

APPENDIX A.2

Previous Boring Logs

TABLE A-2
Summary of Previous Borings

Boring Number			
Complete Log	Log Sketch	Geologic Contacts	Reference
Zone 1			
	B-6, B-7		Caltrans (1991)
B-26, B-27			City of Los Angeles (2000)
B-17, B-18, B-19, B-20, B-40, B-41, B-43, B-44, B-82, B-83, B-84, B-85, B-86, B-87, B-88, B-89, B-90, B-91, B-92, B-93, B-94, B-95, B-97, B-103, B-104, B-105, B-106, B-107, B-108, B-115, B-120			City of Los Angeles (2001)
		2750F, 2750G, 2760A, 2760B, 2760C, 2760F, 2760G, 2761A, 2771C, 2771G, 2771I, 2771K, 2771S, 2781A, 2781B, 2781D, 3948C, 3949A, 3949B, 3949C, 3958C, 3958G, 3958H, 3958J, 3959A, 3959B, 3959C, 3959D, 3959E, 3959F, 3959G, 3968A, 3968B, 3968C, 3969A, 3969B, 3979F, 3979G	Yerkes et al. (1977)
PO-VPB-03, PO-VPB-04, PO-VPB-09		PO-VOP-05, PO-VPB06, PO-VPB-07, PO-VPB-08	JMMI (1992) & CH2M HILL (2007)
47, 48, 49, 53, 56, 57, 58, 59			Law/Crandall (1993)
Zone 2			
B-1A, B-2A, B-3, B-4, B-18, B-19, B-21, B-23			City of Los Angeles (2000)
A-1, A-7			City of Los Angeles (2006a)
C-1, C-2, C-3, C-4, C-5, C-6, C-7			URS (2006)
60, 66, 69			Law/Crandall (1993)
		3968A, 3969C, 3977B, 3977D, 3977F, 3977I, 3977J, 3977K, 3978B, 3978C, 3979A, 3979B, 3979C, 3986D, 3979E, 3986A, 3986C, 3986E, 3987A, 3987B, 3987C, 3987F	Yerkes et al. (1977)

TABLE A-2
Summary of Previous Borings

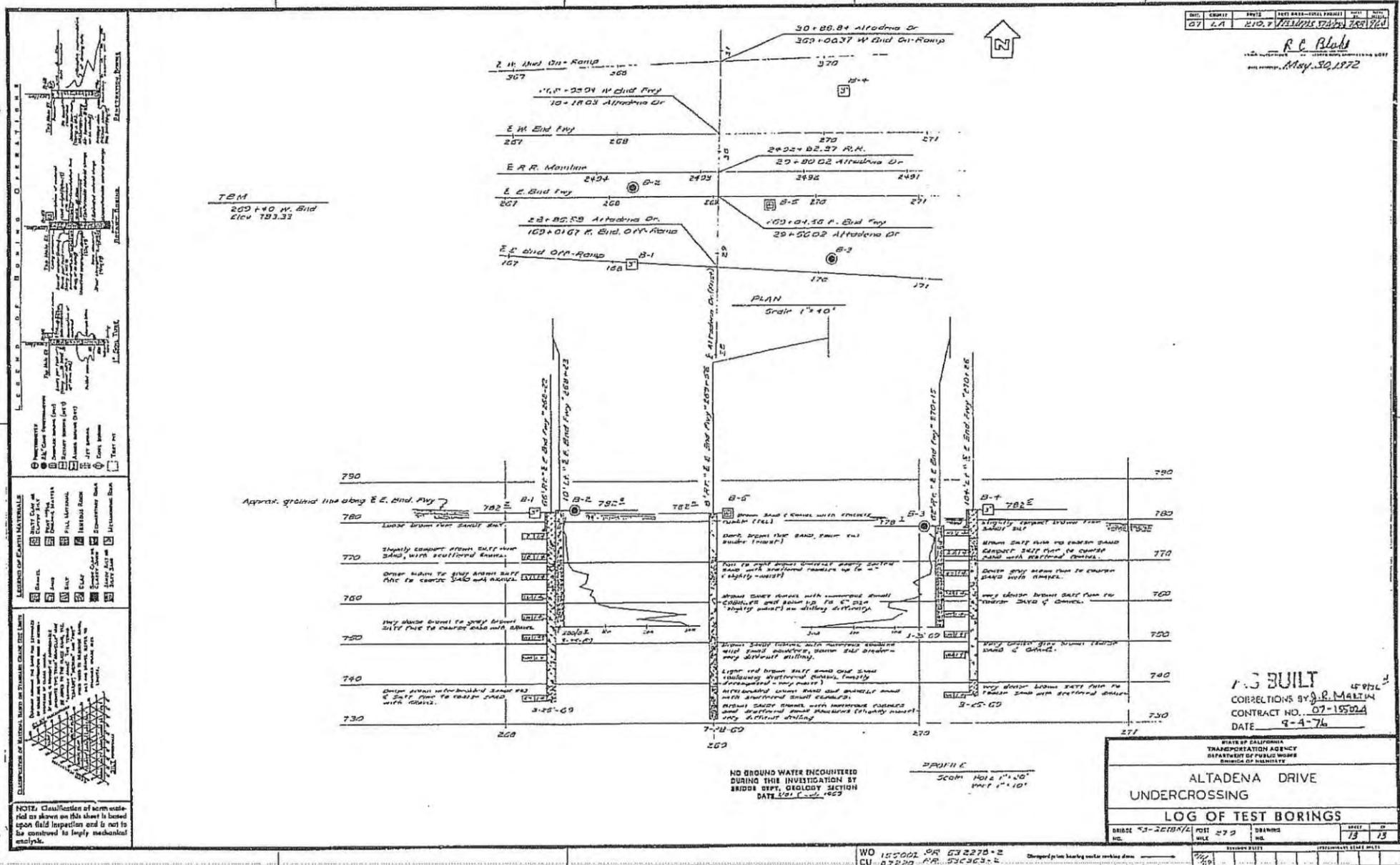
Boring Number			
Complete Log	Log Sketch	Geologic Contacts	Reference
Zone 3			
	4G1		CDWR (1966)
		C-23d, C-23f, C-24a, C-30, C-30a, C-30b, C-34b, C-108a, C-202c	Caltrans (1974a)
ES-1, ES-2, ES-3			Caltrans (1974b)
EM-1, EM-2, EM-3			EMI (2006)
	CA-OAK (28R1)		Geoscience (2004)
		4055, 4056	LACDPW (2009)*
B1, B2, B3, B4			Ninyo & Moore (1999)
73, 74, 80, 81, 82, 90, 93			Law/Crandall (1993)
Zone 4			
	10E1, 24G2, 25B1, 9K1		CDWR (1966)
MW 1-4			CH2M HILL (2003)
	36A2, CA-DSW (36C1), P-CRA (23G1), P-WOO (26C1), SSWC-12 (36G2), P-MON (33L1)		Geoscience (2004)
		4069, 4077B, 4078, 4079, 4085, 4086, 4087, 4089, 4095, 4096, 4096A, 4098, 4105, 4107A, 4107B, 4107R, 4115, 4115C, 4116, 4116K	LACDPW (2009)*
Zone 5			
	2P1, 3N4, 3Q3, 6M1, 7B1, 7K1, 7L2, 8A1, 8E2, 9D2, 10G1, 10R1, 11D1, 12A1, 12G1, 13H1, 13L1, 14D1, 14F1, 14K1, 14Q1, 18K1, 19F1, 21H1, 23C1, 24D1, 24E1		CDWR (1966)
	B-1, B-1a, B-4, B-5, B-8, B-9		Caltrans (1971)

TABLE A-2
Summary of Previous Borings

Boring Number			
Complete Log	Log Sketch	Geologic Contacts	Reference
BC-1, BH-11, BH-13, BH-26, CHC-P5, E-2, MW-2-05, MW 2-06, MW- 1 (AEMC), MW-1 (B&C), MW-1, (Stollar), MW-2 (SCS), MW-2-01, MW2- 02, MW-3 (AEMC), MW-3 (HFI), MW-3 (SCS), MW-7, PZ1, SWB-8			CDM (1998)
ERP-12, ERP-13, ERP-14			CDM (2006)
	CAL AM WC HOWLAND, CROWN CITY PLATTING CO, ERP-15		CDM (2008a)
ERP-16			CDM (2008b)
MW 1-1, MW 1-2, MW 1-3, MW 1-5			CH2M HILL (2003)
MW1-6, MW 1-7, MW1-8			CH2M HILL (2006)
	W12CPMW1, W12ASMW1, W12ASMW2, W12CVMW4, W12IWMW1		CH2M HILL (2009c)
DCMW-1B			GeoSyntec (2006a)
	AZUSA 1, ERP-8, SCMW7		GeoSyntec (2006b)

* Only groundwater data is available for LACDPW water wells.

Caltrans LOTB's

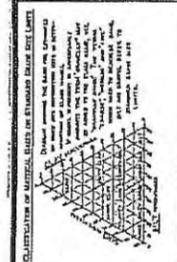
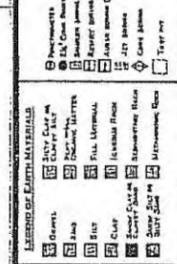
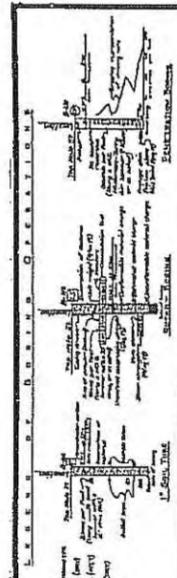


AS BUILT PLANS
 Contract No. 07-155024
 Date Completed _____

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 B-1 (Altadena)
 B-4
 B-5 X (CPT)

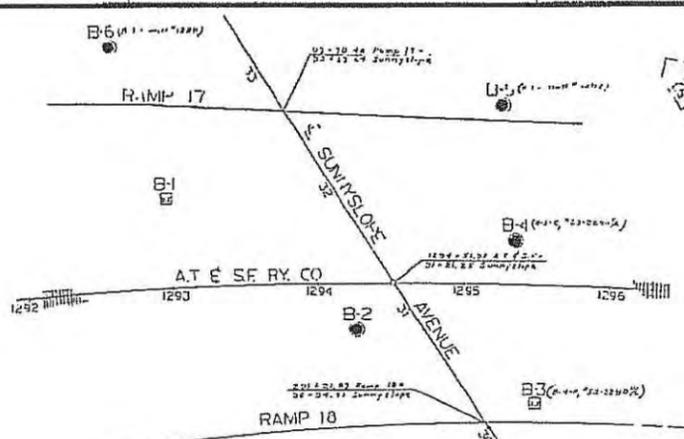
STATE OF CALIFORNIA TRANSPORTATION AGENCY DEPARTMENT OF PUBLIC WORKS DIVISION OF HIGHWAYS	
ALTADENA DRIVE UNDERCROSSING	
LOG OF TEST BORINGS	
BRIDGE 53-28874	POST 272
NO. 13	DATE 7-15-72

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE RECORD DRAWING TAKEN FROM THE ORIGINAL DRAWING ON FILE IN THE ARCHIVES OF THE CALIFORNIA DEPARTMENT OF PUBLIC WORKS, DIVISION OF HIGHWAYS, AND THAT THE SAME IS IN ACCORDANCE WITH THE REQUIREMENTS OF THE CALIFORNIA CIVIL CODE, SECTION 9100.



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

BENCH MARKS
 B.M. # 22-72 Elev. 728.45
 A.K. nail on top of east curb of Sunnyslope Ave. 1' north of signalized curb driveway to service station on N.E. corner of Sunnyslope and East Hill Blvd.
 B.M. # 17-72 Elev. 721.31
 At Int. of La Tierra St. and Sunnyslope Ave. on southeast corner, 11' from B.C.N. found round head bolt in lead in T.C.
 B.M. # 14-72 Elev. 723.55
 At Int. of Kula St. and Eaton Dr. on N.W. corner 2 ft. N. of E.C.N. found round head bolt in lead in T.C.

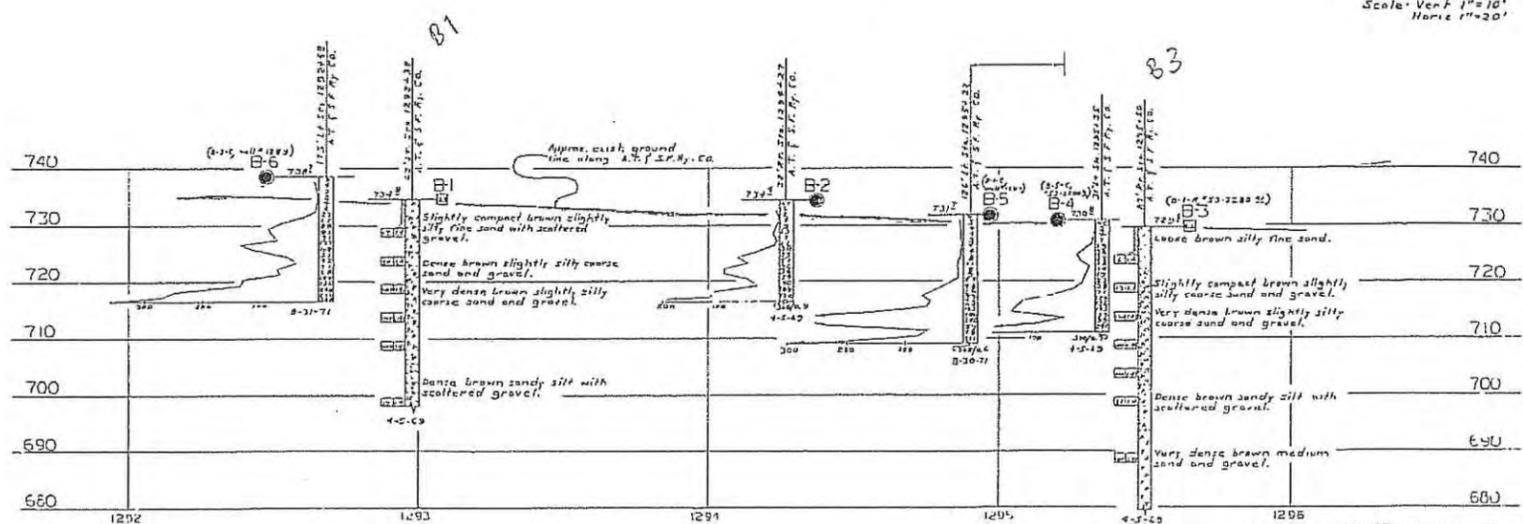


DATE: 07-15-76
 SHEET: 210,7
 PROJECT: SUNNYSLOPE AVENUE UNDERCROSSING
 DRAWN BY: R.C. BARKER
 CHECKED BY: [Signature]
 DATE: 08-20-76

PLAN
 Scale: 1" = 10'

THIS PROJECT WAS INVESTIGATED DURING THE DESIGN PHASE BY BRIDGE DIVISION, DISTRICT SECTION 9 - AUGUST, 1971

PROFILE
 Scale: Vert 1" = 10'
 Horiz 1" = 20'



B-1 Sunny
 B-2 Sunny
 In Zone 9

BRIDGE DEPARTMENT
 ENGINEERING GEOLOGY SECTION

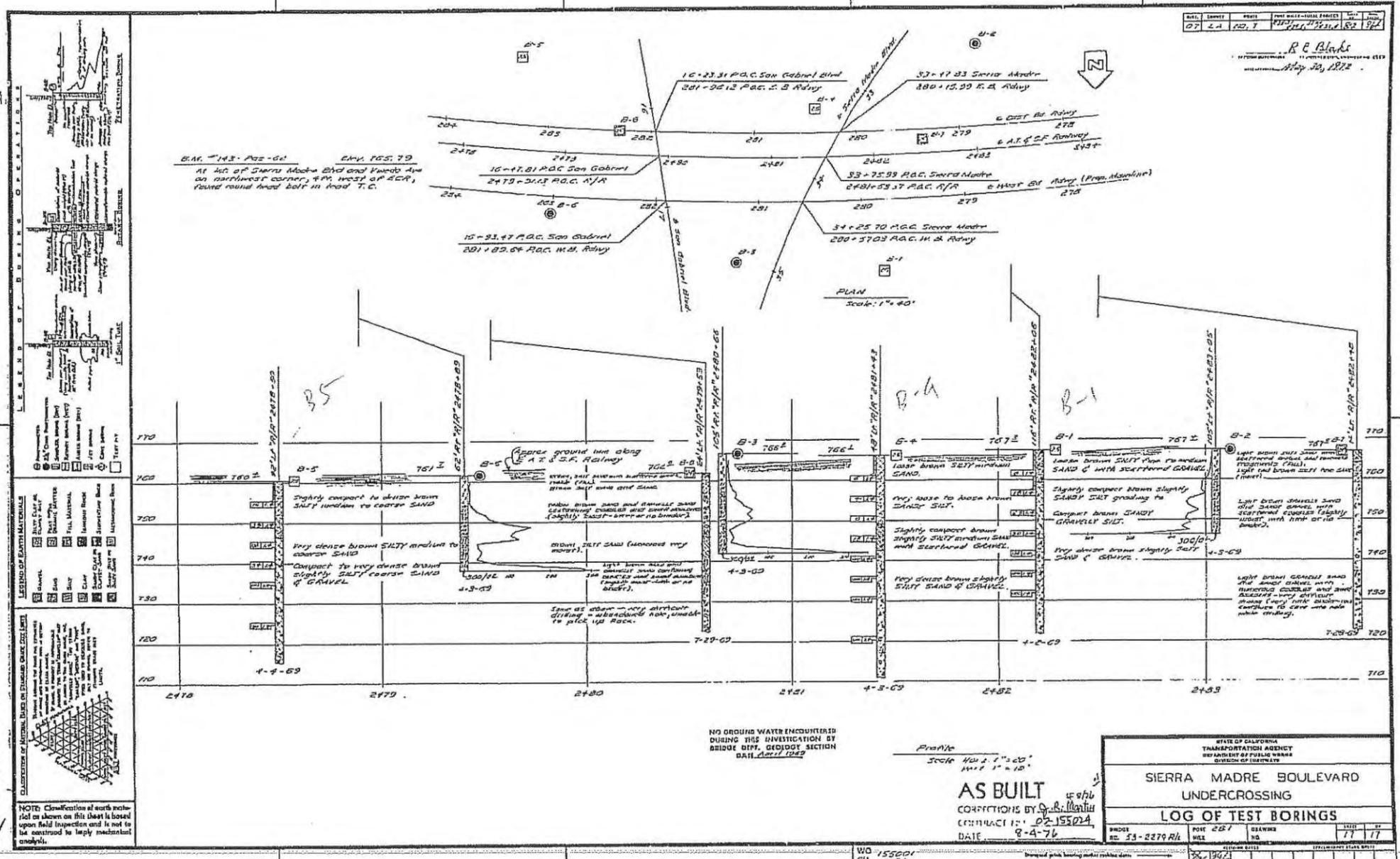
AS BUILT
 CONNECTIONS BY D.R. MARTIN
 CONTRACT NO. 07-155024
 DATE: 8-4-76

STATE OF CALIFORNIA TRANSPORTATION AGENCY DEPARTMENT OF PUBLIC WORKS DIVISION OF HIGHWAYS			
SUNNYSLOPE AVENUE UNDERCROSSING			
LOG OF TEST BORINGS			
BRIDGE NO. 33-2280 R/L	POST MILE 28.4	DEPTH	DATE
		12	76

AS BUILT PLANS
 Contract No. 07-155024
 Date Completed
 Document No. 10007970

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT AS CHECKED BY THE DISTRICT SECTION OF THE STATE DEPARTMENT OF PUBLIC WORKS PURSUANT TO AUTHORITY GRANTED BY THE DIRECTOR OF TRANSPORTATION.

SCALE: 1" = 20'



In Zone 4
8/11/812
210
243!

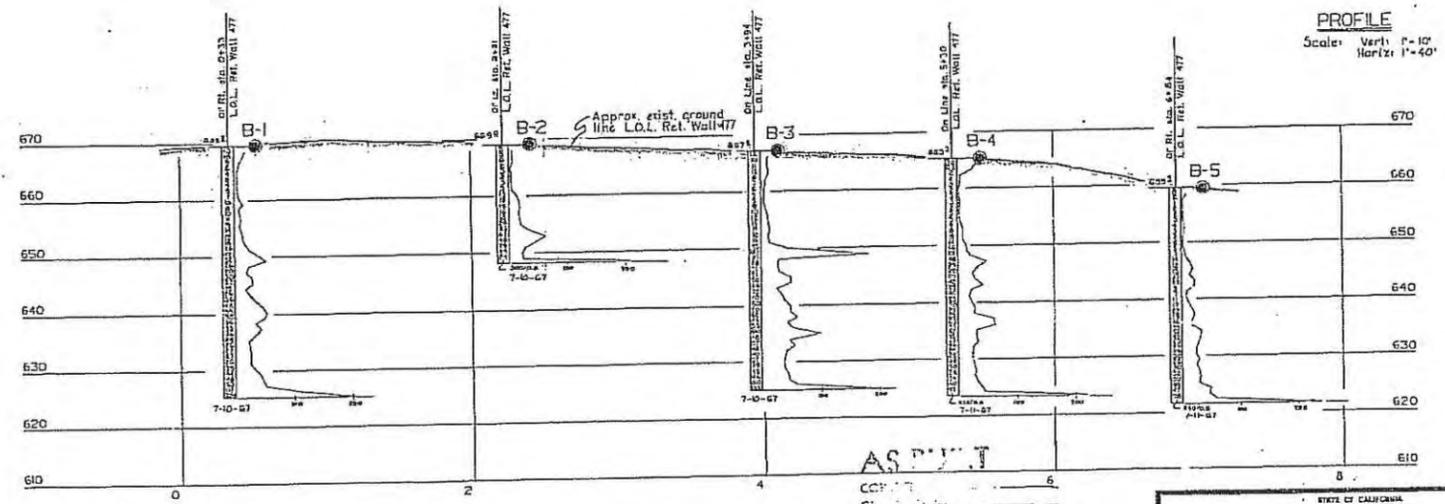
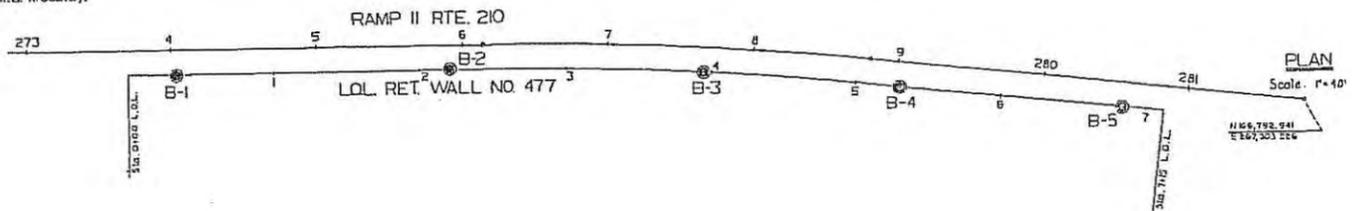
AS BUILT PLANS
Contract No. 02-155024

I HEREBY CERTIFY THAT THE SAID TRUE AND ACCURATE COPY OF THE ABOVE MENTIONED PLAN(S) WAS PREPARED UNDER MY DIRECT SUPERVISION AND CONTROL, ON THE DATE AND AT THE PLACE INDICATED, IN ACCORDANCE WITH THE AUTHORITY CONFERRED UPON ME BY THE DIRECTOR OF TRANSPORTATION.

1/10/18

DT L.A. 510
 November 12, 1968

BENCH MARK
 BM 199-A-62 Elev. 675.83
 On AT & SF RR and Rosemead Blvd.
 L.P. in north P.C.C. slab 4' south of
 guard rail found L & Tack on 3' offset
 east of 4. Rosemead.
 BM 56, R59 Elev. 674.06
 Fd. lead and spike 6' south of curb
 return at SE corner of Michilinda
 and Foothill Blvd. (L.A.C.R.D. Arcadia).



- LEGEND OF MATERIALS**
- 1. 1/2" Clear Particulate
 - 2. 1/4" Clear Particulate
 - 3. 1/8" Clear Particulate
 - 4. 1/4" Sand
 - 5. 1/8" Sand
 - 6. 1/4" Gravel
 - 7. 1/8" Gravel
 - 8. 1/4" Gravel
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 - 98. 1/4" Gravel
 - 99. 1/8" Gravel
 - 100. 1/4" Gravel

NOTE: Classification of earth materials as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

AS BUILT PLANS
 Contract No. 07-033274
 Date Completed
 Document No. 20025083

STATE OF CALIFORNIA
 DEPARTMENT OF PUBLIC WORKS
 DIVISION OF HIGHWAYS

FOOTHILL BOULEVARD RAMP SEPARATION

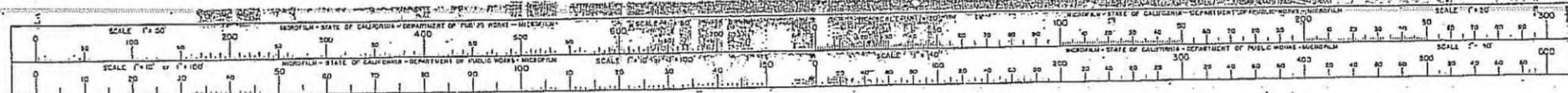
LOG OF TEST BORINGS (RETAINING WALL # 477)

SCALE AS NOTED BORING 53-2011 FILE BORING 532011-1B

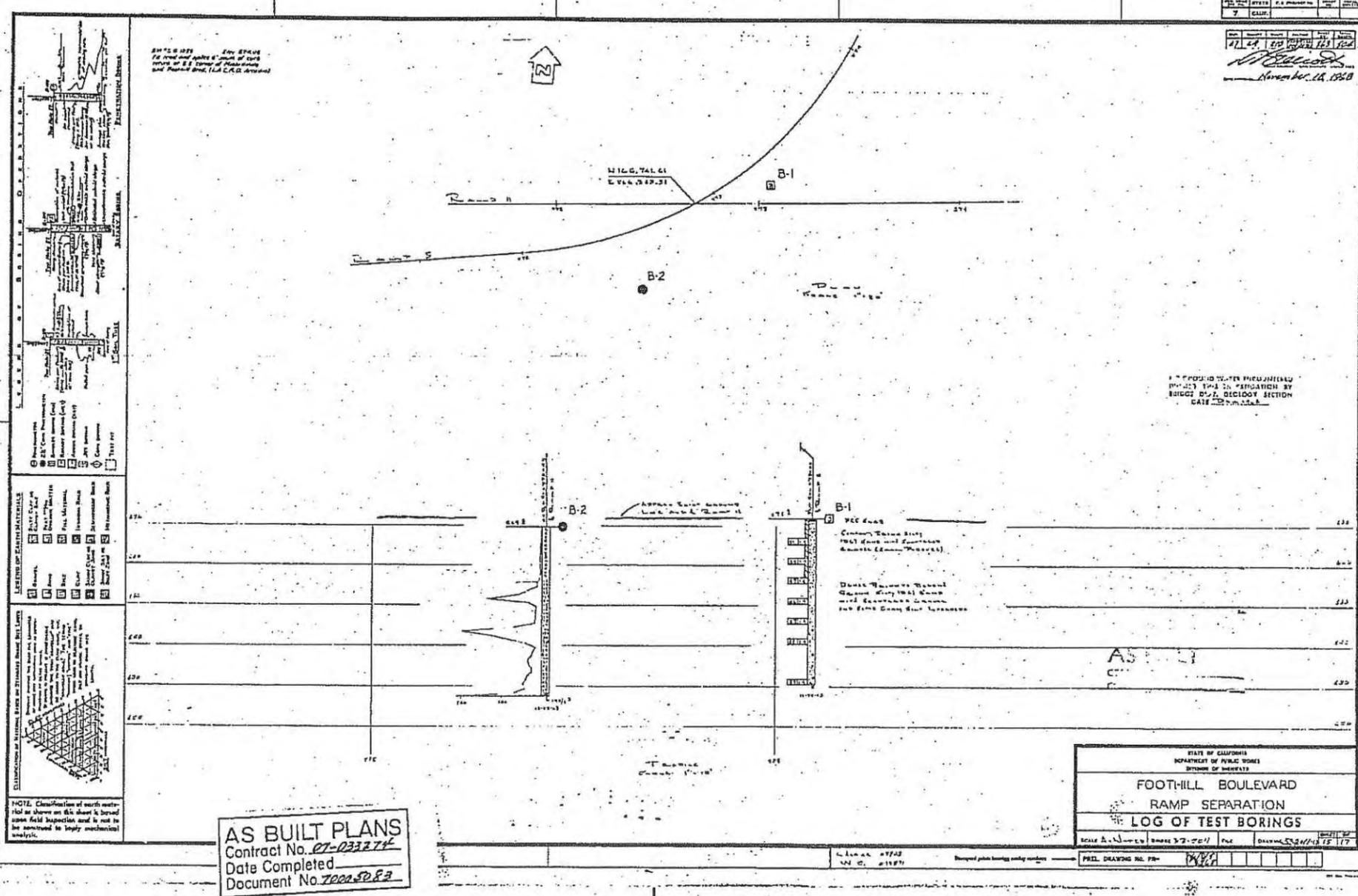
PREL. DRAWING NO. PR- []

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIVISION OF PUBLIC WORKS.

DATE 11/12/68 SIGNATURE [] TITLE: []



12-30-91	DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
TO ACCOMPANY PLANS DATED	07	LA	60,164 210,603	Var	63	102



same duplicate sheet of B-1

AS BUILT PLANS
Contract No. 07-033274
Date Completed
Document No. 7000-SP-83

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS
**FOOTHILL BOULEVARD
RAMP SEPARATION
LOG OF TEST BORINGS**
SCALE: AS SHOWN ON SHEET 53-2011K-117

AS BUILT
No CORRECTIONS BY A. Bains CR
CONTRACT NO. 07-110404
DATE 9-1-93 12-22-93

DESIGN OVERSIGHT
Thomas PD
8/22/91

NOTE: ADDITIONAL AS-BUILT FOUNDATION DATA MAY BE AVAILABLE AT THE DIVISION OF NEW TECHNOLOGY, MATERIALS AND RESEARCH 5500 FOLSOM BOULEVARD, SACRAMENTO, CALIFORNIA 95819

DESIGN	BY	CHECKED
DETAILS	BY	CHECKED
QUANTITIES	BY	CHECKED

PREPARED FOR THE
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PROJECT ENGINEER
[Signature]

BRIDGE NO.
53-2011K
POST MILE
29.65

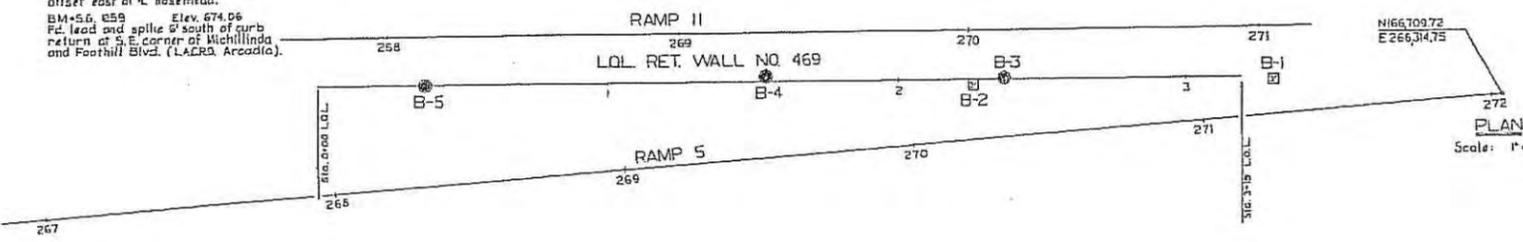
SEISMIC RETROFIT - PROJECT #53
**FOOTHILL BOULEVARD RAMP SEPARATION
AS-BUILT LOG OF TEST BORINGS**

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS
0 1 2 3
CU 07-231
EA 07-110401

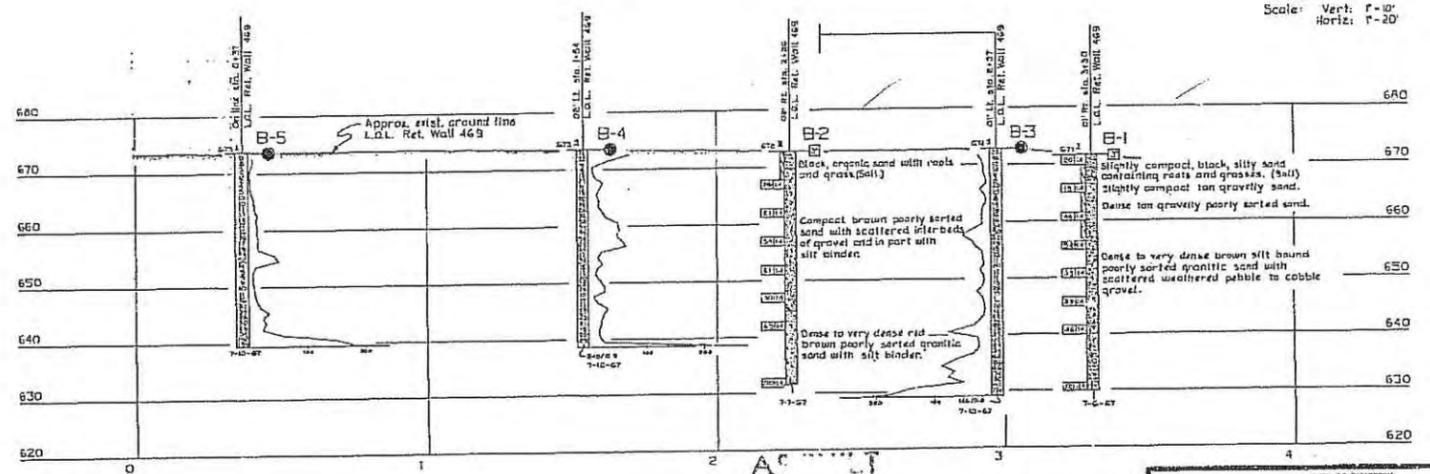
DISREGARD PRINTS BEARING EARLIER REVISION DATES
REVISION DATES (PRELIMINARY STAGE ONLY)
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BENCH MARK
 BM 159-A-62 Elev. 675.53
 On A7.4 SF. R.R. and Rosemead Blvd.
 11' P in north P.C.C. slab 4' south of
 guard rail found L.C. Tack on 3'
 offset east of L. Rosemead.
 BM+5.6, 659 Elev. 674.06
 Ft. lead over spike 5' south of curb
 return at S.E. corner of Michillinda
 and Foothill Blvd. (L.A.C.R.D. Arcadia).



PROFILE
 Scale: Vert: 1"=10'
 Horiz: 1"=20'



BRIDGE DEPARTMENT
 ENGINEERING GEOLOGY SECTION

LEGEND OF EARTH MATERIALS
 (List of symbols and descriptions for soil types)

CLASSIFICATION OF MATERIAL BASED ON ENGINEERING SOILS
 (Soil classification chart)

NOTE: Classification of earth materials as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

AS BUILT PLANS
 Contract No. 07-033274
 Date Completed
 Document No. 2000-50-83

STATE OF CALIFORNIA
 DEPARTMENT OF PUBLIC WORKS
 DIVISION OF HIGHWAYS

FOOTHILL BOULEVARD RAMP SEPARATION
LOG OF TEST BORINGS (RETAINING WALL NO. 469)

SCALE AS NOTED BORING 53-2011 FILE DRAWING 532011-17
 SHEET NO. 15 OF 17

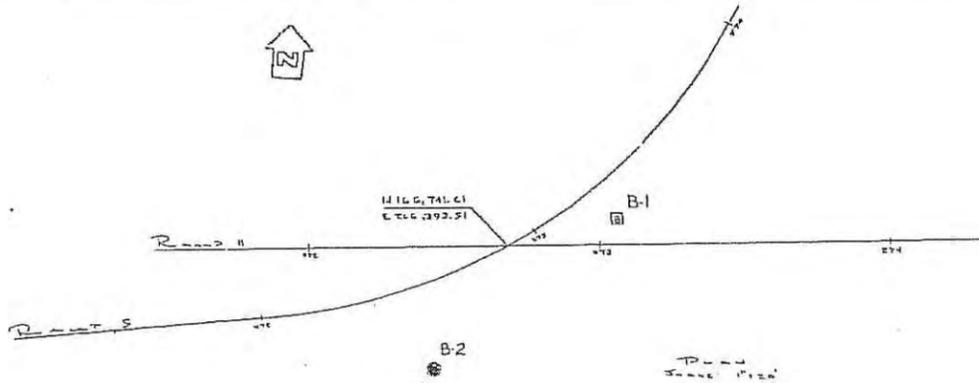
I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF PUBLIC WORKS.

DATE 7-10-07 SIGNATURE [Signature] TITLE AS BUILT



NO.	DATE	BY	REVISION
1	11/18/58	W. J.

30115 G 1223
 7th Street and 12th Street
 and 12th Street, U.C.P.D. (Amended)



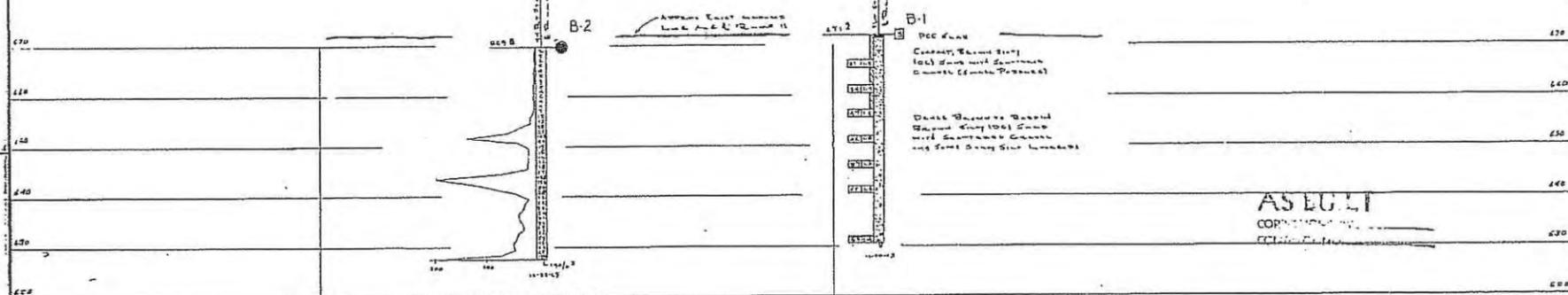
1" FOUND WATER ENCOUNTERED
 DURING THIS INVESTIGATION BY
 BRIDGE ENGR. GEOLOGY SECTION
 DATE 11-18-58

FIELD REPORT
 BY: W. J. ...
 DATE: 11/18/58

BRIDGE DEPARTMENT
 ENGINEERING GEOLOGY SECTION

LEGEND OF MATERIALS

1. Gravel
 2. Sand
 3. Clay
 4. Silt
 5. Organic Matter
 6. Hardpan
 7. Bedrock
 8. Unconsolidated Sand
 9. Unconsolidated Gravel
 10. Unconsolidated Clay
 11. Unconsolidated Silt
 12. Unconsolidated Gravel and Sand
 13. Unconsolidated Gravel and Silt
 14. Unconsolidated Gravel and Clay
 15. Unconsolidated Gravel and Organic Matter
 16. Unconsolidated Gravel and Hardpan
 17. Unconsolidated Gravel and Bedrock
 18. Unconsolidated Gravel and Unconsolidated Sand
 19. Unconsolidated Gravel and Unconsolidated Silt
 20. Unconsolidated Gravel and Unconsolidated Clay
 21. Unconsolidated Gravel and Unconsolidated Organic Matter
 22. Unconsolidated Gravel and Unconsolidated Hardpan
 23. Unconsolidated Gravel and Unconsolidated Bedrock
 24. Unconsolidated Gravel and Unconsolidated Gravel and Sand
 25. Unconsolidated Gravel and Unconsolidated Gravel and Silt
 26. Unconsolidated Gravel and Unconsolidated Gravel and Clay
 27. Unconsolidated Gravel and Unconsolidated Gravel and Organic Matter
 28. Unconsolidated Gravel and Unconsolidated Gravel and Hardpan
 29. Unconsolidated Gravel and Unconsolidated Gravel and Bedrock
 30. Unconsolidated Gravel and Unconsolidated Gravel and Unconsolidated Sand
 31. Unconsolidated Gravel and Unconsolidated Gravel and Unconsolidated Silt
 32. Unconsolidated Gravel and Unconsolidated Gravel and Unconsolidated Clay
 33. Unconsolidated Gravel and Unconsolidated Gravel and Unconsolidated Organic Matter
 34. Unconsolidated Gravel and Unconsolidated Gravel and Unconsolidated Hardpan
 35. Unconsolidated Gravel and Unconsolidated Gravel and Unconsolidated Bedrock



AS BUILT PLANS
 Contract No. 07-033274
 Date Completed
 Document No. 7000-5083

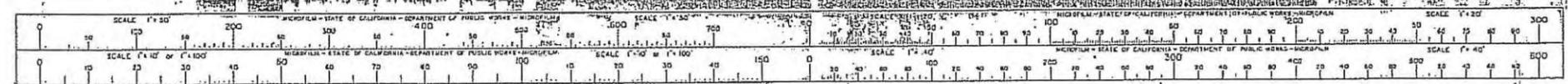
STATE OF CALIFORNIA
 DEPARTMENT OF PUBLIC WORKS
 DIVISION OF HIGHWAYS

**FOOT HILL BOULEVARD
 RAMP SEPARATION
 LOG OF TEST BORINGS**

SCALE AS SHOWN BORING 53-7011 FILE DRAWING 53-1118-17

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN
 UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO
 AUTHORIZATION OF THE DIRECTOR OF PUBLIC WORKS

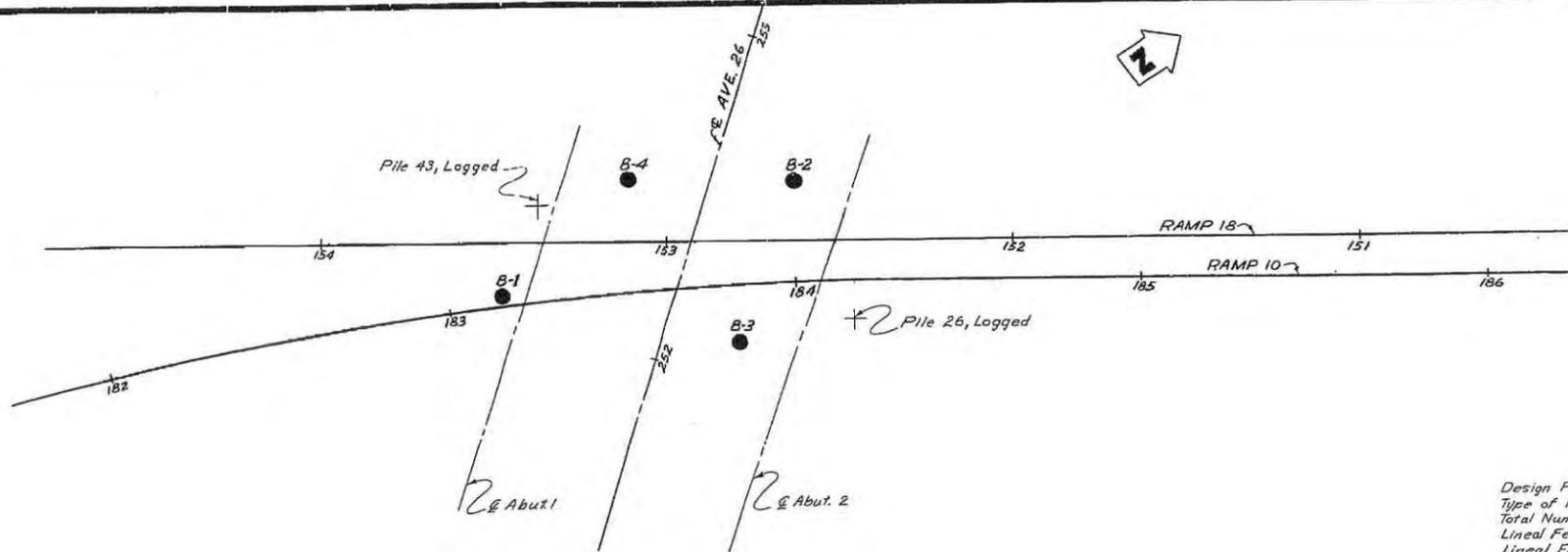
DATE 11/18/58 SIGNATURE W. J. ...



duplicate sheet

DATE: February 15, 1960
 ENGINEER: [Signature]
 CHECKED: [Signature]

BRIDGE DEPARTMENT

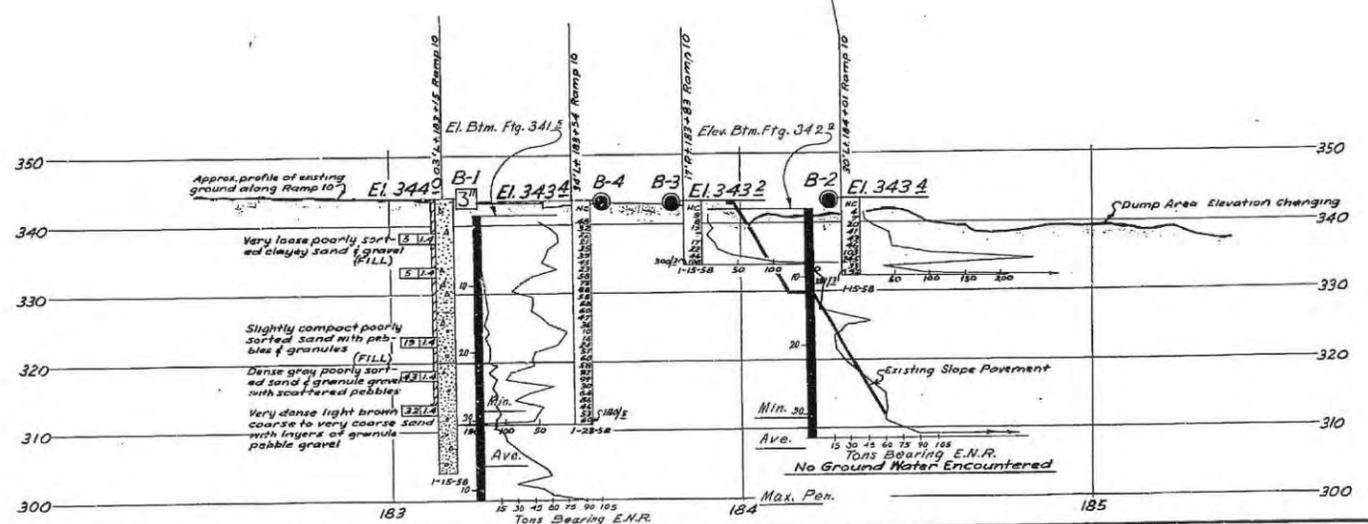


Design Pile Loading ----- 45 Tons
 Type of Pile ----- 10 BP 57
 Total Number of Piles ----- 100
 Lineal Feet of Piles "As Built" ----- 3641.6
 Lineal Feet of Piles Called For on Plans ----- 3845
 Hammer ----- Raymond 65-C
 Location ----- Abut. 1 and Abut. 2

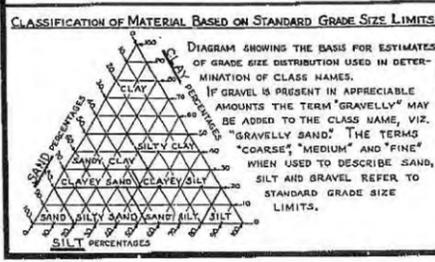
AS BUILT PLANS
 Contract No. 60-7VC74
 Date Completed _____
 Document No. 7000 2339

C.H.C. T.B.M. Elev. 343.68
 N.W. cor. Ave. 26 & Lacy St., on curb.

THIS SET OF PLANS HAS BEEN CORRECTED TO CORRESPOND TO THE "AS BUILT" PRICES DATED AS SUBMITTED BY THE ENGINEER. ENGINEER: G.A. Morse. TRACINGS CORRECTED BY: [Signature] DATE: 10-11-62



FIELD STUDY: GOLDSCHMIDT, [Signature]
 DRAWING: [Signature]
 APPROVED: [Signature]



LEGEND OF EARTH MATERIALS

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

LEGEND OF BORING OPERATIONS

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

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

STATE OF CALIFORNIA
 DEPARTMENT OF PUBLIC WORKS
 DIVISION OF HIGHWAYS

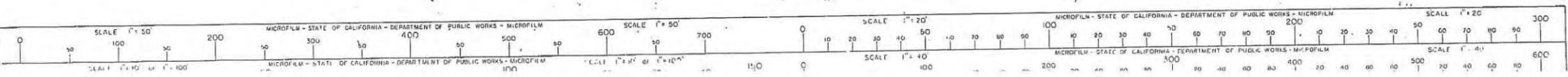
AVENUE 26 U.C.

LOG OF TEST BORINGS

Horiz. 1"=20'
 SCALE Vert. 1"=10'
 BRIDGE 53-1443
 DRAWING C-5782-13

382

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF PUBLIC WORKS.
 DATE 12-23-71 SIGNATURE: James E. Post TITLE: Sr. RMC



The As-Built Log of Test Boring sheet was used to prepare the Geotechnical Report
4 R. Taber 7-25-94

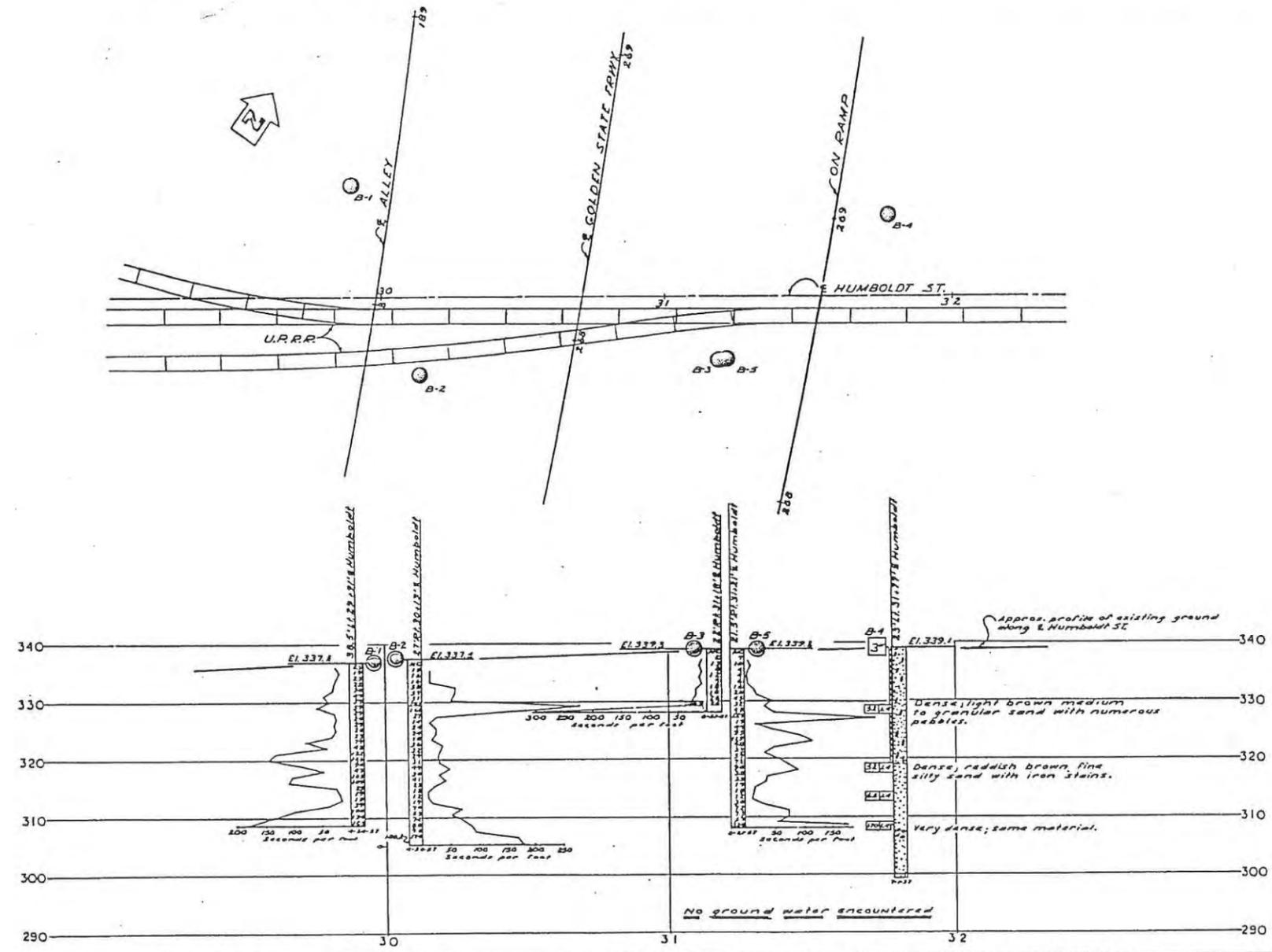
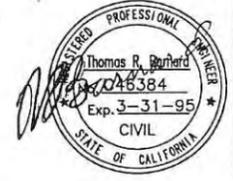
8-15-94
TO ACCOMPANY PLANS DATED

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	LA	5	19.9/20.8	147	147

J-005-3(10)136

NO.	DATE	BY	REVISION
7	CAL		224
171	LA		

February 15, 1960

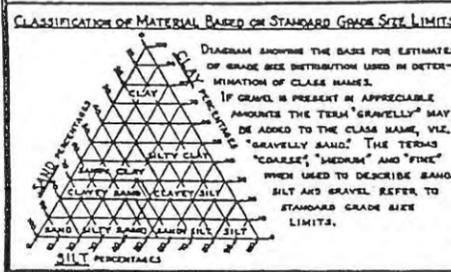


No As Built Changes
Ted Han
07-129004
Feb 5, 1999
Tw 6-17-99

AS BUILT PLANS
Contract No. 60-7VET4
Date Completed
Document No. 70002339

BM 21-LA-54
24 cu ft sp. in c. of curb ref S.E.
con of Humboldt St & Ave. 22.
Elev. 335.47

THIS SET OF PLANS HAS BEEN PREPARED TO
CORRESPOND TO THE AS BUILT RECORDS DATED
BY THE FIELD OFFICE OF THE DISTRICT
ENGINEER, LOS ANGELES DISTRICT
RELATIVE TO THE PROJECT NO. 60-7VET4
No Corrections



LEGEND OF EARTH MATERIALS

Gravel	Silty Clay or Clayey Silt
Sand	Peat and/or Organic Matter
Silt	Fill Material
Clay	Igneous Rock
Sandy Clay or Clayey Sand	Sedimentary Rock
Sandy Silt or Silty Sand	Metamorphic Rock

LEGEND OF BORING OPERATIONS

PLAN OF ANY BORING	1" SOIL TUBE
PENETROMETER	ROTARY BORING
2 1/4" CONE PENETROMETER	PENETRATION BORING
SAMPLER BORING (DRY)	
ROTARY BORING (WET)	
AUGER BORING (DRY)	
JET BORING	
CORE BORING	
TEST PIT	

NOTES

The contractor's attention is directed to Section 7-1.03 of the Standard Specifications and to the Special Provisions accompanying this set of plans.
Classification of earth material as shown on this sheet is based upon field inspection and not to be construed to imply mechanical analysis.

HUMBOLDT ST. U.P.
LOG OF TEST BORINGS

SCALE: VERT. 1" = 10'
BRIDGE 53-1374 FILE C-53 DRAWING C-5-10

EARTHQUAKE RETROFIT PROJECT NO. 145
HUMBOLDT STREET UNDERPASS
AS-BUILT LOG OF TEST BORINGS

DESIGN	By	Checked
DETAILS	By	Checked
QUANTITIES	By	Checked

PREPARED FOR THE
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

Thomas R. Barnard
PROJECT ENGINEER

BRIDGE NO.	53-1374
POST MILE	20.1

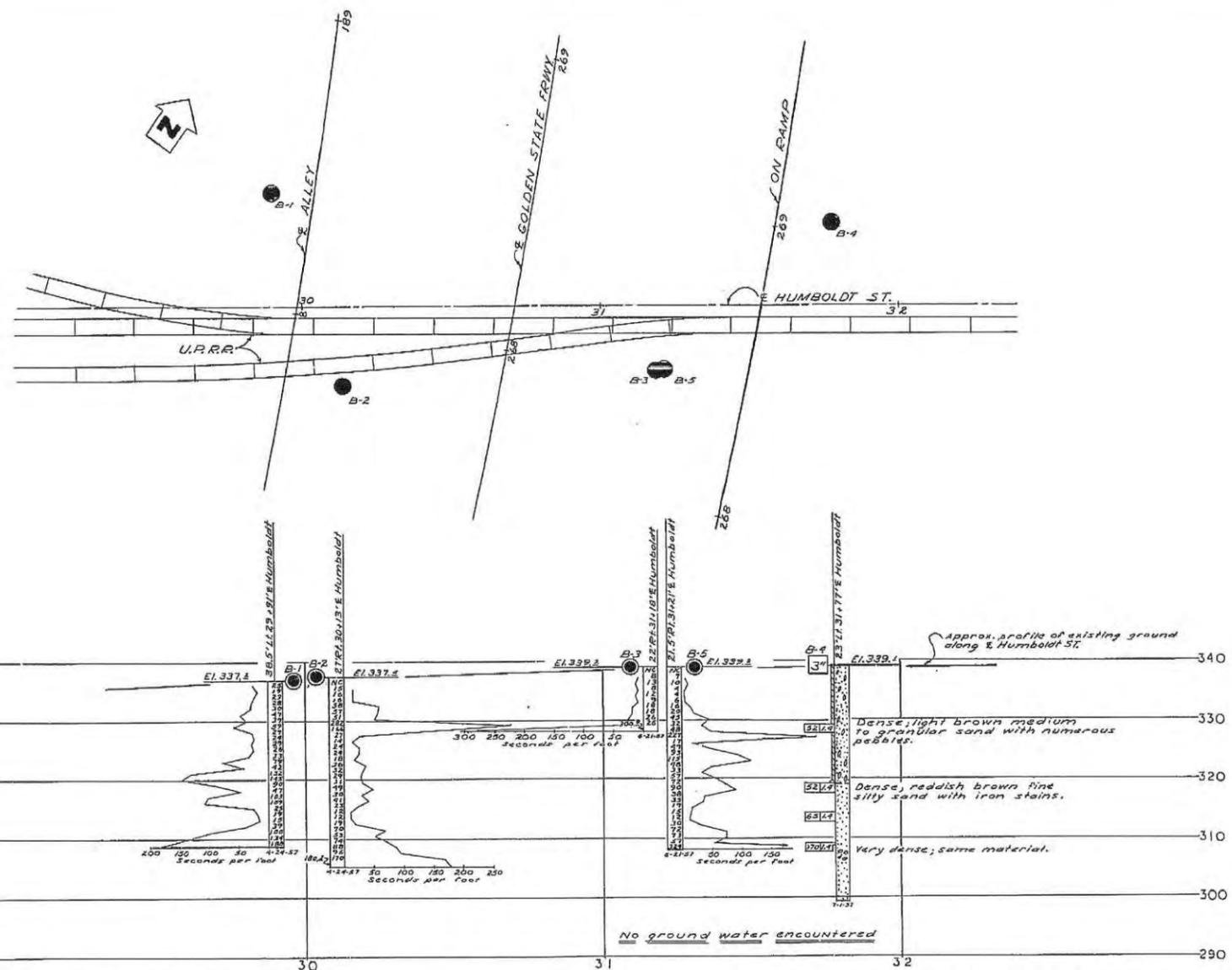
DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISIONS DATES (PRELIMINARY STAGE ONLY)	SHEET 8 OF 8
---	--	--------------

Z-005-3(18) 136

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	CAL.			227	463

DATE APPROVED February 15, 1960

BRIDGE DEPARTMENT



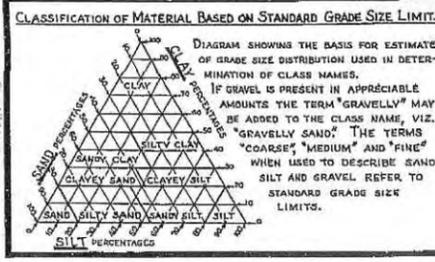
AS BUILT PLANS
 Contract No. 60-7VC74
 Date Completed
 Document No. 70002339

BM 21-4A-54
 74' cul. spk. in c. of curb ret. S.E.
 cor. of Humboldt St. & Ave. 22.
 Elev. = 335.67

THIS SET OF PLANS HAS BEEN CHECKED TO CORRESPOND TO THE "AS BUILT" PRINTS DATED AS SUBMITTED BY RESIDENT ENGINEER G.A. MORSE REVISIONS CORRECTED BY DATE 1/14/61 No Corrections

FIELD STUDY	1. 1/24/59	2. 1/27/59
DESIGNED	3. 1/28/59	4. 1/29/59
APPROVED	5. 1/29/59	6. 1/29/59

Approved & Recommended by: *[Signature]*
 1/29/59



LEGEND OF EARTH MATERIALS

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

LEGEND OF BORING OPERATIONS

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

ROTARY BORING
 Top Hole El. Location
 Casing driven
 Date measured
 Description of material
 Unit weight (pcf)
 Moisture
 Consolidation Test
 SWS #, Silty
 Estimated material change
 Unconformable material change
 Date of boring

PENETRATION BORING
 Top Hole El. Location
 Pushed
 No count
 Date measured
 Seconds per foot
 (Using a No. 100
 McKernan-Terry
 Air Hammer @ 115 psi,
 or as noted)
 Average skin friction above
 this point (pcf)
 Date of boring

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

STATE OF CALIFORNIA
 DEPARTMENT OF PUBLIC WORKS
 DIVISION OF HIGHWAYS

HUMBOLDT ST. U.P.

LOG OF TEST BORINGS

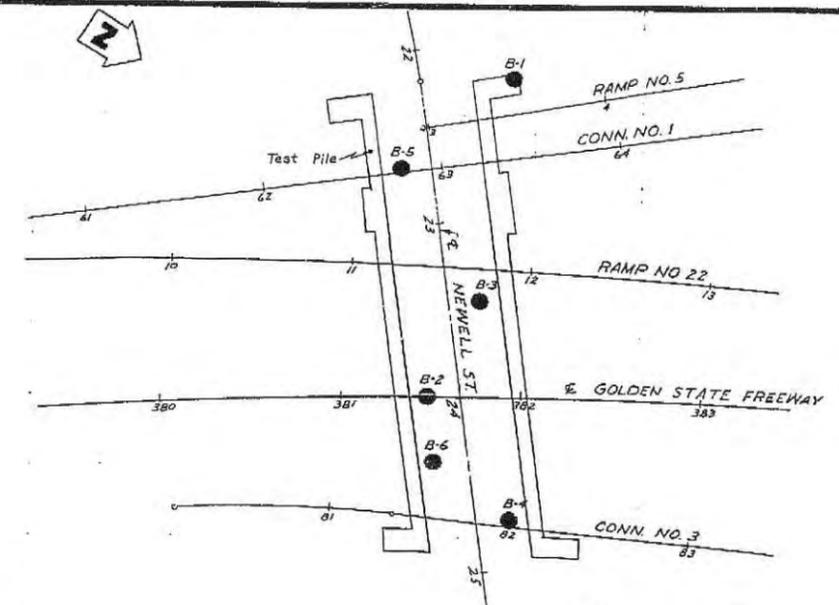
Scale: Horiz. 1"=20'
 Vert. 1"=10'

BRIDGE 53-1374 FILE E-53 DRAWING C-5438-21

224

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF PUBLIC WORKS.
 DATE 12-23-71 SIGNATURE *[Signature]* TITLE SR. RMO

BRIDGE DEPARTMENT



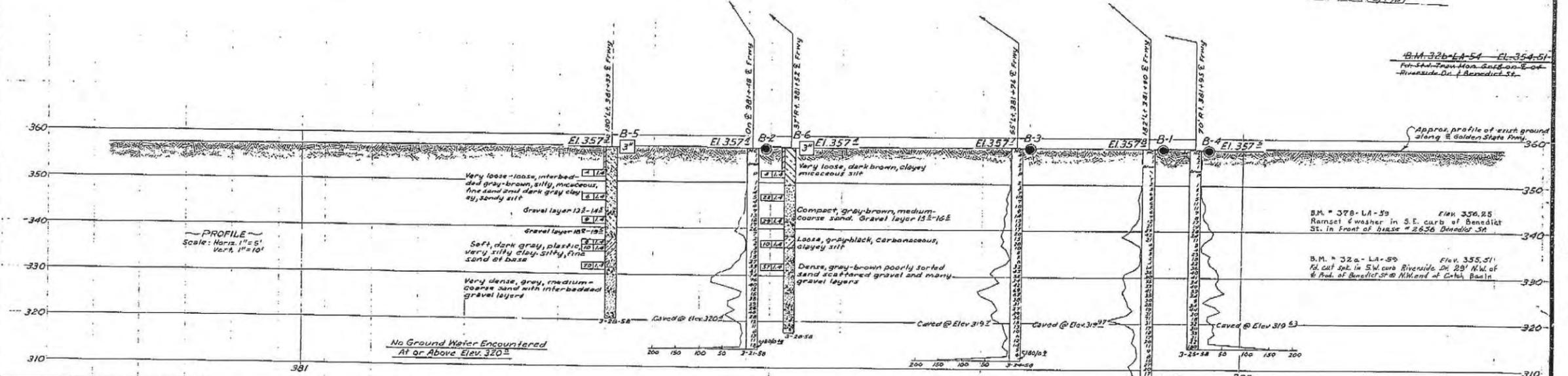
Design Pile Loading: 45 Ton
 Type: Cast in Drilled Hole
 Diameter: 16"
 Total No. Piles: 322
 Total Length As Built: 8267.6'
 Total Length Estimate: 8220.0'
 Remarks: Material encountered substantially that of this sheet.

