FOR CONTRACT NO.: 11-401404

INFORMATION HANDOUT

MATERIALS INFORMATION

AERIALLY DEPOSITED LEAD (ADL) DISTRICT MEMORANDUM DATED MAY 15, 2012

GEOTECHNICAL DESIGN REPORT FOR THE CONCRETE OUTER SEPARATION BARRIER AT LOCATION 1, DATED JANUARY 30,2012.

GEOTECHNICAL DESIGN REPORT FOR THE CONCRETE OUTER SEPARATION BARRIER AT LOCATION 2, DATED JANUARY 18,2012.

GEOTECHNICAL DESIGN REPORT FOR THE CONCRETE OUTER SEPARATION BARRIER AT LOCATION 8, DATED FEBRUARY 14, 2012.

GEOTECHNICAL DESIGN REPORT FOR THE CONCRETE OUTER SEPARATION BARRIER AT LOCATION 20, DATED JANUARY 12, 2012.

GEOTECHNICAL DESIGN REPORT FOR THE CONCRETE OUTER SEPARATION BARRIER AT LOCATION 24, DATED JANUARY 9, 2012.

GEOTECHNICAL DESIGN REPORT FOR THE CONCRETE OUTER SEPARATION BARRIER AT LOCATION 25, DATED FEBRUARY 29, 2012.

STRUCTURAL SECTION RECOMMENDATIONS DATED FEBRUARY 29, 2012.

ROUTE: 11-SD-Var-Var (PM)

State of California

Business, Transportation and Housing Agency

Memorandum

To: **Sandra Lavender**
Environmental Planner
Environmental Analysis

Date: Rev May 15, 2012
File: 11-SD-various
PM: various
EA: 40140K

From: **Joel Kloth**
Engineering Geologist
Environmental Engineering

Subject: Replace Metal Beam Guardrail and Install Concrete Barriers and SMART or REACT Crash Cushions, Various Routes, San Diego County, California

A review by Environmental Engineering regarding the potential for encountering hazardous waste issues/materials on the subject project has been completed. Hazardous waste issues may include Aerially Deposited Lead (ADL) where there is exposed soil for crash cushions, concrete barriers, and treated wood guardrail posts. Results of the lead investigations located in the vicinity of the project footprint can be found in various reports. Total lead concentrations in the vicinity of the project locations range from not detected above the detection limit of 5 milligrams per kilogram (mg/kg), to 3000 mg/kg with an average of approximately 200 mg/kg.

For the Type 60 Mod, REACTS, and SMART crash cushions at locations 1, 2, 8, 12, 13, 14, 17, 20, 31, 32, and 36 (see attached table) excavation activities are to follow SSP 14-11.03 which will invoke the Department of Toxic Substances Control (DTSC) lead variance. For the excavation activities, the soil excavated is hazardous with regard to ADL concentrations. Type "Z-2" material will apply. Using type "Z-2" material, if the soil excavated is relinquished to a contractor, it must be disposed as a hazardous waste at a Class I landfill. For cost estimating, approximately $200.00 per cubic yard for transport and disposal may be used.

Locations not mentioned above do not have ADL either due to age, previous projects performed at the location, or have been covered.

According to 14-11.03, a site specific Lead Compliance Plan shall be prepared to include measures that limit exposure of lead affected soil to persons working onsite, and use of proper Personal Protective Equipment. Persons working with the soil containing hazardous concentrations of lead should have training in accordance with Title 8 of the CCR 1532.1(e)(2)(B).

The wood guardrail posts at each location within the project locations have been treated, and handling and disposal must follow SSP 14-11.09. The wood must be handled and disposed in accordance with Local, State, and Federal guidelines. When treated wood is removed, the treated wood must be disposed at a composite-lined solid waste landfill facility permitted to accept such wastes. If you have questions, please call (619) 688-3146.

Joel Kloth, PG
Engineering Geologist
Environmental Engineering

cc: Jayne Dowda

Location	Rte	PM	LOCATION	TYPE OF WORK	EXISTING GROUND FOR CRASH CUSHION
1	5	R12.688	SB Off ramp to NB 15	Replace MBGR with concrete barrier (proposed type 60), left side, install REACT 9CBB, concrete barrier may need to be on piles in some areas	Bare soil
2	5	R14.25/R 14.43	SB 5 From Beadsley Ave POC to Commercial St OH	Replace MBGR with concrete barrier (proposed type 60 Mod), right side, concrete barrier may need to be on piles in some areas	
3	5	R16.900	SB Off ramp to Front & 2nd Street	Gore, replace with REACT 9CBB, need to taper barrier 20:1 towards CBB	Asphalt Concrete
4	5	R18.362	SB Off ramp to Kettner Blvd	Gore, replace with REACT 9CBB, need to taper barrier 20:1(proposed type 60) towards CBB	Portland Cement Concrete
5	5	R30.412R	NB 5 to SR-56 Bypass	Replace with REACT 9CBB, need to taper barrier 20:1 towards CBB	Portland Cement Concrete
6	5	R32.767	NB 5 to Truck/SR-56 Bypass	Replace with REACT 9CBB, need to taper barrier 20:1 towards CBB, on structure	Portland Cement Concrete
7	5	R32.996	SB 5 to 5 Bypass and 805 Bypass	Replace with REACT 9CBB, need to taper barrier 20:1 towards CBB	Asphalt Concrete & Portland Cement Concrete
8	5	R72.186	SB On ramp from Cristianitos Road	Place concrete barrier (proposed type 60 Mod) along the west side of I-5 from the San Mateo Creek Br to the SB entrance ramp gore, concrete barrier may need to be on piles in some areas	
9	8	R0.165	WB Off ramp to NB Rte 5	Gore, on structure, replace with REACT 9CBB, need to taper barrier 20:1 towards CBB	Asphalt Concrete
10	8	R0.308	EB On ramp from NB Route 209	Gore, on structure, replace with REACT 9CBB, need to taper barrier 20:1 towards CBB	Portland Cement Concrete
11	8	1.600-1.906	WB On ramp from Hotel Circle North	Replace MBGR on the right side with concrete barrier (proposed type 60), place concrete barrier and SMART crash cushion in median island between on/off ramp	Asphalt Concrete

12	8	2.527	EB Off ramp to Mission Center Road	Replace MBGR with concrete barrier (proposed type 60) and REACT 9CBB, need to taper barrier 20:1 towards CBB	Bare soil
13	8	3.089	EB On ramp from Mission Center Rd	Replace MBGR on the left and right sides with concrete barrier (proposed type 60), REACT 4CBB/SMART on right side	Bare soil
14	8	3.902	EB at Texas St OC	Gore at column, replace with SMART, need to taper barrier 20:1 towards CBB,	Bare soil
15	8	3.902	WB at Texas St OC	Gore at column, replace with SMART, need to taper barrier 20:1 towards CBB, curb height = 4"	Asphalt Concrete
16	8	5.607	EB Off ramp to NB 15 / Fairmount Ave	Remove some of the existing concrete barrier, replace sand barrels with REACT 9CBB	Asphalt Concrete
17	8	5.726	WB Fairmount Ave / Collector to WB 8	Extend concrete barrier (proposed type 60) on right side	
18	8	12.056	Segment Off to NB/SB 125	Gore, on structure, replace with REACT 9CBB, need to taper barrier 20:1 towards CBB	Portland Cement Concrete
19	8	12.159	EB Off ramp to Severin Dr	Replace with REACT 9CBB, need to taper barrier 20:1 towards CBB	Asphalt Concrete
20	15	2.371	SB Off to WB 94	Replace MBGR with concrete barrier (proposed type 60) on right side, concrete barrier may need to be on piles in some areas	
21	15	R6.210/ R6.211	SB Off to WB 8/Camino Del Rio South	Gore, replace with REACT 9CBB, need to taper barrier 20:1 towards CBB	Asphalt Concrete
22	15	R6.334/ R6.335	SB Off to WB & EB Route 8	Gore, on structure, replace with REACT 9CBB, need to taper barrier 20:1 towards CBB	Portland Cement Concrete
23	15	R10.575	SB 15 at Junction of SR-52	Gore, replace with REACT 9CBB, need to taper barrier 20:1(proposed type 60 & 60 Mod)	Bare soil
24	15	R10.575/ R10.853	NB 15 from Junction SR-52 to EB/ WB 52 merge	Replace MBGR with Conc Barrier (proposed type 60) left side from gore point (WB SR-52) to merge with EB 52 to NB 15 connector, install REACT 9CBB and on right side from gore point (WB SR-52) to mainline (NB 15), bury concrete barrier in slope	Bare soil

25	54	0.160R-0.420R	SB 5 to EB 54	Replace MBGR with concrete barrier (proposed type 60 & 736), left side, concrete barrier may need to be on piles in some areas (Loc 1 for EA 284301)	
~~26~~	~~56~~	~~8.1~~	~~WB Off ramp to Rancho Penasquitos Blvd~~	~~Gore, replace with REACT 9CBB, need to taper barrier 20:1(proposed type 60) towards CBB~~	~~Bare soil~~
27	67	R0.402	SB Off to WB Route 8	Gore, replace with REACT 9CBB, need to taper barrier 20:1 towards CBB	Asphalt Concrete
28	75	15.725	SB off to Leyte Road	Replace Crash Cushion with SMART	Asphalt Concrete & Portland Cement Concrete
29	75	R22.094	NB Off to National Ave /SB Route 5	Replace with REACT 9CBB, need to taper barrier 20:1 towards CBB, on structure	Portland Cement Concrete
30	75	R22.198	NB Off ramp to National Ave	Replace with REACT 9CBB, need to taper barrier 20:1 towards CBB, on structure	Portland Cement Concrete
31	94	3.127	EB Off to NB 15	Gore, replace with REACT 9CBB, need to taper barrier 20:1 (proposed type 60 & 60 Mod) towards CBB, remove raised curb and gutter	Bare soil
32	94	4.976	EB Off ramp to Euclid Avenue	Gore, replace with REACT 9CBB, need to taper barrier 20:1 (proposed type 60) towards CBB, remove raised curb and gutter	Bare soil
~~33~~	~~125~~	~~18.617~~	~~NB Off ramp to Amaya Drive/Fletcher Pkwy~~	~~Gore, install REACT 9CBB~~	~~Portland Cement Concrete~~
~~34~~	~~125~~	~~21.855~~	~~NB Off to WB Route 52~~	~~Gore, install REACT 9CBB, need to taper barrier 20:1 (proposed type 60) towards CBB~~	~~Asphalt Concrete~~
35	163	0.661	NB Off to NB 5	Replace with REACT 9CBB, need to taper barrier 20:1(proposed type 60) towards CBB	Asphalt Concrete
36	163	0.981	NB On From NB Route 5 / Park Boulevard	Replace existing damaged/slope concrete barrier with Type 60 concrete barrier, left side	
37	163	9.616	SB Off to Route WB 52 WB	Replace with REACT 9CBB, need to taper barrier 20:1 towards CBB	Asphalt Concrete
38	805	28.286	NB Off to NB 56 Bypass at Sorrento Valley Under-crossing	Replace with REACT 9CBB, need to taper barrier 20:1 towards CBB	Asphalt Concrete

ADL Prsent and invokes variance, Type Z-2 material to be disposed of at Class 1 landfill, $200/Cy disposal cost

Minor disturbance 07-330 applies

State of California

Business, Transportation and Housing Agency

Memorandum

To: Oscar Aguilar
Project Engineer
District 11
Office of Design, MS#333

Date: January 30, 2012
File: 11-SD-5-R 12.68
EA: 11-401404
EFIS: 1100000531

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

Subject: Geotechnical Design Report for the Concrete Outer Separation Barrier at Location 1: from Southbound Interstate 5 to Northbound Interstate 15 Connector.

Pursuant to your request, the Office of Geotechnical Design South 2 (OGDS2) has prepared this Geotechnical Design Report (GDR) for the proposed Concrete Outer Separation Barrier at Location 1 from Southbound Interstate 5 to Northbound Interstate 15 connector. This report defines the geotechnical conditions as evaluated from field data and used in the development of the geotechnical design. This report provides recommendations and advisories for project design and construction.

OGDS2 staff is available for further assistance on this project. If you have additional questions or require clarification please contact Jeff Tesar at (office) 858 467-2716 or (mobile) 858 945-0458.

J. Tesar

Jeff Tesar, C.E.G.
Engineering Geologist
Office of Geotechnical Design-South 2

Brian Hinman

Brian Hinman, P.E.
Senior Transportation Engineer

REGISTERED GEOLOGIST
JEFF J. TESAR
No. 2137
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

cc: Ed Hajj
Mark Willian
Art Padilla
Abbas Abghari
District Construction R.E. Pending File

District Project Manager
Geotechnical Services Corporate
District Materials Engineer
Office Chief, OGDS2
It is the responsibility of the District Project Engineer and/or the Design Senior to include this document in the R.E. Pending Files

1.0 EXECUTIVE SUMMARY

Pursuant to the recommendations contained in this report, due to the fact that at Location 1 the barrier will be constructed at about the hinge of the steep connector slope, pile foundations will be necessary for the proposed separation barrier. The barrier on piles should be designed in accordance with Caltrans Standard Plan Type 736-SV-Case 2 (Sheet B15-6) without sound wall. These recommendations are presented in detail within this report and may be used for project design and construction.

2.0 INTRODUCTION

Pursuant to your request, the Caltrans Office of Geotechnical Design South 2 has provided this Geotechnical Design Report to be used for project design and construction. The proposed project involves construction of a concrete outer separation barrier on the southbound (SB) Interstate 5 (I-5) to northbound (NB) Interstate 15 (I-15) connector. The proposed barrier is shown on the site plan layout attached to this report. This barrier will be located west of the edge of the western shoulder. To the west of the proposed barrier, a west to northwest facing slope with an average inclination of approximately 2:1 horizontal to vertical (H:V) bounds this shoulder. The maximum height of this slope is approximately 30.0 feet. This slope is depicted in the attached Photos.

3.0 EXISTING FACILITIES.

The SB I-5 to NB I-15 connector is a one lane ramp connecting I-5 with I-15 in San Diego, California. Existing facilities in the project area include bridges, graded slopes, buried utilities, traffic sign structures, and drainage features.

4.0 PHYSICAL SETTING

The climate in this area is considered semi-arid. Precipitation records available from the National Weather Service indicate that average rainfall at the Miramar Naval Air Station that is located 7.5 miles inland from the Pacific Coast (elevation of 475 feet), and about ten and a half miles to the north of the project limits, is 11 inches per year. In general, at the project area and in its vicinity, annual rainfall increases with distance from the coastline. In addition, nearly 90% of the annual precipitation occurs between the months of November and April. Therefore, the period from November through April is considered to be the rainy season.

The topography in the project area is characterized by a broad, flat mesa dissected by incised arroyos and valleys. The mesa has formed as an uplifted wave cut marine terrace. Subsequent erosion has formed the arroyos and valleys. The project site lies within the valley created at the conjunction of the Chollas Creek and its tributary. From north to west and southwest the SB I-5 to NB I-15 connector descends on a steep gradient through a ramp embankment built within a valley formed by the Chollas Creek and its tributary.

Natural drainage at the project location and in its vicinity occurs mainly through the arroyos.

Runoff water and drainage water in developed areas flows toward, or is channeled to, these topographic features that carry it to Chollas Creek. Then, through Chollas Creek concentrated flows are conveyed west to the San Diego Bay.

There are no man-made or natural features that present any unusual engineering or construction challenges.

5.0 SITE INVESTIGATION

The following subsections describe the investigation conducted for this report.

5.1 Pertinent Reports and Archives Review

The following reports were reviewed during the preparation of this report:

"Interstate 805 Soundwalls Unit 3, from 0.5 Miles South of the I-805/SR-54 Interchange to 0.25 Miles South of the I-805/SR-94 Interchange" by Jeff Tesar, 2011.

5.2 Exploration

Two exploratory borings were conducted along the barrier alignment. The soil borings were advanced into the ground up to a maximum depth of 6.0 feet utilizing a hand auger with 3-inch diameter bit. Soil cuttings were visually classified in the field. No laboratory testing of soils was conducted. Apparent density of soils was estimated from the response of the auger to the drilling effort. Borings were drilled approximately two feet to the west of the existing guard rail barrier. Descriptions of the subsurface soils encountered at boring locations are presented in the attached Table 1, Subsurface Soil Description. The boring locations are shown on the attached project layout plan.

6.0 GEOLOGY

The proposed barrier is underlain by fill materials derived from local cuts during the construction of the freeway. Fill materials consist of sands with trace to some gravel. This fill is underlain by alluvial and slope wash native soils associated with the Chollas Creek and its tributary. The alluvium consists mostly of poorly consolidated stream deposits of silt, sand, and cobble-sized particles derived from bedrock sources that lie in or near the valleys. These deposits intertongue with the Holocene Epoch slopewash that mantles the lower valley slopes. The slopewash deposits are poorly consolidated surficial soils derived chiefly from nearby sources and decomposed bedrock. The slopewash is deposited along the flanks of the lower valley slopes by the interaction of gravity and water (Kennedy and Tan, 1977.)

7.0 GEOTECHNICAL CONSIDERATIONS

The following subsections describe geotechnical characteristics of the project site that may influence design.

7.1 Subsurface Soil Conditions

The alignment of the proposed concrete outer separation barrier is underlain by fill materials consisting of sands and gravels. The apparent density of this fill was estimated to be medium dense. Based on a review of geologic maps this fill is in turn underlain by the native alluvial and slopewash soils.

7.2 Groundwater

The groundwater table is expected to be located at a significant depth relative to the proposed construction and consequently is not anticipated to impact the project.

7.3 Erosion

No evidence of excessive erosion was observed on the face of the existing slope. However, if construction operations related to this project adversely affect the face of the existing slope, then appropriate erosion control measures should be applied to its affected sections.

7.4 Seismic Hazards

The proposed concrete outer separation barrier will not be adversely impacted by seismic events.

7.5 Slope Stability and Rockfall

This slope appears to be in good condition. No evidence of slope failure or distress was found during the subsurface exploration phase of this project.

Rockfall potential does not exist on the project.

7.6 Excavation Characteristics

The soil that underlies the barrier alignment may be excavated utilizing standard heavy duty earth-moving and drilling equipment. The presence of gravel in fill materials can affect the production rate of the drilling and increase by estimated 5% the volume of concrete utilized for the pile foundation construction.

7.7 Embankments

No significant embankment will be constructed as part of the project.

7.8 Volumetric Stability of Embankment and Sub grade Materials

Significant adverse soil conditions such as expansive or collapsible soils were not identified

within the project limits.

7.9 Potential Geologic Hazards

No significant geologic hazards were identified within the project area.

8.0 HAZARDOUS WASTE POTENTIAL

A hazardous waste site evaluation is beyond the scope of this report. No potentially hazardous waste was encountered during site reconnaissance and site subsurface investigation.

9.0 RECOMMENDATIONS AND ADVISORIES

9.1 Concrete Barriers

- Caltrans Standard Plan for Sound Wall on Type 736 SV (Sheet B15-6) Case 2 but without the sound wall is recommended the entire length of the proposed barrier replacement. For the Case 2 Pile Data Table (Sheet B15-8) an angle of internal friction (Φ) of 30 degrees should be utilized.

9.2 Erosion Control

Appropriate erosion control measures should be implemented to protect any newly graded slope face or slope face affected by the construction activities related to this project.

9.3 Surface Drainage

Concentrated surface water should not be allowed to pond behind the concrete barrier. Concentrated runoff should not be directed to drain over the slope. Surface water should be contained by appropriate drainage improvements.

9.4 Construction Advisories

The contractor should anticipate moderately difficult excavation/drilling conditions as described in section 7.6.

10.0 DIFFERING SITE CONDITIONS

The recommendations contained in this report are based on specific project information regarding structure type and location that have been provided by District 11 Design. If any conceptual changes are made during final project design or if site conditions are encountered during construction that are believed to differ from those conveyed in this report, staff from OGDS2 should review the project to provide appropriate recommendations. Any questions regarding the above recommendations should be directed to the attention of Jeff Tesar, at (858) 467-2716.

REFERENCES

1. Michael Kennedy and Siang Tan: *"Geology of the Southern San Diego Metropolitan Area, California."* California Division of Mines and Geology, Map Sheet 29, 1977.
2. *"Interstate 805 Soundwalls Unit 3, from 0.5 Miles South of the I-805/SR-54 Interchange to 0.25 Miles South of the I-805/SR-94 Interchange"* by Jeff Tesar, 2011.
3. State of California, Department of Transportation, Standard Plans, 2010.

