the subgrade soils.

Alluvium present within the project foot print consists of very loose to dense silty sand interbedded with very loose to dense well to poorly graded sand. Localized lenses of lean clays, silts, and gravel are present with the alluvium. Based on the as-build LOTB the alluvium is approximately twenty-feet (20-ft) thick.

Granitic rock underlays the entire project site. The rock is covered by variable thickness alluvium and engineered fill throughout much of the project site, though the rock is exposed at the ground surface within existing cut slopes. Granitic rock within twenty five-feet (25ft) of the ground surface varies from locally decomposed to locally hard. Beyond twenty five-feet (25ft) below ground surface the granitic rock becomes less weathered ultimately transitioning to moderately hard.

Shallow excavations developed to facilitate the refraction seismic survey revealed very angular nested cobbles and boulders in a soil matrix with small open voids. The area in which the excavations were developed is mapped as granitic rock. It is assumed that this is most likely the resulted from blasting operations when the existing cut was excavated. Aerial photos from 1963 show the presence of erosion gullies or fractures in the existing south facing cut slope. Additional information regarding the nature of the features seen in the 1963 aerial photos could not be found and no records of adverse slope conditions

were located in any of available archival data. The slope within the area of the gullies or fractures shows no outward signs of instability.

Granitic rock encountered during construction will exhibit a Geologic Strength Index (GSI, after Geomechanics 2007) of Very Poor to Fair, Very Blocky to Blocky Rock ( $27 < \text{GSI} < 36$ ) and a Rock Mass Rating (RMR, Bieniawski, 1989) of Very Poor to Good Rock ( $17 < \text{RMR} < 65$ ). Based on the results of the GSI and RMR the estimated strength parameters of the granitic rock mass range from  $1000 \text{ psf} < \text{cohesion}(c) < 6900$  and  $31^\circ < \phi < 60^\circ$ .

The pertinent geologic units and the geotechnical strength parameters used in the evaluations are presented in Table 2.

### **7.2.2 Groundwater**

Five (5) as-built LOTB for the Twin Oaks Valley Road OC indicated the presence of groundwater. The occurrences of groundwater are presented in the Table 3. The as-built LOTB are presented in the appendix.

No seeps of spring were identified within the existing cut slopes.

### **7.3 Surface Water**

San Marcos Creek is located along the east side of Twin Oaks Valley Road north of SR-78. San Marcos Creek flows south towards SR-78, crossing under SR-78 approximately one half-mile (0.5mi) west of the Twin Oaks Valley Road OC. San Marcos Creek lies just outside the proposed project limits.

#### **7.3.1 Scour**

The proposed Cast-In-Place retaining wall is not located within a stream course. A scour evaluation for the project is not applicable.

#### **7.3.2 Erosion**

The cut slopes with inclinations of two horizontal to one vertical (2H: 1V) or flatter within the project area are composed of granitic rock covered by a thin veneer of silty sand. These slopes show no erosion and are often well vegetated. Embankment fills within the project limits are inclined at two horizontal to one vertical (2H: 1V) and display no signs of erosion.

### **7.4 Site Seismicity**

The project is located in proximity to the Elsinore Fault (Julian Section) trending in a north-northwesterly direction and laying roughly sixteen-miles (16.0mi) east of the project site. Numerous other fault zones including the Rose Canyon Fault Zone lie to the west. Ground motion caused by nearby and distant seismic events should be anticipated during the life of the facilities.

## **8.0 GEOTECHNICAL ANALYSIS AND DESIGN**

The following section describes the geotechnical analyses, parameters, and design criteria that should be utilized by project designers in the continued developed of the project.

### **8.1 Dynamic Analysis**

This section describes the seismic parameters selected and dynamic analysis developed for the project.

The Elsinore Fault displaces Holocene sediments and is therefore considered active by current standards of practice. The Caltrans Acceleration Response Spectra (ARS) Online Tool Version 2.3.06 (Caltrans ARS Online Tool) was used to determine pertinent seismic data. The Caltrans ARS Online Tool is a web based tool that calculates both deterministic and probabilistic ARS for any location in California based on the criteria set forth in the *Caltrans, Seismic Design Criteria (SDC) Version 1.7, April 2013, Appendix B*.

According to the *SDC Version 1.7, April 2013 Appendix B, Figure B.12 Soil Profile Types*, Soil Profile Type B has shear wave velocities ( $v_{s30}$ ) of greater than twenty five hundred-feet per second and less than five thousand-feet per second ( $2500\text{fps} < v_{s30} < 5000\text{fps}$ ). Soil Profile Type D has SPT values greater than/or equal to fifteen and less than fifty ( $15 \leq N < 50$ ).

The Twin Oaks Valley Road OC archive borings had SPT results that ranged from as low as five (5) to greater than fifty ( $>50$ ). Based on the SPT results and as defined in Appendix B of the SDC, the engineered fill and alluvium have a Soil Profile Type D and the igneous rock formation has a Soil Profile Type B.

The latitude and longitude input into the Caltrans ARS Online Tool were latitude 33.139483, longitude --117.151294. The Shear wave velocity used in the Caltrans ARS online tool was seven hundred sixty-meters per second (760m/s), which corresponds to a Soil Profile Type B. The closest regional active fault as indicated by the Caltrans ARS Online Tool is the Elsinore Fault (Julian Section). Data pertaining to the regional active faults are provided in Table 1.

Based on results produced by the Caltrans ARS Online Tool for the closest regional active fault, the anticipated Peak Ground Acceleration (PGA) for the project site is sixteen one hundredths-gravity (0.16g). The PGA corresponds to the Spectral Acceleration at a period of zero-seconds (0sec). The attenuation period for the fault is estimated to be five-seconds (5sec) with a probability of exceedence of five-percent (5%) in fifty years (50yrs) or a reoccurrence interval of nine hundred and seventy five-years (975yrs). The results produced by the Caltrans ARS Online Tool are presented in Appendix.

The review of the seismic data provided an effective seismic horizontal coefficient,  $K_h$ , for use in pseudo-static (seismic) slope stability analyses. The  $K_h$  used is defined by the Caltrans Guidelines for Foundation Investigation and Reports (Version 1.2) as one third (1/3) the PGA of the project site. Therefore the horizontal acceleration used for the pseudo-static evaluation of the proposed project features is five one hundredths-gravity (0.05g).

## **8.2 Liquefaction Analysis**

Liquefaction involves the sudden loss of shear strength of a saturated, cohesionless soil subjected to cyclic loading produced by an earthquake. The cyclic loading and loss of shear strength cause the soil to temporarily exhibit the strength characteristic of a fluid mass. Typically, liquefaction occurs in areas where groundwater is less than fifty-feet (50ft) from the surface and where the soils are predominantly comprised of poorly consolidated poorly graded fine sands, silty sands, and non plastic silts.

The project resides atop igneous rock and alluvium. The alluvium within the footprint of Twin Oaks Valley Road OC is susceptible to liquefaction. The alluvium consists primarily of fine grained soils with shallow groundwater.

Project features constructed atop alluvium may experience lateral spreading and seismically induced settlement. However, the project included no features that require the mitigation of liquefaction potential.

## **8.3 Cuts and Excavations**

Existing and proposed slopes were described in Section 2.0. This section presents the analyses used to determine the stability, rippability, and grading factors of materials in proposed cuts or excavations.

### **8.3.1 Stability**

Permanent cut slopes of one and one-half horizontal to one vertical (1.5H:1V) have been proposed for this project. A kinematic analysis was performed to evaluate the proposed rock cut slopes for block, wedge, and toppling failures. This analysis determined that the proposed rock cut slopes are mechanically stable and meet Caltrans stability requirements for block, wedge, and toppling failures. A limited equilibrium analysis was performed (Hoek and Bray, 1977) to determine the stability of the proposed rock cut slopes

against circular failure. The analysis determined that the proposed one and one-half horizontal to one vertical (1.5H:1V) rock cut slopes meet Caltrans stability requirements.

### **8.3.2 Rippability**

Rock quality and hardness of surface outcrops in conjunction with p-wave velocities developed from the seismic refraction survey found the in-situ cut material within the project to be rippable by heavy grading equipment. Rock cuts will entail difficult ripping and may require fragmentation to facilitate grading. Intact rock and boulders will be encountered and will require fragmentation utilizing a hydraulic hammer or other fragmentation methods. Trenching for drainage or foundation elements will encounter intact boulders that will require additional excavation effort. Tables presented in the appendix present a correlation between excavation effort and soil lithology.

### **8.3.3 Grading Factors**

Earthwork factors relate the in place volume of material to be excavated to the in place volume of material after placement as fill. The factors are defined as in place volume of compacted fill divided by in place volume of material to be excavated.

$$G_f = V_{\text{fill}}/V_{\text{exc}}$$

Based on data obtained from the seismic refraction survey the grading factor for granitic rock ranges from 1.1 to 1.4. A chart correlating grading factor to seismic velocity (p-wave velocity) is provided in the appendix.

### **8.4 Embankments**

Minimal embankment fill may be placed atop existing fill slopes at some locations. Observations of the performance of existing embankments and the computer program GSTABL7 with STEDWIN v.2 were used to evaluate the stability of existing and possible proposed freeway embankments.

Fill slopes inclined two horizontal to one vertical (2H: 1V) or flatter were found to satisfy Caltrans stability criteria.

### **8.5 Earth Retaining Systems**

One retaining structure has been proposed for this project. The retaining structure is proposed to be a Caltrans Standard Plan Type 1A cast-in-place retaining wall. The wall will be an extension of an existing Type 1A retaining wall which exists along eastbound SR-78. The wall is proposed from Station 740+40.00 to Station 742+84.89 and will be two hundred forty five-feet (245ft) in length with a maximum design height of ten-feet (10ft). The spread footing data table is presented in Table 4.

### **8.6 Culvert Foundations**

No culverts of geotechnical significance (diameter greater than three-feet) are proposed for this project.

### **8.7 Soundwall Foundations**

No soundwalls are proposed for this project.

### **8.8 Overhead Sign Foundations**

Four (4) overhead signs are proposed for this project. All four (4) overhead signs are proposed to be single post configurations. Descriptions of the overhead sign types, locations, and subsurface data are provided in Table 5. The locations of the overhead signs are presented in Figure 2A through 2D. The design of appropriate spread footing and Cast-In-Drilled-Hole pile foundations for each sign may be found in the Standard Plans.

It is not anticipated that groundwater will be encountered during excavation for the overhead sign foundations.

## 9.0 MATERIAL SOURCES

No off site material source has been identified for this project. Material generated from on site excavations will consist primarily of fractured igneous rock. The material generated on site is not anticipated to be suitable for use as roadway embankment.

## 10.0 MATERIAL DISPOSAL

Examples of material unsuitable for embankment subgrade or fill include organic mud, highly expansive clay, stockpiled trash, and debris.

Material generated during construction that is found to be unsuitable for use as roadway subgrade, embankment fill, or topsoil should be placed in a suitable location within the projects limits or properly disposed.

## 11.0 RECOMMENDATIONS

1. Permanent cut slopes should be inclined no steeper than one and one-half horizontal to one vertical (1.5H:1V).
2. Temporary cut slopes in artificial fill may be inclined one and one-half horizontal to one vertical (1.5H:1V). Temporary cut slopes in rock may be inclined one and four tenths horizontal to one vertical (1.4H: 1V).
3. Highway fill slopes should be inclined two horizontal to one vertical (2H:1V) or flatter.
4. The engineered fill found within the project limits will provide suitable subgrade for embankments, roadways, and retaining structures.
5. Material generated from the excavation of existing cut slopes will consisted of granitic rock and may require fragmentation to excavate. The Standard Special Provision (SSP) Section 19-4 "Rock Excavation" and "Rock Excavation (Controlled Blasting)" should be included in the project documents. SSP 19-4\_X1 and 19.4\_X2 are presented in the appendix.
6. RW-740 may be designed and constructed as a Caltrans Standard Type 1A retaining wall. The spread footing data table is presented in Table 4
7. Caltrans Standard Single Post overhead sign foundation recommendations are presented in Table 5.

## 12.0 DESIGN ADVISORIES

1. The material derived from excavations in the granitic rock within the project will be suitable for use as rock fill, but not suitable as embankment fill. The alluvium/colluvium excavated from within the project limits is suitable as embankment fill.
2. Clays within the alluvium should be mixed with sandy soils if utilized as embankment fill.
3. A Type 60G concrete barrier is to be located along the north side of SR-78 from Station 766+00.00 to Station 772+40.00. The barrier transitions between cut and fill along its alignment. The bearing capacity of an embankment fill constructed to Caltrans standards will possess the necessary bearing capacity needed for the use of a Type 60G concrete barrier. The concrete barrier design should follow the minimum offset distance required between the hinge point of the embankment fill and the back of barrier.

### **13.0 CONSTRUCTION CONSIDERATIONS**

1. The on-site engineered fill and alluvium soils may generally be excavated with conventional heavy grading equipment. Much of the on-site granitic rock can be excavated with heavy grading equipment, some of the granitic rock will require additional effort, such as a hydraulic ram, chemical or mechanical splitting, or controlled blasting.
2. Minor caving may occur within shafts drilled in fill. Caving conditions are not anticipated to be widespread. Drilled shafts that tend to cave may be cased or the placed volume of concrete may be increased.
3. The presence of hard rock boulders should be anticipated in drilled shaft. Drilling equipment capable of coring hard rock will be necessary.
4. The presence of hard rock boulders should be anticipated in trenches. Hydraulic rams or other rock fracturing methods will be necessary to excavate trenches.
5. Temporary cut slopes proposed by the Contractor should follow the guidelines set forth in the Caltrans Trenching and Shoring Manual.
6. The location of groundwater is presented in Table 3.
7. A Geotechnical professional should be present during development of rock cut slopes to verify design assumptions.

### **14.0 ACTUAL VS. REPORTED SITE CONDITIONS**

The characterizations of geotechnical conditions along the project alignment and presented in this report are based on the review of the design information provided, proposed project features, as-built plans, geologic maps, geologic literature, archival reports, exploration by OGDS, and laboratory testing. The evaluations and recommendations contained in this report are based on the information discovered and data gathered. If conditions are encountered during the project that appear to differ from the conditions conveyed in this report, or if construction difficulties related to soil conditions are encountered, a representative of OGDS Branch B should be consulted to assist with the assessment of the prevailing geotechnical conditions and to assist in formulating appropriate strategies to facilitate project completion.

Should project design features vary significantly from those described in this report an updated GDR should be prepared by OGDS Branch B to address the geotechnical considerations related to those features.

## REFERENCES

USDA, Natural Resource Conservation Service, (2013), *web soil survey*. [ONLINE] Available at:  
<http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>.

GSTABLE7 with STEDwin v.2.

Caltrans, Division of Engineering Services, Geotechnical Services, (2009), *Geotechnical Services Design Manual v.1.0, Appendix B*.

Caltrans, *Corrosion Guidelines*, Version 1.0, September 2003

Caltrans, *Geotechnical Manual*, Version 1.0, 2014

Caltrans, *Seismic Design Criteria, Appendix B*, August 2009

Caltrans, *Soil and Rock Logging, Classification and Presentation Manual*, 2010

Wikipedia 1: [http://en.wikipedia.org/wiki/Peninsular\\_Ranges](http://en.wikipedia.org/wiki/Peninsular_Ranges)

Wikipedia 2: <http://en.wikipedia.org/wiki/Eocene>

June 10, 2016

Geotechnical Design Report  
State Route 78 Auxiliary Lanes  
EA 11-421601/PID 1115000142

## **FIGURES**

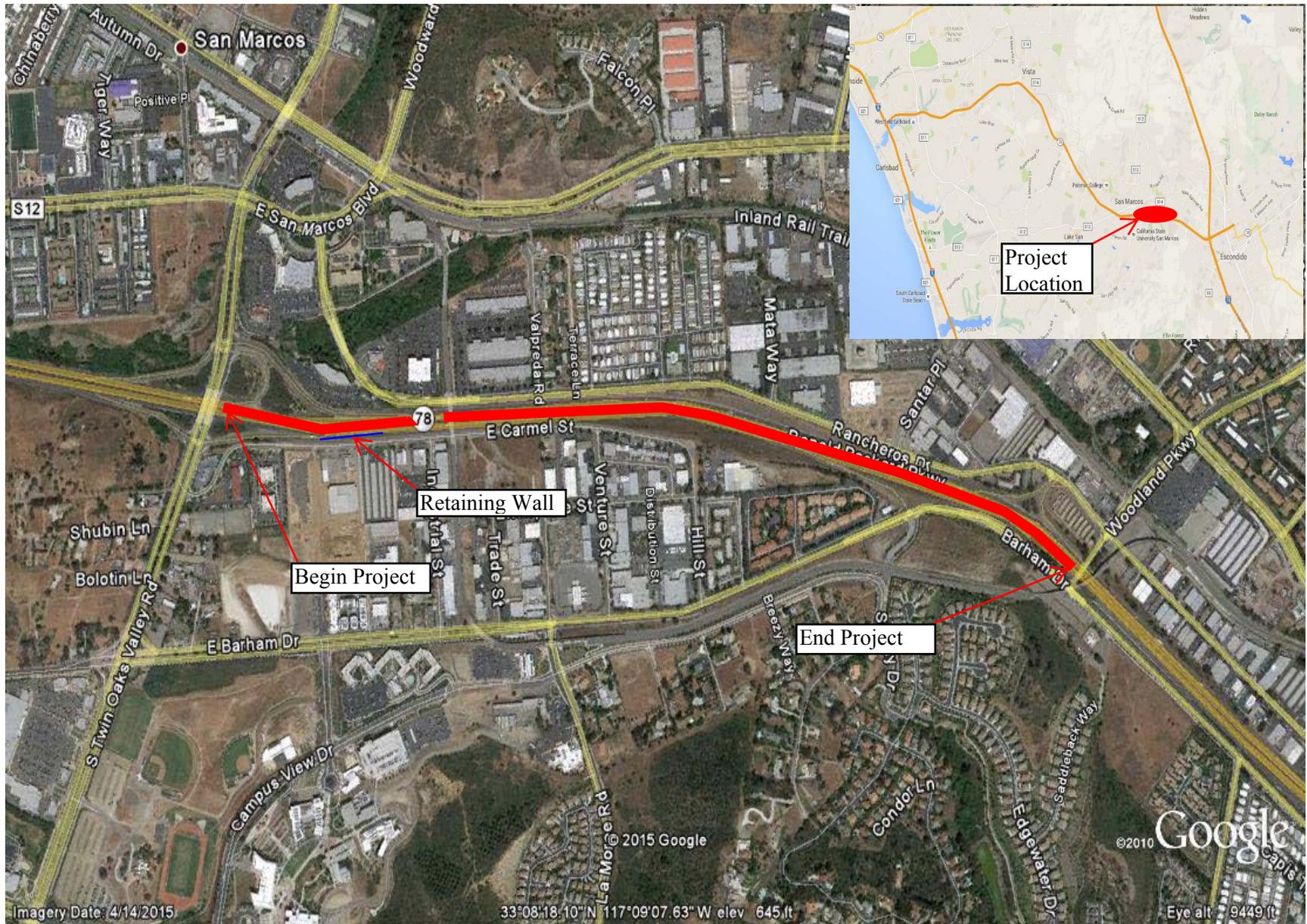


FIGURE 1: PROJECT LOCATION MAP AND  
 AERIAL PHOTOGRAPH



STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
**Stantec**  
 FUNCTIONAL SUPERVISOR: ED HAJJ  
 CALCULATED/DESIGNED BY: [ ]  
 CHECKED BY: [ ]  
 REVISED BY: [ ]  
 DATE REVISED: [ ]