Penetration

	Max.	Min.	Ave.
Abut 1	325.0	328.8	327.7
Abut 2	325.4	330.9	328.0

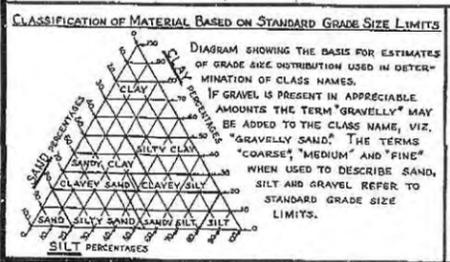
AS BUILT PLANS
 Contract No. 60-7VC69
 Date Completed
 Document No. 7000 2320

60-7VC69-FI
 J. Reese
 Feb. 6, 1961



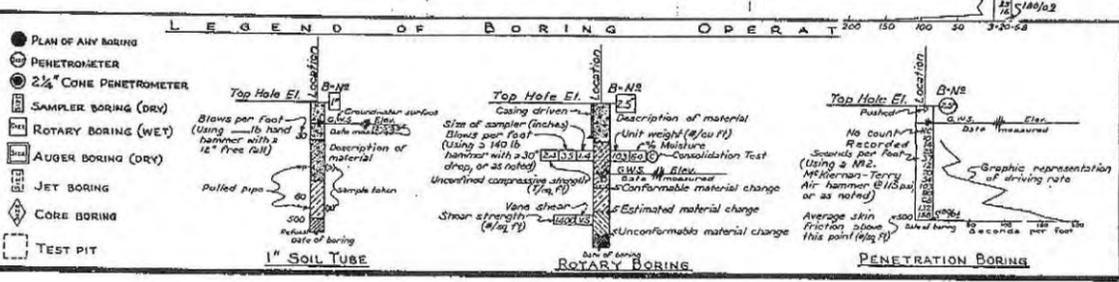
FIELD STUDY	7-14-58
DESIGNED	6-18-58
CHECKED	6-17-58
APPROVED	6-17-58

Approved: J. Reese
 Checked: J. Reese
 Date: 6-17-58



LEGEND OF EARTH MATERIALS

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



NOTES

The contractor's attention is directed to Section 2, Article (4) of the Standard Specifications and to the Special Provisions accompanying this set of plans. Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

STATE OF CALIFORNIA
 DEPARTMENT OF PUBLIC WORKS
 DIVISION OF HIGHWAYS

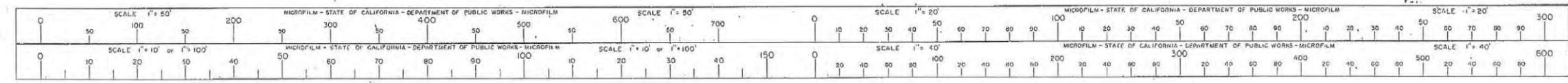
NEWELL STREET UNDERCROSSING

LOG OF TEST BORINGS

SCALE As Noted BRIDGE 52-162 FILE 53 DRAWING D-5982-12

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF PUBLIC WORKS.

DATE 1-23-71 SIGNATURE James E. Coast TITLE SR. RMC



DIST.	COUNTY	ROUTE	POST MILES-TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	LA	5	20.4 / 26.5	206	206

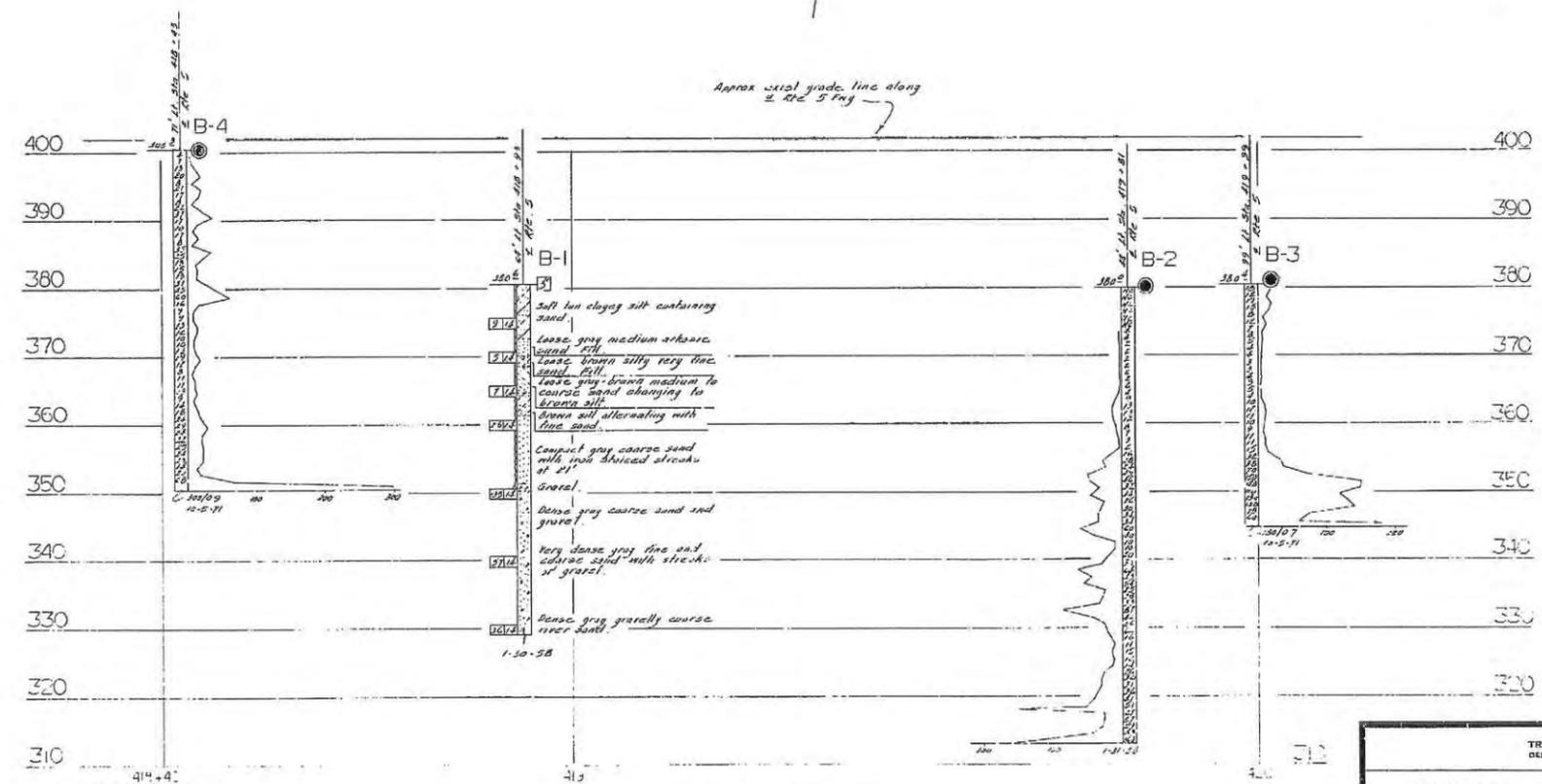
DATE APPROVED: *October 16, 1972*

BENCH MARK
 B.M. #369-LA-54 Elev. 379.53
 Ft. Sht. Four, Mon. P-12 in sidewalk at S.E. corner of
 Riverside Drive and Fletcher Drive.



PLAN
 Scale: 1" = 20'

PROFILE
 Scale: Vert 1" = 10'
 Horiz 1" = 10'



NO CORRECTIONS BY
 CONTRACT NO. _____
 DATE _____

LEGEND OF BORINGS OPERATIONS

LEGEND OF EARTH MATERIALS

CLASSIFICATION OF MATERIAL BASED ON STANDARD GRADE SOIL LAYERS

LEGEND OF PENETRATION TESTS

LEGEND OF SOIL TUBE

FIELD STUDY	By: J. E. Smith	10-5-71
CHECKED	By: P. J. Edwards	11-1-71

BRIDGE DEPARTMENT
 ENGINEERING GEOLOGY SECTION

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

AS BUILT PLANS
 Contract No. 07-222814
 Date Completed _____
 Document No. 1017339

NO GROUND WATER ENCOUNTERED
 DURING THIS INVESTIGATION BY
 BRIDGE DEPT. GEOLOGY SECTION
 DATE October, 1971

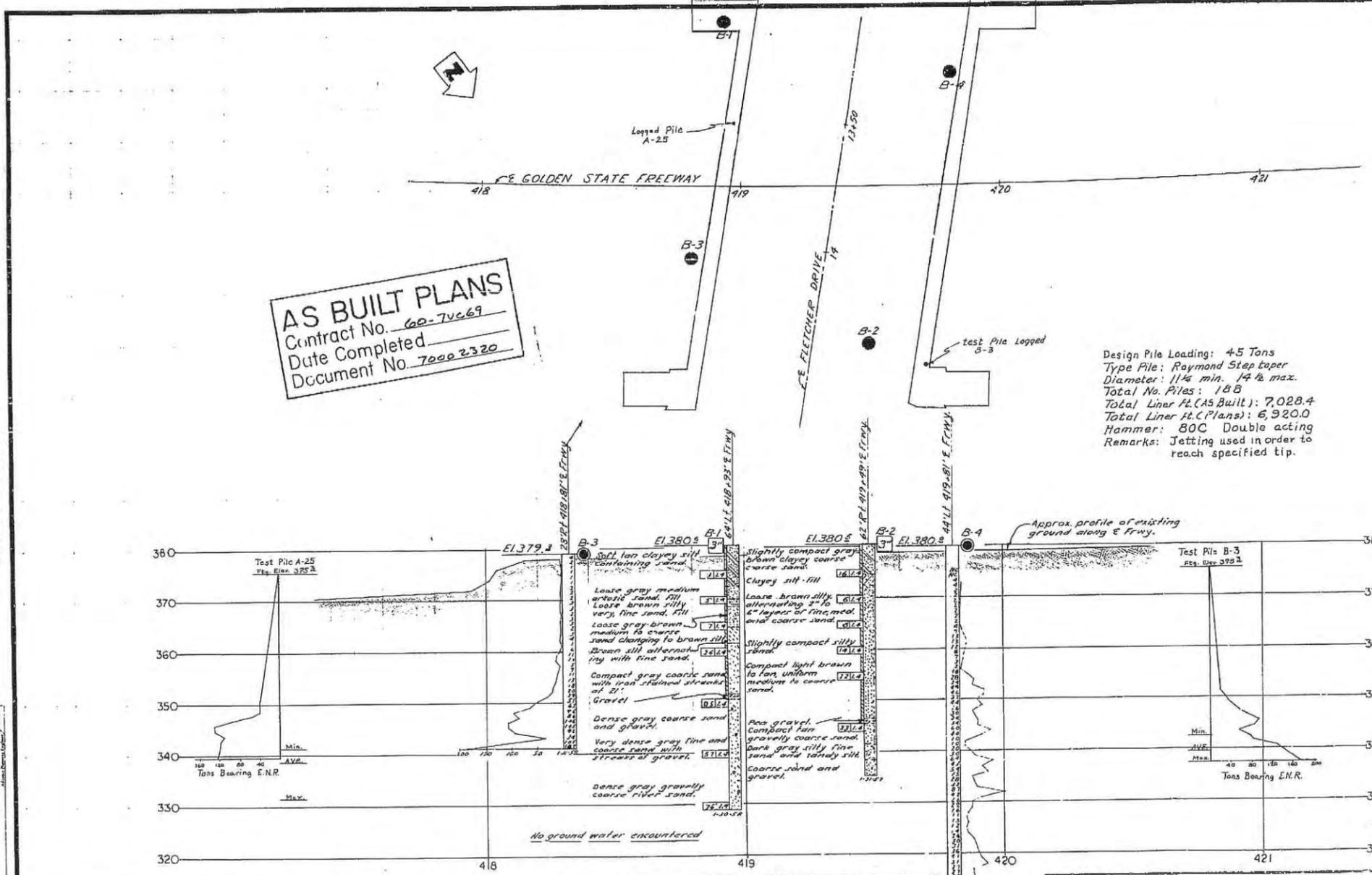
STATE OF CALIFORNIA TRANSPORTATION AGENCY DEPARTMENT OF PUBLIC WORKS DIVISION OF HIGHWAYS			
FLETCHER DRIVE UNDERCROSSING (WIDEN)			
LOG OF TEST BORINGS			
BRIDGE NO. 53-1084	POST MILE 22.97	DRAWING NO.	SHEET 9 OF 9
WO 22511 CU 07202		REVISION DATES	(PRELIMINARY STAGE ONLY)

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 10/29/70 BY [Signature] TITLE [Signature]

BRIDGE DEPARTMENT

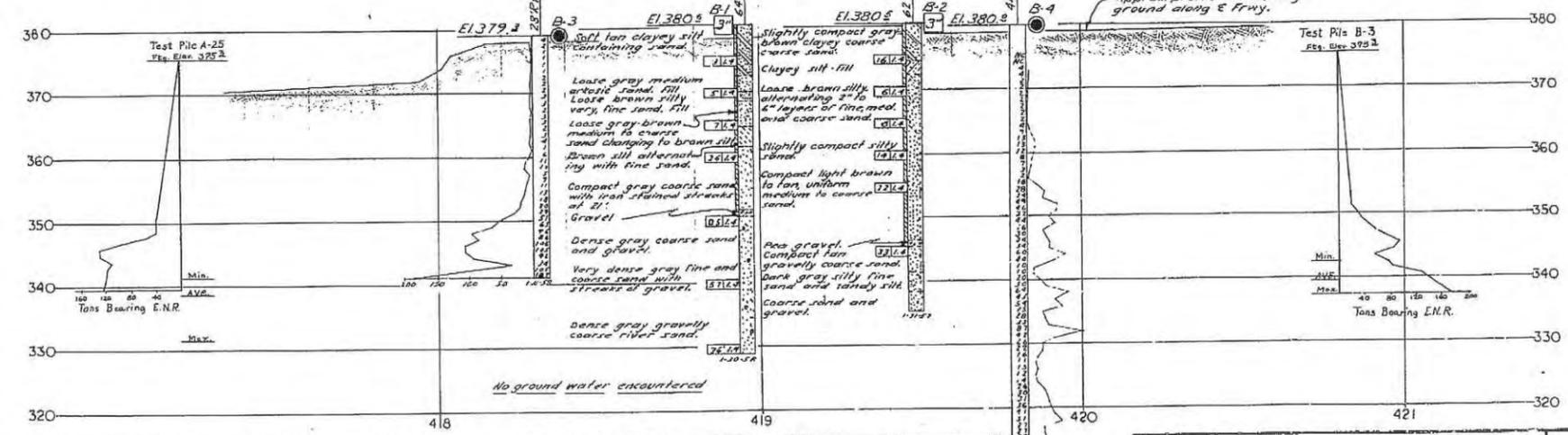
AS BUILT PLANS
 Contract No. 60-7VC69
 Date Completed _____
 Document No. 7000 2320



Design Pile Loading: 4.5 Tons
 Type Pile: Raymond Step taper
 Diameter: 11 1/2 min. 14 1/2 max.
 Total No. Piles: 18 B
 Total Liner Ft. (As Built): 7,028.4
 Total Liner Ft. (Plans): 6,920.0
 Hammer: 80C Double acting
 Remarks: Jetting used in order to reach specified tip.

B.M. # 405-LA-59 Elev. 366.25
 2nd set in S.E. cor. of Clearview 22' x 27' N.E. 2nd & 3rd 25' x 25' N.E. of EGR Pylon #2

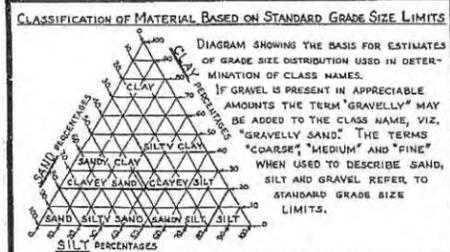
B.M. # 408-LA-59
 2nd set in S.W. cor. of Gilroy St. 15' x 15' & driveway to house # 2801 Gilroy St.



60-7VC69-FI
 Address _____
 Date: Feb. 6, 1961

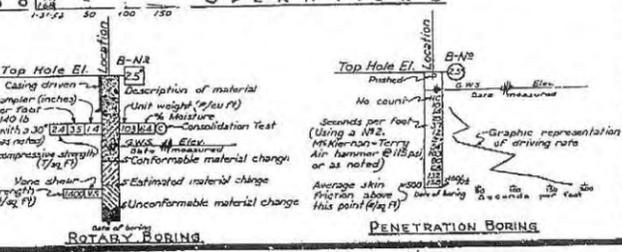
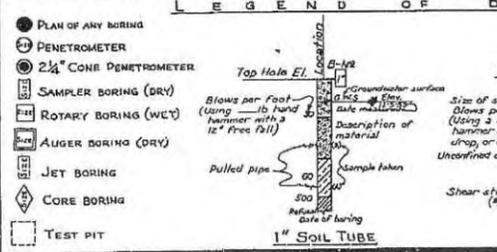
B.M. # 360-LA-54 Elev. 379.50
 1st set in S.W. cor. of 23' x 14' wall S.E. cor. of Riverside Dr. & Fletcher Dr.
 DR

FIELD STUDY	L. Remondino
DRAWN	W. Collins
CHECKED	R. Williams
APPROVED	[Signature]



LEGEND OF EARTH MATERIALS

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



NOTES

The contractor's attention is directed to Section 2, Article (c) of the standard specifications accompanying this set of plans. Classification of earth material as shown on this sheet is based upon and is not to be construed to imply mechanical analysis.

STATE OF CALIFORNIA
 DEPARTMENT OF PUBLIC WORKS
 DIVISION OF HIGHWAYS

FLETCHER

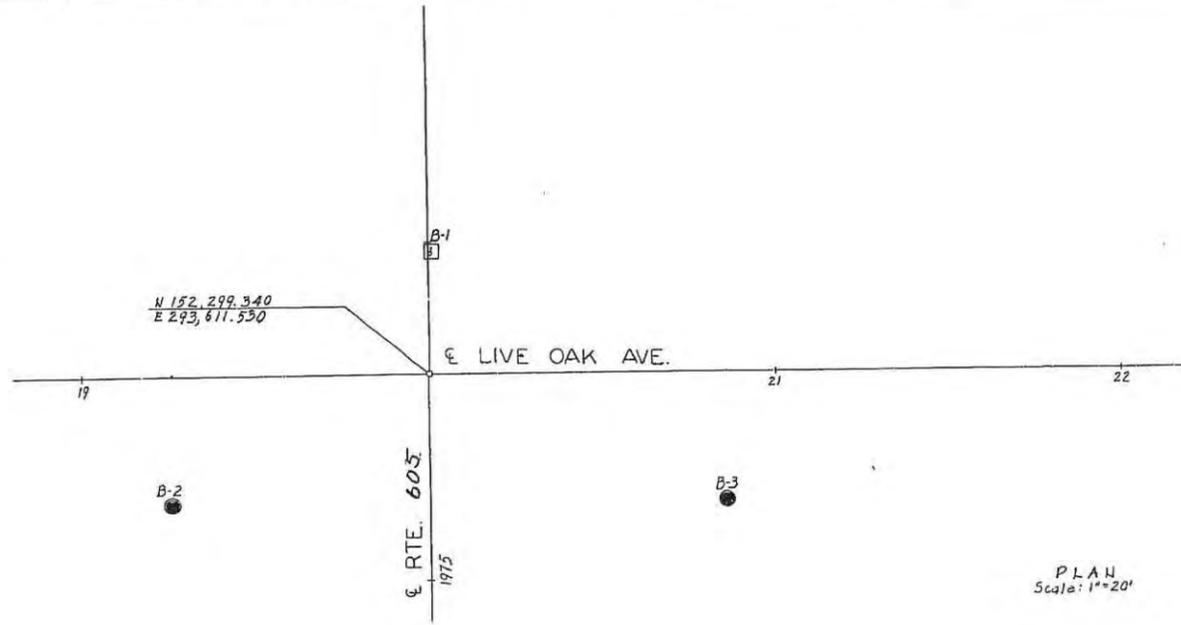
LOG OF T

DATE: April 1, 1961 SCALE: 1" = 10' BRIDGE 53-11

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF PUBLIC WORKS.

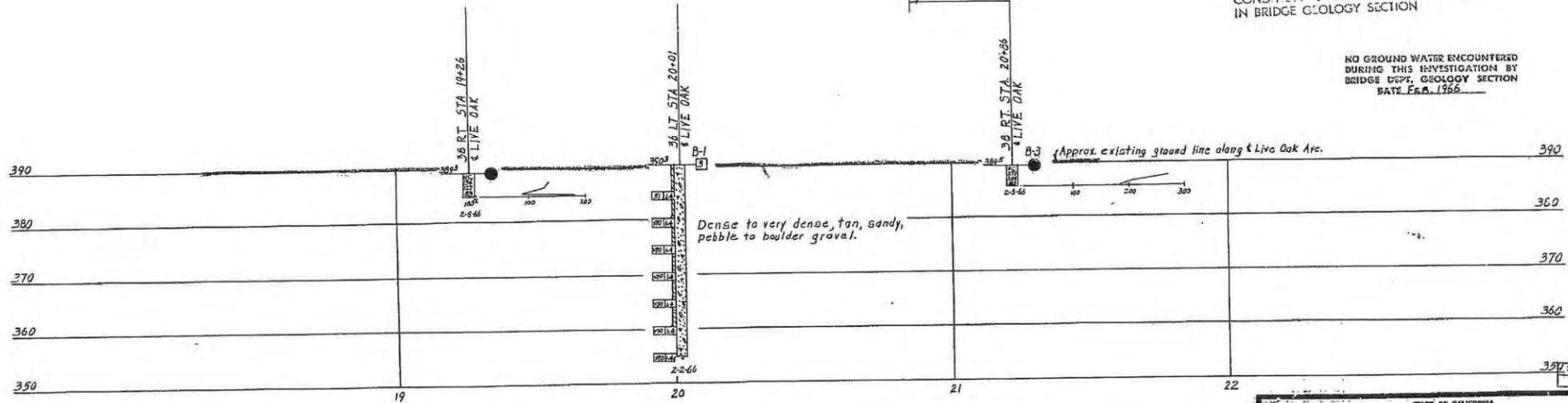
DATE: 12-23-71 SIGNATURE: James E. Court TITLE: SR. RMC

BENCH MARK
 18-1rw-62 Elev. 394.38
 Set ramjet nail in Northwest concrete base of So. Calif. Edison Tower #59-1, located approximately 800 feet south of Live Oak, and approximately 1500 feet west of San Gabriel River (Tower removed)



INFORMATION ON ACTUAL FOUNDATION CONDITIONS & CONCEPT IS ON FILE IN BRIDGE GEOLOGY SECTION

NO GROUND WATER ENCOUNTERED DURING THIS INVESTIGATION BY BRIDGE DEPT. GEOLOGY SECTION DATE Feb. 1966



DESIGNED BY: R.C. Blake
 DRAWN BY: R. Smith
 CHECKED BY: R. Smith

BRIDGE DEPARTMENT
 ENGINEERING GEOLOGY SECTION

LEGEND OF EARTH MATERIALS

Gravel	Silty Clay	Clayey Silt	Drainage Matter
Sand	Silt	Clay	Fill Material
Clayey Sand	Sandy Clay	Sandy Silt	Interstratified Rock
Silt	Sandy Silt	Silt	Sparsely Jointed Rock
Clay	Silt	Silt	Massive Rock
Silt	Silt	Silt	Metamorphic Rock

CLASSIFICATION OF MATERIAL BASED ON STANDARD GRADE SIZE LIMITS

Diagrams showing the standard sieve sizes used in the classification of earth materials. The diagrams show the relationship between sieve sizes and the percentage of material passing through them.

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

AS BUILT PLANS
 Contract No. 07-043824
 Date Completed _____
 Document No. 70001781

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

STATE OF CALIFORNIA DEPARTMENT OF PUBLIC WORKS DIVISION OF HIGHWAYS			
LIVE OAK AVENUE OVERCROSSING			
LOG OF TEST BORINGS			
SCALE	NOTED	Borings	DRAWING
LA	NOTED	53-2036	23.5
PREL. DRAWING No. PR-		532036-9	

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF PUBLIC WORKS.
 DATE 11/2/71 SIGNATURE [Signature] TITLE H.A.C.I.I.

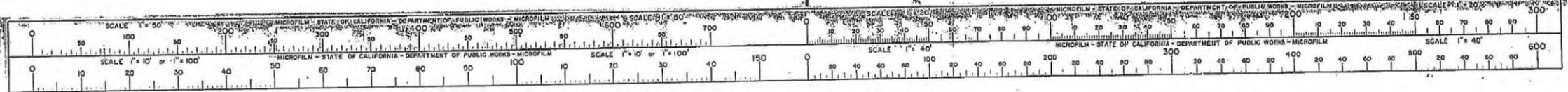


Table 1
Selected Well Data For The Study Area And Vicinity

Well No.	Year Drilled	Elev. - Top of Well	Elev. - Bottom of Well	Total Depth	Elev. - Base of Alluvium	Thickness of Alluvium	Material at Bottom of Well
C-23a	1907	764	665	99	756	08	Granitic Rock
C-23d	1931	570	435	135	462	108	Granitic Rock
C-23f	1938	643	177	466	446	197	Granitic Rock
C-24a	1931	758	563	195	628	130	Tertiary Rock
C-25a	1916	756	577	180	625	131	Tertiary Rock
C-25b	1927	757	582	175	605	152	Granitic Rock
C-25d	1899	802	-508	1310	502?	300?	Granitic Rock
C-26	1901	756	588	168	588	168	Granitic Rock?
C-27	1911	753	494	259	550	203	Granitic Rock?
C-28	1904	750	456	254	505	245	Granitic Rock?
C-29	1924	754	506	248	508	246	Granite
C-30	1904	756	500	256	500	256	Granitic Rock?
C-30a	1898	746	636	110	---	---	Alluvium?
C-30b	1898	747	649	98	---	---	Alluvium?
C-30e	1910	753	468	285	478	275	Granitic Rock?
C-30L	1891	755	625	130	---	---	Alluvium?
C-30m	1903	756	226	530	498	258	Granitic Rock?
C-30n	1926	758	512	246	525	233	"Decomposed Granite Dyke"
C-31a	1925	772	582	190	589	183	Granite

Table 1. Selected Well Data For The Study Area And Vicinity (contd)

Well No.	Year Drilled	Elev. - Top of Well	Elev. - Bottom of Well	Total Depth	Elev. - Base of Alluvium	Thickness of Alluvium	Material at Bottom of Well
C-31c	1928	763	584	179	560	170	"Granite bed-rock"
C-31e	1931	758	548	210	548	210	Granitic Rock?
C-31f	1931	794	442	352	464	330	Granitic Rock?
C-34b	1908	732	572	160	612?	120?	Tertiary Rock?
C-56	1920	715	478	237	533?	182?	Tertiary Rock?
C-56a	1906	715	505	210	533?	182?	Tertiary Rock?
C-56b	1912	722	521	201	531?	191?	Tertiary Rock?
C-56c	1914	710	505	205	519	191?	Tertiary Rock?
C-56f	1905	746	491	255	492	254	Tertiary Rock?
C-57a	1931	701	- 33	734	391	343?	Decomposed Granite?
C-58	1922	714	229	485	231	483	Tertiary Rock?
C-63	1904	666	306	360	318	348	Tertiary Rock?
C-64b	1911	633	423	210	448	185	"Decomposed Granite"
C-65	1922	602	174	428	174	383	Tertiary Rock?
C-106	1907	754	447	307	454	300	Tertiary Rock?
C-108a	1924	690	490	200	516	174	Tertiary Rock?
C-111	1934	776	161	615	---	---	Alluvium
C-119c	1900?	614	153	461	---	---	Alluvium
C-131	1921	752	452	300	460?	292?	Tertiary Rock?

Table 1. Selected Well Data For The Study Area And Vicinity (contd)

Well No.	Year Drilled	Elev. - Top of Well	Elev. - Bottom of Well	Total Depth	Elev. - Base of Alluvium	Thickness of Alluvium	Material at Bottom of Well
C-202	1923	561	56	505	---	---	Alluvium
C-202a	1921	620	116	504	358	262	"Blue Granite"
C-202c	1921	681	459	222	---	---	Tertiary Rock
C-206	1923	534	- 27	561	---	---	Alluvium

Table 2. Exploratory Test Hole Data, 1973 Seismic Study.

Boring No.	Elev. - Top of Boring	Elev. - Bottom of Boring	Total Depth	Elev. - Base of Alluvium	Thickness of Alluvium	Remarks
ES-1	722	371	351	605	117	Below 137 ft, gray-black claystone with white sandstone fragments: interpreted as fault gouge.
ES-2	743	439	304	626	117	Drilled 187 ft of highly deformed siltstone, sandstone and claystone: interpreted as belonging to the Topanga Formation.
ES-3	698	394	304	457	241	Encountered buff colored decomposed granitics which gradually became bluish-gray with depth: interpreted as basement complex rocks.

DRILL LOG

Hole No.
 Page 2 of 5
 07204 - 044611

LA-07 So. Pasadena Monterey Road to Columbia
 102 ft. E. of Meridian
 Location 360 ft. N. Rio 11 Ft., Right, Left Ground Elev. 725 Depth 351
31 W. of R-4 (10-1-71)

Logged by Al Parmer Type of Drill Core Groundwater Depth 30' Date Completed 6/26/73
perched (?)

DEPTH	LOG	DESCRIPTION AND REMARKS
0		Rock bit w/ air to 25'
0'-4'		Alluvium - granitic outwash soil, sandy w/ pebbles.
4'-5'		Gravel - granular to pea gravel, loose, sandy, angular to rounded, few chips of granodiorite pebbles.
5'-17'		Sand w/ few gravelly lenses. Sand is ora-brn., med. gr. w/ silty matrix 20-30% and 10% granules and pebbles. Few gray-green siltstone lenses. Qtz. feldspar predom., ferro-mag. 5%, brn mica 1/2%. Below 12' sand is v. coarse, pebbly (30%), poorly sorted.
17-17.3		Gravel, pebble size, sandy, loose.
17.3-25.5		Sand - med. to v. coarse gr. and pebbly. Silty matrix. Below 20', less pebbles in coarse gr. sand. Grading to med. gr. below 22' w/ random pebbles.
25.5-27.5		Sand - fine gr., silty, soft, med. brn., no visible bedding.
27.5-102		Sand - med. gr., w/ random pebbles & cobbles (cored 6" pebble) blocking recovery. Poorly sorted, silty to coarse gr. w/ lenses of silty, v.f. SS to pebble lenses in 35'-40' run (20% rec.) Color is Lt. grayish brn. except for v.f. SS @ 50-68' and 74-75'. Larger cuttings incl. qtz., gray and pink feldspar, meta. rocks.
50'-55'		Recovered 10" between 50'-55' of slightly plastic, clayey and silty v.f. to fine gr. SS. Some granule size qtz., etc.
60'-63'		Same matl. w/ sand (60'-63') ranging from silty, v.f. gr. to coarse gr. Possible bedding nearly horiz. Only 1 foot of recovery.
		Down-hole T.V. camera showed occasional pebbles. No visible bedding seen before water became too cloudy.

7-LA-07 So. Pasadena Monterey Road to Columbia

102 ft. E. of Meridian

ion 360 ft. W. Rte. 11

3' W. of R-4 (10-1-71)

Ft., Right, Left

Ground Elev. 725

Depth

351

Logged by Al Parmer

Type of Drill Core

Groundwater Depth 30'

Date Completed 6/28/73

perched (?)

DEPTH	LOG	DESCRIPTION AND REMARKS
70		Core recovery inc. w/change to Christenson NX
80		Very coarse gr. silty and pebbly sandstone. Very soft pebbles hard to very soft, wea. granitic and metamorphic detritus. Orthoclase of 10%.
90		Horiz. thin layer of black grains near 90'.
100	102-104±	Possible gravel lense-mod. consol. as core barrel cut five pebbles in place before blocking. No incr. in bit noise. Cobble size prob. occur in lense. Mod. water loss.
110	104±-117.4	Lost most of sample through possible fault material.
110	104-117.4	SS and distributed silty matl., v. coarse gr., pebbly but w/incr yellow-brn color from both yellow silt and yellow rock detritus. Orthoclase from pebble cuttings.
120	117.4-127.0	Poss. fault zone. Good recovery of "squeezed" matl. plastic claystone & siltstone, mottled med. blue-gray to olive-brn. & orange-brn w/ v.f. to med. gr. SS interbeds. Slickensided joints, low to high angle-65°. 6" bed (?) of hard. med. gr. SS, olive-brn 119.4-120.0', 120.0-120.4 highly slickensided claystone. Micaceous SS (120'). Granite (?) pebble 121.7'.
130	122.5-124.8	Hard SS fragments (2" dia), not bedded, in irreg. sh. 60° dip at 126.0 appears to be bedded. Core is predom siltstone.
130	127.0-127.5	Zone of granite pebbles and granular size sandstone. White pebbles in olive brn. matrix.
130	128.0-131.8	Tight fault @ 128.0 W/50° dip - truncates bedding 70°-75° dip. Lt. gray SS blue-gray & orange-brn siltstone below fault.
130	131.8-136.6	Fault zone. Frags. of SS, granitic pebbles in slickensided claystone. Yellow-brown to olive-brown plastic.
140	136.6-	Black claystone W/slicks at 60° @ 137.0. Broken SS frags. (Lt. gray) to 142'. SS is calc., very hard.

DRILL LOG

HOLE NO. _____
 Page 3 of 5
 07204 - 044811

R-4-07 So. Pasadena Monterey Road to Columbia

102 ft. E. of Meridian

Location 360 ft. N. Rte. 11 _____ Ft., Right, Left _____ Ground Elev. _____ Depth 351

.3' W. of R-4 (10-1-71)

Logged by Al Parmer _____ Type of Drill Core _____ Groundwater Depth 30' _____ Date Completed 6/28/73
 perched (?)

DEPTH	LOG	DESCRIPTION AND REMARKS
140		Same matl. w/bedding visible below 142' - dips 50°-55°
150		Core is predom. dark grayish black claystone and/or siltstone, slightly plastic, possible carbonaceous, w/Lt. to med. gray, hard, limey, micaceous fine gr. SS. Bed of hard SS 1-1/2" thick @ 145'. SS @ 145.2 dips 45° and cut on skew by shear dipping 45°. Slickensided joint 55° at 146'. 147' - Sh/ss dip 57° SS(dry) is dark gray to grayish black w/ lt. gray blebs, silty, v.f. gr., mica., very hard, limey.
160		148' - fault cuts interbedded ss& sh. dips 70°. SS frags in sh 148-148.5. 149.5 - SS bed dips 82°. Fault on skew dips 25°. 150 - dips up to 85°.
170		151 - 152 Good exposure in core of sh. w/ lt. gray SS, dip 78°. 152.5 Apparent fault - broken SS. 152.5-153.0 SS - Lt. gray, hard, limey, 60' dips, shows 2 healed offsets. 153-154 Broken zone w/high angle joints. 154-155 High angle dips appear to be warped. 70° dip @ 155'.
180		156-157 Folded bedding. Direction of high angle dip reverses in core 158-159.3 Bedding overturns - 70° dip @ 158 to (reversed) 70°, 85°, then 65° @ 159.3 Predom. dark grayish black siltstone w/ med. gray limey SS laminations 1/16 to 1/4" thick to 160.6. Slicks in bl. sh - 80°-85°.
190		160.6-164± Sandstone, med. gray w/cogified (?) coatings. Limey joint 75°. Appar. X-bedding. Fine to med. gr. Some horiz. slicks. on shaley, high angle shear.
200		164±-172.2 Interbedded carb. sh. & siltstone w/ some thin SS beds and zones of crushed SS. Bedding nearly vertical, warped. Sharp warp at 171 ft. Drag fold?
210		172.2-178.0 SS -Lt. to med. gray, med. to coarse gr., limey, w/ lenticular zones of squeezed, irregular shale partings. 65° dip. 178.0-192.7 Warped sh&ss. Shale is slickensided, irreg. SS is partly broken and displaced. Moist, plastic gouge (?) black clay (2") @ 183' SS/SH contact nearly vert 183.2 - 184.1. SS fragments 184.1-184.4, 185.3-185.4. Sheared bedding dips 30°, shear 72° @ 186.6'. Low dips 10-30°, 185-186' 188.3-188.8' 60° dip; @ 189.0-189.5, 55° dip w/ab 90° change in bedding strike. 191.0-192.7 Core w/409 SS is chaotic jumble of platy SS frags. in shale.
		192.7-195.5 Shale (claystone), as above except bedding vert., irreg. SS. partings. 195.5-198.0 Shale, as above, bedding obscured. 198.0-198.7 Shale, dark grayish black W/SS partings, 65° dips. 198.7-206.7 Core distinct by high degree of broken, rehealed beds of shale claystone, siltstone and SS. Dip 60° @ 202.5' on broken bedding. Betw. 203.5 and 205.0, dip reverses almost 180°. 65° dip @ 205'. Betw. 205.5 and 206.7, dips horiz. to 10° in shattered, displaced beds.
		206.7-218.0 Shale W/SS fragments. Irregular bedding W/dips steep where intact.

DRILL LOG

Hole No. EQ-1
 Page 4 of 5
 07204 - 044811

LA-07 So. Pasadena Monterey Road to Columbia

102 ft. E. $\frac{1}{2}$ Meridian

Location: 360 ft. N. Rte. 11 Ft., Right, Left _____ Ground Elev. 725 Depth 351
3' W. of R-4 (10-1-71)

Logged by Al Farmer Type of Drill Core Groundwater Depth 30' Date Completed 6/28/73
 perched (?)

DEPTH	LOG	DESCRIPTION AND REMARKS
210		Same matl. as above. Poss. dip 70° @ 215.0' Irreg. dips up to 90° 217-218'
220		223.0-223.9 Core shows 30° & 35° dips but in opp. dir. Drag folding or faulting (?) 225.0-227 Poss. vert. dips in part.
230		218.0-278 Core dries toohard, tough claystone. Scattered SS. frags. No visible reliable bedding. Claystone is dark, to med. gray, broken, out of place. Pyrite in SS & claystone. Dip 70° (?) @ 235' Dip 60-65° (?) @ 247' (Core is primarily a rehealed section of fault gouge-breccia w/bedding indistinct or destroyed.)
240		Pyrite in SS @ 243.8
250		251.5-256± Core is so near black, appears to contain lignite or oil-stain. No detectable smell. Pyrite
		256-258 Wapred zones 60° - near vertical.
260		260-261.5 Crushed SS & Sh. 261 Good sample of SS/Sh breccia recemented, with later cycles of crushing and rehealing. 263-264 Apparent vertical dip in claystone 265.5-267 Apparent vertical dip in claystone
270		Photographed boxes 25 thru 30 B & W & color. 273.5- Slicks in claystone. 276 Poss. 65° dip.
280		278-351 Core consists largely of SS breccia in steeply dipping claystone. 278 - Iridescent reflections in secondary chalcopryrite (?) in SS. Core sections are firm and strong when dry. 278.5-279.5 Vertical dip.

DRILL LOG

27 So. Pasadena Monterey Road to Columbia
 107 ft. E. of Meridian
 Location 160 ft. N. Rte. 11 Ft., Right, Left Ground Elev. 725 Depth 351
1/2 W. of R-4 (10-1-71)

Logged by Al Parmer Type of Drill Core Groundwater Depth 30' Date Completed 6/28/73
perched (?)

DEPTH	LOG	DESCRIPTION AND REMARKS
280		Core continues as rehealed fault zone w/at least 2 cycles of squeezing, crushing and rehealing. Approx. 20-30% of matl. is SS fragments that range from v.f. gr. to med. and coarse gr., calc. Some SS has bl. shaley partings, some w/o partings. calcite vein in frag. @ 288.4'.
290		Core lacks any sec. veins - as late stage fracture fillings. 289.3 - Joint in SS-60' - has diagonal (strike-slip) lineations. 297 - Coring cut a SS frag 7" long.
300		301 - SS frag. - crushed and recemented - 5" long. Core is dark, brownish to grayish blac w/up to to 40% SS fragments. 302 - Possible dip 70°. 303 - 311.0 - 30%-40% crushed SS (up to 6" pieces). Few open cracks.
310		311.4 Open fractures in SS piece. No clay or other filling. 315.8 SS fragments, fine gr. abut. med. gr. few calcite frags.
320		322.5-324.0 Claystone is softer, poss. moare recent gouge. Poss. 78-90° dip @ 323.
330		332-335 Vertically sheared SS.
340		Core betw. 346-351 - Rehealed fractured SS & SH beds w/numerous offsets.
350		351.0 - Bottom of hole.

7-LA-07 So. Pasadena. 117' W. of Q Fremont, 210' N. of Q Buena Vista

Location _____ Ft., Right, Left _____ Ground Elev. 745 Depth 304

Logged by A. L. Parmer Type of Drill Core Groundwater Depth _____ Date Completed 7/18/73

DEPTH	LOG	DESCRIPTION AND REMARKS
		Hole was drilled w/ rock bit to 120' except for core runs at 50-55', 75-80, 100-105'. No recovery except for cobble in 100-105' run. Material to 117' prob. pebbly sand.
100		
110		
120		120-125 Tertiary sed. rock, siltstone, SS & claystone, irreg. bedded. med. firm weathered, mottled blue-gray to yell-brn, olive-brn. w/ orange streaks. poss. dip @ 121' at 65°. Core breaks on cross-joints, 50° to 65° dip w/ slick surfaces. Soft wea. SS & plastic clay 121-125'.
130		125-129.8 Same matl., less wea. Bedding dip & strike change within 1/2 foot. Dip @ 125.3 is 47°, @ 125.9 65° w/ est. 70°-80° change in strike bearing. 126.5'-127' strike change ab. 80° from olive clay st. to silty SS bed w/ poss. lignite.
		129.8-130.0 Warped, broken beds - vert. to 40° SS around blue gray claystone
		130.0-131.8 SS - soft, massive, 25° dip (?) speckled gray & med. brn., silty to coarse gr. w/qtz., some granule-size.
140		131.8-144± Laminated zone of thin interbeds of clayst. siltstone & SS. Distinctive colors - Lt. gray SS, orange SS, olive to dark brn., some carbonaceous mtl. low dips (12°). Bedding warped, squeezed (?) in zones @ 132-133'.
		144.2- Probable fault w/ soft SS above, steep dips below
		142.2- Same laminated matl. as above but dips 65°, healed offset bedding. Slick break 145-143.7 @ 70°, matl. is predom. micaceous siltstone (145-
150		dips ab. 80' @ 149. Broken, offset beds dip 70° @ 152-153
		155-158.2 SS - as above, massive beds. Mod. weak; silty, fine to med. gr., speckled lt. gray to med. brn., olive siltstone & orange partings - 80° dips, Bedding is broken, rehealed.
		157.5-158.2 - bedding plane fault?
160		158.2-160.0± Laminated siltstone and SS as above. Rehealed fault 50° dip @ 159.8' Dip 90° 159.8-160.0'.
		160.0 Prob. a major fault: Rehealed breccia (160.0-160.6) on bedding 65° dip.
		160.0-163.0 Sudden change to unweathered matl. Interbedded dark grayish black siltstone shiny w/ mica(?), carbonaceous, and dark gr. SS, fine gr. Also claystone.

DRILL LOG

Hole No. 10-2
 Page 2 of 3
 07204 - 044811

7-LA-07 So. Pasadena. 117' W. of \angle Fremont, 210' N. of \angle Buena Vista

Location _____ Ft., Right, Left _____ Ground Elev. 745 Depth 304

Logged by _____ Type of Drill Core Groundwater Depth _____ Date Completed 7/18/73

DEPTH	DESCRIPTION AND REMARKS	
160		SS is Lt. gray partings as in ES-1 w/ incr. calcareous cement (w/ ineq. freshness) many small fault offsets (avg. 1/4"). Some coaly fragments (?) 161' carbonaceous clayst. breaks on shiny surfaces 60° @ 162, 50° @ 163
163.0-164.8		SS - v. coarse gr., soft, speckled gray & black. Base is 30-40° contact.
164.8-185.0		164.8-185.0 Interbedded SS, siltstone & claystone. Fine gr. matl. is carbon., nearly black. First hard, limey. SS. 166.2-166.5'. Soft, v.c. SS (166.5-167.8'). Same as above SS @ 163-164.8. 60° dip at 169.5' & 172' core is not nearly as firm and competent as in ES-1 claystone. Core predominately micaceous siltstone (173-180') w/ lesser amounts of SS & claystone. Dark grayish-black. Dips - 57° @ 174.5', 45° @ 175.5, 30° @ 177', poss. 25° @ 178', 65° ? @ 178.5', 45° @ 179.5'.
180		Bedding is warped, offset by minor faults 180-180.3. Dips 30° to 65° 180-181, then steepen to 75°-80°. Core at 183.5' has tiny vert. to flat-fault offsets, 1/8" to 1/4", normal & reverse types. SS is slightly calc., soft.
185-194.5		SS - predom. w/ partings of bl. carbonaceous siltst. & clayst. Top SS 185-186' is v.c. gr., silty and w/ granules. Mod. gray w/ bl. gr., all SS sl. calc. Bedding steep, irreg. due to squeezing and small folds & faults. Dip 55° on faulted contact @ 187±. Dip @ 191' is 78-80°, SS is predom. silty, med. gr. & med. to dark gray.
194.5-219.8		Interbedded SS & sh., same char. as above. Dips 60-80°, warped, fault offsets. Many small (1/8"-1/4") chunks of lignite 201'-203'. Bedding shows stronger displacements and more breakage below 194'.
200		At 214.8-215.0 SS - hard, calc., med. gr. Lt. gray
210		Dips of 80° at 219.5' overlie fault w/ 30° dip
219.8-245		SS and sandy siltstone. Steep bedding cut by rehealed faults w/ fault dips about 45°. SS is silty, f.g., hard above 224.5', med. to dark gray. Grades into sandy siltstone. Bedding remnants nearly vertical. Core broke up (weak?) 224.5-227.0. Vertical, offset bedding (228-235) in thin beds alternating between lt. gr., v.f. SS; dark gray, silty, med. gr. SS; dark grayish & brownish black sandy siltstone; and claystone. Core varies from hard to soft.
230		

DRILL LOG

hole No. _____
 Page 3 of 4
 07204 - 0-4611

7-LA-07 So. Pasadena. 117' W. of \angle Fremont, 210' N. of \angle Buena Vista

Location _____ Ft., Right, Left _____ Ground Elev. 745 Depth 304

Logged by _____ Type of Drill Core _____ Groundwater Depth _____ Date Completed 7/18/73

DEPTH	LOG	DESCRIPTION AND REMARKS
230		
240		241.0-241.3 Shattered claystone. All matl. is uniformly fresh appearing, no sec. alteration 242.5-244.0 60° dip truncates 30° dip which in turn is cut by 30° fault (?). Dips ab. 70° below fault. Prob. drag folding.
250		245.0-249.0 Darker than above siltstone & SS. Siltstone is sandy, nearly black. SS is med. to dark gray, fine to med. gr. Dips 60° to 90°. 249.0-250.4 Fault zone (?) Distorted dark claystone w/ (disoriented) SS beds. Major break. 250.4-274.2 Next core run has nearly vertical SS & Siltstone beds w/ only slight warping and breaking. Also claystone, carbon. frags. Core is dark grayish bl. w/ streaks of Lt. to med. gray SS.
260		Slight twist in strike 259-259.8 w/ dip change 90° to 75°. Core is predom. SS (260-264) weak to mod. firm. At least 3 zones of bedding displacement. Irreg. dips. 264.8- small fault offset is horiz. 267.5- small fault offset is nearly horiz.
270		At 271.5- 60° dip in warped SS/ siltstone. Warped contacts to 274' w/ SS broken or squeezed.
280		274.2-276 SS, soft, dark gray, silty, fine to med. gr., speckled gray and black grains. Dip 60°. Bedding may be overturned due to eroded (?) structures.
290		276-295.1 Predom. siltstone, w/ lt. gray SS partings. Dips 80°± (277-278) Between 280-289, thin beds of siltstone & SS are squeezed w/ many minor fault offsets. Core is firm.
300		Below 289 dip is ab. 90° w/ small faults ab. 45° dips at 290.6' and 291.1'. Fault w/ 30° dip at 293'. 295.1-301.4 Bedding is less distinct w/ white blebs of SS & small, black blebs of carbonaceous matl. 296.3-298.3 Recemented SS fragments. Dip at 298.3 = 45°
304		301.4-304.0 Steeply dipping, thin bedded matl. as above. Sandy siltstone (predom.) is dark, grayish black, SS is Lt. to dark gray, silty fine to clean, med. gr.

Rte 7/11 Interchange, 175' N. of Magnolia, 200' W. of Fairview

Location 50 Ft., Left of Ground Elev. 700 Depth 304.0

Logged by Al Parmer Type of Drill Core _____ Groundwater Depth _____ Date Completed _____

DEPTH	LOG	DESCRIPTION AND REMARKS
0-240±		Pebbly sand. No obvious change in character. Same clay seams. Material is granitic outwash of pebbles, sand & silt. Rock bit cuttings and washed. Orthoclase fragments are prominent in cuttings.
240	ROCK BIT TO 240'	240-244 Cutting change - weathered granodiorite, primarily reduced to clay minerals. 244-259 Granodiorite - coarse gr. core had bluish shade and probably is same as "blue rock" noted in water well C23f, located 2 blocks south at depth of 254 feet. In lab, core is grayish brown. About 60% Lt. gray, 30% yellow and green, 10% greenish black. Core is soft and weak. Uniform grain size. Very little quartz or mica.
256.1-257±	X	Hard, fresh granodiorite. Light gray w/est. 30% ferro-magnesium minerals. Probably blocked off in run. More weathered to ...
259-303.4	X	Granodiorite - dark bluish gray, coarse grained. Soft, highly weathered. Slow coring time (up to 7 min/ft) although granodiorite continues to be mushy. Rock bit to 299'. Core is very clayey granodiorite (299-304).
280	X	
300	X	
304	X	303.4-304.0 Quarze vein w/mica @ 303.4'-303.5' purplish gray zone w/450 contact w/Lt. gray clayey rock. Possible fault gouge. B.H.

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	LA	5	22.8/26.3	94	99

 CERTIFIED ENGINEERING GEOLOGIST		
7-8-91		
PLANS APPROVAL DATE		

FOR BENCH MARK SEE
LOG OF TEST BORINGS 1 OF 2

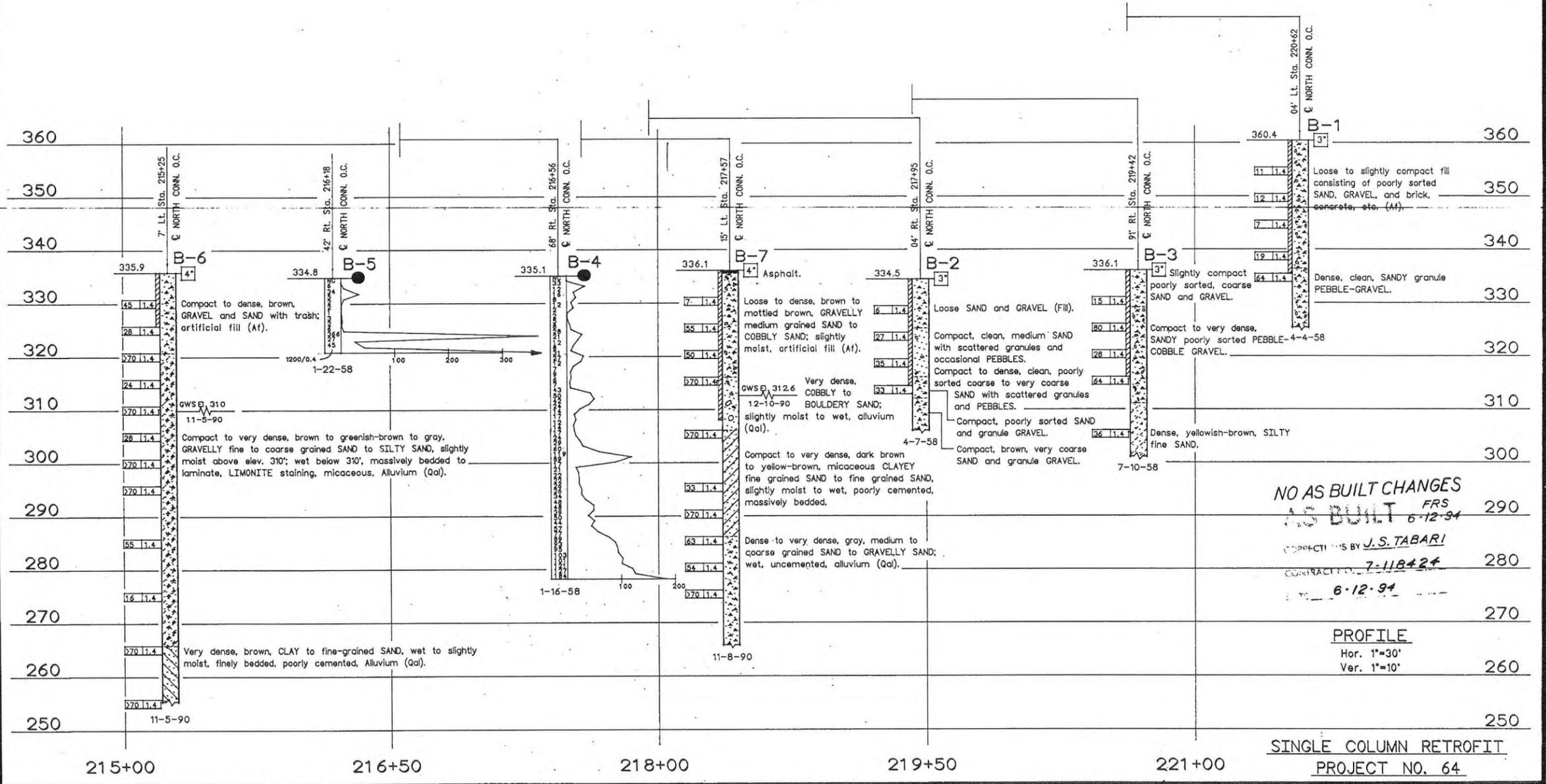
FOR PLAN VIEW SEE
LOG OF TEST BORINGS 1 OF 2

LEGEND OF BORING OPERATIONS

LEGEND OF EARTH MATERIALS

CONSISTENCY CLASSIFICATION FOR SOILS

NOTE: Classification of each material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.



NO AS BUILT CHANGES
AS BUILT FRS 6-12-94
 CORRECTED BY J.S. TABARI
 CONTRACT NO. 7-11842F
6-12-94
PROFILE
 Hor. 1"=30'
 Ver. 1"=10'

OFFICE OF TRANSPORTATION MATERIALS & RESEARCH		ENGINEERING GEOLOGY BRANCH		BRIDGE NO. 53-1457F		NORTH CONNECTOR OVERCROSSING	
DRAWN BY FERNANDO J. ANDRES & VICTOR SESTOKAS		1/91		DIVISION OF STRUCTURES		STRUCTURE DESIGN 3	
CHECKED BY <u>R. Knorr</u> 1/91				DEPARTMENT OF TRANSPORTATION		LOG OF TEST BORINGS SHEET 2 OF 2	

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS	0	1	2	3	CU 07204	EA 118421	DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMINARY STAGE ONLY)	SHEET 13	OF 13
--	---	---	---	---	----------	-----------	---	---	----------	-------

**EL MONTE OPERABLE UNIT
INTERIM REMEDIAL INVESTIGATION/
FEASIBILITY STUDY**

**FINAL REMEDIAL INVESTIGATION
REPORT AND APPENDIX A**

SAN GABRIEL VALLEY
LOS ANGELES COUNTY, CALIFORNIA

April 9, 1998

Document File Number: 8208-110-9.1

Submitted to:

U.S. Environmental Protection Agency
Region IX

Prepared for:

Northwest El Monte Community
Task Force

Prepared by:

Camp Dresser & McKee Inc.
18881 Von Karman, Suite 650
Irvine, California 92612

Major Divisions	Graphic Symbols	Group Symbols	Group Names	
COARSE-GRAINED SOILS (more than half of material is larger than No. 200 sieve)	GRAVELS (more than half of coarse fraction is larger than No. 4 sieve)	≤ 5% Fines	GW Well-graded gravel, well-graded gravel with sand GP Poorly graded gravel, poorly graded gravel with sand	
		6 - 14% Fines	GW-GM Well-graded gravel with silt, well-graded gravel with silt and sand GW-GC Well-graded gravel with clay, well-graded gravel with clay and sand GP-GM Poorly graded gravel with silt, poorly graded gravel with silt and sand GP-GC Poorly graded gravel with clay, poorly graded gravel with clay and sand	
		≥ 15% Fines	GM Silty gravel, silty gravel with sand GC Clayey gravel, clayey gravel with sand	
		SANDS (more than half of coarse fraction is smaller than No. 4 sieve)	≤ 5% Fines	SW Well-graded sand, well-graded sand with gravel SP Poorly graded sand, poorly graded sand with gravel
			6 - 14% Fines	SW-SM Well-graded sand with silt, well-graded sand with silt and gravel SW-SC Well-graded sand with clay, well-graded sand with clay and gravel SP-SM Poorly graded sand with silt, poorly graded sand with silt and gravel SP-SC Poorly graded sand with clay, poorly graded sand with clay and gravel
			≥ 15% Fines	SM Silty sand, silty sand with gravel SC Clayey sand, clayey sand with gravel
	FINE-GRAINED SOILS (more than half of material is smaller than No. 200 sieve)		SILTS AND CLAYS	Liquid Limit < 50
		Liquid Limit > 50		CH Fat clay, fat clay with sand, fat clay with gravel, sandy fat clay, sandy fat clay with gravel, gravelly fat clay, gravelly fat clay with sand MH Elastic silt, elastic silt with sand, elastic silt with gravel, sandy elastic silt, sandy elastic silt with gravel, gravelly elastic silt, gravelly elastic silt with sand
		Organic	OL/OH Organic soil, organic soil with sand, organic soil with gravel, sandy organic soil, sandy organic soil with gravel, gravelly organic soil, gravelly organic soil with sand	

DESCRIPTIVE TERM	Molsture	DEGREE OF SATURATION (x)
Dry		0 - 25
Damp		25 - 50
Molst		50 - 75
Very Molst		75 - 90
Wet		90 - 100

BORING LOG KEY SOILS



environmental engineers, scientists,
planners, & management consultants

1040

Boring Location	NORTHERN PARKING LOT	Elevation & Datum	
Drilling Company	DRILL LINE	Date Started	3/1/90
Drilling Equipment	MOBIL B-81 / 8- AN 12-INCH HOLLOW STEM AUGER	Date Developed/Sampled	3/7/90 - 3/8/90
Type/Diameter of Casing	4-INCH BLANK PVC PIPE	Completion Depth	115.0-FEET
Type of Perforation	0.20-INCH SLOTTED STAINLESS STEEL PIPE	Number of Samples	19
Type of Perforation Backfill	2/12 MONTEREY SAND	Water Depth	91.0-FEET
Type of Seal	BENTONITE PELLETS / CEMENT GROUT	Logged by	KPS
		Checked by	DJM

Depth (ft.)	Description	Graphic Log					Samples		Remarks
		Lithology	Well Const	ova - ppm	USCS	Blow Count	Interval	Number	
0	3-INCHES OF ASPHALT AT SURFACE				ML				
5	SANDY SILT - dark brown, 10% to 20% fine sand, moist, firm, odorless			0		17	5-8	MW1-1	
10	SILTY SAND - dark orange brown, 20% to 30% silt, fine grained, moist, firm, odorless			0	SM	33	10-11	MW1-2	
15	SILTY SAND - grey brown, 10% to 15% silt, dominately fine grained, trace medium to coarse, moist, firm, odorless			0		38	15-16	MW1-3	
20	SILTY SAND - same as above			0		80	20-21	MW1-4	
25	SILTY SAND - dark orange brown, 20% to 25% silt, dominately fine, moderate medium to coarse grains, subrounded, no sorting, no grading, moist, dense, odorless			0	SM	52	25-28	MW1-5	
30									

AMERICAN
ENVIRONMENTAL MANAGEMENT CORP.

LOG OF MONITORING WELL MW1

PROJECT NAME: FAIRCHILD INDUSTRIES
PROJECT NO.: 9024-1 DATE: 3/90

Depth (ft)	Description	Graphic Log					Samples		Remarks
		Lithology	Well Correl	ova ppm	USCS	Blow Count	Interval	Number	
30	SAND - light orange brown, fine to coarse, dominately medium, subangular, no sorting or grading, moist, dense, odorless					77	30-31	MW1-6	
36	SAND - light brown, fine to coarse, trace fine gravel, poorly sorted, slightly graded, dominately coarse graded, subangular, dominately rock fragments, moist, dense, odorless			0	SP	110	35-38	MW1-7	
40	SAND - same as above			0	SM	127	40-41	MW1-8	
45	SILTY SAND - orange brown, 20% to 30% silt, fine grained, moist, very dense, odorless			0		100/8"	45-48	MW1-9	
50	SAND - light brown, trace silt, fine to coarse, dominately medium, poorly sorted, no grading, moist, dense, odorless			0	SP	107	50-51	MW1-10	
55	SAND - same as above			0		98	55-60	MW1-11	
60	SAND - same as above			0		95	60-61	MW1-12	
65	SAND - light orange brown, fine to medium, trace coarse, moderate sorting, poorly graded, moist, dense, odorless			0		94	65-70	MW1-13	
70									

AMERICAN
ENVIRONMENTAL MANAGEMENT CORP.

LOG OF MONITORING WELL MW1

PROJECT NAME : FAIRCHILD INDUSTRIES
PROJECT NUMBER : 9024-1 DATE : 3/90

Depth (ft)	Description	Graphic Log					Samples		Remarks
		Lithology	Well Const	ova ppm	USCS	Blow Count	Interval	Number	
70	SILTY SAND - dark brown, 30% to 40% silt, fine grained, very moist, dense, odorless	[Lithology pattern]		0		91	70-71	MW1-14	
75	SILTY SAND - dark grey brown, 20% to 25% silt, fine to medium, dominately fine, moist, dense, odorless	[Lithology pattern]		0	GL	82	75-76	MW1-15	
80	SILTY SAND - same as above	[Lithology pattern]		0		44	80-81	MW1-16	
85	SILTY SAND - dark orange brown, 30% to 40% silt, fine grained, moist, firm, odorless	[Lithology pattern]		0		38	85-86	MW1-17	
90	SAND - light orange brown, dominately fine grained, very moist to wet, dense, odorless	[Lithology pattern]		0		110/10"	90-91	MW1-18	GROUNDWATER ENCOUNTERED AT APPROXIMATELY 91.0- FEET
95	SAND - light orange brown, fine to coarse, subangular, poorly grade, poorly sorted, wet, dense, odorless	[Lithology pattern]		0	SP	94	95-96	MW1-19	
100									SAMPLES NOT RECOVERED IN SATURATED ZONE BELOW 95.0- FEET
105	SAND - same as above	[Lithology pattern]							
110									

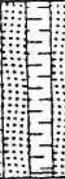
AMERICAN
ENVIRONMENTAL MANAGEMENT CORP.

LOG OF MONITORING WELL MW1

PROJECT NAME: FAIRCHILD INDUSTRIES

PROJECT NUMBER: 9024-1

DATE: 3/90

Depth (ft)	Description	Graphic Log					Samples		Remarks
		Lithology	Well Const	ova-ppm	USCS	Blow Count	Interval	Number	
110	SAND - light brown, fine to coarse, wet dense, odorless				%				
115	Boring terminated at 115.0-feet. Groundwater encountered at approximately 91.0-feet.								
120									
125									
130									
135									
140									
145									
150									

AMERICAN
ENVIRONMENTAL MANAGEMENT CORP.