ATTACHEMENTS

1. Project Location Layout
2. Layout L-1 (Location 1)
3. Table 1, Subsurface Soil Description
4. Photos

Table 1, Subsurface Soil Description

BORING NO.	LOCATION STATION	SUBSURFACE SOIL DESCRIPTION
HA-11-001	693+65 "S4" Line	0-3.0': Poorly-graded SAND (SP): estimated medium dense; brown; moist; medium SAND. 3.0'-5.5': Poorly-graded SAND (SP): estimated medium dense; brown; moist; medium SAND; some fine GRAVEL; (FILL).
HA-11-002	695+30 "S4" Line	0-6.0': Poorly-graded SAND (SP): estimated medium dense; brown; moist; medium SAND; trace fine GRAVEL; (FILL)

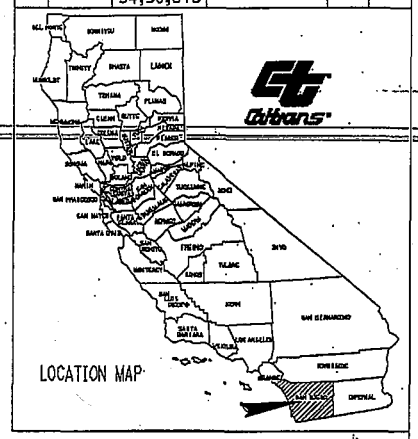
INDEX OF PLANS

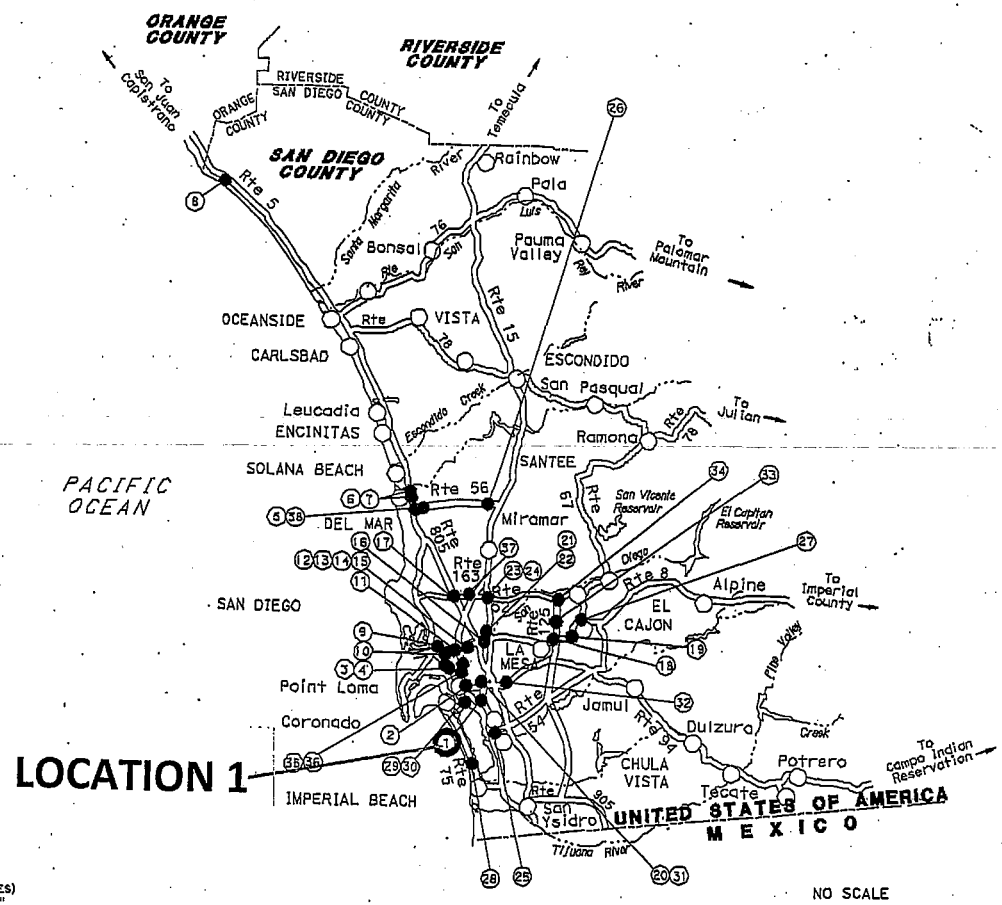
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PROJECT PLANS FOR CONSTRUCTION ON
STATE HIGHWAY
IN SAN DIEGO COUNTY AT VARIOUS LOCATIONS

TO BE SUPPLEMENTED BY STANDARD PLANS DATED MAY 2006

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
11	SD	5,8,15, 54,56,etc	Var		





NO SCALE

PROJECT ENGINEER REGISTERED CIVIL ENGINEER — DATE

REGISTERED PROFESSIONAL ENGINEER — OSCAR AGUILAR No. C62571 Exp. 06-30-12 CIVIL STATE OF CALIFORNIA

PLANS APPROVAL DATE

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

CONTRACT No.	11-401404
PROJECT ID	1100000531

THE CONTRACTOR SHALL POSSESS THE CLASS (OR CLASSES) OF LICENSE AS SPECIFIED IN THE "NOTICE TO BIDDERS."

PROJECT MANAGER: ED HAJJ
DESIGN ENGINEER: OSCAR M AGUILAR

LAST REVISED 01-24-11 — DATE PLOTTED => 25-AUG-2011 TIME PLOTTED => 11:54

BORDER LAST REVISED 7/2/2010 | CALTRANS WEB SITE IS: HTTP//WWW.DOT.CA.GOV/ | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => s128339 DGN FILE => 1100000531cb001.dgn | UNIT 2761 | PROJECT NUMBER & PHASE 1100000531

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
11	SD	5,8,15,54,56,67, 75,94,125,163,805	Var		

REGISTERED CIVIL ENGINEER DATE

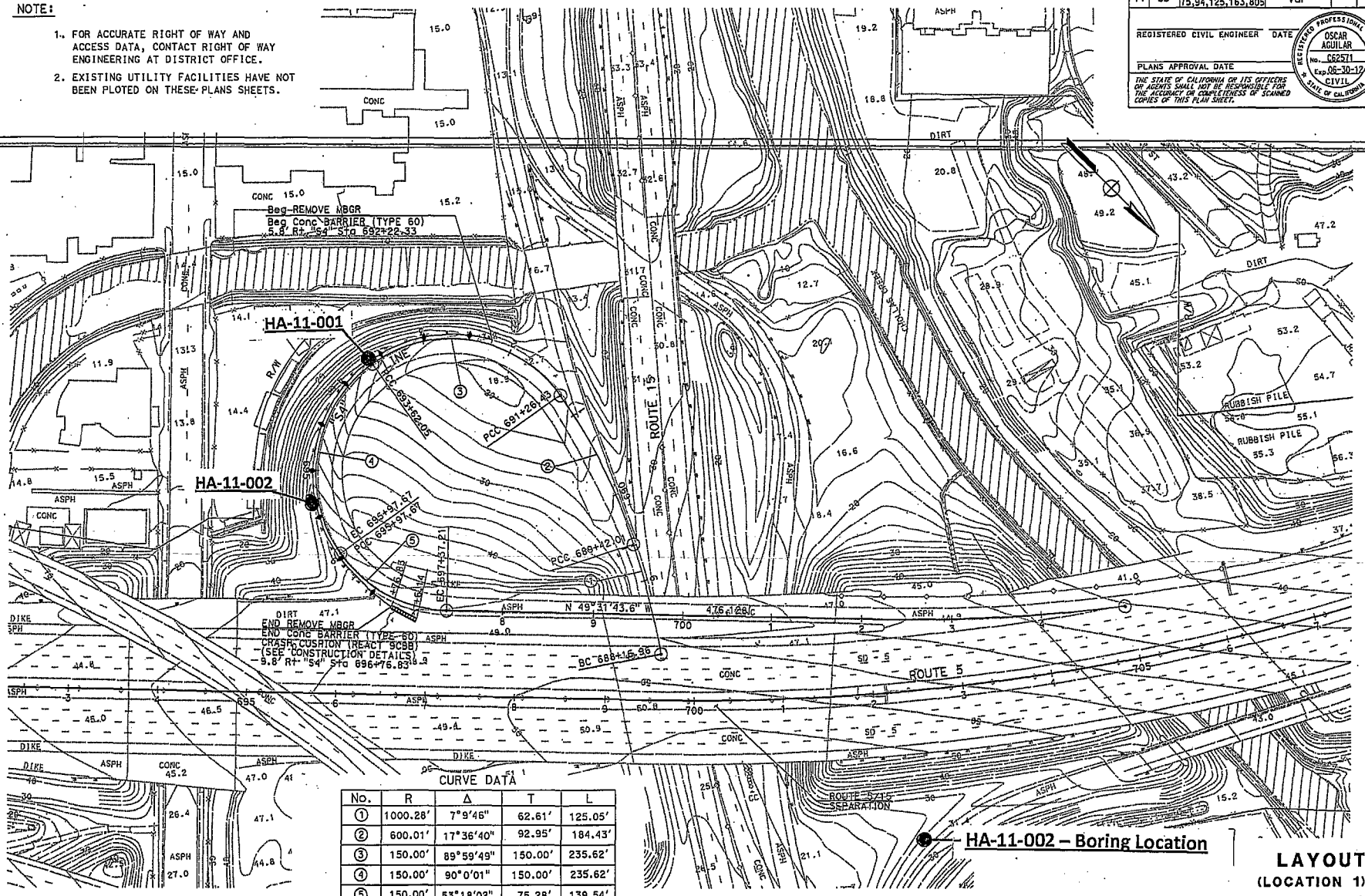
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER OSCAR AGUILAR No. C62571 Exp. 06-30-12 CIVIL STATE OF CALIFORNIA

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.

NOTE:

1. FOR ACCURATE RIGHT OF WAY AND ACCESS DATA, CONTACT RIGHT OF WAY ENGINEERING AT DISTRICT OFFICE.
2. EXISTING UTILITY FACILITIES HAVE NOT BEEN PLOTED ON THESE PLANS SHEETS.



CURVE DATA

No.	R	Δ	T	L
1	1000.28'	7°9'46"	62.61'	125.05'
2	600.01'	17°36'40"	92.95'	184.43'
3	150.00'	89°59'49"	150.00'	235.62'
4	150.00'	90°0'01"	150.00'	235.62'
5	150.00'	53°18'02"	75.28'	139.54'

LAYOUT
(LOCATION 1)
L-1

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

FUNCTIONAL SUPERVISOR: ED HAJJ
CALCULATED-DESIGNED BY: OSCAR M AGUILAR
CHECKED BY: THIN BUI
REVISED BY
DATE REVISED

LAST REVISION DATE PLOTTED => 15-DEC-2011
04-12-11 TIME PLOTTED => 16:30

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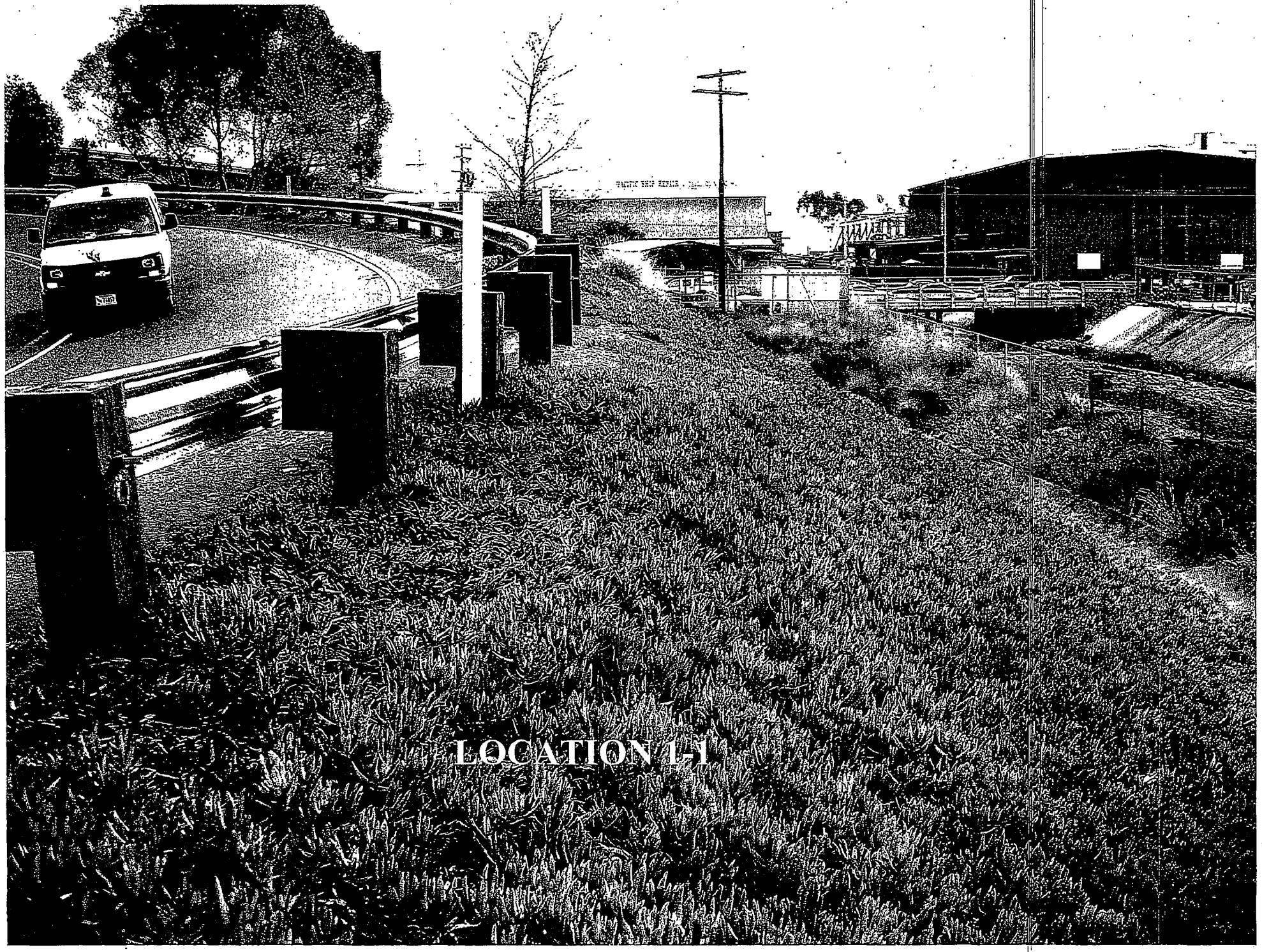
LOCATION 1-1

LOCATION 1-2

State of California

Business, Transportation and Housing Agency

Memorandum

To: Oscar Aguilar
Project Engineer
District 11
Office of Design, MS#333

Date: January 18, 2012
File: 11-SD-5-R14.25/R14.43
EA: 11-401404
EFIS: 1100000531

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

Subject: Geotechnical Design Report for the Concrete Outer Separation Barrier at Location 2: from Southbound Interstate 5 to Beardsly Avenue (Commercial Street).

Pursuant to your request, the Office of Geotechnical Design South 2 (OGDS2) has prepared this Geotechnical Design Report (GDR) for the proposed Concrete Outer Separation Barrier at Location 2 from Southbound Interstate 5 to Beardsly Avenue (Commercial Street). This report defines the geotechnical conditions as evaluated from field data and used in the development of the geotechnical design. This report provides recommendations and advisories for project design and construction.

OGDS2 staff is available for further assistance on this project. If you have additional questions or require clarification please contact Jeff Tesar at (office) 858 467-2716 or (mobile) 858 945-0458.

Jeff Tesar, C.E.G.
Engineering Geologist
Office of Geotechnical Design-South 2

Brian Hinman, P.E.
Senior Transportation Engineer

REGISTERED GEOLOGIST
JEFF J. TESAR
No. 2137
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

cc: Ed Hajj
Mark Willian
Art Padilla
Abbas Abghari
District Construction R.E. Pending File

District Project Manager
Geotechnical Services Corporate
District Materials Engineer
Office Chief, OGDS2
It is the responsibility of the District Project Engineer and/or the Design Senior to include this document in the R.E. Pending Files

1.0 EXECUTIVE SUMMARY

Pursuant to the recommendations contained in this report one section of the proposed concrete outer separation barrier may be constructed per Caltrans Standard Plan Concrete barrier Type 60. However, due to the fact that at Location 2 the barrier will be constructed at about the hinge of the steep ramp slope, pile foundations will be necessary for the second section of the proposed separation barrier. The barrier on piles should be designed in accordance with Caltrans Standard Plan Type 736 SV Case 2 (Sheet B15-6) without sound wall. These recommendations are presented in detail within this report and may be used for project design and construction.

2.0 INTRODUCTION

Pursuant to your request, the Caltrans Office of Geotechnical Design South 2 has provided this Geotechnical Design Report to be used for project design and construction. The proposed project involves construction of a concrete outer separation barrier on the southbound (SB) Interstate 5 (I-5) to Beardsly Avenue (Commercial Street) offramp. The proposed barrier is shown on the site plan layout attached to this report. This barrier will be located west of the edge of the western shoulder. To the west of the proposed barrier, a west facing slope with an average inclination of approximately 2:1 horizontal to vertical (H:V) bounds this shoulder. The maximum height of this slope is approximately 51.0 feet. This slope is depicted in the attached Photos.

3.0 EXISTING FACILITIES.

The SB I-5 to Beardsly Avenue (Commercial Street) ramp is a one lane ramp connecting I-15 with Beardsly Avenue and Commercial Street in San Diego, California. Existing facilities in the project area include bridges, graded slopes, buried utilities, traffic sign structures, and drainage features.

4.0 PHYSICAL SETTING

The climate in this area is considered semi-arid. Precipitation records available from the National Weather Service indicate that average rainfall at the Miramar Naval Air Station that is located 7.5 miles inland from the Pacific Coast (elevation of 475 feet), and about ten miles to the north of the project limits, is 11 inches per year. In general, at the project area and in its vicinity, annual rainfall increases with distance from the coastline. In addition, nearly 90% of the annual precipitation occurs between the months of November and April. Therefore, the period from November through April is considered to be the rainy season.

The topography in the project area is characterized by a broad, flat mesa dissected by incised arroyos and valleys. The mesa has formed as an uplifted wave cut marine terrace. Subsequent erosion has formed the arroyos and valleys. The project site lies within the valley created at the conjunction of the Chollas Creek and its tributary. From north to southwest and west the SB I-5 to Beardsly Ave (Commercial Street) offramp descends on a medium steep gradient through a ramp embankment built within a valley formed by the Chollas Creek and its tributary.

Natural drainage at the project location and in its vicinity occurs mainly through the arroyos. Runoff water and drainage water in developed areas flows toward, or is channeled to, these topographic features that carry it to Chollas Creek. Then, through Chollas Creek it is conveyed west to the San Diego Bay.

There are no man-made or natural features that present any unusual engineering or construction challenges.

5.0 SITE INVESTIGATION

The following subsections describe the investigation conducted for this report.

5.1 Pertinent Reports and Archives Review

The following reports were reviewed during the preparation of this report:

"Interstate 805 Soundwalls Unit 3, from 0.5 Miles South of the I-805/SR-54 Interchange to 0.25 Miles South of the I-805/SR-94 Interchange" by Jeff Tesar, 2011.

5.2 Exploration

Two exploratory borings were conducted along the barrier alignment. The soil borings were advanced into the ground up to a maximum depth of 6.0 feet utilizing a hand auger with 3-inch diameter bit. Soil cuttings were visually classified in the field. No laboratory testing of soils was conducted. Apparent density of soils was estimated from the response of the auger to the drilling effort. Borings were drilled approximately two feet to the west of the existing guard rail barrier. Descriptions of the subsurface soils encountered at boring locations are presented in the attached Table 1, Subsurface Soil Description. The boring locations are shown on the attached project layout plan.

6.0 GEOLOGY

The proposed barrier is underlain by fill materials derived from local cuts during the construction of the freeway. Fill materials consist of sands with trace to some gravel. This fill is underlain by alluvial and slope wash native soils associated with the Chollas Creek and its tributary. The alluvium consists mostly of poorly consolidated stream deposits of silt, sand, and cobble-sized particles derived from bedrock sources that lie in or near the valleys. These deposits intertongue with the Holocene Epoch slopewash that mantles the lower valley slopes. The slopewash deposits are poorly consolidated surficial soils derived chiefly from nearby sources and decomposed bedrock. The slopewash is deposited along the flanks of the lower valley slopes by the interaction of gravity and water (Kennedy and Tan, 1977.)

7.0 GEOTECHNICAL CONSIDERATIONS

The following subsections describe geotechnical characteristics of the project site that may influence design.

7.1 Subsurface Soil Conditions

The alignment of the proposed concrete outer separation barrier is underlain by fill materials consisting of sands and gravels. The apparent density of this fill was estimated to be medium dense. Based on a review of geologic maps this fill is in turn underlain by the native alluvial and slopewash soils.

7.2 Groundwater

The groundwater table is expected to be located at a significant depth relative to the proposed construction and consequently is not anticipated to impact the project.

7.3 Erosion

No evidence of excessive erosion was observed on the face of the existing slope. However, if construction operations related to this project adversely affect the face of the existing slope, then appropriate erosion control measures should be applied to its affected sections.

7.4 Seismic Hazards

The proposed concrete outer separation barrier will not be adversely impacted by seismic events.

7.5 Slope Stability and Rockfall

This slope appears to be in good condition. No evidence of slope failure or distress was found during subsurface exploration phase of this project.

Rockfall potential does not exist on the project.

7.6 Excavation Characteristics

The soil that underlies the barrier alignment may be excavated utilizing standard heavy duty earth-moving and drilling equipment. The presence of gravel in fill materials can affect the production rate of the drilling and increase by estimated 5% the volume of concrete utilized for the pile foundation construction.

7.7 Embankments

No significant embankment will be constructed as part of the project.

7.8 Volumetric Stability of Embankment and Sub grade Materials

Significant adverse soil conditions such as expansive or collapsible soils were not identified within the project limits.

7.9 Potential Geologic Hazards

No significant geologic hazards were identified within the project area.

8.0 HAZARDOUS WASTE POTENTIAL

A hazardous waste site evaluation is beyond the scope of this report. No potentially hazardous waste was encountered during site reconnaissance and site subsurface investigation.

9.0 RECOMMENDATIONS AND ADVISORIES

9.1 Concrete Barriers

- From Station 1216+91.17 ("01" Line) to Station 1220+25 ("01" Line) Caltrans Standard Plan Concrete Barrier Type 60 (Sheet A76B) is recommended for the section of the proposed concrete barrier replacement.

- From Station 1220+25 ("01" Line) through the northern limit of the proposed barrier replacement Caltrans Standard Plan for Sound Wall on Type 736 SV (Sheet B15-6) Case 2 but without the sound wall is recommended of the proposed barrier replacement,. For the Case 2 Pile Data Table (Sheet B15-8) an angle of internal friction (Φ) of 30 degrees should be utilized.

9.2 Erosion Control

Appropriate erosion control measures should be implemented to protect the newly graded slope face.

9.3 Surface Drainage

Concentrated surface water should not be allowed to pond behind the concrete barrier. Concentrated runoff should not be directed to drain over the slope. Surface water should be contained by appropriate drainage improvements.

9.4 Construction Advisories

The contractor should anticipate moderate difficult excavation/drilling conditions as described in section 7.6.

10.0 DIFFERING SITE CONDITIONS

The recommendations contained in this report are based on specific project information regarding structure type and location that have been provided by District 11 Design. If any conceptual changes are made during final project design or if site conditions are encountered during construction that are believed to differ from those conveyed in this report, staff from OGDS2 should review the project to provide appropriate recommendations. Any questions regarding the above recommendations should be directed to the attention of Jeff Tesar, at (858) 467-2716.

REFERENCES

1. Michael Kennedy and Siang Tan: *"Geology of the Southern San Diego Metropolitan Area, California."* California Division of Mines and Geology, Map Sheet 29, 1977.
2. *"Interstate 805 Soundwalls Unit 3, from 0.5 Miles South of the I-805/SR-54 Interchange to 0.25 Miles South of the I-805/SR-94 Interchange"* by Jeff Tesar, 2011.
3. State of California, Department of Transportation, Standard Plans, 2010.