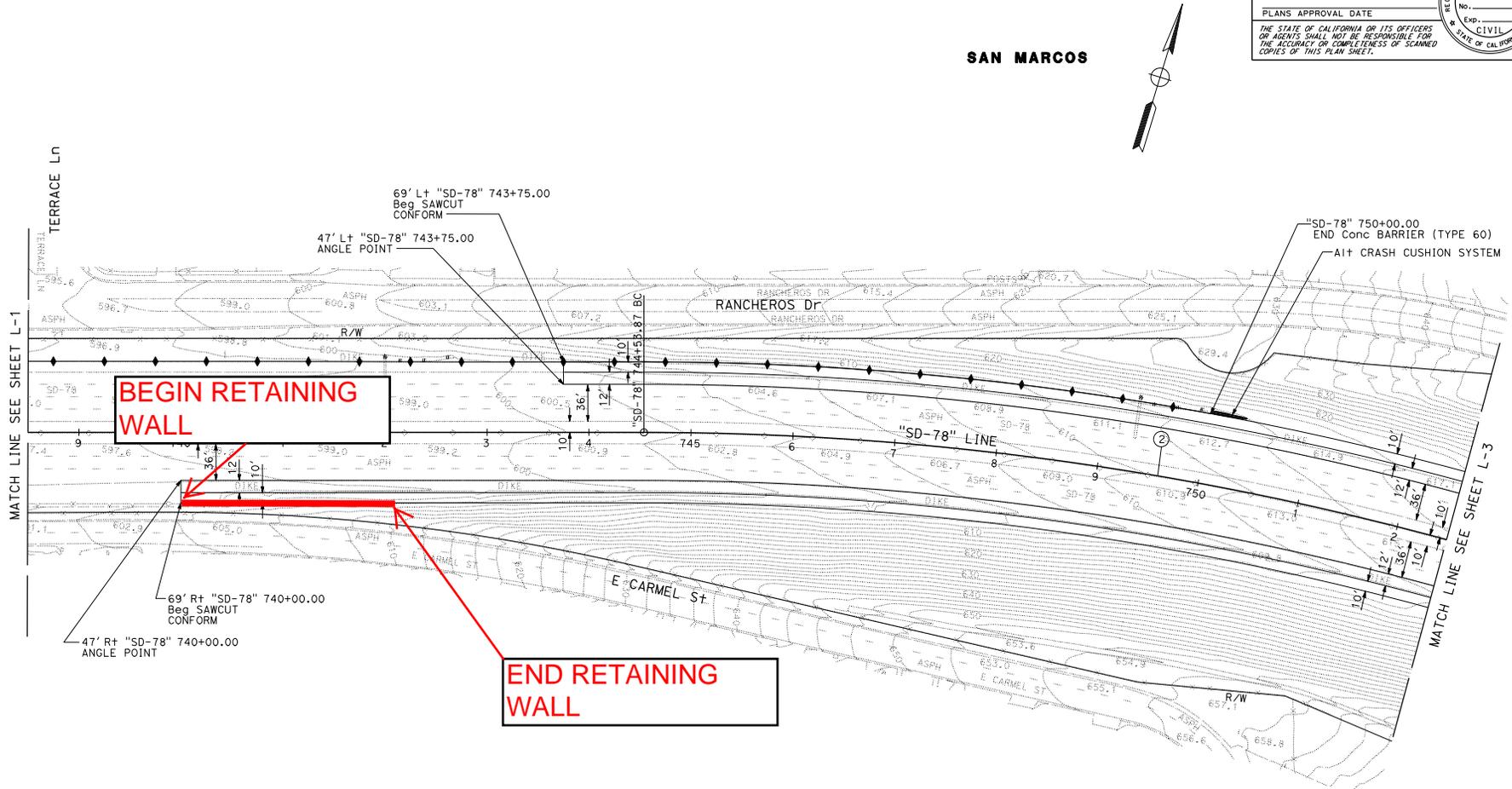
**NOTE:**  
 FOR ACCURATE RIGHT OF WAY DATA, CONTACT  
 RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

CURVE DATA				
No. @	R	$\Delta$	T	L
2	3000'	19°19'41"	510.86'	1012.01'

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER DATE \_\_\_\_\_  
 PLANS APPROVAL DATE \_\_\_\_\_

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**LAYOUT L-2**

SCALE: 1" = 50'

FIGURE 2B: PROJECT LAYOUT

LAST REVISION DATE PLOTTED => 16-SEP-2015  
 08-17-15 TIME PLOTTED => 14:51





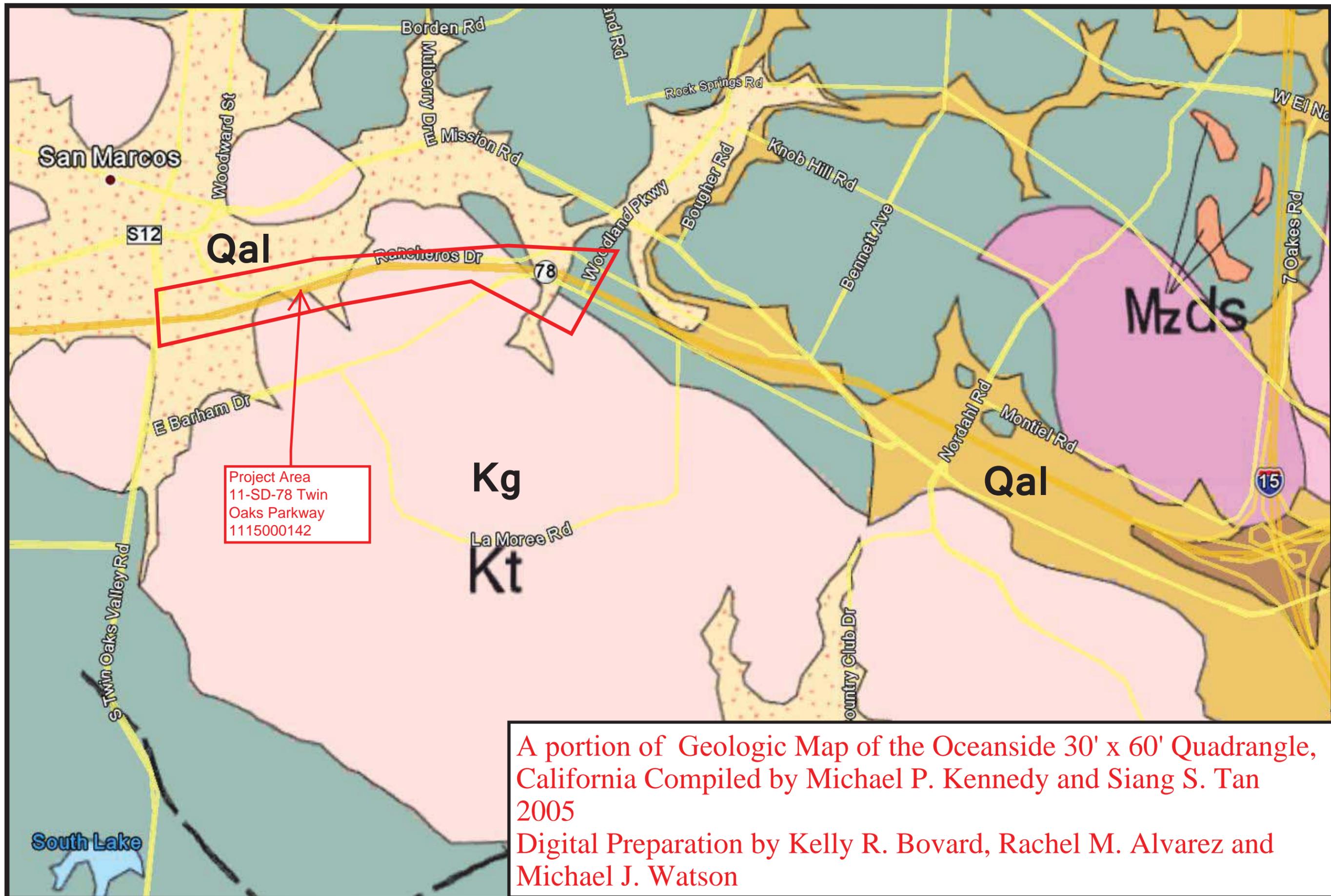


FIGURE 3A: GEOLOGY OVERVIEW MAP

# Project Geologic Map

## 11-SD-78

## 11-421600

## 1115000142

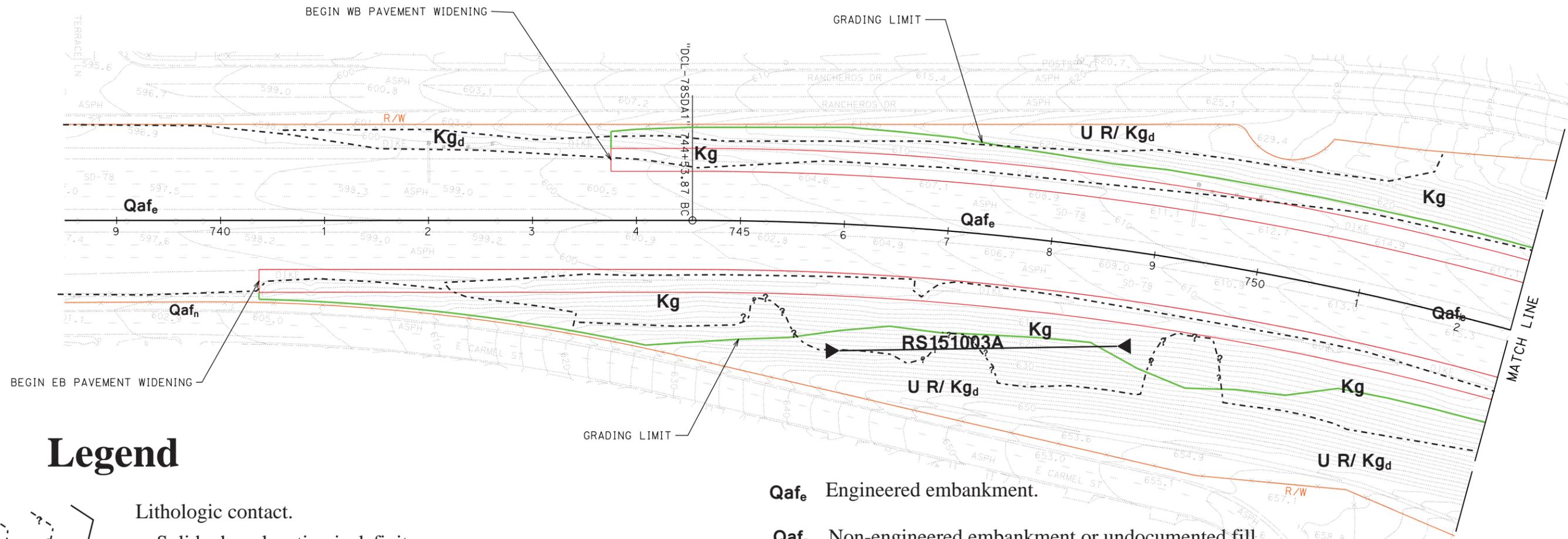
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

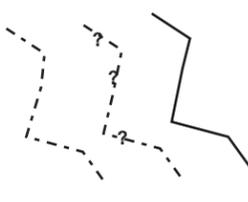
REGISTERED CIVIL ENGINEER	DATE
PLANS APPROVAL DATE	

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### Legend



**Lithologic contact.**  
 Solid where location is definite;  
 dashed where location is approximate;  
 queried where location is uncertain or implied.

**Seismic refraction layout line.** Line designation: RS yymmddA:  
 where yy= year; mm= month; dd= day, A= unique letter designation for each line per day.

**U** Undifferentiated. Where two lithologic units are depicted separated by a slash, / ,the lithologic unit may be one or the other unit or a mixture of both.

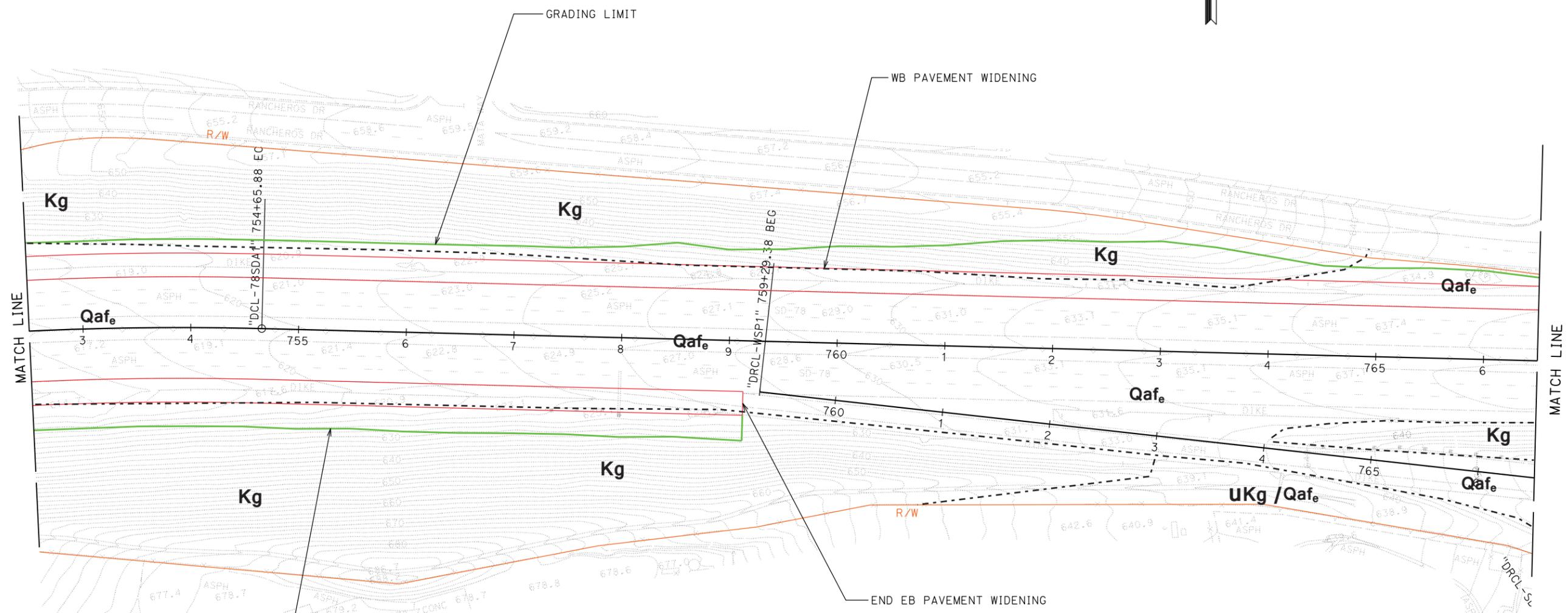
- Qaf<sub>e</sub>** Engineered embankment.
- Qaf<sub>n</sub>** Non-engineered embankment or undocumented fill..
- Qal<sub>u</sub>** Alluvium, undifferentiated.
- Qc** Colluvium. Slope wash.
- R** Regolith: A combination of colluvial and/or decomposed rock.
- Kg<sub>d</sub>** Decomposed granitics.
- Kg** Granitic rock, undefined chemistry ranging from granite, tonalite, granodiorite, to gabbro.

**FIGURE 3B: PROJECT GEOLOGIC MAP**

SCALE: 1" = 50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
 REVISIONS: 08-17-15  
 REVISION: 08-17-15  
 DATE PLOTTED => 24-AUG-2015  
 TIME PLOTTED => 08:53

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
REGISTERED CIVIL ENGINEER			DATE		
PLANS APPROVAL DATE					



# Project Geologic Map

## 11-SD-78

### 11-421600

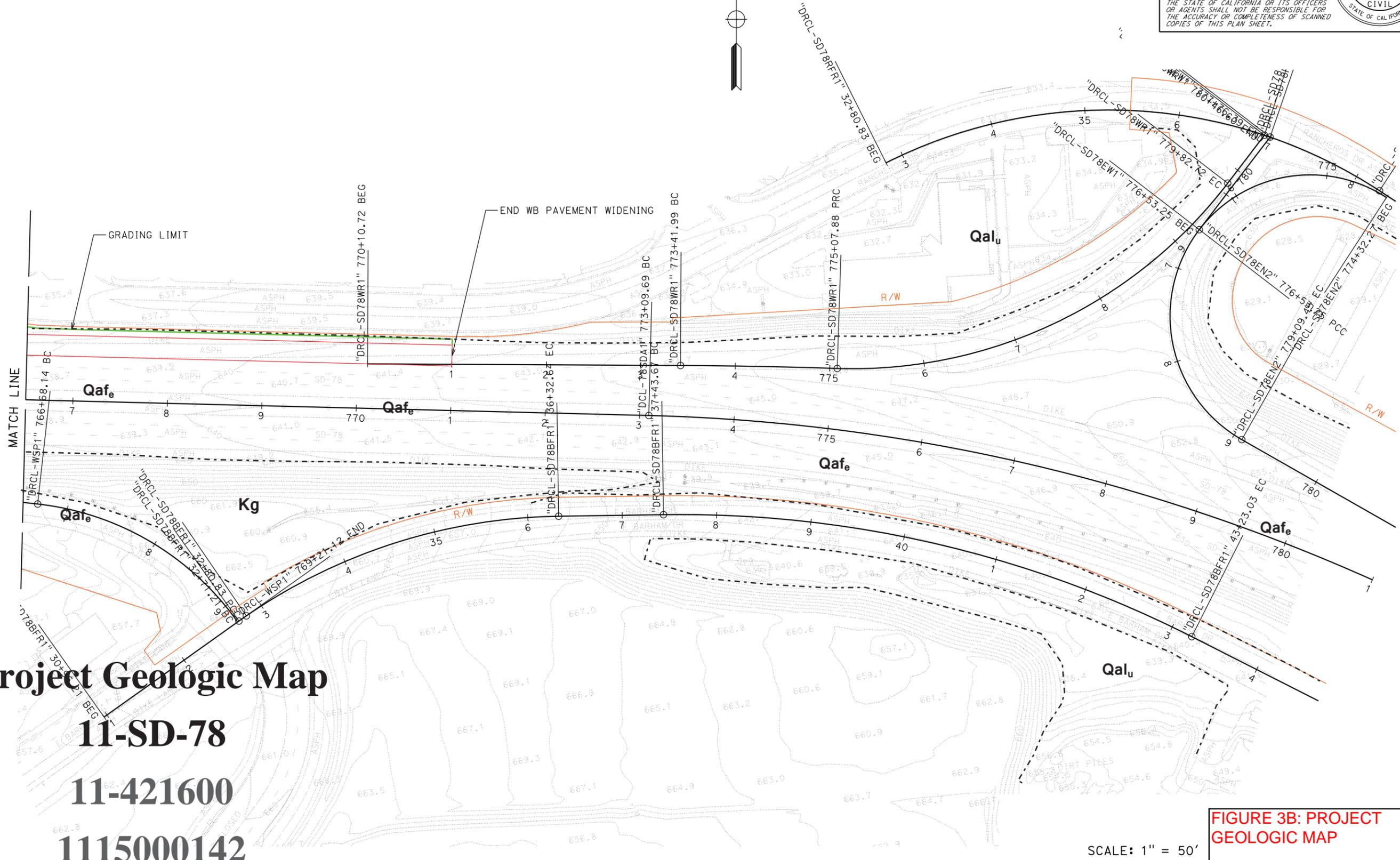
### 1115000142

**FIGURE 3C: PROJECT GEOLOGIC MAP**

SCALE: 1" = 50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED BY	DESIGNED BY	REVISOR	DATE
<b>Caltrans</b>		CHECKED BY			

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
REGISTERED CIVIL ENGINEER			DATE		
PLANS APPROVAL DATE					
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.					