LOG OF MONITORING WELL MW1

PROJECT NAME: FA:RC:HILD INDUSTRIES

PROJECT NUMBER: 9024-1

DATE: 3/90

Boring Location EAST SIDE OF BUILDING AT 9440 GIDLEY		Elevation & Datum	
Drilling Company DRILL LINE		Date Started 2/28/90	Date Finished 3/1/90
Drilling Equipment MOBIL B-61 / 8- AN 12-INCH HOLLOW STEM AUGER		Date Developed/Sampled 3/7/90 - 3/8/90	
Type/Diameter of Casing 4-INCH BLANK PVC PIPE		Completion Depth 115.0-FEET	
Type of Perforation 0.20-INCH SLOTTED STAINLESS STEEL PIPE		Number of Samples 18	
Type of Perforation Backfill 2/12 MONTEREY SAND		Water Depth 91.0-FEET	
Type of Seal BENTONITE PELLETS / CEMENT GROUT		Logged by KPS	Checked by <i>DZM</i>

Depth (ft.)	Description	Graphic Log					Samples		Remarks
		Lithology	Well Const	ova-ppm	USCS	Blow Count	Interval	Number	
0	3-INCHES ASPHALT AT SURFACE				ML				
5	SANDY SILT - light orange brown, 20% to 30% fine sand, structureless, trace organic material (roots), slightly moist, firm, odorless			0		12	5-8	MW3-1	
10	SILTY SAND - light orange brown, 20% to 30% silt, fine grained, moist, firm, odorless			0	SM	28	10-11	MW3-2	
15	SILTY SAND - light orange brown, 10% to 15% silt, fine to medium grained, poorly graded, moderately sorted, moist, firm, odorless			0		17	15-18	MW3-3	
20	SILTY SAND - light orange brown, 10% to 15% silt, dominately medium grained, trace coarse grains, moist, firm, odorless			0	SM	31	20-21	MW3-4	
25	SILTY SAND - light orange brown, 10% to 15% silt, dominately medium grained, moist, firm, odorless			0		21	25-28	MW3-5	
30									



LOG OF MONITORING WELL MW3

PROJECT NAME: FAIRCHILD INDUSTRIES	
PROJECT NO.: 0024-1	DATE: 3/90

Depth (ft.)	Description	Graphic Log				Samples		Remarks
		Lithology	Well Correl	ova-ppm	USCS	Blow Count	Interval	
30	SILTY SAND - grey brown, 30% to 40% silt, fine grained, structureless, slightly moist, firm, odorless			0	SM	31	30-31	MW3-6
36	SILTY SAND - grey brown, 40% to 50% silt, dominately fine grained, trace medium to coarse grains, moist, firm, odorless			0	ML	28	35-38	MW3-7
40	SANDY SILTY - grey brown, trace clay, 20% to 30% fine sand, moist, firm, odorless			0	SP	31	40-41	MW3-8
45	SAND - grey brown, trace silt, fine to coarse, dominately medium grained, poorly sorted, no grading, damp, dense, odorless			0	SM	75	45-48	MW3-9
50	SILTY SAND - orange brown, 10% to 20% silt, dominately fine grained, trace medium to coarse, moist, very dense, odorless			0	ML	80/10"	50-51	MW3-10
55	SANDY SILT - light orange brown, 20% to 30% fine sand, structureless moist, dense, odorless			0		55	55-58	MW3-11
60	SILTY SAND - orange brown, 30% to 40% silt, fine grained, damp, dense, odorless			0	SM	80	80-81	MW3-12
65	SILTY SAND - same as above			0	SM	42	85-88	MW3-13
70								

EARTH QUAKE ON 2/28/90 AT 3:44 PM DURING DRILLING - BOREHOLE SHIFTED AT DEPTH AND CAUSED ABOUT 8.0-INCHES OF RE-ALIGNMENT OF AUGERS AT THE SURFACE - BORING HAD TO BE STRAIGHTENED BY REDRILLING FROM 80.0- FEET TO 115.0- FEET

AMERICAN
ENVIRONMENTAL MANAGEMENT CORP.

LOG OF MONITORING WELL MW3

PROJECT NAME : FAIRCHILD INDUSTRIES

PROJECT NUMBER : 8024-1

DATE : 3/90

Depth (ft)	Description	Graphic Log					Samples		Remarks
		Lithology	Well Const	ova ppm	USCS	Blow Count	Interval	Number	
70	SILTY SAND - orange brown, 10% 15% silt, fine to coarse, dominately fine, poorly sorted, no grading, moist, dense, odorless	[Dotted pattern]	[Vertical lines]	0	SM	4	70-71	MW3-14	
75	SAND - orange brown, trace silt, fine to coarse, dominately medium, moderate sorting, no grading, moist, dense, odorless	[Dotted pattern]	[Vertical lines]	0	SP	55	75-76	MW3-15	
80	SAND - same as above	[Dotted pattern]	[Vertical lines]	0	SP	65	80-81	MW3-16	
85	SAND - light brown, dominately medium grained, good sorting, no grading, subrounded, damp, dense, odorless	[Dotted pattern]	[Vertical lines]	0	SP	82	85-86	MW3-17	
90	SAND - same as above	[Dotted pattern]	[Vertical lines]	0	SP	82	90-91	MW3-18	GROUNDWATER ENCOUNTERED AT APPROXIMATELY 91.0-FEET
95	SAND - same as above	[Dotted pattern]	[Vertical lines]						NO SAMPLE RECOVERED AT 95-FEET
100	SAND - light brown, fine to coarse, subrounded, wet, odorless	[Dotted pattern]	[Vertical lines]		SP				SAMPLES NOT TAKEN IN SATURATED ZONE
105	SAND - light brown, fine to coarse, trace fine gravel, wet, odorless	[Dotted pattern]	[Vertical lines]						
110									

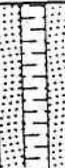
AMERICAN
ENVIRONMENTAL MANAGEMENT CORP.

LOG OF MONITORING WELL MW3

PROJECT NAME: FAIRCHILD INDUSTRIES

PROJECT NUMBER: 9024-1

DATE: 3/90

Depth (ft)	Description	Graphic Log					Samples		Remarks
		Lithology	Well Const	ova-ppm	USCS	Blow Count	Interval	Number	
110	SAND - light brown, fine to coarse, poorly sorted, subrounded, wet, odorless				SP				SAMPLES NOT ATTEMPTED IN SATURATED ZONE
115	Boring terminated at 115.0-feet Groundwater encountered at approximately 91.0-feet.								
120									
125									
130									
135									
140									
145									
150									

AMERICAN
ENVIRONMENTAL MANAGEMENT CORP.

LOG OF MONITORING WELL MW3

PROJECT NAME: FAIRCHILD INDUSTRIES

PROJECT NUMBER: 9024-1

DATE: 3/90

NavCom

BORING SUMMARY NO. BH-11

ELEVATION:

DATE DRILLED: September 6, 1989

DEPTH IN FEET	SAMPLES	BLOW COUNT PER FOOT	FIELD MOISTURE % DRY WEIGHT	DRY DENSITY LB./CU. FT.	Penetrometer Reading	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION			
1						SM	Fine silty SAND	medium dense	dry to slightly moist	brown
2										
3										
4										
5										
6										
7										
8										
9	11-1	19				SP	Fine micaceous SAND, uniform w/silt, 0 ppm		moist	brown
10										
11										
12										
13										
14	11-2	11				SP/SM	Very fine to fine SAND and SILT, mica, 0 ppm		sl. moist	brown
15										
16										
17										
18										
19	11-3	49				SP	Fine to coarse SAND, clean, uniform, 0 ppm		dry	lt. brown
20										
21										
22										
23										
24	11-4	62				SP/SM	Very fine to fine SAND and SILT, mica, uniform, 0 ppm		very sl. moist	rusty/ brown
25										

NavCom

BORING SUMMARY NO. BH-11

ELEVATION:

DATE DRILLED: September 6, 1989

DEPTH IN FEET	SAMPLES	BLOW COUNT PER FOOT	FIELD MOISTURE % DRY WEIGHT	DRY DENSITY LB./CU. FT.	Penetrometer Reading <u>Top</u> <u>bot</u>	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION		
							very dense	very sl. moist	rusty brown
26									
27									
28	11-5	50/5				SP	Fine to medium SAND w/coarse sand, w/ silt, 0 ppm		sl. moist brown
29									
30									
31									
32									
33									
34	11-6	63					Fine to coarse SAND, uniform, clean, <1 ppm		dry lt. brown
35									
36									
37									
38									
39	11-7	79					0 ppm		
40									
41									
42									
43									
44	11-8	64				SM/SP	Very fine to fine SILT and SAND, mica, 1 ppm		sl. moist brown
45									
46									
47									
48									
49	11-9	79				SP	Fine to coarse SAND, uniform clean, 0 ppm		dry to sl. lt. brown moist
50									

BORING SUMMARY NO. BH-11

ELEVATION:

DATE DRILLED: September 6, 1989

DEPTH IN FEET	SAMPLES	BLOW COUNT PER FOOT	FIELD MOISTURE % DRY WEIGHT	DRY DENSITY LB./CU. FT.	Penetrometer Reading <u>top</u> <u>bot</u>	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION			
51						SP		very dense	dry to sl. moist	light brown
52										
53										
54	11-10	32				SM/SP	Very fine to fine SAND and SILT, mica, 1-2 ppm	dense	sl. moist to moist	brown/ rusty
55										
56										
57										
58										
59	11-11	43				SP	Fine to medium sand w/ coarse sand w/ gravel, mica w/silt, trace of clay, <1 ppm			rusty brown
60										
61										
62										
63										
64	11-12	36				SP/SM	Micaceous SAND and SILT w/ w/ clay, fine sand, w/ medium sand, 1-2 ppm		moist	gray/ brown
65										
66										
67										
68										
69	11-13	68				SP	Fine to coarse channel SAND, 0 ppm	very dense	wet	lt. brown to brown
70										
71										
72										
73										
74	11-14	26				SM/SC	Very fine SAND and SILT w/ clay, 0 ppm	medium dense		gray
75										

NavCom

Schaefer Dixon Associates

JOB NUMBER: AR4200D1

BORING SUMMARY NO. BH-11

ELEVATION:

DATE DRILLED: September 6, 1989

DEPTH IN FEET	SAMPLES	BLOW COUNT PER FOOT	FIELD MOISTURE % DRY WEIGHT	DRY DENSITY LB. / CU. FT.	RELATIVE COMPACTION %	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION		
							medium dense	wet	gray
76									
77						SP	Fine to coarse channel SAND w/mica, 0 ppm		light brown
78									
79	11-15	18				SP/SM	Very fine SAND and SILT, 0 ppm		gray/ brown
80									
81							TOTAL DEPTH OF BORING: 80' GROUNDWATER ENCOUNTERED AT: 62.48'		
82									
83									
84									
85									
86									
87									
88									
89									
90									
91									
92									
93									
94									
95									
96									
97									
98									
99									
100									

NAVCOM

Schaefer Dixon Associates

JOB NUMBER: AR4200D1

Logged By: Michael Shea	Date Drilled: 12-5-90	Drilling Contractor: TONTO	Method/Equipment: Hollow Stem Auger B-60	Boring Number: BH-13
See "Legend to Logs" for sampling method, classifications and laboratory test methods	Boring Diam.(in.): 10"	Ground Elev.(ft.): 286	Groundwater Elevation (ft.): 12-4-90 217.5 4-1-91 216.1	Total Depth (ft.): 89
				Drive Wt.(lbs.): 140
				Drop Dist.(in.): 30"

Well Construction	Depth, (ft.)	Sample Type	Blows/Foot	Description	HNU Reading	SAMPLE NO.	Other Tests
<p>Traffic Box Slip Cap on Well Head</p> <p style="text-align: center;">Bentonite Cement Slurry</p>	<p>5</p> <p>10</p> <p>14</p>	<p>10</p> <p>14</p>	<p>10</p> <p>14</p>	<p>Surface Conditions/Location: Vons trucking yard, Asphalt pavement.</p> <p>(SM) SAND with GRAVEL, silty, gray, fine grained, dense, slightly moist, with coarse sand.</p> <hr style="border-top: 1px dashed black;"/> <p>(SP/SC) SAND with CLAY, silty, uniform, dark gray, fine grained, moderately dense, slightly moist.</p> <hr style="border-top: 1px dashed black;"/> <p>(SP/SM) SAND, with silt, uniform, micaceous, brown, fine grained, moderately dense, dry.</p>	<p>0</p> <p>0</p>	<p>13-1</p> <p>13-2</p>	

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. AR4200D3

Date APR.1991

Log of Boring

Figure

A-2 (Sheet 1 of 7)

Logged By: Michael Shea	Date Drilled: 12-5-90	Drilling Contractor: TONTO	Method/Equipment: Hollow Stem Auger B-60	Boring Number: BH-13
See "Legend to Logs" for sampling method, classifications and laboratory test methods	Boring Diam.(in.): 10"	Ground Elev.(ft.): 286	Groundwater Elevation (ft.): 12-4-90 217.5 4-1-91 216.1	Total Depth (ft.): 89
				Drive Wt.(lbs.): 140
				Drop Dist.(in.): 30"

Well Construction	Depth, (ft.)	Sample Type	Blows/Foot	Description	HNU Reading	SAMPLE NO.	Other Tests
Well Casing: 4" Dia. Solid PVC	25	[Pattern]	25	(SW) SAND, light brown, moderately dense, fine-to-medium grained, dry.	0	13-3	
	37	[Pattern]	37	(SP/SM) SAND with SILT, reddish brown, dense, fine grained, slightly moist.	0	13-4	
	25	[Pattern]	25	(Same Material, uniform, micaceous, grayish brown, moderately dense, with trace of clay.			
	8 50/6"	[Pattern]	8 50/6"	(SW) SAND, reddish brown, medium-to-coarse grained, dense, slightly moist.	0	13-5	

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Logged By: Michael Shea	Date Drilled: 12-5-90	Drilling Contractor: TONTO	Method/Equipment: Hollow Stem Auger B-60	Boring Number: BH-13		
See "Legend to Logs" for sampling method, classifications and laboratory test methods	Boring Diam. (in.): 10"	Ground Elev. (ft.): 286	Groundwater Elevation (ft.): 12-4-90 217.5 4-1-91 216.1	Total Depth (ft.): 89	Drive Wt. (lbs.): 140	Drop Dist. (in.): 30"

Well Construction	Depth, (ft.)	Sample Type	Blows/Foot	Description	HNU Reading	SAMPLE NO.	Other Tests
Bentonite Cement Slurry	40	[Cross-hatched]	40	(SW/SM) SAND with SILT and GRAVEL, light brown, fine-to-coarse grained, dense, slightly moist.	0	13-6	
	35	[Dotted]		(Same Material, reddish brown, fine-to-medium grained)	0	13-7	
	40	[Cross-hatched]	13 50/6"	(SP/SM) SAND with SILT and GRAVEL, reddish brown, fine grained, very dense, slightly moist, uniform, micaceous, with trace medium and coarse sand.	0	13-7	
	52	[Diagonal lines]		(CL/ML) CLAY, silty, dark brown, firm, slightly moist.			
	52	[Cross-hatched]		(SP) SAND, reddish brown, fine grained, dense, slightly moist.	0	13-8	
				(SP) SAND, light brown, dense, slightly moist, medium grained, uniform, with coarse sand.			

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Project No. AR4200D3

Date APR.1991

Log of Boring

Figure

Logged By: Michael Shea	Date Drilled: 12-5-90	Drilling Contractor: TONTO	Method/Equipment: Hollow Stem Auger B-60	Boring Number: BH-13
See "Legend to Logs" for sampling method, classifications and laboratory test methods	Boring Diam.(in.): 10"	Ground Elev.(ft.): 286	Groundwater Elevation (ft.): 12-4-90 217.5 4-1-91 216.1	Total Depth (ft.): 89
				Drive Wt.(lbs.): 140
				Drop Dist.(in.): 30"

Well Construction	Depth, (ft.)	Sample Type	Blows/Foot	Description	HNU Reading	SAMPLE NO.	Other Tests
Bentonite Pellets	50	26 50/6"		(SP) SAND with GRAVEL, light brown, fine grained, dense, dry.	0	13-9	
	55	41		(SP-SM) SAND and SILT, micaceous, light brown, fine grained, dense, slightly moist	0	13-10	8240 CAM Metals
		33 50/6"		(SC) SAND, clayey, with silt, grayish brown, stiff, dry to slightly moist.	0	13-11	
				(SW) SAND, uniform, clean, light brown, fine-to-coarse grained, very dense, dry.	0		

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Project No. AR4200D3

Date APR.1991

Log of Boring

Figure

A-2

(Sheet 4 of 7)

Logged By: Michael Shea	Date Drilled: 12-5-90	Drilling Contractor: TONTO	Method/Equipment: Hollow Stem Auger B-60	Boring Number: BH-13
See "Legend to Logs" for sampling method, classifications and laboratory test methods	Boring Diam. (in.): 10"	Ground Elev. (ft.): 286	Groundwater Elevation (ft.): 12-4-90 217.5 4-1-91 216.1	Total Depth (ft.): 89
				Drive Wt. (lbs.): 140
				Drop Dist. (in.): 30"

Well Construction	Depth, (ft.)	Sample Type	Blows/Foot	Description	HNU Reading	SAMPLE NO.	Other Tests
Filter Pack: #1/20 Sand Well Screen: 4" Dia. 0.01" SS Wire Wrap				(SP/SM) SAND with SILT, light brown, very dense, dry, fine grained, with trace medium and coarse sand, with 0.5" gravel. (Abrupt Contact)			
			30 50/5"	(SW) SAND, clean, uniform, light brown, fine-to-coarse grained, very dense, dry.	0	13-12	
		65		(SM) SAND, silty, brown, fine grained, dense, dry to slightly moist.			
			20 50/5"	(SW) SAND, clean, light brown, fine-to-coarse grained, very dense, moist to wet, with 0.5" gravel, with 1" thick saturated silt beds. (Same Material, wet)	0	13-13	
			54 70	(Same Material, clean, uniform, medium-to-coarse grained)	0	13-14	
		42 50/6"	(Same Material, clean, uniform, medium-to-coarse grained)	0	13-15		
		12	(CL) SANDY CLAY, light brown, very firm, very moist.				

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Logged By: Michael Shea	Date Drilled: 12-5-90	Drilling Contractor: TONTO	Method/Equipment: Hollow Stem Auger B-60	Boring Number: BH-13
See "Legend to Logs" for sampling method, classifications and laboratory test methods	Boring Diam.(in.): 10"	Ground Elev.(ft.): 286	Groundwater Elevation (ft.): 12-4-90 217.5 4-1-91 216.1	Total Depth (ft.): 89
			Drive Wt.(lbs.): 140	Drop Dist.(in.): 30"

Well Construction	Depth, (ft.)	Sample Type	Blows/Foot	Description	HNU Reading	SAMPLE NO.	Other Tests
				(CL) SANDY CLAY, gray, very fine grained, very firm, moist, with trace coarse sand and pebbles.	0	13-16	
			28	(SC) SAND, very clayey, to sandy clay, micaceous, gray, very fine grained, very firm, moist.	0	13-17	
			52	(SP/SC) SAND with CLAY, light brown, fine grained, dense, very moist, with coarse sand and trace pebbles.			
	80		51	(SP/SM) SAND and SILT, micaceous, very fine grained, light brown, dense, wet, uniform, with trace of medium and coarse sand.	0	13-18	
			51	(SW) SAND with GRAVEL, light brown to gray to reddish brown, fine-to-very coarse grained, very dense, wet. (Very abrupt contact)	0	13-19	
			40	(SP/SM) SAND and SILT, with trace of clay, light reddish brown, very fine grained, dense, very moist to wet, with iron stained coarse sands in thin layers, micaceous.	0	13-20	
	85		47	(CL) CLAY, sandy and silty, gray, fine grained, very firm, very moist, with trace of coarse sand, uniform, with vertical iron streaks.	0	13-21	
				(SM) SAND, silty, reddish brown, fine-to-medium grained, dense, very moist to wet, with coarse sand, with 0.5" gravel, micaceous.	0		
			Total Depth: 89 Feet				

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

BORING LOG

SCS ENGINEERS
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 3711 Long Beach Blvd.
 Ninth Floor
 Long Beach, CA
 90807-3315
 (310) 426-9544
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PROJECT: SPARLING	HOLE / WELL #: MW - 2
LOCATION: EL MONTE	DIAMETER: 11"
JOB NUMBER: 0194100	TOTAL DEPTH: 96'
GEOLOGIST / ENGINEER: B. GARBACCIO	DATE STARTED: SEPTEMBER 20, 1994
DRILLER: H - F DRILLING	DATE COMPLETED: SEPTEMBER 20, 1994
DRILL RIG: FAILING F-10	SAMPLING DEVICE: CALIFORNIA SPLIT SPOON
DRILLING METHOD: HOLLOW STEM AUGER	PAGE: 1 OF 4

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / 6 INCHES	USCS SYMBOL	DESCRIPTION
0		FLUSH-MOUNTED TRAFFIC-RATED COVER				ASPHALT
1						
2		CONCRETE			CL	DARK BROWN SILTY CLAY, SLIGHTLY MOIST, NO ODOR FID BACKGROUND = 7 ppm
3						
4						
5						
6			2618	12/22/28	ML	DARK BROWN SILT, SLIGHTLY MOIST, NO ODOR FID = 0 ppm
7						
8		4" DIA. SCH. 40 PVC				
9						
10			2619	10/27/30	ML	MEDIUM BROWN SILT, SLIGHTLY MOIST, NO ODOR FID = 0 ppm
11						
12						
13						
14		BENTONITE GROUT				
15					ML	MEDIUM BROWN SILT
16			2620	10/25/30	SP	MEDIUM ORANGE BROWN FINE TO MEDIUM SAND
17					ML	MEDIUM BROWN AND GREEN BROWN SILT, SLIGHTLY MOIST, NO ODOR FID = 0 ppm
18						MEDIUM ORANGE BROWN FINE TO COARSE SAND
19						MEDIUM GREEN BROWN CLAYEY SILT
20			2621	20/30/40	SW	MEDIUM GRAY BROWN FINE TO MEDIUM SAND, SLIGHTLY MOIST, NO ODOR FID = 0 ppm
					ML	
					SP	

BORING LOG

PROJECT : SPARLING
 JOB NUMBER: 0194100

HOLE / WELL #: MW-2
 PAGE : 2 OF 4

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / INCHES	USCS SYMBOL	DESCRIPTION
21						
22						
23						
24						
25			2622	27/50	SP ML	MEDIUM GREEN BROWN AND RUSTY ORANGE BROWN FINE TO MEDIUM SAND WITH 10 - 20 % GRAVEL TO 1.5"
26						
27						MEDIUM GREEN BROWN AND RUSTY ORANGE BROWN SILT TO VERY FINE SAND FID = 0 ppm
28						
29						
30			2623	50	SP CL	MEDIUM GRAY FINE TO MEDIUM SAND WITH 10 % COARSE SAND AND GRAVEL TO 1"
31						MEDIUM BROWN SILTY CLAY, SLIGHTLY MOIST, NO ODOR FID = 0 ppm
32						
33						
34		4" DIA. SCH. 40 PVC				
35			2624	50	ML- SM	MEDIUM BROWN VERY SANDY SILT, SILTY FINE TO MEDIUM SAND WITH POCKETS OF COARSE SAND, SLIGHTLY MOIST, NO ODOR FID = 0 ppm
36						
37						
38						
39						
40			2625	50	SP ML	LIGHT GRAY BROWN FINE TO MEDIUM SAND WITH 5 - 10 % GRAVEL TO 0.25"
41						MEDIUM GREEN BROWN SILT, SLIGHTLY MOIST, NO ODOR FID = 0 ppm
42						
43						
44						
45			2626	40/50 FOR 5	SP	MEDIUM GREEN BROWN FINE SAND WITH 2 - 3 % GRAVEL TO 0.2", SLIGHTLY MOIST, NO ODOR FID = 0 ppm

BORING LOG

PROJECT: SPARLING
 JOB NUMBER: 0184100

HOLE / WELL #: MW - 2
 PAGE : 3 OF 4

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / 6 INCHES	USCS SYMBOL	DESCRIPTION
46						
47						
48						
49						
50			2827	12/50	S P	MEDIUM GREEN BROWN FINE TO MEDIUM SAND WITH 5% GRAVEL TO 0.5" SUBROUNDED GRANITIC, SLIGHTLY MOIST, NO ODOR FID = 0 ppm
51						
52		BENTONITE GROUT				
53						
54						
55		4" DIA. SCH. 40 PVC	2828	50 FOR 8"	S M- S W S W	MEDIUM GREEN BROWN SLIGHTLY SILTY FINE TO COARSE SAND WITH 5 - 10% GRAVEL TO 1"
56						MEDIUM GRAY BROWN FINE TO COARSE SAND AND GRAVEL TO 0.5", SLIGHTLY MOIST, NO ODOR, FID = 0 ppm
57						
58						
59						
60		3 BAGS BENTONITE	2829	50 FOR 5"	S M	MEDIUM GREEN BROWN SILTY FINE TO MEDIUM SAND, SLIGHTLY MOIST, NO ODOR FID = 0 ppm
61						
62						
63						
64						
65			2830	50 FOR 2"	S M S W S P	MEDIUM GREEN BROWN SILTY FINE SAND
66						MEDIUM GREEN BROWN FINE TO COARSE SAND AND GRAVEL TO 1.5", SLIGHTLY MOIST, NO ODOR
67		43 SAND				MEDIUM GREEN BROWN FINE TO MEDIUM SAND WITH 5 - 10% GRAVEL
68		30" O.D. 20" SLOT STAINLESS STEEL SCREEN				
69						MEDIUM GREEN BROWN FINE TO COARSE SAND
70			2831	20/50 FOR 2"	S W S P	MEDIUM GREEN BROWN FINE TO MEDIUM SAND WITH 5% VERY COARSE SAND, SLIGHTLY MOIST FID = 0 ppm

BORING LOG

PROJECT: SPARLING
 JOB NUMBER: 0194100

HOLE / WELL #: MW - 2
 PAGE : 4 OF 4

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / 6 INCHES	USCS SYMBOL	DESCRIPTION	
71						70' - OUTSIDE SAMPLER AND TIP ARE WET	
72							
73							
74							
75					50 FOR 6"	S W	MEDIUM BROWN MEDIUM TO VERY COARSE SAND WITH 5% GRAVEL TO 1.5" SUBROUNDED GRANITIC, WET, NO ODOR FID = 0 ppm
76							
77							
78							
79							
80					50 FOR 6"	M L+ CL	MEDIUM GREEN BROWN SILT WITH THIN CLAY SEAMS (0.2 - 0.5%), WET, NO ODOR
81							
82							
83							
84							
85							
86							
87						FID = FLAME IONIZATION DETECTOR	
88							
89							
90							
91							
92							
93							
94							
95						TD = 95' GROUNDWATER ENCOUNTERED 70 - 75'	

BORING LOG

SCS ENGINEERS
 Environmental Consultants
 3711 Long Beach Blvd.
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 Long Beach, CA
 90807-3316
 (310) 426-9644
 FAX (310) 427-0805

PROJECT: SPARLING	HOLE / WELL #: MW - 3
LOCATION: EL MONTE	DIAMETER: 11"
JOB NUMBER: 01B4100	TOTAL DEPTH: 95'
GEOLOGIST / ENGINEER: B. GARBACCIO	DATE STARTED: SEPTEMBER 20, 1994
DRILLER: H - F DRILLING	DATE COMPLETED: SEPTEMBER 20, 1994
DRILL RIG: FAILING F-10	SAMPLING DEVICE: CALIFORNIA SPLIT SPOON
DRILLING METHOD: HOLLOW STEM AUGER	PAGE: 1 OF 4

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / 6 INCHES	USCS SYMBOL	DESCRIPTION
0		FLUSH-MOUNTED TRAFFIC-RATED COVER				ASPHALT
1						
2		CONCRETE			M L	MEDIUM BROWN CLAYEY SILT, DRY, NO ODOR FID BACKGROUND = 5 ppm
3						
4						
5						
6			2347	14/10/18	M L	MEDIUM ORANGE BROWN CLAYEY SILT WITH 2 - 3 % GRAVEL TO 1", SLIGHTLY MOIST, NO ODOR FID = 0 ppm
7						
8						
9		4" DIA. SCH. 40 PVC				
10						
11			2348	13/22/47	M L - S M	LIGHT BROWN SILT TO VERY FINE SAND, SLIGHTLY MOIST, NO ODOR FID = 0 ppm
12						
13						
14		BENTONITE GROUT				
15					S P	LIGHT BROWN VERY FINE SAND, SLIGHTLY MOIST, NO ODOR
16			2349	12/13/38	S W	MEDIUM ORANGE BROWN FINE TO VERY COARSE SAND AND GRAVEL TO 1" SUBROUNDED GRANITIC, SLIGHTLY MOIST, NO ODOR FID = 0 ppm
17						
18						GRAVEL - COBBLES AT 18"
19						
20			2350	22/50/50	S W	MEDIUM BROWN FINE TO VERY COARSE SAND AND GRAVEL TO >2", SLIGHTLY MOIST, NO ODOR FID = 0 ppm

BORING LOG

PROJECT: SPARLING
 JOB NUMBER: 0194100

HOLE / WELL #: MW - 3
 PAGE : 2 OF 4

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / 6 INCHES	UBCS SYMBOL	DESCRIPTION
21						
22						
23						
24						
25			2351	38/50/100	S W	MEDIUM GRAY BROWN FINE TO VERY COARSE SAND AND GRAVEL TO >2", SLIGHTLY MOIST, NO ODOR FID = 0 ppm
26						
27						
28						
29						
30			2352	50/100	S W	MEDIUM BROWN FINE TO VERY COARSE SAND AND GRAVEL TO > 2", SLIGHTLY MOIST, NO ODOR FID = 0 ppm
31						
32						
33						
34						
35			2353	38/50/100	S P S W	MEDIUM GRAY BROWN FINE TO MEDIUM SAND WITH 10 - 20 % GRAVEL TO 1"
36						MEDIUM BROWN FINE TO VERY COARSE SAND AND GRAVEL TO 0.5", SLIGHTLY MOIST, NO ODOR FID = 0 ppm
37						
38						
39						
40			2354	100 FOR 6"	S W S M - S C S P	MEDIUM BROWN FINE TO COARSE SAND AND GRAVEL MEDIUM BROWN SILTY-CLAYEY SAND MEDIUM BROWN FINE SAND WITH 5 - 10 % GRAVEL TO 0.5", SLIGHTLY MOIST, NO ODOR FID = 0 ppm
41						
42						
43						
44						MEDIUM BROWN SILT MEDIUM BROWN VERY FINE SAND
45			2355	42/100	M L S P M L	MEDIUM BROWN CLAYEY SILT, SLIGHTLY MOIST, NO ODOR FID = 0 ppm

4" DIA. SCH. 40 PVC

BENTONITE GROUT

BORING LOG

PROJECT: SPARLING
 JOB NUMBER: 0194100

HOLE / WELL #: MW - 3
 PAGE : 3 OF 4

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / 6 INCHES	USCS SYMBOL	DESCRIPTION
46						
47						
48						
49						
50			2358	100 FOR 6"	S M	MEDIUM BROWN SILTY FINE TO MEDIUM SAND WITH 5 - 10 % GRAVEL TO 1" SUBROUNDED GRANITIC, SLIGHTLY MOIST, NO ODOR FID = 0 ppm
51						
52		BENTONITE BRIDG				
53						
54						
55		4" DIA SCH 40 PVC	2357	40/100	S W	MEDIUM ORANGE BROWN FINE TO VERY COARSE SAND, SLIGHTLY MOIST, NO ODOR FID = 0 ppm
56						
57						
58						
59						
60		3 BAGG BENTONITE	2358	32/58/85	S W	MEDIUM ORANGE BROWN MEDIUM TO VERY COARSE SAND AND GRVEL TO 1", SLIGHTLY MOIST, NO ODOR FID = 0 ppm BATTERY RUNS OUT ON FID
61						
62						
63						
64						
65			2359	28/56/78	S W	MEDIUM BROWN FINE TO VERY COARSE SAND AND GRAVEL TO 1", SLIGHTLY MOIST, NO ODOR LOST PART OF SAMPLE
66						
67		#2 SAND				
68		30" x 0.020" SLOT STAIN-LESS STEEL SCREEN				
69						
70			2360	35/44/77	S M S W	MEDIUM BROWN SILTY FINE TO MEDIUM SAND, MOIST, NO ODOR MEDIUM BROWN FINE TO COARSE SAND, MOIST

BORING LOG

PROJECT: SPARLING

HOLE / WELL #: MW - 3

JOB NUMBER: 0194100

PAGE : 4 OF 4

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / 6 INCHES	UECS SYMBOL	DESCRIPTION	
71						GROUNDWATER AT APPROX 75'	
72							
73							
74							
75				2361	9/12/20	S W M L	MEDIUM BROWN FINE TO COARSE SAND WITH 10% GRAVEL TO > 2.5". SUBROUNDED GRANITIC, WET, NO ODOR
76							MEDIUM BROWN CLAYEY SILT AT TIP OF SAMPLER, SLIGHTLY MOIST
77							
78							
79							
80					15/22/29	S M - S C M L	MEDIUM BROWN SILTY CLAYEY SAND, WET, NO ODOR MEDIUM BROWN SILT, SLIGHTLY MOIST, NO ODOR
81							
82							
83							
84							
85						S P C L	MEDIUM BROWN FINE TO MEDIUM SAND, WET
86					S P	MEDIUM BROWN AND GREEN BROWN MOTTLED SILTY CLAY, MOIST	
87						MEDIUM BROWN FINE TO MEDIUM SAND WITH COARSE SAND LENSES, WET	
88							
89						90' CUTTINGS FLOWING INSIDE AUGER, DISCONTINUE SAMPLING	
90							
91							
92						FID = FLAME IONIZATION DETECTOR	
93							
94							
95						TD = 95' GROUNDWATER ENCOUNTERED 70 - 75'	

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site On Sultana St. and Lower Azusa Job No. 8208-20400-110W4SHAL Boring/Well No. MW2-01

Drill Contractor Beylik Drilling Drill Method Hollow Stem Auger Logged By Tannehill

Drilling Started 1/23/97 Ended 1/29/97 Elevation & Datum 333.0 Total Depth 146.0 Depth To Water 119.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
				GW	Asphalt to 3".			330
5	3 3 5		0.0/ 0.0	SM	Roadbase to 9", followed by dark brown silty sand.			325
10	6 6 9		0.0/ 0.0	SM	SILTY SAND, dark yellowish brown (10YR 4/4), multicolored grains; 80% fine to medium sand, subangular to rounded, low to high sphericity, poorly graded, trace coarse sand, loose; 20% silt, soft, crumbly, low plasticity; no odor, moist.			320
15	10 13 20/5"		0.0/ 0.0	SP	POORLY GRADED SAND, brown (10YR 5/3), multicolored grains; 95% fine to coarse sand, trace coarse sand, angular to subrounded, low to high sphericity, medium dense; 5% silt; trace fine gravel, poorly graded, subangular to subrounded, low to moderate sphericity; no odor, moist.			315
20	21 28 30		0.0/ 0.0	SP	POORLY GRADED SAND, brown (10YR 5/3), multicolored grains; 95% fine to coarse sand, trace coarse sand, angular to subrounded, low to high sphericity, medium dense; 5% silt; trace fine gravel, poorly graded, subangular to subrounded, low to moderate sphericity; no odor, moist, slightly coarser than above (15).			310
	11 19 30							



environmental engineers, scientists, planners, & management consultants

Remarks Borehole advanced with 8" augers to 146 feet bgs. Reamed with 10" augers to 140 feet bgs. Native fill 140 to 146 feet bgs. Water encountered at 119 ft bgs. Datum is from 4" mild steel pipe in ft msl.

See key sheet for symbols and abbreviations used above.

Boring Log and Sampling Record

Client Northwest El Monte Community Task Force

Site On Sultana St. and Lower Azusa

Job No. 8208-20400-110W4SHAL

Boring/Well No. MW2-01

Drill Contractor Beylik Drilling

Drill Method Hollow Stem Auger

Logged By Tannehill

Drilling Started 1/23/97

Ended 1/29/97

Elevation & Datum 333.0

Total Depth 146.0

Depth To Water 119.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
30	13 30 31		0.0/ 0.0	SP		POORLY GRADED SAND, brown (10YR 5/3) multicolored grains; 95% fine to coarse sand, trace coarse sand, angular to subrounded, low to high sphericity, medium dense; 5% silt; trace fine gravel, poorly graded, subangular to subrounded, low to moderate sphericity; no odor, moist.		305
35	18 27 37		0.0/ 0.0	SP		POORLY GRADED SAND WITH GRAVEL, brown (10YR 5/3), multicolored grains; 85% fine to medium sand, trace coarse sand, angular to subrounded, low to high sphericity, medium dense; 15% fine to medium gravel, subangular to subrounded, low to high sphericity, poorly graded; no odor, moist.		300
40	11 35 50		0.0/ 0.0	SP		POORLY GRADED SAND, brown (10YR 4/3), multicolored grains; 85% fine to medium sand, trace coarse, subangular to rounded, medium dense; 10% silt; 5% fine gravel, angular to subrounded, low sphericity, poorly graded; no odor, moist, slightly coarser than above (30).	Portland Type I-II neat cement (0-110 ft).	295
45	26 50		0.0/ 0.0	SP		POORLY GRADED SAND, brown (10YR 4/3) multicolored grains; 90% fine to medium sand, trace coarse sand, angular to subrounded, low to high sphericity, dense; 10% silt, soft; trace fine gravel, subrounded, low sphericity, poorly graded; no odor, moist, finer than previous sample (35).		290
46	46 50		0.0/ 0.0	SP		POORLY GRADED SAND, brown (10YR 4/3) multicolored grains; 90% fine to medium sand, trace coarse sand, angular to subrounded, low to high sphericity, dense; 10% silt, soft; trace fine gravel, subrounded, low sphericity, poorly graded; no odor, moist, as above (40).	Mild Steel Blank, 4" ID (0-110 ft).	285

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Remarks Borehole advanced with 8" augers to 146 feet bgs. Reamed with 10" augers to 140 feet bgs. Native fill 140 to 146 feet bgs. Water encountered at 119 ft bgs. Datum is from 4" mild steel pipe in ft msl.

See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site On Sultana St. and Lower Azusa Job No. 8208-20400-110W4SHAL Boring/Well No. MW2-01

Drill Contractor Beylik Drilling Drill Method Hollow Stem Auger Logged By Tannehill

Drilling Started 1/23/97 Ended 1/29/97 Elevation & Datum 333.0 Total Depth 146.0 Depth To Water 119.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
55	18 26 39		0.0/ 0.0	SM	[Symbol]	SILTY SAND, dark yellowish brown (10YR 4/4), multicolored grains; 85% fine to medium sand, poorly graded, trace coarse sand, angular to subrounded, low to moderate sphericity, dense; 15% silt, medium toughness, low plasticity; trace gravel (one large gravel), subangular, low sphericity; no odor, damp, finer than previous sample (45).	[Symbol]	280
60	20 22 26		0.0/ 0.0	ML	[Symbol]	SILT WITH SAND, dark brown (10YR 3/3); 85% silt, hard, slightly plastic; 15% fine to medium sand, poorly graded, mostly fine sand, subangular to subrounded, low to high sphericity; no odor, moist.	[Symbol]	275
65	17 25 27		0.0/ 0.0	SM	[Symbol]	SILTY SAND, yellowish brown (10YR 5/4), multicolored grains, 75% fine to medium sand, trace coarse sand, subangular to rounded, low to high sphericity, medium dense; 25% silt, low plasticity; no odor, moist.	[Symbol]	270
70	24 37 42		0.0/ 0.0	SP	[Symbol]	POORLY GRADED SAND, brown (10YR 4/3), multicolored grains, 95% fine to medium sand, subangular to subrounded, low to high sphericity, medium dense; 5% silt, soft, low plasticity; trace fine gravel, poorly graded, subangular, low sphericity; no odor; moist.	[Symbol]	265
75	30 37 49		0.0/ 0.0	SP	[Symbol]	POORLY GRADED SAND, brown (10YR 4/3), multicolored grains; 95% fine to medium sand, angular to subrounded, low to high sphericity, dense sand; 5% silt, soft, crumbly, low plasticity; no odor, moist.	[Symbol]	260

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Remarks Borehole advanced with 8" augers to 146 feet bgs. Reamed with 10" augers to 140 feet bgs. Native fill 140 to 146 feet bgs. Water encountered at 119 ft bgs. Datum is from 4" mild steel pipe in ft msl.

See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site On Sultana St. and Lower Azusa Job No. 8208-20400-110W4SHAL Boring/Well No. MW2-01

Drill Contractor Beylik Drilling Drill Method Hollow Stem Auger Logged By Tannehill

Drilling Started 1/23/97 Ended 1/29/97 Elevation & Datum 333.0 Total Depth 146.0 Depth To Water 119.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
75-80	18 22 37		0.0/ 0.0	SP	POORLY GRADED SAND, brown (10YR 5/3), multicolored grains; 100% fine to medium sand, trace coarse sand, angular to subrounded, low to high sphericity, dense; trace silt; no odor, moist.			255
80-85			0.0/ 0.0	SM SP	SILTY SAND, brown, hard, crumbly, moist.			250
85-90	48 50/2"		0.6/ 0.5	ML	SILT WITH SAND, light brownish gray (10YR 6/2), multicolored grains; 70% silt, soft to hard, dense; 25% fine to coarse sand, poorly graded, dominated by fine to medium sand, subangular to rounded, low to high sphericity; 5% fine gravel, subangular, low sphericity; no odor, dry to moist, hard drilling.			245
90-95	34 50		1.1/ 0.7	ML	SILT WITH SAND, olive brown (2.5Y 4/4), multicolored sand; 85% silt, low plasticity, low toughness, hard; 15% fine to coarse sand, poorly graded, mostly finer sand, subangular to subrounded, low to high sphericity; no odor, moist, hard, slow drilling.			240
95-100	47 50		1.0/ 0.8	SP ML	POORLY GRADED SAND, brown (10YR 4/3), multicolored grains; 100% fine to medium sand, trace coarse sand, angular to subrounded, low to high sphericity, loose; damp, no odor.			235
100-105				ML	SILT WITH SAND, light olive brown (2.5Y 5/6), multicolored sand; 85% silt, hard, compact; 15% fine to coarse sand, poorly graded, mostly fine to medium sand, subangular to subrounded, low to high sphericity; dry, no odor.			
105-110	9 18 28			SM	SILTY SAND, dark yellowish brown (10YR 4/4), multicolored sand; 80% fine to			



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See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site On Sultana St. and Lower Azusa

Job No. 8208-20400-110W4SHAL

Boring/Well No. MW2-01

Drill Contractor Beylik Drilling

Drill Method Hollow Stem Auger

Logged By Tannehill

Drilling Started 1/23/97

Ended 1/29/97

Elevation & Datum 333.0

Total Depth 146.0

Depth To Water 119.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
105	12 25 29		0.7/ 0.6	ML		medium sand, subangular to subrounded, low to high sphericity, poorly graded; 20% silt, soft, low plasticity.		230
			0.0/ 0.0	SM		SILT, dark yellowish brown (10YR 4/4); 95% silt, hard, compact, low plasticity, very stiff; 5% fine to medium sand, poorly graded, micaceous, dominated by fine sand, medium dense; no odor, dry to moist.		
			0.0/ 0.0	ML		SILTY SAND, brown (10YR 5/3), multicolored grains; 80% fine to medium sand, poorly graded, subangular to subrounded, low to high sphericity, medium dense; 20% silt, soft, no plasticity; no odor, moist.		
			0.0/ 0.0	ML		SILT, dark yellowish brown (10YR 4/4), 90% silt, hard, compact, crumbly; 10% fine to medium sand, poorly graded, subrounded high sphericity; no odor, moist.		225
110	20 26 37		0.2/ 0.0	SP		POORLY GRADED SAND, 90% fine to medium sand, poorly graded, subangular to rounded, low to high sphericity; 10% silt.		
			0.2/ 0.0	ML		Grades to SILT, dark yellowish brown (10YR 4/4) to olive (5Y 4/3); 90% silt, dense, hard, crumbly; 10% fine to medium sand, poorly graded subangular to subrounded, low to high sphericity; trace gravel, one large gravel; no odor, moist.	Wyo-Ben (Enviroplug medium) Bentonite Chips (110-113 ft).	220
115	11 17 28		0.0/ 0.0	SM SP		SILTY SAND, dark yellowish brown (10YR 4/4), 70% fine to medium sand; 30% silt; trace clay; grades to POORLY GRADED SAND WITH SILT, dark yellowish brown (10YR 4/4), multicolored grains; 90% fine to coarse sand, dominated by fine to medium sand, subangular to subrounded, low to high sphericity; medium dense; 10% silt, low plasticity, soft; trace fine gravel, subangular, low sphericity; damp; moist.	LW Osborne #60 sand (113-115 ft).	215
120	18 24 38		0.0/ 0.0	SP SM		POORLY GRADED SAND WITH SILT, brown (10YR 4/3), multicolored grains; 90% fine to medium sand, trace coarse sand, angular to subrounded, low to high sphericity, dense; 10% silt, soft, low plasticity; trace gravel, subangular, low sphericity; damp to moist, increased moisture, no odor.	Stainless Steel Blank, 4" ID (110-120 ft).	
	7 7 11		0.5/ 0.0	SP		Groundwater encountered at 119 feet bgs.		210
	7 18 22			SM		POORLY GRADED SAND, yellowish brown (10YR 5/4), multicolored grains; 95% fine to medium sand, trace coarse sand, angular		



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Remarks Borehole advanced with 8" augers to 146 feet bgs. Reamed with 10" augers to to 140 feet bgs. Native fill 140 to 146 feet bgs. Water encountered at 119 ft bgs. Datum is from 4" mild steel pipe in ft msl.

See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site On Sultana St. and Lower Azusa

Job No. 8208-20400-110W4SHAL

Boring/Well No. MW2-01

Drill Contractor Beylik Drilling

Drill Method Hollow Stem Auger

Logged By Tannehill

Drilling Started 1/23/97

Ended 1/29/97

Elevation & Datum 333.0

Total Depth 146.0

Depth To Water 119.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
130	12 16 26		0.6/ 0.0	SM		to subrounded, low to high sphericity; 5% silt; no odor; damp, coarser than 120.	RMC Lonestar #3 sand (115-142 ft).	205
	20 27 30		0.8/ 0.0	ML		SILTY SAND, olive brown (2.5Y 4/4); 70% fine to medium sand, poorly graded; 30% silt; wet.		
	27 31 38		0.5/ 0.0	ML		SILTY SAND, olive brown (2.5Y 4/4), multicolored grains; 85% fine to medium sand, trace coarse sand, poorly graded; subangular to subrounded, low to high sphericity, medium dense; 15% silt, soft, low plasticity; trace fine gravel, subangular, low plasticity; damp, no odor.	Stainless Steel Wire Wrap Screen 0.020" slot 4" ID (120-140 ft).	200
	34 46 50		0.4/ 0.0	ML		SILT, light olive brown (2.5Y 5/4), very stiff, crumbly, low plasticity; trace fine sand, micaceous; moist, drier than previous (127.5), less sand.		
135			1.1/ 0.0	SM		SILT, olive brown (2/5Y 4/4), 90% silt, hard, crumbly; 10% fine to medium sand, poorly graded, micaceous; very stiff, dry.	Native Fill Material (140-146 ft).	195
	16 24 29		0.1/ 0.0	SM		SILTY SAND, olive brown (2.5Y 4/4), multicolored grains; 70% fine to medium sand, poorly graded, micaceous, subangular to subrounded, low to high sphericity; 30% silt, soft, crumbly, low plasticity; no odor, damp. Sand lense at 133.5, silty with clay, grades to sand at 134.5 ft.		
140	26 50		0.4/ 0.0	SP		SILTY SAND, olive brown (2.5Y 4/4), multicolored grains; 75% fine to medium sand, poorly graded, micaceous, subangular to subrounded, low to high sphericity; 25% silt, soft, no plasticity; no odor, wet, slightly coarser than previous (135).		190
	23 50		0.4/ 0.0	SP SM		POORLY GRADED SAND, light olive brown (2.5Y 5/6), multicolored grains; 95% fine to medium sand, trace coarse sand, subangular to subrounded, low to high sphericity, medium dense; 5% silt, soft; no odor, wet. Coarser than previous (137.5). Silt at 138.5, Sand at 140 ft.		
145			0.4/ 0.0	ML		POORLY GRADED SAND WITH SILT, light olive brown (2.5Y 5/6), multicolored grains; 90% fine to medium sand, trace coarse sand, subangular to subrounded, low to high sphericity, dense; 10% silt, soft; no odor, slightly finer than previous (142.5), wet.		185
			0.6/ 0.0	ML		SILT, light olive brown (2.5Y 5/4); 90% silt, dry, compact, low plasticity, crumbly, hard; 10% fine sand, poorly graded, micaceous; little moisture.		
						SILT, light olive brown (2.5Y 5/4); 90% silt, moist, compact, crumbly, low plasticity;		

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planners, & management consultants

Remarks Borehole advanced with 8" augers to 146 feet bgs. Reamed with 10" augers to to 140 feet bgs. Native fill 140 to 146 feet bgs. Water encountered at 119 ft bgs. Datum is from 4" mild steel pipe in ft msf.

See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site On Sultana St. and Lower Azusa Job No. 8208-20400-110W4SHAL Boring/Well No. MW2-01

Drill Contractor Beylik Drilling Drill Method Hollow Stem Auger Logged By Tannehill

Drilling Started 1/23/97 Ended 1/29/97 Elevation & Datum 333.0 Total Depth 146.0 Depth To Water 119.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
155						10% fine sand, poorly graded, micaceous; no odor.		180
160						Total Depth = 146 ft bgs Groundwater encountered at 119 ft bgs.		175
165								170
170								165
								160



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Remarks Borehole advanced with 8" augers to 146 feet bgs. Reamed with 10" augers to to 140 feet bgs. Native fill 140 to 146 feet bgs. Water encountered at 119 ft bgs. Datum is from 4" mild steel pipe in ft msl.

See key sheet for symbols and abbreviations used above.

Boring Log and Sampling Record

Client Northwest El Monte Community Task Force

Site On Hart St. and Marshall St.

Job No. 8208-20400-110W4SHAL

Boring/Well No. MW2-02

Drill Contractor Baylik Drilling

Drill Method Hollow Stem Auger

Logged By Tannehill

Drilling Started 1/22/97

Ended 1/22/97

Elevation & Datum 279.0

Total Depth 85.0

Depth To Water 64.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
				GW SP	Asphalt to 3". Roadbase to 12".			
5	4 8 23		0.0/ 0.0			POORLY GRADED SAND, brown (10YR 4/3), multicolored grains; 100% fine to coarse sand, dominated by fine to medium sand, trace of coarse sand, angular to rounded, low to high sphericity, loose; trace fine gravel, rounded, low sphericity; no odor, moist.		275
10	9 10 10		0.0/ 0.0	SP ML		POORLY GRADED SAND to SANDY SILT; dark grayish brown (10YR 4/2), multicolored grains; SAND is poorly graded, angular to rounded; 95% fine to medium sand; 5% fine gravel, subangular to subrounded, loose; SILT is 85% silt; 15% fine to medium sand, micaceous, stiff; no odor; moist.	Portland Type I-II neat cement (0-50.6 ft).	270
15	4 5 9		0.0/ 0.0	SM		SILTY SAND, brown (10 YR 4/3); multicolored sand; 60% fine to medium sand, poorly graded, subangular to rounded, low to high sphericity, medium dense; 30% silt; 10% clay, low plasticity; no odor, moist.		265
20	8 28 30		0.0/ 0.0	ML SP		SILT to SAND; brown (10YR 4/3), multicolored sand; SILT is soft, low plasticity; grades to POORLY GRADED SAND, 90% fine to medium sand, trace coarse sand, angular to subrounded, low to high sphericity, dense; 10% silt, low plasticity; no odor, moist.	Mild Steel Blank, 4" ID (0-50 ft).	260
	10 18 21							255



Remarks Borehole advanced with 8" augers to 85 feet bgs. Reamed with 10" augers to 80 feet bgs. Native fill 80 to 85 feet bgs. Water encountered at 64 feet bgs. Datum is from top of 3/4" PVC pipe:ft msl

See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site On Hart St. and Marshall St. Job No. 8208-20400-110W4SHAL Boring/Well No. MW2-02

Drill Contractor Beylik Drilling Drill Method Hollow Stem Auger Logged By Tannehill

Drilling Started 1/22/97 Ended 1/22/97 Elevation & Datum 279.0 Total Depth 85.0 Depth To Water 64.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
30	14 44 50		0.0/ 0.0	SP	SP	POORLY GRADED SAND, brown (10YR 5/3), multicolored grains; 95% fine to medium sand, angular to subrounded, low to high sphericity, dense; 5% silt; no odor; moist.	[Pattern]	250
35	18 23 50		0.0/ 0.0	SP	SP	POORLY GRADED SAND, brown (10YR 5/3), multicolored grains; 90% fine to medium sand, trace coarse sand, angular to subrounded, low to high sphericity, very dense; 5% fine gravel, subrounded, low sphericity; 5% silt; no odor, moist.	[Pattern]	245
40	7 17 23		0.0/ 0.0	CL	CL	SILTY CLAY, dark grayish brown (10YR 4/2) to brown (10YR 4/3); 70% clay, slightly plastic, hard; 25% silt, slightly plastic; 5% fine sand, poorly graded, subangular, high sphericity; no odor, moist.	[Pattern]	240
45	18 20 27		0.0/ 0.0	SM	SM	SILTY SAND, yellowish brown (10YR 5/4), multicolored grains; 85% fine to medium sand, angular to subrounded, low to high sphericity, dense; 15% silt; no odor, moist.	[Pattern]	235
45	13 26 40		0.0/ 0.0	SM	SM	SILTY SAND, yellowish brown (10YR 5/4), multicolored grains; 75% fine sand, trace medium to coarse sand, subangular to subrounded, low to high sphericity, dense; 25% silt, harder than above, crumbly; no odor, moist.	[Pattern]	230

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Remarks Borehole advanced with 8" augers to 85 feet bgs. Reamed with 10" augers to 80 feet bgs. Native fill 80 to 85 feet bgs. Water encountered at 64 feet bgs. Datum is from top of 3/4" PVC pipe:ft msl

See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site On Hart St. and Marshall St.

Job No. 8208-20400-110W4SHAL

Boring/Well No. MW2-02

Drill Contractor Beylik Drilling

Drill Method Hollow Stem Auger

Logged By Tannehill

Drilling Started 1/22/97

Ended 1/22/97

Elevation & Datum 279.0

Total Depth 85.0

Depth To Water 64.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
55	12 26 34		0.0/ 0.0	ML		SANDY SILT, brown (10YR 5/3), multicolored grains; 70% silt, crumbly, hard; 30% fine to medium sand, trace coarse sand, subangular to subrounded, low to high sphericity; no odor, moist.	Wyo-Ben (Enviroplug medium) Bentonite Chips (50.6-52.7 ft).	225
60	14 19 28		0.0/ 0.0	ML		SANDY SILT, yellowish brown (10YR 5/4), multicolored grains; 70% silt, low plasticity, hard; 30% fine to medium sand, poorly graded, subangular to rounded, low to high sphericity; no odor, moist.	LW Osborne #60 sand (52.7-54.7 ft).	220
65	46 53 3"-4" 22 39 50		0.0/ 0.0	ML		SANDY SILT, olive (5Y 5/4), multicolored sand; 85% silt, low plasticity, hard; 20% fine sand, poorly graded, trace medium sand, micaceous, low to high sphericity; no odor, moist.	Stainless Steel Blank, 4" ID (50-60 ft).	215
70	28 50		0.0/ 0.0	SW		WELL GRADED SAND WITH GRAVEL, brown (10YR 5/3), multicolored grains; 60% fine to coarse sand, angular to subrounded, low to high sphericity, very dense; 35% fine to medium gravel, poorly graded, subangular to subrounded, low to medium sphericity; 5% silt; no odor, wet. Water encountered at ~64 ft bgs. Grades to finer sand at 66-67 ft bgs. Poorly graded sand; trace silt; wet.	RMC Lonestar #3 sand (54.7-80 ft).	210
	32 50		0.0/ 0.0	SM		SILT WITH SAND, dark yellowish brown (10YR 4/4) multicolored grains; 65% fine sand, trace medium sand, very dense, crumbly; 35% silt, low plasticity; no odor, moist.	Stainless Steel Wire Wrap Screen 0.020" slot, 4" ID	205
	42 50		0.2/ 0.0	ML		SILT WITH SAND, brown (10YR 4/3) to dark yellowish brown (10YR 4/4), multicolored grains; 70% silt, low plasticity, hard, crumbly; 30% fine sand, poorly graded; no odor, moist.		
				SP		POORLY GRADED SAND, brown (10YR 4/3), multicolored grains; 95% fine to medium sand, trace coarse, angular to		



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Remarks Borehole advanced with 8" augers to 85 feet bgs. Reamed with 10" augers to 80 feet bgs. Native fill 80 to 85 feet bgs. Water encountered at 64 feet bgs. Datum is from top of 3/4" PVC pipe:ft msl

See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site On Hart St. and Marshall St. Job No. 8208-20400-110W4SHAL Boring/Well No. MW2-02

Drill Contractor Beylik Drilling Drill Method Hollow Stem Auger Logged By Tannehill

Drilling Started 1/22/97 Ended 1/22/97 Elevation & Datum 279.0 Total Depth 85.0 Depth To Water 64.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
			0.4/ 0.2	SP		subrounded, low to high sphericity, very dense; 5% silt; no odor, wet.		
	50/6"		0.4/ 0.4	SP		POORLY GRADED SAND, dark yellowish brown (10YR 4/4), multicolored grains; 95% fine to medium, angular to subrounded, low to high sphericity, very dense; 5% silt; no odor, wet, finer than above (72.5).		
80	50/6"		0.5/ 0.5	SP		POORLY GRADED SAND, dark yellowish brown (10YR 4/6), multicolored grains; 95% fine to coarse sand, angular to subrounded, low to high sphericity, dominated by fine to medium sand, very dense; 5% silt; no odor, wet, coarser than above (75).		200
	48/6"		0.5/ 0.5	SP		POORLY GRADED SAND, dark grayish brown (2.5Y 4/2) multicolored grains; 95% fine to medium sand, trace coarse sand, subangular to subrounded, low to high sphericity, dominated by fine sand, very dense; 5% silt; no odor, wet, finer than above (77.5).		195
85	50/6"		0.5/ 0.5	ML		POORLY GRADED SAND, dark yellowish brown (10YR 3/4), multicolored grains; 95% fine to medium sand, trace coarse sand, subangular to subrounded, low to high sphericity, dense; 5% silt; no odor, moist, coarser than above (80).	Native Fill Material (80-85 ft).	
						SILT, olive brown (2.5Y 4/4); 90% silt, low plasticity, hard; 10% fine sand, poorly graded; no odor, moist.		
90						Total depth = 85 ft bgs Groundwater encountered at 64 ft bgs.		185
95								180



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Remarks Borehole advanced with 8" augers to 85 feet bgs. Reamed with 10" augers to 80 feet bgs. Native fill 80 to 85 feet bgs. Water encountered at 64 feet bgs. Datum is from top of 3/4" PVC pipe:ft msl

See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site Brookline and Olney, City of Rosemead Job No. 8208-20400-110W6MW28 Boring/Well No. PZ1

Drill Contractor BC2 Drilling Drill Method Hollow Stem Auger Logged By Will Grove, R.G.

Drilling Started 7/19/95 Ended 7/19/95 Elevation & Datum _____ Total Depth 111.0 Depth To Water _____

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
5	16 18 20		0.0	SP		POORLY GRADED SAND WITH GRAVEL, brown (10YR4/3), 70% sand, very fine to medium, poorly graded, 30% gravel, trace silt.		
				ML		SANDY SILT, dark brown, 60% silt, 40% sand, very fine sand, moist.		
10	17 19 28		0.0	ML		SANDY SILT, yellowish brown (10YR5/4), 60% silt, 40% sand, very fine sand, micaceous, moist.		
15			0.0	SP		POORLY GRADED SAND, very pale brown (10YR7/4), sand is very fine to medium grain, poorly graded, mode medium sand, subrounded, minor gravel(5%), damp.		
20			0.0	SP		POORLY GRADED SAND, very pale brown (10YR7/4), sand is very fine to medium grain, poorly graded, mode medium sand, subrounded, minor gravel(5%), damp.		
25	16 19 20		0.0	SP		POORLY GRADED SAND, very pale brown (10YR7/3), sand is very fine to medium grain, poorly graded, mode fine sand, subrounded, minor gravel(5%), damp.		
30	21 24 30		0.0	SP		POORLY GRADED SAND, very pale brown (10YR7/4), sand is very fine to medium grain, poorly graded, mode medium sand, subrounded, minor gravel(5%), damp.		
	14			SP		POORLY GRADED SAND, very pale brown		



*environmental engineers, scientists,
planners, & management consultants*

Remarks

See key sheet for symbols and abbreviations used above.

Boring Log and Sampling Record

Client Northwest El Monte Community Task Force

Site Brookline and Olney, City of Rosemead Job No. 8208-20400-110W6MW28 Boring/Well No. PZ1

Drill Contractor BC2 Drilling Drill Method Hollow Stem Auger Logged By Will Grove, R.G.

Drilling Started 7/19/95 Ended 7/19/95 Elevation & Datum _____ Total Depth 111.0 Depth To Water _____

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
	21 24		0.0			(10YR7/3), sand is very fine to fine grain, poorly graded, mode medium sand, subrounded, damp.		
40			0.0	SP		POORLY GRADED SAND, very pale brown (10YR7/3), sand is very fine to fine grain, poorly graded, mode medium sand, subrounded, damp.		
45	32 50		0.0	ML		SILT WITH CLAY AND SAND, brown (10YR4/3), 60% silt, 30% clay, 10% sand, transition zone sample smears as with clay very slightly plastic, sand is very fine grain, poorly graded.		
50	18 20 21		0.0	SW		WELL GRADED SAND, light gray (10YR7/2), fine to coarse grained, subangular to subrounded, well graded, moderate sphericity, trace very coarse sand.	 <p>Neat Cement with 5% bentonite</p>	
55	27 50		0.0	SW		WELL GRADED SAND, light gray (10YR7/2), fine to coarse grained, subangular to subrounded, well graded, moderate sphericity, trace very coarse sand, trace gravel, 1.5" diameter.		
60	50		0.0	SW		WELL GRADED SAND, light gray (10YR7/2), fine to coarse grained, subangular to subrounded, well graded, moderate sphericity, trace very coarse sand, saturated.		
65	50		0.0	SW		WELL GRADED SAND WITH GRAVEL, light gray (10YR7/2), fine to coarse grained, subangular to subrounded, well graded, moderate sphericity, 20% gravel.		
	50			CL		CLAY WITH SILT, gray (7.5YRN5)		



Remarks

See key sheet for symbols and abbreviations used above.

Boring Log and Sampling Record

Client Northwest El Monte Community Task Force

Site Brookline and Olney, City of Rosemead

Job No. 8208-20400-110W6MW28

Boring/Well No. PZ1

Drill Contractor BC2 Drilling

Drill Method Hollow Stem Auger

Logged By Will Grove, R.G.

Drilling Started 7/19/95

Ended 7/19/95

Elevation & Datum _____

Total Depth 111.0

Depth To Water _____

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
			0.0	ML		moderately plastic, moist.		
75	50		0.0	ML		SANDY SILT, yellowish brown (10YR5/6), 60% silt, 40% sand, sand very fine, tight material, with clay above.		
80							2" PVC Sch 40, blank	
85	50		0.0	SW		WELL GRADED SAND WITH GRAVEL, light gray (10YR7/2), fine to coarse sand, well graded, subangular to subrounded, 20% gravel, saturated.		
			0.0	ML		SANDY SILT, blue gray (10YR4/1), 30% very fine sand, silt with minor organic matter, moist.		
90			0.0	SW		WELL GRADED SAND, very pale brown (10YR5/3), top of sand is fine to medium sand grading to medium to very coarse, subrounded to angular, well graded, saturated.		
95			0.0	ML		SANDY SILT, yellowish brown (10YR5/4), 70% silt, 30% sand, slightly plastic, very fine sand, damp.		
100			0.0	ML		SILT, blue gray (10YR4/1), 20% clay, 10% sand, minor coarse sand in matrix, slightly plastic.	Volclay grout seal	
			0.0	ML		SILT, blue gray (10YR4/1), 20% clay, 10%	#2/16 gravel pack RMC Lonestar	

CDM
*environmental engineers, scientists,
 planners, & management consultants*

Remarks

See key sheet for symbols and abbreviations used above.

Boring Log and Sampling Record

Client Northwest El Monte Community Task Force

Site Brookline and Olney, City of Rosemead Job No. 8208-20400-110W6MW28 Boring/Well No. PZ1

Drill Contractor BC2 Drilling Drill Method Hollow Stem Auger Logged By Will Grove, R.G.

Drilling Started 7/19/95 Ended 7/19/95 Elevation & Datum _____ Total Depth 111.0 Depth To Water _____

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
110			0.0	ML	sand, minor coarse sand in matrix, slightly plastic.		2" PVC Sch 40, 10 Slot Screen (104-109 ft bgs) End Cap Native Slough	
115			0.0		SILT, blue gray (10YR4/1), 20% clay, 10% sand, minor coarse sand in matrix, slightly plastic.			
120					CLAY, blue gray (10YR4/1), plastic.			
125						Total depth = 111 ft bgs		
130								
135								

environmental engineers, scientists, planners, & management consultants

Remarks

See key sheet for symbols and abbreviations used above.

LOG OF BORING

Drill Rig: B-61		Boring Diameter: 11 inches		Boring Elevation:		Boring Number: MW-3	
Drilling Date: 6/9/89		Logger:		Registered Geologist:		This log is a representation of subsurface conditions at the time and place of drilling. The passage of time or other locations may cause consequential changes in conditions.	