ATTACHEMENTS

1. Project Location Layout
2. Layout L-2 (Location 2)
3. Table 1, Subsurface Soil Description
4. Photos

Table 1, Subsurface Soil Description

BORING NO.	LOCATION STATION	SUBSURFACE SOIL DESCRIPTION
HA-11-001	1221+00 "01" Line	0-3.0': Poorly-graded SAND (SP): estimated medium dense; brown; moist; fine SAND; trace fine GRAVEL; trace coarse SAND (FILL). 3.0'-6.0': Poorly-graded SAND (SP): estimated medium dense; brown; moist; medium SAND; few fine GRAVEL; trace coarse SAND (FILL)
HA-11-002	1223+80 "01" Line	0-4.0': Poorly-graded SAND (SP): estimated medium dense; brown; moist; fine SAND; trace fine GRAVEL; trace coarse SAND (FILL). 4.0'-6.0': Poorly-graded SAND (SP): estimated medium dense; brown; moist; fine SAND; some GRAVEL; (FILL)

INDEX OF PLANS

STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

PROJECT PLANS FOR CONSTRUCTION ON

STATE HIGHWAY

IN SAN DIEGO COUNTY AT VARIOUS LOCATIONS

TO BE SUPPLEMENTED BY STANDARD PLANS DATED MAY 2006

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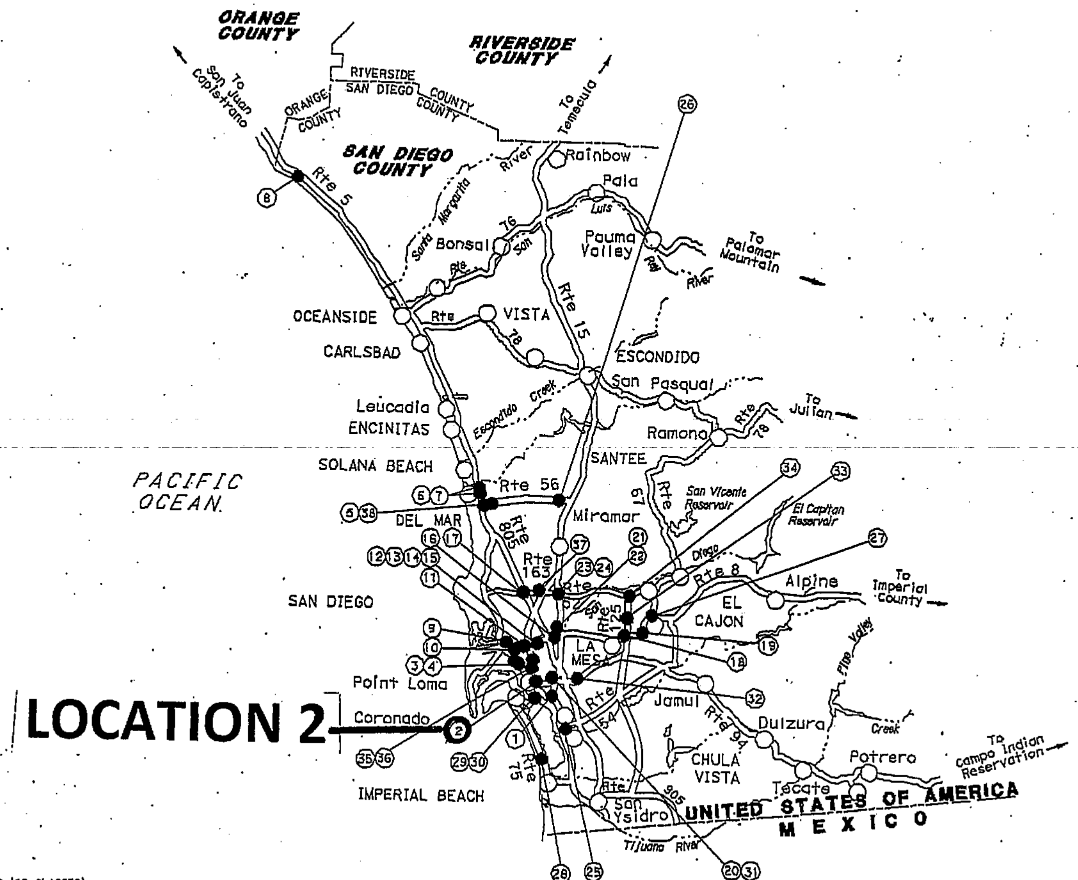

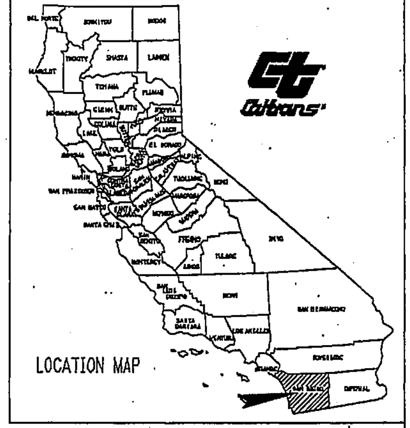

NO SCALE

THE CONTRACTOR SHALL POSSESS THE CLASS (OR CLASSES) OF LICENSE AS SPECIFIED IN THE "NOTICE TO BIDDERS."

DESIGN ENGINEER OSCAR M AGUILAR

PROJECT MANAGER ED HAJJ

PROJECT ENGINEER REGISTERED CIVIL ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER OSCAR AGUILAR No. C62571 Exp. 06-30-12 CIVIL STATE OF CALIFORNIA

PLANS APPROVAL DATE

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

CONTRACT No.	11-401404
PROJECT ID	1100000531

LAST REVISION 01-24-11 DATE PLOTTED => 25-AUG-2011 TIME PLOTTED => 11:54

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
11	SD	5,8,15,54,56,67, 75,94,125,163,805	Var		

REGISTERED CIVIL ENGINEER DATE

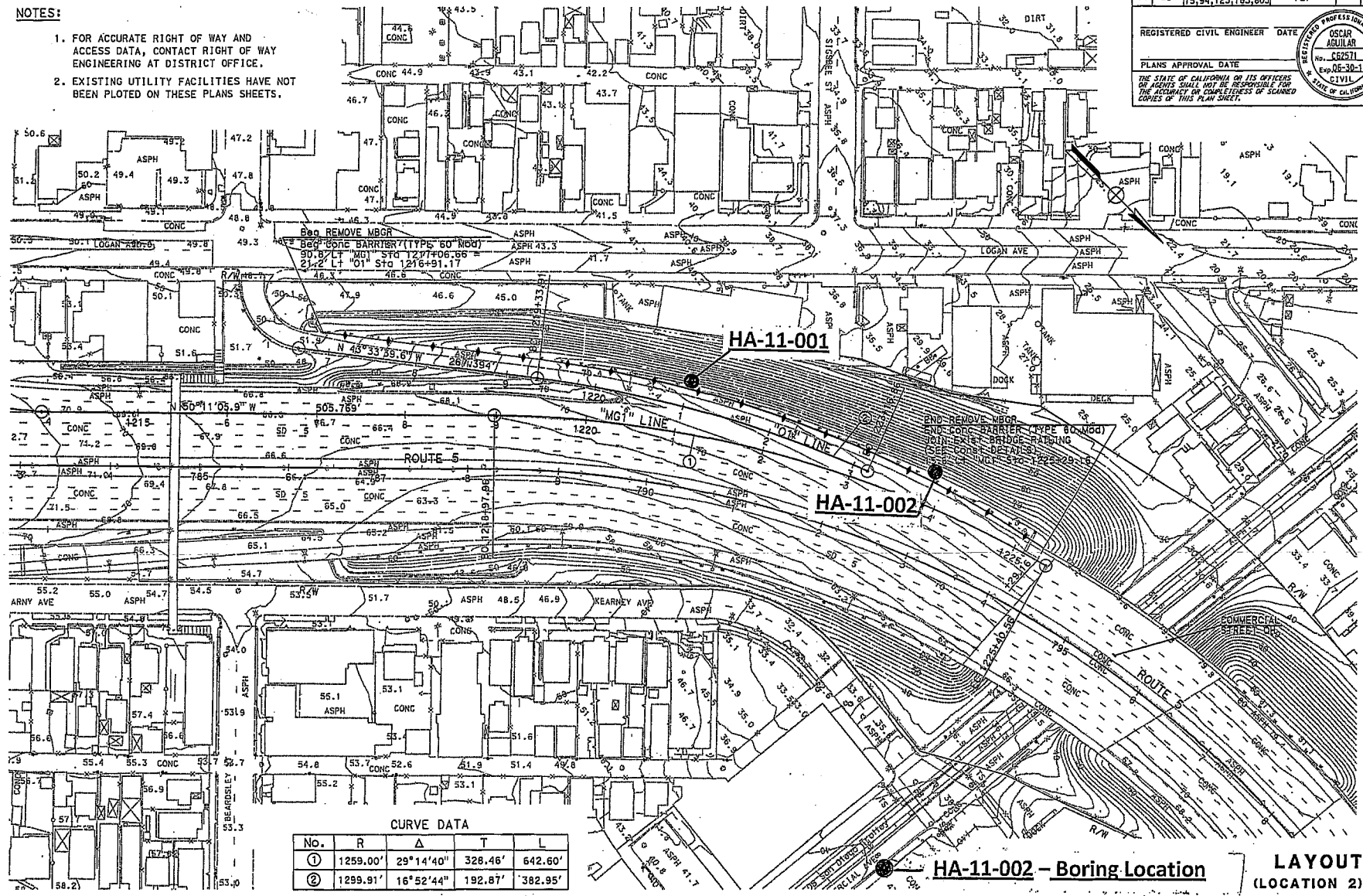
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER OSCAR AGUILAR No. C62571 Exp. 06-30-12 CIVIL STATE OF CALIFORNIA

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.

NOTES:

1. FOR ACCURATE RIGHT OF WAY AND ACCESS DATA, CONTACT RIGHT OF WAY ENGINEERING AT DISTRICT OFFICE.
2. EXISTING UTILITY FACILITIES HAVE NOT BEEN PLOTED ON THIS PLANS SHEETS.



No.	R	Δ	T	L
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②	1299.91'	16°52'44"	192.87'	382.95'

SCALE: 1"=50'

LAYOUT (LOCATION 2)

L-2

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

DESIGN

FUNCTIONAL SUPERVISOR: ED HAJJ

CALCULATED-DESIGNED BY: OSCAR M AGUILAR

CHECKED BY: THIN BUI

REVISED BY / DATE REVISED

LAST REVISION DATE PLOTTED => 15-DEC-2011 TIME PLOTTED => 15:31

04-12-11

BORDER LAST REVISED 7/2/2010

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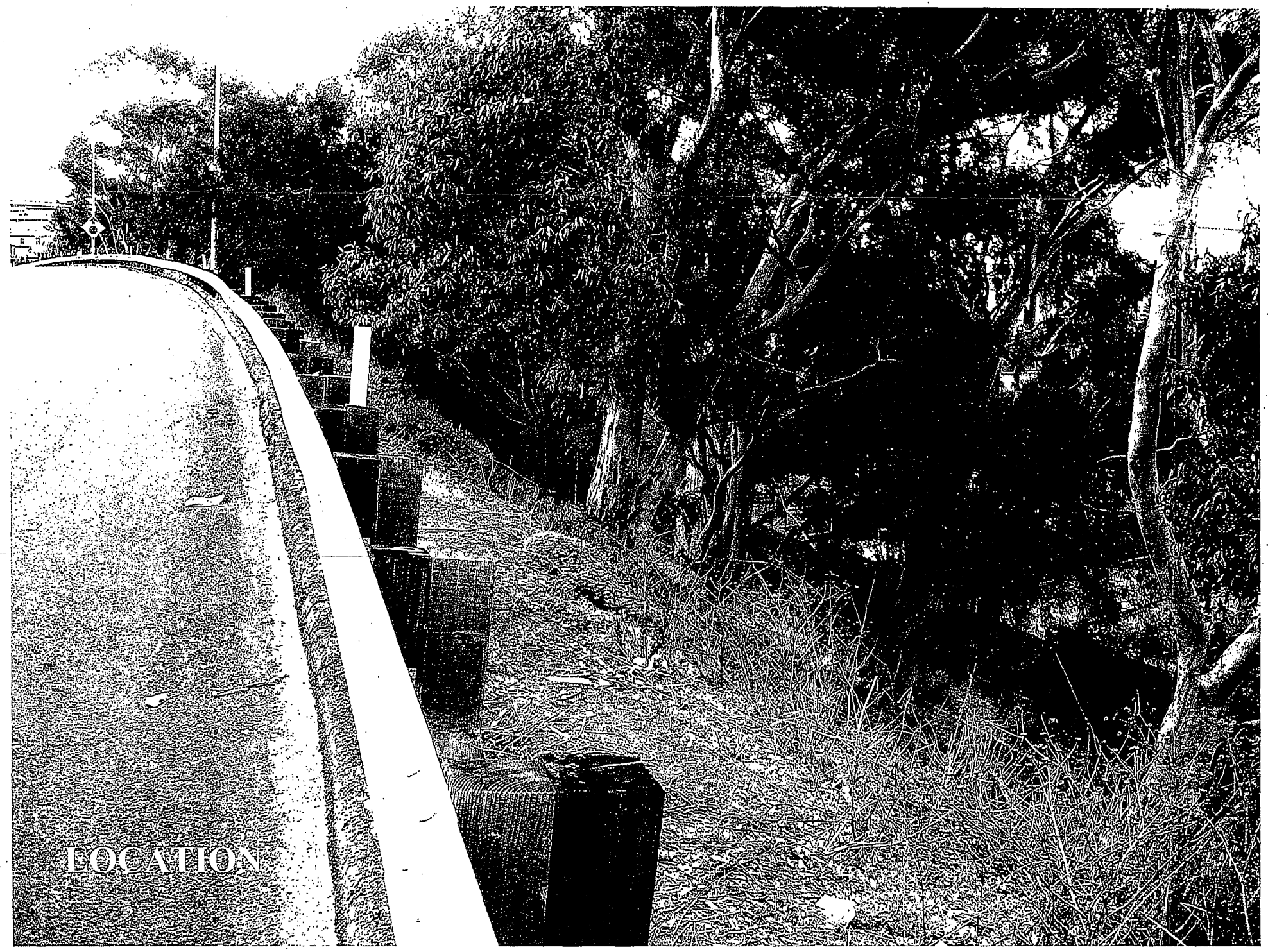
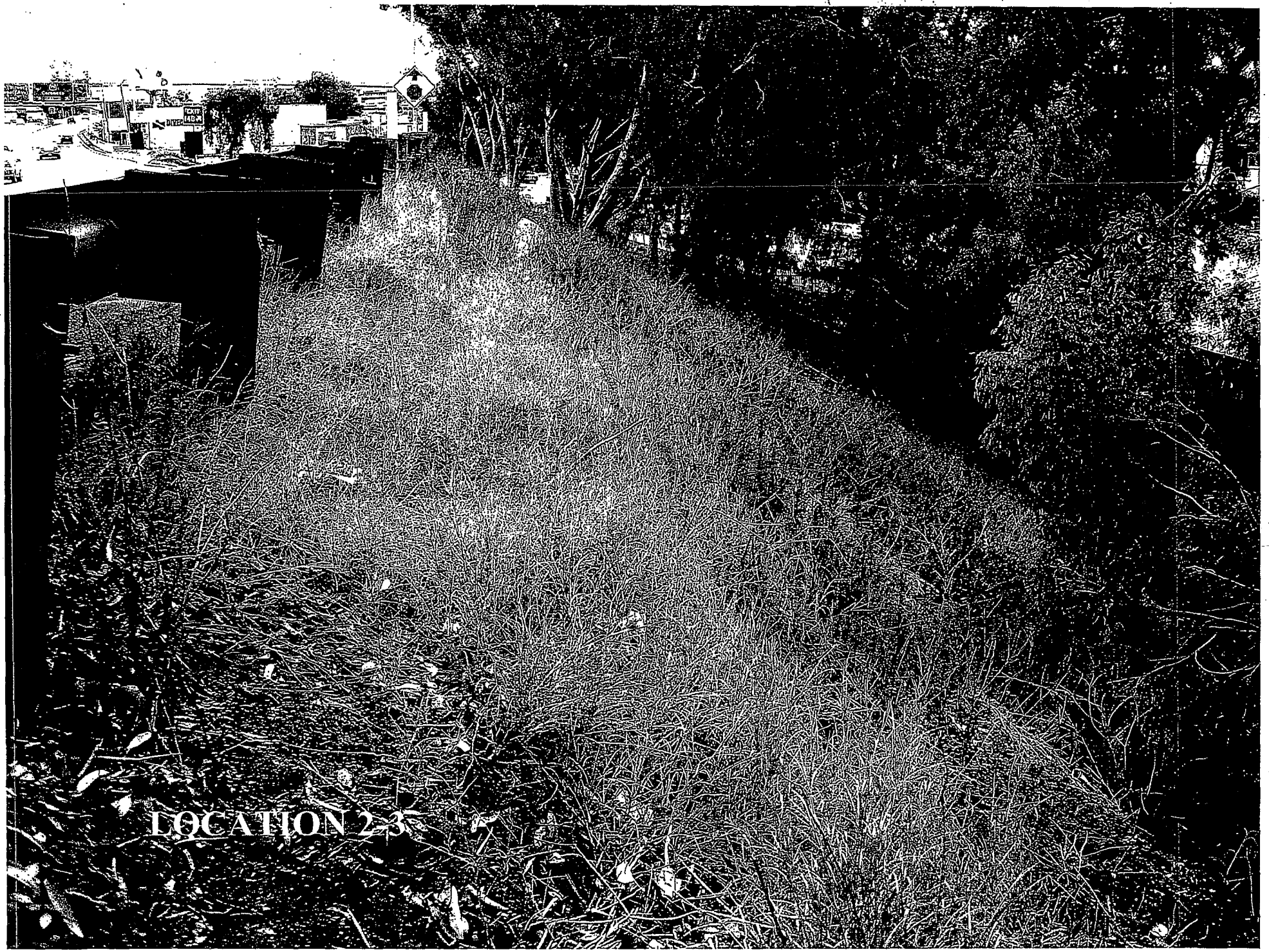
UNIT 2761

PROJECT NUMBER & PHASE 110000005311


LOCATION

LOCATION 2-2


LOCATION 2-35

State of California

Business, Transportation and Housing Agency

Memorandum

To: Oscar Aguilar
Project Engineer
District 11
Office of Design, MS#333

Date: February 14, 2012
File: 11-SD-5-R72.18
EA: 11-401404
EFIS: 1100000531

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

Subject: Geotechnical Design Report for the Concrete Outer Separation Barrier at Location 8: on the Cristianitos Road to Southbound Interstate 5 Onramp.

Pursuant to your request, the Office of Geotechnical Design South 2 (OGDS2) has prepared this Geotechnical Design Report (GDR) for the proposed Concrete Outer Separation Barrier at Location 8 on the Cristianitos Road to Southbound Interstate 5 on ramp. This report defines the geotechnical conditions as evaluated from field data and used in the development of the geotechnical design. This report provides recommendations and advisories for project design and construction.

OGDS2 staff is available for further assistance on this project. If you have additional questions or require clarification please contact Jeff Tesar at (office) 858 467-2716 or (mobile) 858 945-0458.

J. Tesar

Jeff Tesar, C.E.G.
Engineering Geologist
Office of Geotechnical Design-South 2

Brian Hinman

Brian Hinman, P.E.
Senior Transportation Engineer

REGISTERED GEOLOGIST
JEFF J. TESAR
No. 2137
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

cc: Ed Hajj
Mark Willian
Art Padilla
Abbas Abghari
District Construction R.E. Pending File

District Project Manager
Geotechnical Services Corporate
District Materials Engineer
Office Chief, OGDS2
It is the responsibility of the District Project Engineer and/or the Design Senior to include this document in the R.E. Pending Files

1.0 EXECUTIVE SUMMARY

Pursuant to the recommendations contained in this report the proposed concrete outer separation barrier may be constructed pursuant to Caltrans Standard Plan Concrete Barrier Type 60. These recommendations are presented in detail within this report and may be used for project design and construction.

2.0 INTRODUCTION

Pursuant to your request, the Caltrans Office of Geotechnical Design South 2 has provided this Geotechnical Design Report to be used for project design and construction. The proposed project involves construction of a concrete outer separation barrier on the Cristianitos Road to southbound (SB) Interstate 5 (I-5) on ramp. The proposed barrier is shown on the site plan layout attached to this report. This barrier will be located west of the edge of the western shoulder. To the west of the proposed barrier, a west facing slope with an average inclination of approximately 2:1 horizontal to vertical (H:V) bounds this shoulder. From south to north the slope ranges in height from approximately 15 feet to 8 feet This slope is depicted in the attached photos.

3.0 EXISTING FACILITIES.

The Cristianitos Road to SB I-15 on ramp is a one lane ramp connecting Christianitos Road with I-15 in San Onofre, San Diego County, California. Existing facilities in the project area include bridges, graded slopes, buried utilities, traffic sign structures, and drainage features.

4.0 PHYSICAL SETTING

The climate in this area is considered semi-arid. Precipitation records available from the Marine Corps Base Camp Pendleton Weather Station indicate that average rainfall at the station that is located approximately 2.0 miles inland from the Pacific Coast and about 2.5 miles to the east of the project limits, is 11.83 inches per year. In general, at the project area and in its vicinity, annual rainfall increases with distance from the coastline. In addition, nearly 90% of the annual precipitation occurs between the months of November and April. Therefore, the period from November through April is considered to be the rainy season.

The topography in the project area is characterized by a broad, flat coastal plain. This plain was formed as an uplifted wave cut marine terrace. Subsequent erosion has formed arroyos and valleys within the plain. The project site lies at the western edge of the plain. From north to south the Cristianitos Road to SB I-5 onramp descends on a mild gradient on a ramp embankment.

Natural drainage at the project location and in its vicinity occurs mainly through the arroyos. Runoff water and drainage water flows toward, or is channeled to, these topographic features that carry it west to the Pacific Ocean. In addition, to the south of the southern limits of the project San Mateo Creek serves as a major drainage feature for the project area.

There are no man-made or natural features that present any unusual engineering or construction challenges.

5.0 SITE INVESTIGATION

The following subsections describe the investigation conducted for this report.

5.1 Pertinent Reports and Archives Review

The following reports were reviewed during the preparation of this report:

"Retaining Wall Within the Northbound and Southbound Interstate5, Aliso Creek Safety Roadside Rest Areas Near Oceanside, San Diego County, California" by Richard Rusnak, 2010.

5.2 Exploration

Three exploratory borings were conducted along the barrier alignment. The soil borings were advanced into the ground up to a maximum depth of 7.0 feet utilizing a hand auger with a 3-inch diameter bit. Soil cuttings were visually classified in the field. No laboratory testing of soils was conducted. Apparent density and consistency of soils were estimated from the response of the auger to the drilling effort. Borings were drilled approximately three feet to the west of the western edge of the existing shoulder. Descriptions of the subsurface soils encountered at boring locations are presented in the attached Table 1, Subsurface Soil Description. The boring locations are shown on the attached project layout plan.

6.0 GEOLOGY

The proposed barrier is underlain by fill materials derived from local cuts during the construction of the freeway. Fill materials predominately consist of sands with trace to some gravel. The approximately 50 feet long northern section of the proposed barrier is underlain by native silty clay with trace gravel.

Fill materials are underlain by Pleistocene epoch marine deposits and marine terrace deposits. Soils belonging to this formation consist of clays with interbedded thick sand and gravel lenses, locally with lagoonal and alluvial soils. Fill materials under the southern section of the proposed barrier alignment are underlain by alluvium associated with the Mateo Creek channel. Alluvium consists of decomposed granite (sands) interbedded with peat and lagoonal sediments (silts and sands) (Santa Ana Map Sheet, 1966.)

7.0 GEOTECHNICAL CONSIDERATIONS

The following subsections describe geotechnical characteristics of the project site that may influence design.