**Project Geologic Map**  
**11-SD-78**  
**11-421600**  
**1115000142**

**FIGURE 3B: PROJECT GEOLOGIC MAP**

SCALE: 1" = 50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY	REVISOR
<b>Caltrans</b>		CHECKED BY	DATE REVISED

June 10, 2016

Geotechnical Design Report  
State Route 78 Auxiliary Lanes  
EA 11-421601/PID 1115000142

## **TABLES**

**TABLE 1: REGIONAL ACTIVE FAULT(S)**

Fault Name (Initials)	FID	M <sub>MAX</sub>	Fault Type	Fault Dip	Dip Direction	Z <sub>BOT</sub>	Z <sub>TOR</sub>	R <sub>RUP</sub>	R <sub>JB</sub>	R <sub>X</sub>	F <sub>NM</sub>	F <sub>RV</sub>
Elsinor Fault (Julian section)	390	7.7	SS	84°	Northeast	11.7mi (18.9km)	0.0	16.0mi (25.8km)	16.0mi (25.8km)	14.6mi (23.5km)	0	0

Notes: FID = The fault ID number. Fault Identification Number (FID), used to identify a fault trace on the Caltrans Deterministic PGA Map.

M<sub>MAX</sub> = Maximum Moment Magnitude: Defined as the largest earthquake a fault is capable of generating.

Fault Type = Right Lateral Strike Slip (RLSS).

Fault Dip = The angle between the fault plane and the horizontal plane.

Dip Direction = The direction the fault dips.

Z<sub>BOT</sub> = The depth to the bottom of the rupture plane.

Z<sub>TOR</sub> = The depth to the top of the rupture plane.

R<sub>RUP</sub> = The closest distance to the fault rupture plane.

R<sub>JB</sub> = The shortest horizontal distance to the surface projection of the rupture area (a.k.a. Joyner-Boone Distance).

R<sub>X</sub> = The horizontal distance to the fault trace or surface projection of the top of the rupture plane.

F<sub>NM</sub> = The faults identified as a normal fault.

F<sub>RV</sub> = The faults identified as a reverse fault.

**TABLE 2: SOIL STRENGTH PARAMETERS**

<b>Geologic Unit</b>	<b>Cohesion (psf)</b>	<b>Angle of Internal Friction (degrees)</b>	<b>In-Situ Dry Density (pcf)</b>
Artificial Fill	200	34	120
Alluvium	250	28	115
Granitic Rock	1500	35	120

**TABLE 3: GROUNDWATER ELEVATIONS**

<b>Boring No.</b>	<b>Groundwater Elevation (feet)</b>	<b>Origin of Groundwater Reading</b>
B-101	556	Date measured 04-03-1995, Archive Log of Test Boring, Twin Oaks Valley Road Overercrossing
B-102	556	Date measured 04-03-1995, Archive Log of Test Boring, Twin Oaks Valley Road Overercrossing
B-1	556	Date measured 04-10-1959, Archive Log of Test Boring, Twin Oaks Valley Road Overercrossing
B-3	556	Date measured 04-07-1959, Archive Log of Test Boring, Twin Oaks Valley Road Overercrossing

**TABLE 4: SPREAD FOOTING DATA TABLE, STANDARD PLAN TYPE 1A (CASE 2) RETAINING WALL**

**RW-740, H<sub>MAX</sub>=10'**

Begin Station	End Station	Design Height H (ft)	Minimum Footing Embedment Depth* (ft)	Minimum Sub Excavation Depth Below footing** (ft)	Settlement Calculated at Net Bearing Pressure (in)	Total Permissible Settlement (in)	Loading Type	Effective Footing Width B' (ft)	Net Bearing Stress q' (ksf)	Permissible Net Contact Stress q <sub>pn</sub> (ksf)	Gross Uniform Bearing Stress q <sub>o</sub> (ksf)	Factored Gross Nominal Bearing Resistance q <sub>r</sub> (ksf)
740+40.00 "SD-78" Line	741+04.00 "SD-78" Line	10	1.5	N/A	<1.0	1.0	Service I	10.6	1.3	4.4	N/A	N/A
							Strength I	6.5	N/A	N/A	2.3	4.7
							Extreme I	5.3	N/A	N/A	4.1	11.8
							Extreme II	N/A	N/A	N/A	N/A	N/A
741+04.00 "SD-78" Line	742+84.89 "SD-78" Line	8	1.5	N/A	<1.0	1.0	Service I	8.8	1.1	3.9	N/A	N/A
							Strength I	4.5	N/A	N/A	2.3	5.2
							Extreme I	3.9	N/A	N/A	3.9	12.5
							Extreme II	N/A	N/A	N/A	N/A	N/A

\*Minimum depth of embedment is greater than shown on standard plan because of placement of retaining wall on slope.

\*\* Over excavation is measured from the bottom elevation of footing.

**TABLE 5: OVERHEAD SIGN SUBSURFACE DATA**

<b>Overhead Sign Station</b>	<b>Number of Posts</b>	<b>Soil Description</b>	<b>Cal OSHA Soil Type</b>	<b>Foundation</b>
Eastbound State Route 78				
"SD-78" Line 731+00	Single-Post	Alluvium	B	Pile
"SD-78" Line 758+20	Single-Post	Formation	Stable Rock	Pile
Westbound State Route 78				
"SD-78" Line 729+40	Single-Post	Alluvium	B	Pile
"SD-78" Line 749+50	Single-Post	Formation	Stable Rock	Spread Footing

June 10, 2016

Geotechnical Design Report  
State Route 78 Auxiliary Lanes  
EA 11-421601/PID 1115000142

## **APPENDIX**

F-0106-1 (1)

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	CAL.			111	128

DIST.	COUNTY	ROUTE	POST MILE-TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	78	12.1/15.7	86	96

DIST.	COUNTY	ROUTE	SECTION	POST MILE	TOTAL SHEETS
XI	SD	78	B	H-7	7

DATE APPROVED July 5, 1980

**BENCH MARK ELEV. 628.95**  
 B.M. 27  
 Std. disc, 77' Lt. Sta. 543+65 "B" Line

**BENCH MARK ELEV. 686.86**  
 B.M. 28  
 Std. disc, 271' Lt. Sta. 561+43 "B" Line

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY

*Robert J. Anderson* 7/1

DATE APPROVED 7-23-80

**RICHLAND ROAD UC (Widen)**

LOG OF TEST BORINGS 2 of 2

Project No. 11-185274  
 Bridge No. 57-389

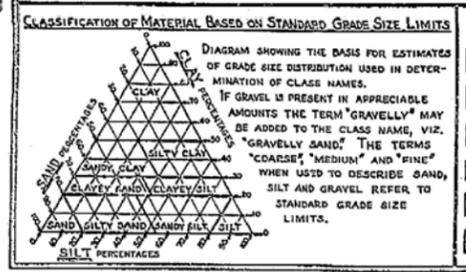
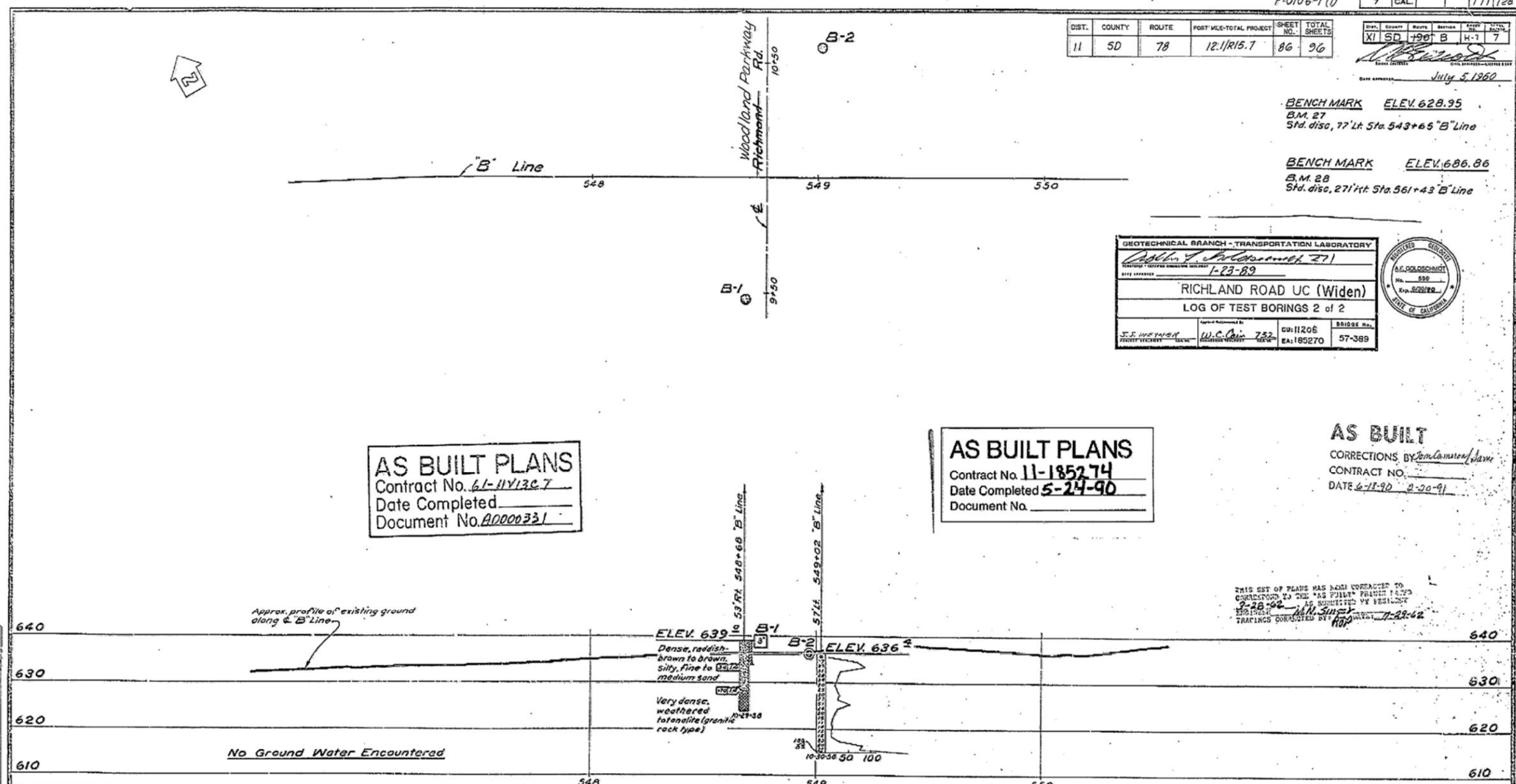


**AS BUILT PLANS**  
 Contract No. 61-1113C.7  
 Date Completed \_\_\_\_\_  
 Document No. A0000331

**AS BUILT PLANS**  
 Contract No. 11-185274  
 Date Completed 5-24-90  
 Document No. \_\_\_\_\_

**AS BUILT**  
 CORRECTIONS BY *Tom Cameron*  
 CONTRACT NO. \_\_\_\_\_  
 DATE 6-18-90 2-20-91

THIS SET OF PLANS HAS BEEN CORRECTED TO CORRESPOND TO THE "AS BUILT" PRINTING 1-2-79  
 7-28-80 AS SUBMITTED BY FIELD  
 TRACINGS CORRECTED BY *Tom Cameron* 7-28-80



**LEGEND OF EARTH MATERIALS**

GRAVEL	SILTY CLAY OR CLAYEY SILT
SAND	PEAT AND/OR ORGANIC MATTER
SILT	FILL MATERIAL
CLAY	IGNEOUS ROCK
SANDY CLAY OR CLAYEY SAND	SEDIMENTARY ROCK
SANDY SILT OR SILTY SAND	METAMORPHIC ROCK

**LEGEND OF BORING OPERATIONS**

- PLAN OF ANY BORING
- PENETROMETER
- 2 1/2" CONE PENETROMETER
- SAMPLER BORING (DRY)
- ROTARY BORING (WET)
- AUGER BORING (DRY)
- JET BORING
- CORE BORING
- TEST PIT

1" SOIL TUBE

Top Hole El. Location

Casing driven

Size of sampler (inches)

Blows per foot (Using 140 lb hammer with 2" 30" sampler)

Unconfined compression strength (Psi)

Vane shear

Shear strength (Psi)

Penetration Boring

**NOTES**

The contractor's attention is directed to Section 2-1.03 of the Standard Specifications and to the Special Provisions accompanying this set of plans. Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

STATE OF CALIFORNIA  
 DEPARTMENT OF PUBLIC WORKS  
 DIVISION OF HIGHWAYS

**RICHLAND ROAD U.C.**

2 of 2 LOG OF TEST BORINGS

Scale: Vert. 1"=10', Horiz. 1"=20'

BRIDGE 57-389 FILE DRAWING C-6263-7

FIELD REVIEW  
 CHECKED  
 APPROVED

86



F-0106-1 (i)

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	CAL.			111	128

DIST.	COUNTY	ROUTE	SECTION	POST MILE	TOTAL MILES
XI	SD	190	B	H-1	7

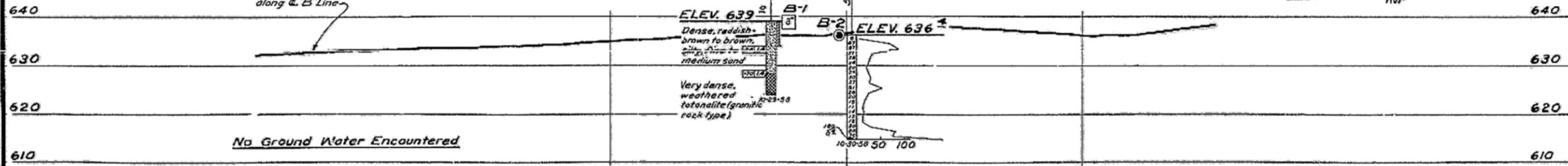
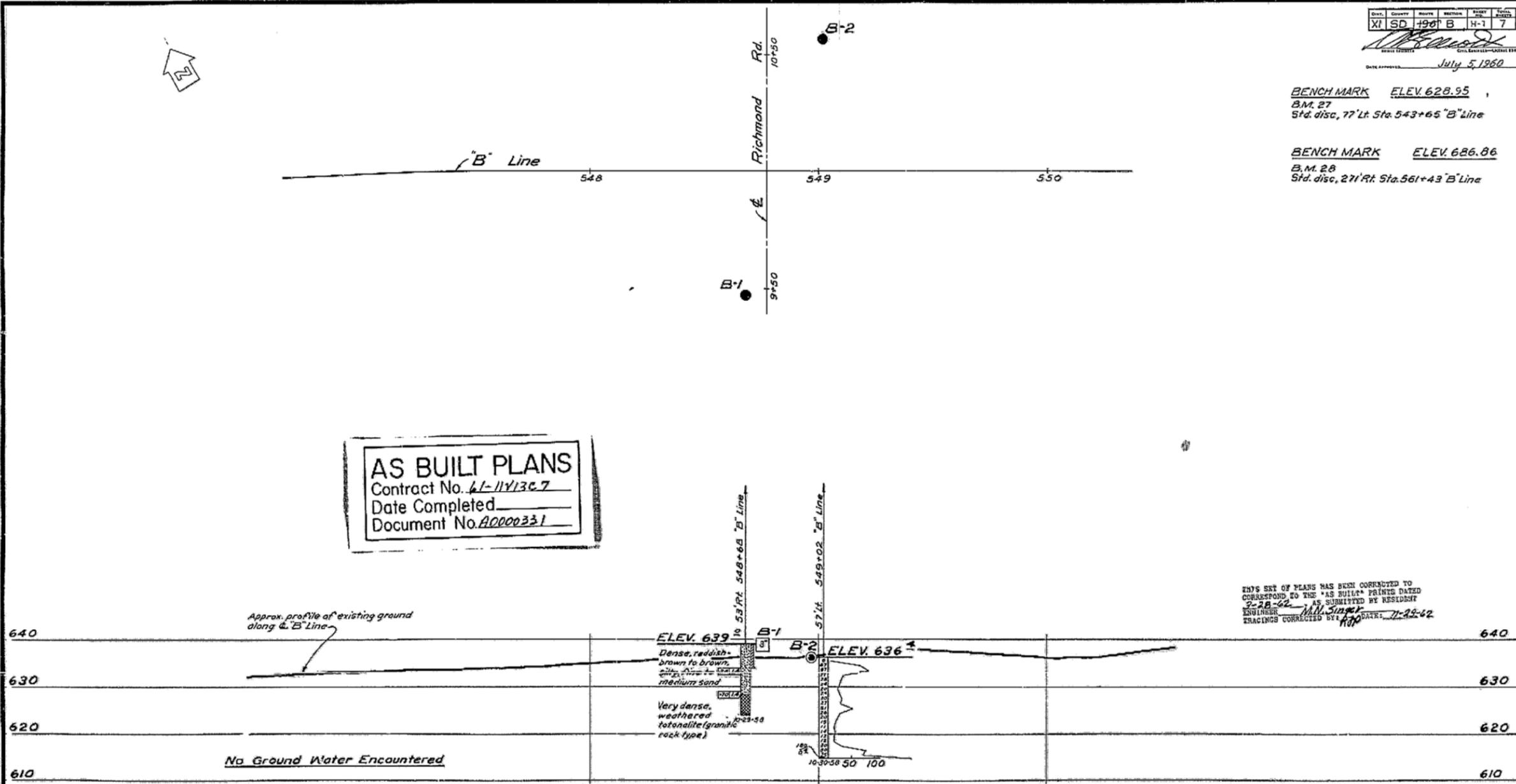
DATE APPROVED: July 5, 1960

BENCHMARK ELEV. 628.95  
B.M. 27  
Std. disc. 77' Lt. Sta. 543+65 "B" Line

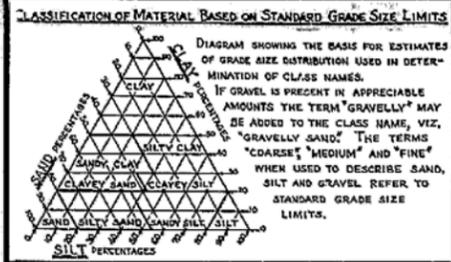
BENCHMARK ELEV. 686.86  
B.M. 28  
Std. disc. 271' Rt. Sta. 561+43 "B" Line

AS BUILT PLANS  
Contract No. 41-11Y13C.7  
Date Completed \_\_\_\_\_  
Document No. A0000331

THIS SET OF PLANS HAS BEEN CORRECTED TO CORRESPOND TO THE "AS BUILT" PRINTS DATED 3-28-62 AS SUBMITTED BY RESIDENT ENGINEER Will Singer DATE: 7-25-62 TRACINGS CORRECTED BY WSP



FILED STUDY N.A.F. GERMERSON 17 10-26-59  
DRAWN BY E.P. JONES 8-25-59  
CHECKED BY J.S. BROWN 11-10-59  
Approved & Recommended by: W. Singer  
Date: 7-25-62



LEGEND OF EARTH MATERIALS

GRAVEL	SILTY CLAY OR CLAYEY SILT
SAND	PEAT AND/OR ORGANIC MATTER
SILT	FILL MATERIAL
CLAY	IGNEOUS ROCK
SANDY CLAY OR CLAYEY SAND	SEDIMENTARY ROCK
SANDY SILT OR SILTY SAND	METAMORPHIC ROCK