SAMPLE		VAPOR READINGS	TIME	BLOW COUNTS	DEPTH, FEET	WELL CONSTRUCTION DETAIL	SOIL/ROCK SYMBOL	SOIL/ROCK TYPE	DESCRIPTION AND REMARKS
BULK	TUBE								
								SM	6" asphalt SILTY SAND: light brown, dry-slightly moist
		10	8:50a	2-3-4	5			SW ML	FINE SAND: well graded, brown, dispersed mica, dry, interbedded with silty sand: brown, slightly moist
		25	9:00a	5-9-12	10				CLAYEY SILT: dark brown, moist, vertical root holes CLAYEY SILT: same as above, dispersed medium sand
		40	9:05a	5-5-7	15			SW	FINE SAND: well graded, light brown, dispersed muscovite
		40	9:10a	16-20-22	20			SM	SILTY SAND: 20% clay, dark brown, moist dispersed muscovite
		40	9:17a	9-11-13	25				SILTY SAND: same as above, 1/2" diameter gravels, vertical color change without lithological change, two samples are taken from dark and light color parts
		20	9:25a	18-20-26	30				25/A top dark brown color 25 bottom light brown color SILTY SAND: gravelly, same as above
		45	9:35a	15-18-27	35			SP	SAND: silty sand and medium-coarse sand interbedded, slightly moist, less gravel, 10-15% clay
		40	9:45a	21-36-45	40				GRAVELLY SAND: medium-coarse, 1" diameter angular gravels 25%, vertical color change dark and light brown, slightly moist
		30	10:00a	19-30-37	45				GRAVELLY SAND: significant amount of silt, 1/2" angular pebbles
		40	10:15a	22-24-46	50				GRAVELLY SAND: silty, brown, quartz cobbles up to 2" diameter, silt and clayey silt

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BALL-INCON GLASS PACKAGING CORP.

4000 N. ARDEN DR. EL MONTE, CA

Project Number:

1507 02

Figure Number:

A 20

LOG OF BORING

Drill Rig: B-61		Boring Diameter: 11 inches	Boring Elevation:	Boring Number: MW-3
Drilling Date: 6/9/89	Logger:	Registered Geologist:	This log is a representation of subsurface conditions at the time and place of drilling. The passage of time or other locations may cause consequential changes in conditions.	

SAMPLE		VAPOR READINGS	TIME	BLOW COUNTS	DEPTH, FEET	WELL CONSTRUCTION DETAIL	SOIL/ROCK SYMBOL	SOIL/ROCK TYPE	DESCRIPTION AND REMARKS
BULK	TUBE								
									lamination about 3" thick
		30	10:30a	19-24-30	55		SM		SILTY SAND: brown and gray mottled, 10% clay gravel up to 1/2" diameter
		30	10:45a	11-28-34	60		SP		GRAVELLY SAND: light brown, loose, fine and coarser grain sand alteration, moist
		30	10:55a	11-38-50	65		ML		CLAYEY SILT: brown-dark brown, moist-wet, slightly stiff, includes 10-15% gravels
		30	11:05a	22-41-52	70		SM		SILTY SAND: very little gravel, 10% clay, wet
					75		SP		GRAVELLY SAND: light brown, moderate, saturated loose
					80				
					85				
					90		CL		CLAY: blue-gray, very stiff, plastic
									NOTES: <ul style="list-style-type: none"> - total depth is 92 ft. - ground water encountered at 70.5 ft. - samples taken at 75', 80', 85', 89' with 1" OD sampler only for site description - at 90' normal sample is taken to verify clay

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BALL-INCON GLASS PACKAGING CORP.

4000 N. ARDEN DR. EL MONTE, CA

Project Number:
1597-03

Figure Number:
A-3b

LOG OF BORING

Drill Rig: H-F DRILLING FAILING F-10	Boring Diameter: 11 inches	Boring Elevation: FEET	Boring Number: MW-7
Drilling Date: 12/3/90	Logger:	Registered Geologist:	

This log is a representation of subsurface conditions at the time and place of drilling. The passage of time or other locations may cause consequential changes in conditions.

SAMPLE	TLU PPM	VAPOR READINGS	TIME	BLOW COUNTS	DEPTH, FEET	WELL CONSTRUCTION DETAIL	SOIL/ROCK SYMBOL	SOIL/ROCK TYPE	DESCRIPTION AND REMARKS
						6-inches of Asphalt			
						Sand and gravel fill material			
		55	8:47A	6-8-10	5		ML		<u>CLAYEY SILT</u> : Brown-gray, micaceous, slightly stiff, moist.
		50	8:55A	6-9-12	10		SM		<u>SILTY SAND</u> : Brown-gray, micaceous, moist.
		55	9:00A	6-9-12	15				
		55	9:05A	6-15-19	20		ML		<u>SANDY SILT</u> : Brown, micaceous, moist.
		60	9:10A	7-11-19	25		SC		<u>CLAYEY SAND</u> : Fine, contains 20% clay and some silt, firm.
		65	9:20A	25-30-30	30		SW		<u>SAND</u> : Medium-coarse, brown, contains some gravels, firm.
		60	9:23A	24-40-44	35				Same as above, loose, lighter color.
		65	9:28A	22-32-45	40		SM		<u>SILTY SAND</u> : Fine, brown to gray, contains some gravels, firm, slightly moist, micaceous.
		65	9:45A	10-22-25	45				
		70	9:58A	31-35-45	50				

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BALL INCON GLASS PACKAGING CORP.
4000 N. ARDEN DR, EL MONTE, CALIFORNIA

Project Number:
15976

Figure Number:

LOG OF BORING

Drill Rig: -F DRILLING FAILING F-10		Boring Diameter: 11 inches	Boring Elevation: FEET	Boring Number: MW-7
Drilling Date: 12/3/90	Logger:	Registered Geologist:		This log is a representation of subsurface conditions at the time and place of drilling. The passage of time or other locations may cause consequential changes in conditions.

SAMPLE	TLU PPM	VAPOR READINGS	TIME	BLOW COUNTS	DEPTH, FEET	WELL CONSTRUCTION DETAIL	SOIL/ROCK SYMBOL	SOIL/ROCK TYPE	DESCRIPTION AND REMARKS
									Same as above, gravelly sand interbedded
		80	10:05A	17-50	55			SW	
		80	10:12A	9-26-50	60				GRAVELLY SAND: Well graded, brown, firm, moist, contains gravels to 1-inch diameter.
									Same as above, contains some clay
		75	10:20A	9-26-50/5"	65				Same as above, loose, no clay.
		80	10:35A	22-50	70				Same as above, contains some silt.
		80	10:40A	7-23-50/5"	75			ML	CLAYEY SILT: Gray-brown, stiff, moist-wet, contains some burrow mottling.
								SM	SILTY SAND: Fine, brown, micaceous, firm, moist-wet.
		80	10:50A	6-13-40	80				Same as above saturated.
								SW	
			11:00A	6-15-45	85				
					90				SAND: Well graded, contains some gravel, saturated, loose.
					95				

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BALL INCON GLASS PACKAGING CORP.
4000 N. ARDEN DR, EL MONTE, CALIFORNIA

Project Number:
15976

Figure Number:

LOG OF BORING

Drill Rig: H-F DRILLING FAILING F-10		Boring Diameter: 11 inches	Boring Elevation: FEET	Boring Number: MW-7
Drilling Date: 12/3/90	Logger:	Registered Geologist:	This log is a representation of subsurface conditions at the time and place of drilling. The passage of time or other locations may cause consequential changes in conditions.	

SAMPLE		TLU PPM	TIME	BLOW COUNTS	DEPTH, FEET	WELL CONSTRUCTION DETAIL	SOIL/ROCK SYMBOL	SOIL/ROCK TYPE	DESCRIPTION AND REMARKS
BULK	TUBE	VAPOR READINGS							
									<p>NOTES:</p> <p>Continuous sample was taken from 89 feet to the total depth of boring. Due to the loose sand in the bottom very little amount of representative sample was recovered. No clay encountered in any of the sampler. Total depth of the boring is 97 feet.</p> <p>Casing depth is 95 feet.</p> <p>Ground water was encountered at 77 feet.</p> <p>Bottom of the boring was collapsed from 95 to 97 feet.</p> <p>Stainless steel wire-wrap screen with 0.010-inch opening interval is from 65 to 95 feet.</p> <p>Blank PVC casing interval is from surface to 65 feet.</p> <p>Number 2/12 monterey sand filter pack interval is from 61.5 to 95 feet.</p> <p>Bentonite seal (pellets and chips) interval is from 56 to 61.5 feet.</p> <p>Bentonite grout interval is from 5 to 56 feet.</p> <p>Bentonite chips interval is from 3 to 5 feet.</p> <p>Concrete interval is from surface to 3 feet.</p>

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BALL INCON GLASS PACKAGING CORP.
4000 N. ARDEN DR, EL MONTE, CALIFORNIA

Project Number:
15976

Figure Number:

SOIL BORING LOG

ENVIRONMENTAL SUPPORT TECHNOLOGIES, INC.
23011 MOULTON PARKWAY, SUITE E-6
LAGUNA HILLS, CALIFORNIA 92653
(714) 457-9664

p.1 of 2

CLIENT NAME: Chadwick-Helmuth Company	BORING NUMBER: CHC-P5
PROJECT NAME: CHC	BORING LOGGED BY: M. Tye
DATE: March 17, 1993	DRILLING CONTRACTOR: Discovery Drilling
BEGIN DRILLING: 10:25 (3/17/93)	DRILLING METHOD: 8-inch HSA
END DRILLING: 12:05 (3/17/93)	SITE LOCATION: 4601 N. Arden Drive, El Monte, Ca.

TIME	DEPTH	BLOW COUNTS	PERCENT RECOVERY	TOV (PPM)	SAMPLE DESCRIPTION	USCS SOIL TYPE	LAB SAMPLE
10:25	0'	N/A	N/A	N/A	Surface = exposed topsoil with vegetation.	SM	N/A
10:27	1'	N/A	N/A	ND	Fine to medium silty sand, brown (10YR 4/3), well sorted, poorly graded, moist.	SM	N/A
10:30	5'	8-8-10	100%	ND	Fine to medium silty sand, brown (10YR 4/3), well sorted, poorly graded, medium dense, moist.	SM	A
10:35	10'	6-7-10	100%	ND	Fine to medium silty sand, brown (10YR 4/3), well sorted, poorly graded, medium dense, moist.	SM	A
10:40	15'	6-6-8	100%	3.5 as hexane	Medium sand with silt, brown (10YR 4/3), poorly graded, well sorted, medium dense, moist.	SP-SM	A
10:45	20'	5-7-9	100%	6.8 as hexane	Fine to medium sand with silt, brown (10YR 4/3) well sorted, poorly graded, medium dense, moist.	SM	A
10:52	25'	15-22-33	100%	49.0 as hexane	Fine to medium sand with silt, brown (10YR 4/3) well sorted, poorly graded, very dense, moist.	SM	A
10:56	30'	30-50/6*	100%	62.0 as hexane	Fine to medium sand with silt, brown (10YR 4/3) well sorted, poorly graded, very dense, moist.	SM	A
11:02	35'	18-32-36	100%	495.0 as hexane	Fine to medium sand with silt, brown (10YR 4/3) poorly sorted, well graded, very dense, moist.	SW-SM	LAB
11:10	40'	12-22-30	100%	177.0 as hexane	Fine to medium silty sand, brown (10YR 4/3) well graded, poorly sorted, very dense, moist. (Perched water encountered ?)	SM	A

HSA-Hollow stem auger
TOV-Total Organic Vapors
Spoon-California modified split-spoon
LAB-Sample analyzed at certified laboratory
HCO-Hydrocarbon odor

NS-Not sampled
USCS-United Soil Classification System
ND-Not detected
A-Sample archived
N/A-Not applicable

- 1) USCS Classifications are field derived.
- 2) Subsurface information from boring logs depict conditions only at specific locations and dates indicated. Soil conditions at other locations may differ from conditions at these locations. Also the conditions at these locations may change with time.

Prepared by Michael Tye

Reviewed by KL A. Thomson

SOIL BORING LOG

ENVIRONMENTAL SUPPORT TECHNOLOGIES, INC.
23011 MOULTON PARKWAY, SUITE E-6
LAGUNA HILLS, CALIFORNIA 92653
(714) 457-9664

p.2 of 2

CLIENT NAME: Chadwick-Helmuth Company	BORING NUMBER: CHC-P5
PROJECT NAME: CHC	BORING LOGGED BY: M. Tye
DATE: March 17, 1993	DRILLING CONTRACTOR: Discovery Drilling
BEGIN DRILLING: 10:25 (3/17/93)	DRILLING METHOD: 8-inch HSA
END DRILLING: 12:05 (3/17/93)	SITE LOCATION: 4601 N. Arden Drive, El Monte, Ca.

TIME	DEPTH	BLOW COUNTS	PERCENT RECOVERY	TOV (PPM)	SAMPLE DESCRIPTION	USCS SOIL TYPE	LAB SAMPLE
11:16	45'	10-18-19	100%	280.0 as hexane	Fine silty sand, brown (10YR 4/3) well sorted, poorly graded, dense, moist.	SM	A
11:22	50'	23-50/6*	100%	740.0 as hexane	Fine to medium sand with silt, brown (10YR 4/3) well sorted, poorly graded, very dense, moist.	SM	A
11:29	55'	25-28-45	100%	875.0 as hexane	Upper 50% = coarse sand with silt, well graded, poorly sorted, very dense, wet. Lower 50% = fine silty sand, well sorted, poorly graded, very dense, wet.	SW-SM SM	LAB
11:33	60'	30-30-30	100%	266.0 as hexane	Coarse sand with silt, brown (10YR 4/3) well graded, poorly sorted, very dense, moist to wet.	SW-SM	A
11:38	65'	50/5*	100%	375.0 as hexane	Coarse sand with silt, brown (10YR 4/3) well graded, poorly sorted, very dense, wet.	SW-SM	A
11:45	70'	23-50/3*	100%	425.0 as hexane	Fine to medium sand with silt, brown (10YR 4/3), well sorted, poorly graded, very dense, moist.	SM	LAB
11:52	75'	12-19-30	100%	2.5 as hexane	Fine to medium sand with silt, brown (10YR 4/3), well sorted, poorly graded, dense, moist.	SM	A
11:57	80'	28-50/6*	100%	37.0 as hexane	Fine to medium sand with silt, brown (10YR 4/3), well sorted, poorly graded, very dense, moist.	SM	A
12:00	82'	N/A	N/A	N/A	Groundwater encountered (03/17/93)	N/A	N/A
12:05	95'	N/A	100%	N/A	Sample collected for sieve analysis.	SM	LAB

HSA-Hollow stem auger
TOV-Total Organic Vapors
Spoon-California modified split-spoon
LAB-Sample analyzed at certified laboratory
HCO-Hydrocarbon odor

NS-Not sampled
USCS-United Soil Classification System
ND-Not detected
A-Sample archived
N/A-Not applicable

- 1) USCS Classifications are field derived.
- 2) Subsurface information from boring logs depict conditions only at specific locations and dates indicated. Soil conditions at other locations may differ from conditions at these locations. Also the conditions at these locations may change with time.

Prepared by: *Michael Jno*

KL A Thomas

MONITORING WELL E-2

SHEET 1 OF 3

COORDINATES N NA
E NA

FIELD ENGINEER S. KILKENNY DATE BEGAN 1/24/90

EDITED BY S. KILKENNY DATE FINISHED 1/24/90

CHECKED BY M. EATON GROUND SURFACE EL. NA

DEPTH IN FEET	OVA READING - H ₂ O (ppm)	PENETRATION RESISTANCE (BLOWS PER FOOT)	SAMPLE TYPE	U.S.C.S.	PROFILE	DESCRIPTION
0						- 4" asphalt
5	<10	40	UD		sm	- Brown, dense, micaceous, well graded SILTY SAND with gravel, moist, no odor
10	<10	>50	UD			- very dense, no odor
15	<10	>50	UD			- no odor
20	<10	>50	UD			- no odor
25	<10	>50	UD			- red and gray, mottled, no odor
30	<10	35	UD			- no odor
35	<10	>50	UD	sp		- Light brown, fine SAND, less moist
40	250	48	UD			- iron oxide coating on sand-sized grains, moist, no odor

UD = UNDISTURBED SAMPLE

CLIENT CROWN CITY PLATING COMPANY

PROJECT NO. 89-216

LOCATION EL MONTE, CALIFORNIA

ENVIRONMENTAL SOLUTIONS, INC

					MONITORING WELL <u>E-2</u>		SHEET <u>2</u> OF <u>3</u>	
DEPTH IN FEET	OVA READING - HNu (ppm)	PENETRATION RESISTANCE (BLOWS PER FOOT)	SAMPLE TYPE	U.S.C.S.	PROFILE	COORDINATES		
						N	E	
						FIELD ENGINEER <u>S. KILKENNY</u>		DATE BEGAN <u>1/24/90</u>
						EDITED BY <u>S. KILKENNY</u>		DATE FINISHED <u>1/24/90</u>
						CHECKED BY <u>M. EATON</u>		GROUND SURFACE EL. <u>NA</u>
DESCRIPTION								
40								
45	--	>50	UD	sp				- No sample available
50	60	>50	UD	sm				- Brown, very dense, SILTY SAND, moist, no odor
55	<10	>50	UD					- brown to red, no odor
60	<10	>50	UD					- Brown, very dense, poorly graded fine SAND, moist, no odor
65	<10	>50	UD					- increasing silt content, no odor
70	<10	>50	UD	sp				- trace gravel, no odor
75	<10	>50	UD					- coarse SAND, no odor
80	<10	>50	UD					- very dense, SILTY SAND, moist, no odor

UD = UNDISTURBED SAMPLE

CLIENT CROWN CITY PLATING COMPANY

PROJECT NO. 89-216

LOCATION EL MONTE, CALIFORNIA

ENVIRONMENTAL SOLUTIONS, INC

DEPTH IN FEET	OVA READING - HNU (ppm)	PENETRATION RESISTANCE (BLOWS PER FOOT)	SAMPLE TYPE	U.S.C.S.	PROFILE	MONITORING WELL <u>E-2</u>		SHEET <u>3</u> OF <u>3</u>	
						FIELD ENGINEER <u>S. KILKENNY</u>	DATE BEGAN <u>1/24/90</u>	COORDINATES N <u>NA</u>	COORDINATES E <u>NA</u>
						EDITED BY <u>S. KILKENNY</u>	DATE FINISHED <u>1/24/90</u>		
						CHECKED BY <u>M. EATON</u>	GROUND SURFACE EL. <u>NA</u>		
DESCRIPTION									
80				▽	sw 	- Ground water encountered at approximately 82 to 83 feet while drilling			
85	<10	>50	UD			- Brown, white, gray, very dense, well graded gravelly coarse SAND, wet, no odor			
90	<10	>50	UD			- no odor			
95	<10	>50	UD			- no odor			
100	<10	>50	UD			- no odor			
105	<10	>50	UD			- no odor			

UD = UNDISTURBED SAMPLE

- TOTAL DEPTH = 103.5' (SAMPLED TO 105')
- GROUND WATER ENCOUNTERED AT APPROXIMATELY 82 TO 83 FEET WHILE DRILLING ON 1/24/90
- MONITORING WELL DRILLED USING HOLLOW STEM AUGER (F-10) RIG BY HF DRILLING CO., FULLERTON, CALIFORNIA

WELL COMPLETION DATA

- 0 - 2' Concrete
- 2 - 65' Bentonite grout
- 65 - 70' 1/4" bentonite pellets
- 70 - 103.5' No. 1C sand filter pack
- 0 - 73.5' 4" diameter Sch. 40 blank PVC
- 73.5 - 103.5' 4" diameter Type 304 stainless steel Johnson well screen

CLIENT CROWN CITY PLATING COMPANY

PROJECT NO. 89-216

LOCATION EL MONTE, CALIFORNIA

ENVIRONMENTAL SOLUTIONS, INC.

BORING LOG

Project Name: M.C.Gill Corporation Project Number: 3705

Soil Boring Monitoring Well Boring/Well Number: MW-1 Sheet 2 of 3

Depth (feet)	USC Soil Type	Description	Blow Counts	Sample No.	Graphic Log			PID/FID Readings	Remarks
					Lithology	Annulus	Casing		
35		Becoming tan, some silt layers some large gravel	15 15 34 40	7			3		
40			44 45	8			5		
45	ML	Sandy silt, greenish-brown, moist, hard	10 23 32	9			20		
50			25 35 40	10			4		
55	SM	Silty sand, tan, moist, micaceous, dense	6 21	11			3		
60	ML	Sandy silt, brown, moist, hard	25 15 15	12			0		
65	SP	Sand, brown, moist, fine to coarse, very dense	17 30 45 45	13			5		
70			35 30 45	14			18		

BORING LOG

Project Name: M.C.Gill Corporation Project Number: 3705

Soil Boring Monitoring Well Boring/Well Number: MW-1 Sheet 3 of 3

Depth (feet)	USC Soil Type	Description	Blow Counts	Sample No.	Graphic Log			PID/FID Readings	Remarks
					Lithology	Annulus	Casing		
75		Becoming tan, wetter	38 50	15				0	
80	ML	Sandy silt, brown, wet, micaceous, very dense	12 20 40	16				0	
85									Sieve analysis sample taken at 85 feet
90									
95									
100		Bottom of Boring 100 feet							
105									
110									

Brown and Caldwell

DRILLING COMPANY WesTech OPERATOR Tony HELPER #1 Robert INSPECTED BY Steve Joseph, R.G. REVIEWED BY Steve Joseph, R.G.	HAMMER WEIGHT AND FALL 140 lbs / 30" drop		BOREHOLE LOCATION South-southwest Building 8	
	1st GROUNDWATER (TIME/DATE) November 3, 1992		SURFACE CONDITION Asphalt	
	STABLE GROUNDWATER (TIME/DATE)			
HOLE NO. SWB-8 MWV-1	PROJECT NO. 92-1060-02	PROJECT Trail Chemical Corporation	DATE 11/3/92	SHEET 1 OF 2

DIST. FROM SURF.	SAMPLE TYPE & BLOW/SF	SAMPLE	PROBS CONSTRUCTION	WELL CONSTRUCTION	SOIL LOG	USCS	LOG OF MATERIAL
			CHRISTI BOX & CAP			af	ASPHALT - 4" , GRAVEL BASE- 10"
			CONCRETE ENVIRONPLUG			SP	SILTY GRAVELLY SAND,, medium sand, moist, dense (looks to be about 3' of artificial fill (af)).
5	P 5	S-01-5				SP	SAND, medium, some silt, dark grayish brown (10YR 4/2), slightly moist, loose.
			# 3 SAND				
10	P 5	S-01-10				SM	SILTY SAND, medium, some gravel, dark reddish brown (5YR 3/2), moist, loose.
			ENVIRONPLUG				
15	P 8	S-01-15				SM	SILTY SAND, fine, small amount clay, dark brown (7.5YR 4/3), moist, medium dense.
			0.125 INCH NYLASLOW				
			PROBE				
	P 12	S-01-20				SP	SAND, medium to fine, with some silt, well sorted, brown (7.5YR 5/4), slightly moist, medium dense.
			# 3 SAND				
			0.125 INCH NYLASLOW				
25	P 11	S-01-25				SM	SILTY SAND, medium to fine, some minor clay, reddish brown (5YR 4/3), moist, medium dense.
			ENVIRONPLUG				
30	P 60	S-01-30				SP	SAND, medium, well sorted, some gravel (0.5 inch), dark grayish brown (10YR 6/3), slightly moist, medium dense.
35	P 17	S-01-35				SP	SAND, coarse, well sorted, some gravel (0.50 inch), pale brown (10YR 6/3), slightly moist, medium dense.
			PROBE				
40	P 16	S-01-40				SP	SAND, medium to coarse, well sorted, some gravel (0.5 inch), some silt, dark brown (7.5YR 4/3), slightly moist, medium dense.
			# 3 SAND				
45	P 19	S-01-45				SP	SAND, coarse, light yellowish brown (10YR 6/4), slightly moist, dense.
			ENVIRONPLUG				
							4.0 INCHES PVC CASING

VERES

BORING LOG

COMPANY **WesTech**
 OPERATOR **Tony**
 SUPERVISOR **Robert**
 INSPECTED BY **Steve Joseph, R.G.**
 REVIEWED BY **Steve Joseph, R.G.**

HAMMER WEIGHT AND FALL
140 lbs / 30" drop
 1st GROUNDWATER (TIME/DATE)
November 3, 1992
 STABLE GROUNDWATER (TIME/DATE)

BOREHOLE LOCATION
South-southwest Building 8
 SURFACE CONDITION
Asphalt

WELL NO. **SWB-0** PROJECT NO. **92-1060-02** PROJECT **Trail Chemical Corporation** DATE **11/3/92** SHEET **2**
MWV-1 OF **2**

ST. COM. I.R.F.	SAMPLE TYPE & BLOW COUNT	SAMPLE	PROBES CONSTRUCTION	WELL CONSTRUCTION	SOIL LOG	USCS	LOG OF MATERIAL
50	P 22 28 31	S-01-50 ENVIRONPLUG	→			SM	SILTY SAND, coarse, some gravel (2.0 inches), yellowish brown (10YR 5/6), slightly moist, medium dense, a very moist layer of silt (1.5 inches).
55	P 50 50	S-01-55 0.125 INCH NYLASLOW	→			SP	SAND, medium to fine, some silt with trace amounts of fine gravel, dark yellowish brown (10YR 4/4), slightly moist, dense.
60	P 43 60	S-01-60 #3 SAND PROBE ENVIRONPLUG	→			SP	SAND, medium to fine, some silt with trace gravel (0.5 inches), dark yellowish brown (10YR 4/4), slightly moist, dense.
65	P 35 80	S-01-65 #3 SAND	→			SP	SAND, medium with trace gravel and silt, yellowish brown (10YR 5/4), slightly moist, very dense.
70	P 45 50	S-01-70 4.0 INCHES PVC CASTING	→			SP	SAND, medium to coarse with trace gravel (1.25 inches), light yellowish brown (10YR 6/4), very slightly moist, dense.
75	P 16 24 28	S-01-75				ML	SILT, trace amounts of medium sand and gravel very dark grey (5Y 3/1), moist, very stiff.
80	P 17 21 24	S-01-80				ML	SILT, trace amounts of clay, medium sand, micaceous, olive grey (5Y 4/2), moist, stiff.
85	P 23 50	S-01-85				SM	SILTY SAND, trace of gravel (0.25 inch), brown (7.5YR 4/4), moist, dense.
90	P 28 41	S-01-90				SP	SAND, coarse to medium, some silt and gravel (2.0 inches), brown (7.5YR 4/3), wet, dense.
95	G					SP	SAND, coarse to medium, some silt and gravel, dark brown (10YR 3/3), wet, medium dense.
100	G					SP	SAND, medium, some silt and gravel, grayish brown (10YR 5/2), very damp, dense.

4.0 INCHES STAINLESS STEEL SCREEN

R. L. STOLLAR & ASSOCIATES, INC.
FIELD LOG OF BORING

SITE TYPE SITE ID
 BORING 0704W

Brown Jordan
 SHEET 1 OF 5
 mw

PROJECT NAME AND LOCATION Chicago Pacific, El Monte				PROJECT NUMBER 88460		ELEVATION AND DATUM MW-1 (Stollar)							
DRILLING COMPANY Datum Exploration				DRILLER Tom Zuidema		DATE AND TIME STARTED 12-28-88 1530			DATE AND TIME COMPLETED 12-29-88 1104				
DRILLING EQUIPMENT: METHOD Mobile B-61, Hollow Stem Auger						COMPLETION DEPTH 84.5 ft			TOTAL NO. OF SAMPLES 18				
SIZE AND TYPE OF BIT 10" OD HSA				NO. OF SAMPLES:		BULK		SS 18		DRIVE		LABORATORY 2	
DRILLING FLUID None				WATER LEVEL:		FIRST 64'			AFTER _____ HOURS				
SAMPLER HAMMER TYPE In Hole DRIVING WT. 140 lbs DROP 30						HYDROGEOLOGIST/DATE Bob Boudra 12-29-88			CHECKED BY/DATE				
DEPTH/FEET	SAMPLES				DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF			MOISTURE	CONSISTENCY	COLOR	COMMENTS
	TYPE AND NUMBER	INTERVAL	RECOVERY	BLOW COUNT			GR	SA	FI				
0		6		4	Clayey silt w/sand, somewhat plastic	ML		5	95	Mst	So	5 yr 3/2	Headspace 0.0 ppm
1		6	12/18	4	Dk reddish brown -								
		6		5	Organic, sand grains - -								
2					Sub angular, poorly graded								
3													
4		6		8	Silty sand, dark yellowish brown	SM		80	20	Mst	So	10 yr 4/4	Headspace 0.0 ppm
5		6	10/18	8	Sub rounded grains, fair grading								
		6		8	Crumbly but slightly plastic								
6													
7													
8													
9		6		2	Sand w/silty, Dark yellowish brown	SP		95	5	Mst	So	10 yr 4/4	Headspace 0.0 ppm
10		6	18	3	Poorly graded, grains rounded,								
		6		4	loose								
11													
12													
13													
14		6		5	Silty sand, dark brown, grains sub	SM		85	15	Mst	FM	10 yr 3/3	Headspace 73 ppm
15		6	18	11	rounded, fair grading, somewhat								
		6		16	plastic								

FIELD LOG OF BORING

BORING	0704W
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CONTINUATION SHEET: PROJECT NUMBER 88460

SHEET 2 OF 5

DEPTH/FEET	SAMPLES			DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF			MOISTURE	CONSISTENCY	COLOR	COMMENTS	
	TYPE AND NUMBER	INTERVAL	RECOVERY			BLOW COUNT	GR	SA					FI
1 5													
6													
7													
8													
9		6		9	Sand, coarse to fine w/silt,	SW	95	5	Mst	H	10 yr 5/6	Headspace 0.0 ppm	
2 0		6	18/	30	yellowish brown sub-rounded to sub								
		6		38	angular grains, cumbly to loose								
1					Well graded								
2													
3												OVM: 0:6 ppm at Hole. 0.0 in. Breathing Zone	
4		6		20	Sand w/silt, yellowish brown,	SP	95	5	Mst	H	10 yr 5/6	Headspace 0.0 ppm	
2 5		6	18/	30	sub-rounded to sub-angular grains								
		6		40	Poorly graded, loose to crumbly								
6													
7													
8													
9		6		28	Silty sand. Brown, grains sub-	SM	80	20	Mst	H	10 yr 4/3		
3 0		6	6/	50	rounded, fair grading, crumbly but								
					somewhat plastic								
1													
2													
3													
4													
3 5		6	6	50	Gravelly sand, yellowish brown,	SP	20	80	Mst	H	10 yr 5/6	Headspace 0.2 ppm	
					rounded to sub-angular grains,								
					poorly graded, loose								

FIELD LOG OF BORING

CONTINUATION SHEET: PROJECT NUMBER 88460

SITE TYPE SITE ID

BORING 0704W

SHEET 3 OF 5

DEPTH/FEET	SAMPLES				DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF			MOISTURE	CONSISTENCY	COLOR	COMMENTS
	TYPE AND NUMBER	INTERVAL	RECOVERY	BLOW COUNT			GR	SA	FI				
3 5													
6													
7													
8													
9		6		40	Gravelly sand as above							Headspace 0.0 ppm	
4 0		5	87/11	50									
1													
2													
3													
4		6		18	Sand w/gravel, yellowish brown	SP	5	95	Mst	H	10 yr 5/6	Headspace 0.9 ppm	
4 5		6	12/	50	grains sub-rounded to sub-angular, Poorly graded, mostly coarse sand, Very loose, not cohesive								
6													
7													
8													
9		5	5	50	Gravelly sand, yellowish brown	SW/ SP	15	85	Mst	H	10 yr 5/6	Headspace 0.4 ppm	
5 0					some angular schist gravel sand grains sub-anqular, fair grading, loose								
1													
2													
3													
4		6		15	Sand, one large granite cobble	SP	1	99	Mst	H	10 yr 4/6	Headspace 0.4 ppm	
5 5					(approx. 2" Dia.) Mostly med. to fine sand, dark yellowish brown, grains rounded to sub-rounded, poorly graded, loose								

FIELD LOG OF BORING

BORING	0704W
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CONTINUATION SHEET: PROJECT NUMBER 88460

SHEET 4 OF 5

DEPTH/FEET	SAMPLES				DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF			MOISTURE	CONSISTENCY	COLOR	COMMENTS
	TYPE AND NUMBER	INTERVAL	RECOVERY	BLOW COUNT			GR	SA	FI				
5													
6													
7													
8													
9		6	6	40	Sand as above in upper 6".								
6		5	5	50	One inch interval of granite	SP	5	95		Mst H	10 yr 5/6'	Headspace 0.4 ppm	
1					then four inches of sand w/gravel,								
2					mostly coarse sand, yellowish								
3					brown, grains rounded to sub-								
4					rounded, poorly graded, loose								
6		6	3	50	Silty sand, dark yellowish brown	SM	75	25	Sat H	10 yr 4/4'	Headspace 0.2 ppm		
6					fair grading, grains rounded to							Water encountered	
7					sub-rounded, sample saturated							at 64'	
8													
9		6		16	Gravelly sand, coarse to med. sand	SP	20	80		Sat H	10 yr 5/4'	Headspace 0.2 ppm	
7		6		50	Sub-rounded to sub-angular sand								
1					grains, gravel rounded, yellowish								
2					brown, poorly graded, loose. Not								
3					cohesive								
4		6		36	Sandy silt. Dark yellowish brown	ML	35	65	Sat H	10 yr 4/4'	Headspace 1.1 ppm		
7					Sand coarse to fine, grains rounded								
5					to sub-rounded, well graded,								
					somewhat plastic but cohesive								

FIELD LOG OF BORING

CONTINUATION SHEET: PROJECT NUMBER 88460

SITE TYPE SITE ID

BORING	0704W
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SHEET 5 OF 5

DEPTH/FEET	SAMPLES				DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF			MOISTURE	CONSISTENCY	COLOR	COMMENTS
	TYPE AND NUMBER	INTERVAL	RECOVERY	BLOW COUNT			GR	SA	FI				
7 5													
6													
7													
8													
9													
8 0	6		35		Silty sand, brown, mostly fine	SM	85	15	Sat H	10 yr	5/3'	Headspace 0.9 ppm	
	3	6'	50		sand, grains rounded, poorly graded, plastic and cohesive								
1													
2													
3													
4													
8 5	6		39		Sand, yellowish brown, coarse to med. rounded grains, poorly graded	SP	100		Sat H	10 yr	5/4'	Total Depth 84.5' Headspace 0.6 ppm	
	5	11'	50										
6													
7													
8													
9													
0													
1													
2													
3													
4													
5													

Project Name: HERMETIC SEAL CORPORATION

Project Number: 3771

Soil Boring Monitoring Well

Boring/Well Number: BC-1

Sheet 1 of 3

Boring Location: <u>S.E. Corner of Property</u>		Elevation and Datum:	
Drilling Contractor: <u>Drill Line</u>	Driller: <u>F. Martin</u>	Date Started: <u>1-11-88</u>	Date Finished: <u>1-11-88</u>
Drilling Equipment: <u>B-61</u>	Borehole Diameter: <u>11"</u>	Completed Depth (feet): <u>83'</u>	Water Depth (feet): <u>63' ATD</u>
Sampling Method: California Modified <input type="checkbox"/> Shelby Tube <input type="checkbox"/> Split Spoon <input checked="" type="checkbox"/>		WELL CONSTRUCTION	
Drilling Fluid: <u>---</u>		Type and Diameter of Well Casing: <u>4 inch PVC Schedule 40</u>	
Backfill Material: <u>Sand-Concrete</u>		Slot Size: <u>0.02"</u>	Filter Material: <u>#3 Sand</u>
Logged By: <u>R. Hastings</u>	Checked By: <u>V. Bedi</u>	Development Method: <u>Surge and Pump</u>	

Depth (feet)	USC Soil Type	Description	Blow Counts	Sample No.	Graphic Log			PID/FID Readings OVA PPM	Remarks
					Lithology	Annulus	Casing		
0 - 5	SM	Asphaltic Concrete Silty sand, brown, moist, well graded fine to medium, dense Becoming finer	33	1	[Lithology]	++		200	
5 - 10	ML	Sandy silt, light brown, dry, oxides, hard	9 13 23	2	[Lithology]	++		120	
10 - 15	SM GM	Silty sand and gravel, tan-brown, dry, well graded fine to coarse, micaceous, gravel maximum size 2 inch, dense	18 23 26	3	[Lithology]	++		90	
15 - 20	SW	Sand, brown, dry, well graded, fine to coarse gravel, maximum, oxides, dense, some silt	17 23 27	4	[Lithology]	++		60	2 feet soft drilling, sand and gravel in cuttings
20 - 25	SM	Silty sand, brown and tan mottled, moist, poorly graded, fine, micaceous, trace small 1/2" gravel, dense	4 17 23	5	[Lithology]	++		0	
25 - 30	SM	Silty sand and gravel, brown, dry, well graded 1 inch gravel, dense	13 17 23	6	[Lithology]	++		0	

BORING LOG

Project Name: HERMETIC SEAL CORPORATION Project Number: 3771

Soil Boring Monitoring Well Boring/Well Number: BC-1 Sheet 3 of 3

Depth (feet)	USC Soil Type	Description	Blow Counts	Sample No.	Graphic Log			PID/FID Readings OVA PPM	Remarks
					Lithology	Annulus	Casing		
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">75</div> <div style="margin-bottom: 10px;">80</div> <div style="margin-bottom: 10px;">50</div> <div style="margin-bottom: 10px;">65</div> <div style="margin-bottom: 10px;">100</div> </div>	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">SW</div> <div style="margin-bottom: 10px;">SM</div> </div>	<p>Some 2 inch gravel, silty sand appears to be in 2 to 3 inch layers in a coarse sand and gravel matrix</p> <p>Bottom of boring 83 feet</p>							

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site 9521 Valley Boulevard Job No. 8208-20142-110W4MW25 Boring/Well No. MW2-05

Drill Contractor Beylik Drilling Drill Method Mud Rotary Logged By Tannehill, Lopez

Drilling Started 10/8/96 Ended 10/13/96 Elevation & Datum 289.5 Total Depth 422.2 Depth To Water 73.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
5			9.9/ 3.0	ML	ASPHALT	SILT WITH SAND, dark yellowish brown (10YR4/4); 85% silt, soft, fluffy, low toughness, no plasticity; 15% fine sand; moist; no odor, micaceous, moist.		285
10			8.5/ 3.1	ML		SILT WITH SAND, dark yellowish brown (10YR4/4); 85% silt, soft, fluffy, low toughness, no plasticity; 15% fine sand; moist; no odor, micaceous, moist.		280
15			8.9/ 3.3	SM		SILTY SAND, dark yellowish brown (10YR4/4); 85% fine to medium sand, poorly graded, trace coarse sand, subangular to rounded, micaceous; 15% silt, soft, low plasticity, low toughness; no odor, moist.	Cement Grout Seal (0-57 ft. bgs).	275
			9.7/ 3.7	SP		POORLY GRADED SAND, brown (10YR4/3), multicolored grains; 95% fine to medium sand, trace coarse sand, subangular to rounded, medium to high sphericity; 5% silt; soft, no odor, micaceous, moist.		270
20			6.5/ 3.2	SP		POORLY GRADED SAND, brown (10YR4/3), multicolored grains; 95% fine to medium sand, trace coarse sand, subangular to rounded, medium to high sphericity; 5% silt; soft, no odor, micaceous, moist.		265



environmental engineers, scientists, planners, & management consultants

Remarks Conductor borehole of 24" diam. to 50.5 feet below ground surface (ft bgs) with flight auger. No pilot hole drilled. Borehole of 12.25" diameter to 422.23 ft bgs. Datum is from 2" diameter Westbay PVC in ft msl.

See key sheet for symbols and abbreviations used above.

Boring Log and Sampling Record

Client Northwest El Monte Community Task Force

Site 9521 Valley Boulevard Job No. 8208-20142-110W4MW25 Boring/Well No. MW2-05

Drill Contractor Beylik Drilling Drill Method Mud Rotary Logged By Tannehill, Lopez

Drilling Started 10/8/96 Ended 10/13/96 Elevation & Datum 289.5 Total Depth 422.2 Depth To Water 73.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
30			10.3/ 3.2	SP SM	[Symbol]	POORLY GRADED SAND WITH SILT, dark brown (10YR4/3), multicolored grains; 85% fine to medium sand, trace coarse sand, subangular to rounded, low to high sphericity; 10% silt; 5% fine gravel, poorly graded, subrounded, medium sphericity; soft, no odor, micaceous, moist.		260
			6.7/ 3.2	SP	[Symbol]			
			5.3/ 2.7	SP SM	[Symbol]	POORLY GRADED SAND, dark yellowish brown (10YR4/6), multicolored grains; 100% fine to medium sand, trace coarse sand, angular to rounded, low to high sphericity; trace fine gravel, poorly graded, subrounded, low to moderate sphericity; no odor, micaceous, moist.		255
35			8.8/ 2.6	SP SM	[Symbol]	SILTY SAND, grayish brown (2.5Y5/2), multicolored grains; 60% fine sand, trace medium to coarse sand, subangular to rounded, low to high sphericity; 30% silt; 10% clay, low plasticity, low toughness; no odor, moist, micaceous.	● Mild Steel Blank (0-90 ft. bgs.)	
			7.5/ 2.6	SP SM	[Symbol]	POORLY GRADED SAND WITH SILT, brown (10YR4/3), multicolored grains; 90% fine sand, trace medium to coarse sand, subangular to rounded, low to high sphericity; 10% silt; no odor, micaceous, moist.		250
			7.9/ 2.5	SM	[Symbol]	POORLY GRADED SAND WITH SILT, brown (10YR4/3), multicolored grains; 90% fine sand, trace medium to coarse sand, subangular to rounded, low to high sphericity; 10% silt; no odor, micaceous, moist.		
45			8.9/ 2.6	SP	[Symbol]	SILTY SAND, grayish brown (2.5Y5/2), multicolored grains; 60% fine sand, trace medium to coarse sand, subangular to rounded, low to high sphericity; 30% silt; 10% clay, low plasticity, low toughness; no odor, moist, micaceous.		245
			9.8/		[Symbol]	POORLY GRADED SAND, light olive brown (2.5Y5/4), multicolored grains; 95% fine sand, trace medium sand, subangular to rounded, low to high sphericity; 5% silt; no odor, micaceous, moist.		240

CDM
*environmental engineers, scientists,
 planners, & management consultants*

Remarks Conductor borehole of 24" diam. to 50.5 feet below ground surface (ft bgs) with flight auger. No pilot hole drilled. Borehole of 12.25" diameter to 422.23 ft bgs. Datum is from 2" diameter Westbay PVC in ft msl.

See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site 9521 Valley Boulevard Job No. 8208-20142-110W4MW25 Boring/Well No. **MW2-05**

Drill Contractor Beylik Drilling Drill Method Mud Rotary Logged By Tannehill, Lopez

Drilling Started 10/8/96 Ended 10/13/96 Elevation & Datum 289.5 Total Depth 422.2 Depth To Water 73.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
55			2.2 34.2/ 1.4	SP SW SM		<p>POORLY GRADED SAND, light olive brown (2.5Y5/4), multicolored grains; 95% fine sand, trace medium sand, subangular to rounded, low to high sphericity; 5% silt; no odor, micaceous, moist, slightly coarser than previous sample at 46 feet.</p> <p>SILT, brown (10YR4/3), soft, low plasticity, low toughness. Grades to WELL GRADED SAND WITH SILT, brown (10YR4/3), multicolored grains, 90% fine to coarse sand, angular to rounded, low to high sphericity; 10% silt; no odor, micaceous, quiet drilling.</p>		235
60								230
65			7.5/ 1.1	SW SM		<p>WELL GRADED SAND WITH SILT, dark yellowish brown (10YR4/4), multicolored grains; 85% fine to coarse sand, angular to rounded, low to high sphericity; 15% silt, as rounded flakes, soft, low plasticity; no odor, quiet drilling.</p>		225
70								220
			6.0/ 1.2	SW		<p>WELL GRADED SAND, brown (10YR4/3), multicolored grains; 95% fine to coarse</p>		215

CDM
*environmental engineers, scientists,
 planners, & management consultants*

Remarks Conductor borehole of 24" diam. to 50.5 feet below ground surface (ft bgs) with flight auger. No pilot hole drilled. Borehole of 12.25" diameter to 422.23 ft bgs. Datum is from 2" diameter Westbay PVC in ft msl.

See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site 9521 Valley Boulevard Job No. 8208-20142-110W4MW25 Boring/Well No. **MW2-05**

Drill Contractor Beylik Drilling Drill Method Mud Rotary Logged By Tannehill, Lopez

Drilling Started 10/8/96 Ended 10/13/96 Elevation & Datum 289.5 Total Depth 422.2 Depth To Water 73.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
80					•••••	sand, angular to subrounded, low to high sphericity; 5% silt; trace fine gravel, poorly graded, subangular, low sphericity; no odor, quiet drilling, slight rig chatter at 82 feet.	—Benseal and #3 Sand mix (57-101 ft. bgs).	210
85			21.7/ 0.7	SP	•••••	POORLY GRADED SAND, brown (10YR5/3), multicolored grains; 95% fine to coarse sand, angular to subrounded, low to high sphericity, dominated by medium to coarser sand; 5% silt, as flakes; trace fine gravel, subangular, low sphericity; no odor.		205
90					•••••			200
95			5.8/ 0.0	SP SM	•••••	POORLY GRADED SAND WITH SILT AND GRAVEL, brown (10YR4/3), multicolored grains; 70% fine to coarse sand, angular to rounded, low to high sphericity, dominated by medium to coarse sand; 20% fine gravel, subangular to subrounded, low to high sphericity; 10% silt, seen as flakes, soft, low toughness, low plasticity; no odor, quiet drilling.	●—Stainless Steel Blank (90-110 ft. bgs).	195
					•••••			190

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Remarks Conductor borehole of 24" diam. to 50.5 feet below ground surface (ft bgs) with flight auger. No pilot hole drilled. Borehole of 12.25" diameter to 422.23 ft bgs. Datum is from 2" diameter Westbay PVC in ft msl.

See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site 9521 Valley Boulevard Job No. 8208-20142-110W4MW25 Boring/Well No. MW2-05

Drill Contractor Beylik Drilling Drill Method Mud Rotary Logged By Tannehill, Lopez

Drilling Started 10/8/96 Ended 10/13/96 Elevation & Datum 289.5 Total Depth 422.2 Depth To Water 73.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
105			6.1/ 0.0	SP	[Symbol]	<p>POORLY GRADED SAND, grayish brown (10YR5/2), multicolored grains; 90% fine to coarse sand, angular to subrounded, low to high sphericity, dominated by fine to medium sand; 10% fine gravel, subangular to subrounded, low to high sphericity; no odor, somewhat chattery drilling.</p>	<p>Transition Sand #60 LW Osborne sand (101-105 ft. bgs).</p>	185
110								
115							<p>Filter Pack #3 Lonestar Sand (105-126 ft. bgs).</p>	175
120			5.1/ 0.0	SP	[Symbol]	<p>POORLY GRADED SAND, brown (10YR4/3), multicolored grains; 95% fine to coarse sand, angular to subrounded, low to high sphericity, dominated by medium sand; 5% silt; no odor, light chatter during drilling, finer than previous interval.</p>	<p>Stainless Steel Wire Wrap Screen 20 slot, 4" ID (110-120 ft bgs).</p>	170
								165



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Remarks Conductor borehole of 24" diam. to 50.5 feet below ground surface (ft bgs) with flight auger. No pilot hole drilled. Borehole of 12.25" diameter to 422.23 ft bgs. Datum is from 2" diameter Westbay PVC in ft msl.

See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site 9521 Valley Boulevard Job No. 8208-20142-110W4MW25 Boring/Well No. MW2-05

Drill Contractor Beylik Drilling Drill Method Mud Rotary Logged By Tannehill, Lopez

Drilling Started 10/8/96 Ended 10/13/96 Elevation & Datum 289.5 Total Depth 422.2 Depth To Water 73.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
130			0.9/ 0.0	SP	•••••	POORLY GRADED SAND, olive gray (5YR5/2), multicolored grains; 90% fine to coarse sand, angular to subrounded, low to high sphericity, dominated by coarser sand, color from finer sand; 5% silt; 5% fine gravel, poorly graded, subangular to subrounded, moderate sphericity; no odor. Rig chatter, may be a clay zone at 136 or 137 feet due to chatter ending then starting again after 0.5 feet.	<ul style="list-style-type: none"> • Transition Sand #60 LW Osborne sand (126-128 ft. bgs). • Stainless Steel Blank (120-140 ft. bgs). 	160
135								155
140			13.6/ 0.0	SP	•••••	POORLY GRADED SAND, olive gray (5YR4/2), multicolored grains; 95% fine to coarse sand, gap graded, not very much medium sand observed, angular to subrounded, low to high sphericity; 5% silt; trace fine gravel, subangular to rounded, low to high medium sphericity.		150
145							<ul style="list-style-type: none"> • Benseal and #3 Sand mix (128-168 ft. bgs). 	145
140			9.7/ 0.0	SP	•••••	POORLY GRADED SAND, olive gray (5YR4/2), multicolored grains; 95% fine to coarse sand, gap graded, not very much medium sand observed, angular to		140

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Remarks Conductor borehole of 24" diam. to 50.5 feet below ground surface (ft bgs) with flight auger. No pilot hole drilled. Borehole of 12.25" diameter to 422.23 ft bgs. Datum is from 2" diameter Westbay PVC in ft msl.

See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site 9521 Valley Boulevard Job No. 8208-20142-110W4MW25 Boring/Well No. MW2-05

Drill Contractor Beylik Drilling Drill Method Mud Rotary Logged By Tannehill, Lopez

Drilling Started 10/8/96 Ended 10/13/96 Elevation & Datum 289.5 Total Depth 422.2 Depth To Water 73.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
155						subrounded, low to high sphericity; 5% silt; trace fine gravel, subangular to rounded, low to high medium sphericity.		135
160			9.5/ 0.0	SP		POORLY GRADED SAND, olive brown (2.5YR4/3), multicolored grains; 95% fine to medium sand, trace coarse sand, angular to subrounded, low to high sphericity; 5% silt; no odor, fairly smooth drilling.	Mild Steel Blank (140-160 ft bgs).	130
165							Stainless Steel Blank (160-180 ft. bgs).	125
170			6.6/ 0.0	SP		POORLY GRADED SAND, brown (10YR5/3), multicolored grains; 95% fine to medium sand, trace coarse sand, angular to subrounded, low to high sphericity; 5% silt; no odor, sparse rig chatter, finer than previous interval.	Transition Sand #60 LW Osborne sand (168-170 ft. bgs).	120
								115



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Remarks Conductor borehole of 24" diam. to 50.5 feet below ground surface (ft bgs) with flight auger. No pilot hole drilled. Borehole of 12.25" diameter to 422.23 ft bgs. Datum is from 2" diameter Westbay PVC in ft msl.

See key sheet for symbols and abbreviations used above.

Boring Log and Sampling Record

Client Northwest El Monte Community Task Force

Site 9521 Valley Boulevard Job No. 8208-20142-110W4MW25 Boring/Well No. **MW2-05**

Drill Contractor Beylik Drilling Drill Method Mud Rotary Logged By Tannehill, Lopez

Drilling Started 10/8/96 Ended 10/13/96 Elevation & Datum 289.5 Total Depth 422.2 Depth To Water 73.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
180			9.5/ 0.0	SP	[Dotted pattern]	POORLY GRADED SAND, brown (10YR5/3), multicolored grains; 95% fine to medium sand, trace coarse sand, angular to subrounded, low to high sphericity; 5% silt; no odor, sparse rig chatter, slightly finer than previous interval.	<ul style="list-style-type: none"> ● Filter Pack #3 Lonestar Sand (170-202 ft. bgs). ● Stainless Steel Wire Wrap Screen 20 slot, 4" ID (180-190 ft bgs). ● Stainless Steel Blank (190-210 ft. bgs). 	110
185								105
190			9.5/ 0.0	SP	[Dotted pattern]	POORLY GRADED SAND, grayish brown (2.5Y5/2), multicolored grains; 95% fine to medium sand, angular to subrounded, low to high sphericity, trace coarse sand; 5% silt; no odor, some rig chatter during drilling, coarser than previous interval.		100
195								95
								90



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Remarks Conductor borehole of 24" diam. to 50.5 feet below ground surface (ft bgs) with flight auger. No pilot hole drilled. Borehole of 12.25" diameter to 422.23 ft bgs. Datum is from 2" diameter Westbay PVC in ft msl.

See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site 9521 Valley Boulevard

Job No. 8208-20142-110W4MW25

Boring/Well No. MW2-05

Drill Contractor Beylik Drilling

Drill Method Mud Rotary

Logged By Tannehill, Lopez

Drilling Started 10/8/96

Ended 10/13/96

Elevation & Datum 289.5

Total Depth 422.2

Depth To Water 73.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
205			5.5/ 0.0	SP	•••••	POORLY GRADED SAND, light olive brown (2.5YR5/3), multicolored grains; 95% fine to coarse sand, angular to subrounded, low to high sphericity, dominated by medium sand, trace coarse sand; 5% silt; no odor, slightly finer than previous interval.	● Transition Sand #60 LW Osborne sand (202-204 ft. bgs).	85
210								80
215			2.7/ 0.0	SW	•••••	WELL GRADED SAND, light olive brown (2.5YR5/3), multicolored grains; 95% fine to coarse sand, angular to subrounded, low to high sphericity, dominated by medium sand; 5% silt; no odor, light chatter.		75
220								70
			3.7/ 0.0	SW	•••••	WELL GRADED SAND, olive (5YR4/4), multicolored grains; 95% fine to coarse sand, angular to subrounded, low to high sphericity; 5% silt; trace fine gravel; no		65

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Remarks Conductor borehole of 24" diam. to 50.5 feet below ground surface (ft bgs) with flight auger. No pilot hole drilled. Borehole of 12.25" diameter to 422.23 ft bgs. Datum is from 2" diameter Westbay PVC in ft msl.

See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site 9521 Valley Boulevard Job No. 8208-20142-110W4MW25 Boring/Well No. MW2-05

Drill Contractor Beylik Drilling Drill Method Mud Rotary Logged By Tannehill, Lopez

Drilling Started 10/8/96 Ended 10/13/96 Elevation & Datum 289.5 Total Depth 422.2 Depth To Water 73.0 ▼

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
230					•••••	odor, scattered rig chatter.		60
235			1.9/ 0.0	SW	•••••	WELL GRADED SAND, olive (5YR4/4), multicolored grains; 95% fine to coarse sand, angular to subrounded, low to high sphericity; 5% silt; trace fine gravel; no odor, slightly finer than previous interval, scattered rig chatter.	Benseal and #3 Sand mix (204-266.5 ft. bgs).	55
240					•••••		Mild Steel Blank (210-260 ft. bgs).	50
245			0.8/ 0.0	SW	•••••	WELL GRADED SAND, olive (5YR4/4), multicolored grains; 95% fine to coarse sand, angular to subrounded, low to high sphericity; 5% silt; trace fine gravel; no odor, scattered rig chatter.		45
					•••••			40

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Remarks Conductor borehole of 24" diam. to 50.5 feet below ground surface (ft bgs) with flight auger. No pilot hole drilled. Borehole of 12.25" diameter to 422.23 ft bgs. Datum is from 2" diameter Westbay PVC in ft msl.

See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site 9521 Valley Boulevard Job No. 8208-20142-110W4MW25 Boring/Well No. **MW2-05**

Drill Contractor Beylik Drilling Drill Method Mud Rotary Logged By Tannehill, Lopez

Drilling Started 10/8/96 Ended 10/13/96 Elevation & Datum 289.5 Total Depth 422.2 Depth To Water 73.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
255			1.4/ 0.0	SP	•••••	POORLY GRADED SAND, olive gray (5YR4/2), multicolored grains; 95% fine to coarse sand, angular to subrounded, low to high sphericity, dominated by fine to medium sand, trace coarse sand; 5% silt; no odor, light chatter during drilling.	Stainless Steel Blank (260-280 ft. bgs).	35
260					•••••			265
270			2.3/ 0.0	SP	•••••	POORLY GRADED SAND, olive gray (5YR4/2), multicolored grains; 95% fine to coarse sand, angular to subrounded, low to high sphericity, dominated by fine to medium sand, trace coarse sand; 5% silt; no odor, light chatter during drilling.	Transition Sand #60 LW Osborne (266.5-269 ft. bgs).	25
					•••••			20

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 planners, & management consultants*

Remarks Conductor borehole of 24" diam. to 50.5 feet below ground surface (ft bgs) with flight auger. No pilot hole drilled. Borehole of 12.25" diameter to 422.23 ft bgs. Datum is from 2" diameter Westbay PVC in ft msl.

See key sheet for symbols and abbreviations used above.

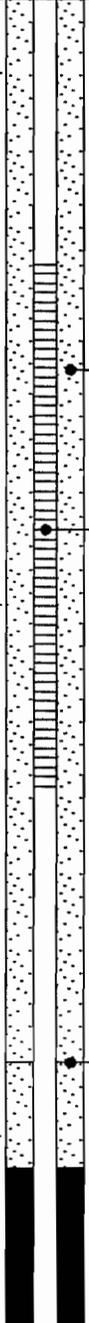
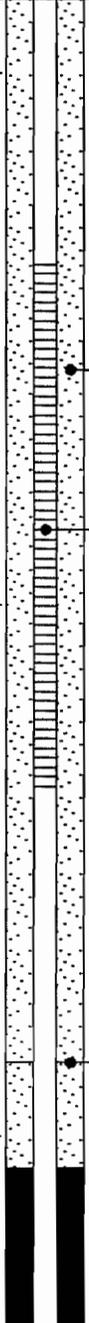
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Boring Log and Sampling Record

Site 9521 Valley Boulevard Job No. 8208-20142-110W4MW25 Boring/Well No. **MW2-05**

Drill Contractor Beylik Drilling Drill Method Mud Rotary Logged By Tannehill, Lopez

Drilling Started 10/8/96 Ended 10/13/96 Elevation & Datum 289.5 Total Depth 422.2 Depth To Water 73.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
280			6.4/ 0.5	SW		WELL GRADED SAND, light olive brown (2.5Y4/2), multicolored grains; 90% fine to coarse sand, angular to subrounded, low to high sphericity; 5% fine gravel, poorly graded, subangular to subrounded, low to high sphericity; 5% silt; no odor, light chatter during drilling.	 <p>Filter Pack #3 Lonestar Sand (269-295 ft. bgs).</p> <p>Stainless Steel Wire Wrap Screen 20 slot, 4" ID (280-290 ft bgs).</p>	10
285			4.5/ 0.6	SW		WELL GRADED SAND, light olive brown (2.5Y5/3), multicolored grains; 95% fine to coarse sand, angular to subrounded, low to high sphericity; 5% silt; trace fine gravel, poorly graded, subangular, low sphericity; no odor, light chatter during drilling.		5
290			5.2/ 0.3	SP		POORLY GRADED SAND WITH GRAVEL, light olive brown (2.5Y5/4), multicolored grains; 90% fine to coarse sand, angular to subrounded, low to high sphericity, dominated by coarse sand; 10% fine gravel, angular to subrounded; trace silt; no odor, light chatter during drilling.	 <p>Transition Sand #60 LW Osborne sand (295-297 ft. bgs).</p>	0
295								-5
								-10

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Remarks Conductor borehole of 24" diam. to 50.5 feet below ground surface (ft bgs) with flight auger. No pilot hole drilled. Borehole of 12.25" diameter to 422.23 ft bgs. Datum is from 2" diameter Westbay PVC in ft msl.

See key sheet for symbols and abbreviations used above.

Boring Log and Sampling Record

Client Northwest El Monte Community Task Force

Site 9521 Valley Boulevard Job No. 8208-20142-110W4MW25 Boring/Well No. MW2-05

Drill Contractor Beylik Drilling Drill Method Mud Rotary Logged By Tannehill, Lopez

Drilling Started 10/8/96 Ended 10/13/96 Elevation & Datum 289.5 Total Depth 422.2 Depth To Water 73.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
305							● Stainless Steel Blank (290-310 ft. bgs).	-15
310			3.8/ 0.0	SP		POORLY GRADED SAND WITH GRAVEL, olive brown (2.5Y4/4), multicolored grains; 85% fine to coarse sand, angular to subrounded, low to high sphericity, dominated by coarse sand; 10% fine gravel, poorly graded, angular to subrounded; 5% silt, seen as flakes, soft; no odor.		-20
315							● Mild Steel Blank (310-354 ft. bgs)	-25
320			3.0/ 0.1	SW		WELL GRADED SAND, dark grayish brown (2.5Y4/2), multicolored grains; 85% fine to coarse sand, angular to subangular, high sphericity, dominated by fine sand; 10% silt; 5% fine gravel, subangular to subrounded, low to high sphericity; no odor.		-30
								-35

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Remarks Conductor borehole of 24" diam. to 50.5 feet below ground surface (ft bgs) with flight auger. No pilot hole drilled. Borehole of 12.25" diameter to 422.23 ft bgs. Datum is from 2" diameter Westbay PVC in ft msl.

See key sheet for symbols and abbreviations used above.

Boring Log and Sampling Record

Client Northwest El Monte Community Task Force

Site 9521 Valley Boulevard Job No. 8208-20142-110W4MW25 Boring/Well No. MW2-05

Drill Contractor Beylik Drilling Drill Method Mud Rotary Logged By Tannehill, Lopez

Drilling Started 10/8/96 Ended 10/13/96 Elevation & Datum 289.5 Total Depth 422.2 Depth To Water 73.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
330			2.4/ 0.2	SW	•••••	WELL GRADED SAND WITH GRAVEL, light olive brown (2.5Y5/4), multicolored grains; 85% fine to coarse sand, angular to subrounded, low to high sphericity, dominated by fine sand; 15% gravel, subangular to subrounded, low to high sphericity; no odor.	Benseal and #3 Sand mix (297-362.5 ft. bgs).	-40
335								-45
340			2.1/ 0.1	SW	•••••	WELL GRADED SAND WITH CLAY, olive brown (2.5Y5/4), 60% fine to coarse sand, angular to subrounded, dominated by fine sand; 20% clay, seen as flakes; 10% silt; 10% fine gravel, subangular, low sphericity; no odor.		-50
345			3.7/ 0.1	SW	•••••	WELL GRADED SAND WITH GRAVEL, light olive brown (2.5Y5/4), multicolored grains; 70% fine to coarse sand, angular to rounded, low to high sphericity, dominated by medium sand; 30% poorly graded gravel, angular fragments, low sphericity; trace silt.		-55
								-60

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 planners, & management consultants*

Remarks Conductor borehole of 24" diam. to 50.5 feet below ground surface (ft bgs) with flight auger. No pilot hole drilled. Borehole of 12.25" diameter to 422.23 ft bgs. Datum is from 2" diameter Westbay PVC in ft msl.

See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site 9521 Valley Boulevard Job No. 8208-20142-110W4MW25 Boring/Well No. **MW2-05**

Drill Contractor Beylik Drilling Drill Method Mud Rotary Logged By Tannehill, Lopez

Drilling Started 10/8/96 Ended 10/13/96 Elevation & Datum 289.5 Total Depth 422.2 Depth To Water 73.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
355			3.5/ 0.1	GP		POORLY GRADED GRAVEL WITH CLAY AND SAND, light olive brown (2.5Y5/4), multicolored grains; 65% fine gravel, angular to subrounded, low to medium sphericity; 25% medium to coarse sand, poorly graded, angular to rounded, low to high sphericity; 10% clay; trace silt; no odor.		-65
360			2.0/ 0.2	CL		CLAY, light olive brown (2.5Y5/4), 80% clay, seen as flakes or balls caught in strainer and in bucket; 10% fine gravel, poorly graded, subangular, moderate sphericity; 10% fine to coarse sand, subangular, moderate sphericity; no odor, slow drilling. Sample was not washed so clay would not be lost.	Stainless Steel Blank (354-374 ft. bgs).	-70
365							Transition Sand #60 LW Osborne (362.5-366 ft. bgs).	-75
370			3.6/ 0.1	CL		CLAY, light olive brown (2.5Y5/4), 85% clay, seen as flakes or balls caught in strainer and in bucket; 10% sand, poorly graded, subangular, moderate sphericity; 5% fine gravel, poorly graded, subangular, moderate sphericity; no odor, slow drilling. Sample was not washed so clay would not be lost.	Filter Pack #3 Lonestar Sand (366-390 ft. bgs).	-80
								-85

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Remarks Conductor borehole of 24" diam. to 50.5 feet below ground surface (ft bgs) with flight auger. No pilot hole drilled. Borehole of 12.25" diameter to 422.23 ft bgs. Datum is from 2" diameter Westbay PVC in ft msl.