7.1 Subsurface Soil Conditions

The alignment of the proposed concrete outer separation barrier is underlain by fill materials consisting of sands with trace to some gravel. The apparent density of this fill was estimated to be medium dense. Based on a review of geologic maps this fill is in turn underlain by the native Pleistocene epoch marine and marine terrace deposits. In addition, the approximately 50 feet long northern section of the proposed barrier is underlain by native clays with trace gravel. The apparent consistency of these clays was estimated to be medium stiff.

7.2 Groundwater

The groundwater table is expected to be located at a significant depth relative to the proposed construction and consequently is not anticipated to impact the project.

7.3 Erosion

No evidence of excessive erosion was observed on the face of the existing slope. However, if construction operations related to this project adversely affect the face of the existing slope, then appropriate erosion control measures should be applied to affected sections.

7.4 Seismic Hazards

The proposed concrete outer separation barrier will not be adversely impacted by seismic events.

7.5 Slope Stability and Rockfall

This slope appears to be in good condition. No evidence of slope failure or distress was found during the subsurface exploration phase of this project.

Rockfall potential does not exist on the project.

7.6 Excavation Characteristics

The soil that underlies the barrier alignment may be excavated utilizing standard heavy duty earth-moving and drilling equipment. The presence of gravel in fill materials can affect the production rate of the drilling and increase by estimated 5% the volume of concrete utilized for the pile foundation construction.

7.7 Embankments

No significant embankment will be constructed as part of the project.

7.8 Volumetric Stability of Embankment and Sub grade Materials

Significant adverse soil conditions such as expansive or collapsible soils were not identified within the project limits.

7.9 Potential Geologic Hazards

No significant geologic hazards were identified within the project area.

8.0 HAZARDOUS WASTE POTENTIAL

A hazardous waste site evaluation is beyond the scope of this report. No potentially hazardous waste was encountered during site reconnaissance and site subsurface investigation.

9.0 RECOMMENDATIONS AND ADVISORIES

9.1 Concrete Barriers

- Along the entire alignment of the of the proposed concrete barrier replacement Caltrans Standard Plan Concrete Barrier Type 60 (Sheet A76B) is recommended.

9.2 Erosion Control

Appropriate erosion control measures should be implemented to protect the newly graded slope face.

9.3 Surface Drainage

Concentrated surface water should not be allowed to pond behind the concrete barrier. Concentrated runoff should not be directed to drain over the slope. Surface water should be contained by appropriate drainage improvements.

9.4 Construction Advisories

The contractor should anticipate moderate difficult excavation/drilling conditions as described in section 7.6.

10.0 DIFFERING SITE CONDITIONS

The recommendations contained in this report are based on specific project information regarding structure type and location that have been provided by District 11 Design. If any conceptual changes are made during final project design or if site conditions are encountered during construction that are believed to differ from those conveyed in this report, staff from OGDS2 should review the project to provide appropriate recommendations.

Any questions regarding the above recommendations should be directed to the attention of Jeff Tesar, at (858) 467-2716.

REFERENCES

1. Geologic Map of California, , Santa Ana Sheet, California Division of Mines and Geology, 1966.
2. *"Retaining Wall Within the Northbound and Southbound Interstate5, Aliso Creek Safety Roadside Rest Ares Near Oceanside, San Diego County, California"* by Richard Rusnak, 2010..
3. State of California, Department of Transportation, Standard Plans, 2010.

ATTACHEMENTS

1. Project Location Layout
2. Layout L-8 (Location 8)
3. Table 1, Subsurface Soil Description
4. Photos

Table 1, Subsurface Soil Description

BORING NO.	LOCATION STATION	SUBSURFACE SOIL DESCRIPTION
HA-11-001	3835+35 "ROUTE5" Line	0-4.0': Poorly-graded SAND (SP): estimated medium dense; brown; moist; medium SAND; trace fine GRAVEL. 4.0'-7.0': Poorly-graded SAND (SP): estimated medium dense; gray; moist; medium SAND; some fine GRAVEL.
HA-11-002	3839+40 "11SD5AR2" Line	0-4.0': Poorly-graded SAND (SP): estimated medium dense; brown; moist; fine SAND. 4.0'-7.0': Poorly-graded SAND (SP): estimated medium dense; brown; moist; fine SAND; trace GRAVEL.
HA-11-003	3843+45 "11SD5AR2" Line	0-3.0': Silty CLAY; estimated soft to medium stiff; gray; moist; plastic; trace fine GRAVEL. 0.3' - 7.0': Silty CLAY; estimated medium stiff; gray; moist; plastic.

INDEX OF PLANS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PROJECT PLANS FOR CONSTRUCTION ON
STATE HIGHWAY
IN SAN DIEGO COUNTY AT VARIOUS LOCATIONS

TO BE SUPPLEMENTED BY STANDARD PLANS DATED MAY 2006

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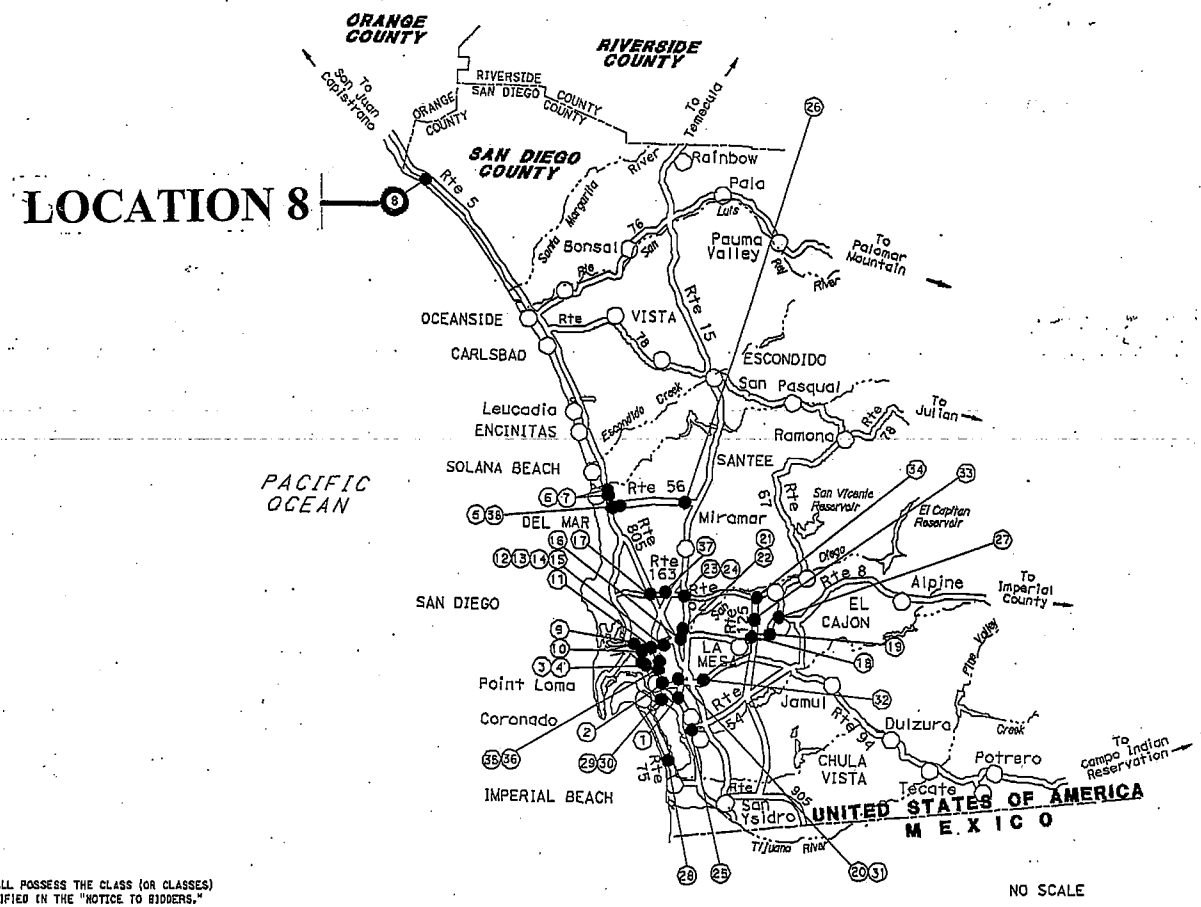

THE CONTRACTOR SHALL POSSESS THE CLASS (OR CLASSES) OF LICENSE AS SPECIFIED IN THE "NOTICE TO BIDDERS."

PROJECT ENGINEER REGISTERED CIVIL ENGINEER — DATE

REGISTERED PROFESSIONAL ENGINEER — OSCAR AGUILAR No. C62571 Exp. 06-30-12 CIVIL — STATE OF CALIFORNIA

PLANS APPROVAL DATE

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

CONTRACT No.	11-401404
PROJECT ID	1100000531

PROJECT MANAGER: ED HAJJ
DESIGN ENGINEER: OSCAR M AGUILAR

LAST REVISED 01-24-11 | DATE PLOTTED => 25-AUG-2011 | TIME PLOTTED => 11:54

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DIst	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
11	SD	5,8,15,54,56,67, 75,94,125,163,805	Var		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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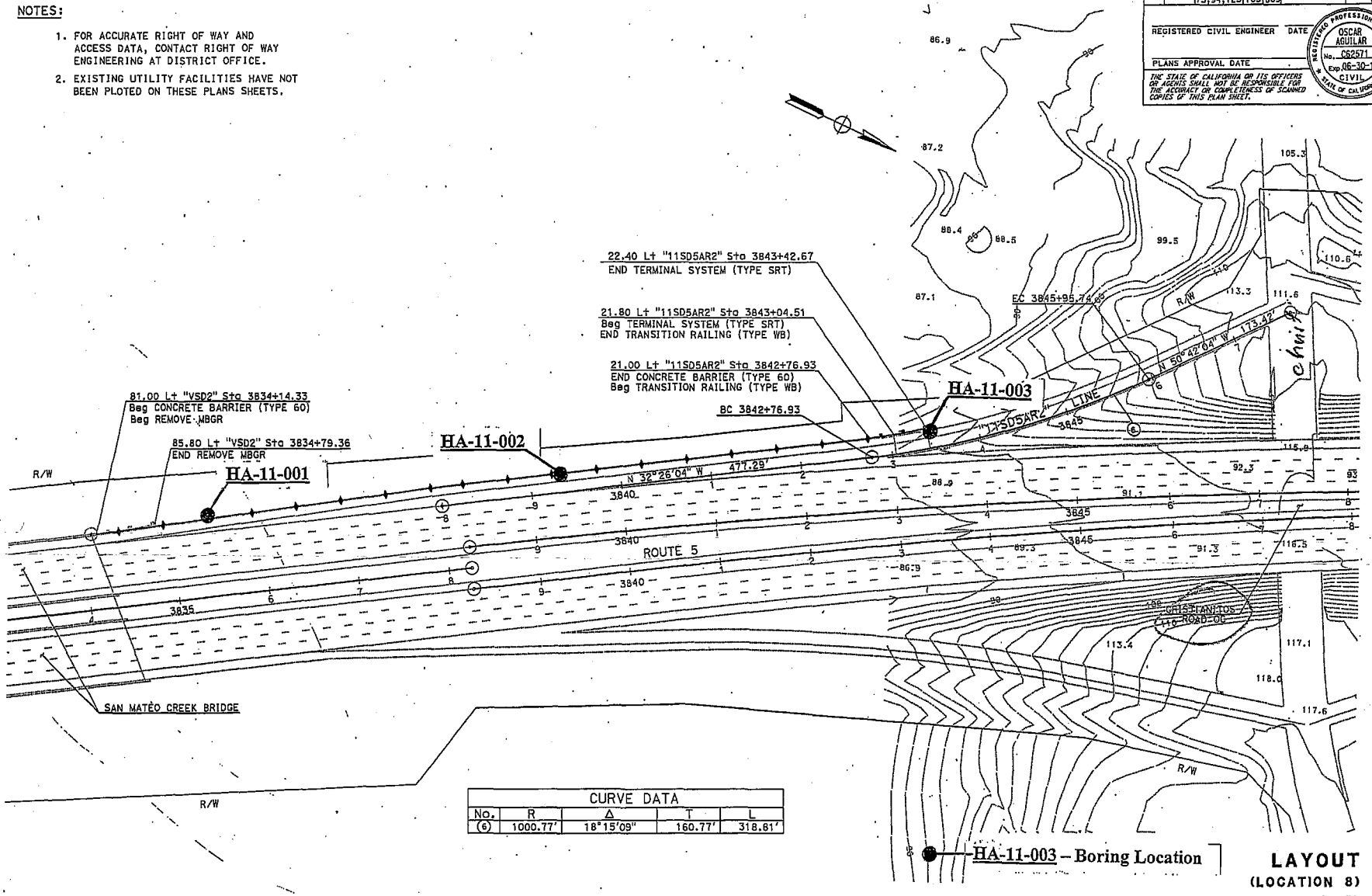
REGISTERED PROFESSIONAL ENGINEER OSCAR AGUILAR No. C62571 Exp. 06-30-12 CIVIL STATE OF CALIFORNIA

NOTES:

1. FOR ACCURATE RIGHT OF WAY AND ACCESS DATA, CONTACT RIGHT OF WAY ENGINEERING AT DISTRICT OFFICE.
2. EXISTING UTILITY FACILITIES HAVE NOT BEEN PLOTED ON THESE PLANS SHEETS.



CURVE DATA				
No.	R	Δ	T	L
(6)	1000.77'	18°15'09"	160.77'	318.81'

LAYOUT
(LOCATION 8)
L-7

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN
FUNCTIONAL SUPERVISOR: ED HAJJ
CALCULATED-DESIGNED BY: OSCAR M AGUILAR
CHECKED BY
REVISED BY
DATE REVISED

LASE ROSSEN DATE PLOTTED => 15-DEC-2011
03-30-11 TIME PLOTTED => 16:33

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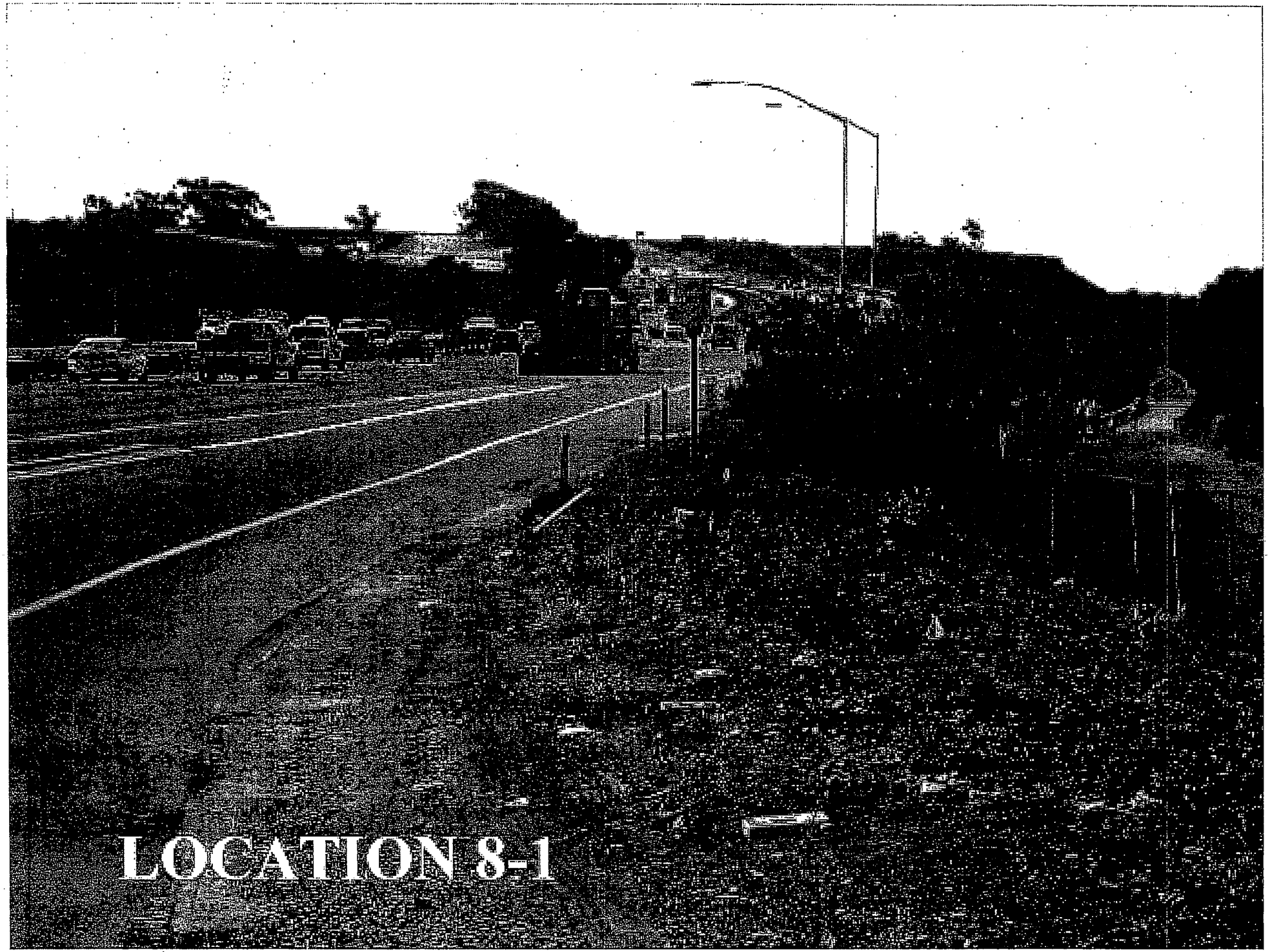
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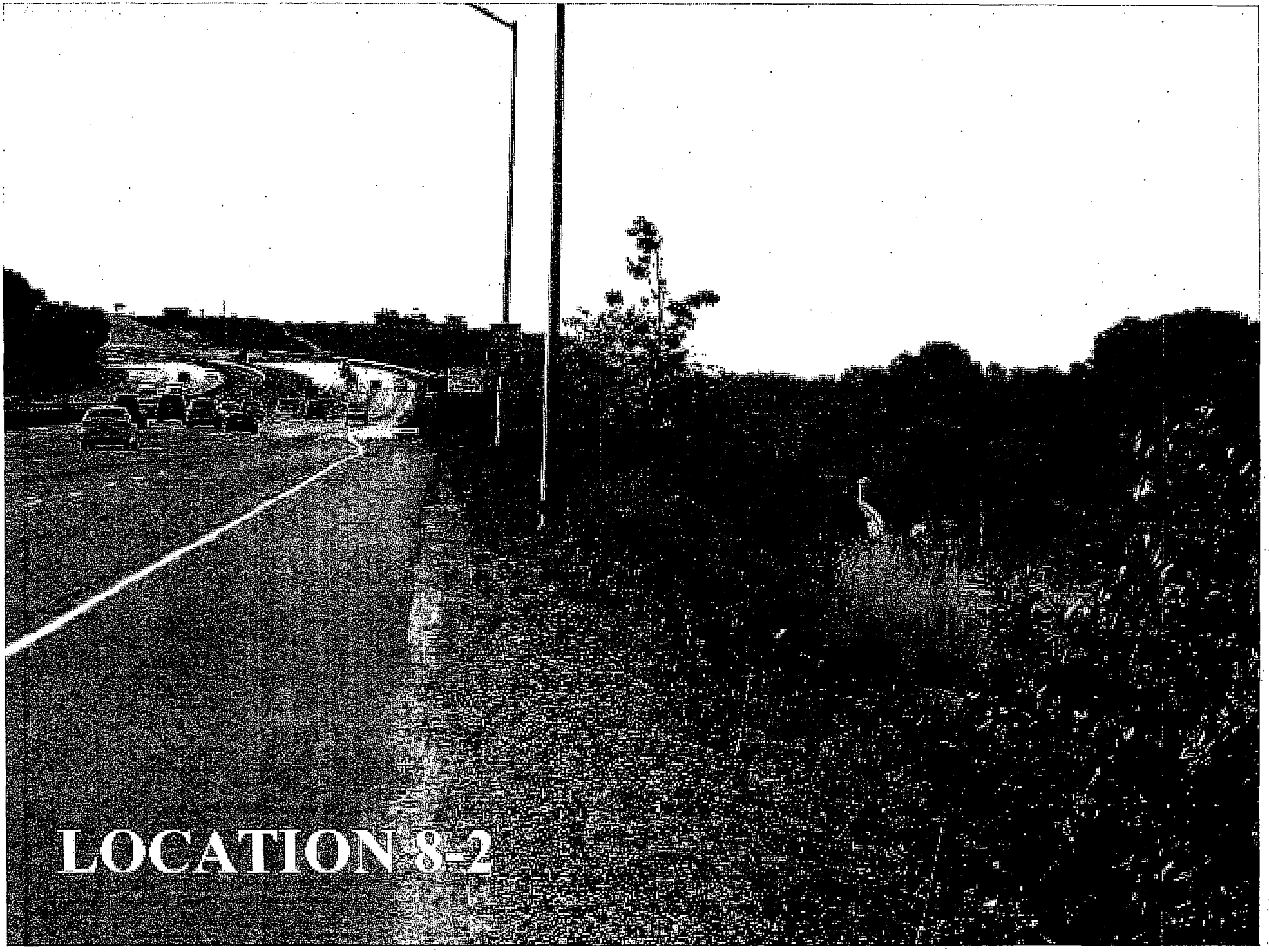
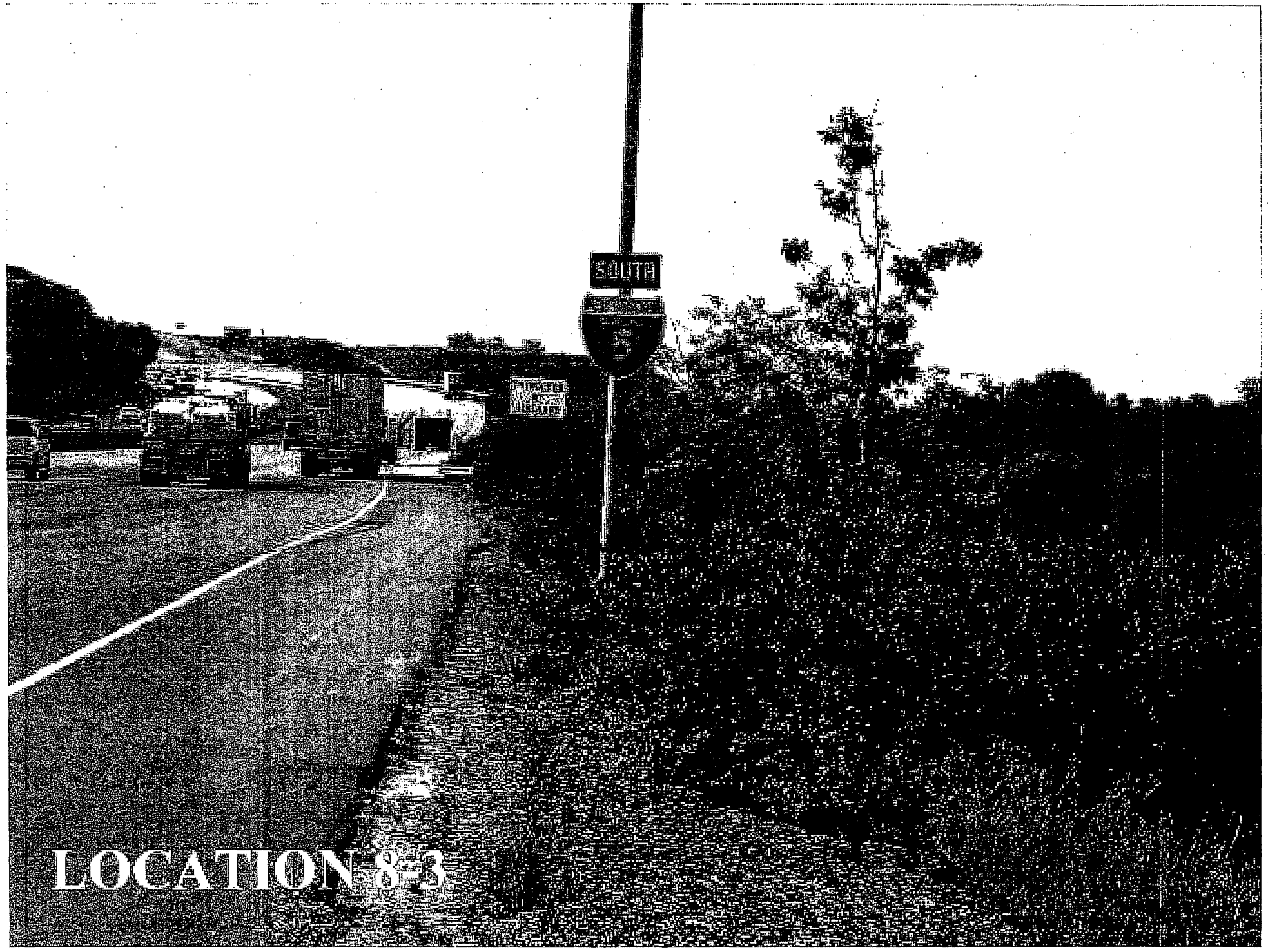

LOCATION 8-2


SOUTH
5
LOCATION 8-3

State of California

Business, Transportation and Housing Agency

Memorandum

To: Oscar Aguilar
Project Engineer
District 11
Office of Design, MS#333

Date: January 12, 2012
File: 11-SD-15-2.37
EA: 11-401404
EFIS: 1100000531

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

Subject: Geotechnical Design Report for the Concrete Outer Separation Barrier at Location 20: from Southbound Interstate 15 to Westbound State Route 94 Connector.