LEGEND OF BORING OPERATIONS

PLAN OF ANY BORING	ROTTING	Penetration Boring
PENETROMETER	2 1/4" CONE PENETROMETER	Sampler Boring (Dry)
SAMPLER BORING (DRY)	ROTTARY BORING (WET)	Auger Boring (Dry)
ROTTARY BORING (WET)	AUGER BORING (DRY)	JET BORING
AUGER BORING (DRY)	JET BORING	CORE BORING
JET BORING	CORE BORING	TEST PIT
CORE BORING	TEST PIT	

NOTES  
The contractor's attention is directed to Section 2-1.03 of the Standard Specifications and to the Special Provisions accompanying this set of plans. Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

STATE OF CALIFORNIA  
DEPARTMENT OF PUBLIC WORKS  
DIVISION OF HIGHWAYS

**RICHLAND ROAD U.C.**

**LOG OF TEST BORINGS**

SCALE: Vert. 1"=10'  
Horiz. 1"=20'

BRIDGE 57-389 FILE DRAWING C-6263-7

PREL. DRAWING NO. P-6263 1/24

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	78	12.71/3.5	300	301

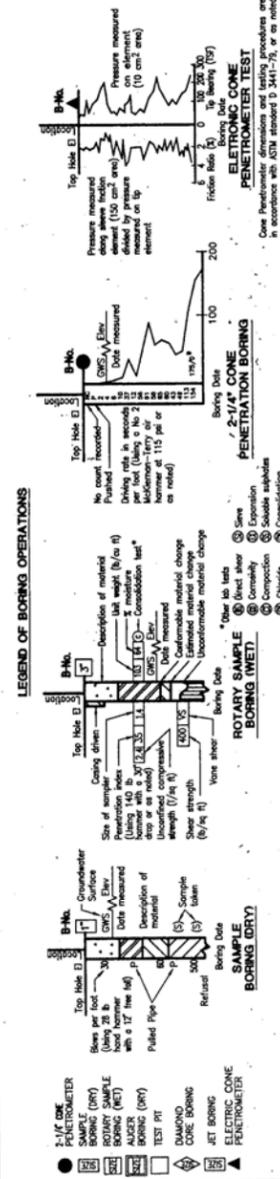
*Joseph J. Vettel*  
REGISTERED PROFESSIONAL ENGINEER  
3-8-99  
PLANS APPROVAL DATE



**AGRA**  
Earth & Environmental, Inc.

NOTES:

- 1.) GROUNDWATER ENCOUNTERED IN BOTH BORINGS B-101 AND B-102 AT ELEVATION 556 FEET.
- 2.) ELEVATIONS BASED ON TOPOGRAPHIC MAP BRIDGE SITE PLAN, BY ASL CONSULTING ENGINEERS.
- 3.) BORINGS LOGGED BY TED M. PRIMAS, PROJECT GEOLOGIST.
- 4.) BENCHMARK - BRASS DISK STAMPED "78-12.9 1988" IN SIDEWALK, 66 FEET SOUTH OF SOUTHWEST CORNER OF THE BRIDGE ON TWIN OAKS VALLEY ROAD OVER ROUTE 78 ELEV. 584.03 (NAVD 88)
- 5.) SAMPLER: 2.5" I.D., 2.75" O.D.
- 6.) ⊕ BORING BY CALTRANS (1958/1959)



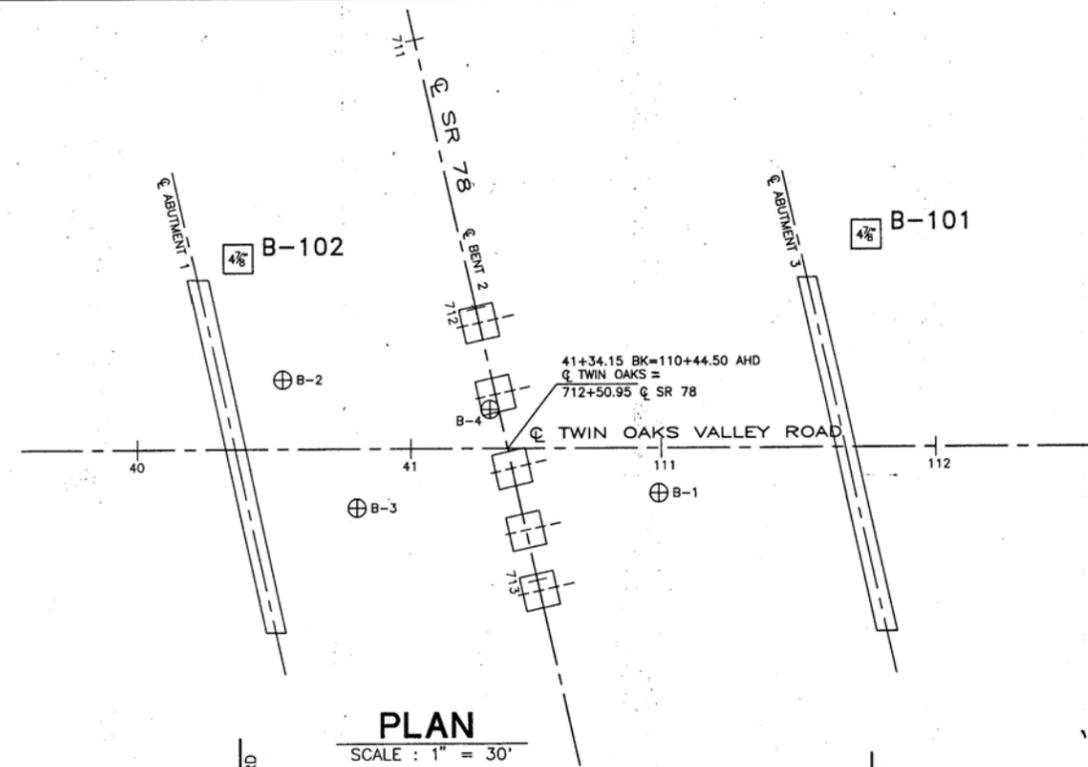
**LEGEND OF EARTH MATERIALS**

CLAYEY SILT	GRAVEL
PEAT and/or ORGANIC MATTER	SAND
FILL MATERIAL	SILT
UNCONSOLIDATED SAND	CLAY
UNCONSOLIDATED SILT	SANDY CLAY or CLAYEY SAND
UNCONSOLIDATED CLAY	CLAYEY SILT or SILTY SAND
SEDIMENTARY ROCK	SILT CLAY
IGNEOUS ROCK	
METAMORPHIC ROCK	

**CONSISTENCY CLASSIFICATION FOR SOILS**

Penetration Index (blows/ft)	Cohesive	
	Granular	Cohesive
0-4	Very loose	Very soft
5-9	Loose	Soft
10-19	Slightly compact	Stiff
20-29	Compact	Very stiff
30-59	Dense	Hard
>70	Very dense	Very hard

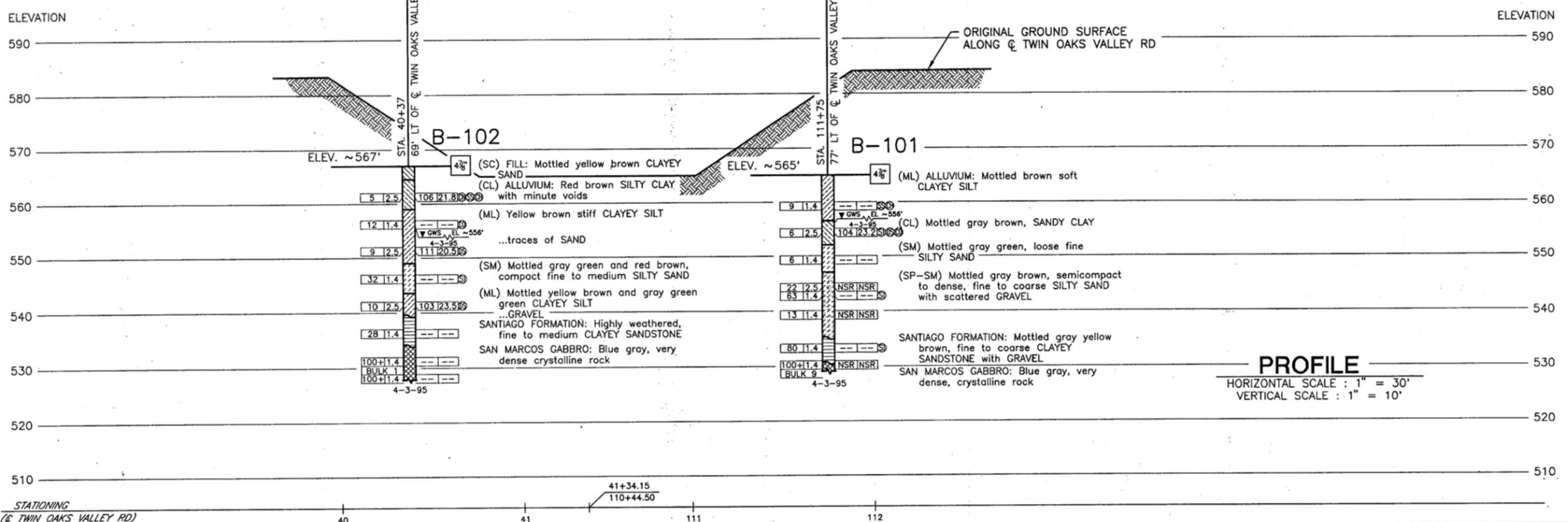
NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be compared to any mechanical analysis.



**AS BUILT**

CORRECTIONS BY George Valuska/RLA  
CONTRACT NO. 147024 10-31-01  
DATE \_\_\_\_\_

"NO AS BUILT CHANGES"



**PROFILE**  
HORIZONTAL SCALE : 1" = 30'  
VERTICAL SCALE : 1" = 10'

DESIGN OVERSIGHT <i>J.M. [Signature]</i> SIGN OFF DATE 11/19/98	DRAWN BY JOE MAGLIATO	TED M. PRIMAS FIELD INVESTIGATOR DATE 4-3-95	PREPARED FOR THE <b>STATE OF CALIFORNIA</b> DEPARTMENT OF TRANSPORTATION	JACK L. ABCARIUS PROJECT ENGINEER	BRIDGE NO. 57-1033 POST MILE 12.91	<b>TWIN OAKS VALLEY ROAD O.C.</b> <b>LOG OF TEST BORINGS</b>	REVISION DATES (PRELIMINARY STAGE ONLY) 5/1/96 11/8/96	SHEET 22	OF 23
--	--------------------------	---	--	--------------------------------------	---	---	---	-------------	----------

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS  
0 1 2 3  
CU 11  
EA 147021

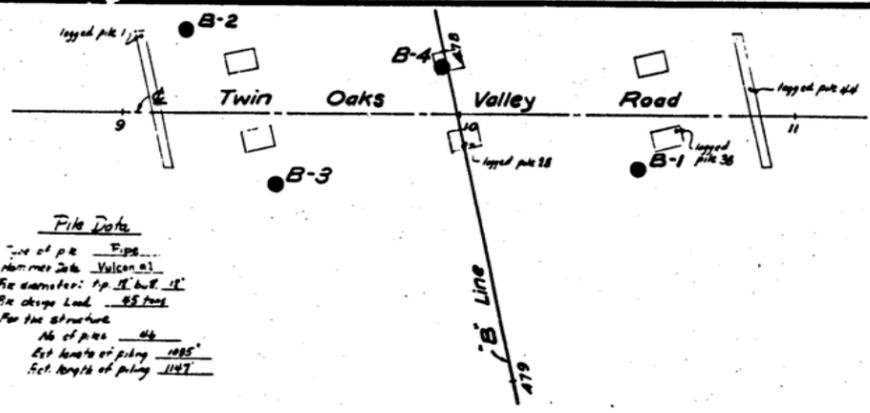
DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
11	SD	78	12.713.5	301	301

REGISTERED CIVIL ENGINEER  
 3-8-99  
 PLANS APPROVAL DATE  
 McDANIEL ENGINEERING COMPANY, INC.  
 5030 CAMINO DE LA SIESTA, STE. 204  
 SAN DIEGO, CA 92108



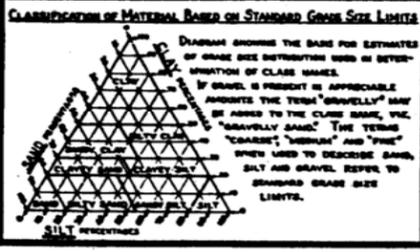
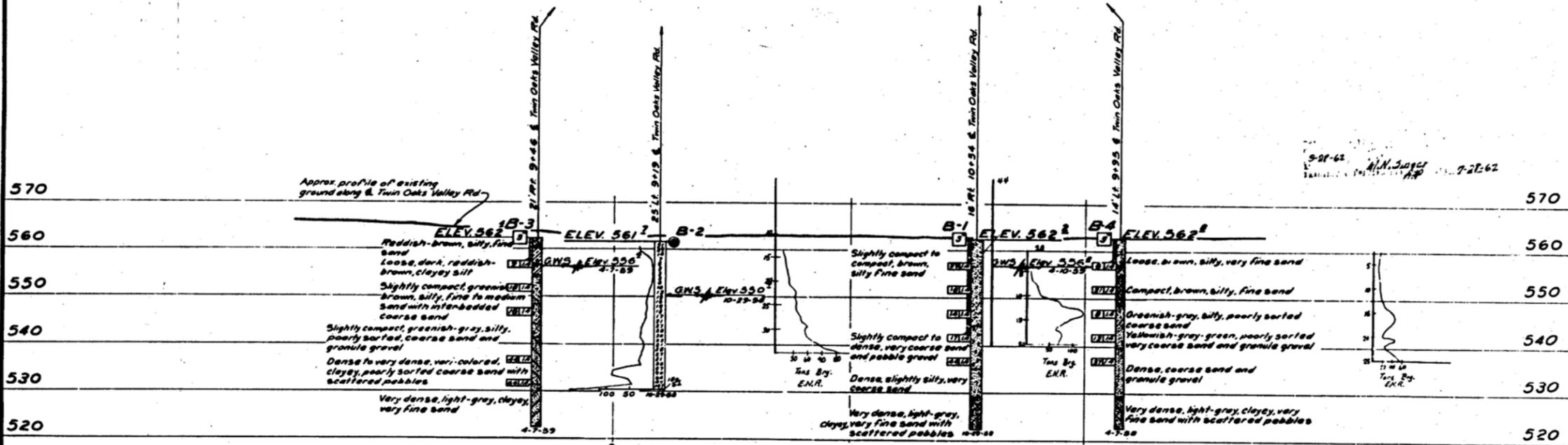
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

**BENCHMARK ELEV. 575.38**  
 B.M. No. 22  
 5th disc. 76' Lt Sta 465+79 B Line



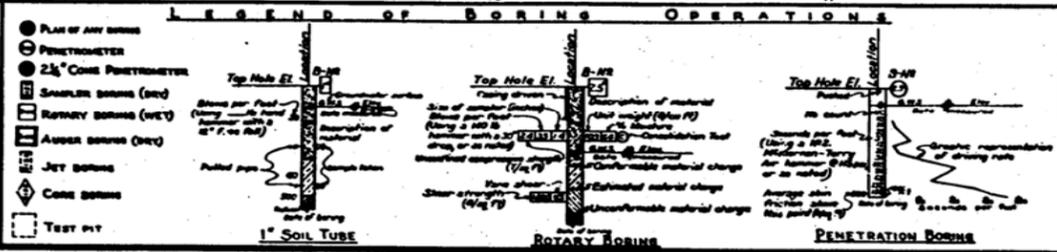
**File Data**  
 Type of pile: Piles...  
 Hammer: S&W Vulcan...  
 An. diameter: 10" dia. 11"  
 An. drive: 100 ft...  
 An. structure: 44"  
 No. of piles: 44  
 Est. length of piling: 1185'  
 Act. length of piling: 1147'

**AS BUILT PLANS**  
 Contract No. 41-11V13C7  
 Date Completed  
 Document No. A0002331



**LEGEND OF EARTH MATERIALS**

GRAVEL	SILTY CLAY OR CLAYEY SILT
SAND	PEAT OR ORGANIC MATTER
SILT	FILL MATERIAL
CLAY	IGNEOUS ROCK
SANDY CLAY OR CLAYEY SAND	SEDIMENTARY ROCK
SANDY SILT OR SILTY SAND	METAMORPHIC ROCK



**NOTES**  
 The contractor's attention is directed to Section 2-1.03 of the Standard Specifications and to the Special Provisions accompanying this set of plans. Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

**TWIN OAKS VALLEY ROAD O.C.**  
**LOG OF TEST BORINGS**  
 SCALE: HORIZ. 1"=10' VERT. 1"=20' BRIDGE 57-300 FILE DRAWING

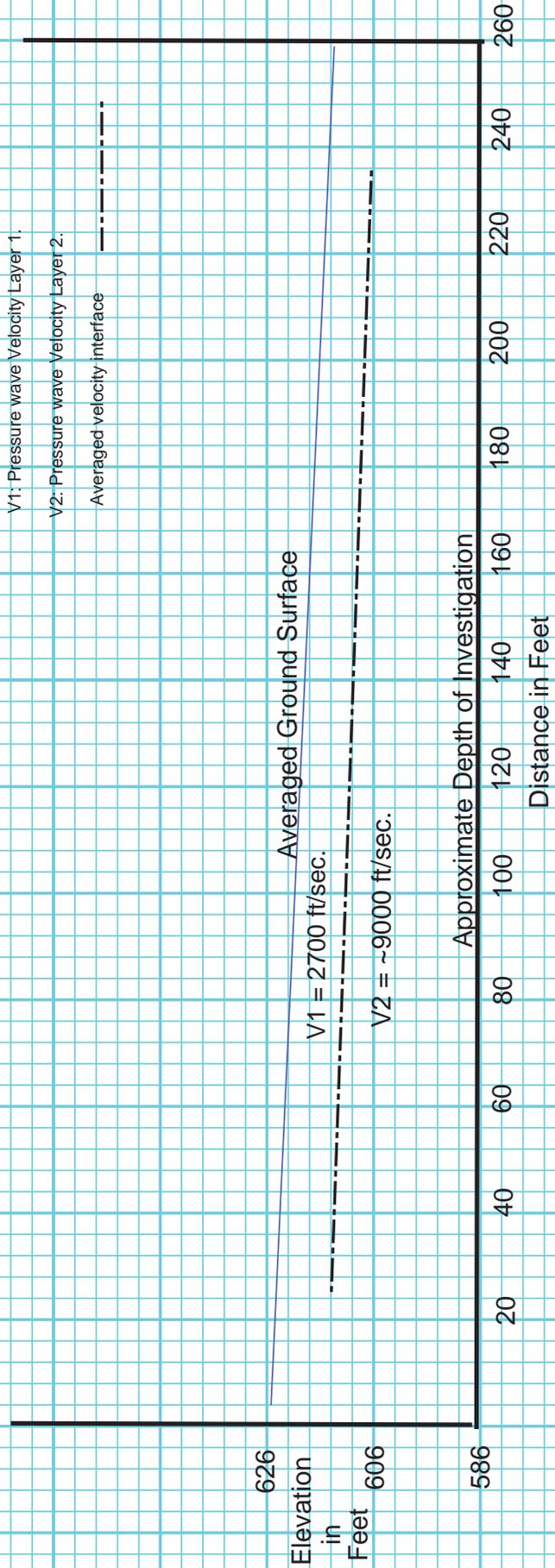
**AS BUILT**  
 CORRECTIONS BY George Valuska /RLA  
 CONTRACT NO. 147024 10-31-01  
 DATE