See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site 9521 Valley Boulevard Job No. 8208-20142-110W4MW25 Boring/Well No. MW2-05

Drill Contractor Beylik Drilling Drill Method Mud Rotary Logged By Tannehill, Lopez

Drilling Started 10/8/96 Ended 10/13/96 Elevation & Datum 289.5 Total Depth 422.2 Depth To Water 73.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
380			3.2/0.0	CL	CLAY, light olive brown (2.5Y5/4); 65% clay, seen as flakes or balls caught in strainer and in bucket; 25% sand, poorly graded, subangular, moderate sphericity; 10% fine gravel, poorly graded, fragmented, low sphericity; no odor, slow drilling. Sample was not washed so clay would not be lost.		Stainless Steel Wire Wrap Screen 20 slot, 4" ID (374-384 ft. bgs).	-90
385			3.0/0.0	SC	CLAYEY SAND WITH GRAVEL, olive brown (2.5Y4/4), multicolored grains; 60% fine to coarse sand, poorly graded, angular to subrounded, low to high sphericity, dominated by coarse sand; 25% fine gravel, poorly graded, angular, low sphericity; 15% clay; no odor.			-95
390			2.5/0.0	CL	GRAVELLY CLAY WITH SAND, light olive brown (2.5Y5/6), multicolored grains; 50% clay; 35% fine gravel, poorly graded, angular, low sphericity; 15% sand, poorly graded, subangular to angular fragments, low to high sphericity; no odor.		Transition Sand #60 LW Osborne (390-392 ft. bgs).	-100
395			4.9/0.0	SC	CLAYEY SAND WITH GRAVEL, light olive brown (2.5Y5/3); 65% fine to coarse sand, subangular to rounded, low to high sphericity, dominated by fine sand; 15% fine gravel, poorly graded, subangular to subrounded, low to high sphericity; 15% clay, seen as flakes or balls; 5% silt; no odor.		Stainless Steel Blank (384-404 ft. bgs).	-105
			2.2/0.0	SC	CLAYEY SAND WITH GRAVEL, light yellowish brown (2.5Y6/4); 50% fine to			-110

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Remarks Conductor borehole of 24" diam. to 50.5 feet below ground surface (ft bgs) with flight auger. No pilot hole drilled. Borehole of 12.25" diameter to 422.23 ft bgs. Datum is from 2" diameter Westbay PVC in ft msl.

See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site 9521 Valley Boulevard Job No. 8208-20142-110W4MW25 Boring/Well No. **MW2-05**

Drill Contractor Beylik Drilling Drill Method Mud Rotary Logged By Tannehill, Lopez

Drilling Started 10/8/96 Ended 10/13/96 Elevation & Datum 289.5 Total Depth 422.2 Depth To Water 73.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
405			NA	SC	[Hatched Pattern]	coarse sand, subangular to rounded, low to high sphericity, dominated by fine sand; 20% fine gravel, poorly graded, subangular to subrounded, low to moderate sphericity; 20% clay, seen as flakes or balls; 10% silt; no odor. CLAYEY SAND, light yellowish brown (2.5Y6/4), multicolored grains; 70% fine to coarse sand, poorly graded, subangular to rounded, low to high sphericity, dominated by fine to medium sand, trace coarse sand; 20% clay, seen as flakes or balls; 10% silt; no odor.	Mild Steel Blank with endcap (404-409 ft. bgs).	-115
410			NA	CL	[Hatched Pattern]	CLAY WITH SAND, olive brown (2.5Y4/3), multicolored grains; 70% clay; 15% silt; 10% fine to coarse sand, poorly graded, subangular to subrounded, low to high sphericity; 5% fine gravel, poorly graded, subangular, low to moderate sphericity; no odor.	Benseal and #3 Sand mix (392-422 ft. bgs).	-120
415								-125
420								-130
						Total Depth of Borehole to 422.23 ft. bgs.		-135

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Remarks Conductor borehole of 24" diam. to 50.5 feet below ground surface (ft bgs) with flight auger. No pilot hole drilled. Borehole of 12.25" diameter to 422.23 ft bgs. Datum is from 2" diameter Westbay PVC in ft msl.

See key sheet for symbols and abbreviations used above.

Client Northwest El Monte Community Task Force

Boring Log and Sampling Record

Site On Steel St. and Rosemead Blvd. Job No. 8208-20142-110W6MW26 Boring/Well No. MW2-06

Drill Contractor Beylik Drilling Drill Method Mud Rotary Logged By Tannehill, Munoz

Drilling Started 11/19/96 Ended 11/22/96 Elevation & Datum 311.1 Total Depth 410.0 Depth To Water 112.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
				SP	[Symbol]	ASPHALT to 4 inches below ground surface.		310
5			1.4/ 0.4		[Symbol]	POORLY GRADED SAND WITH GRAVEL, yellowish brown (10YR5/4), multicolored grains; 85% fine to medium sand, trace coarse sand, angular to rounded, low to high sphericity; 15% fine to coarse gravel, poorly graded, subangular, low to moderate sphericity; no odor, soft.		305
			1.4/ 0.4	ML	[Symbol]	SILT WITH SAND, brown (7.5Y4/3), multicolored grains; 75% silt, soft; 20% fine to coarse sand, poorly graded, subangular to subrounded, low to high sphericity; 5% fine gravel, poorly graded, subangular to subrounded, low sphericity; no odor, soft.		
10			1.7/ 0.4	SP	[Symbol]	POORLY GRADED SAND, yellowish brown (10YR5/4), multicolored grains; 100% fine to coarse sand, angular to subrounded, low to high sphericity, dominated by fine to medium sand, trace coarse sand; no odor.		300
			1.6/ 0.5	SW	[Symbol]	WELL GRADED SAND, yellowish brown (10YR 5/4), multicolored grains; 100% fine to coarse sand, angular to subrounded, low to high sphericity; trace gravel, poorly graded, subangular to subrounded, low sphericity; no odor, coarser than previous interval.		
15			2.0/ 0.5	SM	[Symbol]	SILTY SAND, brown (10YR5/3), multicolored grains; 60% fine to medium sand, poorly graded, subangular to rounded, low to high sphericity; 40% silt, soft; no odor, soft.		295
			1.5 0.5	SM	[Symbol]	SILTY SAND, brown (10YR5/3), multicolored grains; 60% fine to medium sand, poorly graded, subangular to rounded, low to high sphericity; 40% silt, soft; no odor, soft.		
20			1.4/ 0.5	SM	[Symbol]	SILTY SAND, dark yellowish brown (10YR4/4), multicolored grains; 80% fine to coarse sand, poorly graded, subangular to rounded, low to high sphericity; 20% silt, soft; trace fine gravel, subrounded, low sphericity; no odor. Total Depth of conductor casing.		290
			5.0/ 1.4	SP	[Symbol]	POORLY GRADED SAND, brown (10YR4/3), multicolored grains; 95% fine to medium		



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planners, & management consultants*

Remarks Conductor borehole of 24" diameter to 20 feet below ground surface (ft bgs) with flight auger. Pilot hole of 5" diameter to 404 ft bgs. Reamed borehole of 12.25" diameter to 410 ft bgs. Datum is from 2" diameter WB PVC:ft msl.

See key sheet for symbols and abbreviations used above.

Boring Log and Sampling Record

Client Northwest El Monte Community Task Force

Site On Steel St. and Rosemead Blvd.

Job No. 8208-20142-110W6MW26

Boring/Well No. MW2-06

Drill Contractor Beylik Drilling

Drill Method Mud Rotary

Logged By Tannehill, Munoz

Drilling Started 11/19/96 Ended 11/22/96

Elevation & Datum 311.1

Total Depth 410.0 Depth To Water 112.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
30					GP	sand, trace coarse sand, subangular to subrounded, low to high sphericity; 5% silt; no odor, smooth drilling.	● Cement Grout Seal (0-48 ft. bgs).	285
35			5.2/ 1.4		GP	POORLY GRADED GRAVEL, yellowish brown (10YR5/4), multicolored grains; 85% fine gravel, angular to subrounded, low to high sphericity; 15% fine to coarse sand, poorly graded, angular to subrounded, low to high sphericity; trace silt; no odor, smooth drilling.	● Mild Steel Blank (0-134 ft. bgs).	275
45			4.1/ 1.4		SM	SILTY SAND, dark dark yellowish brown (10YR4/4), multicolored grains; 70% fine to coarse sand, poorly graded, subangular to subrounded, low to high sphericity; 30% silt, as flakes, soft; trace clay; no odor, smooth drilling, silt and sand may be interbedded.		265

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Boring Log and Sampling Record

Client Northwest El Monte Community Task Force

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Drill Contractor Beylik Drilling Drill Method Mud Rotary Logged By Tannehill, Munoz

Drilling Started 11/19/96 Ended 11/22/96 Elevation & Datum 311.1 Total Depth 410.0 Depth To Water 112.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
80						coarse sand, subangular to rounded, low to high sphericity; 35% fine gravel, poorly graded, subangular to subrounded, low to high sphericity; 5% silt, soft; no odor, smooth drilling.		235
85			14.1/ 3.8	SW		WELL GRADED SAND, light olive brown (2.5Y5/4), multicolored grains; 80% fine to coarse sand, subangular to rounded, low to high sphericity; 15% fine gravel, poorly graded, subangular to subrounded, low to high sphericity; 5% silt, soft; no odor, finer than previous interval.	● Benseal and #3 Sand mix (48-144 ft. bgs).	225
90			NA	ML		(CORE) SILT, olive (5Y5/4); 70% silt, pliable; 30% clay, pliable; trace fine sand, micaceous; Eleven inches of recovery, no bagged sample. Core sample was 11 inches long and 1.75 inches in diameter. Slid easily out of sleeves.		220
95			22.6/ 4.2	SW SM		WELL GRADED SAND WITH SILT, light olive brown (2.5Y5/6), multicolored grains; 85% fine to coarse sand, angular to subrounded, low to high sphericity; 10% silt, 5% fine gravel, poorly graded, subangular to subrounded, low to moderate sphericity; no odor, smooth drilling.		215

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Drilling Started 11/19/96 Ended 11/22/96 Elevation & Datum 311.1 Total Depth 410.0 Depth To Water 112.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
130					SP	30% fine to coarse sand, poorly graded, subangular to rounded, low to high sphericity; no odor, smooth drilling.		185
135			1.7/ 0.6		SP	POORLY GRADED SAND, light olive brown (2.5Y5/3), multicolored grains; 100% fine to medium sand, trace coarse sand, angular to rounded, low to high sphericity; no odor, smooth drilling.		175
140					SW	WELL GRADED SAND, light olive brown (2.5Y5/4), multicolored grains; 90% fine to coarse sand, angular to subrounded, low to high sphericity; 5% silt, 5% fine gravel, poorly graded, angular to subrounded, low to moderate sphericity; no odor, smooth drilling.	<ul style="list-style-type: none"> ● Stainless Steel Blank (134-154 ft. bgs). ● Transition Sand #30 Lonestar sand (144-147 ft. bgs). 	170
145			3.4/ 0.2		SW			165



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Drill Contractor Beylik Drilling Drill Method Mud Rotary Logged By Tannehill, Munoz

Drilling Started 11/19/96 Ended 11/22/96 Elevation & Datum 311.1 Total Depth 410.0 Depth To Water 112.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
155			2.3/ 0.2	SP	•••••	POORLY GRADED SAND, light olive brown (2.5Y5/4), multicolored grains; 95% fine to coarse sand, dominated by fine to medium sand, subangular to rounded, low to high sphericity; 5% fine gravel, poorly graded, angular to subrounded; no odor, smooth drilling.	<ul style="list-style-type: none"> ● Filter Pack #3 Lonestar Sand (147-169 ft. bgs). ● Stainless Steel Wire Wrap Screen 20 slot, 4"ID (154-164 ft. bgs). 	160 155
165			3.4/ 0.0	SP	•••••	POORLY GRADED SAND, light olive brown (2.5Y5/4), multicolored grains; 95% fine to coarse sand, dominated by fine to medium sand, subangular to rounded, low to high sphericity; 5% fine gravel, poorly graded, angular to subrounded; no odor, smooth drilling, slightly finer than previous interval.		145
170			NA	SM	•••••	Coring from 169 to 174 with no recovery.	<ul style="list-style-type: none"> ● Transition Sand #30 Lonestar sand (169-172 ft. bgs). ● Stainless Steel Blank (164-184 ft. 	140



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Drilling Started 11/19/96

Ended 11/22/96

Elevation & Datum 311.1

Total Depth 410.0

Depth To Water 112.0

DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
					•••••	slightly plastic; 25% fine to medium sand (trace), subangular to subrounded, low to high sphericity; 10% clay, slightly plastic; no odor, sample is fairly soft, pliable.	bgs).	135
180			0.5/ 0.0	SP	•••••	POORLY GRADED SAND, olive brown (2.5Y4/3), multicolored grains; 95% fine to medium sand, trace coarse sand, subangular to rounded, low to high sphericity; 5% silt; trace fine gravel, poorly graded, angular to subrounded, low to moderate sphericity; no odor.		130
185			1.3/ 0.0	SP	•••••	POORLY GRADED SAND, olive brown (2.5Y4/3), multicolored grains; 95% fine to medium sand, trace coarse sand, subangular to rounded, low to high sphericity; 5% silt; trace fine gravel, poorly graded, angular to subrounded, low to moderate sphericity; no odor.		125
190					•••••			120
195			1.0/ 0.0	SP	•••••	POORLY GRADED SAND, olive brown (2.5Y4/3), multicolored grains; 95% fine to medium sand, trace coarse sand, subangular to rounded, low to high sphericity; 5% silt; trace fine gravel, poorly graded, angular to subrounded, low to moderate sphericity; no odor, small sample amount.		115



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Boring Log and Sampling Record

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DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
230			2.1/ 0.0	SM	SM	medium sand, trace coarse sand, subangular to rounded, low to high sphericity; 5% silt; trace fine gravel, poorly graded, angular to subrounded, low to moderate sphericity; no odor, small sample amount. (CORE) SILTY SAND, olive brown (2.5Y4/4); 80% fine sand, poorly graded; 20% silt, nonplastic; trace gravel; wet, no odor.	● Mild Steel Blank (184-254 ft. bgs).	85
235			0.7/ 0.0	SM	SM	SILTY SAND, olive brown (2.5Y4/4); 80% fine sand, poorly graded; 15% silt, nonplastic; 5% clay, soft, semi-round cuttings; trace fine gravel; no odor.		75
240			0.3/ 0.0	SC	SC	CLAYEY SAND, olive brown (2.5Y4/4); 80% fine to medium sand, poorly graded; 20% clay, soft, rounded cuttings, low plasticity; trace coarse sand; wet, no odor		70
245								65



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DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
255			0.4/ 0.0	SW SC		WELL GRADED SAND WITH CLAY, olive brown (2.5Y4/4); 90% fine to coarse sand, subangular to subrounded, high sphericity; 10% clay, soft, rounded cuttings; wet, no odor.		60
260							● Stainless Steel Blank (254-274 ft. bgs).	50
265			0.5/ 0.0	SW		WELL GRADED SAND, dark olive brown (2.5Y3/3); 90% fine to coarse sand, subangular, high to moderate sphericity; 10% fine gravel, subangular, moderate sphericity; no fines, wet, no odor.	● Transition Sand #30 Lonestar sand (263-266 ft. bgs).	45
270							● Filter Pack #3 Lonestar Sand (266-289 ft. bgs).	40
			0.1/ 0.0	GW		(CORE) WELL GRADED GRAVEL, multicolored pink to white; igneous origin of		

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DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
						the coarse gravel and cobbles, subangular to subrounded, 90% gravel, moderate sphericity; 10% coarse sand.		35
280			0.8/ 0.0	SW		WELL GRADED SAND, light olive brown, multicolored grains; 95% fine to coarse sand, subangular to subrounded, high sphericity; 5% fine gravel, subangular, low sphericity, some medium grains; wet.	● Stainless Steel Wire Wrap Screen 20 slot, 4"ID (274-284 ft. bgs).	30
285			0.0/ 0.0	SW		WELL GRADED SAND, light olive brown, multicolored grains; 95% fine to coarse sand, subangular to subrounded, high sphericity; 5% fine gravel, subangular, low sphericity, some medium grains; wet.		25
290							● Transition Sand #30 Lonestar sand (289-292 ft. bgs).	20
295			0.0/ 0.0	GW		WELL GRADED GRAVEL, multicolored grains; 95% fine to coarse gravel, subrounded, high sphericity; 5% coarse sand, subangular; wet, no odor.	● Stainless Steel Blank (284-304 ft. bgs).	15
			0.3/ 0.0	SP		POORLY GRADED SAND, brown (10YR4/3); 90% fine to medium grain; 10% coarse		



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DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
305			0.8/ 0.0	SP	[Dotted pattern]	<p>sand, subangular; mica grains, wet, no odor.</p> <hr/> <p>POORLY GRADED SAND, brown (10YR4/3); 90% medium to coarse sand, high sphericity, subangular; 10% very fine sand; wet, no odor.</p>	<p>● Benseal and #3 Sand mix (292-353 ft. bgs).</p>	-10
315			0.6/ 0.0	SP	[Dotted pattern]	<p>POORLY GRADED SAND, brown (10YR4/3), multicolored grains; 85% medium to coarse sand, subangular, high sphericity; 15% fine gravel, angular to subangular, poorly graded; wet, no odor.</p>	<p>● Mild Steel Blank (304-344 ft. bgs).</p>	-5
320			0.4/ 0.0	SP	[Dotted pattern]	<p>POORLY GRADED SAND, brown (10YR5/3), multicolored grains; 95% fine to medium</p>		-10



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DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
330						sand, poorly graded, subangular, high sphericity; 5% coarse sand, subrounded, high sphericity; wet, no odor.		-15
335			0.3/ 0.0	GW		WELL GRADED GRAVEL, multicolored but mainly brown (10YR5/3); fine to coarse gravel, subangular to subrounded, moderate sphericity, igneous in origin; trace coarse sand.		-25
340			0.5/ 0.0	SP		POORLY GRADED SAND WITH GRAVEL, olive brown (2.5Y4/3), multicolored grains; 70% fine to coarse sand, angular to subrounded, low to high sphericity, dominated by fine to medium sand; 30% fine gravel, poorly graded, angular to subrounded, low to high sphericity; no odor, hard, slow drilling.		-30
345			0.8/ 0.0	GP		POORLY GRADED GRAVEL WITH SAND, olive brown (2.5Y4/3), multicolored grains; 65% fine gravel, angular to subrounded, low to moderate sphericity; 35% fine to coarse sand, well graded, angular to rounded, low to high sphericity; trace silt; no odor, slow, hard drilling.		-35

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DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
380					●●●●●	75% fine to coarse sand, angular to subrounded, low to high sphericity; 25% fine gravel, angular to subrounded, low to moderate sphericity; trace silt; no odor, some rig chatter during interval.		-65
385			1.1/ 0.0	SW	●●●●●	WELL GRADED SAND WITH GRAVEL, light olive brown (2.5Y5/4), multicolored grains; 75% fine to coarse sand, angular to subrounded, low to high sphericity; 25% fine gravel, angular to subrounded, low to moderate sphericity; trace silt; no odor, some rig chatter during interval.	● Transition Sand #30 Lonestar sand (383-384 ft. bgs).	-75
390			0.7/ 0.0	SP	●●●●●	(CORE) POORLY GRADED SAND, olive brown (2.5Y4/4), multicolored grains; 95% fine to coarse sand, subangular to subrounded, low to high sphericity; 5% silt; three inches of recovery.	● Stainless Steel Blank (374-394 ft. bgs).	-80
395			0.8/ 0.0	ML		SILT WITH SAND, light olive brown (2.5Y5/4), multicolored grains; 80% silt, soft, as flakes; 20% fine to coarse sand, poorly graded, subangular to subrounded, low to high sphericity; no odor, smooth drilling.	● Mild Steel Blank with endcap (394-399 ft. bgs).	-85



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DEPTH FEET	SAMPLE NO.	FID ppm	PID ppm	USCS	Lithology	DESCRIPTION	Well Construction Detail	ELEVATION FEET
<div style="text-align: center;"> <p>405</p> <p>410</p> <p>415</p> <p>420</p> </div>						<p>Total Depth of Pilot Hole to 404 feet below ground surface. Reamed borehole to 410 feet below ground surface.</p>	<p>● Benseal and #3 Sand mix (384-410 ft. bgs).</p>	<div style="text-align: center;"> <p>-90</p> <p>-95</p> <p>-100</p> <p>-105</p> <p>-110</p> </div>



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Logged By:	Date Drilled:	Drilling Contractor:	Method/Equipment:	Boring Number:			
Michael Shea	3-5-91	TONTO	Hollow Stem Auger B-60	BH-26			
See "Legend to Logs" for sampling method, classifications and laboratory test methods	Boring Diam.(in.): 8"	Ground Elev.(ft.): 287	Groundwater Elevation (ft.): 03/04/91 207.2 04/01/91 205.3	Total Drive Wt.(lbs.): 150			
			Drop Dist.(in.): 30"				
Well Construction	Depth, (ft.)	Sample Type	Blows/Foot	Description	HNU Reading	SAMPLE NO.	Other Tests
4" PVC Schedule 40 Solid Casing	70			(Same Material, fine-to-coarse grained, fairly clean, with trace of pebbles.)	2-3	26-8	
	45			(SP) SAND with GRAVEL, brown, fine grained, dense, dry, uniform.			
	89			(Same Material, light brown, very dense, with trace of coarse grained sand.)	4	26-9	
	50			(SW) SAND, light brown, medium-to-coarse grained, dense, dry to slightly moist.			
	51			(SW) SAND, light brown to red, fine-to-medium grained, dense to very dense, dry to slightly moist, red staining, with trace of coarse grained sand and 1/2" diameter gravel.	2-4	26-10	
55			(Same Material, no staining.) (Same Material, light brown, with interbeds of fine-to-very fine grained sand and silt.)	6	26-11		
76							

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Logged By: Michael Shea	Date Drilled: 3-5-91	Drilling Contractor: TONTO	Method/Equipment: Hollow Stem Auger B-60	Boring Number: BH-26
See "Legend to Logs" for sampling method, classifications and laboratory test methods	Boring Diam.(in.): 8"	Ground Elev.(ft.): 287	Groundwater Elevation (ft.): 03/04/91 207.2 04/01/91 205.3	Total Depth (ft.): 150
			Drive Wt.(lbs.): 140	Drop Dist.(in.): 30"

Well Construction	Depth, (ft.)	Sample Type	Blows/Foot	Description	HNU Reading	SAMPLE NO.	Other Tests
-------------------	--------------	-------------	------------	-------------	-------------	------------	-------------

4" PVC Schedule 40 Solid Casing Top of 4" Stainless Steel Blank Pipe Bentonite Cement Slurry	65		93	(SW) SAND (fairly clean) with GRAVEL, light brown, fine-to-coarse grained, very dense, dry, loose, with trace of pebbles.	8	26-12	
	70		50	(SP/SM) SAND and SILT, light brown, fine grained, dense to very dense, moist to wet, micaceous, with very thin silt interbeds, trace of medium and coarse grained sand and pebbles.	7	26-13	
	75		51	(Same Material, light gray to brown, very fine-to-fine grained, very dense, moist, with trace of 1-2" diameter gravel and slight orange to red mottling.	< < 1	26-14	
			38	(Same Material, dense to very dense, uniform, with slight orange mottling.)	0	26-15	
			30	(SW) SAND with GRAVEL, light brown, fine-to-medium grained, moderately dense to dense, moist to very moist, uniform with trace of coarse grained	0	26-16	

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Project No. AR4200D3

Date APR.1991

Log of Boring

Figure

A-11 (Sheet 4 of 8)

Logged By: Michael Shea	Date Drilled: 3-5-91	Drilling Contractor: TONTO	Method/Equipment: Hollow Stem Auger B-60	Boring Number: BH-26
See "Legend to Logs" for sampling method, classifications and laboratory test methods	Boring Diam.(in.): 8"	Ground Elev.(ft.): 287	Groundwater Elevation (ft.): ▽ 03/04/91 207.2 ▽ 04/01/91 205.3	Total Depth (ft.): 150
			Drive Wt.(lbs.): 140	Drop Dist.(in.): 30"

Well Construction	Depth, (ft.)	Sample Type	Blows/Foot	Description	HNU Reading	SAMPLE NO.	Other Tests
Bentonite Cement Slurry			38	sand and pebbles, orange mottling.			
			61	(SP) SAND, grayish brown, very fine-to-fine grained, dense, very moist, uniform, with trace of coarse grained sand and 1/2" diameter gravel.		26-17	
			61	(SW) SAND (fairly clean), gray, medium-to-coarse grained, very dense, very wet, with trace of fine grained sand, gravel, and pebbles.		26-18	
			61	(SP) SAND with GRAVEL, gray, fine grained, very dense, very moist to wet, uniform, dark red mottling.		26-19	
			30	(SP/SM) SAND and SILT, gray, fine grained, dense, very moist to wet, with dark red mottling and trace of gravel.		26-20	
			47	(Same Material, very fine grained, moderately dense to dense, micaceous, with trace of coarse grained sand.)		26-21	
	Stainless Steel Blank Pipe			20 50/6"	(SW) SAND (fairly clean), gray, fine-to-medium grained, very dense, wet, uniform, with trace of coarse grained sand.		26-22
			25 50/6"	(Same Material, with trace of 1/2" diameter gravel.)		26-23	
			25 50/6"	(Same Material)		26-24	

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Logged By: Michael Shea	Date Drilled: 3-5-91	Drilling Contractor: TONTO	Method/Equipment: Hollow Stem Auger B-60	Boring Number: BH-26
See "Legend to Logs" for sampling method, classifications and laboratory test methods	Boring Diam. (in.): 8"	Ground Elev. (ft.): 287	Groundwater Elevation (ft.): 03/04/91 207.2 04/01/91 205.3	Total Depth (ft.): 150
				Drive Wt. (lbs.): 140
				Drop Dist. (in.): 30"

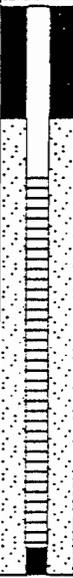
Well Construction	Depth, (ft.)	Sample Type	Blows/foot	Description	HNU Reading	SAMPLE NO.	Other Tests
Bentonite Cement Slurry			40 50/6"	(Same Material, with trace of coarse grained sand and 1/2-1" diameter gravel.)		26-25	
			34 60/6"			26-26	
	105		46 50/6"			26-27	
			50/6"	(Same Material, dark gray, with trace of coarse grained sand and 1" diameter gravel.)		26-28	
4" Stainless Steel Blank Pipe	110		50/6"	(Same Material, light brown to gray, fine-to-coarse grained, with trace of pebbles.)		26-29	
			50/3"	(Same Material, fine-to-medium grained, uniform.)		26-30	
	115		41	(SP/SM) SAND and SILT, light grayish brown, very fine-to-fine grained, dense, wet, uniform, with interbeds of light reddish brown coarse grained sand.		26-31	
			25 50/4"	(SW) SAND (dirty) with GRAVEL, reddish green, fine-to-coarse grained, very dense, wet.		26-32	

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Logged By: Michael Shea	Date Drilled: 3-5-91	Drilling Contractor: TONTO	Method/Equipment: Hollow Stem Auger B-60	Boring Number: BH-26
See "Legend to Logs" for sampling method, classifications and laboratory test methods	Boring Diam.(in.): 8"	Ground Elev.(ft.): 287	Groundwater Elevation (ft.): 03/04/91 207.2 04/01/91 205.3	Total Depth (ft.): 150
			Drive Wt.(lbs.): 140	Drop Dist.(in.): 30"

Well Construction	Depth, (ft.)	Sample Type	Blows/Foot	Description	HNU Reading	SAMPLE NO.	Other Tests
			50/5"	(Same Material, lost sample.)		26-33	
			35 50/5"	(SP/SM) SAND and SILT, brown, very fine-to-fine grained, very dense, wet, uniform.		26-34	
	125		50/6"	(SW) SAND, light brown, fine-to-medium grained, very dense, wet, uniform.		26-35	
Bentonite Cement Slurry			26 50/5"	(SP/SM) SAND and SILT, light brown, very fine-to-fine grained, very dense, wet.		26-36	
	130		50/6"			26-37	
			36 55/5"	(Same Material, uniform, micaceous.)		26-38	
	135		50/6"			26-39	
Bentonite Pellet Seal			38 50/5"	(Same Material)		26-40	

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Logged By: Michael Shea	Date Drilled: 3-5-91	Drilling Contractor: TONTO	Method/Equipment: Hollow Stem Auger B-60	Boring Number: BH-26			
See "Legend to Logs" for sampling method, classifications and laboratory test methods	Boring Diam.(in.): 8"	Ground Elev.(ft.): 287	Groundwater Elevation (ft.):  03/04/91 207.2  04/01/91 205.3	Total Depth (ft.): 150			
				Drive Wt.(lbs.): 140			
				Drop Dist.(in.): 30"			
Well Construction	Depth, (ft.)	Sample Type	Blows/Foot	Description	HNU Reading	SAMPLE NO.	Other Tests
 Filter Pack: #1/20 Monterey Sand Stainless Steel Well Screen: 0.01" Wire Wrap End Cap			50/5"	(SW/SM) SAND and SILT, light brown, medium-to-coarse grained, very dense, wet, with trace of 1" diameter gravel.		26-41	
			30 50/3"	(SW) SAND (clean), gray, medium-to-coarse grained, very dense, wet, uniform.		26-42	
	145		50/3"	(SP/SM) SAND and SILT, light brown, very fine-to-fine grained, very dense, wet, uniform, with interbeds of medium-to-coarse grained sand.		26-43	
			50/4"				26-44
	150			Total Depth: 150 Feet Well Data: Meas. Pt. Elev. 286.66 Ft. Depth to Water Below M.P. 81.38 Ft. G.W. Elev. 205.28 Ft. (Static: 4-1-91)			
	155						

The substrata descriptions above are generalized representations and based upon visual/manual classification of cuttings and/or samples obtained during drilling. Predominant material types shown on the log may contain different materials and the change from one predominant material type to another could be different than indicated. Descriptions on this log apply only at the specific location at the time of drilling and may not be representative of subsurface conditions at other locations or times.

Western Portion of the El Monte
Operable Unit
Compliance and Sentinel Well Installation and
Groundwater Monitoring Report

May 24, 2006

Prepared for:

West Side Performing Settling Defendant

Prepared by:

CDM

18581 Teller Avenue, Suite 200
Irvine, California 92612

Project No. 27315-42227-W1.MPWELL



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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1.DRILL BORING/WELL NUMBER ERP-12
 PROJECT NAME EMOU DATE DRILLED 2/7/05-2/8/05
 LOCATION _____ CASING TYPE/DIAMETER Schedule 40 PVC/4-inch
 DRILLING METHOD Mud Rotary SCREEN TYPE/SLOT Stainless Steel Wire Wrap/10-slot (0.010")
 SAMPLING METHOD Grab GRAVEL PACK TYPE #2/12 Lonestar Sand
 GROUND SURFACE ELEVATION (FT MSL) 321.23 GROUT TYPE/QUANTITY Portland Cement with 5% Bentonite Gel
 TOP OF CASING ELEVATION (FT MSL) 320.7 STATIC WATER LEVEL (FT BELOW TOC) 121.68
 LOGGED BY Scott A. Sanderson GROUND WATER ELEVATION (FT MSL) 199.02
 REMARKS _____

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					5			SAND: brown, fine, poorly graded, angular, no odor.		
								SAND: same as above.		
					10	SP		SAND: same as above.		
					15			SAND: same as above.		
					20			SAND: same as above.		
					23.0			SAND WITH GRAVEL: brown, poorly graded, fine to medium, angular, no odor, very easy drilling, 50% sand, 50% gravel.	23.0	Portland Cement with 5% Bentonite Gel Grout (0-157 ft bgs)
					25	SP				
					28.0			GRAVEL WITH SAND: brown, poorly graded, fine to medium, angular; no odor, very easy drilling, 60% gravel, 40% sand.	28.0	4" Diameter, Sch 40 PVC Casing (0-173 ft bgs)
					30	GP				
					33.0			SAND WITH GRAVEL: brown, fine to medium, poorly graded, angular, no odor, 50% sand, 50% gravel.	33.0	
					35.0	SP			35.0	9 7/8" Diameter Borehole

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1.DRILL

BORING/WELL NUMBER ERP-12

PROJECT NAME EMOU

DATE DRILLED 2/7/05-2/8/05

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
						ML		SANDY SILT WITH GRAVEL: brown, non plastic, no odor, 50% silt, 30% sand, 20% gravel.	118.0	<p>Portland Cement with 5% Bentonite Gel Grout (0-157 ft bgs)</p> <p>4" Diameter, Sch 40 PVC Casing (0-173 ft bgs)</p>
					120			SANDY SILT: brown, non-plastic, no odor, fairly easy drilling, 70% silt, 30% sand; clay stringers.		
					125	ML		SANDY SILT: brown, non-plastic, no odor, easy drilling, 60% silt, 40% sand, trace clay as stringers.		
					130			SANDY SILT: brown, non-plastic, no odor, easy drilling, 60% silt, 40% sand.		
					133.0			SILTY SAND: brown, poorly graded, no odor, fairly easy drilling, 65% sand, 35% silt.	133.0	
					135	SM				
					138.0			SANDY SILT: brown, non plastic, poorly graded, no odor, fairly easy drilling with chattering from approximately 138.5 to 139.5 ft bgs.	138.0	
					140			SANDY SILT: brown, low plasticity, no odor, mild drill chatter, 40% silt, 40% sand, 10% clay, 10% gravel, mild drill chatter.		
					145	ML				
					150			SANDY SILT: brown, low plasticity, no odor, 40% silt, 40% sand, 10% clay, 10% gravel.		
					155			SANDY SILT: brown, low plasticity, no odor, easy drilling, 50% silt, 30% sand, 20% clay.	155.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1.DRILL

BORING/WELL NUMBER ERP-12

PROJECT NAME EMOU

DATE DRILLED 2/7/05-2/8/05

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
						ML		SANDY SILT: brown, low plasticity, no odor, easy drilling, 50% silt, 30% sand, 20% clay.		
					159.0			SANDY SILT: same as above.	159.0	
					160.0	SM		SILTY SAND: brown, no odor, drill chatter, 60% sand, 40% silt.	160.0	
					163.0	SM		SILTY SAND WITH GRAVEL: brown, no odor, drill chatter, 50% sand, 30% gravel, 20% silt.	163.0	
					165.0	SP		SAND WITH GRAVEL: brown, poorly graded, angular, no odor, drill chatter, 60% sand, 40% gravel; trace silt.	165.0	
					168.0			SILTY SAND WITH GRAVEL: brown, 35% sand, 20% gravel, 35% silt, 10% clay.	168.0	
					170.0					
					175.0	SM		SILTY SAND WITH GRAVEL: brown, poorly graded, angular, no odor, moderate drill chatter, 60% sand, 20% silt, 20% gravel.	175.0	
					178.0					
					180.0	SP		SAND WITH GRAVEL: brown, poorly graded, no odor, moderate drill chatter, 75% sand, 25% gravel, trace silt.	180.0	
					183.0					
					185.0	SM		SILTY SAND WITH GRAVEL: brown, 40% sand, 20% gravel; 40% silt, nonplastic; no odor.	185.0	
					188.0					
					188.0			Total depth of borehole is 188 feet bgs.		
					190.0					
					195.0					

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1MPWELL BORING/WELL NUMBER ERP-13
 PROJECT NAME Northwest El Monte Community Task Force DATE DRILLED May 2 to May 9, 2005
 LOCATION _____ CASING TYPE/DIAMETER Mild & Stainless Steel/ 18" diam. Cond. x 1 1/4"
 DRILLING METHOD Mud Rotary SCREEN TYPE/SLOT Stainless Steel Wire Wrap/010-slot (0.010")
 SAMPLING METHOD Grab GRAVEL PACK TYPE #60 transition sand, #2/12
 GROUND SURFACE ELEVATION (FT MSL) 333.65 GROUT TYPE/QUANTITY Neat cement 0-187', Benseal/sand mix
 TOP OF CASING ELEVATION (FT MSL) 332.92 STATIC WATER LEVEL (FT BELOW TOC) _____
 LOGGED BY W. Grove GROUND WATER ELEVATION (FT MSL) _____
 REMARKS On the north side of Lower Azusa Rd., 60' west of Sultana, Rosemead CA

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					0			SILTY SAND: brown (10YR 5/3); 85% sand, poorly graded, fine, angular to subangular; 15% silt, moist.		<ul style="list-style-type: none"> Traffic Rated Cover Neat Cement Grout Seal (0-187 ft bgs) 18" diam. 1/4" thick mild steel conductor (0-62 ft bgs) 4" ID, mild steel blank (0-200 ft bgs) 30" conductor borehole to 60'
0					5	SM				
					10			SAND: brown (10YR 5/3); 100% sand, poorly graded, fine to medium, angular to subangular, moist.	10.0	
0					20	SP		SAND: same as above.		
					25					
					30			SAND: brown (10YR 5/3); 100% sand, poorly graded, fine to medium, angular to subangular, moist.		
0					30	SP		SAND: brown (10YR 5/3); 95% sand, poorly graded, fine to coarse, mostly medium, angular to subangular; 5% gravel, well graded, fine to coarse, 3-in maximum diameter, subrounded to rounded; trace cobbles. 5-in maximum diameter, subrounded to rounded.	30.0	
					35				35.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1MPWELL

BORING/WELL NUMBER ERP-13

PROJECT NAME Northwest El Monte Community Task Force

DATE DRILLED May 2 to May 9, 2005

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0					40	SM		SILTY SAND: brown (10YR 5/3); 60% sand, poorly graded, fine, angular to subangular; 40% silt, moist.	40.0	<p>4" ID, mild steel blank (0-200 ft bgs)</p> <p>18" diam. 1/4" thick mild steel conductor (0-62 ft bgs)</p> <p>Neat Cement Grout Seal (0-187 ft bgs)</p>
0					45	SP		SAND: brown (10YR 5/3); 90% sand, poorly graded, fine to coarse, mostly fine to medium, angular to subangular; 10% gravel, well graded, fine to coarse, 3-in maximum diameter; trace cobbles, 5-in maximum diameter, subangular to rounded.	50.0	
0					50	SM		SILTY SAND: brown (10YR 5/3); 80% sand, poorly graded, fine, angular to subangular; 20% silt.	55.0	
0					55			SAND: brown (10YR 5/3); 90% sand, poorly graded, fine to coarse, mostly fine to medium, angular to subangular; 10% gravel, well graded, fine to coarse, 3-in maximum diameter; trace cobbles, 5-in maximum diameter, subangular to rounded.	60	
0					60			SAND: brown (10YR 5/3); poorly graded, fine to coarse, mostly medium, angular to subrounded; gravel lens at 69 feet bgs.	65	
0					65	SP			70	
0					70			SAND: brown (10YR 5/3); poorly graded, fine to medium, angular to subrounded.	75.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1MPWELL

BORING/WELL NUMBER ERP-13

PROJECT NAME Northwest El Monte Community Task Force

DATE DRILLED May 2 to May 9, 2005

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0					80	SP		SAND: brown (10YR 5/3); 90% sand, poorly graded, fine to coarse, mostly fine to medium, angular to subangular; 10% gravel, well graded, fine to coarse, 3-in maximum diameter, trace cobbles, 5-in maximum diameter, subangular to rounded.		
0					85			SAND: brown (10YR 5/3); poorly graded, fine to medium, angular to subrounded. Gravel lense @ 84'		
0					90			Gravel lense @ 88'	90.0	Neat Cement Grout Seal (0-187 ft bgs)
0					95	ML		SILT WITH SAND AND GRAVEL: brown (10YR 5/3); 75% silt, soft, fine to coarse, mostly medium, angular to subrounded, low to med. sphericity; 15% sand; 10% gravel, fine, 1/2-in maximum diameter, angular to subrounded, mostly rock fragments.		
0					100			SANDY SILT: brown (10YR 5/3); 90% silt, soft, non-plastic; 10% sand, very fine to fine, subangular to subrounded, poorly graded, trace gravel to 1/2-in maximum diameter, angular to subrounded, poorly graded.	100.0	4" ID, mild steel blank (0-200 ft bgs)
0					105	ML				
0					110	SM		SILTY SAND: brown (10YR 5/3); 80% sand, very fine to medium, subangular to subrounded, poorly graded; 20% silt, soft.	108.0	
0					115			SILTY SAND: brown (10YR 5/3); 80% sand, very fine to medium, subangular to subrounded, poorly graded; 20% silt, soft.	115.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1MPWELL

BORING/WELL NUMBER ERP-13

PROJECT NAME Northwest El Monte Community Task Force

DATE DRILLED May 2 to May 9, 2005

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0					120	SM		SILTY SAND: brown (10YR 5/3); 60% sand, very fine to medium, subangular to subrounded, poorly graded; 40% silt, soft.		
0					121.0				121.0	← Neat Cement Grout Seal (0-187 ft bgs)
0					125	SP		SAND: olive brown (2.5Y 4/3); very fine to fine, some medium, angular to subrounded, poorly graded; trace silt, micaceous.		
0					130	ML		SILT WITH SAND: olive brown (2.5Y 4/4); 80% silt, soft; 20% sand, very fine to medium, subangular to subrounded, poorly graded.	130.0	← 4" ID, mild steel blank (0-200 ft bgs)
0					135	ML		SILT: olive brown (2.5Y 4/4); 90% silt, soft; 10% sand, very fine to fine, subangular to subrounded, poorly graded, micaceous.	135.0	
0					138.0				138.0	
0					140	SP		SAND: olive brown (2.5Y 4/4); 95% sand, very fine to fine, subangular to subrounded, poorly graded; 5% silt.	140.0	
0					145	ML		SILT: olive brown (2.5Y 4/4); 90% silt, soft; 10% sand, very fine to fine, subangular to subrounded, poorly graded, micaceous.	145.0	
0					150				150.0	
0					152.0	SP SM		SAND WITH SILT: olive brown (2.5Y 4/4); 90% sand, very fine to fine, trace medium, subangular to subrounded, poorly graded; 10% silt.	152.0	
0					155	ML		SANDY SILT: olive brown (2.5Y 4/4); 70% silt, 30% sand, very fine to fine, subangular to subrounded, poorly graded, micaceous.	155.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1MPWELL BORING/WELL NUMBER ERP-13
PROJECT NAME Northwest El Monte Community Task Force DATE DRILLED May 2 to May 9, 2005

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0					160	ML		SANDY SILT: olive brown (2.5Y 4/4); 70% silt; 30% sand, very fine to fine, subangular to subrounded, poorly graded, micaceous.	162.0	<p>4" ID, mild steel blank (0-200 ft bgs)</p> <p>Neat Cement Grout Seal (0-187 ft bgs)</p> <p>Benseal and #3 Sand mix (187-212 ft bgs)</p>
					165	ML		SILT: olive brown (2.5Y 4/4); 90% sand, very fine to fine, trace medium, angular to subrounded, mostly subangular, poorly graded; 10% silt, soft, micaceous.	172.0	
					170			SANDY SILT: olive brown (2.5Y 4/4); 60% silt, soft; 40% sand, very fine to fine, angular to subrounded, mostly subangular, poorly graded, micaceous.	176.0	
0					175	ML		SILT WITH SAND: olive brown (2.5Y 4/4); 85% silt, soft; 15% sand, very fine to fine, angular to subrounded, mostly subangular, poorly graded, micaceous	180.0	
					180	ML		SILT: olive brown (2.5Y 4/4); 90% silt, soft; 10% sand, very fine to fine, subangular to subrounded, poorly graded.	190.0	
					185	ML				
0					190	SM		SILTY SAND: olive brown (2.5YR 4/4); 65% sand, very fine to fine, some medium, angular to subrounded, poorly graded; 35% silt, soft.	195.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1MPWELL BORING/WELL NUMBER ERP-13
PROJECT NAME Northwest El Monte Community Task Force DATE DRILLED May 2 to May 9, 2005

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0					200.0	ML		SILT: olive brown (2.5Y 4/4); 90% silt, 10% sand, very fine to fine, subangular to subrounded, poorly graded.	200.0	<ul style="list-style-type: none"> 4" ID, Dielectric coupling (200-202 ft bgs) Benseal and #3 Sand mix (187-212 ft bgs) 4" ID 304 stainless steel blank (202-222 ft bgs) Transition Sand #60 Sand (212-214 ft bgs) Filter Pack #2/12 Sand (214-240 ft bgs) Stainless Steel Wire Wrap Screen, 10 slot, 4" ID (222-232 ft bgs).
0					202.0	ML		SANDY SILT: olive brown (2.5Y 4/4); 60% silt, soft; 40% sand, very fine to fine, some medium, angular to subrounded, poorly graded.	202.0	
0					205.0	ML		SILT: olive brown (2.5Y 4/4); 90% silt, 10% sand, very fine to fine, subangular to subrounded, poorly graded.	205.0	
0					208.0	SP		Sand lense 208-210'	208.0	
0					210.0	ML		SILT: olive brown (2.5Y 4/4); 85% silt, soft, slightly plastic; 10% clay; 5% sand, very fine to fine, subangular to subrounded, poorly graded.	210.0	
0					215.0	ML			215.0	
0					220.0	ML		SILT: olive brown (2.5Y 4/4); 85% silt, soft, slightly plastic; 10% clay; 5% sand, very fine to fine, subangular to subrounded, poorly graded.	220.0	
0					225.0	ML			225.0	
0					226.0	SP		SAND: olive brown (2.5Y 4/4); . 90% sand, very fine to fine, subangular to subrounded, poorly graded; 10% silt; based on elog.	226.0	
0					230.0	SP			230.0	
0					231.0	CL		SANDY CLAY: olive (5Y 5/4); 60% clay, slight plasticity, soft; 20% sand, very fine to fine, some medium, angular to subrounded, poorly graded; 20% silt.	231.0	
0					235.0	CL			235.0	

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PROJECT NAME Northwest El Monte Community Task Force DATE DRILLED May 2 to May 9, 2005

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0					240	CL		SANDY CLAY: olive (5Y 5/4); 60% clay, slight plasticity, soft; 20% sand, very fine to fine, some medium, angular to subrounded, poorly graded; 20% silt.		Filter Pack #2/12 Sand (214-240 ft bgs)
					240			SANDY CLAY: same as above.		Transition Sand #60 Sand (240-243 ft bgs)
					245			Rig chatter at 244'		4" ID 304 stainless steel blank (232-268 ft bgs)
					248.0			SANDY CLAY: olive (5Y 5/4); 45% clay, slight plasticity, soft; 30% silt; 25% sand, very fine to medium, angular to subrounded, poorly graded.	248.0	
					250	SC		CLAYEY SAND: olive (5Y 5/4); 60% sand, very fine to medium, angular to subrounded, poorly graded; 40% clay, slight plasticity.		Benseal and #3 Sand mix (243-257 ft bgs)
					255					
0					256.0			CLAY: olive (5Y 5/4); 80% clay, slight to moderate plasticity, soft; 15% silt; 5% sand, very fine to fine, trace of medium to coarse, angular to subrounded, poorly graded.	256.0	Transition Sand #60 Sand (257-260 ft bgs)
					260	CL				
					265					
0					266.0			CLAY WITH SAND: olive (5Y 5/4); 60% clay, very slight plasticity; 20% silt, slight to moderate plasticity, soft; 20% sand, very fine to fine, trace of medium to coarse, angular to subrounded, poorly graded.	266.0	Filter Pack #2/12 Sand (260-285 ft bgs)
					270	CL				
					272.0					Stainless Steel Wire Wrap Screen, 10 slot, 4" ID (268-278 ft bgs)
0					273			Rig chatter @ 273'		
					275	SP		SAND: olive brown (2.5Y 4/4); 90% sand, very fine to fine, subangular to subrounded, poorly graded; 10% silt; based on elog.		

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PROJECT NAME Northwest El Monte Community Task Force DATE DRILLED May 2 to May 9, 2005

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					276.0			CLAYEY SAND: olive (5Y 5/4); 65% sand, very fine to medium, angular to subrounded, poorly graded, 35% clay, non-plastic.	276.0	Stainless Steel Wire Wrap Screen, 10 slot, 4" ID (268-278 ft bgs)
					280	SC				
					283.0			SANDY CLAY: olive (5Y 4/3); 70% clay, slight plasticity; 20% sand, very fine to medium, angular to subrounded, poorly graded; 10% silt.	283.0	Filter Pack #2/12 Sand (260-285 ft bgs)
0					285			Rig chatter @ 287'		Transition Sand #60 Sand (285-288 ft bgs)
					290					4" ID 304 stainless steel blank (278-341 ft bgs)
0					295	CL		SANDY CLAY: olive (5Y 4/3); 50% clay, non-plastic; 30% silt; 20% sand, very fine to medium, angular to subrounded, poorly graded.		
					300			Rig chatter @ 300'		
					305					
0					309.0			Rig chatter between 309 and 351'	309.0	Benseal and #3 Sand mix (287-329 ft bgs)
					310	SC		CLAYEY SAND: olive (5Y 5/4); 65% sand, very fine to fine, trace medium, subangular to subrounded, poorly graded; 35% clay, slight plasticity.		
					315			CLAYEY SAND: olive (5Y 5/4); 65% sand, very fine to fine, trace medium, subangular to subrounded, poorly graded; 35% clay, slight plasticity.	315.0	

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PROJECT NAME Northwest El Monte Community Task Force

DATE DRILLED May 2 to May 9, 2005

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0					320	SC		Rig chatter between 309 and 351'	321.0	<ul style="list-style-type: none"> Benseal and #3 Sand mix (287-329 ft bgs) 4" ID 304 stainless steel blank (278-341 ft bgs) Transition Sand #60 Sand (329-331 ft bgs) Filter Pack #2/12 Sand (331-357 ft bgs) Stainless Steel Wire Wrap Screen, 10 slot, 4" ID (341-351 ft bgs) 4" ID 304 stainless steel blank (351-395 ft bgs)
0					325	SP SC		SAND WITH CLAY: olive (5Y 5/4); 90% sand, very fine to fine, some medium, angular to subrounded, poorly graded; 10% clay, slight plasticity, micaceous.	331.0	
0					330			CLAYEY SAND: olive (5Y 5/4); 80% sand, very fine to fine, some medium, angular to subrounded, poorly graded; 20% clay, slight plasticity, micaceous.		
0					335	SC		Hard rig chatter at 336'	340.0	
0					340			SAND: olive (5Y 5/4); 95% sand, very fine to medium, angular to subrounded, poorly graded; 5% clay, slight plasticity, trace rock fragments, coarse; gravel lens.		
0					345	SP		Rig chatter between 309 and 351' SAND WITH GRAVEL starting at 346'	354.0	
0					355					

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PROJECT NAME Northwest El Monte Community Task Force

DATE DRILLED May 2 to May 9, 2005

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0						SP		SAND: light olive brown (2.5Y 5/4); very fine to medium, angular to subrounded, poorly graded, minor silt, micaceous. Continuous rig chatter.	399.0	<p>Stainless Steel Wire Wrap Screen, 10 slot, 4" ID (395-405 ft bgs).</p> <p>Filter Pack #2/12 Sand (389-412 ft bgs)</p> <p>4" ID 304 stainless steel blank (405-492 ft bgs)</p> <p>Transition Sand #60 Sand (412-415 ft bgs)</p> <p>Benseal and #3 Sand mix (415-483 ft bgs)</p>
					400			SILTY SAND: light olive brown (2.5Y 5/4); 80% sand, very fine to medium, trace coarse, angular to subrounded, poorly graded, rock fragments; 20% silt, nonplastic, soft, intermittent rig chatter.		
					405	SM				
0					410	SP SM		SAND WITH SILT: light olive brown (2.5Y 5/4); 90% sand, very fine to fine, subangular to subrounded, poorly graded; 10% silt, soft, micaceous.	409.0	
					415	SM		SILTY SAND: light olive brown (2.5Y 5/4); 55% sand, fine to medium, angular to subrounded, poorly graded; 45% silt.	413.0	
0					420			SANDY SILT: light olive brown (2.5Y 5/4); 65% silt; 35% sand, very fine to medium, angular to subrounded, poorly graded.	419.0	
					425	ML		Very hard rig chatter @422'.		
					430			SANDY SILT: light olive brown (2.5Y 5/4); 65% silt; 35% sand, very fine to medium, angular to subrounded, poorly graded.	429.0	
0					435	CL		SANDY CLAY: light olive brown (2.5Y 5/4); 70% clay, slight plasticity, soft; 30% sand, very fine to medium, subangular to subrounded, poorly graded, micaceous.	435.0	

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0					440			CLAY: light yellow brown (2.5Y 6/4); 90% clay, slight plasticity to moderate plasticity, soft; 10% sand, very fine to fine, trace medium, angular to subrounded, poorly graded, micaceous.		<p>← Benseal and #3 Sand mix (415-483 ft bgs)</p> <p>← 4" ID 304 stainless steel blank (405-492 ft bgs)</p>
0					445			CLAY: same as above.		
					450	CL		Minor rig chatter @ 451'.		
0					455			CLAY: light yellow brown (2.5Y 6/4); 90% clay, slight plasticity to moderate plasticity, soft; 10% sand, very fine to fine, trace medium, angular to subrounded, poorly graded, micaceous.		
					460					
					465					
0					470	CL		SANDY CLAY: light yellow brown (2.5Y 6/4); 60% clay, slight plasticity, soft; 40% sand, very fine to medium, angular to subrounded, poorly graded.	467.0	
					475					

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PROJECT NAME Northwest El Monte Community Task Force

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0					476.0			CLAYEY SAND: light yellow brown (2.5Y 6/4); 75% sand, very fine to medium, mostly fine, angular to subrounded, poorly graded; 25% clay, slight moderate plasticity, soft.	476.0	
					480					
					485			Rig chatter from 483-502'		
0					485			CLAYEY SAND: light yellow brown (2.5Y 6/4); 75% sand, very fine to medium, angular to subrounded, poorly graded; 25% clay, slight moderate plasticity, soft.		
					490					
0					495	SC		CLAYEY SAND: light yellow brown (2.5Y 6/4); 65% sand, fine to medium, mostly fine, angular to subrounded, poorly graded; 35% clay, slight moderate plasticity.		
					500	SC				
0					505			CLAYEY SAND: light yellow brown (2.5Y 6/4); 80% sand, very fine to medium, mostly fine, angular to subrounded, poorly graded; 20% clay, slight plasticity to moderate plasticity, soft.		
					510					
0					510			SANDY CLAY: light yellow brown (2.5Y 6/4); 75% sand, fine to medium, mostly fine, angular to subrounded, poorly graded; 25% clay, slight moderate plasticity, soft.	510.0	
					515				515.0	

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PROJECT NUMBER 27315-42227-W1MPWELL BORING/WELL NUMBER ERP-13
 PROJECT NAME Northwest El Monte Community Task Force DATE DRILLED May 2 to May 9, 2005

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0					520	SC		CLAYEY SAND: light yellow brown (2.5Y 6/4); 65% sand, fine to medium, mostly fine, angular to subrounded, poorly graded; 35% clay, slight moderate plasticity.		 <p>← Benseal and #3 Sand mix (508-523 ft bgs)</p> <p>← 4" ID 304 stainless steel blank with end cap (502-522 ft bgs)</p>
					523.0			Total borehole depth is 523 feet bgs.	523.0	
					525					
					530					
					535					
					540					
					545					
					550					
					555					

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1.DRILL BORING/WELL NUMBER ERP-14
 PROJECT NAME EMOU DATE DRILLED 2/2/05-2/4/05
 LOCATION _____ CASING TYPE/DIAMETER Schedule 40 PVC/4-inch
 DRILLING METHOD Mud Rotary SCREEN TYPE/SLOT Stainless Steel Wire Wrap/10-slot (0.010")
 SAMPLING METHOD Grab GRAVEL PACK TYPE #2/12 Lonestar Sand
 GROUND SURFACE ELEVATION (FT MSL) 318.80 GROUT TYPE/QUANTITY Portland Cement with 5% Bentonite Gel
 TOP OF CASING ELEVATION (FT MSL) _____ STATIC WATER LEVEL (FT BELOW TOC) 124.50
 LOGGED BY Scott A. Sanderson GROUND WATER ELEVATION (FT MSL) _____
 REMARKS _____

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					0			SAND WITH GRAVEL: brown, medium, poorly graded, angular, subrounded, no odor.		
					5		SAND WITH GRAVEL: same as above.			
					10	SP	SAND WITH GRAVEL: brown, fine, angular, subrounded, poorly graded, no odor, mild drill chatter throughout the interval with more intense chattering between and 8 and 9 feet and 12.5 and 13 feet.			
					15		SAND WITH GRAVEL: brown, coarse, angular, subrounded, poorly graded, no odor, mild drill chatter throughout the interval, especially from 13 to 15 feet.			
					20		SAND WITH GRAVEL: brown, fine to coarse, poorly graded, angular, subrounded, no odor.			
					25	GW	GRAVEL WITH SAND: brown, well graded, angular, subrounded, no odor, very easy drilling, 60% gravel, 40% sand.			
					30	SP	SAND WITH GRAVEL: brown, fine-grain, poorly graded, angular, subrounded, no odor, very easy drilling, 70% sand, 30% gravel.			
					35		SAND WITH GRAVEL: brown, fine grain, poorly graded, angular, no odor, 80% sand, 20% gravel.			

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1.DRILL

BORING/WELL NUMBER ERP-14

PROJECT NAME EMOU

DATE DRILLED 2/2/05-2/4/05

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					36.5	SP		SAND WITH GRAVEL: brown, coarse, poorly graded, angular, no odor, 60% sand, 40% gravel	36.5	<p>Portland Cement with 5% Bentonite Gel Grout (0-163 ft bgs)</p> <p>4" Diameter, Sch 40 PVC Casing (0-178 ft bgs)</p>
					38.0	SM		SILTY SAND WITH GRAVEL: brown, poorly graded, angular, no odor, 40% sand, 30% silt, 30% gravel, drill chatter from approximately 35.5 to 36.5.	38.0	
					40			SILTY SAND WITH GRAVEL: brown, angular, no odor, 40% sand, 30% silt, 30% gravel, very easy drilling.		
					45	SM		SILTY SAND WITH GRAVEL: brown, angular, no odor, 50% sand, 30% silt, 20% gravel.		
					48.0			SILTY SAND WITH GRAVEL: brown, angular, no odor, 40% sand, 40% gravel, 20% silt.	48.0	
					50	SP		SAND WITH GRAVEL: brown, poorly graded, angular, no odor, 60% sand, 40% gravel, mild drill chatter throughout the interval, with more intense chatter from 52 to 53 feet.		
					53.0			GRAVEL WITH SAND: brown, well graded, angular, no odor, 60% gravel, 40% sand.	53.0	
					60			GRAVEL WITH SAND: same as above.		
					61.0	GW		GRAVEL WITH SAND: brown, well graded, angular, no odor, 75% gravel, 25% sand, mild drill chatter throughout the interval, with more intense chatter between 64 and 65 feet.	61.0	
					63.0	GM		GRAVEL WITH SILT AND SAND: brown, well graded, no odor.	63.0	
					65	GW		GRAVEL WITH SAND: brown, well-graded, angular, no odor, 75% gravel, 25% sand, mild drill chatter throughout the interval, with more intense chatter between 64 and 65 feet.		
					68.0			SANDY SILT: brown, non-plastic, no odor, 65% silt, 35% sand.	68.0	
					70	ML		SILT WITH SAND: brown, low plasticity, no odor, 80% silt, 20% sand.		
					75			SILT WITH SAND: brown, non-plastic, no odor, mild drill chatter, 80% silt, 20% sand.	75.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1.DRILL

BORING/WELL NUMBER ERP-14

PROJECT NAME EMOU

DATE DRILLED 2/2/05-2/4/05

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
								SILT WITH SAND: brown, non-plastic, no odor, mild drill chatter, 80% silt, 20% sand.		
					80	ML		SILT WITH SAND: brown, low plasticity, no odor, 65% silt, 25% sand, 10% gravel; trace clay.		
					83.0			SAND WITH GRAVEL: brown, poorly graded, angular, subrounded, no odor, 65% sand, 30% gravel, 5% silt.	83.0	Portland Cement with 5% Bentonite Gel Grout (0-163 ft bgs)
					85	SP				
					88.0			SILTY SAND: brown, poorly graded, angular, no odor, 65% sand, 30% silt, 5% gravel.	88.0	
					90	SM				
					90.0			SILT WITH SAND: brown, very soft, non-plastic, no odor, 70% silt, 25% sand, 5% gravel.	90.0	4" Diameter, Sch 40 PVC Casing (0-178 ft bgs)
					93.0	ML		SILT WITH SAND: brown, very soft, non-plastic, no odor, 85% silt, 15% sand.	93.0	
					95	SP SM		SAND WITH SILT AND GRAVEL: brown, angular, poorly graded, no odor.		
					98.0			SAND WITH GRAVEL: brown, fine, poorly graded, no odor, 80% sand, 20% gravel.	98.0	
					100					
					105	SP		SAND WITH GRAVEL: same as above.		
					110			SAND WITH GRAVEL: brown, fine, poorly graded, no odor, 70% sand, 30% gravel.		
					115			SAND WITH GRAVEL: brown, fine, poorly graded, no odor, 60% sand, 40% gravel.	115.0	

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BORING/WELL NUMBER ERP-14

PROJECT NAME EMOU

DATE DRILLED 2/2/05-2/4/05

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
								SAND WITH GRAVEL: brown, fine, poorly graded, no odor, 60% sand, 40% gravel.		
								SAND WITH GRAVEL: brown, poorly graded, no odor.		
					120	SP				
								SAND WITH GRAVEL: brown, angular, poorly graded, no odor, 60% sand, 40% gravel.		
					125					
						GW		GRAVEL WITH SAND: brown, angular, well graded, no odor.	127.0	
								SAND WITH GRAVEL: brown, angular, poorly graded, no odor, 60% sand, 40% gravel.	128.0	
					130	SP				Portland Cement with 5% Bentonite Gel Grout (0-163 ft bgs)
								SILTY SAND WITH SILT AND GRAVEL: brown, non-plastic, angular, no odor, 40% sand, 40% silt, 20% gravel.	133.0	
					135					
								SILTY SAND WITH SILT AND GRAVEL: same as above.		
					140					
						SM		SILTY SAND WITH SILT AND GRAVEL: same as above.		
					145					
								SAND WITH SILT AND GRAVEL: brown, no odor, 40% sand, 40% silt, 20% gravel.		
					150					
						ML		SANDY SILT: brown, non-plastic, 60% silt, 40% sand, very easy drilling throughout the interval.	153.0	
					155				155.0	4" Diameter, Sch 40 PVC Casing (0-178 ft bgs)

Continued Next Page

NEWGINT EMOU.GPJ NEWGINT.GDT 12/21/05



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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1.DRILL

BORING/WELL NUMBER ERP-14

PROJECT NAME EMOU

DATE DRILLED 2/2/05-2/4/05

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
						ML		SANDY SILT: brown, non-plastic, 60% silt, 40% sand, very easy drilling throughout the interval.		
					160			SANDY SILT: brown, poorly graded, non-plastic, no odor, 50% silt, 50% sand.		
					163.0				163.0	Portland Cement with 5% Bentonite Gel Grout (0-163 ft bgs)
					165	SM		SILTY SAND WITH GRAVEL: brown, angular, non-plastic, poorly graded, no odor, 40% sand, 40% silt, 20% gravel.		4" Diameter, Sch 40 PVC Casing (0-178 ft bgs)
					168.0				168.0	Bentonite Chips Seal (163-170 ft bgs)
					170			SANDY SILT: brown, fine, non-plastic, no odor, 50% silt, 50% sand.		
					175	ML		SANDY SILT: same as above.		#60 Transition Sand (170-173 ft bgs)
					178.0				178.0	#2/12 Lonestar Sand (173-188 ft bgs)
					180			SILTY SAND: brown, fine, poorly graded, no odor, 70% sand, 30% silt.		
					185	SM		SAND WITH SILT: brown, fine, poorly graded, angular, no odor, 80% sand, 20% silt, drill chatter from approximately 185 to 187 feet.		4" Diameter, Stainless Steel, 10-slot (0.010"), Wire Wrap Screen (178-188 ft bgs)
					188.0			Total depth of borehole is 188 feet bgs.	188.0	
					190					
					195					

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**El Monte Operable Unit
Western Shallow and Northwestern Deep
Portions of the Interim Remedial Action**

Compliance Monitoring Plan

January 3, 2008

Prepared for:

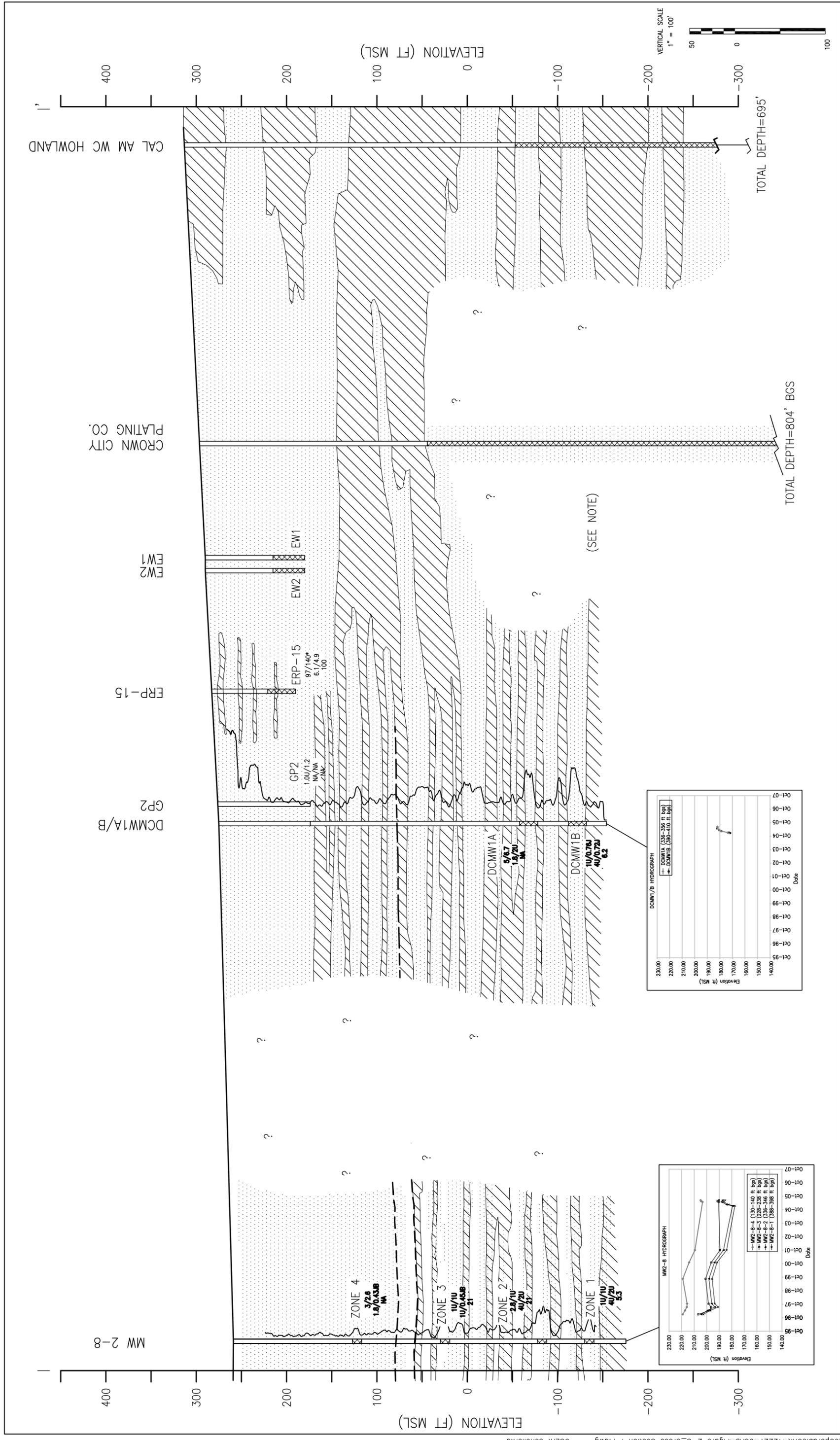
West Side Performing Settling Defendant

Prepared by:

CDM

111 Academy, Suite 150
Irvine, California 92617

Project No. 27315-42227-W1.CMP



DATE: Oct 24, 2007 2:48pm XREFS: K:\227315_ElMonteOperableUnit\227315\CAD\Figure 2-8_Cross Section I-I'.dwg USER: schellerka

EL MONTE OPERABLE UNIT

Geological Cross Section I-I'

Figure 2-8

LEGEND

- GROUND SURFACE
- APPROX LOWER BOUNDARY OF SHALLOW ZONE
- ▨ GRAVEL/SAND
- ▨ SILT/CLAY

NOTE:

LITHOLOGY BASED ON BOREHOLE SOIL LOGS AND RESISTIVITY LOGS, WHEN AVAILABLE.