Pursuant to your request, the Office of Geotechnical Design South 2 (OGDS2) has prepared this Geotechnical Design Report (GDR) for the proposed Concrete Outer Separation Barrier at Location 20 from Southbound Interstate 15 to Westbound State Route 94 Connector. This report defines the geotechnical conditions as evaluated from field data and used in the development of the geotechnical design. This report provides recommendations and advisories for project design and construction.

OGDS2 staff is available for further assistance on this project. If you have additional questions or require clarification please contact Jeff Tesar at (office) 858 467-2716 or (mobile) 858 945-0458.

J. Tesar

Jeff Tesar, C.E.G.
Engineering Geologist
Office of Geotechnical Design-South 2

Brian Hinman

Brian Hinman, P.E.
Senior Transportation Engineer

REGISTERED GEOLOGIST
JEFF J. TESAR
No. 2137
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

cc: Ed Hajj
Mark Willian
Art Padilla
Abbas Abghari
District Construction R.E. Pending File

District Project Manager
Geotechnical Services Corporate
District Materials Engineer
Office Chief, OGDS2
It is the responsibility of the District Project Engineer and/or the Design Senior to include this document in the R.E. Pending Files

1.0 EXECUTIVE SUMMARY

Pursuant to the recommendations contained in this report three sections of the proposed concrete outer separation barrier may be constructed per Caltrans Standard Plan Concrete barrier Type 60. However, due to the fact that at Location 20 the barrier will be constructed at about the hinge of the steep embankment slope, pile foundations will be necessary for the remaining two sections of the proposed separation barrier. The barrier on piles should be designed in accordance with Caltrans Standard Plan Type 736 SV Case 2 (Sheet B15-6) without sound wall. These recommendations are presented in detail within this report and may be used for project design and construction.

2.0 INTRODUCTION

Pursuant to your request, the Caltrans Office of Geotechnical Design South 2 has provided this Geotechnical Design Report to be used for project design and construction. The proposed project involves construction of a concrete outer separation barrier on the southbound (SB) Interstate 15 (I-15) to westbound (WB) State Route 94 (SR-94) Connector. The proposed barrier is shown on the site plan layouts attached to this report. This barrier will be located west of the edge of the western shoulder. To the west of the proposed barrier, from about Station 201+00 ("NW" Line) through northern limit of this barrier alignment, a tributary to Chollas Creek parallels this connector. The west facing bank of the creek was found to be inclined with an average inclination of approximately 1.5:1 horizontal to vertical (H:V) (the inclination of this slope was found to range from near vertical to 1.5:1 H:V). The height of this slope was estimated to range from about nine feet at the northern end of the barrier alignment to approximately 20 feet at its northern limit. This slope is depicted in the attached Photos.

3.0 EXISTING FACILITIES.

The SB I-15 to WB SR-94 Connector is a three and two lanes ramp connecting I-15 with SR-94 in San Diego, California. Existing facilities in the project area include bridges, graded slopes, buried utilities, traffic sign structures, and drainage features.

4.0 PHYSICAL SETTING

The climate in this area is considered semi-arid. Precipitation records available from the National Weather Service indicate that average rainfall at the Miramar Naval Air Station that is located 7.5 miles inland from the Pacific Coast (elevation of 475 feet), and about nine miles to the north of the project limits, is 11 inches per year. In general, at the project area and in its vicinity, annual rainfall increases with distance from the coastline. In addition, nearly 90% of the annual precipitation occurs between the months of November and April. Therefore, the period from November through April is considered to be the rainy season.

The topography in the project area is characterized by a broad, flat mesa dissected by incised arroyos and valleys. The mesa has formed as an uplifted wave cut marine terrace. Subsequent erosion has formed the arroyos and valleys. The project site lies near the head of Pueblo Lands

Canyon. From north to south I-15 descends on a mild gradient on an embankment and ramp built within a canyon that merges with Pueblo Land Canyon that in turn connects to Chollas Valley/Creek.

Natural drainage at the project location and in its vicinity occurs mainly through the arroyos. Runoff water and drainage water in developed areas flows toward, or is channeled to, these topographic features that carry it to Chollas Creek. Then, through Chollas Creek it is conveyed south and west to the San Diego Bay.

There are no man-made or natural features that present any unusual engineering or construction challenges. However, the locally steep inclination of the slope that bounds the proposed barrier to the west could impact the construction activities related to this project.

5.0 SITE INVESTIGATION

The following subsections describe the investigation conducted for this report.

5.1 Pertinent Reports and Archives Review

The following reports were reviewed during the preparation of this report:

"Interstate 805 Soundwalls Unit 3, from 0.5 Miles South of the I-805/SR-54 Interchange to 0.25 Miles South of the I-805/SR-94 Interchange" by Jeff Tesar, 2011.

5.2 Exploration

Four exploratory borings were conducted along the barrier alignment. The soil borings were advanced into the ground up to a maximum depth of 5.0 feet utilizing a hand auger with 3-inch diameter bit. Soil cuttings were visually classified in the field. No laboratory testing of soils was conducted. Apparent density of soils was estimated from the response of the auger to the drilling effort. Borings were drilled approximately two feet to the west of the existing guard rail barrier. Descriptions of the subsurface soils encountered at boring locations are presented in the attached Table 1, Subsurface Soil Description. The boring locations are shown on the attached project layout plans.

6.0 GEOLOGY

The proposed barrier is underlain by fill materials derived from local cuts during the construction of the freeway. Fill materials consist of gravely sands with cobbles. This fill is underlain by native soils belonging to the San Diego Formation, Sandstone Part. The San Diego Formation, Sandstone Part is a fine to medium grained sandstone that typically is yellowish brown, poorly indurated, and locally cemented with limy cement. This formation is characteristically week and susceptible to rapid erosion (Kennedy and Tan, 1977.) Based on observation of selected outcrops at the face of the existing west facing slope the interface between fill and native soils is estimated to be at about an elevation of the existing creek bed.

7.0 GEOTECHNICAL CONSIDERATIONS

The following subsections describe geotechnical characteristics of the project site that may influence design.

7.1 Subsurface Soil Conditions

The alignment of the proposed concrete outer separation barrier is underlain by fill materials consisting of sands, gravels and cobbles. The apparent density of this fill was estimated to be medium dense. Based on a review of geologic maps this fill is in turn underlain by the native San Diego Formation, Sandstone Part. At the face of the existing slope/creek bank numerous cobbles were found to crop out. Based on that observation, it is estimated that fill materials consists approximately of 15% cobbles (by weight).

7.2 Groundwater

The groundwater table is expected to exist at about the elevation of the existing creek bed that bounds the proposed barrier to the west. During the subsurface exploration phase of this project this creek was found to be generally dry locally with several water ponds and puddles in its bed. However, the groundwater table will fluctuate following seasonal changes in the water level of this creek.

7.3 Erosion

At several locations excessive erosion was observed on the face of the existing slope/creek bank. Therefore, you may wish to consult with the District 11 Office of Hydraulics regarding this issue.

7.4 Seismic Hazards

The proposed concrete outer separation barrier will not be adversely impacted by seismic events.

7.5 Slope Stability and Rockfall

No evidence of slope failure was found on the face of the existing slope/creek bank. However, at some locations evidence of an erosional distress was observed during the subsurface exploration phase of this project.

Rockfall potential does not exist on the project.

7.6 Excavation Characteristics

The soil that underlies the barrier alignment may be excavated utilizing standard heavy duty earth-moving and drilling equipment. Locally, within the San Diego, Sandstone Part Formation indurated or cemented zones are expected to be encountered. The excavation of indurated zones

will require more vigorous effort. The presence of cobbles in fill materials can affect the production rate of the drilling and increase by estimated 10% the volume of concrete utilized for the pile foundation construction.

7.7 Embankments

No significant embankment will be constructed as part of the project.

7.8 Volumetric Stability of Embankment and Sub grade Materials

Significant adverse soil conditions such as expansive or collapsible soils were not identified within the project limits.

7.9 Potential Geologic Hazards

No significant geologic hazards were identified within the project area.

8.0 HAZARDOUS WASTE POTENTIAL

A hazardous waste site evaluation is beyond the scope of this report. No potentially hazardous waste was encountered during site reconnaissance and site subsurface investigation.

9.0 RECOMMENDATIONS AND ADVISORIES

9.1 Concrete Barriers

- Caltrans Standard Plan Concrete Barrier Type 60 (Sheet A76B) is recommended for three section of the proposed concrete barrier replacement: one from Station 196+44 ("NW" Line) to Station 200+60 ("NW" Line), second from Station 130+65 ("11-SD-15" Line) to Station 133+25 ("11-SD-15' Line), and third from Station 140+72 ('11-SD-15" Line) to 141+58.8 ("11-SD-15" Line).

- For the remaining two portions a barrier on a pile foundation per Caltrans Standard Plan for Sound Wall on Type 736 SV (Sheet B15-6) Case 2 but without the sound wall is recommended of the proposed barrier replacement,. For the Case 2 Pile Data Table (Sheet B15-8) an angle of internal friction (Φ) of 30 degrees should be utilized.

9.2 Erosion Control

Appropriate erosion control measures should be implemented to protect the newly graded slope face.

9.3 Surface Drainage

Concentrated surface water should not be allowed to pond behind the concrete barrier. Concentrated runoff should not be directed to drain over the slope. Surface water should be contained by appropriate drainage improvements.

9.4 Construction Advisories

The contractor should anticipate difficult excavation/drilling conditions as described in section 7.6. In addition, the most likely probable occurrence of ground water near the creek bed elevation could impact the pile drilling activities for this project.

10.0 DIFFERING SITE CONDITIONS

The recommendations contained in this report are based on specific project information regarding structure type and location that have been provided by District 11 Design. If any conceptual changes are made during final project design or if site conditions are encountered during construction that are believed to differ from those conveyed in this report, staff from OGDS2 should review the project to provide appropriate recommendations. Any questions regarding the above recommendations should be directed to the attention of Jeff Tesar, at (858) 467-2716.

REFERENCES

1. Michael Kennedy and Siang Tan: *"Geology of the Southern San Diego Metropolitan Area, California."* California Division of Mines and Geology, Map Sheet 29, 1977.
2. *"Interstate 805 Soundwalls Unit 3, from 0.5 Miles South of the I-805/SR-54 Interchange to 0.25 Miles South of the I-805/SR-94 Interchange"* by Jeff Tesar, 2011.
3. State of California, Department of Transportation, Standard Plans, 2010.

ATTACHEMENTS

1. Project Location Layout
2. Layouts L-15 and L-16 (Location 20)
3. Table 1, Subsurface Soil Description
4. Photos

Table 1, Subsurface Soil Description

BORING NO.	LOCATION STATION	SUBSURFACE SOIL DESCRIPTION
HA-11-001	204+60 "NW" Line	0-4.0: Poorly-graded SAND with GRAVEL (SP): estimated medium dense; brown; moist; medium SAND; coarse to fine GRAVEL; little COBBLES (FILL).
HA-11-002	133+40 "11-SD-15" Line	0-5.0': Poorly-graded SAND with GRAVEL (SP): estimated medium dense; brown; moist; medium to fine SAND; coarse to fine GRAVEL; little COBBLES (FILL).
HA-11-003	136+75 "11-SD-15" Line	0-3.5': Poorly-graded SAND with GRAVEL (SP): estimated medium dense; brown; moist; fine SAND; coarse to fine GRAVEL; little COBBLES (FILL).
HA-11-004	139+45 "11-SD-15" Line	0-5.0': Poorly-graded SAND with GRAVEL (SP): estimated medium dense; brown; moist; fine SAND; coarse to fine GRAVEL; little COBBLES (FILL).

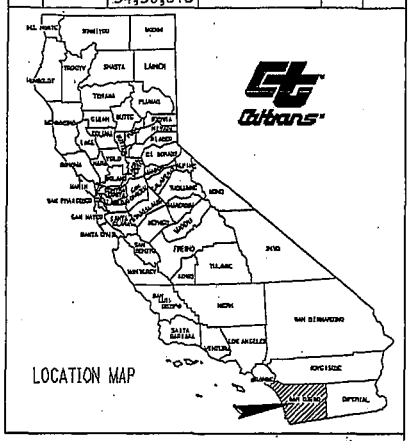
INDEX OF PLANS

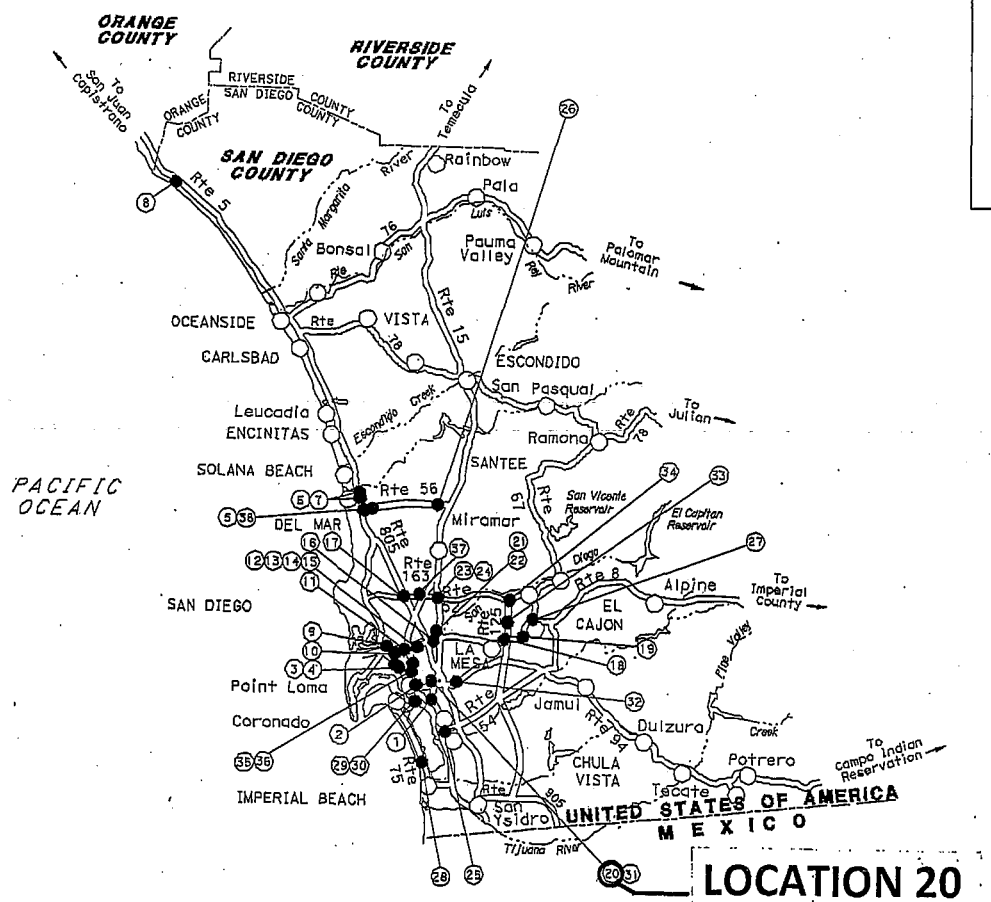
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PROJECT PLANS FOR CONSTRUCTION ON
STATE HIGHWAY
IN SAN DIEGO COUNTY AT VARIOUS LOCATIONS

TO BE SUPPLEMENTED BY STANDARD PLANS DATED MAY 2006

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
11	SD	5,8,15, 54,56,etc	Var		





PROJECT MANAGER: ED HAJJ
DESIGN ENGINEER: OSCAR M AGUILAR

THE CONTRACTOR SHALL POSSESS THE CLASS (OR CLASSES) OF LICENSE AS SPECIFIED IN THE "NOTICE TO BIDDERS."

PROJECT ENGINEER REGISTERED CIVIL ENGINEER — DATE

REGISTERED PROFESSIONAL ENGINEER — OSCAR AGUILAR — No. C62571 — Exp. 06-30-12 — CIVIL — STATE OF CALIFORNIA

PLANS APPROVAL DATE

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

CONTRACT No.	11-401404
PROJECT ID	1100000531

LAST REVISION 01-24-11 — DATE PLOTTED => 25-AUG-2011 — TIME PLOTTED => 11:54

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
11	SD	5,8,15,54,56,67, 75,94,125,163,805	Var		

REGISTERED CIVIL ENGINEER DATE

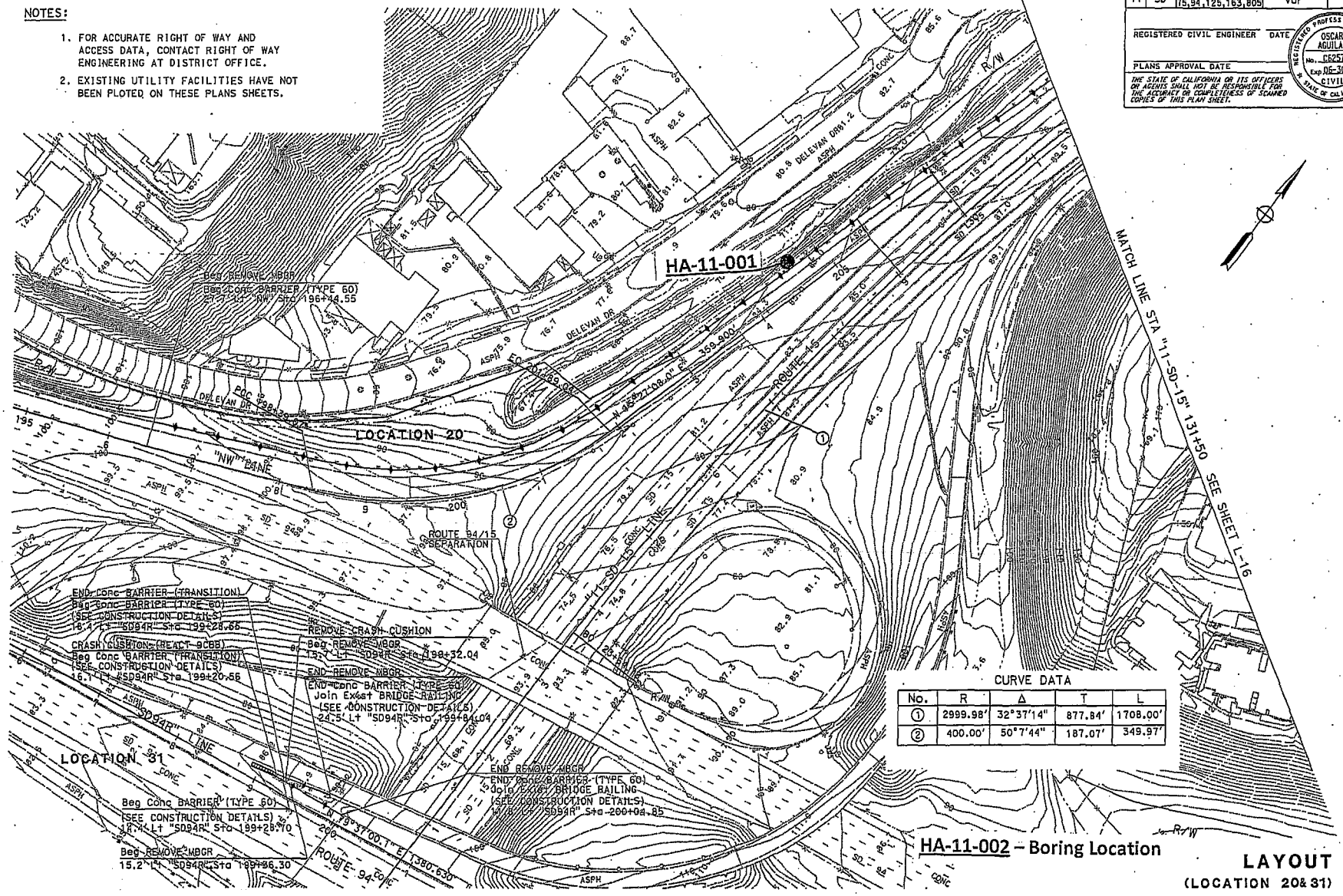
PLANS APPROVAL DATE

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.

REGISTERED PROFESSIONAL ENGINEER OSCAR AGUILAR No. C62571 Exp. 06-30-12 CIVIL STATE OF CALIFORNIA

NOTES:

1. FOR ACCURATE RIGHT OF WAY AND ACCESS DATA, CONTACT RIGHT OF WAY ENGINEERING AT DISTRICT OFFICE.
2. EXISTING UTILITY FACILITIES HAVE NOT BEEN PLOTED ON THESE PLANS SHEETS.