**"NO AS BUILT CHANGES"**

DESIGN BY: <i>Roya Golchooblan</i>	CHECKED: Greg Butler	PREPARED FOR THE <b>STATE OF CALIFORNIA</b> DEPARTMENT OF TRANSPORTATION	BRIDGE No. 57-1033	<b>TWIN OAKS VALLEY ROAD OVERCROSSING</b> <b>AS-BUILT LOG OF TEST BORINGS</b>
DETAILS BY: Bob Arce	CHECKED: Greg Butler		POST MILE 12.91	
QUANTITIES BY: <i>Roya Golchooblan</i>	CHECKED: Bob Arce		PROJECT ENGINEER: Jack L. Abcarlus	
DESIGN OVERSIGHT: <i>[Signature]</i>	ORIGINAL SCALE IN INCHES FOR REDUCED PLANS: 0 1 2 3	CU 11 EA 147021	DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMINARY STAGE ONLY)
SHOUFF DATE: 11/19/98				SHEET 23 OF 23

11-SD-76 Twin Oaks Parkway  
 Seismic Refraction Profile  
 Line: RS151003A

West ← Trend S88W → Trend N88E → East  
 Approximate Station 116 Ft. Right of Station 246+00  
 Approximate Station 99 Ft. Right of Station 748+60



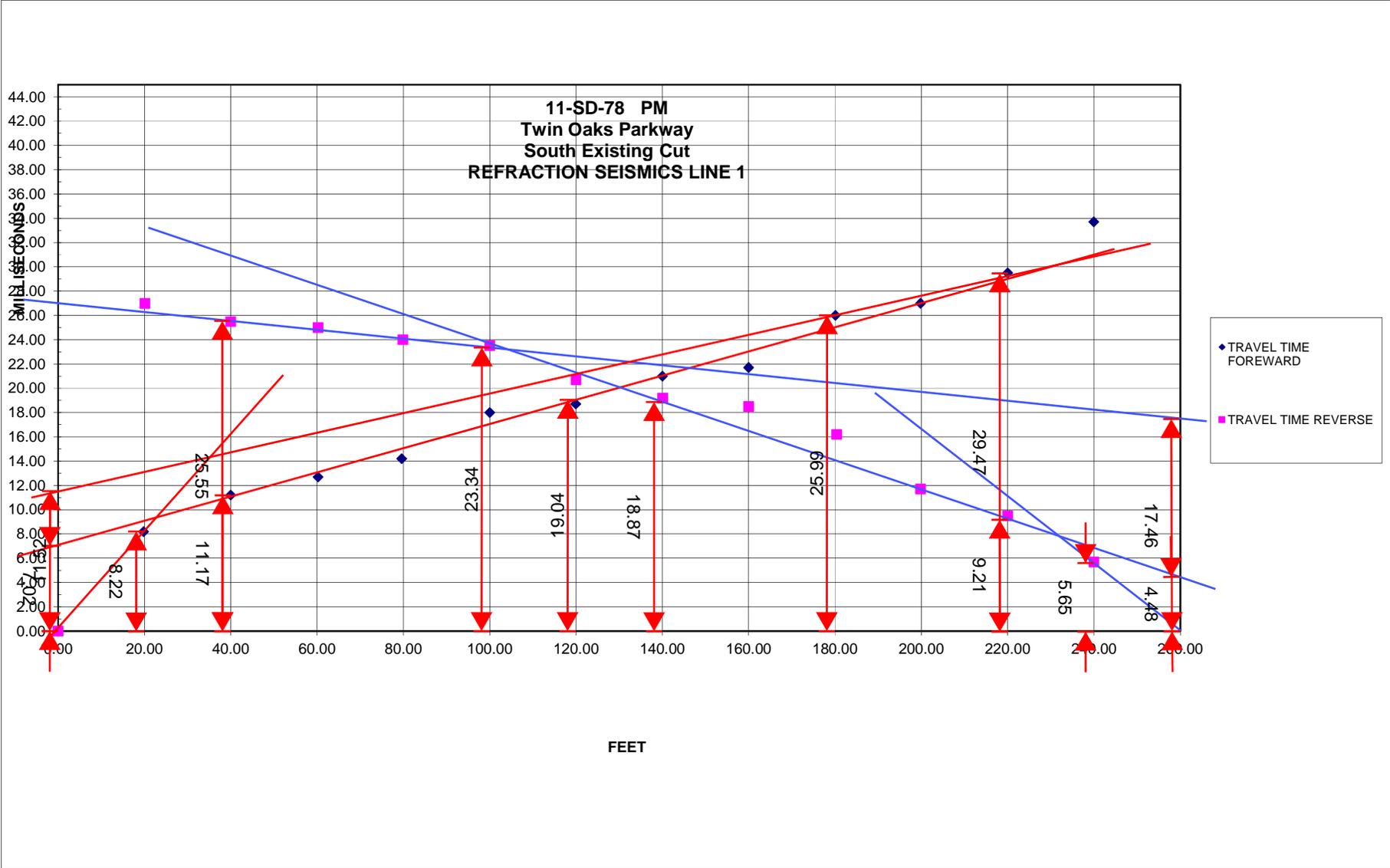
Resolved Output

$\alpha_1$	$\beta_1$	V <sub>1</sub> AVERAGE SURFACE VELOCITY	W <sub>2</sub> DIP ANGLE (°)	V <sub>2</sub> TRUE VELOCITY LAYER 2	DEPTH OF INTERFACE (A <sub>2</sub> ) AT FORWARD END	DEPTH OF INTERFACE (B <sub>2</sub> ) AT REVERSE END
21.04815	17.0149812	2975	2.0	9122	11.05	7.05

$\alpha_1$	$\beta_1$	V <sub>1</sub> AVERAGE SURFACE VELOCITY	W <sub>2</sub> DIP ANGLE (°)	V <sub>2</sub> TRUE VELOCITY LAYER 2	DEPTH OF INTERFACE (A <sub>2</sub> ) AT FORWARD END	DEPTH OF INTERFACE (B <sub>2</sub> ) AT REVERSE END
		2974.50	2.02	9122	11.05	7.05

$\alpha_1$	$\beta_1$	W <sub>3</sub> DIP ANGLE (°)	V <sub>3</sub> TRUE VELOCITY LAYER 3	DEPTH OF 3rd INTERFACE (A <sub>2</sub> ) AT FORWARD END	DEPTH OF 3rd INTERFACE (B <sub>2</sub> ) AT REVERSE END
		-22.75	14838		

TIME UNIT:	SECONDS
DISTANCE UNIT:	FEET
VELOCITY UNIT:	FEET/SEC





RADIANS TO DEGREES		SINE TO ANGLE (RADIANS)	
$\text{SIN}^{-1}\alpha =$	21.04815	$\text{SIN } \alpha = (V_{A1}/V_{B2}) =$	0.367359516
$\text{SIN}^{-1}\beta =$	17.014981	$\text{SIN } \beta = (V_{A1}/V_{A2}) =$	0.296967444
		$\text{COS}\alpha_1 =$	0.933278934
		$\text{COS}\beta_1 =$	0.956228276
$\alpha_1 = \text{SIN}^{-1}\alpha_1 =$	6.2774429	$\text{SIN } \alpha_1 = (V_{A1}/V_{B3}) =$	0.109562046
$\beta_1 = \text{SIN}^{-1}\beta_1 =$	14.827414	$\text{SIN } \beta_1 = (V_{A1}/V_{A3}) =$	0.258787193
DEGREES		RADIANS	
$P_2 =$	13.170183	$P_2 =$	0.229863058
$Q_2 =$	62.699439	$Q_2 =$	1.09431165

DEGREES TO RADIANS		COSINE OF ANGLE		COS $\alpha$ + COS $\beta$	
$A_1$					
ANGLE OF INCIDENCE $(\alpha_1+\beta_1)/2$	0.3321635				
$\alpha$	0.3673595				
$\beta$	0.2969674				
$\text{COS}\alpha_1 + \text{COS}\beta_1 =$	1.8895072			$\text{COS}\alpha_1 + \text{COS}\beta_1 =$	1.889507211
$A_{1'}$	0.074366	RADIANS			
$B_{1'}$	0.2939832	RADIANS			
$a_2 = b_2 =$	0.6620874	RADIANS			
$\alpha_2 =$	0.109562	$\text{COS}\alpha_2 =$	0.99400408	$\text{COS}\alpha_2 + \text{COS}\beta_2 =$	1.960705137
$\beta_2 =$	0.2587872	$\text{COS}\beta_2 =$	0.966701056		

$\alpha_1$	$\beta_1$	$V_1$ AVERAGE SURFACE VELOCITY	$W_2$ DIP ANGLE (°)	$V_2$ TRUE VELOCITY LAYER 2	DEPTH OF INTERFACE ( $A_2$ ) AT FORWARD END
21.04815	17.0149812	2975	2.0	9122	11.05

$\alpha_1$	$\beta_1$	$V_1$ AVERAGE SURFACE VELOCITY	$W_2$ DIP ANGLE (°)	$V_2$ TRUE VELOCITY LAYER 2	DEPTH OF INTERFACE ( $A_2$ ) AT FORWARD END
		2974.50	2.02	9122	11.05

$\alpha_1$	$\beta_1$	$W_3$ DIP ANGLE (°)	$V_3$ TRUE VELOCITY LAYER 3	DEPTH OF 3rd INTERFACE ( $A_2$ ) AT FORWARD END
		-22.75	14838	

TIME UNIT:	SECONDS
DISTANCE UNIT:	FEET
VELOCITY UNIT:	FEET/SEC

**DEPTH OF  
INTERFACE (B<sub>2</sub>) AT  
REVERSE END**

**7.05**

**DEPTH OF  
INTERFACE (B<sub>2</sub>) AT  
REVERSE END**

**7.05**

**DEPTH OF 3rd  
INTERFACE (B<sub>2</sub>) AT  
REVERSE END**

# RELATIONSHIP BETWEEN SEISMIC VELOCITIES AND EARTHWORK FACTORS FOR GRANITIC ROCK

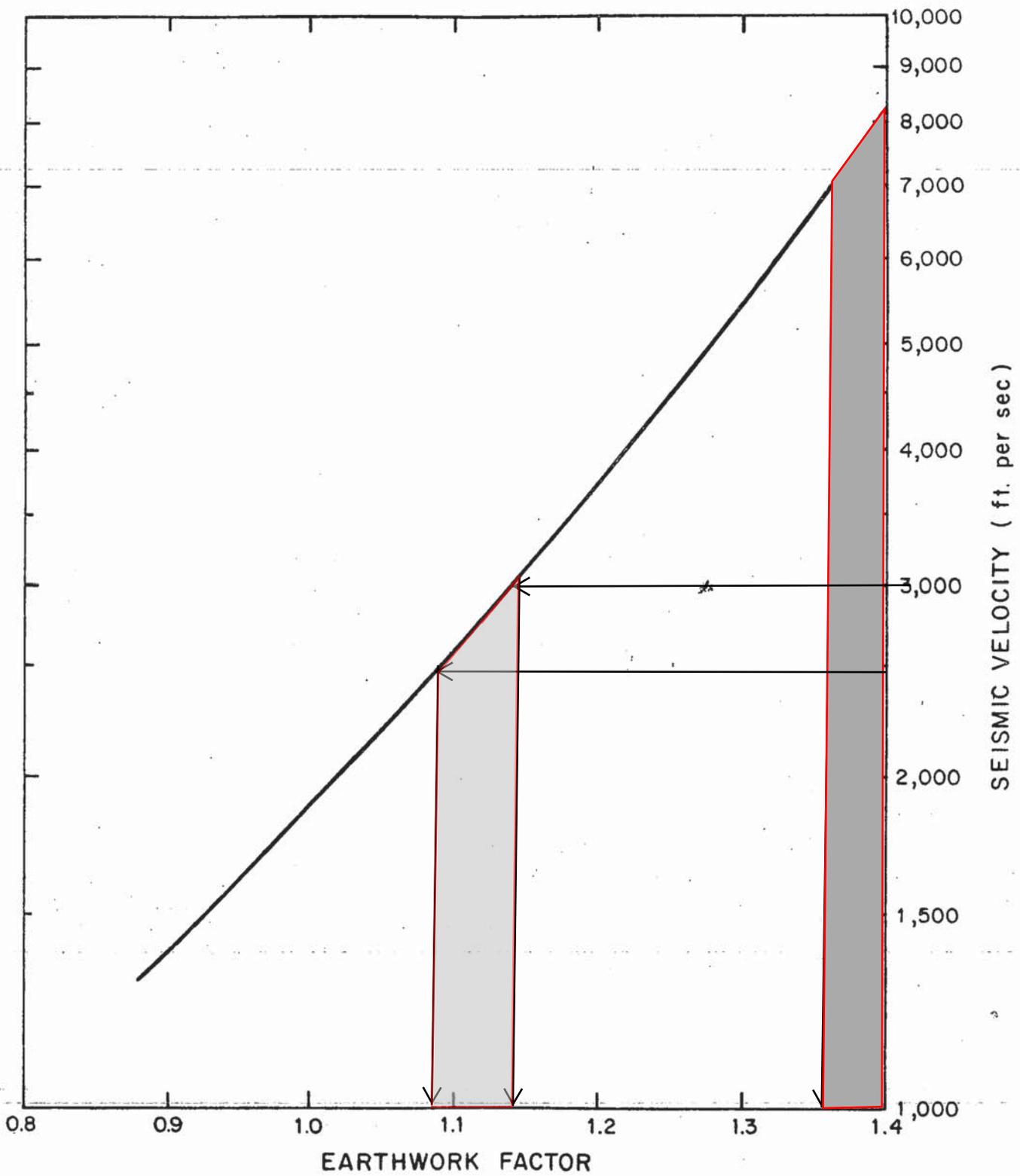
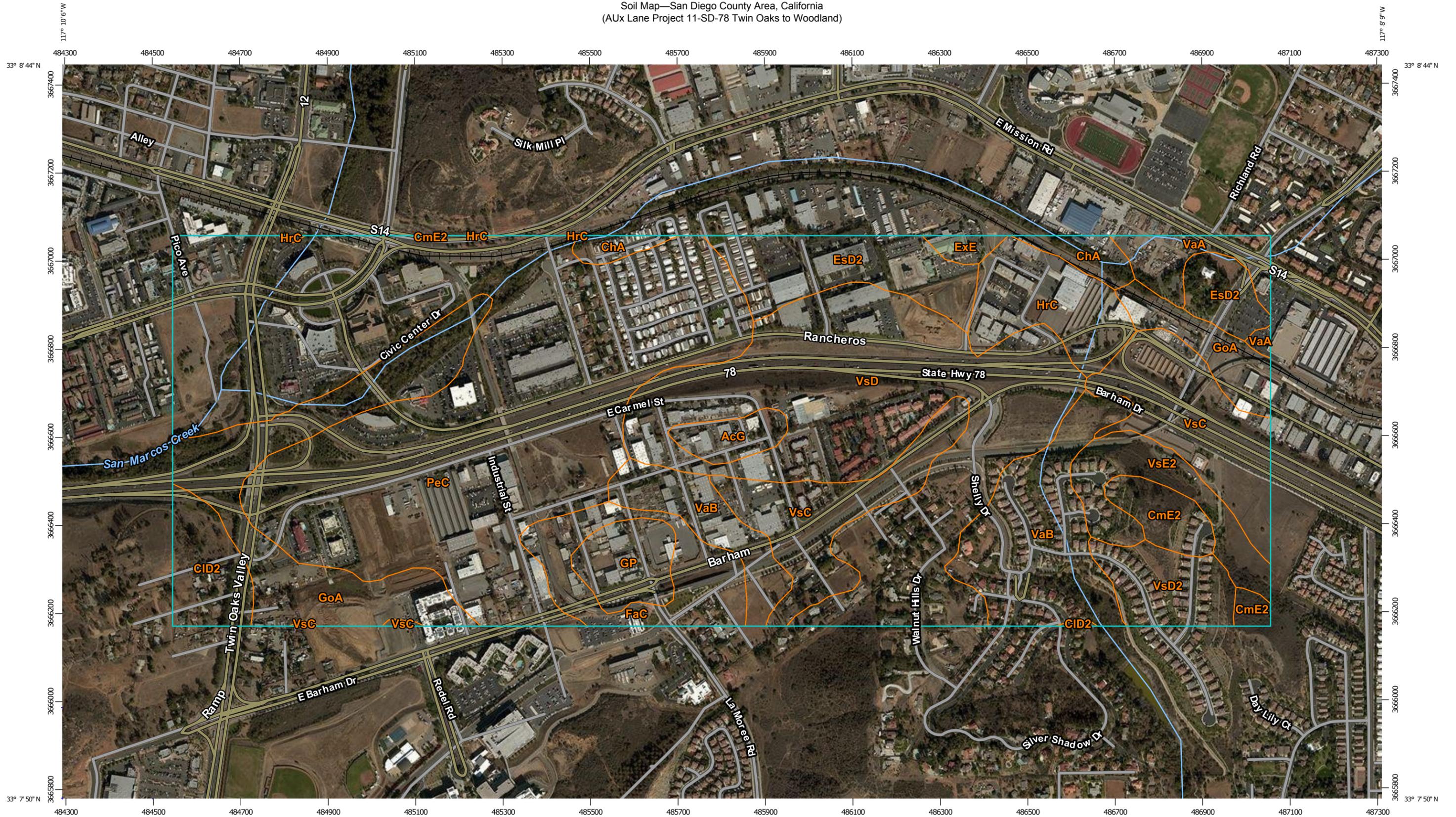


FIGURE 10

Soil Map—San Diego County Area, California  
 (AUX Lane Project 11-SD-78 Twin Oaks to Woodland)



Map Scale: 1:8,130 if printed on B landscape (17" x 11") sheet.  
 0 100 200 400 600 Meters  
 0 350 700 1400 2100 Feet  
 Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### Water Features



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

### Background



Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California  
Survey Area Data: Version 8, Sep 17, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 3, 2014—Nov 22, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