ERP9/ERP12 AND ERP10/ERP14 LITHOLOGY BASED ON DEEPER WELL.

DRILLERS LOG FROM CROWN VALLEY PLATING CO WELL (1962) INDICATES INTERVAL FROM 260 FEET TO 804 FEET BGS IS SAND OR GRAVEL, WHICH IS LIKELY AN OVERSIMPLIFICATION.

DCMW1/B HYDROGRAPH

MWZ-8 HYDROGRAPH

FEET ABOVE MEAN SEA LEVEL

NOT DETECTED ABOVE LABORATORY REPORTING LIMITS

CONCENTRATIONS REPORTED AS ESTIMATED ABOVE METHOD

DETECTION LIMIT AND BELOW REPORTING LIMIT

NOT ANALYZED

CONC. IN MICROGRAMS PER LITER (UG/L)

SCREENED INTERVAL

RESISTIVITY GUARD LOG

HORIZONTAL SCALE

1" = 500'

VERTICAL SCALE

1" = 100'

From Alan Bradford



Western Portion of the El Monte Operable Unit Compliance and Sentinel Well Installation and Groundwater Monitoring Report Addendum

April 25, 2008

2008b

Prepared for:

West Side Performing Settling Defendant



Prepared by:

CDM

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1.ERP16 BORING/WELL NUMBER ERP-16
 PROJECT NAME EMOU DATE DRILLED April 9 - 14, 2007
 LOCATION El Monte Operable Unit CASING TYPE/DIAMETER Mild & 304 Stainless Steel / 4-inch
 DRILLING METHOD Reverse Circulation SCREEN TYPE/SLOT Stainless Steel Wire Wrap/010-slot (0.020")
 SAMPLING METHOD Grab GRAVEL PACK TYPE #3 Lonestar Sand
 GROUND SURFACE ELEVATION (FT MSL) _____ GROUT TYPE/QUANTITY Portland Cement with 5% Bentonite Gel
 TOP OF CASING ELEVATION (FT MSL) _____ STATIC WATER LEVEL (FT BELOW TOC) _____
 LOGGED BY Chad Marvin GROUND WATER ELEVATION (FT MSL) _____
 REMARKS _____

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					0.5			CONCRETE is 6 inches thick.	0.5	Asphalt
					5			SAND WITH GRAVEL: dark yellowish brown (10YR4/4); 80% sand, poorly graded, fine to medium, subangular to rounded; 20% gravel, fine to coarse, mostly fine to medium, 2-inch maximum diameter, subangular to rounded; moist.		16" Conductor Casing (0-61 feet bgs)
				SP	10			SAND WITH GRAVEL: dark yellowish brown (10YR4/4); 80% sand, poorly graded, fine to medium, subangular to rounded; 20% gravel, fine to coarse, mostly fine to medium, 2-inch maximum diameter, subangular to rounded; moist.		4" Sch 40, Mild Steel Blank (0-148 ft bgs)
					15			SILTY SAND: brown (10YR4/3); 80% sand, poorly graded, fine, subangular to subrounded; 15% silt; moist.	17.0	11.0 Sack Cement (0.5-150 ft bgs)
				SM	20			SAND: light olive brown (2.5Y5/3); 100% sand, poorly graded, fine, trace coarse, subangular to subrounded; moist.	22.0	
					25			SAND: yellowish brown (10YR5/4); 100% sand, poorly graded, fine to coarse, mostly fine, subangular to subrounded; trace gravel, poorly graded, fine, 1/4-inch maximum diameter, subangular to subrounded; moist.		
				SP	30					
					35					

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1.ERP16
PROJECT NAME EMOU

BORING/WELL NUMBER ERP-16
DATE DRILLED April 9 - 14, 2007

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					36.0			SAND: yellowish brown (10YR5/4); 100% sand, well graded, fine to medium, subangular to subrounded; trace gravel, well graded, fine, 1/4-inch maximum diameter, subangular to subrounded; moist.	36.0	
					40	SW				
					45	SP		SAND: yellowish brown (10YR4/4); 90% sand, well graded, medium to coarse, subangular to subrounded; 10% gravel, poorly graded, fine to coarse, 1-inch maximum diameter, subangular to subrounded; moist.	43.0	
					46.0	SC		CLAYEY SAND: dark brown (7.5Y3/4); 50% sand, poorly graded, fine, subangular to subrounded; 40% clay, non-plastic, firm; 10% silt; moist.	46.0	4" Sch 40, Mild Steel Blank (0-148 ft bgs)
					47.0			SILTY SAND: brown (10YR4/3); 85% sand, poorly graded, fine, subangular to subrounded; 15% silt; trace gravel, poorly graded, fine to coarse, mostly fine, 2-inch maximum diameter, subangular to subrounded. moist. Trace 4-inch cobbles.	47.0	11.0 Sack Cement (0.5-150 ft bgs)
					50					
					55	SM		SILTY SAND: brown (10YR4/3); 70% sand, poorly graded, fine, subangular to subrounded; 30% silt; moist.		
					59.0			SILTY SAND: dark yellowish brown (10YR3/4); 70% sand, poorly graded, fine, subangular to subrounded; 15% silt; 10% gravel, poorly graded, fine to medium, 3/4-inch maximum diameter, subangular to subrounded; moist.	59.0	
					60.0	CL		CLAY WITH SAND: dark yellowish brown (10YR3/6); 50% clay, low plasticity, hard; 45% sand, poorly graded, fine, subangular to subrounded; moist.	60.0	16" Conductor Casing (0-61 feet bgs)
					65	SM		SILTY SAND: brown (10YR4/3); 80% sand, poorly graded, fine, subangular to subrounded; 15% silt; 5% gravel, poorly graded, fine to medium, 3/4-inch maximum diameter, subangular to subrounded.		
					70			SAND WITH SILT: dark yellowish brown (10YR3/6); 75% sand, poorly graded, medium to coarse, subangular; 10% silt; 10% gravel, fine to medium, 3/4-inch maximum diameter, subangular to rounded; 5% clay, low plasticity, soft.	67.0	
					75	SP SM				

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1.ERP16

BORING/WELL NUMBER ERP-16

PROJECT NAME EMOU

DATE DRILLED April 9 - 14, 2007

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					77.0			SAND: strong brown (7.5YR4/6); 95% sand, well graded, medium to coarse, subangular to subrounded; 5% silt.	77.0	
					80	SW				
					85					
					87.0			SILTY SAND: yellowish brown (10YR5/8); 75% sand, poorly graded, medium to coarse, subangular to subrounded; 15% silt; 10% clay, medium plasticity, soft clay balls; trace gravel, poorly graded, fine, 1/6-inch maximum diameter, subangular to subrounded.	87.0	4" Sch 40, Mild Steel Blank (0-148 ft bgs)
					90	SM				
					91.0			SAND WITH SILT: dark yellowish brown (10YR4/4); 80% sand, poorly graded, medium to coarse, subangular; 10% silt; 10% gravel, fine, 1/4-inch maximum diameter, subangular; trace clay, low plasticity, soft.	91.0	11.0 Sack Cement (0.5-150 ft bgs)
					95	SP SM				
					97.0				97.0	
					100			SAND: dark yellowish brown (10YR3/4); 95% sand, poorly graded, fine, subangular; 5% silt; mica flakes.		
					105	SP				
					110					
					112.0			SAND: dark yellowish brown (10YR4/6); 95% sand, poorly graded, medium to coarse, subangular; 5% silt.	112.0	
					115	SW		SAND: strong brown (7.5YR4/6); 100% sand, well graded, medium to coarse, subangular.	115.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1.ERP16 BORING/WELL NUMBER ERP-16
PROJECT NAME EMOU DATE DRILLED April 9 - 14, 2007

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					120.0	SW		SAND: strong brown (7.5YR4/6); 100% sand, well graded, medium to coarse, subangular.	120.0	<p>4" Sch 40, Mild Steel Blank (0-148 ft bgs)</p> <p>11.0 Sack Cement (0.5-150 ft bgs)</p> <p>4" Mechanical Coupler (148-150 ft bgs)</p> <p>Bentonite/Sand Seal (150-159 ft bgs)</p>
					125.0	SW SM		SAND WITH SILT: brown (10YR4/3); 90% sand, well graded, coarse, subangular to subrounded; 10% silt.		
					130.0	SW SM		SAND WITH SILT: brown (10YR4/3); 90% sand, poorly graded, fine, subangular to subrounded; 10% silt; trace clay.		
					135.0	SM		SILTY SAND: dark yellowish brown (10YR3/4); 75% sand, poorly graded, fine, subangular to subrounded; 25% silt; trace clay, low plasticity, soft; trace gravel, poorly graded, fine, 1/3-inch maximum diameter, subangular to subrounded.		
					141.0	SP		SAND: dark yellowish brown (10YR4/4); 95% sand, poorly graded, fine, subangular; 10% gravel, poorly graded, fine to medium, mostly fine, 3/4-inch maximum diameter, subangular to subrounded; 5% silt; trace clay, low plasticity, soft.		
					146.0	SP		SAND WITH GRAVEL: dark brown (10YR3/3); 80% sand, poorly graded, fine, subangular to subrounded; 15% gravel, fine to coarse, mostly fine, 1-inch maximum diameter, subangular to subrounded; 5% silt.		
					153.0	CL		CLAY: dark brown (10YR3/3); 90% clay, medium plasticity, firm; 10% sand, poorly graded, fine, subangular to subrounded.	153.0	
					155.0				155.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1.ERP16

BORING/WELL NUMBER ERP-16

PROJECT NAME EMOU

DATE DRILLED April 9 - 14, 2007

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					160	CL		CLAY: dark brown (10YR3/3); 90% clay, medium plasticity, firm; 10% sand, poorly graded, fine, subangular to subrounded.		
					163.0	SC		CLAYEY SAND: dark brown (10YR3/3); 55% sand, poorly graded, fine, trace coarse, subangular to subrounded; 40% clay, high plasticity, firm; 5% gravel, poorly graded, fine, 1/4-inch maximum diameter, subangular to subrounded.	163.0	
					168.0	SP		SAND: dark brown (10YR3/3); 90% sand, poorly graded, medium to coarse, subangular to subrounded; 5% gravel, poorly graded, fine, 1/4-inch maximum diameter, subangular to subrounded; 5% silt.	168.0	
					175	SP		SAND: dark yellowish brown (10YR4/4); 90% sand, poorly graded, medium to coarse, subangular to subrounded; 10% gravel, poorly graded, fine, 1/2-inch maximum diameter, subangular to subrounded.	178.0	
					180	SP		SAND WITH GRAVEL: dark brown (10YR3/3); 85% sand, poorly graded, medium to coarse, trace fine, subangular; 15% gravel, fine to medium, 3/4-inch maximum diameter, subangular.	183.0	
					185	CH		CLAY WITH SAND: dark yellowish brown (10YR4/4); 75% clay, high plasticity, firm; 25% sand, poorly graded, fine, subangular.	190.0	
					190	SC		CLAYEY SAND: dark yellowish brown (10YR3/4); 75% sand, poorly graded, fine, subangular; 20% clay, medium plasticity, firm; 5% silt.	195.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1.ERP16

BORING/WELL NUMBER ERP-16

PROJECT NAME EMOU

DATE DRILLED April 9 - 14, 2007

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					198.0	SC		CLAYEY SAND: dark yellowish brown (10YR3/4); 75% sand, poorly graded, fine, subangular; 20% clay, medium plasticity, firm; 5% silt.	198.0	<p>← Bentonite/Sand Seal (188-259 ft bgs)</p> <p>← 4" Sch 40, 304 Stainless Steel Blank (180-272 ft bgs)</p>
					200	SP		SAND: dark grayish brown (10YR4/2); 100% sand, poorly graded, fine, subangular; trace clay, medium plasticity, soft.	205.0	
					205	SC		CLAYEY SAND: dark yellowish brown (10YR3/4); 50% sand, poorly graded, fine, subangular; 40% clay, high plasticity, soft; 10% silt.	209.0	
					210			SAND: brown (10YR4/3); 100% sand, poorly graded, fine to medium, subangular; trace clay, low plasticity, 1/2-inch soft clay balls.		
					215			SAND: brown (10YR4/3); 100% sand, poorly graded, fine, subangular; trace clay, low plasticity, 1/2-inch soft clay balls.		
					220	SP				
					225			SAND: brown (10YR4/3); 100% sand, poorly graded, fine to coarse, mostly fine to medium, subangular to subrounded; trace gravel, poorly graded, fine, 1/4-inch maximum diameter.		
					230			SAND: dark yellowish brown (10YR4/4); 100% sand, poorly graded, fine to coarse, mostly medium, subangular to subrounded; trace clay, medium plasticity, soft.		
					235				235.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1.ERP16
PROJECT NAME EMOU

BORING/WELL NUMBER ERP-16
DATE DRILLED April 9 - 14, 2007

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					238.0	SP SC		SAND WITH CLAY: dark brown (10YR3/3); 90% sand, poorly graded, fine to medium, subangular to subrounded; 10% clay, high plasticity, soft.	238.0	<ul style="list-style-type: none"> Bentonite/Sand Seal (188-259 ft bgs) 4" Sch 40, 304 Stainless Steel Blank (180-272 ft bgs) #60 Transition Sand (259-264 ft bgs) #3 Filter Pack (264-290 ft bgs) 4", 304 Stainless Steel, Wire Wrap Screen, 020"-slot
					240	SW SM		SAND WITH SILT: dark brown (10YR3/3); 90% sand, well graded, fine, trace medium, subangular to subrounded; 10% silt.	242.0	
					245	SP		SAND: dark brown (10YR4/3); 95% sand, poorly graded, fine to coarse, mostly fine to medium, subangular to subrounded; 5% silt; trace clay, soft, trace 1/2-inch firm clay balls.	247.0	
					250	CL		SANDY CLAY: very dark grayish brown (10YR3/2); 70% clay, medium plasticity, firm; 25% sand, poorly graded, fine, subangular to subrounded; 5% silt.	257.0	
					260	SC		CLAYEY SAND: dark brown (10YR3/3); 65% sand, poorly graded, fine, subangular to subrounded; 30% clay, medium plasticity, soft; 5% silt.	261.0	
					265	SP SM		SAND WITH SILT: dark yellowish brown (10YR4/4); 95% sand, poorly graded, fine to medium, subangular to subrounded; 10% silt; 5% clay medium plasticity; trace gravel, poorly graded, fine, 1/3-inch maximum diameter, subangular to diameter.	268.0	
					270	CH		CLAY: dark yellowish brown (10YR3/4); 90% clay, high plasticity, firm; 10% sand, poorly graded, fine, subangular to subrounded.	273.0	
					275	SP SM		SAND WITH SILT: brown (10YR4/3); 90% sand, poorly graded, fine to medium, subangular; 10% silt; trace clay medium plasticity, 1/2-inch soft clay balls.	275.0	

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PROJECT NUMBER 27315-42227-W1.ERP16

BORING/WELL NUMBER ERP-16

PROJECT NAME EMOU

DATE DRILLED April 9 - 14, 2007

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					280	SP SM		SAND WITH SILT: brown (10YR4/3); 90% sand, poorly graded, fine to medium, subangular; 10% silt; trace clay medium plasticity, 1/2-inch soft clay balls.	282.0	(272-282 ft bgs) 4", 304 Stainless Steel, Wire Wrap Screen, 020"-slot (272-282 ft bgs)
					285	SP		SAND: dark yellowish brown (10YR3/4); 95% sand, poorly graded, fine to medium, trace coarse, subangular; 5% clay, medium plasticity, soft.	287.0	#3 Filter Pack (264-290 ft bgs)
					290	CL		SANDY CLAY: dark yellowish brown (10YR3/6); 65% clay, high plasticity, soft; 30% sand, poorly graded, fine, subangular to subrounded; 5% silt.	290.0	
					295	SP		SAND: brown (10YR4/3); 90% sand, poorly graded, coarse, trace fine, subangular to subrounded; 5% gravel, poorly graded, fine, trace medium, 1-inch maximum diameter, 5% silt; trace clay, medium plasticity, soft.	295.0	4" Sch 40, Stainless Steel Blank (282-346 ft bgs)
					300	SM		SILTY SAND: brown (10YR4/3); 65% sand, poorly graded, fine, trace coarse, subangular to subrounded; 30% silt; 5% clay, medium plasticity, soft.	301.0	Bentonite/Sand Seal (290-335 ft bgs)
					305	SP SM		SAND WITH SILT: dark yellowish brown (10YR3/4); 85% sand, poorly graded, fine to coarse, mostly fine to medium, subangular to subrounded; 10% silt; 5% clay medium plasticity, soft; trace gravel, poorly graded, fine to medium, 3/4-inch maximum diameter, subangular to subrounded.	306.0	
					310	CH		SANDY CLAY: dark yellowish brown (10YR3/4); 65% clay, high plasticity, soft; 35% sand, poorly graded, fine, subangular to subrounded; trace gravel, poorly graded, fine, 1/3-inch maximum diameter, subangular to subrounded.	314.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1.ERP16
PROJECT NAME EMOU

BORING/WELL NUMBER ERP-16
DATE DRILLED April 9 - 14, 2007

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
						SC		CLAYEY SAND: dark yellowish brown (10YR4/4); 80% sand, poorly graded, fine to medium, subangular to subrounded; 30% clay, high plasticity, soft.		<p>4" Sch 40, Stainless Steel Blank (282-346 ft bgs)</p> <p>Bentonite/Sand Seal (290-335 ft bgs)</p> <p>#60 Transition Sand (335-338 ft bgs)</p> <p>#3 Filter Pack (338-364 ft bgs)</p> <p>4", 304 Stainless Steel, Wire Wrap Screen, 020"-slot (346-356 ft bgs)</p>
					320	CH		CLAYEY SAND: dark brown (10YR3/3); 70% sand, poorly graded, fine to medium, mostly fine, subangular to subrounded; 25% clay, medium plasticity, soft; 5% silt.	321.0	
					325	CH		SANDY CLAY: dark brown (10YR3/3); 65% clay, high plasticity, soft; 35% sand, poorly graded, medium, subangular to subrounded.	326.0	
					330	SP		SAND WITH GRAVEL: dark yellowish brown (10YR3/4); 80% sand, poorly graded, medium to coarse, subrounded; 20% gravel, fine to coarse, mostly fine, 1-inch maximum diameter, subangular; trace clay, high plasticity, soft.	331.0	
					335	SC		CLAYEY SAND: dark yellowish brown (10YR3/4); 75% sand, poorly graded, fine to coarse, subangular to subrounded; 15% clay, medium plasticity, soft; 10% gravel, poorly graded, fine to medium, 3/4-inch maximum diameter, subangular.	337.0	
					340	SP		SAND: dark yellowish brown (10YR3/4); 90% sand, poorly graded, fine to coarse, mostly fine, subangular; 10% gravel, poorly graded, fine, 1/2-inch maximum diameter, subangular.	342.0	
					345	CH		SANDY CLAY: dark yellowish brown (10YR4/4); 70% clay, high plasticity, soft; 30% sand, poorly graded, fine, trace medium, subangular to subrounded.	347.0	
					350	SW		SAND: dark yellowish brown (10YR3/4); 90% sand, well graded, medium to coarse, subangular to subrounded; 10% gravel, well graded, fine, 1/2-inch maximum diameter, subangular to subrounded. Rig chattering at 348'-356'.	350.0	
					355	SP		SAND WITH GRAVEL: dark yellowish brown (10YR3/4); 85% sand, poorly graded, coarse, subangular to subrounded; 15% gravel, poorly graded, fine to coarse, mostly fine, 1-inch maximum diameter, subangular to subrounded. 1-inch firm clay balls.	355.0	

Continued Next Page

NEWGINT EMOU.GPJ NEWGINT.GDT 05/24/07



18581 Teller Avenue, Suite 200
Irvine, CA 92612
(949) 752-5452
(949) 752-1307 (FAX)

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1.ERP16
PROJECT NAME EMOU

BORING/WELL NUMBER ERP-16
DATE DRILLED April 9 - 14, 2007

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					360	SP		SAND WITH GRAVEL: dark yellowish brown (10YR3/4); 80% sand, poorly graded, medium to coarse, subangular to subrounded; 15% gravel, poorly graded, fine to medium, 3/4-inch maximum diameter, subangular to subrounded, 5% silt.	364.0	#3 Filter Pack (338-364 ft bgs)
					365	SC		CLAYEY SAND: dark yellowish brown (10YR3/4); 80% sand, poorly graded, fine to coarse, mostly medium to coarse, angular to subrounded; 15% clay, medium plasticity, soft; 5% silt; trace gravel, poorly graded, fine, 1/4-inch maximum diameter, angular to subrounded.	368.0	4" Sch 40, 304 Stainless Steel Blank (356-450 ft bgs)
					370	SW		SAND: dark yellowish brown (10YR3/4); 95% sand, well graded, medium to coarse, subangular to subrounded; 5% gravel, well graded, fine, 1/3-inch maximum diameter, subangular to subrounded.		
					375			Rig chattering at 373'.		
					380	SP SM		SAND WITH SILT: yellowish brown (10YR5/4); 85% sand, poorly graded, fine to medium, trace coarse, subangular to subrounded; 10% silt; 5% gravel, poorly graded, fine, 3/4-inch maximum diameter, subangular to subrounded.	377.0	Bentonite/Sand Seal (364-439 ft bgs)
					385				386.0	
					390	CL		CLAY WITH SAND: brown (7.5Y4/3); 60% clay, medium plasticity, firm; 30% sand, poorly graded, fine, trace medium, subangular to subrounded; 10% silt.		
					395			SANDY CLAY: dark yellowish brown (10YR4/4); 55% clay, high plasticity, soft; 40% sand, poorly graded, fine, trace coarse, subangular to subrounded; 5% silt.	395.0	

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NEWGINT EMOU.GPJ NEWGINT.GDT 05/24/07



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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1.ERP16

BORING/WELL NUMBER ERP-16

PROJECT NAME EMOU

DATE DRILLED April 9 - 14, 2007

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					400	CL		CLAY WITH SAND: dark yellowish brown (10YR4/4); 75% clay, high plasticity, soft; 25% sand, poorly graded, fine, trace coarse subangular to subrounded.		
					405				406.0	← Bentonite/Sand Seal (364-439 ft bgs)
					410	SP		SAND: dark yellowish brown (10YR3/4); 85% sand, poorly graded, medium to coarse, subangular to subrounded; 10% gravel, poorly graded, medium, 1/2-inch maximum diameter, subangular to subrounded.		
					415	SC		CLAYEY SAND: dark yellowish brown (10YR4/6); 55% sand, poorly graded, fine, trace medium, subangular to subrounded; 45% clay, medium plasticity, soft.	417.0	← 4" Sch 40, 304 Stainless Steel Blank (356-450 ft bgs)
					420	CH		SANDY CLAY: dark yellowish brown (10YR3/6); 65% clay, high plasticity, soft; 30% sand, poorly graded, fine, subangular to subrounded; 5% silt.		
					425	SC		CLAYEY SAND: olive brown (2.5Y4/4); 70% sand, poorly graded, fine to medium, trace coarse, subangular to subrounded; 25% clay, medium plasticity, soft; 5% silt.		
					430	CH		CLAY: dark yellowish brown (10YR3/6); 90% clay, high plasticity, soft; 10% sand, poorly graded, fine, subangular to subrounded.	429.0	
					435				435.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1.ERP16
PROJECT NAME EMOU

BORING/WELL NUMBER ERP-16
DATE DRILLED April 9 - 14, 2007

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					440	CH		CLAY WITH SAND: dark yellowish brown (10YR3/6); 80% clay, high plasticity, soft; 20% sand, poorly graded, fine, subangular to subrounded.		
					443.0				443.0	
					445	SC		CLAYEY SAND: dark yellowish brown (10YR3/4); 80% sand, poorly graded, medium to coarse, subangular to subrounded; 20% clay, medium plasticity, soft.		
					450					
					452.0				452.0	
					455	SW		SAND: dark yellowish brown (10YR4/4); 95% sand, well graded, fine to coarse, mostly medium to coarse, subangular to subrounded; 5% gravel, well graded, fine, trace coarse, 1-inch maximum diameter, subangular to subrounded; trace clay, high plasticity, soft.		
					460					
					463.0				463.0	
					465	SC		CLAYEY SAND: olive brown (2.5Y4/4); 60% sand, poorly graded, fine to coarse, subangular to subrounded; 35% clay, medium plasticity, soft; 5% gravel, poorly graded, fine, 1/3-inch maximum diameter, subangular to subrounded.		
					469.0				469.0	
					470	SP		SAND WITH GRAVEL: dark yellowish brown (10YR4/4); 85% sand, poorly graded, medium to coarse, subangular to subrounded; 15% gravel, fine, trace medium to coarse, 1-inch maximum diameter, subangular to subrounded; trace clay, high plasticity, soft 1/2-inch clay balls.		
					475.0				475.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1.ERP16

BORING/WELL NUMBER ERP-16

PROJECT NAME EMOU

DATE DRILLED April 9 - 14, 2007

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
						CH		CLAY WITH SAND: dark brown (7.5Y3/3); 80% clay, high plasticity, soft; 20% sand, poorly graded, fine, subangular to subrounded; trace gravel, poorly graded, fine, 1/3-inch maximum diameter, subangular to subrounded.		
					480	SP		SAND: dark yellowish brown (10YR4/4); 90% sand, poorly graded, medium, subangular to subrounded; 10% gravel, poorly graded, fine, 1/3-inch maximum diameter, subangular to subrounded; trace clay, medium plasticity, soft.	479.0	<p>← Bentonite/Sand Seal (468-514 ft bgs)</p> <p>← 4" Sch 40, 304 Stainless Steel Blank (460-525 ft bgs)</p>
					485	CL		CLAY WITH SAND: dark yellowish brown (10YR4/4); 65% clay, low plasticity, firm; 25% sand, poorly graded, medium to coarse, subangular to subrounded; 10% silt; trace gravel, poorly graded, fine, 1/4-inch maximum diameter, subangular to subrounded,	484.0	
					490	SC		CLAYEY SAND: dark yellowish brown (10YR4/4); 55% sand, poorly graded, fine to medium, subangular to subrounded; 40% clay, medium plasticity, soft; 5% silt.	489.0	
					495	CL		CLAY WITH SAND: dark yellowish brown (10YR4/6); 75% clay, medium plasticity, soft; 25% sand, poorly graded, medium, subangular to subrounded.	494.0	
					500	CH		CLAY: dark yellowish brown (10YR4/4); 90% clay, high plasticity, soft; 10% sand, poorly graded, fine, subangular to subrounded.	499.0	
					505	SC		CLAYEY SAND: olive brown (2.5Y4/4); 80% sand, poorly graded, fine to medium, trace coarse, subangular to subrounded; 15% clay, medium plasticity, soft; 5% silt.	506.0	
					510	SP		SAND: dark yellowish brown (10YR4/4); 90% sand, poorly graded, medium, subangular to subrounded; 5% gravel, poorly graded, fine, 1/3-inch maximum diameter, subangular to subrounded; 5% clay, medium plasticity, soft.	510.0	
					515				515.0	

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NEWGINT EMOU.GPJ NEWGINT.GDT 05/24/07

PROJECT NUMBER 27315-42227-W1.ERP16

BORING/WELL NUMBER ERP-16

PROJECT NAME EMOU

DATE DRILLED April 9 - 14, 2007

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					520	SP		SAND: dark yellowish brown (10YR4/6); 90% sand, poorly graded, medium to coarse, subangular to subrounded; 5% clay, medium plasticity, soft; trace gravel, poorly graded, fine, 1/3-inch maximum diameter, subangular to subrounded.		
					523.0				523.0	← #60 Transition Sand (514-516 ft bgs)
					525	CL		CLAY WITH SAND: dark yellowish brown (10YR4/6); 80% clay, medium plasticity, soft; 20% sand, poorly graded, fine, subangular to subrounded.		
					527.0				527.0	← 4" Sch 40, 304 Stainless Steel Blank (460-525 ft bgs)
					530	SW		SAND: dark yellowish brown (10YR4/4); 95% sand, well graded, coarse, subangular to subrounded; 5% gravel, well graded, fine to medium, 1-inch maximum diameter, subangular to subrounded.		
					535					← #3 Filter Pack (516-544 ft bgs)
					540	SP SC		SAND WITH CLAY: dark yellowish brown (10YR4/4); 90% sand, poorly graded, medium to coarse, subangular to subrounded; 10% clay, medium plasticity, soft.		
					544.0				537.0	← 4", 304 Stainless Steel, Wire Wrap Screen, 020" slot (525-535 ft bgs)
					545	CL		CLAY WITH SAND: dark yellowish brown (10YR4/4); 55% clay, medium plasticity, soft; 40% sand, poorly graded, fine to medium, subangular to subrounded; 5% gravel, poorly graded, fine, 1/3-inch maximum diameter, subangular to subrounded.		
					549.0				544.0	← 4" Sch 40, 304 Stainless Steel Blank with Endcap (535-555 ft bgs)
					550	SC		CLAYEY SAND: olive brown (2.5Y4/4); 65% sand, poorly graded, medium to coarse, subangular to subrounded; 30% clay, low plasticity, soft; 5% silt.		
					554.0				549.0	← Bentonite/Sand Seal (544-563 ft bgs)
					555				554.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 27315-42227-W1.ERP16

BORING/WELL NUMBER ERP-16

PROJECT NAME EMOU

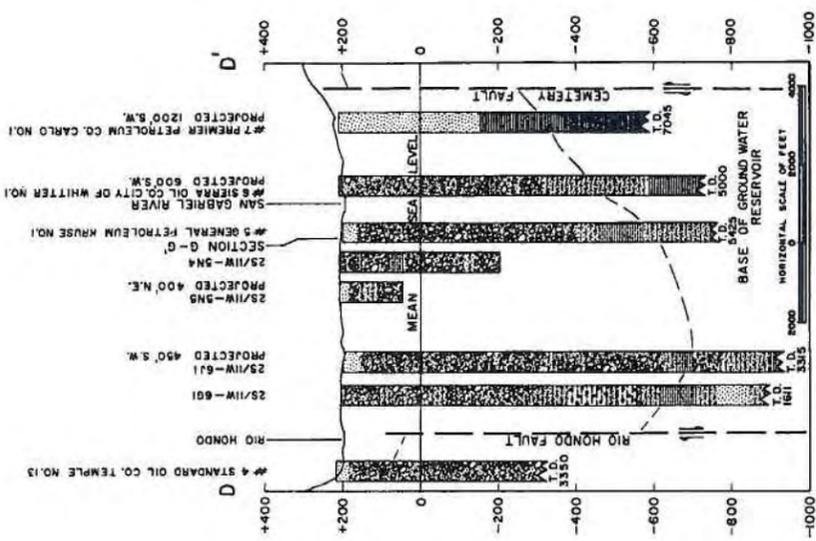
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Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					560	CH		CLAY WITH SAND: dark yellowish brown (10YR4/4); 75% clay, high plasticity, soft; 20% sand, poorly graded, fine, subangular to subrounded, 5% silt.		<p>← Bentonite/Sand Seal (544-563 ft bgs)</p> <p>← Sluff (563-577 ft bgs) Sluff (563-577 ft bgs)</p>
					565	CH		CLAY: dark yellowish brown (10YR4/4); 90% clay, high plasticity, soft; 10% sand, poorly graded, fine, subangular to subrounded.	563.0	
					570	CH			572.0	
					575	SP		SAND: olive brown (2.5Y4/4); 95% sand, poorly graded, medium to coarse, subangular to subrounded; 5% clay, medium plasticity, soft.	577.0	
					580			Total depth of pilot is 577 feet bgs.		
					585					
					590					
					595					

NEWGINT_EMOU.GPJ_NEWGINT.GDT_05/24/07

CDWR, 1966



SECTION D-D'—THROUGH WHITTER NARROWS

LEGEND

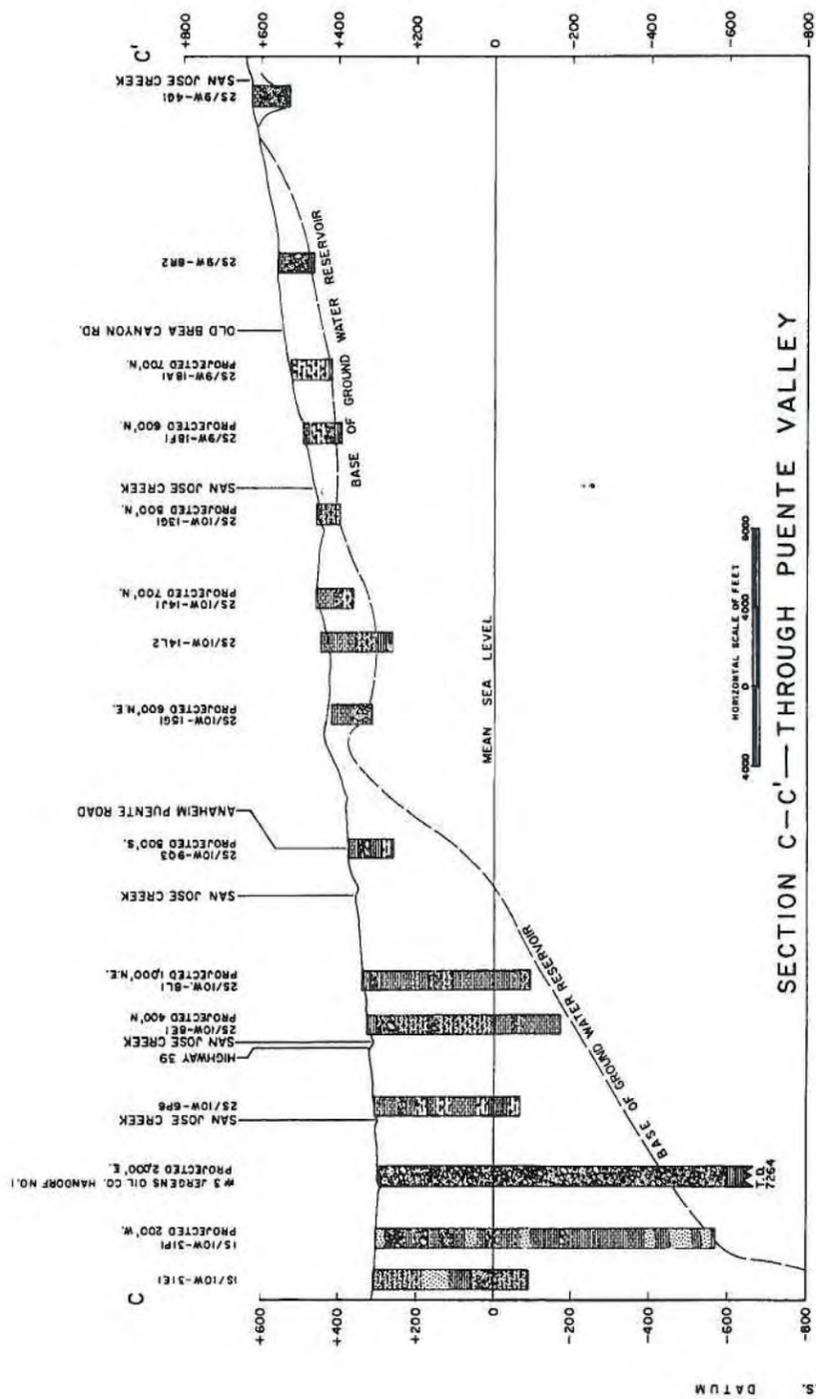
- SAND
- GRAVEL OR GRAVEL AND SAND
- CLAY
- SANDY CLAY
- GRAVELLY CLAY
- SEDIMENTARY BEDROCK
- CRYSTALLINE BEDROCK
- FAULTS

NOTE:
LOCATIONS OF WELL LOG SECTIONS ARE SHOWN ON PLATE 13

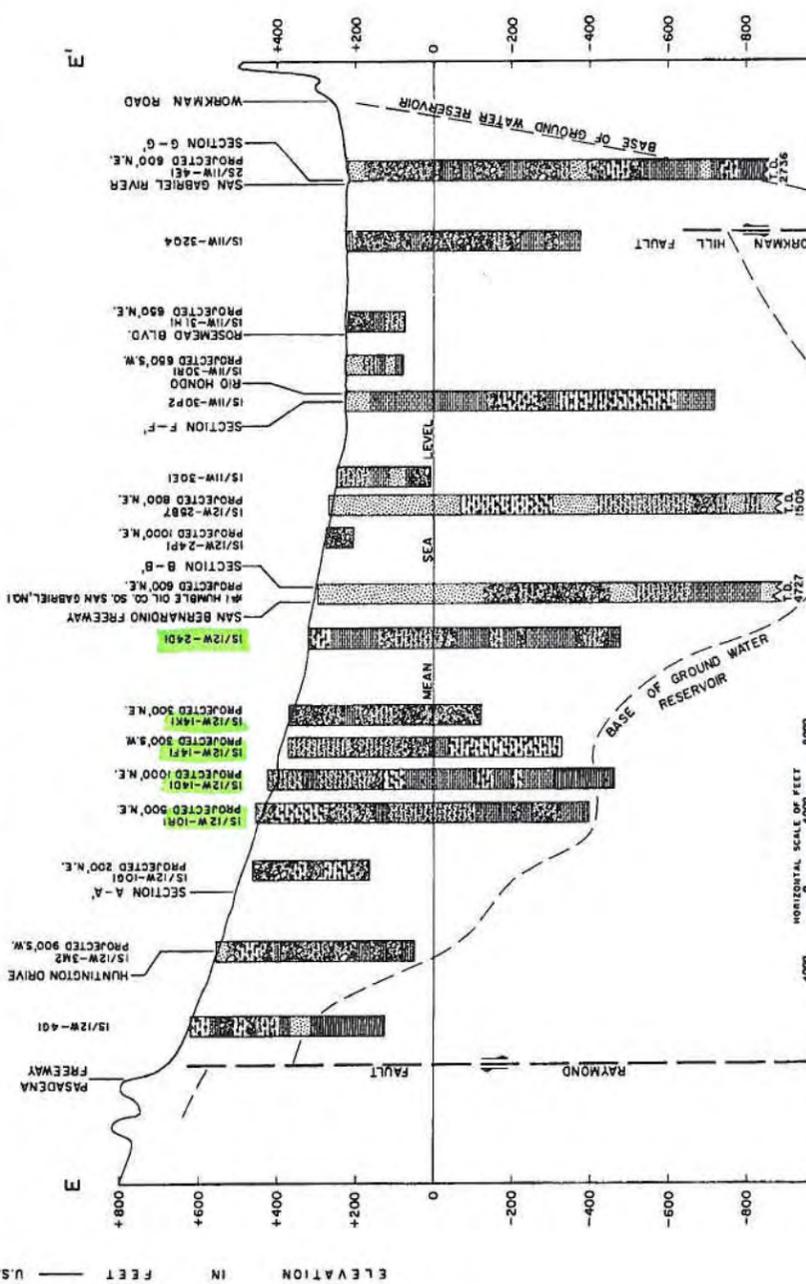
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THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT
GEOLOGY AND HYDROLOGY OF THE
SAN GABRIEL VALLEY

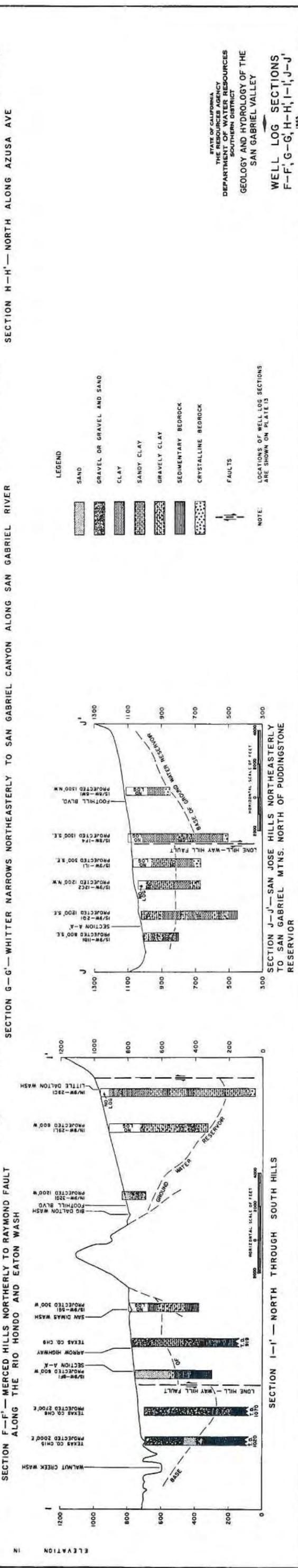
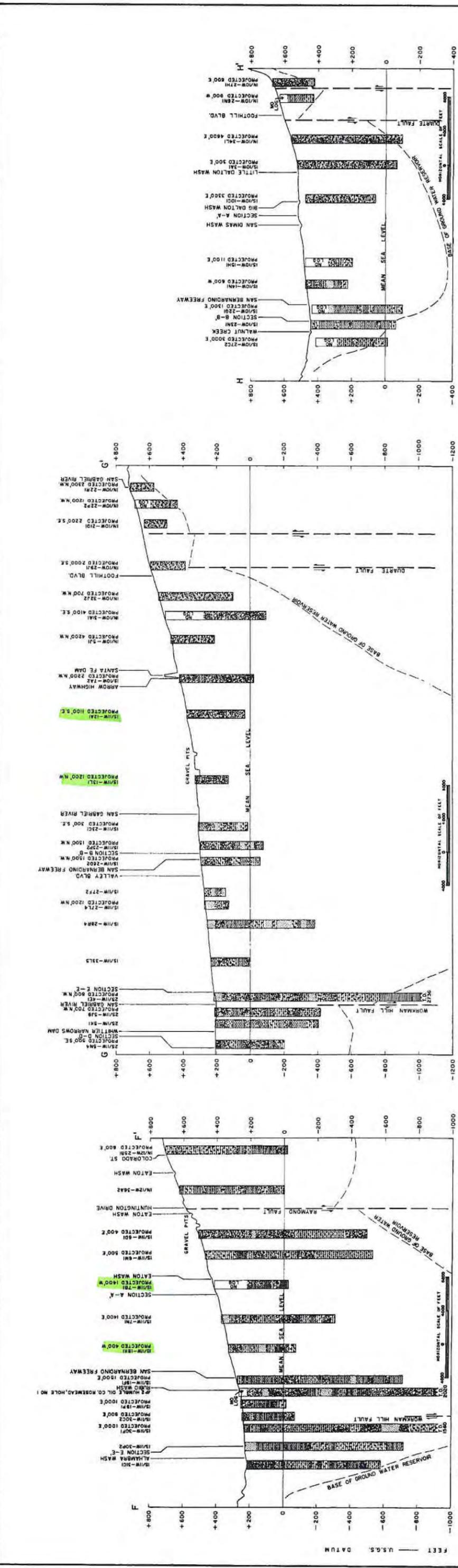
WELL LOG SECTIONS
C-C', D-D', E-E'

1965



SECTION C-C'—THROUGH PUENTE VALLEY





LEGEND

- SAND
- GRAVEL OR GRAVEL AND SAND
- CLAY
- SANDY CLAY
- GRAVELLY CLAY
- SEDIMENTARY BEDROCK
- CRYSTALLINE BEDROCK
- FAULTS

NOTE: LOCATIONS OF WELL LOG SECTIONS ARE SHOWN ON PLATE 13

STATE OF CALIFORNIA
 THE RESOURCES AGENCY
 DEPARTMENT OF WATER RESOURCES
 SOUTHERN DISTRICT
 GEOLOGY AND HYDROLOGY OF THE
 SAN GABRIEL VALLEY
WELL LOG SECTIONS
 F-F', G-G', H-H', I-I', J-J'

DRAFT
WELL INSTALLATION REPORT
FOR SAN GABRIEL VALLEY NPL AREA 3
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

SAN GABRIEL BASIN
LOS ANGELES COUNTY, CALIFORNIA

EPA CONTRACT NO. 68-W-98-225
EPA WORK ASSIGNMENT NO. 041-RICO-09ES
CH2M HILL PROJECT NO. 175859.FI.03

Prepared for
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105

Prepared by
CH2M HILL
Southern California Regional office
3 Hutton Centre Drive
Suite 200
Santa Ana, California 92707
October 2003



Boring Number: MW1-1

Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Front Street and Atlantic Street
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: NA
Logged by: Tom Perina
Start/Finish Date: 12.21.2002 / 12.23.2002

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
0		Ground Surface		
0 - 5		ASPHALT AND FILL MATERIAL		first 11-feet were air-knifed
5 - 15		POORLY GRADED SAND (SP) , some granitic cobbles, medium sand, yellowish brown (10YR 5/4)		bucket auger from 10-26 feet below ground surface
15 - 26		POORLY GRADED SAND (SP) , 10% gravel, weathered granitic clasts, light olive brown (2.5Y 5/6) SILTY SAND (SM) , deeply weathered granitic clasts, light olive brown (2.5Y 5/6)		
26 - 40		POORLY GRADED SAND (SP) , with trace gravel, fine to medium sand		
40 - 50		POORLY GRADED SAND (SP) , brownish yellow (10YR 6/6), fine to medium sand, trace gravel		



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Front Street and Atlantic Street

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Tom Perina

Start/Finish Date: 12.21.2002 / 12.23.2002

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
55		POORLY GRADED SAND WITH GRAVEL (SP) , coarse sand, yellow (10YR 7/6)		
60		POORLY GRADED SAND WITH GRAVEL (SP) , coarse sand; trace gray clay "balls"		
65		SANDY CLAY (CL) , yellowish brown (10YR 5/6)		
70				
75				
80		WELL GRADED SAND WITH GRAVEL (SW-GW) , very pale brown (10YR 7/4), medium to very coarse ssand, >15% gravel		
85				
90		CLAYEY GRAVEL (GC) , clay in the form of "balls"		
95		SANDY CLAY (CL)		
100				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Front Street and Atlantic Street

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Tom Perina

Start/Finish Date: 12.21.2002 / 12.23.2002

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
105		CLAYEY GRAVEL (GC) , very pale brown (10YR 7/4) gravels with pale brown (10YR 6/3) sandy clay		
110		GRAVEL (GW) , very pale brown (10YR 7/4)		
115		SANDY CLAY (CL)		
120		GRAVEL (GW) , fine gravel, very pale brown (10YR 7/4)		
130				
135				
140		GRAVEL WITH CLAY (GC) , very pale brown (10YR7/4)		bedrock contact @ 140' based on geophysical logs
145				
150				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Front Street and Atlantic Street

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Tom Perina

Start/Finish Date: 12.21.2002 / 12.23.2002

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
155				
160		<u>CLAYEY SAND (SC)</u> , trace gravel, brownish yellow (10YR 6/6)		
165				
170				
175				
180				
185				
190				drilled to 193 feet below ground surface on 12/30/02
195				
200				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Front Street and Atlantic Street

Project Number: 175859.FI.03

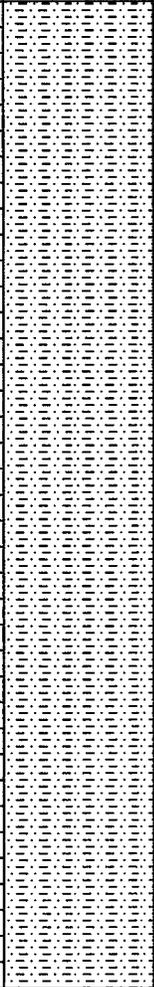
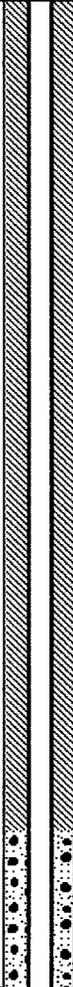
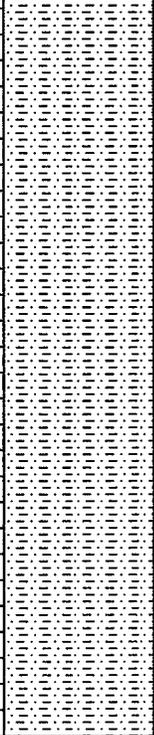
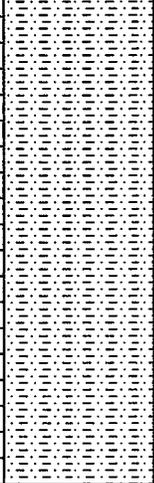
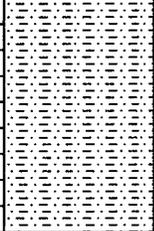
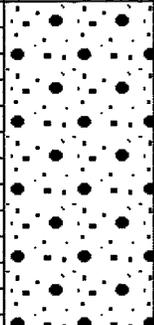
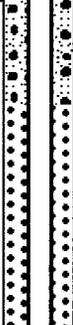
Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Tom Perina

Start/Finish Date: 12.21.2002 / 12.23.2002

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
205		<u>SANDY CLAY (CL)</u> , brownish yellow (10YR 6/6)		
210				
215				
220				
225				
230				
235				
240				
245		<u>GRAVEL (GW)</u> very pale brown (10YR 7/4), trace clay in the form of "balls" (in top 2-feet of gravel layer; most likely traces of the above clay layer)		
250				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Front Street and Atlantic Street

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Tom Perina

Start/Finish Date: 12.21.2002 / 12.23.2002

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
255				
260				
265				
270				some clay "balls"
275		<u>SANDY CLAY (CL)</u> , yellowish brown (10YR 5/4)		approximate gravel-clay interface
280				
285				
290				
295				
300				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Front Street and Atlantic Street

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Tom Perina

Start/Finish Date: 12.21.2002 / 12.23.2002

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
305				
310				
315				
320		<u>CLAY (CL)</u> , plastic, no visible sand		
322		<u>GRAVEL (GW)</u> , trace cobbles		hard drilling from 322 to 323 feet below ground surface
323		<u>CLAY (CL)</u> , light yellowish brown (10YR6/4), no sand, plastic		
325				
330				still only clay coming out at 330 feet below ground surface
335				
340				
345				hard drilling - cobbles present
350				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Front Street and Atlantic Street

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Tom Perina

Start/Finish Date: 12.21.2002 / 12.23.2002

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments	
	Soil Type				
355					
360					
365					<u>CLAY (CL)</u> , gray (10YR 5/1), plastic, no visible sand
370					
375		<u>CLAY (CL)</u> , dark gray (10YR 4/1), plastic, trace sand			
380					
385					
390					
395					
400					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Front Street and Atlantic Street

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Tom Perina

Start/Finish Date: 12.21.2002 / 12.23.2002

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
405					cobbles present
410					cobbles present
415					
420					
425					
430			<u>CLAY (CL)</u> , pale brown (10YR 6/3), plastic, trace sand		
435					
440			<u>CLAY (CL)</u> , gray (10YR 5/1), plastic, trace sand		
445					
450					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Front Street and Atlantic Street

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Tom Perina

Start/Finish Date: 12.21.2002 / 12.23.2002

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
455				cobbles present
460		End of Log		TD = 460' bgs
465				
470				
475				
480				
485				
490				
495				
500				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main&4th(MW1-2A is 20' west of MW1-2B)

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Maura Kennelly

Start/Finish Date: 12.10.2002 / 1.2.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
0		Ground Surface		
0 - 5		ASPHALT AND FILL MATERIAL		Core asphalt w/auger rig on 12/10/02, hand auger to 5' bgs
5 - 10		WELL-GRADED SAND (SW) Dark yellowish brown (10YR 3/4), dry, very fine to very coarse sand, 5% silt		5' to 25' bgs bore w/bucket rig and install conductor casing 12/10/02
10 - 15		WELL-GRADED SAND (SW) Fine to very coarse sand, 7% gravel, trace 3" cobbles, light olive brown (2.5Y 5/6), dry		
15 - 20		WELL-GRADED SAND (SW) Dark yellowish brown (10YR 4/6), dry, fine to very coarse sand, 7% fine to medium gravel (sub-rounded to sub-angular)		
20 - 25		WELL-GRADED SAND W/GRAVEL (GW) 15% gravel, trace cobbles		
25 - 30		WELL-GRADED SAND (SW) Fine to coarse sand		
30 - 35		POORLY GRADED SAND (SP) Coarse to very coarse sand		Begin mud rotary drilling @ 10:45 on 12/12/02
35 - 40		POORLY GRADED SAND (SP) Fine to medium sand		
40 - 45		WELL GRADED SAND w/SILT AND CLAY (SW-SM) Very fine to very coarse sand, 15%-20% silt and clay (in the form of "balls"), trace fine gravel		
45 - 50				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main&4th(MW1-2A is 20' west of MW1-2B)

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Maura Kennelly

Start/Finish Date: 12.10.2002 / 1.2.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments	
	Soil Type				
55		POORLY GRADED SAND (SP) Fine to medium sand		Rig chatter between 54' and 73' bgs (coarse material)	
60		WELL GRADED SAND (SW) Fine to very coarse			
65		POORLY GRADED SAND (SP) Fine to medium sand			
70		WELL GRADED SAND (SW) Medium to very coarse sand, trace clay, gravel and cobbles			
75		WELL GRADED SAND (SW) Fine to coarse			
80		WELL GRADED SAND w/SILT (SW-SM) Fine to very coarse sand, 15%-20% silty clay "balls"			
85					
90		GRAVELS AND COBBLES (GW)			
95		POORLY GRADED SAND (SP) Coarse to very coarse			Rig chatter @ 89'
100		POORLY GRADED SAND (SP) Sub-angular, dark yellowish brown (10YR 4/4), multi-colored granite; coarse to very coarse			



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main&4th(MW1-2A is 20' west of MW1-2B)

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Maura Kennelly

Start/Finish Date: 12.10.2002 / 1.2.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
105		WELL GRADED SAND (SW) Dark yellowish brown (10YR 4/4), fine to very coarse sand		<p>Stop for day @ 16:30</p> <p>12/13/02 start drilling @ 08:30</p> <p>Rig chatter 139' - 151' (gravels & cobbles)</p>
110		WELL GRADED SAND (SW) Yellowish brown (10YR 5/4), fine to very coarse sand		
115		WELL GRADED SAND (SW) Very fine to medium sand, trace coarse sand, brown (10YR 4/3), trace clay		
120		WELL GRADED SAND (SW) Very fine to medium sand, trace coarse sand, brown (10YR 4/3), trace clay		
125		WELL GRADED SAND (SW) Very fine to medium sand, trace coarse sand, brown (10YR 4/3), trace clay		
130		WELL GRADED SAND (SW) Very fine to medium sand, trace coarse sand, brown (10YR 4/3), trace clay		
135		WELL GRADED SAND (SW) Very fine to very coarse sand, dark yellowish brown (10YR 4/4)		
140		WELL GRADED SAND (SW) Very fine to very coarse sand, dark yellowish brown (10YR 4/4)		
145		WELL GRADED SAND (SW) coarse sand, trace gravel		
150				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main&4th(MW1-2A is 20' west of MW1-2B)

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Maura Kennelly

Start/Finish Date: 12.10.2002 / 1.2.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
		WELL GRADED GRAVEL (GW) Trace silty clay "balls" (reddish brown)		
155		SILTY CLAY (CL) Trace sand and gravel		
160		WELL GRADED SAND (SW) Fine to coarse sand, yellowish brown (10YR 5/4)		
165		SILTY CLAY (CL) Trace sand		
170		WELL GRADED SAND w/SILT (SW-SM) Fine to very coarse sand, 15%-20% silt/clay, trace gravel (sub-angular)		
175		WELL GRADED SAND (SW) Fine to coarse sand, yellowish brown (10YR 5/4)		
180		WELL GRADED SAND w/SILT & CLAY (SW-SM) Brown (10YR 4/3), very fine to medium sand, 10%-15% silty clay "balls"		
185		WELL GRADED SAND w/SILT & CLAY (SW-SM) Brown (10YR 4/3), very		
190				
195		POORLY GRADED SAND (SP) Medium to fine sand, yellowish brown (10YR 5/4)		
200				



Boring Number: MW1-2

Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main&4th(MW1-2A is 20' west of MW1-2B)

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Dug by: Maura Kennelly

Start/Finish Date: 12.10.2002 / 1.2.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
205			WELL GRADED SAND (SW) Very fine to very coarse sand, trace gravel		213' to 228' Possible very fine confining layer (CL/ML) Out of clays @ 230 Rig chatter (driller says "we're in tighter/stiffer material"; compacted coarse sands; (slow drilling))
210			POORLY GRADED SAND (SP) Medium to fine sand, yellowish brown (10YR 5/4)		
215			WELL GRADED SAND (SW) Very fine to very coarse sand, trace gravel		
220			SILTY CLAY w/SAND (CL) 10%-15% fine sand		
225					
230			WELL GRADED SAND (SW) Very fine to very coarse sand, trace gravel		
235			POORLY GRADED SAND w/SILTY CLAY (SP-SC) Coarse to very coarse sand, 10%-15% silty clay "balls"		
240			WELL GRADED SAND (SW) Fine to coarse sand		
245			WELL GRADED SAND w/GRAVEL (SW) Medium to very coarse sand, 15% gravel		
250			WELL GRADED SAND (SW) Yellowish brown (10YR 5/4), fine to coarse		



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main&4th(MW1-2A is 20' west of MW1-2B)

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Maura Kennelly

Start/Finish Date: 12.10.2002 / 1.2.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
255			WELL GRADED GRAVEL w/SAND (GW) Yellowish brown (10YR 5/4), coarse to very coarse sand, sub-rounded to sub-angular gravel (>20%); trace cobbles		@252' bgs Stop for day @14:30; change bit to drill through coarser material 12/16/02 Start drilling @ 253' bgs bedrock contact @ 285' based on interpretation of geophysical logs
260			WELL GRADED SAND (SW) Yellowish brown (10YR 5/4), very fine to coarse sand, trace silty clay "balls"		
265			POORLY GRADED SAND (SP) Coarse to very coarse, trace gravel		
270			WELL GRADED SAND (SW) Very fine to coarse sand, trace silty clay, yellowish brown (10YR 5/4)		
275			POORLY GRADED SAND (SP) Multi-colored granite, coarse to very coarse, trace gravel (could be chopped up cobbles), sub-angular		
280			POORLY GRADED SAND (SP) Fine to medium, trace silty clay "balls"		
285			WELL GRADED SAND w/SILTY CLAY (SW-SC) Fine to coarse sand, 20%-25% silty clay/clayey silt		
290			POORLY GRADED SAND (SP) Fine to medium sand		
295			POORLY GRADED SAND (SP) Fine to medium sand		
300			POORLY GRADED SAND (SP) Fine to medium sand		



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main & 4th (MW1-2A is 20' west of MW1-2B)

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Maura Kennelly

Start/Finish Date: 12.10.2002 / 1.2.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
305			POORLY GRADED SAND (SP) Medium to coarse sand, sub-angular to angular		
310			WELL GRADED SAND (SW) Fine to medium sand, trace silty clay		
315					
320					
325					
330			WELL GRADED SAND (SW) Fine to very coarse sand, trace gravel, yellowish brown (10YR 5/4)		
335					
340			SANDY CLAY (SC/CL) Fine to medium sand		
345					
350					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main & 4th (MW1-2A is 20' west of MW1-2B)

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Maura Kennelly

Start/Finish Date: 12.10.2002 / 1.2.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
355		WELL GRADED SAND w/SILT (SW-SM) Very fine to medium sand, 15%-20% silt, yellowish brown		
360		SILTY CLAY (CL)		
370				
375				
380		SILTY CLAY (CL) Trace fine sands		
385		WELL GRADED SAND (SW) Very fine to medium sand		
390				
395				
400				



Boring Number: MW1-2

Sheet: 9 of 9

Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main & 4th (MW1-2A is 20' west of MW1-2B)

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Maura Kennelly

Start/Finish Date: 12.10.2002 / 1.2.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
405	[Dotted pattern]	WELL GRADED SAND (SW) Very fine to medium sand; increase in silty clay "balls"	[Dotted pattern]	Slightly coarser grained
410		WELL GRADED SAND (SW) Fine to very coarse sand, some silty clay "balls"		
415				
420	[Dotted pattern]	WELL GRADED SAND (SW) Very fine to medium sand, trace silty clay		
425			[Dotted pattern]	SANDY CLAY (SC/CL)
430	[Dotted pattern]	End of Log End of Log		
435			[Dotted pattern]	End of Log End of Log
440	[Dotted pattern]	End of Log End of Log		
445			[Dotted pattern]	End of Log End of Log
450	[Horizontal line pattern]	End of Log End of Log		



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Main Street and Cordova Avenue
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: NA
Logged by: Bill Hannah and Ping Tian
Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
0		Ground Surface		
0 - 5		ASPHALT AND FILL		Air knife was used for first 10'; bucket rig was used to 26'
5 - 15		WELL GRADED SAND (SW) 60% medium grained sand, 30% fine grained sand, 10% coarse grained sand, yellowish brown (10YR, 5/4), <5% gravel, most likely fill, moist to dry		
15 - 20		WELL GRADED SAND (SW) Light olive brown (2.5Y, 5/6), 70% medium sand, 25% fine sand, 5% coarse sand, <5% gravel, granitic clast, moist		
20 - 35		WELL GRADED SAND (SW) 60% medium sand, 30% fine sand, 10% gravel, (5-20 mm), weathered sub-angular granitic clasts, dry to moist		
35 - 40		WELL GRADED SAND (SW) 70% coarse sand, 35% medium sand, 5% fine sand, brown, gray, white, pink, sub-angular to sub-rounded, quartz, k-spar, metamorphics		Background PID = 0.0 PPM. Rotary mud drilling notes: gravels were possibly logged as coarse to very coarse sand as gravels could have been broken up by tri-cone bit
40 - 45		WELL GRADED SAND (SW) Gravels <5%, 5-10 mm, metamorphics, weathered granites		Drill chatter @ 39' 8:22 PID = 0.0 PPM
45 - 50		WELL GRADED SAND (SW) Brown, gray, white, pink, 50% coarse sand, 30% fine sand, 20% medium sand, sub-angular to sub-rounded, metamorphics, micas, quartz, k-spars, <5% gravel		Drill chatter @ 46'
50 - 55		WELL GRADED SAND (SW) 50% coarse to very coarse sand, 30% fine sand, 20% medium sand, diorite, granodiorite, weathered granite, plagioclase, anorthosite, pyrite, micas, metamorphics, angular to sub-rounded		9:26 PID = 0.0 PPM



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Main Street and Cordova Avenue
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: NA
Logged by: Bill Hannah and Ping Tian
Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
55					Drill chatter @ 58'
60					9:35 PID = 0.0 PPM
65					9:52 PID = 0.0 PPM
70			WELL GRADED SAND (SW) 50% coarse sand, 30% fine sand, 20% medium sand, <5% gravel		Drill chatter @ 71'
75					Drill chatter @ 77'
80					Drill chatter @ 80'; 10:08 PID = 0.0 PPM
85			WELL GRADED SAND (SW) 50% coarse to very coarse sand, 30% fine sand, 20% medium sand, <5% gravel (5-10mm), same mineralogy as above		Mud Test: Visc = 35 s/qt; Sand = 0.25%; Weight = 8.9 lb/gal; Water loss = 13cc/30 mins
90					10:20 PID = 0.0 PPM
95					Drill chatter @ 95'
100					Drill chatter @ 100'; 10:33 PID = 0.0 PPM