SCALE: 1"=50'

LAYOUT
(LOCATION 20& 31)

L-15

STATE OF CALIFORNIA – DEPARTMENT OF TRANSPORTATION | Caltrans | DESIGN

FUNCTIONAL SUPERVISOR: ED HAJJ

CALCULATED-DESIGNED BY: OSCAR M AGUILAR

CHECKED BY

REVISED BY | DATE REVISED

LAST REVISED DATE PLOTTED => 15-DEC-2011
TIME PLOTTED => 15:34
03-30-11

BORDER LAST REVISED 7/2/2010 | USERNAME => s129339 | DGN FILE => 11000005311ea015.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 2761 | PROJECT NUMBER & PHASE 11000005311

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11	SD	5,8,15,54,56,67, 75,94,125,163,805	Var		

REGISTERED CIVIL ENGINEER DATE

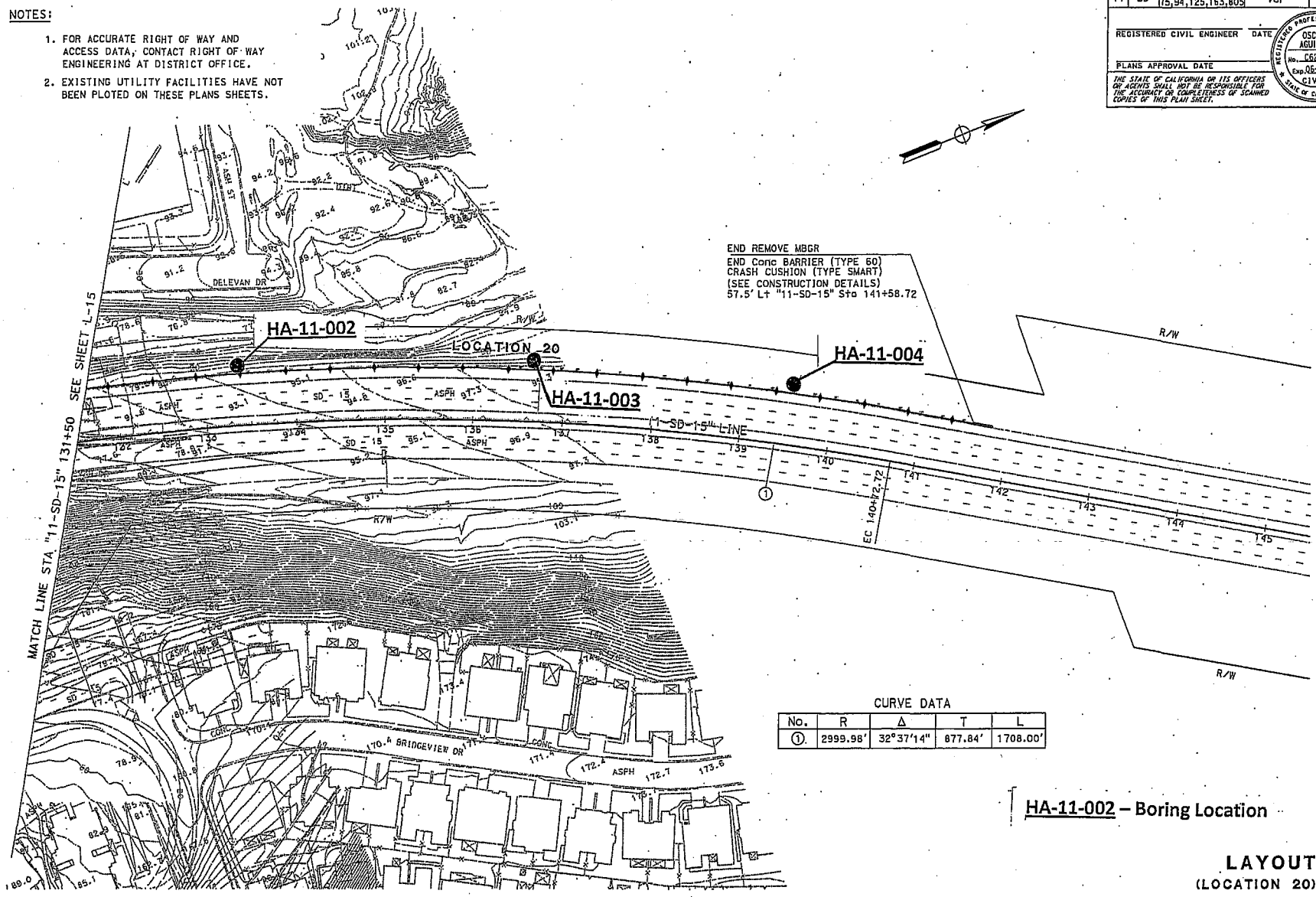
PLANS APPROVAL DATE

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.

REGISTERED PROFESSIONAL ENGINEER OSCAR AGUILAR No. C62571 Exp. 06-30-12 CIVIL STATE OF CALIFORNIA

NOTES:

1. FOR ACCURATE RIGHT OF WAY AND ACCESS DATA, CONTACT RIGHT OF WAY ENGINEERING AT DISTRICT OFFICE.
2. EXISTING UTILITY FACILITIES HAVE NOT BEEN PLOTED ON THESE PLANS SHEETS.



CURVE DATA

No.	R	Δ	T	L
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HA-11-002 – Boring Location

LAYOUT
(LOCATION 20)

SCALE: 1"=50'

L-16

STATE OF CALIFORNIA – DEPARTMENT OF TRANSPORTATION

Caltrans

DESIGN

FUNCTIONAL SUPERVISOR: ED HAJJ

CALCULATED-DESIGNED BY: OSCAR M AGUILAR

CHECKED BY

REVISED BY

DATE REVISED

LAST REVISION 03-30-11

DATE PLOTTED => 15-DEC-2011

TIME PLOTTED => 16:35

BORDER LAST REVISED 7/2/2010

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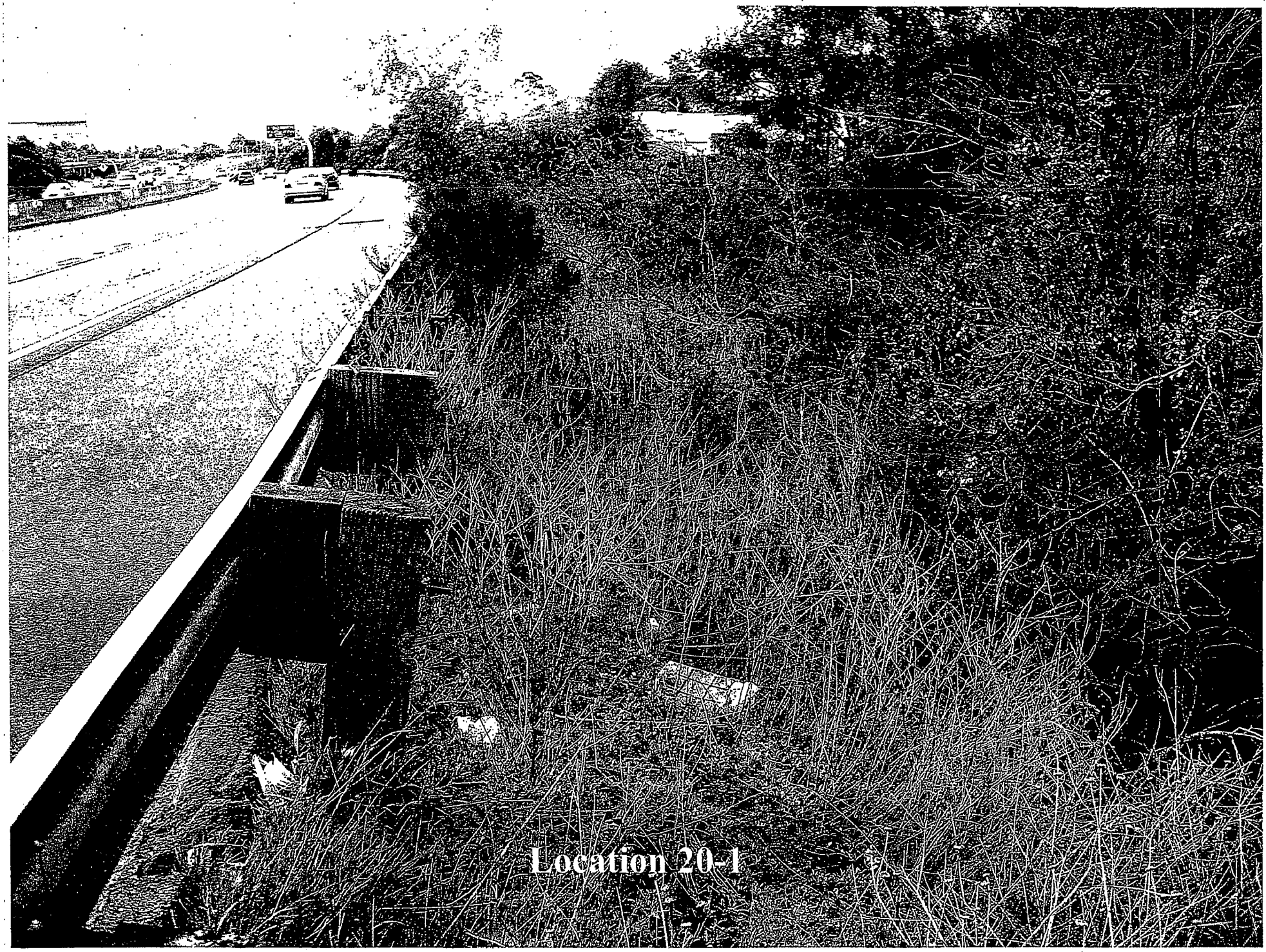
UNIT 2761

PROJECT NUMBER & PHASE 11000005311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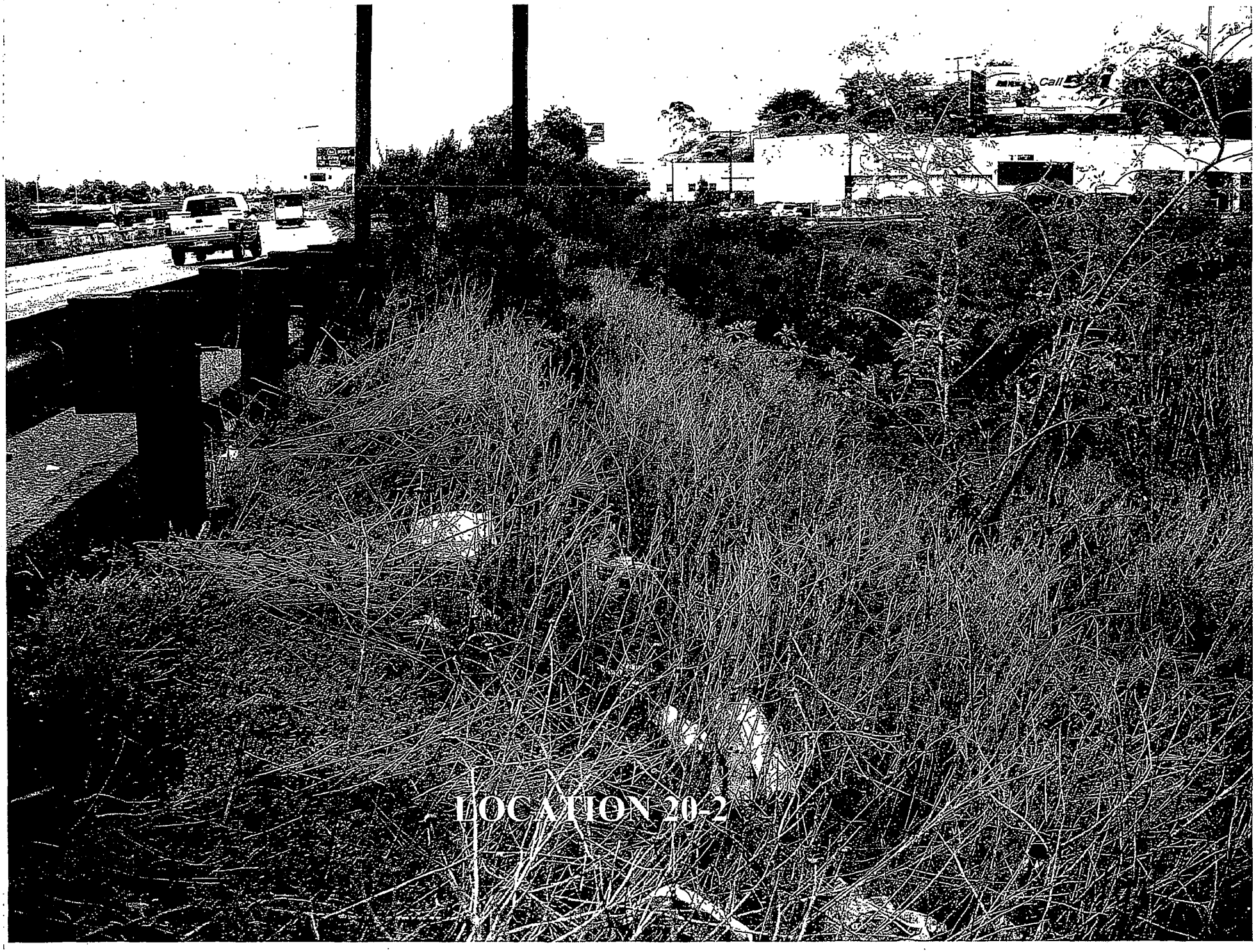

LOCATION 20-2

LOCATION 20-

State of California

Business, Transportation and Housing Agency

Memorandum

To: Oscar Aguilar
Project Engineer
District 11
Office of Design, MS#333

Date: January 9, 2012
File: 11-SD-52-10.57/10.85
EA: 11-401404
EFIS: 1100000531

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

Subject: Geotechnical Design Report for the Concrete Outer Separation Barrier at Location 24: from Westbound State Route 52 to Northbound Interstate 15 Connector.

Pursuant to your request, the Office of Geotechnical Design South 2 (OGDS2) has prepared this Geotechnical Design Report (GDR) for the proposed Concrete Outer Separation Barrier at Location 24 from Westbound State Route 52 to Northbound Interstate 15 Connector. This report defines the geotechnical conditions as evaluated from field data and used in the development of the geotechnical design. This report provides recommendations and advisories for project design and construction.

OGDS2 staff is available for further assistance on this project. If you have additional questions or require clarification please contact Jeff Tesar at (office) 858 467-2716 or (mobile) 858 945-0458.

J. Tesar

Jeff Tesar, C.E.G.
Engineering Geologist
Office of Geotechnical Design-South 2

Brian Hinman

Brian Hinman, P.E.
Senior Transportation Engineer

REGISTERED GEOLOGIST
JEFF J. TESAR
No. 2137
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

cc: Ed Hajj
Mark Willian
Art Padilla
Abbas Abghari
District Construction R.E. Pending File

District Project Manager
Geotechnical Services Corporate
District Materials Engineer
Office Chief, OGDS2
It is the responsibility of the District Project Engineer and/or the Design Senior to include this document in the R.E. Pending Files

"Caltrans improves mobility across California"

1.0 EXECUTIVE SUMMARY

Pursuant to the recommendations contained in this report two sections of the proposed concrete outer separation barrier may be constructed per Caltrans Standard Plan Concrete barrier Type 60. However, due to the fact that at Location 24 the barrier will be constructed at about the hinge of the steep slope, pile foundations will be necessary for the remaining sections of the proposed separation barrier. The barrier on piles should be designed in accordance with Caltrans Standard Plan Type 736 SV Case 2 (Sheet B15-6) without sound wall. These recommendations are presented in detail within this report and may be used for project design and construction.

2.0 INTRODUCTION

Pursuant to your request, the Caltrans Office of Geotechnical Design South 2 has provided this Geotechnical Design Report to be used for project design and construction. The proposed project involves construction of a concrete outer separation barrier on the westbound (WB) State Route 52 (SR-52) to northbound (NB) Interstate 15 (I-15) Connector. The proposed barrier is shown on the site plan layout attached to this report. This barrier will be located east of the edge of the northeastern shoulder. From about Station 424+00 ("R-6" Line) through 421+66 ("CEB" Line) a northeast and east-facing slope with an average inclination of approximately 1.5:1 horizontal to vertical (H:V) bounds this shoulder (the inclination of this slope was found to range from 1.35:1 H:V to 1.75:1 H:V). The maximum height of this slope was estimated to be about 55 feet. This slope is depicted in the attached Photos.

3.0 EXISTING FACILITIES.

The WB SR-52 to NB I-15 Connector is one and two lanes ramp connecting SR-52 with I-15 in San Diego, California. Existing facilities in the project area include bridges, graded slopes, buried utilities, traffic signs structures, and drainage features.

4.0 PHYSICAL SETTING

The climate in this area is considered semi-arid. Precipitation records available from the National Weather Service indicate that average rainfall at the Miramar Naval Air Station that is located 7.5 miles inland from the Pacific Coast (elevation of 475 feet), and about three miles to the north of the project limits, is 11 inches per year. In general, at the project area and in its vicinity, annual rainfall increases with distance from the coastline. In addition, nearly 90% of the annual precipitation occurs between the months of November and April. Therefore, the period from November through April is considered to be the rainy season.

The topography in the project area is characterized by a broad, flat mesa dissected by incised arroyos and valleys. The mesa has formed as an uplifted wave cut marine terrace. Subsequent erosion has formed the arroyos and valleys. The project site lies near the head of Murphy Canyon. From south to north I-15 ascends on a mild gradient within Murphy Canyon and tops out on Kearny Mesa just north of the I-15/SR-52 interchange.

Natural drainage at the project location and in its vicinity occurs mainly through the arroyos. Runoff water and drainage water in developed areas flows toward, or is channeled to, these topographic features that carry it to Murphy Canyon. In turn, drainage within Murphy Canyon is conveyed south to the San Diego River and then west to the Pacific coast.

There are no man-made or natural features that present any unusual engineering or construction challenges.

5.0 SITE INVESTIGATION

The following subsections describe the investigation conducted for this report.

5.1 Pertinent Reports and Archives Review

The following reports were reviewed during the preparation of this report:

"Foundation Recommendations for the South Connector Overcrossing (E52/N15)" by Lisa Alviso, 1985.

5.2 Exploration

Three exploratory borings were conducted along the barrier alignment. The soil borings were advanced into the ground up to a maximum depth of 5.0 feet utilizing a hand auger with 3-inch diameter bit. Soil cuttings were visually classified in the field. No laboratory testing of soils was conducted. Apparent density of soils was estimated from the response of the auger to the drilling effort. Borings were drilled approximately two feet to the east of the existing guard rail barrier. Descriptions of the subsurface soils encountered at boring locations are presented in the attached Table 1, Subsurface Soil Description. The boring locations are shown on the attached project layout plan.

6.0 GEOLOGY

The proposed barrier is underlain by fill materials derived from local cuts during the construction of the freeway. Fill materials consist of gravely and cobbly sands. This fill is underlain by native soils belonging to the Stadium Conglomerate Formation. The Stadium Conglomerate consists of a massive cobble conglomerate with a dark yellowish-brown coarse-grained sandstone matrix. The sandstone matrix constitutes less than 20 percent of the unit (Kennedy and Peterson, 1975)

7.0 GEOTECHNICAL CONSIDERATIONS

The following subsections describe geotechnical characteristics of the project site that may influence design.

7.1 Subsurface Soil Conditions

The alignment of the proposed concrete outer separation barrier is underlain by fill materials consisting of sands, gravels and cobbles. The apparent density of this fill was estimated to be medium dense. Based on a review of geologic maps this fill is in turn underlain by the native Stadium Conglomerate Formation. At the face of the existing slope numerous cobbles were found to crop out. Based on that observation, it is estimated that fill materials consists approximately of 25% cobbles (by weight).

7.2 Groundwater

The groundwater table is located at a significant depth relative to the proposed construction and consequently is not anticipated to impact the project.

7.3 Erosion

No evidence of excessive erosion was observed on the face of the existing slope. However, if construction operations related to this project adversely affect the face of the existing slope, then appropriate erosion control measures should be applied to its affected sections.

7.4 Seismic Hazards

The proposed concrete outer separation barrier will not be adversely impacted by seismic events.

7.5 Slope Stability and Rockfall

This slope appears to be in good condition. No evidence of slope failure or distress was found during subsurface exploration phase of this project.

Rockfall potential does not exist on the project.

7.6 Excavation Characteristics

The soil that underlies the barrier alignment may be excavated utilizing standard heavy duty earth-moving and drilling equipment. Locally, within the Stadium Conglomerate indurated or cemented zones are expected to be encountered. The excavation of indurated zones will require more vigorous effort. The presence of cobbles in fill materials can affect the production rate of the drilling and increase by estimated 15% the volume of concrete utilized for the pile foundation construction.

7.7 Embankments

No significant embankment will be constructed as part of the project.

7.8 Volumetric Stability of Embankment and Sub grade Materials

Significant adverse soil conditions such as expansive or collapsible soils were not identified within the project limits.

7.9 Potential Geologic Hazards

No significant geologic hazards were identified within the project area.

8.0 HAZARDOUS WASTE POTENTIAL

A hazardous waste site evaluation is beyond the scope of this report. No potentially hazardous waste was encountered during site reconnaissance and site subsurface investigation.

9.0 RECOMMENDATIONS AND ADVISORIES

9.1 Concrete Barriers

- Caltrans Standard Plan Concrete Barrier Type 60 (Sheet A76B) is recommended for two section of the proposed concrete barrier replacement, one from Station 423+14.64 ("R-6" Line) to Station 423+40 ("R-6" Line), and second from Station 423+96 ("R-6" Line) to Station 426+10 ("R-6' Line).

- For the remaining portions a barrier on a pile foundation per Caltrans Standard Plan for Sound Wall on Type 736 SV (Sheet B15-6) Case 2 but without the sound wall is recommended of the proposed barrier replacement,. For the Case 2 Pile Data Table (Sheet B15-8) an angle of internal friction (Φ) of 30 degrees should be utilized.

9.2 Erosion Control

Appropriate erosion control measures should be implemented to protect the newly graded slope face.

9.3 Surface Drainage

Concentrated surface water should not be allowed to pond behind the concrete barrier. Concentrated runoff should not be directed to drain over the slope. Surface water should be contained by appropriate drainage improvements.

9.4 Construction Advisories

The contractor should anticipate difficult excavation/drilling conditions as described in section 7.5.

10.0 DIFFERING SITE CONDITIONS

The recommendations contained in this report are based on specific project information regarding structure type and location that have been provided by District 11 Design. If any conceptual changes are made during final project design or if site conditions are encountered during construction that are believed to differ from those conveyed in this report, staff from OGDS2 should review the project to provide appropriate recommendations. Any questions regarding the above recommendations should be directed to the attention of Jeff Tesar, at (858) 467-2716.