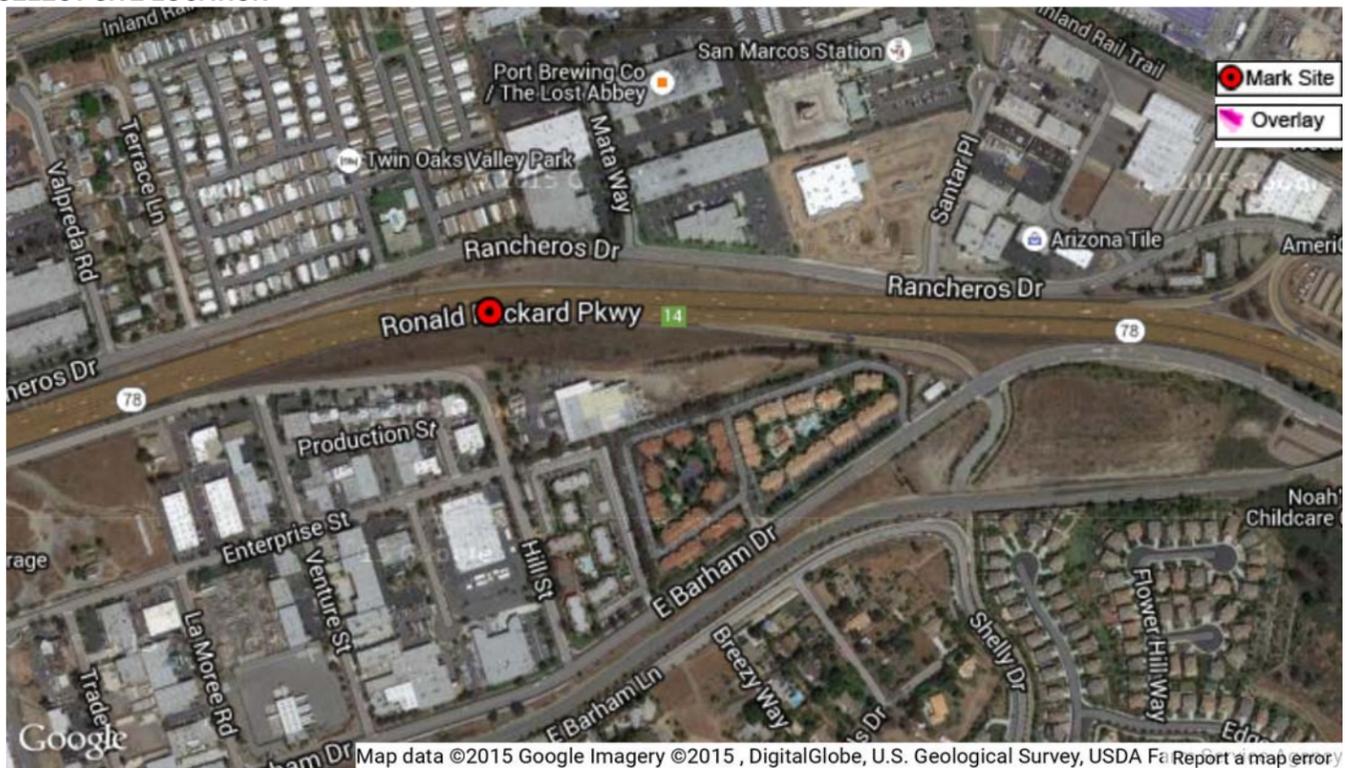
San Diego County Area, California (CA638)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AcG	Acid igneous rock land	5.4	1.0%
ChA	Chino fine sandy loam, 0 to 2 percent slopes	6.6	1.2%
CID2	Cieneba coarse sandy loam, 5 to 15 percent slopes, eroded	11.4	2.1%
CmE2	Cieneba rocky coarse sandy loam, 9 to 30 percent slopes, eroded	8.4	1.5%
EsD2	Escondido very fine sandy loam, 9 to 15 percent slopes, eroded	26.3	4.8%
ExE	Exchequer rocky silt loam, 9 to 30 percent slopes	2.1	0.4%
FaC	Fallbrook sandy loam, 5 to 9 percent slopes	17.6	3.2%
GoA	Grangeville fine sandy loam, 0 to 2 percent slopes	46.8	8.5%
GP	Gravel pits	9.6	1.7%
HrC	Huerhuero loam, 2 to 9 percent slopes	17.5	3.2%
PeC	Placentia sandy loam, 2 to 9 percent slopes, warm MAAT, MLRA 19	182.4	33.0%
VaA	Visalia sandy loam, 0 to 2 percent slopes	8.6	1.6%
VaB	Visalia sandy loam, 2 to 5 percent slopes	41.3	7.5%
VsC	Vista coarse sandy loam, 5 to 9 percent slopes	44.7	8.1%
VsD	Vista coarse sandy loam, 9 to 15 percent slopes	96.9	17.6%
VsD2	Vista coarse sandy loam, 9 to 15 percent slopes, eroded	12.0	2.2%
VsE2	Vista coarse sandy loam, 15 to 30 percent slopes, eroded	14.5	2.6%
<b>Totals for Area of Interest</b>		<b>551.9</b>	<b>100.0%</b>

# CALIFORNIA DEPARTMENT OF TRANSPORTATION

## Caltrans ARS Online (v2.3.06)

This web-based tool calculates both deterministic and probabilistic acceleration response spectra for any location in California based on criteria provided in [Appendix B of Caltrans Seismic Design Criteria](#). [More...](#)

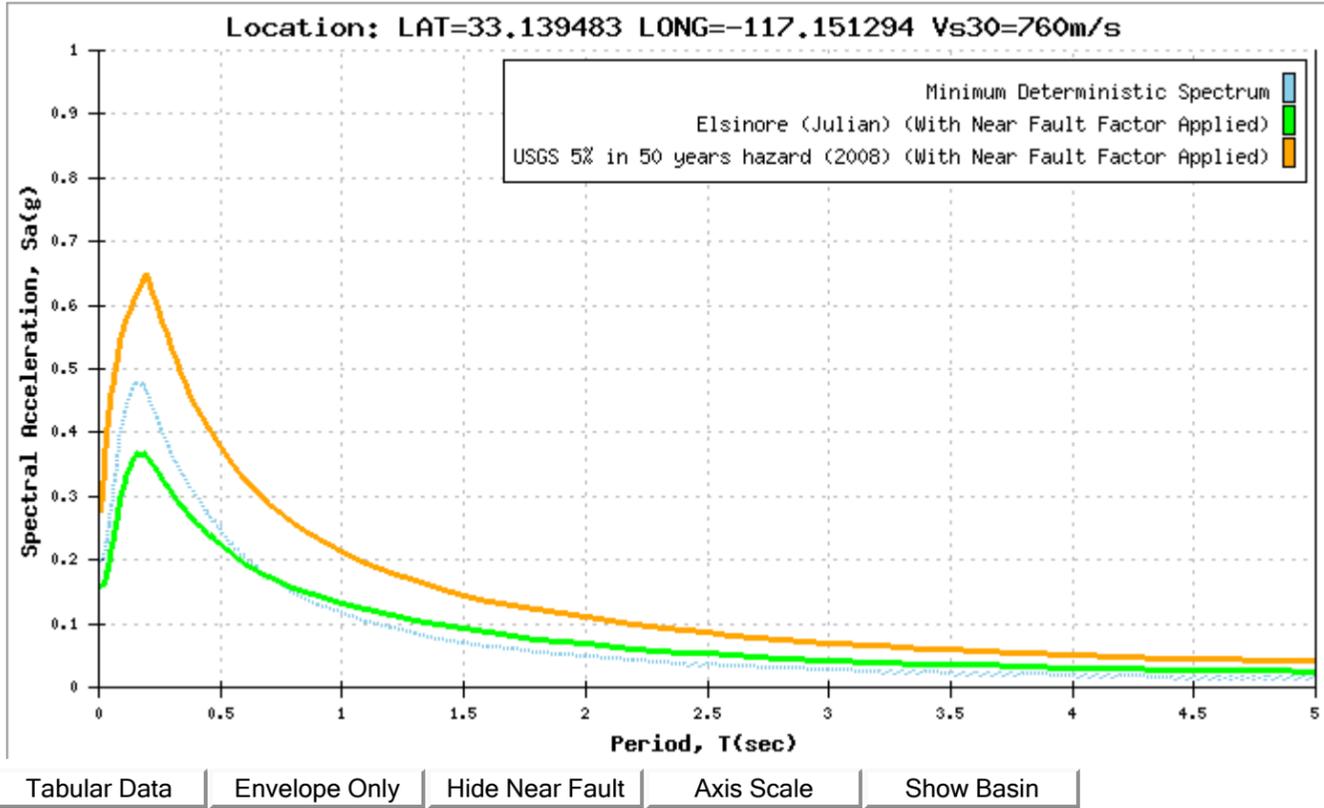
### SELECT SITE LOCATION



Latitude: 
 Longitude: 
 Vs30:  m/s

CALCULATED SPECTRA

Display Curves: 1



Apply Near Fault Adjustment To:

NOTE: Caltrans SDC requires application of a Near Fault Adjustment factor for sites less than 25 km (Rrup) from the causative fault.

- Deterministic Spectrum Using  
25.79 Km Elsinore (Julian)
  - Probabilistic Spectrum Using  
25.79 Km (Recommend Performing Deaggregation To Verify)
- Show Spectrum with Adjustment Only  
 Show Spectrum with and without near fault Adjustment
- OK

Conditions of Use | Privacy Policy  
Copyright © 2009 State of California

**SITE DATA (ARS Online Version 2.3.06)**

<b>Shear Wave Velocity, <math>V_{s30}</math>:</b>	760 m/s
<b>Latitude:</b>	33.139483
<b>Longitude:</b>	-117.151294
<b>Depth to <math>V_s = 1.0</math> km/s:</b>	N/A
<b>Depth to <math>V_s = 2.5</math> km/s:</b>	N/A

**DETERMINISTIC****Elsinore (Julian)**

<b>Fault ID:</b>	390
<b>Maximum Magnitude (MMax):</b>	7.7
<b>Fault Type:</b>	SS
<b>Fault Dip:</b>	84 Deg
<b>Dip Direction:</b>	NE
<b>Bottom of Rupture Plane:</b>	18.90 km
<b>Top of Rupture Plane(Ztor):</b>	0.00 km
<b>Rrup</b>	25.79 km
<b>Rjb:</b>	25.79 km
<b>Rx:</b>	23.36 km
<b>Fnorm:</b>	0
<b>Frev:</b>	0

<b>Period</b>	<b>SA(Base Spectrum)</b>	<b>Basin Factor</b>	<b>Near Fault Factor(Applied)</b>	<b>SA(Final Spectrum)</b>
0.01	0.160	1.000	1.000	0.160
0.05	0.210	1.000	1.000	0.210
0.1	0.313	1.000	1.000	0.313
0.15	0.363	1.000	1.000	0.363
0.2	0.363	1.000	1.000	0.363
0.25	0.333	1.000	1.000	0.333
0.3	0.305	1.000	1.000	0.305
0.4	0.257	1.000	1.000	0.257
0.5	0.224	1.000	1.000	0.224
0.6	0.195	1.000	1.000	0.195
0.7	0.173	1.000	1.000	0.173
0.85	0.150	1.000	1.000	0.150
1	0.132	1.000	1.000	0.132
1.2	0.113	1.000	1.000	0.113
1.5	0.092	1.000	1.000	0.092
2	0.068	1.000	1.000	0.068
3	0.043	1.000	1.000	0.043
4	0.031	1.000	1.000	0.031
5	0.025	1.000	1.000	0.025

**PROBABILISTIC****Probabilistic Model****USGS Seismic Hazard Map(2008) 975 Year Return Period**

<b>Period</b>	<b>SA(Base Spectrum)</b>	<b>Basin Factor</b>	<b>Near Fault Factor(Applied)</b>	<b>SA(Final Spectrum)</b>
0.01	0.277	1.000	1.000	0.277
0.05	0.454	1.000	1.000	0.454
0.1	0.562	1.000	1.000	0.562
0.15	0.612	1.000	1.000	0.612
0.2	0.651	1.000	1.000	0.651
0.25	0.584	1.000	1.000	0.584
0.3	0.534	1.000	1.000	0.534
0.4	0.440	1.000	1.000	0.440
0.5	0.378	1.000	1.000	0.378
0.6	0.327	1.000	1.000	0.327
0.7	0.288	1.000	1.000	0.288
0.85	0.246	1.000	1.000	0.246
1	0.214	1.000	1.000	0.214
1.2	0.180	1.000	1.000	0.180
1.5	0.145	1.000	1.000	0.145
2	0.110	1.000	1.000	0.110
3	0.070	1.000	1.000	0.070
4	0.050	1.000	1.000	0.050
5	0.042	1.000	1.000	0.042

**MINIMUM DETERMINISTIC SPECTRUM**

<b>Period</b>	<b>SA</b>
0.01	0.197
0.05	0.267
0.1	0.414
0.15	0.476
0.2	0.466
0.25	0.413
0.3	0.369
0.4	0.303
0.5	0.248
0.6	0.203
0.7	0.171
0.85	0.138
1	0.115
1.2	0.093
1.5	0.070
2	0.047
3	0.027
4	0.018
5	0.014

**Envelope Data**

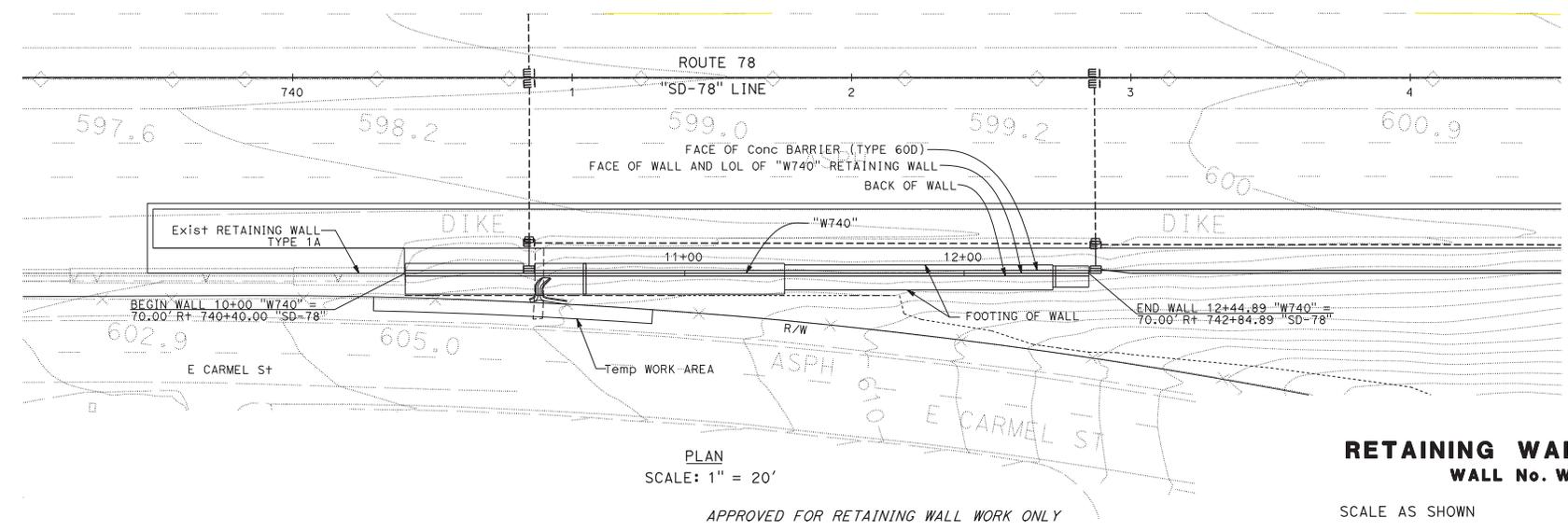
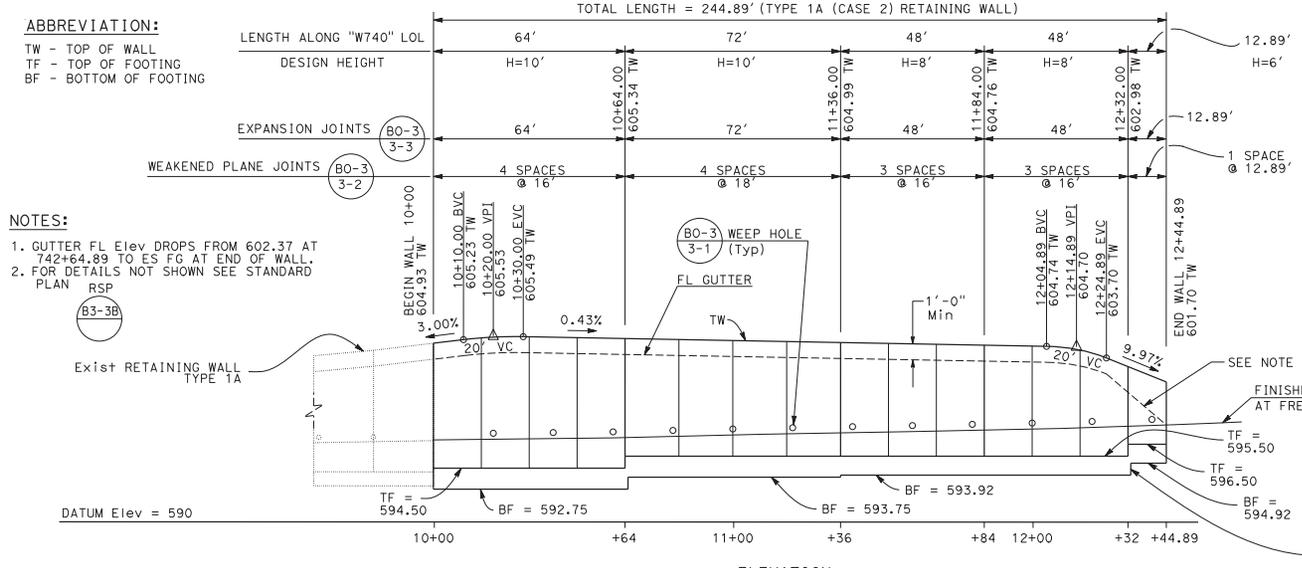
<b>Period</b>	<b>SA</b>
0.01	0.277
0.05	0.454
0.1	0.562
0.15	0.612
0.2	0.651
0.25	0.584
0.3	0.534
0.4	0.440
0.5	0.378
0.6	0.327
0.7	0.288
0.85	0.246
1	0.214
1.2	0.180
1.5	0.145
2	0.110
3	0.070
4	0.050
5	0.042

REVISIONS:  
 REVISED BY: PHOUKHAO SASTINOUAN  
 DATE REVISED: TOM GUERRINI  
 CALCULATED/DESIGNED BY: ED HAJJ  
 CHECKED BY:  
 FUNCTIONAL SUPERVISOR:  
 DEPARTMENT OF TRANSPORTATION DESIGN  
 STATE OF CALIFORNIA - CALTRANS

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	78	13.0/14.1		

REGISTERED CIVIL ENGINEER DATE  
 THOMAS M. GUERRINI  
 No. 65539  
 Exp 09-30-17  
 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 SCANNED COPIES OF THIS PLAN SHEET.



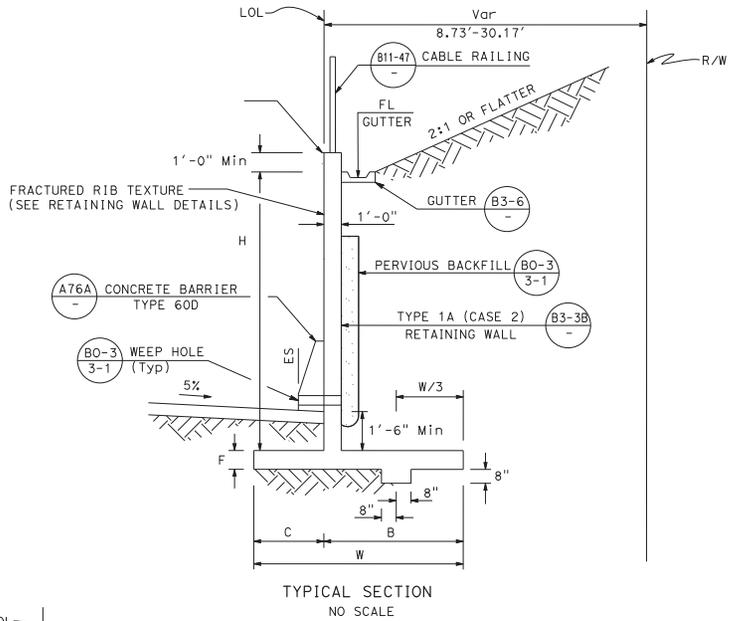
**RETAINING WALL PLAN**  
**WALL No. W740**  
 SCALE AS SHOWN **R1-1**

LAST REVISION DATE PLOTTED => 27-MAY-2016  
 02-05-16 TIME PLOTTED => 12:38

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
**Edgett**  
 DESIGN  
 FUNCTIONAL SUPERVISOR  
 ED HAJJ  
 CALCULATED-DESIGNED BY  
 CHECKED BY  
 PHOUKHAO SASTINOUAN  
 TOM GUERRINI  
 REVISED BY  
 DATE REVISED

NOTES:  
 1. FOR SPREAD FOOTING SECTION C-C, SEE RSP B3-3B.  
 2. SEE RSP B3-3B FOR ADDITIONAL INFORMATION.