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Main Street and Cordova Avenue
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: NA
Logged by: Bill Hannah and Ping Tian
Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments	
	Soil Type					
105					Drill chatter @ 103'	
					Drill chatter @ 106'	
110					10:48 PID = 0.0 PPM	
					Drill chatter @ 113'	
115						
120			WELL GRADED SAND (SW) 50% coarse to very coarse sand, 30% fine sand, 20% medium sand, <5% gravel (5-10mm), granite, quartz, anorthosite, k-spar, diorite, granodiorite, gneiss, minor micas, metamorphics			
125						
130						11:27 PID = 0.0 PPM
135						
140						11:41 PID = 0.0 PPM
145						
150						11:54 PID = 0.0 PPM Drill chatter @ 150'



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main Street and Cordova Avenue

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Bill Hannah and Ping Tian

Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
155	Well Graded Sand (SW) pattern		<p>WELL GRADED SAND (SW) Grayish brown (10YR, 5/2), 40% coarse sand, 40% fine sand, 20% medium sand, mineralogy as above, gravel <5% (5-10mm)</p>		Drill chatter @ 155'
160					Drill chatter @ 159' 12:15 PID = 0.0 PPM
165					12:27 PID = 0.0 PPM
170	Well Graded Sand (SW) pattern		<p>WELL GRADED SAND (SW) 40% coarse sand, 30% fine sand, 20% medium sand, 10% gravel</p>		12:27 PID = 0.0 PPM
175					12:45 PID = 0.0 PPM
180					Drill chatter @ 184'
185	Well Graded Sand (SW) pattern		<p>WELL GRADED SAND (SW) 60% coarse to very coarse grained sand, 20% fine sand, 20% medium sand, <5% gravel (5-10mm)</p>		13:02 PID = 0.0 PPM Drill chatter @ 191'
190					1/13/03 08:35 PID = 0.0 PPM
195					
200					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main Street and Cordova Avenue

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Bill Hannah and Ping Tian

Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
205			WELL GRADED SAND (SW) 50% coarse to very coarse sand, 30% fine sand, 20% medium sand, <5% gravel		Drill chatter @ 203'
					Drill chatter @ 207'
210					08:45 PID = 0.0 PPM
215					
220					9:29 PID = 0.0 PPM Drill chatter @ 221'
225					
230					09:48 PID = 0.0 PPM
235					
240					
245					
250			10:48 PID = 0.0 PPM		



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Main Street and Cordova Avenue
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: NA
Logged by: Bill Hannah and Ping Tian
Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments	
	Soil Type				
255				11:03 PID = 0.0 PPM	
260					
265					
270					
275					Drill chatter @ 275'
280					Drill chatter @ 280'
285					
290					12:04 PID = 0.0 PPM
295					
300					Drill chatter @ 298'



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main Street and Cordova Avenue

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Bill Hannah and Ping Tian

Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments	
	Soil Type				
305		WELL GRADED SAND (SW) 50% coarse sand, 30% fine sand, 20% medium sand		Drill chatter @ 303'	
310				12:48 PID = 0.0 PPM; Drill chatter @ 310'	
315					
320				Drill chatter @ 318' 13:13 PID - 0.0 PPM	
325				Drill chatter @ 325'	
330				13:43 PID = 0.0 PPM Drill chatter @ 331'	
335					
340				WELL GRADED SAND (SW) 40% fine sand, 40% coarse sand, 20% medium sand	Soft drilling @ 336'
345				WELL GRADED SAND (SW) 50% coarse sand, 30% fine sand, 20% medium sand	Drill chatter @ 341'
350					14:48 PID = 0.0 PPM



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main Street and Cordova Avenue

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Bill Hannah and Ping Tian

Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
355				
360				
365				
370				
375				
380				
385				
390				
395				
400				
				PID = 0.0 PPM
				16:39 PID = 0.0 PPM; weakly cemented



Boring Number: MW1-3

Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main Street and Cordova Avenue

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Bill Hannah and Ping Tian

Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
405				
410		WELL GRADED SAND (SW) 40% fine sand, 40% coarse and, 20% medium sand		1/14/03 09:07 PID = 0.0 PPM; weakly cemented
415				
420				9:38 PID = 0.0 PPM
425				
430				9:59 PID = 0.0 PPM
435				
440				
445				
450				10:55 PID = 0.0 PPM



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main Street and Cordova Avenue

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Bill Hannah and Ping Tian

Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
455			WELL GRADED SAND (SW) 50% coarse sand, 30% fine sand, 20% medium sand		Drill chatter @ 460'; 11:07 PID = 0.0 PPM
460			WELL GRADED SAND (SW) 50% coarse sand, 30% fine sand, 20% medium sand, weakly cemented		
465			WELL GRADED SAND (SW) 40% coarse sand, 40% fine sand, weakly cemented		
470			WELL GRADED SAND (SW) 50% coarse sand, 30% fine sand, 20% medium sand, <5% gravel, weakly cemented		
475					
480			WELL GRADED SAND (SW) 40% fine sand, 30% coarse sand, 30% medium sand, weakly cemented, gravel <5%, minor clay		11:30 PID = 0.0 PPM 11:59 PID = 0.0 PPM 12:15 PID = 0.0 PPM
485					
490					
495					
500					



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Main Street and Cordova Avenue
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: NA
Logged by: Bill Hannah and Ping Tian
Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
505		WELL GRADED SAND (SW) 40% fine sand, 30% coarse sand, 20% medium sand, 10% clay, weakly cemented		
510		WELL GRADED SAND (SW) Brown (10YR, 4/1), 50% fine sand, 30% coarse sand, 10% medium sand, 10% clay, weakly cemented		
515				
520		WELL GRADED SAND (SW) 40% coarse sand, 40% fine sand, 20% medium sand, weakly cemented		13:58 PID = 0.0 PPM
525				Drill chatter @ 524'
530				14:30 PID = 0.0 PPM Drill chatter @ 532'
535				Drill chatter @ 535'
540				14:50 PID = 0.0 PPM
545				
550				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main Street and Cordova Avenue

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Bill Hannah and Ping Tian

Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
555				15:31 PID = 0.0 PPM
560				
565				
570				
575				
580		WELL GRADED SAND (SW) 50% fine sand, 30% coarse sand, 10% clay, 10% medium sand		16:35 PID = 0.0 PPM Resume drilling on 1/15/03 @ 08:30 @ 593'
585				
590				
595		WELL GRADED SAND (SW) Yellowish brown, fine to coarse grained sand, approximately 40% coarse sand, 20% medium sand, 20% fine sand, 10% clay		08:40
600				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main Street and Cordova Avenue

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Bill Hannah and Ping Tian

Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
605		WELL GRADED SAND w/CLAY (SW-SC) Yellowish brown, fine to coarse grained sand, medium plastic clay, approximately 40% coarse sand, 25% medium sand, 25% fine sand, 10% clay		
610		CLAYEY SAND (SC) Yellowish brown, fine to coarse sand, medium plastic clay, 25% coarse sand, 25% medium sand, 20% fine sand, 30% clay		09:00
615				
620		WELL GRADED SAND w/CLAY (SW-SC) Yellowish brown with white staining, fine to coarse sand, medium plastic clay, 40% coarse sand, 25% medium sand, 25% fine sand, 10% clay		09:28
625				
630		WELL GRADED SAND w/CLAY (SW-SC) Yellowish brown with white staining, fine to coarse grained sand, medium plastic clay, 40% coarse sand, 25% medium sand, 25% fine sand, 10% clay		10:10
635				
640				10:25
645				
650				10:45



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Main Street and Cordova Avenue
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: NA
Logged by: Bill Hannah and Ping Tian
Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
655				
660		WELL GRADED SAND w/CLAY (SW) Yellowish brown, fine to coarse grained sand, low plastic clay, 30% coarse sand, 30% medium sand, 30% fine sand, 10% clay		11:15
665				
670		WELL GRADED SAND (SW) Yellowish brown, fine to coarse grained sand, 10% fine gravel, 30% coarse sand, 30% medium sand, 20% fine sand, 10% clay		11:50
675				
680		WELL GRADED SAND w/CLAY (SW) Yellowish brown, fine to coarse sand, 30% coarse sand, 30% medium sand, 30% fine sand, 10% low plastic clay		12:30
685				
690		CLAYEY SAND (SC) Yellowish brown, fine to coarse sand, 30% coarse sand, 20% medium sand, 30% fine sand, 20% low plastic clay		12:55
695				
700				13:25



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main Street and Cordova Avenue

Project Number: 175859.FI.03

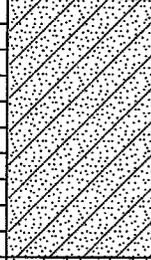
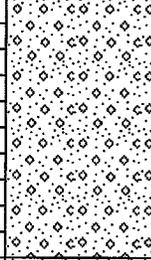
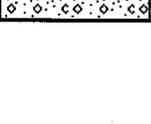
Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Bill Hannah and Ping Tian

Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
705				
710		WELL GRADED SAND (SW) Yellowish brown, fine to coarse sand, 30% coarse sand, 30% medium sand, 20% fine sand, 10% clay, 10% gravel		13:45
715				
720		WELL GRADED SAND (SW) Yellowish brown, fine to coarse grained sand, 30% coarse sand, 30% medium sand, 30% fine sand, 10% low plastic clay		14:30
725				
730				14:50
735				
740				15:10
745				
750				15:20



Boring Number: MW1-3

Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Main Street and Cordova Avenue
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: NA
Logged by: Bill Hannah and Ping Tian
Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
755		WELL GRADED SAND (SW) Yellowish brown, fine to coarse grained sand, 30% coarse sand, 30% medium sand, 35% fine sand, 5% clay		15:45 16:00
760				
765		WELL GRADED SAND (SW) Yellowish brown, fine to coarse grained sand, 30% coarse sand, 30% medium sand, 35% fine sand, 5% clay		16:00
770				
775		WELL GRADED SAND (SW) Yellowish brown, fine to coarse grained sand, 30% coarse sand, 30% medium sand, 35% fine sand, 5% clay		09:00
780				
785		CLAYEY SAND (SC) Yellowish brown, fine to coarse grained sand, 40% coarse sand, 20% medium sand, 20% fine sand, 10% medium plastic clay		09:45
790				
795		CLAYEY SAND (SC) Yellowish brown, fine to coarse grained sand, 40% coarse sand, 20% medium sand, 20% fine sand, 10% medium plastic clay		10:45
800				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main Street and Cordova Avenue

Project Number: 175859.FI.03

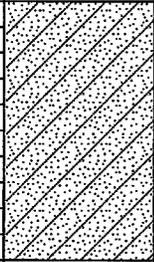
Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Bill Hannah and Ping Tian

Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
805				
810		End of Log		10:50 TD = 810'
815				
820				
825				
830				
835				
840				
845				
850				



Boring Number: MW1-4

Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Alhambra and Novelda Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Maura Kennelly

Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
0			Ground Surface		Install conductor casing to 25 ft bgs, drill to 25 ft bgs by hollow stem auger (15" bit and 14" conductor casing) at 0830 hrs on 5/6/03
0 - 5			ASPHALT AND FILL MATERIAL		
5 - 20			WELL GRADED SAND WITH GRAVEL (SW) , dark brown, 80% fine to very coarse sand, 18% fine to very coarse gravel, 2% angular to sub-angular cobbles		
20 - 25			WELL GRADED SAND WITH GRAVEL (SW) , dark brown, fine to very fine coarse sand, fine to very coarse gravel, 15% sub-rounded to sub-angular 3" or greater cobbles		
25 - 30			WELL GRADED SAND WITH GRAVEL (SW) , yellowish brown, 90% fine to very coarse sand, 10% fine to very coarse, angular to sub-angular gravel, trace cobbles		
30 - 40			WELL GRADED SAND (SW) , dark grayish brown (25Y4/2), 85% very fine to medium; 15% coarse to very coarse sand		5/7/03 1200 hrs, mud rotary (12.25" Mill Tooth bit)
40 - 50			CLAYEY SILT WITH SAND (ML) , dark yellowish brown (10YR 4/6), 90% silt with clay, 10% medium to coarse sand		



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Alhambra and Novelda Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Maura Kennelly

Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
55			SANDY SILT WITH CLAY (ML) , dark yellowish brown (10YR4/6), 90% silt with clay, 10% medium to coarse sand		
60			POORLY GRADED SAND WITH GRAVEL (SP) , coarse to very coarse sand, 5% angular to sub-angular gravel		Rig chatter
65			GRAVELS AND COBBLES , angularity of pieces suggest broken up cobbles, 50% coarse to very coarse sand		
70			POORLY GRADED SAND WITH GRAVEL (SP) , coarse to very coarse, 5 to 7% gravel		
75			WELL GRADED SAND (SW) , yellowish brown (10YR5/4) very fine to very coarse sand, trace medium gravel		
80					Rig chatter (possible cobbles or gravels)
85					
90					
95					
100					



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Alhambra and Novelda Rd
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: N/A
Logged by: Maura Kennelly
Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments	
	Soil Type					
105			WELL GRADED SAND (SW) , dark yellowish brown (10YR4/6), very fine to coarse sand, 5% silt, trace clay, trace gravel		Rig chatter (cobbles and gravel)	
110			POORLY GRADED SAND WITH SILT AND GRAVEL (SP) , coarse to very coarse sand, trace gravel, trace clay/silt		Rig chatter	
115						
120					WELL GRADED SAND (SW) , yellowish brown (10YR5/4), 95% very fine to very coarse sand, 1% gravel, 4% silt/clay	
130						
135						
140			SILTY SAND (SM) , very fine to fine sand, 25% silt, trace clay, trace coarser sand			
145						
150			WELL GRADED SAND WITH SILT (SW-SM) , 85% very fine to very coarse sand, 15% clay/silt			



Boring Number: MW1-4

Sheet: 4 of 17

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Alhambra and Novelda Rd
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Mud Rotary
 Sampling Method: N/A
 Logged by: Maura Kennelly
 Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
155				
160		POORLY GRADED SAND (SP) , brown (10YR4/3), 90% very fine to fine sand, 8% coarse sand, 2% silt/clay		
165				
170				
175				
180		WELL GRADED SAND (SW) , 90% medium to very coarse sand, 5% very fine to fine sand, 5% silty clay		
185		SILTY SAND (SM) , 60% medium to very coarse sand, 25% silt/silty clay, 15% very fine to fine sand		
190				
195				
200				
			1000 hrs	Stop for day 5/8/03, start drilling at 0930 hrs, switch to a button carbide bit



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Alhambra and Novelda Rd
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: N/A
Logged by: Maura Kennelly
Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
205		WELL GRADED SAND (SW) , 80% medium to very coarse sand, 15% very fine to fine sand, 5% clayey silt/silt	1050 hrs	
210		POORLY GRADED SAND (SP) , 90% coarse to very coarse sand, 5% very fine to medium sand, 5% silty clay		
220		WELL GRADED SAND WITH SILT AND CLAY (SW-SM) , very fine to coarse sand, 15% silt/clay	1105 hrs	
230		WELL GRADED SAND WITH SILT AND CLAY (SW-SM) , 75% very fine to coarse sand, 25% silt/clay	1120 hrs	
235		WELL GRADED SAND WITH SILT AND CLAY (SW-SM) , very fine to coarse sand, 15% silt/clay		
240			1135 hrs	
250				250 ft bgs - Hard to get a large sample of silt because it doesn't ball up like clay, it appears platy, can see it on shaker as well



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Alhambra and Novelda Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Maura Kennelly

Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
255			<u>SANDY SILT (SM-ML)</u> , 60% silt, 30% sand (fine to coarse), 10% clay		1225 hrs
260			<u>SILTY SAND (SM)</u> , 70% very fine to coarse sand, 30% silt/clay		
265					
270			<u>SILTY SAND/SANDY SILT (SW-SM/ML)</u> , 60% very fine to coarse sand, 40% silt/clay		
275					
280					
285					
290			<u>SILTY SAND (SW-SM)</u> , 75% very fine to medium sand, 10% coarse sand, 15% silt/clay		
295					
300					



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Alhambra and Novelda Rd
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: N/A
Logged by: Maura Kennelly
Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
305				
310		WELL GRADED SAND (SW) , 90% very fine to medium sand, 7% coarse sand, 3% clayey silt, trace very coarse sand		1405 hrs
315				
320		WELL GRADED SAND (SW) , 93% very fine to medium sand, 7% silt/clay, trace coarse to very coarse sand		1430 hrs
325				
330		WELL GRADED SAND (SW) , 90% very fine to medium sand, 10% silt, trace coarse sand		1445 hrs
335				
340				
345				
350				



Boring Number: MW1-4

Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Alhambra and Novelda Rd
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: N/A
Logged by: Maura Kennelly
Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
355		WELL GRADED SAND WITH CLAY (SW-SC) , 85% very fine to coarse sand, 7% coarse sand, 8% silty clay/clayey silt, medium to low plasticity		
360		SILTY SAND (SM) , 75% very fine to fine sand, 25% silt clay		
365				
370				
375				
380				
385				
390		SILTY SAND (SM) , 75% very fine to fine sand, 25% silt/clay, trace coarse sand		
395				Stop for day 5/9/03 0930 hrs
400				0950 hrs



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Alhambra and Novelda Rd
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: N/A
Logged by: Maura Kennelly
Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
405		WELL GRADED SAND WITH SILT AND CLAY (SW-SC) , 80% very fine to coarse sand (70% very fine to medium sand and 10% coarse sand), 20% silt and clay		Easy to drill through, quite soft 1000 hrs 1025 hrs Formation became less soft, possible coarser material, however, still lots of silty clay Some rig chatter A lot more coarse sand
410		CLAY WITH SAND (CL) , lots of fines, approximately 5 to 10% very fine to fine sand		
415		SILTY CLAY (CL) , trace medium to coarse sand, soft, low plasticity		
420		SILTY WELL GRADED SAND (SM-SW) , 75% very fine to very coarse sand, 20% silt, 5% clay		
425		SANDY CLAY/CLAYEY SAND (SC/CL) , lots of fines, approximately 20% medium to coarse sand, clay is very silty and has a low plasticity		
430		SANDY CLAY/CLAYEY SAND (SC/CL) , lots of fines, approximately 20% medium to coarse sand, clay is very silty and has a medium to low plasticity		
435		WELL GRADED SAND WITH SILT (SM-SW) , 45% very fine to fine sand, 30% medium to very coarse sand, 25% silt and clay		
440		WELL GRADED SAND WITH SILT (SM-SW) , 45% very fine to fine sand, 30% medium to very coarse sand, 25% silt and clay		
445		WELL GRADED SAND WITH SILT (SM-SW) , 45% very fine to fine sand, 30% medium to very coarse sand, 25% silt and clay		
450		WELL GRADED SAND WITH SILT (SM-SW) , 45% very fine to fine sand, 30% medium to very coarse sand, 25% silt and clay		



Boring Number: MW1-4

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Alhambra and Novelda Rd
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Mud Rotary
 Sampling Method: N/A
 Logged by: Maura Kennelly
 Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
455	[Pattern: Dotted]			[Pattern: Dotted]	1130 hrs
460			WELL GRADED SAND WITH SILT (SW) , 35% very fine to medium sand, 50% coarse to very coarse sand, 15% silt/clay		1215 hrs
465	[Pattern: Dotted]			[Pattern: Dotted]	
470			SILTY SAND (SM) , 45% silt, 45% very fine to fine sand, 10% medium to coarse sand		
475	[Pattern: Vertical Lines]			[Pattern: Vertical Lines]	Harder drilling 1300 hrs
480			SILTY SAND (SM) , 45% silt, 35% very fine to fine sand, 20% medium to very coarse sand		
485	[Pattern: Vertical Lines]			[Pattern: Vertical Lines]	Button bit moving slow in finer material Silt suspends in water (drilling fluid), hard to capture good sample, platy appearance when brought to surface 1640 hrs
490			CLAYEY SILT (ML) , trace medium to coarse sand		
495	[Pattern: Vertical Lines]			[Pattern: Vertical Lines]	
500			SILTY SAND/SANDY SILT (SM/ML) , 50% silt and clay, 50% very fine to coarse sand		
					1700 hrs, stop for day 5/10/03, 0900 hrs, switch to a mill tooth bit



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Alhambra and Novelda Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Maura Kennelly

Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
500	[Vertical line pattern]	CLAYEY SILT (ML) , medium to low plasticity, 5 to 7% medium to coarse sand	[Dotted pattern]	500 ft bgs - Rig chatter, however the cuttings are extremely fine
505		SILT (ML) , 5% clay, 10% fine to coarse sand		Rig chatter, greater than that at 500 ft bgs
510	[Dotted pattern]	SANDY SILT WITH CLAY (ML) , 60% silt, 35% very fine to coarse sand, 5% clay (medium to low plasticity)	[Dotted pattern]	0940 hrs Drilling fluid is very thick (without adding more bentonite) indicating that there is clay (lots of fines)
515		SANDY SILT WITH CLAY (ML) , 60% silt, 30% sand, 10% clay		
520	[Diamond pattern]	WELL GRADED SAND WITH SILT AND CLAY (SW) , 75% very fine to very coarse sand, 15% silt, 10% clay	[Dotted pattern]	Easier drilling (softer material)
525				
530	[Diamond pattern]	WELL GRADED SAND WITH SILT AND CLAY (SW) , 75% very fine to very coarse sand, 15% silt, 10% clay, contains more coarse sand than above	[Dotted pattern]	1010 hrs
535				
540	[Vertical line pattern]	SILTY SAND (SM) , 45% very fine to coarse sand, 55% silt/clay	[Dotted pattern]	1040 hrs Bucket did not pick up a good sample because of all the fines
545				
550			[Dotted pattern]	1055 hrs



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Alhambra and Novelda Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Maura Kennelly

Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
555		WELL GRADED SAND WITH CLAY (SW-SC) , 65% very fine to coarse sand, 35% silty clay (brown 7.5YR4/2)		Thinning back mud by pumping into Baker tank (clay is thickening it up)
560		WELL GRADED SAND WITH CLAY AND SILT (SW) , 5% clay (brown 7.5YR4/2), 20% silt, 50% medium to very coarse sand, 25% very fine to fine sand		1155 hrs Rig chatter, slow moving, stiff/hard native material
565				
570				1215 hrs
575				1220 hrs
580		WELL GRADED SAND WITH SILT (SW) , 40% medium to coarse sand, 40% very fine to fine sand, 20% silt		
585				1230 hrs
590		WELL GRADED SAND WITH SILT (SW) , 40% medium to coarse sand, 45% very fine to fine sand, 10% silt/clay		1235 hrs
595				
600				1300 hrs



Boring Number: MW1-4

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Alhambra and Novelda Rd
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Mud Rotary
 Sampling Method: N/A
 Logged by: Maura Kennelly
 Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
605			SILTY SAND (SM) , 60% very fine to coarse sand, 40% silt/clay		1305 hrs, rig chatter (stiffer material), drilling very slowly
610			WELL GRADED SAND (SW) , 90% very fine to coarse sand, 10% silt/clay		
615			WELL GRADED SAND (SW) , 50% medium to coarse sand, 30% very fine to fine sand, 20% silt/clay		
620			WELL GRADED SAND (SW) , 85% very fine to medium sand, 15% clay and silt		1410 hrs, driller indicates softer material
625					
630			SANDY SILT WITH CLAY (ML) , 70% silt, 10% clay, 20% very fine to coarse sand		Stop for day at 1330 hrs 5/12/03 1300 hrs
635					
640			SANDY SILT WITH CLAY (ML) , 60% silt, 10% clay, 30% very fine to coarse sand		
645					
650					1345 hrs



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Alhambra and Novelda Rd
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: N/A
Logged by: Maura Kennelly
Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
655					
660			SILTY SAND (SM) , 75% very fine to coarse sand, 25% silt, trace clay, yellowish brown (10YR5/6)		1415 hrs
665					
670					1430 hrs
675					
680			WELL GRADED SAND (SW) , 10% silt, 90% very fine to coarse sand		
685					
690					
695			POORLY GRADED SAND WITH SILT (SP-SM) , 80% very fine to fine sand, 10% silt, dense		Drilling got alot easier, drillier says we might have hit a clay layer Harder drilling 1500
700					



Boring Number: MW1-4

Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Alhambra and Novelda Rd
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: N/A
Logged by: Maura Kennelly
Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
705				
710		POORLY GRADED SAND WITH SILT (SP-SM) , very fine to fine sand, 20% silt, 5 to 7% coarse sand, dense		1615, Very stiff, very slow drilling rate
715		SILTY SAND (SM) , 55% very fine to fine sand, 25% medium to coarse sand, 20% silt		Stop for day at 1715 5/13/03 0930
720		POORLY GRADED SAND WITH SILT (SP-SM) , 80% very fine to fine sand, 20% silt, trace medium grained sand		1005, very stiff, very slow drilling rate (bedrock?)
725				1040, sandstone?
730				1110
735				Driller said he thinks the type of material changed, drilling got alot easier, rig chatter
740		WELL GRADED SAND (SW) , 60% very fine to medium sand, 20% coarse sand (slightly cemented with silty clay), 20% silt		1145, easier drilling
745				1150
750				



Boring Number: MW1-4

Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Alhambra and Novelda Rd
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: N/A
Logged by: Maura Kennelly
Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
755					1210
760					1235
765					1245
770					1255
775			WELL GRADED SAND WITH SILT AND CLAY (SW) , 50% very fine to fine sand, 25% medium to coarse sand, 25% silt/clay (fines)		Rig chatter
780					
785			WELL GRADED SAND WITH SILT (SW) , brown (10YR4/3), 85% very fine to medium sand, 15% silt, trace black clay		1335
790					1340
795			WELL GRADED SAND WITH SILT (SW) , 85% very fine to coarse sand, 15% silt, trace clay, very dark grayish brown (10YR3/2)		1350
800					



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Alhambra and Novelda Rd
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: N/A
Logged by: Maura Kennelly
Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
805			WELL GRADED SAND WITH SILT AND CLAY (SW) , 80% very fine to coarse sand, 20% silt and black clay		
810			End of Log		1435 on 5/13/03, total depth = 810 ft bgs
815					
820					
825					
830					
835					
840					
845					
850					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
0			Ground Surface		
0 - 5			ASPHALT AND ROAD BASE MATERIAL		Air knife used for first 10 feet, 18 inch bit (direct mud rotary) used to 25 feet bgs, install 14 inch conductor casing
5 - 30			WELL GRADED SAND WITH GRAVEL (SW) , yellowish brown, 90% fine to very coarse sand, 10% fine gravel (0.25" average), subangular		Logger B. Lechler 5/28/03
30 - 40			WELL GRADED SAND (SW) , with some pebbles, sand is mostly quartz and feldspars		
40 - 50			POORLY GRADED SAND AND GRAVEL (SP) , approximately 15% gravel (quartz and feldspar) with some clay balls, sand is medium to very coarse, approximately 70% coarse sand		Rig chatter



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
55			SANDY SILT WITH CLAY (ML) , yellowish brown (10YR5/4), 90% silt with clay, 10% fine sand, trace coarse sand		
60			SANDY SILT WITH CLAY (ML) , yellowish brown (10YR5/4), 90% silt with clay, 10% fine sand, trace coarse sand, interbedded gravel, gravel likely coming from larger clasts, possible transition zone		Rig chatter
65			WELL GRADED SAND WITH GRAVEL (SW) , 60% well graded sand, 35% medium gravel (mostly granitic, some lithics)		Rig chatter
75			WELL GRADED SAND WITH GRAVEL (SW) , trace clay, 60% well graded sand, 35% medium gravel (mostly granitic, some lithics)		Stop drilling for 15 minutes
85					
90					
95			WELL GRADED SAND WITH GRAVEL (SW) , contains less gravel than above		
100					Rig chatter



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
105			WELL GRADED SAND (SW) , brown (10YR4/3) to dark yellowish brown (10YR4/4)		
110			WELL GRADED SAND (SW) , more coarse than above, possible transition to gravel or interbedded with gravel		Rig chatter
115					Rig chatter
120			POORLY GRADED SAND (SP) , with trace silt/clay balls, approximately 15% sand is more coarse than above		
125					
130			WELL GRADED SAND AND GRAVEL (SW) , gravel is angular, probably from larger clasts, mostly quartz and feldspar with some darker lithics		
135					
140			WELL GRADED SAND (SW) , dark yellowish brown (10YR4/6), mostly fine to medium sand (75%), 20% coarse to very coarse sand, and approximately 5% silt/clay		
145					Rig chatter
150					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
155		POORLY GRADED SAND (SP) , with gravel, 60% very coarse sand, 20% fine to medium gravel, and 20% fine to medium sand		
160		POORLY GRADED SAND (SP) , with silt/clay, 85% fine to medium sand, 10% silt/clay, and 5% coarse sand		
165		WELL GRADED SAND (SW) , with silt and gravel, gravel is fine and not from larger clasts		
170		POORLY GRADED SAND (SP) , with gravel, 75% coarse sand to fine gravel, 25% fine to medium sand		
175		POORLY GRADED SAND (SP) , with gravel, 75% coarse sand to fine gravel, 25% fine to medium sand		
180		POORLY GRADED SAND (SP) , with gravel, 75% coarse sand to fine gravel, 25% fine to medium sand		
185		POORLY GRADED SAND (SP) , with gravel, 75% coarse sand to fine gravel, 25% fine to medium sand	1315 hrs	
190		POORLY GRADED SAND (SP) , 75% coarse to very coarse sand with fine gravel, 25% fine to medium sand		
195		WELL GRADED SAND (SW) , very fine to very coarse sand, approximately 30% coarse to very coarse sand		
200		WELL GRADED SAND (SW) , very fine to very coarse sand, approximately 30% coarse to very coarse sand		



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
205					
210			WELL GRADED SAND (SW) , very fine to very coarse sand, approximately 30% coarse to very coarse sand, with few gravel clasts		
215					
220			WELL GRADED SAND (SW) , very coarse to very fine sand with trace fines (silt/clay)		Rig chatter
225					
230			POORLY GRADED SAND (SP) , 80% coarse to very coarse sand, 20% fine to medium sand		Rig chatter
235					
240			WELL GRADED SAND (SW) , approximately 60% fine to medium sand and 40% coarse sand.		Cuttings coming off shaker are finer than those collected from mud tank, therefore, above 230 to 235 is probably SW.
245					
250					1535 hrs



Boring Number: MW1-5

Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Live Oak and Junipero Serra Rd
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: N/A
Logged by: Paul Pongetti and B.J. Lechler
Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
255		WELL GRADED SAND (SW) , more coarse than above, 50% coarse to very coarse sand, 50% fine to medium sand		Driller says drilling is harder. Soft drilling (possible clay) Stop for day at 1655 hrs 5/29/03 0800 hrs
260				
265				
270		WELL GRADED SAND (SW) , coarser than above, approximately 60% coarse to very coarse sand, 40% fine to medium sand		
275				
280		POORLY GRADED SAND (SP) , 80% coarse to very coarse sand, 20% fine to medium sand		
285		WELL GRADED SAND (SW) , 50% fine to medium sand, 50% coarse sand		
290				
295				
300		WELL GRADED SAND (SW) , with gravel, 40% fine to medium sand, 30% coarse sand, 20% fine gravel		



Boring Number: MW1-5

Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Live Oak and Junipero Serra Rd
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: N/A
Logged by: Paul Pongetti and B.J. Lechler
Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
305			POORLY GRADED SAND WITH SILT (SP-SM) , mostly fine to medium sand (80%), with 10% fines (silt/clay), and 5% coarse sand		PID reading = 0.0 ppm at drill rig 0915 hrs
310			WELL GRADED SAND WITH SILT/CLAY (SW-SM/SC) , 85% very fine to very coarse sand, with approximately 15% silt/clay		
315			WELL GRADED SAND (SW) , 60% fine to medium sand, 40% coarse to very coarse sand		
320			WELL GRADED SAND (SW) , 50% fine to medium sand, 40% coarse sand, 10% silt/clay		
325			WELL GRADED SAND (SW) , approximately 70% fine to medium sand, 30% coarse to very coarse sand, trace fines (silt/clay)		
330			WELL GRADED SAND (SW) , approximately 70% fine to medium sand, 30% coarse to very coarse sand, trace fines (silt/clay)		
335			WELL GRADED SAND (SW) , approximately 70% fine to medium sand, 30% coarse to very coarse sand, trace fines (silt/clay)		
340			WELL GRADED SAND (SW) , approximately 70% fine to medium sand, 30% coarse to very coarse sand, trace fines (silt/clay)		
345			WELL GRADED SAND (SW) , approximately 70% fine to medium sand, 30% coarse to very coarse sand, trace fines (silt/clay)		
350			WELL GRADED SAND (SW) , approximately 70% fine to medium sand, 30% coarse to very coarse sand, trace fines (silt/clay)		



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
355			<u>WELL GRADED SAND (SW)</u> , less coarse than above		0950 hrs
360			<u>WELL GRADED SAND (SW)</u> , with fines (silt/clay), approximately 60% fine to medium sand, 30% coarse to very coarse sand, 10% silt/clay		
365					
370			<u>WELL GRADED SAND (SW)</u> , 50% fine to very fine sand, 35% medium sand, 15% coarse to very coarse sand		
375					
380			<u>WELL GRADED SAND (SW)</u> , with silt/clay, 50% fine to medium sand, 40% coarse sand, 10% silt/clay		1030 hrs
385					
390					
395			<u>WELL GRADED SAND (SW)</u> , coarser than above, 40% fine to medium sand, 30% coarse to very coarse sand, 15% silt/clay, 15% fine gravel		
400					1105 hrs



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
405				
410		WELL GRADED SAND (SW) , 40% fine to medium sand, 30% coarse to very coarse sand, 15% silt/clay, 15% fine gravel, coarse grains are quartz and feldspars, finer grains are quartz, micas		
415		POORLY GRADED SAND (SP) , with clay and gravel, 60% medium to coarse sand, 20% fine gravel, 20% clay/silt		1200 hrs Driller said approximately last 5 feet were hard drilling, speculates a boulder.
420		POORLY GRADED SAND (SP) , with clay and gravel, 60% medium to coarse sand, 20% fine gravel, 20% clay/silt, clays appear to be weathered lithic fragments, gravel composed of quartz and feldspars		
425		WELL GRADED SAND (SW) , with clay and gravel, 30% fine to medium sand, 30% coarse sand, 20% fine gravel, 20% clay (weathered lithics)		
430				
435				1245 hrs
440		WELL GRADED SAND (SW) , with clay and gravel, 40% fine to medium sand, 40% coarse to very coarse sand, 15% clay, 5% fine gravel		
445				1330 hrs
450				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
455			SILTY CLAY (CL) , with sand, clay/silt is yellowish brown (10YR5/4), to dark yellow brown (10YR4/4), medium plasticity, with 10% coarse to fine sand		1410 hrs
460					
465					
470			SANDY CLAY/SILT (CL-ML) , yellowish brown (10YR5/4), approximately 60% silt/clay, 20% fine sand, 20% medium to coarse sand		
475					
480					
485			POORLY GRADED SAND (SP) , with silt/clay, 30% fine sand, 30% medium sand, 30% silt/clay, 10% coarse sand		
490					1650 hrs
495			WELL GRADED SAND (SW) , with silt/clay, 40% fine to medium sand, 40% coarse to very coarse sand, 20% silt/clay		Soft drilling (hard drilling from 487 to 498).
500					



Boring Number: MW1-5

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Live Oak and Junipero Serra Rd
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Mud Rotary
 Sampling Method: N/A
 Logged by: Paul Pongetti and B.J. Lechler
 Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
505		POORLY GRADED SAND (SP) , with silt, 75% coarse to very coarse sand, 15% fine to medium sand, 10% silt/clay		Hard drilling
510		WELL GRADED SAND (SW) , with silt, 40% coarse sand, 20% medium sand, 20% fine sand, 20% silt/clay		
515		SANDY SILT/CLAY (ML-CL) , 70% silt/clay, 15% fine to medium sand, 10% coarse sand		Soft drilling
520		WELL GRADED SAND (SW) , 40% very fine to fine sand, 30% medium sand, 30% coarse to very coarse sand		1600 hrs
525				
530		WELL GRADED SAND (SW) , with silt/clay, 40% very fine to fine sand, 30% medium sand, 30% coarse to very coarse sand, with a few silt/clay balls		
535		WELL GRADED SAND (SW) , with silt/clay, 40% fine sand, 20% medium sand, 20% coarse sand, 20% silt/clay		
540				
545		WELL GRADED SAND (SW) , 40% fine sand, 30% coarse sand, 20% medium sand, 10% silt/clay		
550				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
555					1635 hrs
560					
565			WELL GRADED SAND (SW) , 60% fine to medium sand, 30% coarse sand, 10% silt/clay		
570			CLAY WITH SILT AND SAND (CL) , yellowish brown (10YR5/4), 95% clay/silt with fine to coarse sand		
575			WELL GRADED SAND (SW) , with silt/clay, 40% fine sand, 30% medium sand, 20% coarse sand to fine gravel, 10% silt/clay		
580					1725 hrs, done for day. 5/30/03, resume drilling at 0810 hrs.
585			WELL GRADED SAND (SW) , with silt and clay, a little coarser than above, 60% fine to medium sand, 10% coarse sand, 10% silt/clay		
590					
595			WELL GRADED SAND (SW) , 30% fine sand, 30% coarse sand to fine gravel, 20% medium sand, 20% silt/clay (weathered lithics)		0855 hrs
600					Rig chatter



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
605					0945 hrs
610					
615		WELL GRADED SAND (SW) , 70% fine to medium sand, 30% coarse sand with trace fine gravel			
620					
625					
630					1055 hrs
635		WELL GRADED SAND (SW) , 40% medium sand, 30% coarse sand, 30% fine sand			
640		WELL GRADED SAND (SW) , 40% medium sand, 30% coarse sand, 30% fine sand, coarse to medium grains composed of quartz and feldspars, finer grains of quartz and micas			
645		WELL GRADED SAND (SW) , with silt and clay, 40% fine sand, 20% medium sand, 20% coarse sand; 20% silt/clay			
650					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
655			WELL GRADED SAND (SW) , 40% medium sand, 30% coarse sand, 30% fine sand		1150 hrs
660					
665					
670					
675			WELL GRADED SAND (SW) , 40% medium sand, 40% coarse sand, 20% fine sand, and nearly all quartz and feldspar		1230 hrs
680					
685			WELL GRADED SAND (SW) , 40% fine sand, 30% medium sand, 30% coarse sand		1325 hrs
690					Samples are biased toward coarse side. There are more fines coming off shaker that are not represented in samples.
695					
700					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
705			WELL GRADED SAND WITH CLAY (SW) , 40% fine sand, 20% medium sand, 20% coarse to very coarse sand, 20% clay/silt, clay propably represents interbeds		Driller says we have probably been in and out of clay since approximately 695 ft bgs.
710			WELL GRADED SAND (SW) , 40% fine sand, 30% medium sand, 25% coarse sand with <5% fine gravel and <5% clay		
715			WELL GRADED SAND (SW) , 40% fine sand, 30% medium sand, 25% coarse sand, <5% clay, no gravel		
720			WELL GRADED SAND (SW) , 40% fine sand, 30% coarse sand, 20% medium sand, 10% silt/clay		
725					
730			WELL GRADED SAND (SW) , 40% fine to very fine sand, 30% medium sand, 20% coarse sand, 10% silt	1400 hrs	1445 hrs
735					
740			WELL GRADED SAND WITH CLAY (SW) , 40% fine to very fine sand, 30% medium sand, 20% coarse sand, 10% silt, with a few clay balls		
745					
750				Driller says we have been in and out of clay (soft drilling) since 700 ft bgs. He said a lot of it dissolves so it is difficult to get sample or see in shaker.	



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
755			WELL GRADED SAND (SW) , with clay, 70% fine to medium sand, 20% coarse sand, 10% clay/silt (interbeds), trace fine gravel		1515 hrs
760					
765			WELL GRADED SAND (SW) , 60% fine to medium sand, 40% coarse sand, with some silt (not represented in sample)		1540 hrs
770					
775					
780			WELL GRADED SAND (SW) , 40% coarse sand, 30% medium sand, 20% fine sand, 10% silt, fines (silt/fine sand) are mostly micas and quartz		Cuttings coming off shaker suggest much finer sand, but can not get representative sample.
785					
790			WELL GRADED SAND (SW) , 50% fine to very fine sand, 30% medium sand, 20% coarse sand		1625 hrs
795					
800					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
805	[Patterned Soil Type]			[Patterned MW Construction]	1645 hrs
810			End of Log		
815					
820					
825					
830					
835					
840					
845					
850					

**WELL INSTALLATION REPORT
(EPAMW16, EPAMW17, and EPAMW18)
FOR SAN GABRIEL VALLEY NPL AREA 3
REMEDIAL
INVESTIGATION/FEASIBILITY STUDY**

Prepared for
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105

February 2006

Prepared by



3 Hutton Centre Drive
Suite 200
Santa Ana, California 92707

WELL INSTALLATION REPORT
(EPAMW16, EPAMW17, and EPAMW18)
FOR SAN GABRIEL VALLEY NPL AREA 3
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

SAN GABRIEL BASIN
LOS ANGELES COUNTY, CALIFORNIA

EPA CONTRACT NO. 68-W-98-225
EPA WORK ASSIGNMENT NO. 041-RICO-09ES
CH2M HILL PROJECT NO. 335379.FI.03

Prepared for
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105

Prepared by
CH2M HILL
Southern California Regional office
3 Hutton Centre Drive
Suite 200
Santa Ana, California 92707
February 2006



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Walnut Grove Ave and Las Tunas Dr

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Direct Mud Rotary

Sampling Method: N/A

Logged by: V. Mathur and B. Lechler

Start/Finish Date: 12.06.04/12.16.04

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
0			Ground Surface		Borehole location cleared to 7 feet using air knife method. 18 inch borehole drilled using bucket auger and 14 inch conductor casing installed to 25 feet
0 - 5			ASPHALT AND ROAD BASE MATERIAL		
5 - 30			SANDY SILT/CLAY (ML/CL) same as above, trace fine gravel		Logger B. Lechler 12/09/04 0940 hrs
30 - 40			SILTY SAND (SM) brown, moist, soft fine to medium grained, some gravel, cobbles		
40 - 50			WELL GRADED SAND W/ SILT AND GRAVEL (SW-SM) dark yellowish brown (10YR 4/6), 30% medium sand, 20% coarse sand, 20% fine gravel, 20% fine sand, 10% silt		
50					rig chatter 1000 hrs



Boring Number: MW1-6

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Walnut Grove Ave and Las Tunas Dr
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Direct Mud Rotary
 Sampling Method: N/A
 Logged by: V. Mathur and B. Lechler
 Start/Finish Date: 12.06.04/12.16.04

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
55			<p>SILTY SAND (SM) dark yellowish brown (10YR 3/6), 50% very fine to fine sand, 30% medium sand, 15% silt, 5% coarse sand and gravel. Interbeds of clay (CH), very dark grayish brown (10YR 3/2), 100% fines</p>		rig chatter
60			<p>SILTY SAND W/ GRAVEL (SM) dark yellowish brown (10YR 3/6), 50% fine sand, 20% medium to coarse sand, 15% gravel, 15% silt</p>		1035 hrs
80			<p>SILTY SAND (SM) & POORLY GRADED GRAVEL (GP) SM: same as 40-50 feet. GP: 70% gravel (10-20 mm), 30% coarse sand to fine gravel, more gravel 60-70 feet</p>		
90			<p>POORLY GRADED GRAVEL (GP) yellowish brown (10YR 5/4), 80% fine gravel (10-20 mm), 10% fine gravel (<10 mm), 5% coarse sand, 5% fine to medium sand</p>		1050 hrs rig chatter
100					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Walnut Grove Ave and Las Tunas Dr

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Direct Mud Rotary

Sampling Method: N/A

Logged by: V. Mathur and B. Lechler

Start/Finish Date: 12.06.04/12.16.04

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
105					
110			POORLY GRADED GRAVEL W/ SAND (GP) yellowish brown (10YR 5/4), 75% fine gravel (2-10 mm), 20% coarse to very coarse sand, 5% fine to medium sand		1120 hrs
115					
120			POORLY GRADED GRAVEL W/ SILT AND SAND (GP-GM) dark yellowish brown (10YR 4/4), 60% fine gravel (2-10 mm); 20% coarse sand, 10% fine to medium sand, 10% fines		
125					
130					1155 hrs, stop for lunch, resume drilling at 1300 hrs
135					
140			SILT W/ SAND (ML) dark yellowish brown (10YR 4/4), 80% fines, 15% very fine to fine sand, 5% medium sand, trace coarse sand, gravel lenses 130-140 feet		rig chatter
145					rig chatter
150					1325 hrs



CH2MHILL

Boring Number: MW1-6

Sheet: 4 of 17

Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Walnut Grove Ave and Las Tunas Dr

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Direct Mud Rotary

Sampling Method: N/A

Logged by: V. Mathur and B. Lechler

Start/Finish Date: 12.06.04/12.16.04

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
155			SILT W/ SAND (ML) dark yellowish brown (10YR 3/6), same as above, but more dense (silt came up in larger balls)		
160			SILTY GRAVEL (GM) yellowish brown (10YR 5/4), 60% fine gravel, 20% fines (as lenses or thin beds), 10% coarse sand, 10% fine to medium sand		
165				rig chatter	
170				1435 hrs	
175					
180			POORLY GRADED GRAVEL W/ SILT AND SAND (GP-GM) yellowish brown (10YR 5/4), 70% fine gravel, 10% coarse sand, 10% fine to medium sand, 10% fines		
185					
190			SANDY SILT/CLAY (ML/CL) yellowish brown (10YR 4/4), 80% fines, 15% very fine to fine sand, 5% medium to coarse sand, trace fine gravel 200-220 feet		
195				1510 hrs	
200					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Walnut Grove Ave and Las Tunas Dr

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Direct Mud Rotary

Sampling Method: N/A

Logged by: V. Mathur and B. Lechler

Start/Finish Date: 12.06.04/12.16.04

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
205			SANDY SILT/CLAY (ML/CL) yellowish brown (10YR 5/4), 65% fines, 15% very fine to fine sand, 10% fine gravel, 10% medium to coarse sand		1540 hrs
210					
215					
220			SILT/CLAY (ML/CL) dark yellowish brown (10YR 4/4), 90% fines, 10% fine to coarse sand, more clay than above		1615 hrs
225					
230			SILTY SAND (SM) dark yellowish brown (10YR 4/4), 50% very fine to fine sand, 30% fines, 10% coarse sand, 10% medium sand		
235					
240			SILTY SAND (SM) dark yellowish brown (10YR 4/4), 40% very fine to fine sand, 30% fines, 20% medium sand, 10% coarse sand to fine gravel		
245					
250					1645 hrs



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Walnut Grove Ave and Las Tunas Dr

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Direct Mud Rotary

Sampling Method: N/A

Logged by: V. Mathur and B. Lechler

Start/Finish Date: 12.06.04/12.16.04

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
255			SANDY SILT (ML) yellowish brown (10YR 5/4), 50% fines, 30% very fine to fine sand, 15% medium to coarse sand, 5% fine gravel		
260			SANDY SILT (ML) yellowish brown (10YR 5/4), 60% fines, 30% very fine to fine sand, 10% medium sand to fine gravel		
265					
270			SILTY GRAVEL W/ SAND (GM) dark yellowish brown (10YR 4/6), 40% fine gravel, 20% coarse sand, 20% fine to medium sand, 20% silt		1715 hrs
275					rig chatter
280			POORLY GRADED GRAVEL W/ SILT (GP-GM) yellowish brown (10YR 5/6), 80% fine gravel (could be pieces of larger clasts), 10% silt, 5% coarse sand, 5% fine to medium sand		
285					
290			SANDY SILT/CLAY (ML/CL) & SILTY GRAVEL (GM) ML/CL: yellowish brown (10YR 5/6), 80% fines, 15% fine sand, 5% medium to coarse sand GM: 70% coarse sand to fine gravel, 15% fine to medium sand, 15% fines		1810 hrs, done drilling for day Resume drilling 12/10/04 at 0800 hrs
295					
300					0815 hrs, Pickup pump not working, stop to repair



Boring Number: MW1-6

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Walnut Grove Ave and Las Tunas Dr
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Direct Mud Rotary
 Sampling Method: N/A
 Logged by: V. Mathur and B. Lechler
 Start/Finish Date: 12.06.04/12.16.04

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
305			SANDY SILT/CLAY (ML/CL) & SILTY SAND (SM) (ML/CL): same as 290-300 feet (SM): 60% coarse sand, 15% medium sand, 15% silt, 10% very fine to fine sand		
310					
315					
320			SANDY SILT (ML) & POORLY GRADED GRAVEL W/ SAND (GP) ML: yellowish brown (10YR 5/4), 70% fines, 15% medium to coarse sand, 15% very fine to fine sand GP: 70% fine gravel, 20% coarse sand, 10% fine to medium sand		rig chatter
325					rig chatter
330			POORLY GRADED GRAVEL W/ SAND (GP) 80% fine gravel (could be fragments of larger gravel), 15% coarse sand, 5% fine to medium sand, some sandy silt (ML) interbeds		0950 hrs rig chatter 331-334 feet
335					
340			POORLY GRADED GRAVEL W/ SILT AND SAND (GP-GM) brown (10YR 5/3), 70% fine gravel, 10% coarse sand, 10% fine to medium sand, 10% silt		
345					rig chatter
350					1130 hrs



Boring Number: MW1-6

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Walnut Grove Ave and Las Tunas Dr
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Direct Mud Rotary
 Sampling Method: N/A
 Logged by: V. Mathur and B. Lechler
 Start/Finish Date: 12.06.04/12.16.04

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
355			<u>SANDY SILT/CLAY (ML/CL)</u> yellowish brown (10YR 5/4), 60% fines, 30% very fine to fine sand, 10% medium to coarse sand, trace gravel		
360					
365					
370			<u>SANDY SILT (ML)</u> dark yellowish brown (10YR 4/6), 65% fines, 25% very fine to fine sand, 10% medium to coarse sand		1200 hrs
375					
380			<u>SILTY SAND (SM)</u> dark yellowish brown (10 YR 4/6), 40% very fine to fine sand, 30% fines, 30% medium to coarse sand		
385					
390			<u>SANDY SILT (ML)</u> yellowish brown (10YR 5/4), 60% fines, 30% very fine to fine sand, 10% medium to coarse sand		1240 hrs
395					
400					



Boring Number: MW1-6

Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Walnut Grove Ave and Las Tunas Dr

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Direct Mud Rotary

Sampling Method: N/A

Logged by: V. Mathur and B. Lechler

Start/Finish Date: 12.06.04/12.16.04

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
405			SILTY SAND (SM) yellowish brown (10YR 5/4), 50% very fine to fine sand, 25% fines, 15% medium sand, 10% coarse sand, trace gravel		rig chatter
410			POORLY GRADED SAND W/ GRAVEL (SP) 60% coarse sand, 30% fine gravel (< 5 mm), 10% fine to medium sand, gravel subangular to rounded, some silty sand (SM) interbeds as above		rig chatter 1330 hrs
415					
420					rig chatter
425					
430			CLAY (CL) yellowish brown (10YR 5/4), medium plasticity, 90% fines, 10% fine to medium sand, some sand interbeds		1410 hrs
435					
440			SILT (ML) & POORLY GRADED SAND (SP) ML: yellowish brown (10YR 5/4), 80% fines, 15% fine to medium sand, 5% coarse sand SP: 70% coarse sand to fine gravel, 30% fine to medium sand		
445					rig chatter
450					1450 hrs



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Walnut Grove Ave and Las Tunas Dr

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Direct Mud Rotary

Sampling Method: N/A

Logged by: V. Mathur and B. Lechler

Start/Finish Date: 12.06.04/12.16.04

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
455			SILTY SAND (SM) yellowish brown (10YR 5/4), 40% very fine to fine sand, 40% fines, 20% medium to coarse sand		rig chatter
460			WELL GRADED SAND W/ SILT (SW-SM) yellowish brown (10YR 5/6), 35% coarse sand, 35% medium sand, 15% very fine to fine sand, 10% fines, 5% fine gravel		rig chatter
465					
470			WELL GRADED SAND W/ SILT AND GRAVEL (SW-SM) & SANDY SILT (ML) SW-SM: yellowish brown (10YR 5/6), 30% coarse sand, 20% medium sand, 20% fine sand, 20% fine gravel, 10% silt ML: 60% fines, 30% fine to medium sand, 10% coarse sand		1550 hrs, stop drilling to repair pump, resume drilling at 1735 hrs rig chatter
475					
480			SANDY SILT (ML) & POORLY GRADED GRAVEL (GP) ML: 60% fines, 30% very fine to fine sand, 10% medium sand GP: 70% fine gravel, 20% coarse sand, 10% fine to medium sand		rig chatter
485					rig chatter
490			CLAY (CL) & WELL GRADED SAND W/ SILT AND GRAVEL (SW-SM) CL: brown (10YR 5/3), 90% fines, 10% very fine to fine sand SW-SM: 30% medium sand, 30% very fine to fine sand, 15% coarse sand, 15% fine gravel, 10% silt		1815 hrs, done drilling for day Resume drilling 12/11/04 0830 hrs, change bit to tricone for harder formations
495					
500					



Boring Number: MW1-6

Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Walnut Grove Ave and Las Tunas Dr

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Direct Mud Rotary

Sampling Method: N/A

Logged by: V. Mathur and B. Lechler

Start/Finish Date: 12.06.04/12.16.04

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
505			SILTY SAND (SM) brown (10YR 5/3), 30% coarse sand, 30% fine to medium sand, 30% fines, 10% fine gravel		Driller says it feels like hard sand
510			POORLY GRADED SAND W/ SILT (SP-SM) 50% coarse sand, 20% medium sand, 20% fine sand, 10% fines		0910 hrs, stop to clean shaker screens, resume drilling at 0930 hrs
515					
520			POORLY GRADED SAND (SP) 60% coarse sand, 20% medium sand, 15% fine sand, 5% fines		
525					
530			SANDY SILT (ML) yellowish brown (10YR 5/4), 60% fines, 20% coarse sand, 10% medium sand, 10% fine sand		0950 hrs
535					
540			SANDY SILT (ML) yellowish brown (10YR 5/4), 60% fines, 15% fine sand, 15% medium sand, 10% coarse sand		
545					
550					1030 hrs



Boring Number: MW1-6

Sheet: 12 of 17

Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Walnut Grove Ave and Las Tunas Dr

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Direct Mud Rotary

Sampling Method: N/A

Logged by: V. Mathur and B. Lechler

Start/Finish Date: 12.06.04/12.16.04

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
555			SILTY SAND (SM) yellowish brown (10YR 5/6), 25% coarse sand, 25% medium sand, 25% very fine to fine sand, 25% fines		
560			SILT (ML) yellowish brown (10YR 5/6), 60% fines, 20% fine sand, 10% medium sand, 10% coarse sand		
565					hard drilling
570			SANDY SILT (ML) yellowish brown (10YR 5/6), 50% fines, 20% coarse sand, 15% fine sand, 15% medium sand		1110 hrs
575					
580					
585					rig chatter
					rig chatter
590			WELL GRADED SAND W/ SILT (SW-SM) yellowish brown (10YR 5/6), 30% coarse sand, 30% medium sand, 30% fine sand, 10% silt		1210 hrs
595					560-600 feet, drilling has been slow/hard, recovery is poor
600					



CH2MHILL

Boring Number: MW1-6

Sheet: 13 of 17

Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Walnut Grove Ave and Las Tunas Dr

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Direct Mud Rotary

Sampling Method: N/A

Logged by: V. Mathur and B. Lechler

Start/Finish Date: 12.06.04/12.16.04

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
605			SANDY SILT (ML) yellowish brown (10YR 5/6), 80% fines, 20% very fine to medium sand		
610			SILT W/ SAND (ML) 80% fines, 15% fine sand, 5% medium to coarse sand	1300 hrs	Driller says silt probably started around 605 feet
615					
620					
625			SILTY SAND (SM) 30% fine sand, 30% silt, 20% medium sand, 20% coarse sand	hard drilling	
630			SILTY SAND (SM) dark yellowish brown (10YR 4/6), 30% very fine to fine sand, 30% fines, 30% medium sand, 10% coarse sand, silt/clay (ML/CL) interbeds 640-650 feet	1350 hrs	
635					
640					
645					
650					1425 hrs



CH2MHILL

Boring Number: MW1-6

Sheet: 14 of 17

Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Walnut Grove Ave and Las Tunas Dr

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Direct Mud Rotary

Sampling Method: N/A

Logged by: V. Mathur and B. Lechler

Start/Finish Date: 12.06.04/12.16.04

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
655			SILT/CLAY (ML/CL) Very hard to retrieve sample while drilling. Not much material coming out on the shaker, so likely fine grained		
660					
665					
670			SANDY SILT (ML) yellowish brown (10YR 5/4), 50% fines, 30% very fine to fine sand, 15% medium sand, 5% coarse sand		1530 hrs
675					
680			SANDY SILT/CLAY (ML/CL) yellowish brown (10YR 5/4), 70% fines, 20% very fine to fine sand, 10% medium to coarse sand		
685					
690			CLAY (CL) 90% fines, 10% very fine to fine sand, trace medium to coarse sand		1615 hrs, done drilling for day Resume drilling 12/13/04 1010 hrs, changed back to bit for softer formations
695					
700					



Boring Number: MW1-6

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Walnut Grove Ave and Las Tunas Dr
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Direct Mud Rotary
 Sampling Method: N/A
 Logged by: V. Mathur and B. Lechler
 Start/Finish Date: 12.06.04/12.16.04

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
705	[Diagonal Hatching]		SANDY CLAY (CL) brown (10YR 4/3), 70% fines, 15% fine sand, 10% medium sand, 5% coarse sand	[Diagonal Hatching]	rig chatter
710			SANDY CLAY (CL) brown (10YR 4/3), 60% fines, 20% fine sand, 10% medium sand, 10% coarse sand		1045 hrs
715	[Vertical Dotted]		SILTY SAND (SM) brown (10YR 4/3), 40% fines, 25% coarse sand, 25% medium sand, 10% fine sand	[Diagonal Hatching]	slow/hard drilling
720			SANDY SILT/CLAY (ML/CL) brown (10YR 4/3), 70% fines, 25% fine sand, 5% medium to coarse sand		1145 hrs
725	[Vertical Dotted]		SANDY SILT/CLAY (ML/CL) brown (10YR 4/3), 70% fines, 25% fine sand, 5% medium to coarse sand	[Diagonal Hatching]	
730			SILT W/ SAND (ML) dark yellowish brown (10 YR 4/6), 80% fines, 15% fine sand, 5% medium to coarse sand		
735	[Vertical Dotted]		SILT W/ SAND (ML) dark yellowish brown (10 YR 4/6), 80% fines, 15% fine sand, 5% medium to coarse sand	[Diagonal Hatching]	
740					
745	[Vertical Dotted]			[Diagonal Hatching]	
750					1220 hrs



Boring Number: MW1-6

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Walnut Grove Ave and Las Tunas Dr
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Direct Mud Rotary
 Sampling Method: N/A
 Logged by: V. Mathur and B. Lechler
 Start/Finish Date: 12.06.04/12.16.04

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
755			SILT (ML) yellowish brown (10YR 5/4), 90% fines, 10% fine sand		
760			SANDY SILT (ML) yellowish brown (10YR 5/4), 60% fines, 30% fine sand, 10% medium to coarse sand, trace fine gravel		
765					
770			SANDY SILT (ML) yellowish brown (10YR 5/4), 70% fines, 15% fine sand, 10% medium sand, 5% coarse sand		1300 hrs
775					
780					
785					rig chatter 783-788 feet
790			SILTY SAND (SM) 40% fines, 25% fine sand, 20% medium sand, 15% coarse sand		1405 hrs
795					rig chatter
					rig chatter
800					rig chatter 1440 hrs, done drilling, run geophysics



Boring Number: MW1-6

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Walnut Grove Ave and Las Tunas Dr
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Direct Mud Rotary
 Sampling Method: N/A
 Logged by: V. Mathur and B. Lechler
 Start/Finish Date: 12.06.04/12.16.04

Depth (ft)	Borehole Information		MW Construction	Comments
	Soil Type	Lithologic Description		
805		WELL GRADED SAND W/ SILT (SW-SM) 35% medium sand, 30% fine sand, 25% coarse sand, 10% fines		Resume drilling 12/16/04 1420 hrs
810		SILTY SAND (SM) 30% medium sand, 30% fine sand, 20% coarse sand, 20% fines		1445
815				rig chatter
820				
825				rig chatter
830		End of Log		
835				
840				
845				
850				



Boring Number: MW1-7

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: N. Olive Ave and Main St
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Direct Mud Rotary
 Sampling Method: N/A
 Logged by: V. Mathur and B. Lechler
 Start/Finish Date: 01.03.05/01.06.05

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
0		Ground Surface		
0 - 3		<u>ASPHALT AND ROAD BASE MATERIAL</u>		
3 - 12		<u>SANDY SILT (ML)</u> brown, cobbles up to 10 inches in diameter, fewer and smaller cobbles 10-12 feet		Borehole location cleared to 7 feet using air knife method. 18 inch borehole drilled using bucket auger and 14 inch conductor casing installed to 25 feet
12 - 25		<u>SILTY SAND (SM)</u> brown		
25 - 40		<u>POORLY GRADED GRAVEL W/ SAND (GP)</u> 70% fine gravel (<10 mm), 20% coarse sand, 10% silt to medium sand		Logger B. Lechler 01/04/05 1555 hrs
40 - 50		<u>SANDY SILT (ML)</u> dark yellowish brown (10YR 4/6), 70% fines, 10% coarse sand, 10% medium sand, 10% fine sand		1605 hrs rig chatter 1630 hrs



Boring Number: MW1-7

Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: N. Olive Ave and Main St
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Direct Mud Rotary
Sampling Method: N/A
Logged by: V. Mathur and B. Lechler
Start/Finish Date: 01.03.05/01.06.05

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
55			SANDY SILT (ML) dark yellowish brown (10YR 4/6), 60% fines, 30% very fine to fine sand, 10% medium sand, trace coarse sand		
60					
65					
70					1655 hrs
75					
80			SILTY SAND (SM) dark yellowish brown (10YR 4/6), 40% fine sand, 40% fines, 20% medium sand		
85					
90			SILTY SAND (SM) dark yellowish brown (10YR 4/6), 30% medium sand, 30% fine sand, 30% fines, 10% coarse sand, trace gravel		1730 hrs rig chatter
95					
100					



Boring Number: MW1-7

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: N. Olive Ave and Main St
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Direct Mud Rotary
 Sampling Method: N/A
 Logged by: V. Mathur and B. Lechler
 Start/Finish Date: 01.03.05/01.06.05

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
105					
110			SILTY SAND (SM) dark yellowish brown (10YR 4/6), 60% fine sand, 30% fines, 10% medium to coarse sand		1805 hrs
115					
120			SILTY SAND (SM) dark yellowish brown (10YR 4/6), 40% fine sand, 30% fines, 20% medium sand, 10% coarse sand, trace gravel		rig chatter 123-126 feet
125					
130			WELL GRADED GRAVEL W/ SAND (GW) 70% fine gravel (<10 mm, could be from larger clasts), 20% coarse sand, 10% fine to medium sand		1830 hrs, done drilling for day Resume drilling 01/05/05 0810 hrs
135					rig chatter 132-139 feet
140			WELL GRADED SAND W/ SILT AND GRAVEL (SW-SM) yellowish brown (10YR 5/6), 30% coarse sand, 20% medium sand, 20% fine sand, 20% fine gravel, 10% fines, less gravel (more coarse sand) 150-160 feet		slow/hard drilling
145					
150					0915 hrs



Boring Number: MW1-7

Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: N. Olive Ave and Main St
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Direct Mud Rotary
Sampling Method: N/A
Logged by: V. Mathur and B. Lechler
Start/Finish Date: 01.03.05/01.06.05

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
155				rig chatter 150-155 feet
160		<u>SANDY SILT (ML)</u> dark yellowish brown (10YR 4/6), 50% fines, 20% coarse sand, 20% fine sand, 10% medium sand		rig chatter
165				1000 hrs
170		<u>SILTY SAND (SM)</u> dark yellowish brown (10YR 4/6), 30% coarse sand, 30% medium sand, 20% fine sand, 20% fines		
175				
180				
185				
190		<u>SILTY SAND (SM)</u> yellowish brown (10YR 5/6), 30% medium sand, 30% fine sand, 30% fines, 10% coarse sand		1050 hrs
195				
200				



Boring Number: MW1-7

Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: N. Olive Ave and Main St
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Direct Mud Rotary
Sampling Method: N/A
Logged by: V. Mathur and B. Lechler
Start/Finish Date: 01.03.05/01.06.05

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
205					
210			SILTY SAND (SM) yellowish brown (10YR 5/6), 25% coarse sand, 25% medium sand, 25% fine sand, 25% fines,	1120 hrs	rig chatter
215					
220			SILTY SAND (SM) & POORLY GRADED GRAVEL W/ SAND (GP) SM: same as above GP: 50% fine gravel, 30% coarse sand, 20% fine to medium sand		rig chatter
225					rig chatter
230			WELL GRADED SAND W/ SILT AND GRAVEL (SW-SM) yellowish brown (10YR 5/6), 25% fine gravel (<5 mm), 25% coarse sand, 20% medium sand, 20% fine sand, 10% fines	1215 hrs	rig chatter
235					rig chatter
240			WELL GRADED SAND W/ SILT AND GRAVEL (SW-SM) yellowish brown (10YR 5/6), 40% coarse sand, 20% fine gravel, 20% medium sand, 10% fine sand, 10% fines		rig chatter
245					1330 hrs, stop drilling for 20 minutes
250					1415 hrs



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: N. Olive Ave and Main St

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Direct Mud Rotary

Sampling Method: N/A

Logged by: V. Mathur and B. Lechler

Start/Finish Date: 01.03.05/01.06.05

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
255		WELL GRADED SAND (SW) yellowish brown (10YR 5/6), 35% coarse sand, 35% medium sand, 30% fine sand		rig chatter 250-267 feet
260		SILTY SAND (SM) yellowish brown (10YR 5/6), 30% coarse sand, 25% medium sand, 25% fine sand, 20% fines		
265				
270				
275			1510 hrs rig chatter	
280		WELL GRADED SAND (SW) yellowish brown (10YR 5/6), 40% coarse sand, 30% medium sand, 20% fine sand, 5% fine gravel, 5% fines		bedrock contact at 284 feet based on geophysical logs
285				
290		SANDY SILT (ML) dark yellowish brown (10YR 5/6), 70% fines, 20% fine sand, 10% medium to coarse sand		1600 hrs
295				
300				1625 hrs, done drilling, run geophysics



Boring Number: MW1-7

Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: N. Olive Ave and Main St
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Direct Mud Rotary
Sampling Method: N/A
Logged by: V. Mathur and B. Lechler
Start/Finish Date: 01.03.05/01.06.05

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
305		<u>LEAN CLAY (CL)</u> yellowish brown (10YR 5/4), 85% fines, 15% fine sand, trace medium to coarse sand		Resume drilling 01/06/05 0805
310				0830 hrs
315		<u>LEAN CLAY (CL)</u> olive gray (5Y 5/2), medium plasticity, 95% fines, 5% fine sand		
320		<u>LEAN CLAY (CL)</u> olive (5Y 4/3), medium plasticity, firm, 95% fines, 5% fine sand		0855 hrs
325				
330				
335				
340				
345				
350				0920 hrs



Boring Number: MW1-7

Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: N. Olive Ave and Main St
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Direct Mud Rotary
Sampling Method: N/A
Logged by: V. Mathur and B. Lechler
Start/Finish Date: 01.03.05/01.06.05

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
355				
360				
365				
370				
375				
380				
385				
390				
395				
400				
		LEAN CLAY (CL) black (2.5Y 2.5/1), medium plasticity, 95% fines, 5% fine sand		0945 hrs slow drilling 375-385 feet 1030 hrs slow drilling

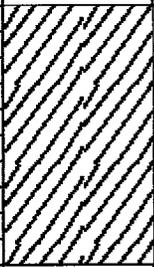


Boring Number: MW1-7

Sheet: 9 of 9

Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: N. Olive Ave and Main St
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Direct Mud Rotary
Sampling Method: N/A
Logged by: V. Mathur and B. Lechler
Start/Finish Date: 01.03.05/01.06.05

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
405				
410		End of Log		1135 hrs, done drilling, run geophysics
415				
420				
425				
430				
435				
440				
445				
450				



Boring Number: MW1-8

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Marguerita and Commonwealth Ave.
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Direct Mud Rotary
 Sampling Method: N/A
 Logged by: B. Lechler
 Start/Finish Date: 04.11.05/04.19.05

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
0			Ground Surface		Borehole location cleared to 7.5 feet using air knife method. 18 inch borehole drilled using bucket auger and 14 inch conductor casing installed to 26 feet
			ASPHALT AND ROAD BASE MATERIAL		
5			SANDY SILT (ML)		
10					
15					
20			POORLY GRADED GRAVEL (GP) large gravel up to 60 mm		
25					
30			WELL GRADED SAND (SW) dark yellowish brown (10YR 4/4), 35% medium sand, 30% coarse sand, 30% fine sand, 5% silt		0945 hrs, drilled to 28 feet 04/18/05 0840 hrs, resume drilling
35			POORLY GRADED GRAVEL (GP) & SANDY SILT (ML) GP: 80% fine gravel (<5 mm), 10% coarse sand, 10% fine to medium sand ML: dark yellowish brown (10YR 4/6), soft, medium plasticity, 70% fines, 30% very fine to fine sand		rig chatter
40					
45			SANDY SILT (ML) same as above		0900 hrs
50					



Boring Number: MW1-8

Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Marguerita and Commonwealth Ave.