REFERENCES

1. Michael Kennedy and Gary Peterson: "*Geology of the San Diego Metropolitan Area, California, La Mesa Quadrangle.*" California Division of Mines and Geology, Bulletin 200, 1975.

2. "*Foundation Recommendations for the South Connector Overcrossing (E52/N15)*" by Lisa Alviso, 1985.

3. State of California, Department of Transportation, Standard Plans, 2010.

ATTACHEMENTS

1. Project Location Layout
2. Layouts L-19 (Location 24)
3. Table 1, Subsurface Soil Description
4. Photos

INDEX OF PLANS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PROJECT PLANS FOR CONSTRUCTION ON
STATE HIGHWAY
IN SAN DIEGO COUNTY AT VARIOUS LOCATIONS

TO BE SUPPLEMENTED BY STANDARD PLANS DATED MAY 2006

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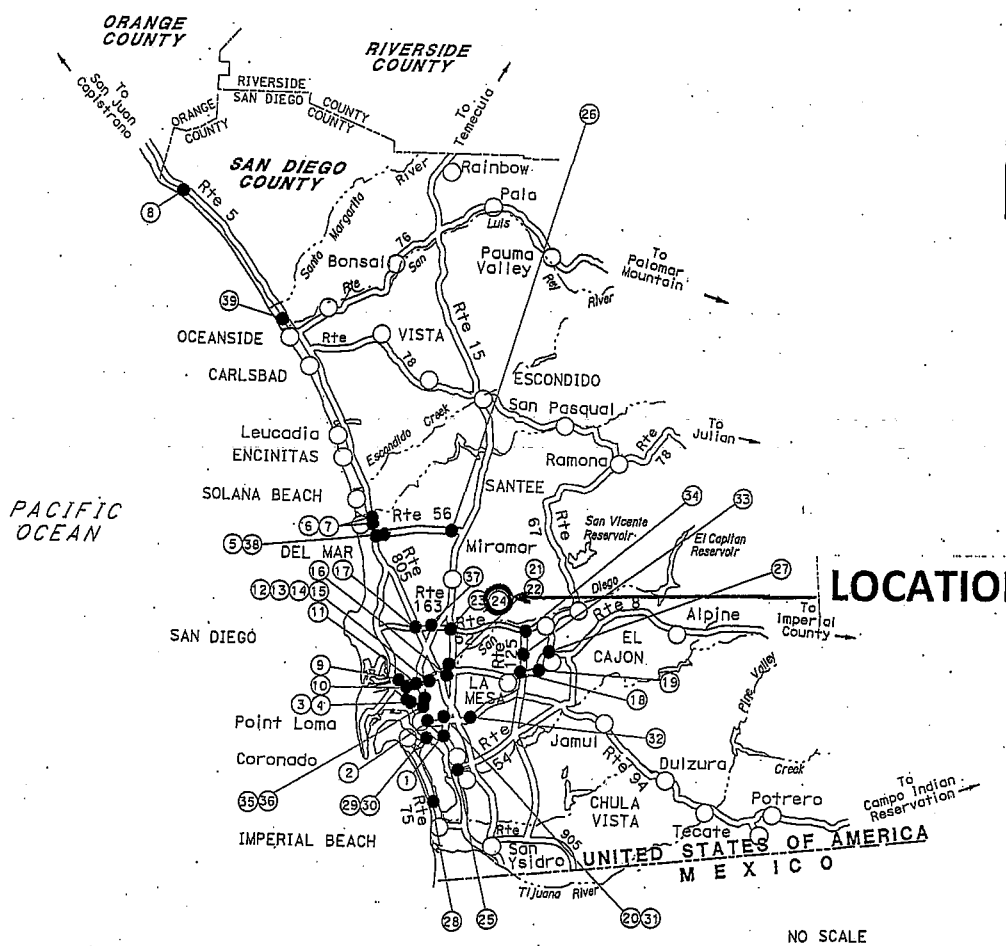


NO SCALE

THE CONTRACTOR SHALL POSSESS THE CLASS (OR CLASSES) OF LICENSE AS SPECIFIED IN THE "NOTICE TO BIDDERS."

PROJECT ENGINEER DATE
REGISTERED CIVIL ENGINEER

REGISTERED PROFESSIONAL ENGINEER OSCAR AGUILAR No. C62571 Exp. 06-30-12 CIVIL STATE OF CALIFORNIA

PLANS APPROVAL DATE

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

CONTRACT No.	11-401404
PROJECT ID	1100000531

PROJECT MANAGER ED HAJJ
DESIGN ENGINEER OSCAR M AGUILAR

LAST REVISION 11-24-11
DATE PLOTTED => 15-DEC-2011
TIME PLOTTED => 07:39

BORDER LAST REVISED 7/2/2010 | CALTRANS WEB SITE IS: HTTP//WWW.DOT.CA.GOV/ | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => s129711 DGN FILE => 1100000531ab001.dgn | UNIT 2761 | PROJECT NUMBER & PHASE 11000005311

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
11	SD	5,8,15,54,56,67, 75,94,125,163,805	Var		

REGISTERED CIVIL ENGINEER DATE

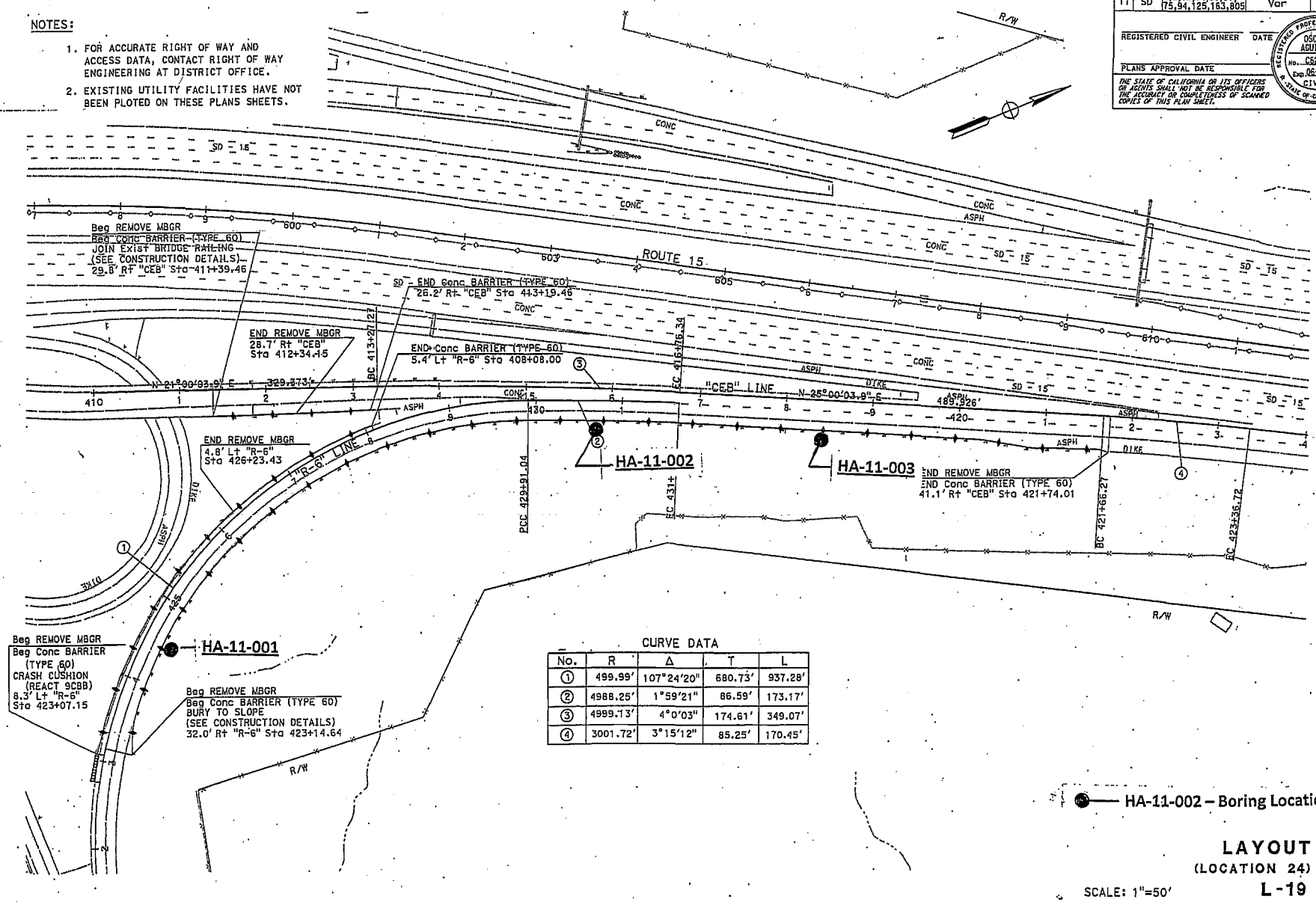
PLANS APPROVAL DATE

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.

REGISTERED PROFESSIONAL ENGINEER OSCAR AGUILAR No. C62571 Exp. 06-30-12 CIVIL STATE OF CALIFORNIA

NOTES:

1. FOR ACCURATE RIGHT OF WAY AND ACCESS DATA, CONTACT RIGHT OF WAY ENGINEERING AT DISTRICT OFFICE.
2. EXISTING UTILITY FACILITIES HAVE NOT BEEN PLOTED ON THESE PLANS SHEETS.



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③	4999.13'	4°0'03"	174.61'	349.07'
④	3001.72'	3°15'12"	85.25'	170.45'

HA-11-002 – Boring Location

LAYOUT
(LOCATION 24)

SCALE: 1"=50'

L-19

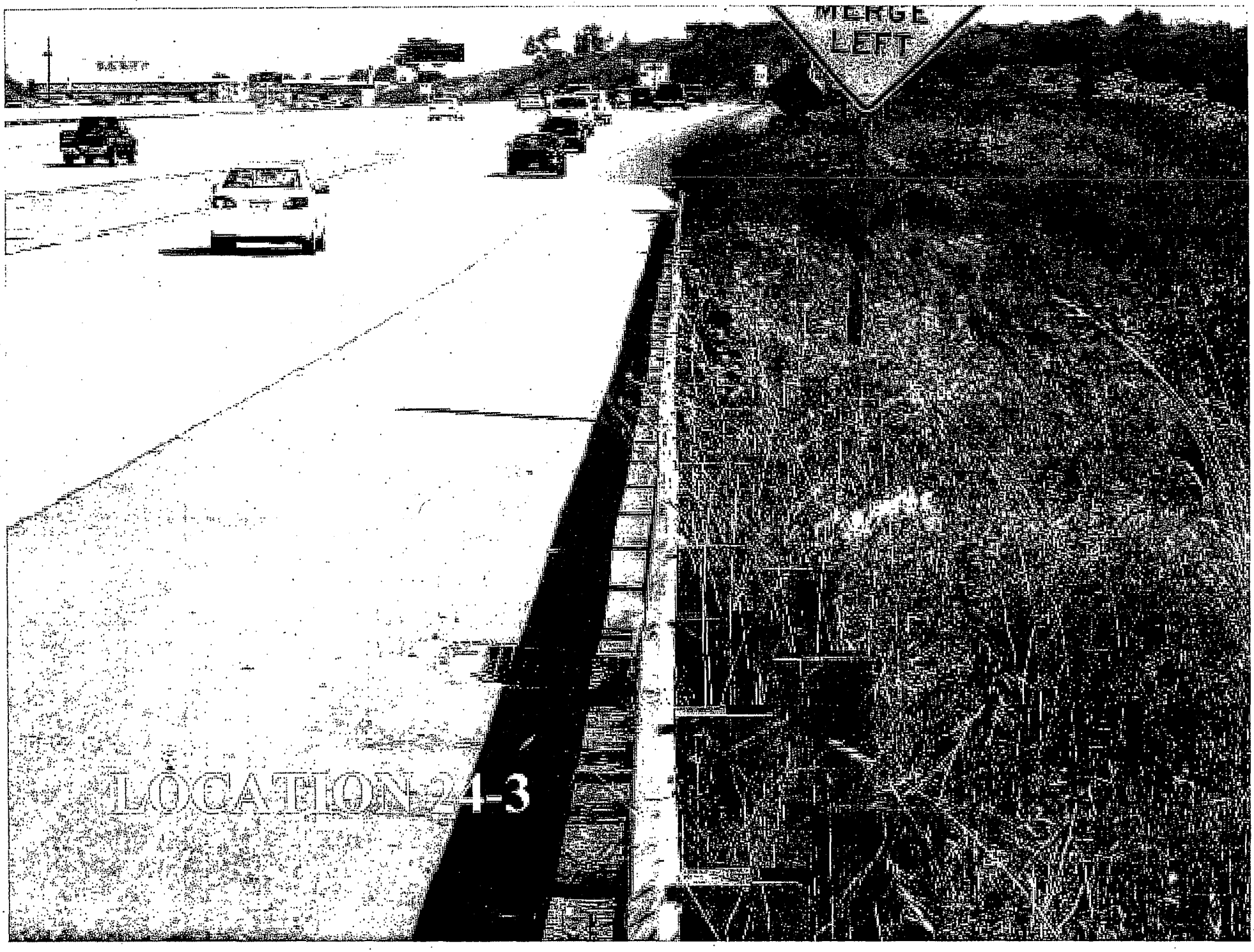
STATE OF CALIFORNIA – DEPARTMENT OF TRANSPORTATION
Caltrans DESIGN

FUNCTIONAL SUPERVISOR: ED HAJJ
CALCULATED-DESIGNED BY: OSCAR M AGUILAR
CHECKED BY
REVISED BY
DATE REVISED

LAST REVISION 03-30-11 DATE PLOTTED => 29-NOV-2011 TIME PLOTTED => 12:55

BORDER LAST REVISED 7/2/2010 | USERNAME => s129339 DGN FILE => 11000005311p019.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 2761 | PROJECT NUMBER & PHASE 11000005311

LOCATION 24


MERGE
LEFT
LOCATION 24-3

State of California

Business, Transportation and Housing Agency

Memorandum

To: Oscar Aguilar
Project Engineer
District 11
Office of Design, MS#333

Date: February 29, 2012
File: 11-SD-54-R0.16/R0.42
EA: 11-401404
EFIS: 1100000531

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

Subject: Geotechnical Design Report for the Concrete Outer Separation Barrier at Location 25: from Southbound Interstate 5 to Eastbound State Route 54 Connector.

Pursuant to your request, the Office of Geotechnical Design South 2 (OGDS2) has prepared this Geotechnical Design Report (GDR) for the proposed Concrete Outer Separation Barrier at Location 25 from Southbound Interstate 5 to Eastbound State Route 54 Connector. This report defines the geotechnical conditions as evaluated from field data and used in the development of the geotechnical design. This report provides recommendations and advisories for project design and construction.

OGDS2 staff is available for further assistance on this project. If you have additional questions or require clarification please contact Jeff Tesar at (office) 858 467-2716 or (mobile) 858 945-0458.

Brian Hinman

Jeff Tesar, C.E.G.
Engineering Geologist
Office of Geotechnical Design-South 2

Brian Hinman, P.E.
Senior Transportation Engineer

J. Tesar

REGISTERED GEOLOGIST
JEFF J. TESAR
No. 2137
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

cc: Ed Hajj — District Project Manager
Mark Willian — Geotechnical Services Corporate
Art Padilla — District Materials Engineer
Abbas Abghari — Office Chief, OGDS2
District Construction R.E. Pending File — It is the responsibility of the District Project Engineer and/or the Design Senior to include this document in the R.E. Pending Files

"Caltrans improves mobility across California"

1.0 EXECUTIVE SUMMARY

Pursuant to the recommendations contained in this report one section of the proposed concrete outer separation barrier may be constructed per Caltrans Standard Plan Concrete barrier Type 60. However, due to the fact that at Location 25 the barrier will be constructed at about the hinge of the steep ramp slope, pile foundations will be necessary for the second section of the proposed separation barrier. The barrier on piles should be designed in accordance with Caltrans Standard Plan Type 736 SV Case 2 (Sheet B15-6) without sound wall. In addition, it is recommended that for this project a section of the distressed and failed asphalt concrete (AC) shoulder adjacent to the location of the proposed barrier be rebuilt per specifications contained in this report. These recommendations are presented in detail within this report and may be used for project design and construction.

2.0 INTRODUCTION

Pursuant to your request, the Caltrans Office of Geotechnical Design South 2 has provided this Geotechnical Design Report to be used for project design and construction. The proposed project involves construction of a concrete outer separation barrier on the southbound (SB) Interstate 5 (I-5) to eastbound (EB) State Route 54 (SR-54) connector. The proposed barrier is shown on the site plan layout attached to this report. This barrier will be located north of the edge of the northern shoulder. To the north of the proposed barrier, a north facing slope with an average inclination of approximately 2:1 horizontal to vertical (H:V) bounds this shoulder. The maximum height of this slope is approximately 30.0 feet. This slope is depicted in the attached photos.

3.0 EXISTING FACILITIES.

The SB I-5 to EB SR-54 connector is a one and two lanes ramp connecting I-5 with SR-54, in National City, California. Existing facilities in the project area include bridges, graded slopes, buried utilities, traffic sign structures, and drainage features.

4.0 PHYSICAL SETTING

The climate in this area is considered semi-arid. Precipitation records available from the National Weather Service indicate that average rainfall at the Miramar Naval Air Station that is located 7.5 miles inland from the Pacific Coast (elevation of 475 feet), and about 14.5 miles to the north of the project limits, is 11 inches per year. In general, at the project area and in its vicinity, annual rainfall increases with distance from the coastline. In addition, nearly 90% of the annual precipitation occurs between the months of November and April. Therefore, the period from November through April is considered to be the rainy season.

The topography in the project area is characterized by a broad, flat alluvial plane associated with the Sweetwater River. To the north and south this plain is bounded by mesas, and to the west it is bounded by the San Diego Bay. Mesas that bound this plain have formed as an uplifted wave cut marine terrace. Subsequently, erosion by the Sweetwater River has dissected this terrace

creating both mesas and the alluvial plain. From north to southeast and east the SB I-5 to EB SR-54 connector descends on a medium steep gradient through a ramp embankment.

Runoff water and drainage water at the project location flows toward, or is channeled to, Sweetwater River that carries it west to the San Diego Bay.

There are no man-made or natural features that present any unusual engineering or construction challenges.

5.0 SITE INVESTIGATION

The following subsections describe the investigation conducted for this report.

5.1 Pertinent Reports and Archives Review

The following report was reviewed during the preparation of this report:

"Interstate 805 Soundwalls Unit 3, from 0.5 Miles South of the I-805/SR-54 Interchange to 0.25 Miles South of the I-805/SR-94 Interchange" by Jeff Tesar, 2011.

5.2 Exploration

Four exploratory borings were conducted along the barrier alignment. The soil borings were advanced into the ground up to a maximum depth of 7.0 feet utilizing a hand auger with 3-inch diameter bit. Soil cuttings were visually classified in the field. No laboratory testing of soils was conducted. Apparent density of soils was estimated from the response of the auger to the drilling effort. Borings were drilled approximately two feet to the west of the edge of the shoulder or existing guard rail barrier. Descriptions of the subsurface soils encountered at boring locations are presented in the attached Table 1, Subsurface Soil Description. The boring locations are shown on the attached project layout plan.

6.0 GEOLOGY

The proposed barrier is underlain by fill materials derived from local cuts during the construction of the freeway. Fill materials consist of sands with trace of fine gravel. This fill is underlain by alluvial and slope wash native soils associated with the Sweetwater River and nearby mesas. The alluvium consists mostly of poorly consolidated stream deposits of silt, sand, and cobble-sized particles derived from bedrock sources that lay upstream the river. These deposits intertongue with the Holocene Epoch slopewash that mantels the slopes of the nearby mesas. The slopewash deposits are poorly consolidated surficial soils derived chiefly from nearby sources and decomposed bedrock (Kennedy and Tan, 1977.)

7.0 GEOTECHNICAL CONSIDERATIONS

The following subsections describe geotechnical characteristics of the project site that may influence design.

7.1 Subsurface Soil Conditions

The alignment of the proposed concrete outer separation barrier is underlain by fill materials consisting of sands and gravels. The apparent density of this fill was estimated to be medium dense. Based on a review of geologic maps this fill is in turn underlain by the native alluvial soils associated with the Sweetwater River.

7.2 Groundwater

The groundwater table is expected to be located at the approximately elevation of the Sweetwater River water surface. Consequently, it is not anticipated to impact the project.

7.3 Erosion

No evidence of excessive erosion was observed on the face of the existing slope. However, if construction operations related to this project adversely affect the face of the existing slope, then appropriate erosion control measures should be applied to the affected sections.

7.4 Seismic Hazards

The proposed concrete outer separation barrier will not be adversely impacted by seismic events.

7.5 Slope Stability and Rockfall

This slope appears to be in good condition. No evidence of slope failure or distress was found during subsurface exploration phase of this project.

Rockfall potential does not exist on the project.

7.6 Excavation Characteristics

The soil that underlies the barrier alignment may be excavated utilizing standard heavy duty earth-moving and drilling equipment. The presence of gravel in fill materials can affect the production rate of the drilling and increase by estimated 3% the volume of concrete utilized for the pile foundation construction.

7.7 Embankments

No significant embankment will be constructed as part of the project.

7.8 Volumetric Stability of Embankment and Sub grade Materials

Significant adverse soil conditions such as expansive or collapsible soils were not identified within the project limits.

7.9 Potential Geologic Hazards

No significant geologic hazards were identified within the project area.

8.0 HAZARDOUS WASTE POTENTIAL

A hazardous waste site evaluation is beyond the scope of this report. No potentially hazardous waste was encountered during site reconnaissance and site subsurface investigation.

9.0 RECOMMENDATIONS AND ADVISORIES

9.1 Concrete Barrier

- From Station 67+80 ("54E1" Line) to the eastern limit of the proposed barrier location Caltrans Standard Plan Concrete Barrier Type 60 (Sheet A76B) is recommended for the proposed barrier.

- From the western limit of the proposed barrier location to Station 67+80 ("54E1" Line) Caltrans Standard Plan for Sound Wall on Type 736 SV (Sheet B15-6) Case 2 but without the sound wall is recommended for the proposed barrier. For the Case 2 Pile Data Table (Sheet B15-8) an angle of internal friction (Φ) of 30 degrees should be utilized.

9.2 AC Shoulder

- From the western limit of the proposed barrier location to Station 64+40 ("54E" Line) soils under existing AC shoulder should be removed to the depth of 3.5 feet below the ground surface. A geotextile reinforcement fabric should be placed at the bottom of the excavation. Subsequently, the excavation should be backfilled with the existing soils compacted to 95% Relative Compaction in accordance with CTM 216.

- For the project the utilization of the geotextile reinforcement fabric should conform to the Caltrans Standard Specifications, Section 19-8 Subgrade Enhancement Geotextile.

- Recommendations for the structural section of the rebuilt AC shoulder have been provided by the District Pavement Engineer. These recommendations are attached to this report.

9.3 Erosion Control

Appropriate erosion control measures should be implemented to protect the newly graded slope face.