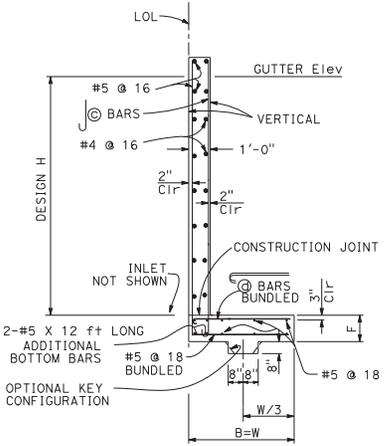
TABLE OF REINFORCING STEEL, DIMENSIONS	
DESIGN H	10'
W	7'-6"
C	0
B	7'-6"
F	1'-9"
⊙ BARS	2-#6 @ 6
⊕ BARS	2-#6 @ 6



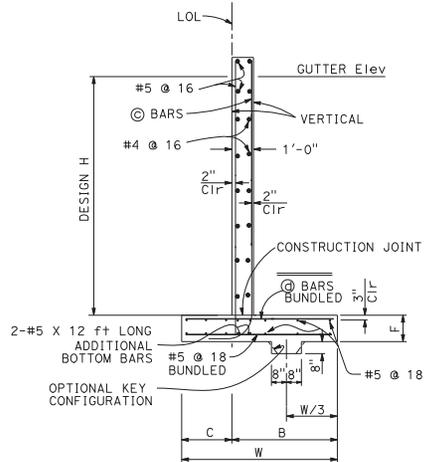
District	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS
11	SD	78	13.0/14.1	

REGISTERED CIVIL ENGINEER DATE  
 THOMAS M. GUERRINI  
 No. 65539  
 Exp 09-30-17  
 CIVIL  
 STATE OF CALIFORNIA

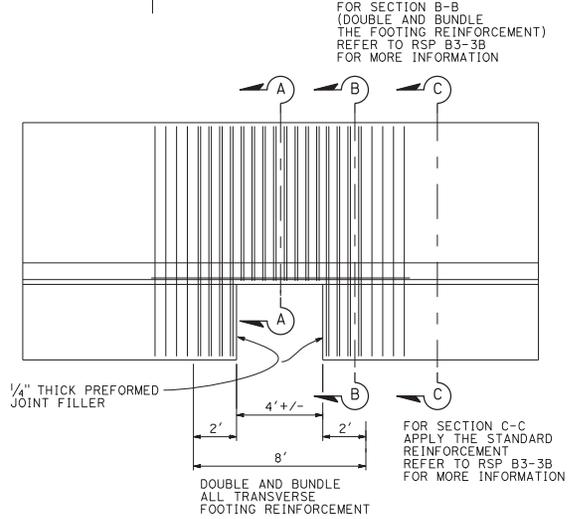
PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



SPREAD FOOTING SECTION A-A AT INLET  
 S+10+44.28  
 (INLET NOT SHOWN)  
 PLACE CONCRETE IN TOE AGAINST UNDISTURBED MATERIAL, EXCEPT AS PERMITTED BY THE ENGINEER



SPREAD FOOTING SECTION B-B AT INLET  
 PLACE CONCRETE IN TOE AGAINST UNDISTURBED MATERIAL, EXCEPT AS PERMITTED BY THE ENGINEER  
 RETAINING WALL TYPE 1A MODIFIED  
 FOR INSTALLATION OF DI



FOOTING REINFORCEMENT AT DI  
 S+10+44.28

**RETAINING WALL DETAILS**  
 WALL No. W740  
 NO SCALE  
**R1-2**

BORDER LAST REVISED 7/2/2010

USERNAME => s108638  
 DGN FILE => 1115000142qa002.dgn



UNIT 2761

PROJECT NUMBER & PHASE

11150001421

LAST REVISION DATE PLOTTED => 27-MAY-2016  
 02-05-16 TIME PLOTTED => 12:38

**Replace section 19-4 with:  
19-4 ROCK EXCAVATION**

**19-4.01 GENERAL**

**19-4.01A Summary**

Section 19-4 includes specifications for performing rock excavation, presplitting rock, and controlled blasting to form rock excavation slopes. You may use hydraulic splitters, pneumatic hammers, blasting, or other authorized roadway excavation techniques to fracture rock and construct stable final rock cut faces. Notify the Engineer when rock excavation is encountered. The Engineer must concur with the designation of Rock Excavation prior to doing this work.

You may use hydraulic splitters, pneumatic hammers, blasting, or other authorized roadway excavation techniques to fracture rock and construct stable final rock cut faces.

Comply with section 12.

If you choose to use blasting, comply with federal, state, and local blasting regulations. Regulations containing specific Cal-OSHA requirements for blasting activities include 8 CA Code of Regs, Ch 4, Subchapter 7, Group 18, "Explosive Materials."

You are liable for damages resulting from blasting activities.

**19-4.01B Definitions**

Rock Excavation is the excavation of all hard, indurated, massive or discontinuous, compacted or cemented earth materials that require blasting, mechanical fragmentation or the use of heavy ripping equipment to excavate.

Rock that cannot be ripped by a tracked bulldozer working in the direction of greatest weakness, equipped with a single shank ripper, possessing a minimum weight of 81,000 pounds, and minimum power measured at the flywheel of 285 horsepower is classified as Rock Excavation.

Rock excavation may be determined in the field based upon correlation of fracture density and rock strength as depicted on the Point Index Load/Discontinuity Spacing Index chart in the Information Handout.

**presplitting:** Establishment of a free surface or shear plane in rock along the specified excavation slope by the controlled use of explosives and blasting accessories in appropriately aligned and spaced drill holes.

**19-4.01C Submittals**

Submit 3 copies of a blasting safety plan for review. The plan must include:

1. References to applicable federal, state, and local codes and regulations
2. Copies of permits required for blasting activities
3. Business name, contractor license number, address, and telephone number of the blasting subcontractor
4. Proof of current liability insurance and bonding
5. Name, address, telephone number, copies of applicable licenses, and resume of:
  - 5.1. Blaster-in-charge
  - 5.2. Personnel responsible for blast design, loading, and conducting blasting operations
  - 5.3. Safety officer for blasting subcontractor
6. Name, address, and telephone number of the local fire station and law enforcement agencies
7. Detailed description of:
  - 7.1. Location where explosives will be stored
  - 7.2. Security measures to protect and limit access to the explosives

- 7.3. Transportation means for explosives
- 7.4. List of personnel permitted to handle the explosives
- 8. Exclusion zone and limited-entry zone for nonblast related operations and personnel surrounding loading and blasting operations
- 9. Details of warning signals used to alert employees on the job site of an impending blast and to indicate the blast is completed and the area is safe to enter
- 10. How blasting operations will be conducted
- 11. Measures to protect blasting operations and personnel from lightning
- 12. Emergency evacuation procedures for areas where explosives may be present
- 13. How misfires will be recognized, handled, and resolved including:
  - 13.1. Who will be notified
  - 13.2. How blast zone will be secured until misfire is resolved
  - 13.3. Identification of equipment that may be needed to resolve misfires
- 14. Details of signs to be used around blasting zones including:
  - 14.1. Timing of when signs will be posted relative to a specific blast
  - 14.2. Name and telephone number of person responsible for placing signs
  - 14.3. Roadway signs for compliance with Chapter 6, Typical Application 2, of the California MUTCD
- 15. Traffic control details for:
  - 15.1. Loading and blasting operations
  - 15.2. Misfire event or other blast related phenomenon that causes a transportation corridor to remain closed to the public
- 16. Description of possible noxious gas generation and details of safeguards to be used to protect employees, work zones adjacent to the shot, private property, and the public
- 17. Procedure to report and resolve complaints for blast related accidents
- 18. Copies of each MSDS and manufacturer data sheets of explosives, caps, primers, initiators, and other compounds

After the plan is authorized, submit 3 additional copies of the authorized plan.

**19-4.02 MATERIALS**

The maximum diameter of explosives used in presplit holes must not be greater than 50 percent of the diameter of the presplit hole.

Only standard cartridge explosives prepared and packaged by explosive manufacturing firms must be used in the presplit holes. These must consist of one of the following:

- 1. Fractional portions of standard cartridges to be affixed to the detonating cord in the field
- 2. Solid column explosives joined and affixed to the detonating cord in the field.

Stemming materials must be dry free-running material meeting the grading requirements shown in the following table:

Sieve sizes	Percentage passing
3/8"	100
No. 8	90

**19-4.03 CONSTRUCTION**

Before drilling the presplitting holes, remove overburden soil and weathered rock along the top of the excavation for a distance of at least 50 feet beyond the drilling limits or to the end of the excavation. Ensure removal of overburden soil and weathered rock and expose fresh rock to an elevation equal to the bottom of the adjacent lift of the presplitting holes being drilled.

Drill slope holes for presplitting along the line of the planned slope within the tolerances specified. The drill holes must be at least 2-1/2 inches, but not more than 3 inches in diameter. Control the drilling operations by the use of proper equipment and techniques to ensure that no hole deviates from the plane

of the planned slope by more than 12 inches or from being parallel to an adjacent hole by more than 67 percent of the planned horizontal spacing between holes.

The length of presplit holes for an individual lift must not exceed 30 feet unless you can demonstrate to the Engineer that you can stay within the tolerances and produce a uniform slope. The length of holes may then be increased to a maximum of 60 feet if authorized.

The spacing of presplit holes must not exceed 3 feet on centers and must be adjusted to produce a uniform shear face between holes.

The Engineer may order you to drill auxiliary holes along the presplit line. These holes must not be loaded or stemmed. Except for spacing, auxiliary drill holes must comply with the specifications for presplit holes. Drilling auxiliary drill holes along the presplit line is change order work.

Place the adjacent line of production holes inside the presplit lines in such a manner that avoids damage to the presplit face.

If necessary to reduce shatter and overbreak of the presplit surface, the 1st line of production holes must be drilled parallel to the slope line at the top of the cut and at each bench level thereafter.

Blasting techniques that result in damage to the presplit surface must be immediately discontinued.

No portion of the production holes may be drilled within 8 feet of a presplit plane unless authorized. The bottom of the production holes must not be lower than the bottom of the presplit holes.

A maximum offset of 24 inches will be permitted for a construction working bench at the bottom of each lift for use in drilling the next lower presplitting pattern.

Adjust the drilling operations to compensate for drift of previous levels and for the offset at the start of a new level to maintain the specified slope plane.

If the methods of drilling and blasting do not produce a uniform slope and shear face without overbreak and within the tolerances specified, then drill, blast, and excavate in short sections, up to 100 feet, until a technique produces the desired results.

If a fractional portion of a standard explosive cartridge is used, the cartridge must be firmly affixed to a length of detonating cord. The cord must be equal to the depth of the drill hole so that the cartridge does not slip down the detonating cord nor cock across the hole and bridge the flow of stemming material. Spacing of cartridges along the length of the detonating cord must not exceed 30 inches center to center and must be adjusted to give the desired results.

If a solid column type explosive is used, the column must be assembled and affixed to the detonating cord complying with the explosive manufacturer's instructions. Submit as an informational submittal a copy of the explosive manufacturer's instructions before using the column type explosive.

The bottom charge of a presplit hole may be larger than the line charges but must not cause overbreak. The top charge of the presplitting hole must be placed far enough below the collar to avoid overbreaking the surface.

Before placing the charge, the hole must be free of obstructions for the hole's entire depth. Ensure placing of the charge does not cause caving of material from the walls of the holes.

The Engineer may order the use of stemming materials as necessary to achieve a satisfactory presplit face. Stemmed presplit holes must be completely filled to the collar.

Detonate charges in each presplitting pattern simultaneously.

The tolerances in section 19-2.03G do not apply to presplit surfaces of excavation slopes where presplitting is required. The presplit face must not deviate more than 1 foot from the plane passing through adjacent drill holes except where the character of the rock has irregularities that are unavoidable.

The average plane of the completed slopes must not deviate more than 1 foot from the plan slopes measured perpendicular to the plane of the slope. No portion of the slope may encroach on the roadbed.

If equally satisfactory presplit slopes are obtained, you may either presplit the slope face before drilling for production blasting or presplit the slope face and production blast at the same time, provided that the presplitting drill holes are fired with zero delay. The production holes must be delayed by at least 50 milliseconds starting at the row of holes farthest from the slope and progressing in steps to the row of holes nearest the presplit line. The presplitting holes must extend either to the end of the excavation or for a distance of not less than 50 feet beyond the limits of the production holes to be detonated.

#### **19-4.04 PAYMENT**

Rock excavation is measured as specified for roadway excavation in section 19-2.04.

The Department does not pay for holes that:

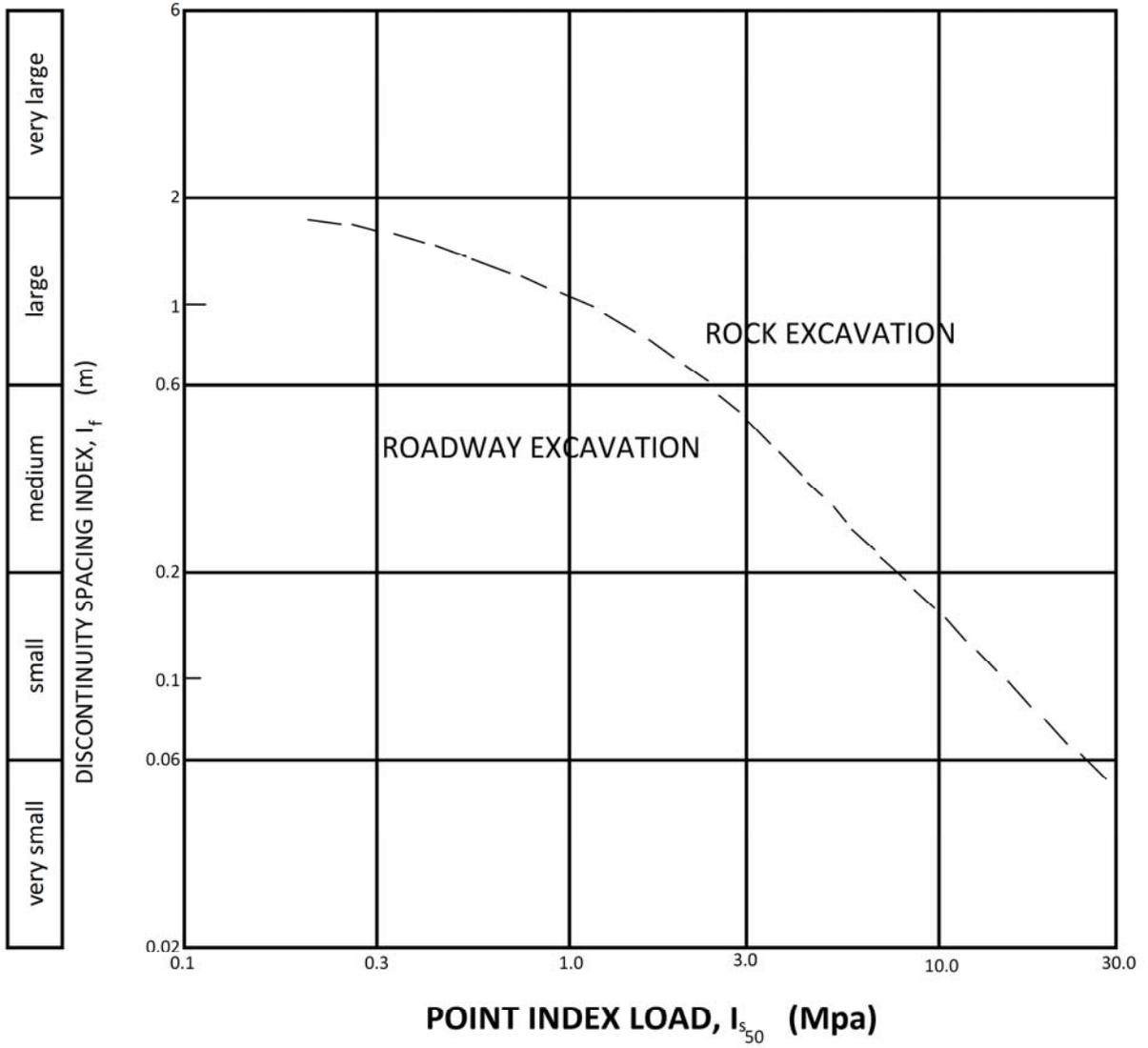
1. Fail to meet the alignment specified controls
2. Are drilled where the finish slope does not meet the slope tolerances specified

The Department pays only for holes that qualify in alignment and slope finish and show a hole trace for approximately 50 percent of the drilled length.

The Engineer determines which presplit holes qualify for payment after excavation but before slope trimming or cleanup work.

Drill hole (presplitting) is measured by the theoretical slope length as computed from elevations, taken before detonating each lift, and a plane 3 feet below finished grade. The Department does not pay for drilling more than 3 feet below finished grade unless additional drilling is ordered. For holes that produce an acceptable slope and comply to the tolerances, except alignment within the plane of the slope, the length paid for is 75 percent of the theoretical slope length.

## POINT INDEX LOAD/DISCONTINUITY SPACING INDEX



# Memorandum

*Serious drought.  
Help Save Water!*

**To:** ELLEN RENKER  
Associate Environmental Planner  
Project Analysis, Branch A

**Date:** December 28, 2015

**File:** 11-42160  
11-1500-0142  
11-SD-78  
PM 13.0 to 14.5

**From:** BRENT BERGE  
Transportation Engineer  
Environmental Engineering



**Subject:** **REVISED HAZARDOUS WASTE REVIEW FOR 'FAST-TRACK' PROJECT  
"CONSTRUCT EASTBOUND AND WESTBOUND AUX LANES ON SR-78"**

The scope includes constructing eastbound and westbound auxiliary lanes along SR-78 between Twin Oaks Valley Road (PM 13.0) and 0.25 miles east of Woodland Parkway (PM 14.5) in the City of San Marcos in San Diego County. Road widening, construction of retaining walls, drainage, and culvert work will be done. There will be no widening of bridges and there will be no right-of-way acquisition involved. The following is a discussion regarding typical hazardous waste issues that could affect this project:

Aerially deposited lead (ADL) – Hazardous levels of ADL exist on both eastbound and westbound SR-78. The soil was tested down to 2' along the shoulders of both eastbound and westbound SR-78 and results are documented in the ADL Report prepared by Kleinfelder, Inc. dated November 30, 2015.

Along eastbound SR-78, all soil will be excavated together down to at least 2' and is classified as type "X", non-hazardous. This soil will be relinquished to the contractor. NSSP 7-1.02K(6)(j)(iii) "Earth Material Containing Lead" shall be followed. (The top 1' of soil is hazardous; therefore, excavated soil must be removed at total depths of 2' or greater to ensure that the combined soil is non-hazardous.)

Along westbound SR-78, the top 1' is classified as type "Z2", hazardous, and requires disposal at a Class 1 landfill facility. Soil below 1' is classified as type "X", non-hazardous, and may be relinquished to the contractor. NSSP 14-11.03 "Material Containing Hazardous Waste Concentrations of Aerially Deposited Lead" shall be followed and will specify that the soil shall be excavated in lifts.

The quantities sheet in the project plans should separate the two types of excavated soil into two tables. One table will be named "Roadway X" while the other table will be named "Roadway Z2".

Asbestos containing materials (ACM), lead containing paint (LCP) – The project does not affect any structures or facilities that would warrant an asbestos containing material or lead containing paint inspection so ACM and LCP will not be issues for this project.

Naturally occurring asbestos (NOA) – NOA will not be an issue on this project since NOA does not occur in the project area.

Treated wood waste (TWW) – Treated wood waste to be removed include wooden posts for metal beam guard railing (MBGR) and roadside signs. The treated wood must be properly stored and be disposed at a composite-lined solid waste landfill facility permitted to accept such wastes. *SSP 14-11.09 Treated Wood Waste* must be followed to deal with any wood waste.

Yellow thermoplastic, yellow painted traffic stripe, and pavement marking – Paint stripe removal will require *SSP 15-2.02C(2) Remove Traffic Stripes and Pavement Markings Containing Lead*. Projects implemented in this area since 1997, the year the district stopped using high levels of lead in paint, have removed all yellow paint stripe with hazardous levels of lead. This SSP therefore requires the preparation of a lead compliance plan but does not require the stripe debris to be disposed of as a hazardous waste.

A single Lead Compliance Plan under section 7-1.02K(6)(j)(ii) shall be prepared for workers performing construction activities dealing with soil disturbance and traffic stripe removal.

**The issues identified in this document are not considered as mitigation under CEQA. These issues are routine construction issues that are handled in the construction contract through inclusion of standard special provisions. This project can proceed with very little risk of impacts due to unanticipated hazardous waste or other contamination related issues.**

This determination is based on information provided in the request dated June 3, 2015, updated with ADL results from the Kleinfelder report dated November 30, 2015, and the email from Tom Guerrini dated December 18, 2015 that expanded the project limits. Please submit a supplemental request for a hazardous waste assessment to cover any changes in the nature or scope of the project.

If you have any questions or comments, please contact Brent Berge at (619) 688-3146.

c: Diane Vermeulen – Environmental Engineering (by email only)

bb



**AVAILABILITY RESPONSE AND PRELIMINARY COMMENT – ENGINEERING**

PROJECT NO.: 1115000142

APN(s): VARIOUS

APPLICANT: CALTRANS - CALIFORNIA DEPT OF TRANSPORTATION

TOTAL ACREAGE: \_\_\_\_\_

LOCATION: HWY 78 TOVR/Woodland Pkwy/E. Barham

WORK ORDER#: \_\_\_\_\_

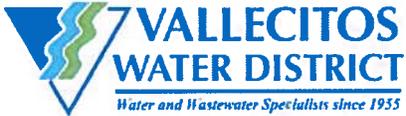
- 1) Located within the Vallecitos Water District (VWD) boundary:
  - Water       Wastewater (sewer)       Sphere of Influence
  - Annexation Required:       Water       Sewer       Water and Sewer
  - Not in VWD District. Please contact: \_\_\_\_\_
- 2) Proposed Dwelling Units: \_\_\_\_\_ Master Plan Land Use: \_\_\_\_\_  
 Proposed Land Use: \_\_\_\_\_  
 Density Change
- 3) Will require:  Water/Sewer Study     Water Supply Assessment (WSA)  
 Water pressure zone (HGL) of \_\_\_\_\_ above sea level.       Pump Zone: \_\_\_\_\_
- 4) The existing water mains available:  Frontage HWY 78

<u>Located</u>	<u>Size</u>	<u>Material</u>	<u>Distance from Property</u>
<u>RANCHEROS DRIVE</u>	_____	_____	_____ LF approx.
<u>E. CARMEL STREET</u>	_____	_____	_____ LF approx.
<u>BARHAM DRIVE</u>	_____	_____	_____ LF approx.
- 5) The existing sewer mains available:  Frontage
 

<u>Located</u>	<u>Size</u>	<u>Material</u>	<u>Distance from Property</u>
_____	_____	_____	_____ LF approx.
_____	_____	_____	_____ LF approx.
_____	_____	_____	_____ LF approx.
- 6) VWD easements existing in proposed development area?     Yes     No  
 Water       Sewer       Easement(s) Attached \_\_\_\_\_ Per Map #: \_\_\_\_\_
- 7) Existing facilities on site:     Water Meter(s)    Quantity: \_\_\_\_\_    Size(s): \_\_\_\_\_  
 Water Capacity OK       Sewer Capacity OK       VWD crossings inspection  
 Water Capacity deficient     Sewer Capacity deficient     Additional Capacity needed.
- 8) Additional Comments: \*     Plan Check required     Water Demand Form required.  
 Conditions will be provided at a later date determined by Water/Sewer Study & Plan Check.  
 Other: DROUGHT RESTRICTIONS ARE IN EFFECT PLEASE SEE WEBSITE VWD.ORG FOR CURRENT CONDITIONS  
 Other: CONSTRUCTION METERS HAVE A 90 DAY LIMIT AN ADDITIONAL 30 DAYS MAY BY APPROVED BY THE GM  
 Other: AN AGREEMENT BETWEEN CALTRANS AND VWD REQUIRED WITH CONDITIONS OF APPROVAL

Name: INGRID STICHTER      Title: Eng Tech II      Signature:       Date: 2-1-2014

\*All equipment on site must meet current Vallecitos Water District Standards. Drought declarations may determine availability. Water and Wastewater is periodically monitored & increased usage may require additional capacity. Please see back side of sheet for general terms and conditions associated with water and wastewater availability statements.



## **WATER & SEWER AVAILABILITY**

Water and sewer service will be provided under the rules and regulations of the District, under normal operating conditions after all required fees have been paid and all conditions of the District have been satisfied.

All new projects are required to complete a water and sewer study to assess the impacts of any increased density and identify measures which will be required to mitigate those impacts.

Existing District pipelines located within the boundaries of the project that are in conflict with the proposed development will require relocation within the public right-of-way or District easements at the developer's expense. Drivable access to, and along, the facilities must be maintained at all times. District policy requires that all newly created parcels have frontage on the District main and extensions of facilities to serve each newly created parcel will be required.

Water or Sewer facilities not within the public right-of-way will require a minimum 20-foot easement granted to the District. The District may require additional easements through the project or private properties for future extensions. The owner of the project is responsible for obtaining any easements including expenses incurred. Joint use of these easements is not allowed by the District and easements for storm drain and other facilities should be analyzed early so that adequate sizing of easements for all facilities and various agencies is provided.

No structures will be allowed over District facilities. This includes but is not limited to, walls, entrance medians, landscaping, gates, guard house structures, curbs and gutters, or driveways that will be constructed over District facilities.

For protection of District facilities, any areas with water pressures near or higher than 150 psi will require water pressure regulators before the meter.

The Fire Department should be contacted to verify fire flow requirements and location of fire flow facilities required for the proposed project. A hydraulic analysis prepared by the District will be required to determine the available fire flow for the project. The owner/developer is responsible for all costs incurred in obtaining the hydraulic analysis. Looping or upgrades to the existing facilities both onsite and offsite may be required based on results of the required Water and Sewer Study or Fire Flow Analysis.

The District adopted Ordinance No. 162 on May 6, 2009, which identifies various water conservation measures as they relate to current and future drought conditions including the curtailment of availability letters and limiting new service connections at level 3.

This letter is issued for planning purposes only, and is not a representation, expressed or implied that the District will provide service at a future date. The Vallecitos Water District relies one hundred percent on imported water supplies. Water may not be available at the time the project is built. Commitments to provide service are made by the District Board of Directors and are subject to compliance with District fees, charges, rules and regulations.

**VALLECITOS WATER DISTRICT**  
201 Vallecitos de Oro  
San Marcos, CA 92069  
(760) 744-0460

**WARRANTY BOND  
FOR TRAFFIC STRIPE AND PAVEMENT MARKING TAPE (WARRANTY)**

TM-D11-0001 (REV 2016.08.17)

CONTRACT NUMBER			BOND NUMBER		BUSINESS NAME OF PRINCIPAL	
<b>LOCATION</b>	DISTRICT	COUNTY	ROUTE	POST MILE	PREMIUM AMOUNT	EFFECTIVE DATE

**INSTRUCTIONS TO SURETY COMPANY**

**On the Surety Bond, under the "Description of Attached Document," on the line labeled "Title or Type of Document," the Surety Company shall list the description of WARRANTY BOND FOR TRAFFIC STRIPE AND PAVEMENT MARKING TAPE (WARRANTY) and shall also include the CONTRACT NUMBER.**

**KNOW ALL PERSONS BY THESE PRESENTS,**

**THAT WHEREAS,** The State of California (State), acting by and through the Department of Transportation, has awarded to \_\_\_\_\_ ("Contractor"), a contract ("Contract") for the construction work described as follows:

\_\_\_\_\_  
\_\_\_\_\_; and

**WHEREAS,** The Contractor is required by the Contract to arrange for a warranty bond ("this Bond"), in connection with traffic stripe and pavement marking tape items of work bid as warranty items under said Contract, guaranteeing the faithful performance of the tape-related warranty obligations under the Contract; and

**WHEREAS,** The Contract allows either the Contractor or tape manufacturer ("Tape Manufacturer") to act as Principal for this Bond; and

**WHEREAS,** If agreed between the Contractor and Tape Manufacturer, the Tape Manufacturer shall act as the Principal; otherwise, the Contractor shall act as Principal; and

**WHEREAS,** The \_\_\_\_\_ shall be known forthwith as Principal; and  
*(Indicate one: Business Name of "Contractor" or Business Name of "Tape Manufacturer")*

**WHEREAS,** The Principal is required by the Contract, sections 3-1.09 and 84-7, to warrant the completed traffic stripe and pavement marking tape items of work bid as warranty items under said Contract, and to furnish a warranty bond guaranteeing the faithful performance of the tape-related warranty obligations for the periods, of five (5) years for traffic stripe and of two (2) years for pavement marking, as described under the Contract thereof.

**NOW, THEREFORE,** We, the undersigned Principal and \_\_\_\_\_  
\_\_\_\_\_ ("Surety"), a Surety Company qualified and duly licensed to do business in the State of California, are held and firmly bound unto the State in the penal sum of \_\_\_\_\_ Dollars No/100-dollars (\$ \_\_\_\_\_), lawful money of the United States of America, to be paid to the said State or its certain attorney, its successors and assigns, for which payment, well and truly to be made, we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

**THE CONDITION OF THIS OBLIGATION IS SUCH:**

1. The Contract documents are incorporated by reference herein.
2. That if the above bound Principal, or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in connection with warranty work for traffic stripe and pavement marking tape items of work bid as warranty

items in the foregoing Contract, including any and all amendments, supplements, and alterations thereto made as therein provided in connection with warranty work for traffic stripe and pavement marking tape items of work bid as warranty items, on his or their part to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless the State, its officers and agents, as therein stipulated, then this obligation shall become and be null and void; otherwise, it shall be and remain in full force and virtue, it being expressly understood and agreed that the liability of Surety for any and all claims hereunder shall in no event exceed the Bonded Sum.

3. Surety's obligations under this Bond shall include the Principal's obligation to pay its subcontractors, suppliers, and mechanics for warranty-related work or supply.
4. This Bond shall cover the cost to perform required warranty work, but shall not cover any damages of the type specified to be covered by any professional liability insurance, whether or not such insurance is provided in an amount sufficient to cover such damages.
5. Whenever Principal shall be, and is declared by the State to be, in default with respect to its warranty obligations under the Contract Documents, provided that the State is not then in material default thereunder, Surety shall promptly take one of the following actions with the consent of the State:
  - 5.1. Arrange for Principal to perform and complete the warranty obligations of the Contract
  - 5.2. Complete the warranty work in accordance with the terms and conditions of the Contract documents then in effect, through its agents or through independent contractors
  - 5.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the State for a contract for performance and completion of the warranty work (as defined in the Contract), through a procurement process approved by the State, arrange for a contract to be prepared for execution by the State and the contractor selected with the State's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract
  - 5.4. Waive its right to perform and complete, arrange for completion or obtain a new contractor; and then with reasonable promptness under the circumstances:
    - 5.4.1. After investigation, determine the amount for which it may be liable to the State and, as soon as practicable after the amount is determined, tender payment therefore to the State, or
    - 5.4.2. Deny liability in whole or in part and notify the State citing reasons therefore.
6. If Surety does not proceed as provided in Paragraph 5 with reasonable promptness, Surety shall be deemed to be in default on this Bond fifteen days after receipt of an additional written notice from the State to Surety demanding that Surety perform its obligations under this Bond, and the State shall be entitled to enforce any remedy available to the State. If Surety proceeds as provided in Subparagraph 5.4, and the State refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice the State shall be entitled to enforce any remedy available to the State.
7. After the State has terminated the Principal's right to complete the Contract, and if Surety elects to act under Subparagraph 5.1, 5.2, or 5.3 above, then the responsibilities of Surety to the State shall not be greater than those of the Principal under the warranty requirements under the Contract, and the responsibilities of the State to Surety shall not be greater than those of the State under the warranty requirements under the Contract. To the limit of the Bonded Sum, but subject to commitment of the unpaid balance of the mitigation costs and damages in connection with securing the faithful performance of the tape-related warranty obligations under the Contract, Surety is obligated without duplication for:
  - 7.1. The responsibilities of the Principal for correction of defective work
  - 7.2. Actual damages, including additional legal, design professional and delay costs resulting from Principal's default, and resulting from the actions or failure to act of Surety under Paragraph 5.
8. The said Surety agrees that no change, extension of time, alterations, additions, omissions or other modifications of the terms of the Contract, or in the work to be performed with respect to the project, or in the specifications or plans, or any change or modification of any terms of payment or extension of time for any payment pertaining or relating to the Contract, or any recession or attempted recession of the Contract, or this Bond, or any conditions precedent or subsequent in this Bond attempting to limit the right of recovery of claimants otherwise entitled to recover under this Bond, or any fraud practiced by any other person other than the claimant seeking to recover from this Bond, shall in any way affect its obligations on this Bond, and it does hereby waive notice of such changes, extension of time, alterations, additions, omissions or other modifications.

BUSINESS NAME OF PRINCIPAL		DATE
BUSINESS ADDRESS OF PRINCIPAL		BUSINESS PHONE
CITY	STATE	ZIP CODE
PRINT OR TYPE NAME AND TITLE OF AUTHORIZED SIGNATURE		AUTHORIZED SIGNATURE

NOTE: Signatures of those executing for the Principal must be properly acknowledged.

**CALIFORNIA ALL PURPOSE ACKNOWLEDGMENT**

State of California

County of \_\_\_\_\_

On \_\_\_\_\_, before me, a notary public in and for the county and state aforesaid, personally  
 (Date)

appeared \_\_\_\_\_  
 who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to within the instrument and acknowledged to me that he/she executed the same in his/her authorized capacity(ies), and that by his/her signature(s) on the instrument, the person(s) or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal:

\_\_\_\_\_  
 Signature of Notary Public (SEAL)

BUSINESS NAME OF SURETY		DATE
BUSINESS ADDRESS OF SURETY		BUSINESS PHONE
CITY	STATE	ZIP CODE

***I certify (or declare) under penalty of perjury that I have executed the foregoing bond under an unrevoked power of attorney. Executed on (date) \_\_\_\_\_ in (CITY) \_\_\_\_\_ (STATE) \_\_\_\_\_ under the laws of the State of California.***

PRINT OR TYPE NAME OF ATTORNEY-IN-FACT FOR SURETY	SIGNATURE OF ATTORNEY-IN-FACT FOR SURETY
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NOTE: Signatures of those executing for the Surety must be properly acknowledged, and a Power of Attorney attached.

**CALIFORNIA ALL PURPOSE ACKNOWLEDGMENT**

State of California

County of \_\_\_\_\_

On \_\_\_\_\_, before me, a notary public in and for the county and state aforesaid, personally  
(Date)

appeared \_\_\_\_\_  
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to within the instrument and acknowledged to me that he/she executed the same in his/her authorized capacity(ies), and that by his/her signature(s) on the instrument, the person(s) or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal:

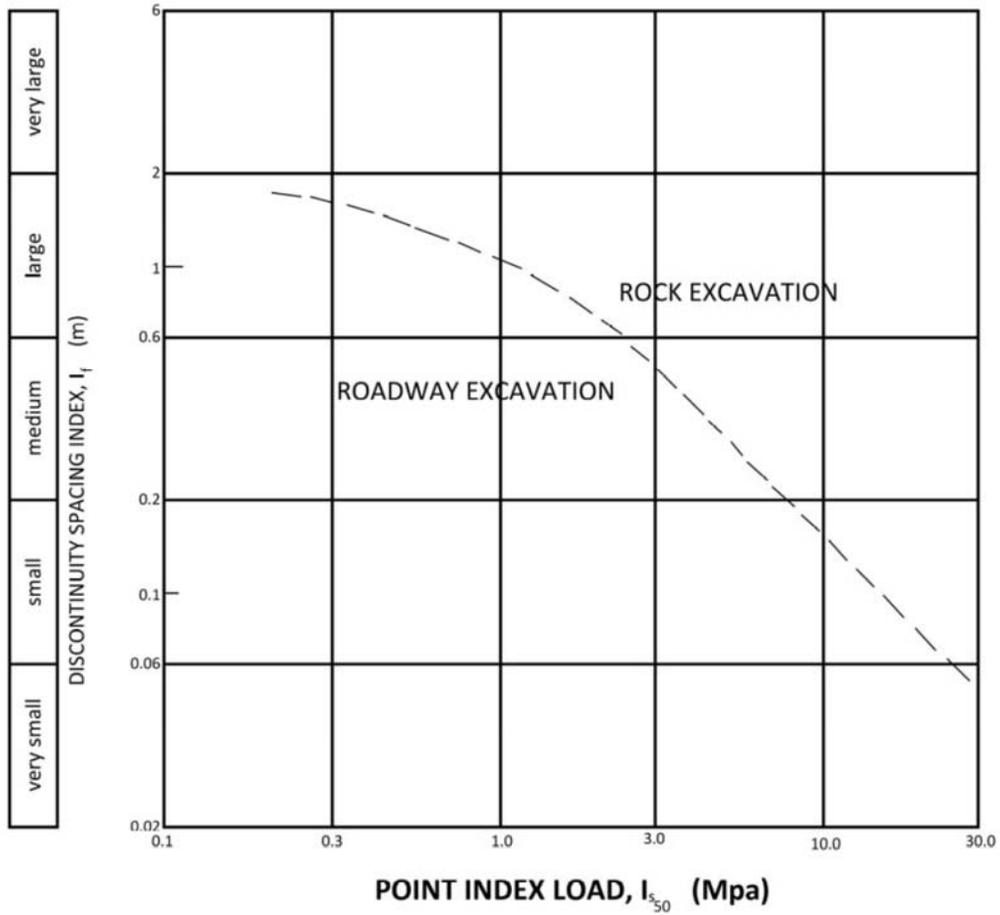
\_\_\_\_\_  
*Signature of Notary Public* (SEAL)

Contract No. 11-421604

11-SD-78 PM 13.0/14.1

Project ID 1115000142

### POINT INDEX LOAD/DISCONTINUITY SPACING INDEX



Read Me File for Cross Sections

*AADD-11-421604XS\_EB-SR-78.pdf* – EB-SR-78 Cross Sections dated 6/24/16

*AADD-11-421604XS\_WB-SR-78.pdf* – WB-SR-78 Cross Sections dated 6/24/16