9.4 Surface Drainage

Concentrated surface water should not be allowed to pond behind the concrete barrier. Concentrated runoff should not be directed to drain over the slope. Surface water should be contained by appropriate drainage improvements.

9.5 Construction Advisories

The contractor should anticipate moderate difficult excavation/drilling conditions as described in section 7.6. In addition, for the AC shoulder restoration task import of borrow soils could be required.

10.0 DIFFERING SITE CONDITIONS

The recommendations contained in this report are based on specific project information regarding structure type and location that have been provided by District 11 Design. If any conceptual changes are made during final project design or if site conditions are encountered during construction that are believed to differ from those conveyed in this report, staff from OGDS2 should review the project to provide appropriate recommendations. Any questions regarding the above recommendations should be directed to the attention of Jeff Tesar, at (858) 467-2716.

REFERENCES

1. Michael Kennedy and Siang Tan: *"Geology of the Southern San Diego Metropolitan Area, California."* California Division of Mines and Geology, Map Sheet 29, 1977.
2. *"Interstate 805 Soundwalls Unit 3, from 0.5 Miles South of the I-805/SR-54 Interchange to 0.25 Miles South of the I-805/SR-94 Interchange"* by Jeff Tesar, 2011.
3. State of California, Department of Transportation, Standard Plans, 2010.
4. State of California, Department of Transportation, Standard Specifications, 2010

ATTACHEMENTS

1. Project Location Layout
2. Layout L-20 (Location 25)
3. Table 1, Subsurface Soil Description
4. *"Structural Section Recommendations"* Internal Memorandum by David Evans, February 29, 2012.
5. Photos

INDEX OF PLANS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PROJECT PLANS FOR CONSTRUCTION ON
STATE HIGHWAY
IN SAN DIEGO COUNTY AT VARIOUS LOCATIONS

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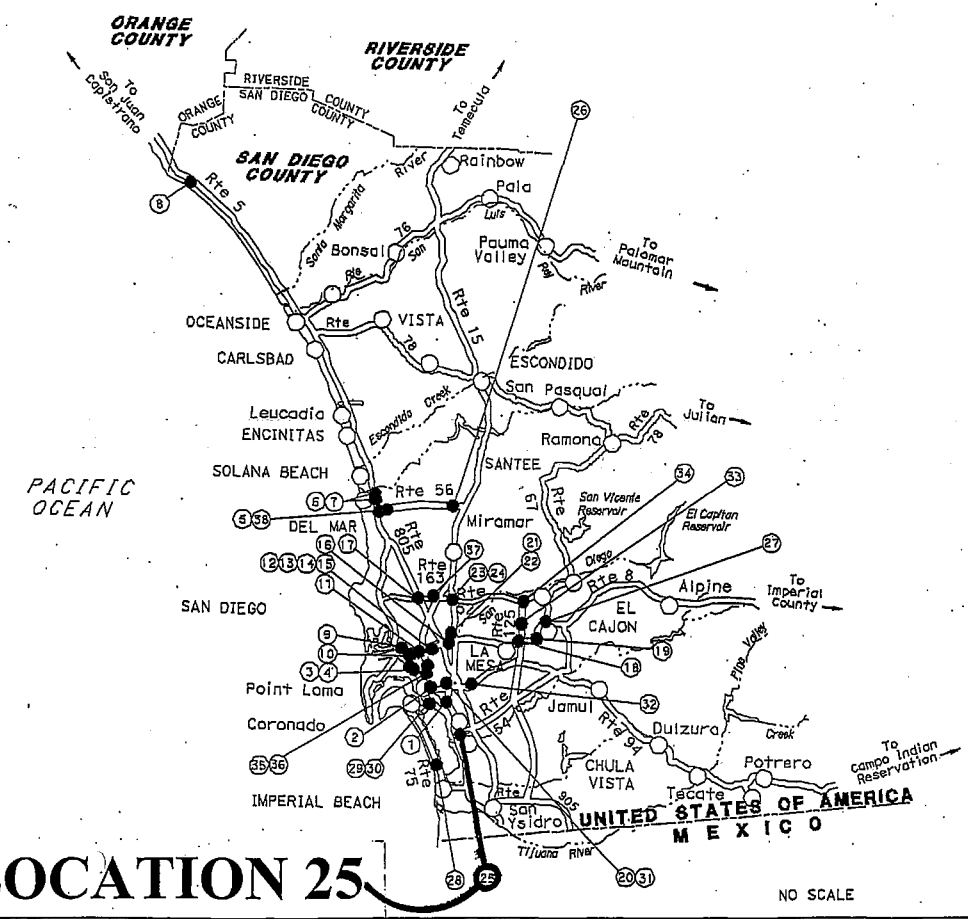

NO SCALE

PROJECT ENGINEER REGISTERED CIVIL ENGINEER — DATE

OSCAR AGUILAR No. C62571 Exp. 06-30-12 CIVIL STATE OF CALIFORNIA

PLANS APPROVAL DATE

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CONTRACT No.	11-401404
PROJECT ID	1100000531

DATE PLOTTED => 15-AUG-2011
TIME PLOTTED => 11:54

LAST REVISION 01-24-11

PROJECT MANAGER ED HAJJ

DESIGN ENGINEER OSCAR M AGUILAR

THE CONTRACTOR SHALL POSSESS THE CLASS (OR CLA OF LICENSE AS SPECIFIED IN THE "NOTICE TO BIDDER

BORDER LAST REVISED 7/2/2010 | CALTRANS WEB SITE IS: HTTP//WWW.DOT.CA.GOV/. | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => 6129339 DGN FILE => 1100000531cb001.dgn | UNIT 2761 | PROJECT NUMBER & PHASE 11000005311

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
11	SD	5,8,15,54,56,61, 75,94,125,163,805	Var		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER OSCAR AGUILAR No. C62571 Exp. 06-30-12 CIVIL STATE OF CALIFORNIA

NOTE:

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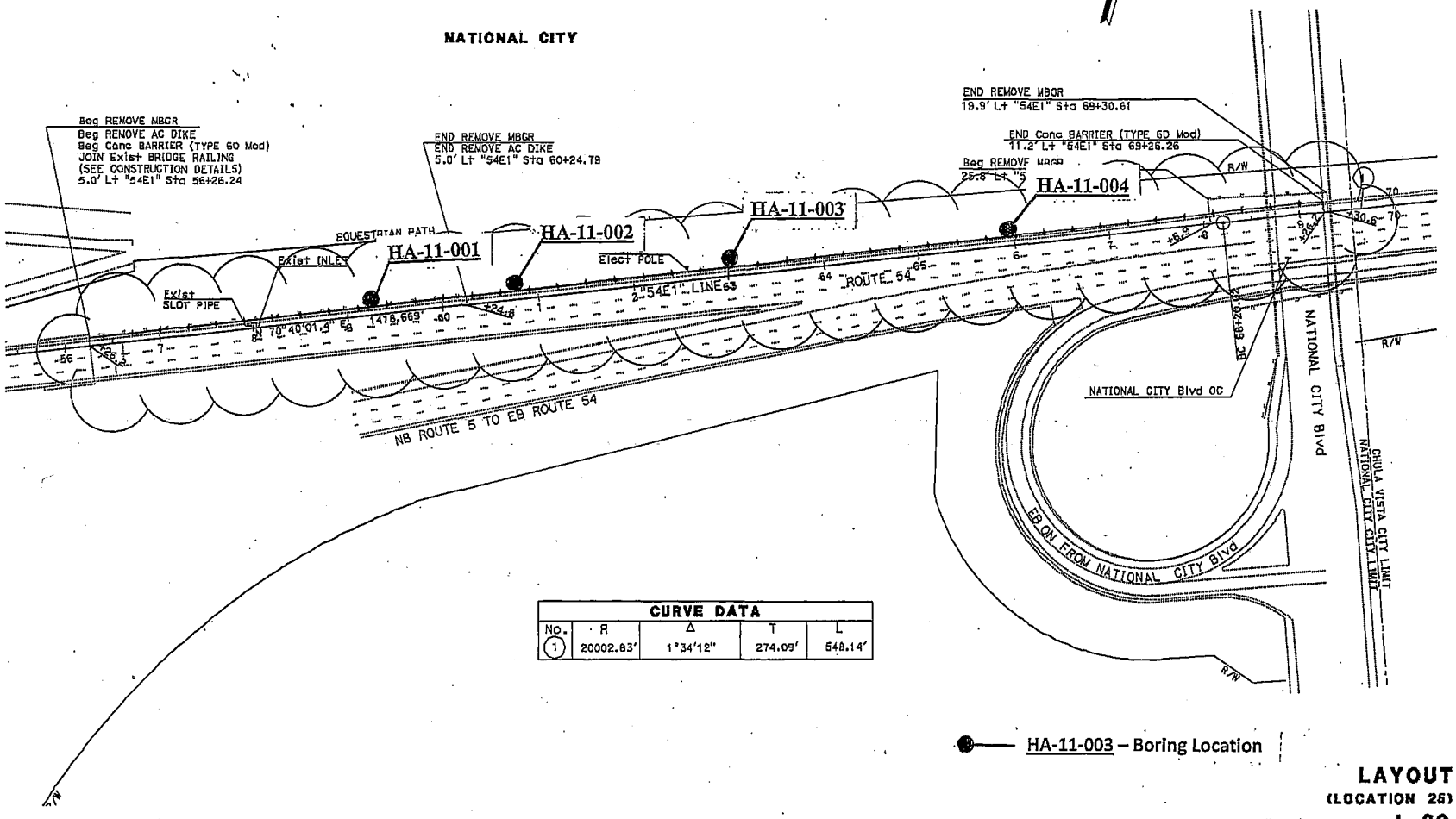

CURVE DATA				
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LAYOUT
(LOCATION 26)
L-20

SCALE: 1"=50'

STATE OF CALIFORNIA – DEPARTMENT OF TRANSPORTATION
Caltrans DESIGN
FUNCTIONAL SUPERVISOR ED HAJJ
CALCULATED-DESIGNED BY
CHECKED BY
OSCAR M AGUILAR
REVISED BY
DATE REVISED

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LOC ROUTE | DATE PLOTTED => 25-AUG-2011 | TIME PLOTTED => 10:21 | 03-30-11

State of California

Business, Transportation and Housing Agency

Memorandum

To : JEFF TESAR
Engineering Geologist
Office of Geotechnical Design – South 2

Date: February 29, 2012

File: 11-SD-54
PM R0.16/R0.42
EA 11-401404
EFIS 1100000531

From : **DEPARTMENT OF TRANSPORTATION - DISTRICT 11**
PAVEMENT ENGINEERING SECTION

Subject: **STRUCTURAL SECTION RECOMMENDATIONS**

In accordance with your request, the following structural section is furnished for the replacement ramp shoulder of the Southbound I-5 to Eastbound SR-54 ramp.

The Traffic Index (TI) of 6.5 for the ramp shoulder was determined from the Caltrans Highway Design Manual. The basement soil R-value of 5 is estimated from previous projects in the area.

Shoulder (TI = 6.5, R-value = 5)

0.30' HMA-A
1.20' AB – Class 2

Design Notes:

1) The aggregate gradation for the HMA (Type A) is ¾" maximum, coarse.
2) The recommended PG grade of asphalt for the AC is PG 64-10.

If you have questions with regards to this memorandum, please contact me at 858-467-4056 or FAX at 858-467-4063.

David Evans, P.E.
District Pavement Engineer
Pavement / Roadbed Section

REGISTERED PROFESSIONAL ENGINEER
DAVID S. EVANS
No. C48245
Exp. 6-30-12
CIVIL
STATE OF CALIFORNIA

cc: A Padilla (DME)
M Peinado (MS 330)
E Hajj (MS 330)
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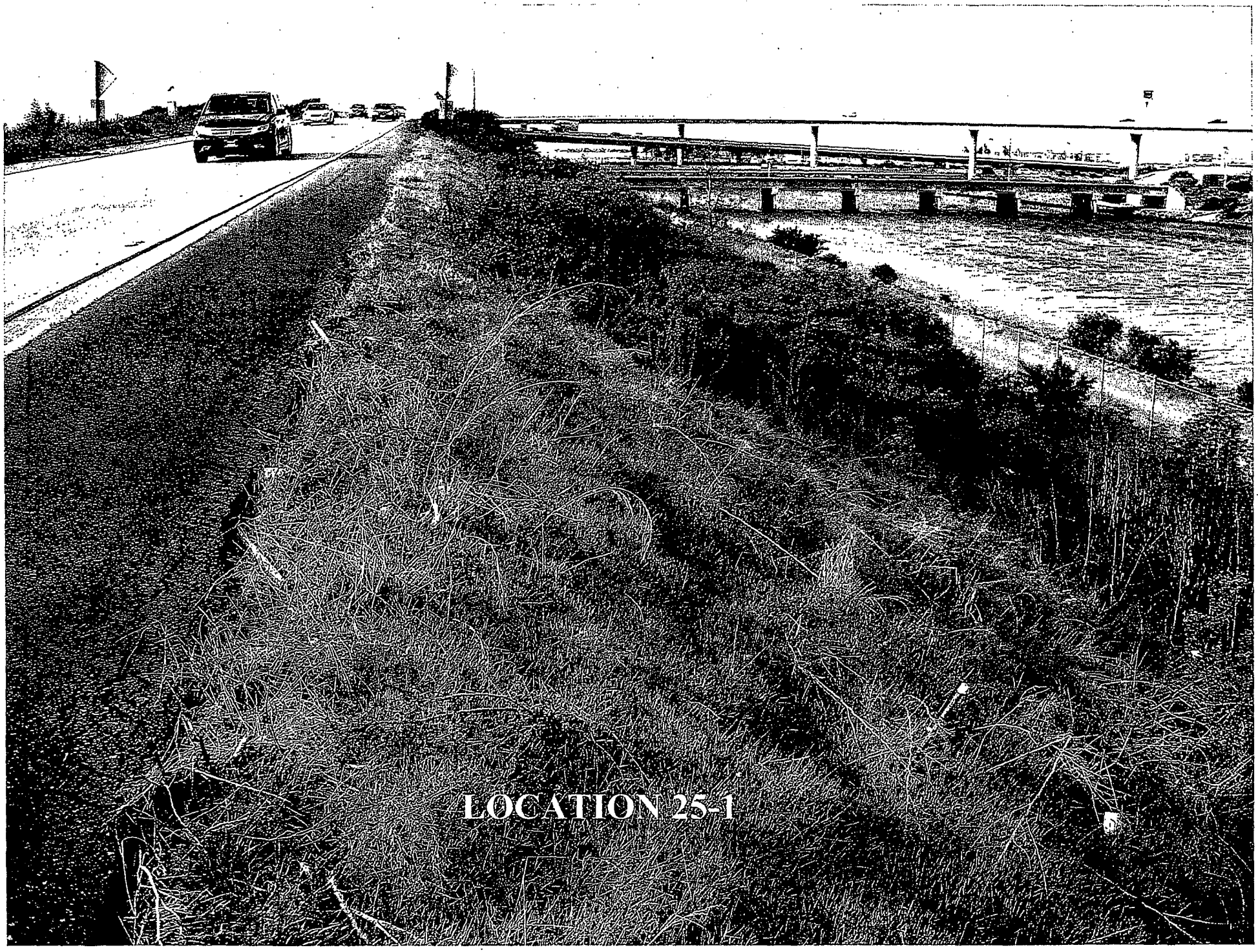
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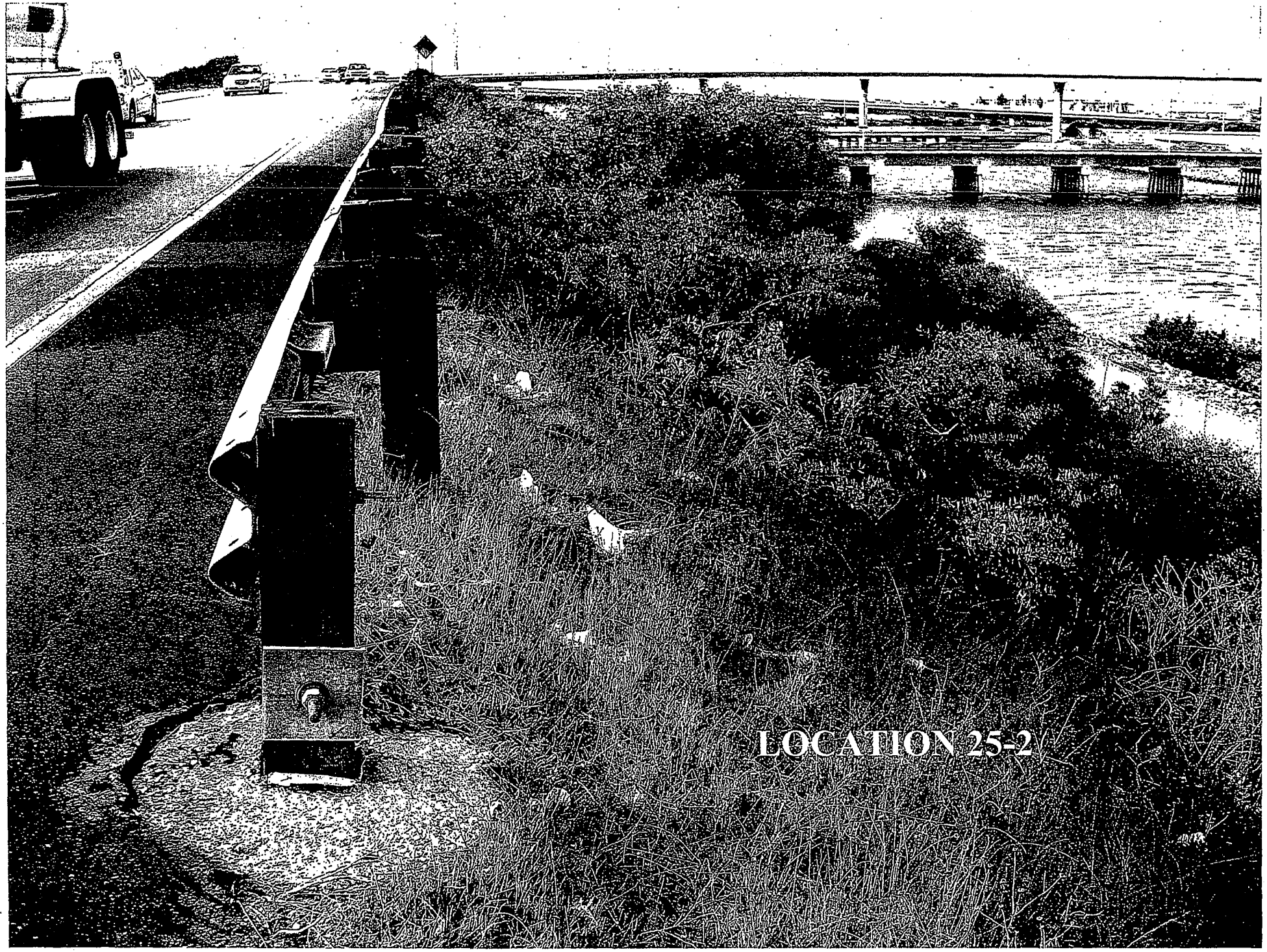
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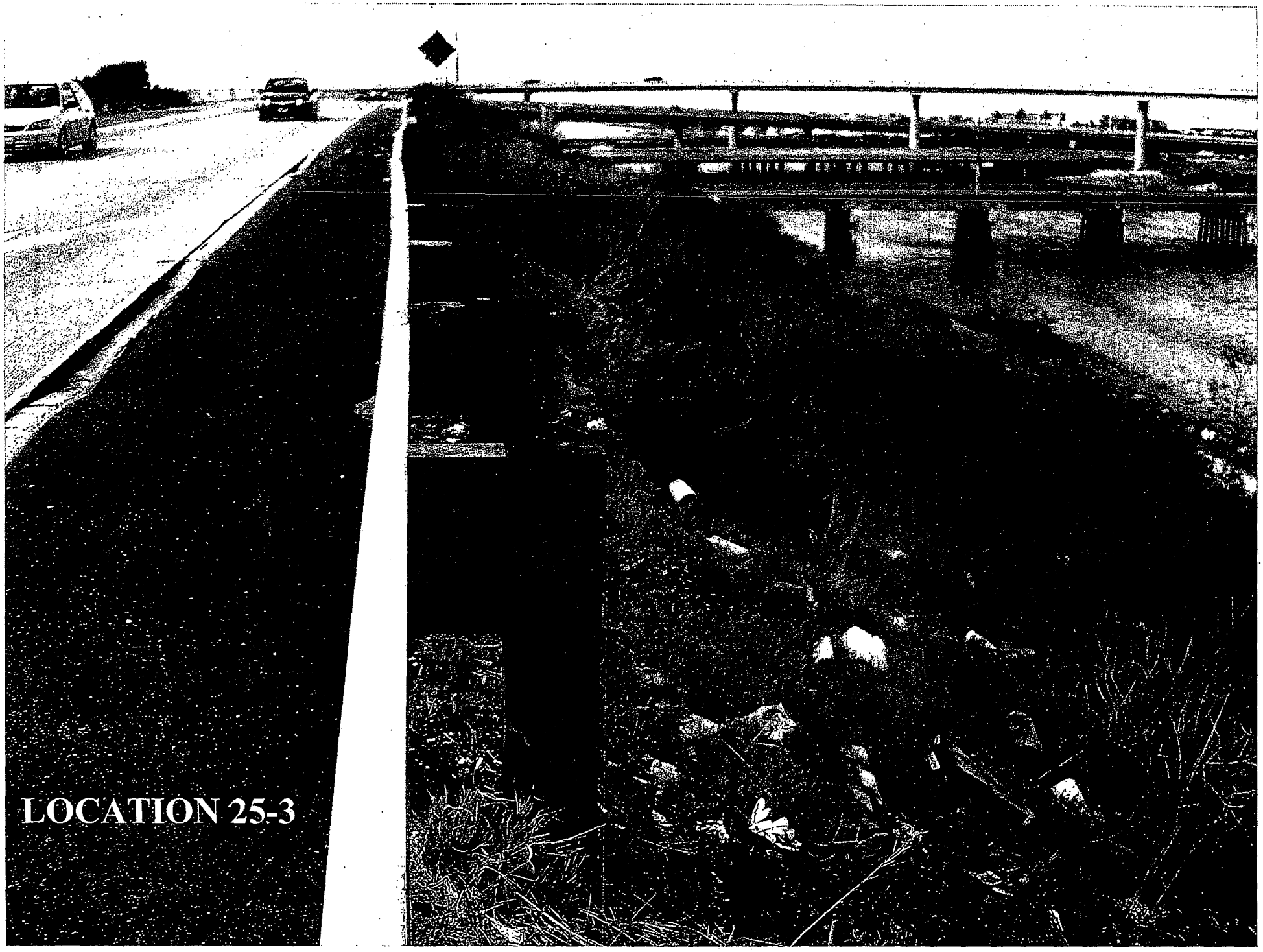
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