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Direct Mud Rotary

Sampling Method: N/A

Logged by: B. Lechler

Start/Finish Date: 04.11.05/04.19.05

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
55					
60			LEAN CLAY (CL) brown (10YR 4/3), medium to high plasticity, 90% fines, 10% very fine sand		
65					0945 hrs
70			LEAN CLAY (CL) & WELL GRADED GRAVEL (GW) CL: same as above GW: 70% fine gravel (5 - 10 mm), 20% medium to coarse sand, 10% fine sand to silt		
75					rig chatter
80			SILTY SAND (SM) dark yellowish brown (10YR 4/4), 40% medium sand, 20% coarse sand, 20% fine sand, 20% fines		
85					1025 hrs
90			SILTY SAND (SM) same as above		
95					rig chatter
100			SILTY GRAVEL W/ SAND (GM) light olive brown (2.5Y 5/4), 50% fine gravel (<10 mm), 20% fines, 15% coarse sand, 15% fine to medium sand, gravels mostly quartz and granites, some weathered mafics		
					rig chatter, slow drilling



Boring Number: MW1-8

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Marguerita and Commonwealth Ave.
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Direct Mud Rotary
 Sampling Method: N/A
 Logged by: B. Lechler
 Start/Finish Date: 04.11.05/04.19.05

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
105			SILTY SAND (SM) yellowish brown (10YR 5/6), 30% coarse sand, 30% medium sand, 20% very fine to fine sand, 20% fines		rig chatter 1140 hrs
115			POORLY GRADED SAND W/ SILT AND GRAVEL (SP-SM) 50% coarse sand, 15% fine gravel, 15% medium sand, 10% very fine to fine sand, 10% fines		
125			SILT (ML) light olive brown (2.5Y 5/4), soft, low plasticity, 90% fines, 10% very fine to medium sand		1240 hrs
135			SILT (ML) same as above, some sand and gravel interbeds		
145			SILT (ML) yellowish brown (10YR 5/4), soft, 90% fines, 10% very fine to medium sand		1355 hrs bedrock contact at 146 feet based on geophysical logs
150					



Boring Number: MW1-8

Sheet: 4 of 6

Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Marguerita and Commonwealth Ave.

Project Number: 175859.FI.03

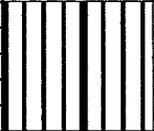
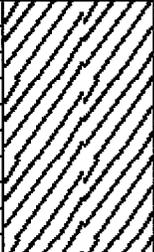
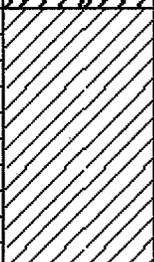
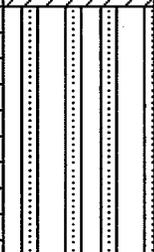
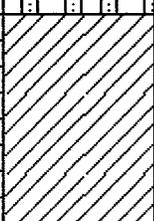
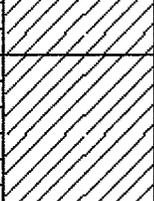
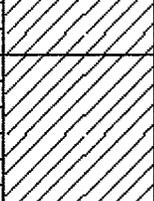
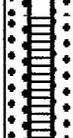
Driller: WDC Exploration & Wells

Drilling Method: Direct Mud Rotary

Sampling Method: N/A

Logged by: B. Lechler

Start/Finish Date: 04.11.05/04.19.05

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
155		LEAN CLAY W/ SAND (CL) dark yellowish brown (10YR 4/4), soft, medium plasticity, 85% fines, 10% very fine to medium sand, 5% coarse sand		1500 hrs
160				
165		FAT CLAY (CH) dark yellowish brown (10YR 3/6), firm, high plasticity, 95% fines, 5% very fine to fine sand		1600 hrs
170				
175		SILT W/ SAND (ML) yellowish brown (10YR 5/4), 85% fines, 10% medium to coarse sand, 5% very fine to fine sand		
180				
185		FAT CLAY (CH) dark yellowish brown (10YR 3/6), firm, high plasticity, 100% fines		slow drilling 197-203 feet
190				
195		FAT CLAY (CH) same as above		
200				



Boring Number: MW1-8

Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Marguerita and Commonwealth Ave.

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Direct Mud Rotary

Sampling Method: N/A

Logged by: B. Lechler

Start/Finish Date: 04.11.05/04.19.05

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
205					1705 hrs
210			FAT CLAY (CH) light olive brown (2.5Y 5/6), soft, high plasticity, 100% fines		
215					
220					
225			FAT CLAY (CH) light olive brown (2.5Y 5/4), soft, high plasticity, 100% fines		1745 hrs, done for day 04/19/05 0935 hrs, resume drilling
230					
235			FAT CLAY (CH) same as above		
240					
245			LEAN CLAY (CL) olive (5Y 4/3), soft to firm, medium plasticity, 95% fines, 5% fine sand		1005 hrs
250					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Marguerita and Commonwealth Ave.

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Direct Mud Rotary

Sampling Method: N/A

Logged by: B. Lechler

Start/Finish Date: 04.11.05/04.19.05

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
255			<u>LEAN CLAY (CL)</u> same as above		
260					
265			<u>LEAN CLAY (CL)</u> same as above		1050 hrs
270					
275			<u>LEAN CLAY (CL)</u> same as above		
280					
285			<u>LEAN CLAY (CL)</u> dark olive gray (5Y 3/2), soft, medium plasticity, 100% fines		1130 hrs
290			<u>LEAN CLAY (CL)</u> black (5Y 2.5/2), soft, medium plasticity, 100% fines		
295					
300					1200 hrs

2006 REPORT
SAN FERNANDO VALLEY BASIN
GROUNDWATER MONITORING PROGRAM

SAN FERNANDO VALLEY
LOS ANGELES COUNTY, CALIFORNIA

USEPA CONTRACT NO. 68-W-98-225
USEPA WORK ASSIGNMENT NO. 246-RICO-0959

Prepared for
United States Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, CA 94105

Prepared by
CH2M HILL, Inc.
155 Grand Avenue, Suite 1000
Oakland, CA 94612

December 2007

TABLE 2-1

Groundwater Elevation - First, Second, Third, and Fourth Quarters 2006
 San Fernando Valley Basin - Groundwater Monitoring Program

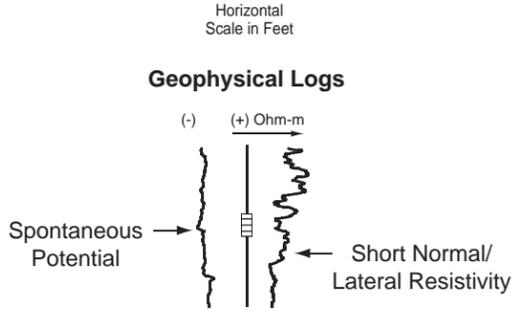
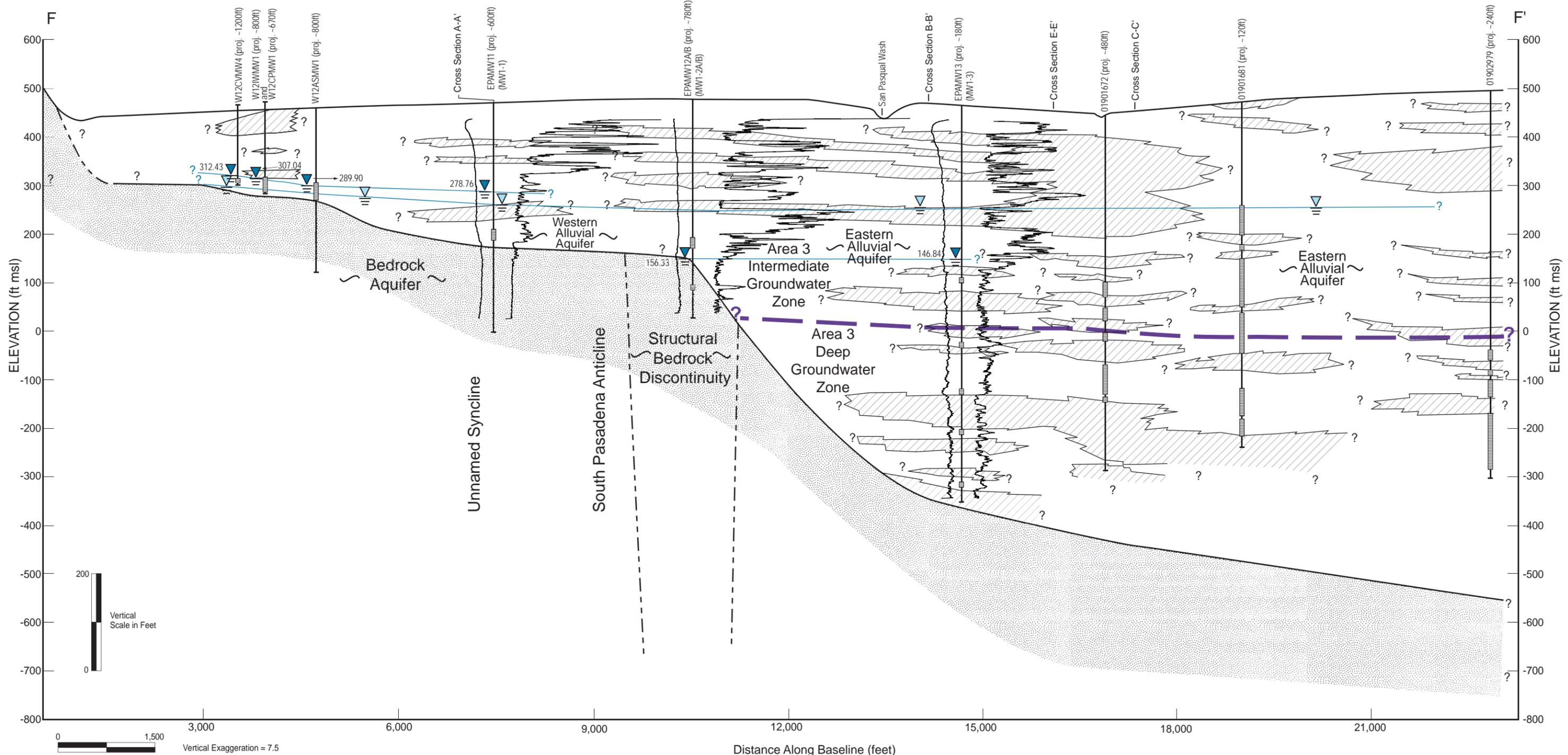
Well ID	Sample Date	Depth to Water (ft bgs)	Groundwater Elevation (ft msl)
NH-VPB-12	NS	NM	NM
NH-VPB-12	NS	NM	NM
NH-VPB-12	NS	NM	NM
NH-VPB-12	NS	NM	NM
NH-VPB-13	NS	NM	NM
NH-VPB-13	NS	NM	NM
NH-VPB-13	NS	NM	NM
NH-VPB-13	NS	NM	NM
NH-VPB-14	NS	NM	NM
NH-VPB-14	NS	NM	NM
NH-VPB-14	NS	NM	NM
NH-VPB-14	NS	NM	NM
PO-C01-195	3/21/2006	44.25	399.47
PO-C01-195	7/6/2006	44.57	399.15
PO-C01-195	10/13/2006	44.22	399.5
PO-C01-195	1/5/2007	43.79	399.93
PO-C01-354	NS	NM	NM
PO-C01-354	NS	NM	NM
PO-C01-354	NS	NM	NM
PO-C01-354	12/15/2006	42.59	399.71
PO-C02-053	3/21/2006	37.37	389.25
PO-C02-053	NS	NM	NM
PO-C02-053	NS	NM	NM
PO-C02-053	12/18/2006	37.67	388.95
PO-C02-205	NS	NM	NM
PO-C02-205	NS	NM	NM
PO-C02-205	NS	NM	NM
PO-C02-205	12/18/2006	35.15	391.64
PO-C03-182	3/21/2006	47.54	337.61
PO-C03-182	NS	NM	NM
PO-C03-182	NS	NM	NM
PO-C03-182	12/15/2006	60.93	324.22
PO-C03-235	NS	NM	NM
PO-C03-235	NS	NM	NM
PO-C03-235	NS	NM	NM
PO-C03-235	12/15/2006	60.86	324.13
PO-VPB-01	3/20/2006	24.85	386.48
PO-VPB-01	NS	NM	NM
PO-VPB-01	NS	NM	NM
PO-VPB-01	12/18/2006	25.3	386.03

Well ID	Sample Date	Depth to Water (ft bgs)	Groundwater Elevation (ft msl)
PO-VPB-02	3/28/2006	44.13	399.28
PO-VPB-02	7/11/2006	44.61	398.8
PO-VPB-02	10/13/2006	44.31	399.1
PO-VPB-02	1/5/2007	43.79	399.62
PO-VPB-03	NS	NM	NM
PO-VPB-03	6/27/2006	43.6	342.51
PO-VPB-03	10/16/2006	48.65	337.46
PO-VPB-03	12/15/2006	50.31	335.8
PO-VPB-04	NS	NM	NM
PO-VPB-04	NS	NM	NM
PO-VPB-04	NS	NM	NM
PO-VPB-04	NS	NM	NM
PO-VPB-05	NS	NM	NM
PO-VPB-05	NS	NM	NM
PO-VPB-05	NS	NM	NM
PO-VPB-05	12/18/2006	46.5	320.07
PO-VPB-06	NS	NM	NM
PO-VPB-06	NS	NM	NM
PO-VPB-06	NS	NM	NM
PO-VPB-06	12/18/2006	26.98	319.49
PO-VPB-07	3/24/2006	59.42	334.82
PO-VPB-07	7/11/2006	64.25	329.99
PO-VPB-07	10/17/2006	71.13	323.11
PO-VPB-07	1/5/2007	71.9	322.34
PO-VPB-08	NS	NM	NM
PO-VPB-08	7/11/2006	18.49	312.81
PO-VPB-08	10/5/2006	18.22	313.08
PO-VPB-08	12/18/2006	18.32	312.98
PO-VPB-09	NS	NM	NM
PO-VPB-09	NS	NM	NM
PO-VPB-09	NS	NM	NM
PO-VPB-09	NS	NM	NM
PO-VPB-10	3/21/2006	60.39	412.41
PO-VPB-10	7/6/2006	60.81	411.99
PO-VPB-10	NS	NM	NM
PO-VPB-10	12/14/2006	59.7	413.1
PO-VPB-11	NS	NM	NM
PO-VPB-11	NS	NM	NM
PO-VPB-11	NS	NM	NM
PO-VPB-11	NS	NM	NM

CH2M HILL, 2009

Southwest

Northeast



Legend

Lithologic Units (contacts and extents queried (?) where interpretation infeasible due to limited dataset)

- Predominantly Coarse-grained Material
- Predominantly Fine-grained Material
- Sedimentary Bedrock

- Screened Well Intervals
- Groundwater Elevation: 2007², queried (?) where interpretation infeasible due to the limited dataset
- Groundwater Elevation: 1933³, queried (?) where interpretation infeasible due to limited dataset
- Approximate location of boundary between groundwater zones, extent queried (?) where interpretation infeasible due to limited dataset

Notes:

- See Figure 3-4 for locations of cross-sections in plan view.
- Groundwater zone boundaries shown are conceptual.
- These cross sections show generalized lithologies based on the following categories: predominantly coarse grained material (includes gravel, sand, silty sand, and/or clayey sand) and predominantly fine grained material (includes clay, silt, sandy silt, and/or sandy clay).
- (1) Sedimentary bedrock elevations are shown on Figure 3-16.
- (2) 2007 groundwater elevations represent the water table or potentiometric surface as measured in spring 2007, in feet (relative to) mean sea level.
- (3) 1933 groundwater elevations shown on Figure 3-5.
- (4) This Figure (3-15) is the same as Figure D-14 in Appendix D.

Figure 3-15
Conceptual Hydrogeologic Cross Section F-F'
 Remedial Investigation
 San Gabriel Valley Area 3 Superfund Site

GEOTECHNICAL DIVISION
ENGINEERING

2000 NOV -8 AM 11:17

CITY OF LOS ANGELES
DEPARTMENT OF GENERAL SERVICES
STANDARDS DIVISION

**AVE. 45 - ARROYO DR.
RELIEF SEWER**

LAB NO. 140-4997

N80°E; 50°SE → get trap 20' w/o B-28

W.O. NO. E2000462

NOVEMBER 2000

GEOTECHNICAL SERVICES FILE: 00-072

KEY TO SYMBOLS

Symbol Description

STRATA



Gravel



Clayey sands, sand-clay mixtures



PCC pavement.

MISCELLANEOUS



Water table at date indicated.



Water seep at date indicated.



Boring continues.



Drill rejection.

SAMPLERS



Standard Penetration.



Split Spoon.

KEY TO SYMBOLS

Symbol Description

Symbol Description

STRATA



AC pavement.



Silty, clayey sand.



Silty sands, sand-silt mixtures



Inorganic silts and very fine sands,
rock flour, silty or clayey fine sands
or clayey silts with slight plasticity.



Silty gravels, gravel-sand-silt mixtures



Siltstone



Clayey silt/silty clay.



Poorly graded sands or gravelly sands,
little or no fines



Claystone



Sandy silt/silty sand.

Notes:

1. The drilling operation was cleared by Geotechnical Services to commence as of 07-12-00.
2. Exploratory borings were drilled on dates indicated on the log sheets with a CME-75 drill rig using 8" diameter hollow stem augers.
3. Water was encountered at locations and depths indicated on the log sheets during the drilling of this project.
4. Boring locations and elevations were provided by Geotechnical Services.
5. Abbreviations used on logs:
 - N/o = north of NCF = north curb face NE = northeast
 - S/o = south of SCF = south curb face NW = northwest
 - E/o = east of ECF = east curb face SE = southeast
 - W/o = west of WCF = west curb face SW = southwest
 - C/L = center line PL = property line
 - AC = asphalt concrete PCC = Portland cement concrete
 - TVA = toxic vapor analyzer LEL = lower explosive limit
 - PPM = parts per million HT = high torque
6. A maximum blow count value of 75 per inch increment was used for the Standard Penetration Test.
7. The stratification lines indicated on the boring maps and profiles represent the approximate boundary between material types and the transition may be gradual.
8. The materials, boundaries, and conditions have been established only at the boring locations, and are not necessarily representative of subsurface conditions elsewhere across the site.

UNIFIED SOIL CLASSIFICATION SYSTEM *

MAJOR DIVISIONS		GROUP SYMBOLS	TYPICAL NAMES	
COARSE GRAINED SOILS (More than 50% of material is LARGER than No.200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No.4 sieve size)	CLEAN GRAVELS (Little or no fines)	 GW	Well graded gravels, gravel-sand mixtures, little or no fines.
		 GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.	
		GRAVELS WITH FINES (Appreciable amount of fines)	 GM	Silt gravels, gravel-sand-silt mixtures.
		 GC	Clayey gravels, gravel-sand-clay mixtures.	
	SANDS (More than 50% of coarse fraction is SMALLER than the No.4 sieve size)	CLEAN SANDS (Little or no fines)	 SW	Well graded sands, gravelly sands, little or no fines.
		 SP	Poorly graded sands or gravelly sands, little or no fines.	
		SANDS WITH FINES (Appreciable amount of fines)	 SM	Silty sands, sand-silt mixtures.
		 SC	Clayey sands, sand-clay mixtures.	
FINE GRAINED SOILS (More than 50% of material is SMALLER than No.200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)		 ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
	SILTS AND CLAYS (Liquid limit GREATER than 50)		 CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			 OL	Organic silts and organic silty clays of low plasticity.
			 MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
	SILTS AND CLAYS (Liquid limit GREATER than 50)		 CH	Inorganic clays of high plasticity, fat clays.
			 OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			 Pt	Peat and other highly organic soils.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

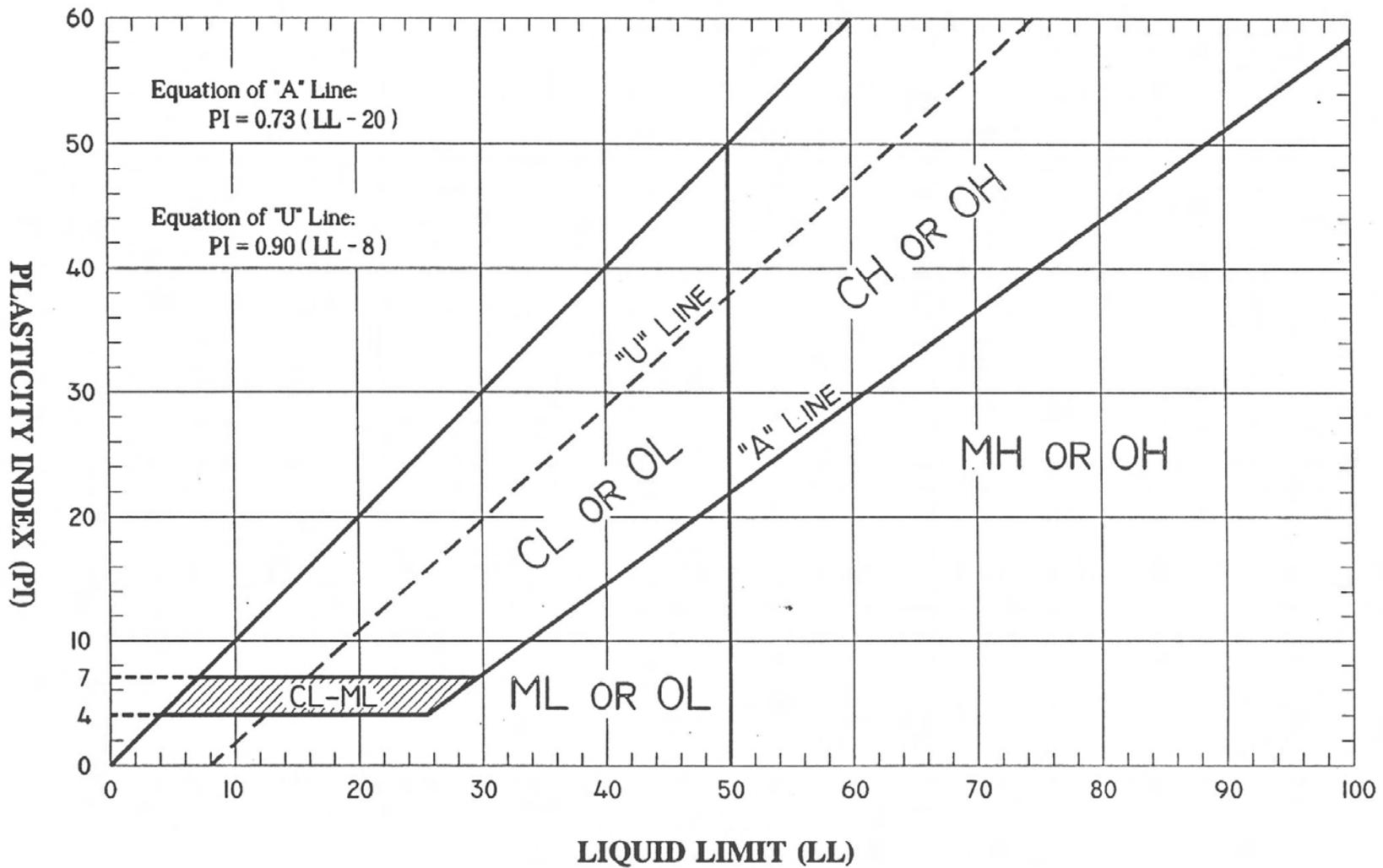
P A R T I C L E S I Z E L I M I T S

SILT OR CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		
	No.200	No.40	No.10	No.4	3/4 in.	3 in.	12 in.
	U. S. S T A N D A R D S I E V E S I Z E						

* Reference:
 The Unified Soil Classification System, Corps of Engineers.
 U.S. Army Technical Memorandum No. 3-357, Vol. I, March 1953.
 (Revised April, 1960)

CITY OF LOS ANGELES
DEPARTMENT OF GENERAL SERVICES
 STANDARDS DIVISION
 2319 DORRIS PLACE
 LOS ANGELES CA 90031
 (213) 485-2242

CLASSIFICATION OF FINE-GRAINED SOILS *



* Reference:
 U.S. Army Corps of Engineers

CITY OF LOS ANGELES
 DEPARTMENT OF GENERAL SERVICES
 STANDARDS DIVISION
 2319 DORRIS PLACE
 LOS ANGELES CA 90031
 (213) 485-2242

LOG OF TEST BORING

LAB. NO.: 140- 4997 **PROJECT:** AVENUE 45 - ARROYO DR. RELIEF SEWER
BORING NO.: B-1 **ELEVATION:** 531.5' **DRILLING DATE:** 07/18/2000
BORING LOCATION: C/L Arroyo Glen St. and C/L Avenue 63
DRILL RIG TYPE: CME-75 using 8" diameter hollow stem augers
DEPTH TO STANDING WATER: None **DEPTH TO WATER SEEPAGE:** None
DRILLER: Adams **LOGGER:** Redlin **ENGINEER:** None Present

ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	USCS	Field Description	Moist. %	Dens. Pcf
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">0</div> <div style="margin-bottom: 10px;">530</div> <div style="margin-bottom: 10px;">5</div> <div style="margin-bottom: 10px;">525</div> <div style="margin-bottom: 10px;">10</div> <div style="margin-bottom: 10px;">520</div> <div style="margin-bottom: 10px;">15</div> <div style="margin-bottom: 10px;">515</div> <div style="margin-bottom: 10px;">20</div> <div style="margin-bottom: 10px;">510</div> <div style="margin-bottom: 10px;">25</div> <div style="margin-bottom: 10px;">505</div> <div style="margin-bottom: 10px;">30</div> <div style="margin-bottom: 10px;">500</div> <div style="margin-bottom: 10px;">35</div> <div style="margin-bottom: 10px;">495</div> </div>			<p>6" AC pavement in fair condition</p> <p>FILL MATERIAL. Light brown/tan silty sand with some gravel. Moist and firm.</p> <p style="text-align: center;">---</p> <p style="text-align: center;">No free water</p> <p style="text-align: center;">---</p> <p>Bulk soil sample taken at 2-1/2' depth. Damaged water line at 2-1/2' depth. Terminated test boring hole.</p>		

LOG OF TEST BORING

LAB NO. : 140- 4997

PROJECT: AVENUE 45 - ARROYO DR. RELIEF SEWER

BORING NO.: B-1A

ELEVATION: 532'

DRILLING DATE: 07/27/2000

BORING LOCATION: 5' N/o C/L Avenue 63 and @ C/L Arroyo Glen-St.

DRILL RIG TYPE: CME-75 using 8" diameter hollow stem augers

DEPTH TO STANDING WATER: 13'

DEPTH TO WATER SEEPAGE: None

DRILLER: Adams

LOGGER: Redlin

ENGINEER: None Present

ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/FOOT	USCS	Field Description	Standard Penetration Readings			
				1st 6"	2nd 6"	3rd 6"	
0		SM	6" AC pavement in fair condition				
530			Brown silty sand with some clay binders and a little gravel. Moist and firm.	5	6	7	
5		GM	Light brown/tan gravel-sand-silt mixture with some cobbles. Damp and dense.	12	15	20	
525							
10					10	18	20
520							
15				First encountered water at 13' depth.	25	21	25
515							
20					25	38	30
510							
25				26	40	45	
505			— Encountered groundwater at 13' depth. —				
30			— Water sample taken prior to removing hollows. —				
500							
35							
495							

LOG OF TEST BORING

LAB. NO.: 140- 4997

PROJECT: AVENUE 45 - ARROYO DR. RELIEF SEWER

BORING NO.: B-2

ELEVATION: 518.25'

DRILLING DATE: 07/13/2000

BORING LOCATION: C/L Avenue 64 and 95' SW/o C/L Arroyo Glen St.

DRILL RIG TYPE: CME-75 using 8" diameter hollow stem augers

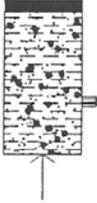
DEPTH TO STANDING WATER: None

DEPTH TO WATER SEEPAGE: None

DRILLER: Adams

LOGGER: Redlin

ENGINEER: None Present

ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	USCS	Field Description	Moist. %	Dens. Pcf
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">0</div> <div style="margin-bottom: 10px;">515</div> <div style="margin-bottom: 10px;">5</div> <div style="margin-bottom: 10px;">510</div> <div style="margin-bottom: 10px;">10</div> <div style="margin-bottom: 10px;">505</div> <div style="margin-bottom: 10px;">15</div> <div style="margin-bottom: 10px;">500</div> <div style="margin-bottom: 10px;">20</div> <div style="margin-bottom: 10px;">495</div> <div style="margin-bottom: 10px;">25</div> <div style="margin-bottom: 10px;">490</div> <div style="margin-bottom: 10px;">30</div> <div style="margin-bottom: 10px;">485</div> <div style="margin-bottom: 10px;">35</div> <div style="margin-bottom: 10px;">480</div> </div>	 <p style="margin-top: 100px;">50/3</p>		<p>4" AC pavement in fair condition</p> <p>FILL MATERIAL. Light brown/tan gravel-sand-silt mixture with cobbles. Damp and dense. Split Spoon sample at 2-1/2' depth not retained due to cobble.</p> <p style="text-align: center;">---</p> <p style="text-align: center;">No free water</p> <p style="text-align: center;">---</p> <p>Drilled through top of large sewer at 4' depth. Test boring hole terminated.</p>		

LOG OF TEST BORING

LAB. NO.: 140- 4997 **PROJECT:** AVENUE 45 - ARROYO DR. RELIEF SEWER
BORING NO.: B-2A **ELEVATION:** 518.25' **DRILLING DATE:** 07/18/2000
BORING LOCATION: 10' SE/o C/L AveNUE 64 & 95' SW/o C/L Arroyo Glen St. at entrance to park
DRILL RIG TYPE: CME-75 using 8" diameter hollow stem augers
DEPTH TO STANDING WATER: None **DEPTH TO WATER SEEPAGE:** None
DRILLER: Adams **LOGGER:** Redlin **ENGINEER:** None Present

ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	USCS	Field Description	Moist. %	Dens. Pcf
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">0</div> <div style="margin-bottom: 10px;">515</div> <div style="margin-bottom: 10px;">5</div> <div style="margin-bottom: 10px;">510</div> <div style="margin-bottom: 10px;">10</div> <div style="margin-bottom: 10px;">505</div> <div style="margin-bottom: 10px;">15</div> <div style="margin-bottom: 10px;">500</div> <div style="margin-bottom: 10px;">20</div> <div style="margin-bottom: 10px;">495</div> <div style="margin-bottom: 10px;">25</div> <div style="margin-bottom: 10px;">490</div> <div style="margin-bottom: 10px;">30</div> <div style="margin-bottom: 10px;">485</div> <div style="margin-bottom: 10px;">35</div> <div style="margin-bottom: 10px;">480</div> </div>		<p>SM/GM</p>	<p>4" AC pavement in fair condition</p> <p>Light brown/tan silty sand with some gravel. Damp and loose. Gravel content is increasing with depth.</p> <p>Encountered cobbles at 8' depth.</p> <p>Drill rig refusal at 13' depth. Moved test boring hole 6' to the northeast. Drill rig refusal at 14' depth. Possibly due to large cobbles or small boulders.</p> <p style="text-align: center;">--- No free water ---</p>		

LOG OF TEST BORING

LAB. NO.: 140- 4997

PROJECT: AVENUE 45 - ARROYO DR. RELIEF SEWER

BORING NO.: B-4

ELEVATION: 508'

DRILLING DATE: 07/18/2000

BORING LOCATION: Arroyo Seco parking lot, 495' SW/o C/L railroad overpass & 55' NW/o NWCF 110 Fwy

DRILL RIG TYPE: CME-75 using 8" diameter hollow stem augers

DEPTH TO STANDING WATER: None

DEPTH TO WATER SEEPAGE: 11'-23' (perched)

DRILLER: Adams

LOGGER: Redlin

ENGINEER: None Present

ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	USCS	Field Description	Moist. %	Dens. Pcf
0		SM/GM	4" AC pavement in fair condition		
505	 30/12		Light brown silty sand with a little gravel. Moist and dense. Gravel content is increasing with depth. Encountered cobbles at 2-1/2' depth. Split Spoon sample at 2-1/2' depth not obtained due to cobble.	6.5	
5	 15/12			1.9	112
500					
10	 25/12			4.1	115
495			Encountered perched water at 11' depth.		
15	 30/12			5.1	124
490					
20	 29/12		Took water sample prior to 20' washout.	7.4	149
485			BEDROCK. Brown claystone bedrock. Damp and hard.		
25	 50/6			11.9	121
480			--- Encountered perched water from 11' to 23' depth ---		
30					
475					
35					
470					

LOG OF TEST BORING

LAB NO. : 140- 4997

PROJECT: AVENUE 45 - ARROYO DR. RELIEF SEWER

BORING NO.: B-18

ELEVATION: 440'

DRILLING DATE: 08/01/2000

BORING LOCATION: C/L Avenue 50 and 320' SE/o C/L Echo St.

DRILL RIG TYPE: CME-75 using 8" diameter hollow stem augers

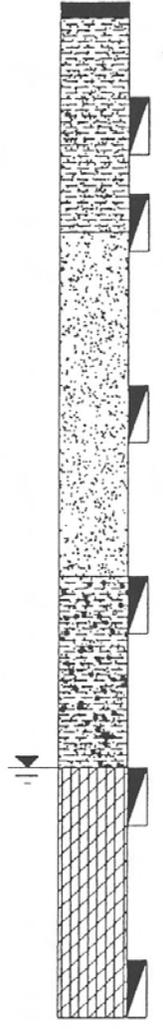
DEPTH TO STANDING WATER: 20'

DEPTH TO WATER SEEPAGE: None

DRILLER: Adams

LOGGER: Redlin

ENGINEER: None Present

ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/FOOT	USCS	Field Description	Standard Penetration Readings			
				1st 6"	2nd 6"	3rd 6"	
440 0		SM	5" AC pavement in poor condition with alligating and raveling				
435 5			SP	Light brown silty sand with some clay binders and a little gravel. Moist and loose. Possible fill material. (TVA reading = 0 ppm & LEL reading = 0% at 2-1/2' depth)	1	1	1
430 10				Tan poorly graded medium sand with a little silt. Damp and dense. (TVA reading = 0 ppm & LEL reading = 0% at 5' depth)	1	2	2
425 15		GM	(TVA reading = 0 ppm & LEL reading = 0% at 10' depth)	5	7	9	
420 20			Tan gravel-sand-silt mixture. Damp and dense. (TVA reading = 0 ppm & LEL reading = 0% at 15' depth)	5	7	9	
415 25		CL-ML	Light brown/tan silty clay/clayey silt with some fine sand. Wet and firm. Encountered groundwater at 20' depth. (TVA reading = 0 ppm & LEL reading = 0% at 20' depth)	10	15	20	
410 30			Water sample taken inside hollow stem augers at 25' depth. (TVA reading = 0 ppm & LEL reading = 0% at 25' depth)	20	24	26	
405 35			--- Encountered groundwater at 20' depth ---				

LOG OF TEST BORING

LAB NO. : 140- 4997

PROJECT: AVENUE 45 - ARROYO DR. RELIEF SEWER

BORING NO.: B-19

ELEVATION: 473'

DRILLING DATE: 08/01/2000

BORING LOCATION: C/L Avenue 50 and C/L Echo St.

DRILL RIG TYPE: CME-75 using 8" diameter hollow stem augers

DEPTH TO STANDING WATER: None

DEPTH TO WATER SEEPAGE: None

DRILLER: Adams

LOGGER: Redlin

ENGINEER: None Present

ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/FOOT	USCS	Field Description	Standard Penetration Readings		
				1st 6"	2nd 6"	3rd 6"
0		GM	6" AC pavement in fair condition			
470			Light brown/tan gravel-sand-silt mixture. Damp and dense. (TVA reading = 0 ppm & LEL reading = 0% at 2-1/2' depth)	15	18	24
5			(TVA reading = 0 ppm & LEL reading = 0% at 5' depth)	16	21	22
465						
10			Encountered cobbles at 10' depth. (TVA reading = 0 ppm & LEL reading = 0% at 10' depth)	50	75	
460			†			
15			(TVA reading = 0 ppm & LEL reading = 0% at 15' depth)	33	75	
455						
20		SM/ML	Light brown silty sand/sandy silt. Moist and firm. (TVA reading = 0 ppm & LEL reading = 0% at 20' depth)	5	7	10
450						
25			(TVA reading = 0 ppm & LEL reading = 0% at 25' depth)	15	20	25
445			--- No free water ---			
30						
440						
35						
435						

LOG OF TEST BORING

LAB NO. : 140- 4997

PROJECT: AVENUE 45 - ARROYO DR. RELIEF SEWER

BORING NO.: B-21

ELEVATION: 432'

DRILLING DATE: 07/31/2000

BORING LOCATION: C/L of dirt road NW/o 110 Freeway & 2100' SW/o C/L Avenue 52

DRILL RIG TYPE: CME-75 using 8" diameter hollow stem augers

DEPTH TO STANDING WATER: 23'

DEPTH TO WATER SEEPAGE: None

DRILLER: Adams

LOGGER: Redlin

ENGINEER: None Present

ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/FOOT	USCS	Field Description	Standard Penetration Readings		
				1st 6"	2nd 6"	3rd 6"
<div style="display: flex; align-items: center;"> <div style="flex: 1;"> <p>0</p> <p>430</p> <p>5</p> <p>425</p> <p>10</p> <p>420</p> <p>15</p> <p>415</p> <p>20</p> <p>410</p> <p>25</p> <p>405</p> <p>30</p> <p>400</p> <p>35</p> <p>395</p> </div> <div style="flex: 2;"> </div> </div>			<p>FILL MATERIAL. Light brown silty sand with some clay binders and a little gravel. Moist and firm. Road berm fill. (TVA reading = 0 ppm & LEL reading = 0% at 2-1/2' depth)</p>	3	3	3
		GM	<p>Light brown/tan gravel-sand-silt mixture with some cobbles. Damp and dense. (TVA reading = 0 ppm & LEL reading = 0% at 5' depth)</p> <p>(TVA reading = 0 ppm & LEL reading = 0% at 10' depth)</p> <p>(TVA reading = 0 ppm & LEL reading = 0% at 15' depth)</p> <p>(TVA reading = 0 ppm & LEL reading = 0% at 20' depth)</p> <p>First encountered water at 23' depth.</p> <p>(TVA reading = 0 ppm & LEL reading = 0% at 25' depth)</p> <p>(TVA reading = 0 ppm & LEL reading = 0% at 30' depth)</p>	10	13	10
			<p>--- Encountered groundwater at 23' depth. ---</p> <p style="text-align: center;">---</p> <p>Tried to sample water prior to removing hollow stem augers but there was not enough to sample.,</p>			

LOG OF TEST BORING

LAB NO. : 140- 4997

PROJECT: AVENUE 45 - ARROYO DR. RELIEF SEWER

BORING NO.: B-23

ELEVATION: 422'

DRILLING DATE: 08/15/2000

BORING LOCATION: C/L dirt road NW/o 110 Frwy & 3150' SW/o C/L Ave 52 @ SW end of S. G. Park

DRILL RIG TYPE: CME-75 using 8" diameter hollow stem augers

DEPTH TO STANDING WATER: None

DEPTH TO WATER SEEPAGE: None

DRILLER: Adams

LOGGER: Redlin

ENGINEER: None Present

ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/FOOT	USCS	Field Description	Standard Penetration Readings		
				1st 6"	2nd 6"	3rd 6"
<div style="display: flex; align-items: center;"> <div style="flex: 1;"> <p>0</p> <p>420</p> <p>5</p> <p>415</p> <p>10</p> <p>410</p> <p>15</p> <p>405</p> <p>20</p> <p>400</p> <p>25</p> <p>395</p> <p>30</p> <p>390</p> <p>35</p> <p>385</p> </div> <div style="flex: 2;"> </div> </div>	<p>SM/GM</p>	<p>Brown/gray sandy gravel/gravelly sand with some silt and a few small cobbles. Moist and dense.</p>	<p>14</p> <p>15</p> <p>18</p> <p>23</p> <p>14</p> <p>17</p>	<p>25</p> <p>31</p> <p>14</p> <p>50</p> <p>41</p> <p>57</p>	<p>31</p> <p>65</p> <p>11</p> <p>75</p> <p>41</p> <p>75</p>	
			<p>---</p> <p>No free water</p> <p>---</p>			

LOG OF TEST BORING

LAB NO. : 140- 4997

PROJECT: AVENUE 45 - ARROYO DR. RELIEF SEWER

BORING NO.: B-26

ELEVATION: 408'

DRILLING DATE: 08/01/2000

BORING LOCATION: 8' SW/o C/L E. Ave. 45 & 410' SE/o SECF Figueroa St.

DRILL RIG TYPE: CME-75 using 8" diameter hollow stem augers

DEPTH TO STANDING WATER: None

DEPTH TO WATER SEEPAGE: None

DRILLER: Adams

LOGGER: Redlin

ENGINEER: None Present

ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/FOOT	USCS	Field Description	Standard Penetration Readings		
				1st 6"	2nd 6"	3rd 6"
0		GM	4" AC pavement in poor condition with alligating and raveling			
405			Light brown/tan gravel-sand-silt mixture with cobbles. Damp and dense. (TVA reading = 0 ppm & LEL reading = 0% at 2-1/2' depth)	20	25	50
5			(TVA reading = 0 ppm & LEL reading = 0% at 5' depth)	22	30	37
400			(TVA reading = 0 ppm & LEL reading = 0% at 10' depth)	18	17	14
10			(TVA reading = 0 ppm & LEL reading = 0% at 15' depth)	50	75	
395			(TVA reading = 0 ppm & LEL reading = 0% at 20' depth)	26	36	34
15			No free water			
390						
20						
385						
25						
380						
30						
375						
35						
370						

LOG OF TEST BORING

LAB NO. : 140- 4997

PROJECT: AVENUE 45 - ARROYO DR. RELIEF SEWER

BORING NO.: B-27

ELEVATION:

DRILLING DATE: 07/31/2000

BORING LOCATION: 15' NW/o C/L Figueroa St. and 30' SW/o C/L E. Avenue 45

DRILL RIG TYPE: CME-75 using 8" diameter hollow stem augers

DEPTH TO STANDING WATER: None

DEPTH TO WATER SEEPAGE: None

DRILLER: Adams

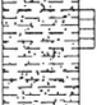
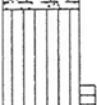
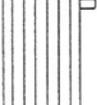
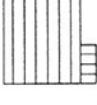
LOGGER: Redlin

ENGINEER: None Present

ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/FOOT	USCS	Field Description	Standard Penetration Readings		
				1st 6"	2nd 6"	3rd 6"
0		SM	8" AC pavement Light brown/tan silty sand with some gravel. Moist and firm. Gravel content is increasing with depth. (TVA reading = 0 ppm & LEL reading = 0% at 2-1/2' depth)	4	5	6
5		GM	Light brown/tan gravel-sand-silt mixture with cobbles. Damp and dense. (TVA reading = 0 ppm & LEL reading = 0% at 5' depth)	75		
10			(TVA reading = 0 ppm & LEL reading = 0% at 10' depth)	22	40	58
15			--- No free water --- Encountered concrete substructure at 13' depth. Abandoned test boring hole.			
20						
25						
30						
35						

LOG OF TEST BORING

LAB. NO.: 140- 4997 **PROJECT:** AVENUE 45 - ARROYO DR. RELIEF SEWER
BORING NO.: B-27A **ELEVATION:** **DRILLING DATE:** 08/15/2000
BORING LOCATION: 10' NW/o C/L Figueroa St. and 39' SW/o C/L E. Avenue 45
DRILL RIG TYPE: CME-75 using 8" diameter hollow stem augers
DEPTH TO STANDING WATER: None **DEPTH TO WATER SEEPAGE:** None
DRILLER: Adams **LOGGER:** Roth **ENGINEER:** None Present

ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	USCS	Field Description	Moist. %	Dens. Pcf
0			8" AC pavement in poor condition 16" railroad ballast		
9/12		SM	Brown silty sand with a little gravel. Moist and dense.	5.5	119
5			Split Spoon sample at 5' depth slid out of sampler during retrieval, not recovered.		
22/12					
10					
38/12					
15		ML	Brown clayey silt with a little sand. Moist and firm.	21.9	101
6/12					
20			Encountered poorly graded sand at 19' depth.	3.4	123
26/12					
25			--- No free water ---		
30					
35					

LOG OF TEST BORING

LAB NO. : 140- 4997

PROJECT: AVENUE 45 - ARROYO DR. RELIEF SEWER

BORING NO.: B-27B

ELEVATION:

DRILLING DATE: 08/15/2000

BORING LOCATION: 10' NW/o C/L Figueroa St. and 42' SW/o C/L E. Avenue 45

DRILL RIG TYPE: CME-75 using 8" diameter hollow stem augers

DEPTH TO STANDING WATER: None

DEPTH TO WATER SEEPAGE: None

DRILLER: Adams

LOGGER: Roth

ENGINEER: None Present

ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/FOOT	USCS	Field Description	Standard Penetration Readings		
				1st 6"	2nd 6"	3rd 6"
0			8" AC pavement			
		SM	Light brown/tan silty sand with some gravel. Moist and firm. Gravel content is increasing with depth.			
5		GM	Light brown/tan gravel-sand-silt mixture with cobbles. Damp and dense.			
10						
15		ML	Brown clayey silt with a little sand. Moist and firm. Split Spoon sample at 15' depth slid out of sampler during retrieval, not retained. (TVA reading = 0 ppm & LEL reading = 0% at 15' depth)	4	5	5
20			Encountered poorly graded sand with gravel at 19' depth. (TVA reading = 0 ppm & LEL reading = 0% at 20' depth)	3	14	20
25			--- No free water ---			
30						
35						

City of Los Angeles, 2001

SOIL CLASSIFICATION LEGEND

MAJOR DIVISIONS			TYPICAL NAMES		SAMPLE TYPE SYMBOLS	
COARSE GRAINED SOILS More than half is larger than No. 200 sieve	GRAVELS More than half coarse fraction is larger than No. 4 sieve size	Clean gravels with little or no fines	GW	Well graded gravels, gravel-sand mixtures	Std. Penetration Test (50.8 mm OD) Type U Ring Sampler (82.6 mm OD) California Sampler (76.2 mm OD) CME Core (76.2 mm ID) Grab Sample Core Run (NQ, HQ) Non-standard Penetration Test (with split spoon sampler)	
		Gravel with over 12% fines	GP	Poorly graded gravels, gravel-sand mixtures		
			GM	Silty gravels, gravel-sand-silt mixtures		
		SANDS More than half coarse fraction is smaller than No. 4 sieve size	Clean sands with little or no fines	SW		Well graded sands, gravelly sands
	SP			Poorly graded sands, gravelly sands		
	Sands with over 12% fines		SM	Silty sand, sand-silt mixtures		
			SC	Clayey sands, sand-clay mixtures		
			SILTS AND CLAYS Liquid limit less than 50	ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity
				CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	SILTS AND CLAYS Liquid limit greater than 50	OL	Organic clays and organic silty clays of low plasticity			
MH		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts				
CH		Inorganic clays of high plasticity, fat clays				
OH		Organic clays of medium to high plasticity, organic silts				
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils		

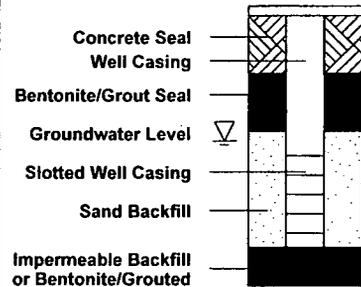
CONTACT BETWEEN UNITS

- Change in geologic unit
- Soil type change within geologic unit
- Obscure or gradational change

MOISTURE DESCRIPTION

- Dry - Free of moisture, dusty
- Moist - Damp but no visible free water
- Wet - Visible free water, saturated

PIEZOMETER DETAIL



DESCRIPTORS FOR SOIL STRATA AND STRUCTURE (ENGLISH/METRIC)

General Thickness or Spacing		Structure		General Attitude	
Parting:	less than 1/16 in. (1.6 mm)	Pocket:	Erratic, discontinuous deposit of limited extent	Near horizontal:	0 to 10 deg.
Seam:	1/16 to 1/2 in. (1.6 to 12.5 mm)	Lens:	Lenticular deposit	Low angle:	10 to 45 deg.
Layer:	1/2 to 12 in. (12.5 to 305 mm)	Varved:	Alternating seams of silt and clay	High angle:	45 to 80 deg.
Stratum:	> 12 in. (305 mm)	Laminated:	Alternating seams	Near Vertical:	80 to 90 deg.
Scattered:	< 1 per ft. (305 mm)	Interbedded:	Alternating layers		
Numerous:	> 1 per ft. (305 mm)				

STRUCTURE DESCRIPTION (cont.)

Fractured	Breaks easily along definite fractured planes
Slickensided	Polished, glossy, fractured planes
Blocky, Diced	Breaks easily into small angular lumps
Sheared	Disturbed texture, mix of strengths
Homogenous	Same color and appearance throughout

RELATIVE DENSITY OR CONSISTENCY VS. SPT N-VALUE

COARSE GRAINED			FINE GRAINED		
Density	N (blows/.15 m)	Approx. Relative Density (%)	Consistency	N (blows/.15 m)	Approx. Undrained Shear Str. (kN/m ²)
Very Loose	0 to 4	0 - 15	Very Soft	0 to 2	<12
Loose	4 to 10	15 - 35	Soft	2 to 4	12 - 24
Medium Dense	10 to 30	35 - 65	Medium Stiff	4 to 8	24 - 48
Dense	30 to 50	65 - 85	Stiff	8 to 15	48 - 96
Very Dense	Over 50	85 - 100	Very Stiff	15 to 30	96 - 192
			Hard	over 30	>192

Notes:

1. Sample descriptions in this report are based on visual field and laboratory observations, which include density/consistency, moisture condition, grain size, and plasticity estimates, and should not be construed to imply field or laboratory testing unless presented herein. Visual-manual classification methods in accordance with ASTM D 2488 were used as an identification guide. Where laboratory data are available, soil classifications are in general accordance with ASTM D 2487.
2. Dual symbols are used to indicate gravel and sand units with 5 to 12 percent fines.
3. In general blow counts for non-SPT samples are not SPT N values for density or consistency relationships. Occasionally density and consistency were inferred from non-SPT blow counts where SPT values were not available.
4. NR noted below sample blow counts on boring logs indicates no recovery.

PHYSICAL PROPERTY TEST

- AL - Atterberg Limits
- 200 - Fines Content
- MA - Mechanical Sieve Analysis
- Hyd - Hydrometer Analysis
- MC - Moisture Content
- MD - Moisture Content/Dry Density
- Comp - Compaction Test (Proctor)
- SG - Specific Gravity
- CBR - California Bearing Ratio
- RM - Resilient Modulus
- Perm - Permeability
- Cons - Consolidation
- Chem - Analytical Chemical Analysis
- Corr - Corrosion
- VS - Vane Shear
- DS - Direct Shear
- UC - Unconfined Compression
- TX - Triaxial Shear Test
- UU - Unconsolidated, Undrained TX
- CU - Consolidated, Undrained TX
- CD - Consolidated, Drained TX

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Project No: 30182 Figure: A-1

ROCK CLASSIFICATION LEGEND

BEDROCK COMPOSITION	Sym	STRENGTH	STRATAGRAPHIC STRUCTURE
SANDSTONE		DESCRIPTOR Low	MASSIVE - Rock without significant structure
SILTSTONE		Approximate Unconfined Compressive Strength $kN/m^2 \times 1000$ <27	BEDDED - Regular layering from sedimentation
CLAYSTONE		Moderate 27 to 48	FISSILE - Tendency to break along laminations
INTERBEDDED SILTSTONE/SANDSTONE		High >48	FOLIATED - Parallel arrangement or distribution of minerals
INTERBEDDED CLAYSTONE/SANDSTONE		CEMENTATION	For Metamorphic Rocks:
INTERBEDDED SILTSTONE/CLAYSTONE		DESCRIPTOR Weak	SCHISTOSE - Parallel arrangement of tabular minerals giving a planar fissility
INTERBEDDED SANDSTONE/SILTSTONE/CLAYSTONE		CRITERIA Crumbles or breaks with handling or little finger pressure	GNEISSOSE - Segregation of minerals into bands
		Moderate Crumbles or breaks with considerable finger pressure	CLEAVAGE - Tendency to split along secondary, planar textures or structures
		Strong Will not crumble or break with finger pressure	

ROCK QUALITY DESIGNATION

Sample Rock Core:

Core Run Total Length 1.52 m (5 ft)

$RQD = \frac{\sum \text{Core Piece Lengths} > 0.1 \text{ m}}{\text{Total Core Run Length}} \times 100\%$

$RQD = \frac{0.50 + 0.13 + 0.53}{1.52} \times 100\%$

RQD = 76%

RQD (Rock Quality Designation)	Description of Rock Quality
0 - 25%	Very Poor
25 - 50%	Poor
50 - 75%	Fair
75 - 90%	Good
90 - 100%	Excellent

Notes:

- Length is zero along sections with no centerline pieces longer than 0.1 meters.
- Mechanical breaks are disregarded when calculating RQD.

DISCONTINUITY TERMS

FRACTURE - Collective term for any natural break excluding shears, shear zones, and faults

JOINT - Planar break with little or no displacement

FOLIATION JOINT or BEDDING JOINT - Joint along foliation or bedding

INCIPIENT JOINT or INCIPIENT FRACTURE - Joint or fracture not evident until wetted and dried; breaks along existing surface

SLICKENSIDED - A polished and striated rock surface that results from friction along a fault plane

BEDDING PLANE SEPARATION or PARTING - A separation along bedding resulting from stress relief or slaking

FRACTURE ZONE - Planar zone of broken rock without gouge

MECHANICAL BREAK - Breaks due to drilling, handling, or testing

SHEAR - Surface of differential movement evident by presence of slickensides, striations, or polishing

SHEAR ZONE - Zone of gouge and rock fragments bounded by planar or near planar shear surfaces

FAULT - Shear zone of significant extent; differentiation from shear may be site-specific

VESICULARITY*

Slightly Vesicular	1 to 10%
Moderately Vesicular	10 to 30%
Highly Vesicular	30 to 50%
Scoriaceous	> 50%

*Characteristic of Igneous Rocks

JOINT ROUGHNESS

DESCRIPTOR	CRITERIA
Stepped	Near-normal steps and ridges occur on the fracture surface
Rough	Large, angular asperities can be seen
Moderately Rough	Asperities are clearly visible and fracture surface feels abrasive
Slightly Rough	Small asperities on the fracture surface are visible and can be felt
Smooth	No asperities, smooth to the touch
Polished	Extremely smooth and shiny

DISCONTINUITY AND STRATIFICATION SPACING OF BEDDING

STRATIFICATION	SPACING	DISCONTINUITY
Thick	>2 ft (>0.6 m)	Wide
Medium Thick	8 to 24 in (0.2 to 0.6 m)	Moderate
Thin	2-1/2 to 8 in (60 to 200 mm)	Close
Very Thin	3/4 to 2-1/2 in. (20 to 60 mm)	Very Close
Laminated:		
Thickly	1/4 to 3/4 in (6 to 20 mm)	Extremely Close
Thinly	<1/4 in (<6 mm)	

WEATHERING DESCRIPTOR

DESCRIPTIVE TERM	DISCOLORATION EXTENT	FRACTURE CONDITION	MATERIAL CONDITION
Fresh	None	Slight Discoloration	Unchanged
Slightly Weathered	Slight Penetration Away From Fracture	Discolored; May Contain Thick Filling	Partial Discoloration
Moderately Weathered	Significant Penetration	Discolored; May Contain Thick Filling	Partial to Complete Discoloration; Not Friable Except for Poorly Cemented Rocks
Highly Weathered	Throughout	—	Friable and Possibly Pitted; Partial Separation of Grain Boundaries; Corestones may be Present
Completely Weathered	Throughout	—	All Material Changed to Soil; Texture and Structure Largely Preserved

General Note:

Sample descriptions in this report are based on visual field and laboratory observations and should not be construed to imply field or laboratory testing unless presented herein. Geologic formation notations such as Qoal, Tp2, etc. were developed by the City of Los Angeles specifically for this Project. Definitions of each geologic formation notation are presented in the GIR.

PHYSICAL PROPERTY TEST

CAI	- Cerchar Abrasivity Index
PA	- Thin-section Petrographic Analysis
D	- Density
UCS	- Uniaxial Compressive Strength
ITS	- Indirect (Brazilian) Tensile Strength
PLI	- Point Load Index
AMC	- Abrasive Mineral Content
LAR	- Los Angeles Rattler

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Project No: 30182 Figure: A-2

ROCK CLASSIFICATION NEIS.GPJ CDM BLLV.GDT 9/4/01 REV.3

Date(s) Drilled	5/11/99	Logged By	RRH	Boring B-17 Sheet 1 of 2	
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	0.20-meter O.D.		
Drill Rig Type	Mobile B-61	Hammer Data	63.6 kg./136.4kg., 0.76-m drop		
Sampling Method(s)	Dames & Moore Type-U, Standard Penetration Test			Job Number	00596-064-015
Approximate Groundwater Depth and Date Measured	Groundwater encountered at 11.1m			Total Depth Drilled (m)	23.2
Comments	- 136.4kg hammer used below 22m N566499.685; E1978375.172			Approximate Ground Surface Elevation (m)	109

Elevation (m)	Depth (m)	SAMPLES		Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (kN/m ³)	OTHER TESTS and REMARKS
		Type	Number						
0					SM	Asphaltic Concrete Pavement FILL [Af]: Silty SAND yellowish-brown to dark brown, moist, medium dense with little gravel Grades dark brown without gravel			
2	1	A	5						
	7	B	7						
	11	A	11		SP-SM	RECENT ALLUVIUM [Qal]: SAND with silt brown, moist, medium dense, fine to medium	7	14.8	
	12	B	12						
	13		13						
105	3	A	6			Grades micaceous			
	6	B	6						
	8	A	18						
	18	B	24				5	16.1	SA (9) DSCD
	20		29						
100	6	A	10		SM	Silty SAND greenish-gray, moist, medium dense, fine with seams of fine sandy silt (hydrocarbon-like odor noted)	29	13.2	-200 (15) DSCD
	13	B	13						
	18	A	18			Grades dense			
	20		20		SW-SM	OLDER ALLUVIUM [Qoa]: SAND with silt greenish-gray to dark gray, wet, dense, fine to coarse with some fine gravel (slight hydrocarbon-like odor noted)	9		+4 (23)
	22		22						
	22	A	22			Grades brown, very dense, cementation, without gravel			
	44		44				13	19.4	SA (6) DSCD
	50/.08m								
	25	A	25		SM	Silty SAND greenish-gray, wet, very dense, fine to coarse with some fine to coarse gravel (hydrocarbon-like odor noted)			SA (17)
95	14								
	50/.10m								
					CL	Silty CLAY			

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Figure B-1

Elevation (m)	Depth (m)	SAMPLES		Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (kN/m ³)	OTHER TESTS and REMARKS
		Type	Number						
16	16	A	10	13		yellowish-red, moist, very stiff with fine to medium sand	19	17.6	LL=33, PI=22 DSCD SA/HA (61)
		B		28 26					
		A	11	41	SW-SM	SAND with silt			
		B		43 45		brown, wet, very dense, fine to coarse with some fine gravel			SA (9)
18	18					PUENTE FORMATION [Tp2]: Sandy SILTSTONE			
		A	12	100		yellowish-red, moist, very dense, fine, weathered	20	16.3	LL=NP, PI=NP
				75/03m		Grades dark brown with layers of gray silty fine sand			
20	20	A	13	62		Silty SANDSTONE			
				50/05m		gray, moist, very dense, fine weathered, cemented			
		A	14	45		Sandy SILTSTONE			
				75/03m		brown, moist, very dense, fine to coarse, weathered with seams of silty claystone			
22	22		15	100/03m		Grades gray			
24	24								
26	26								
28	28								
30	30								
32	32								
34	34								

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Elevation (m)	Depth (m)	SAMPLES		Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (kN/m ³)	OTHER TESTS and REMARKS
		Type	Number						
90	16	▲	10	5 8 19		Grades fine to coarse			SA (3)
		■	11 A B	10 25 39		Grades fine to medium	20	15.1	
	18	▲	12 A	36 50/.08m		Grades very dense with trace fine to coarse gravel			
	20	■	13	19 42 49		Grades fine to coarse without gravel	19	17.1	SA (3)
-85						PUENTE FORMATION [Tp2]: Silty SANDSTONE light gray, slightly moist, very dense, fine, weathered			
	22	▲	14	47 50/.05m					
	24	■	15	24 50/.08m					
	26	■	16	80/.13m			17	17.4	
-80						Interbedded Silty SANDSTONE and Sandy SILTSTONE mottled light gray and dark gray, slightly moist, very dense, fine, weathered			
	28	■	17	48 50/.13m					
	30	■	18	100/.15m					
	32	■	19	42 50/.08m					
-75									
	34								

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Date(s) Drilled	5/3/99	Logged By	LS	Boring B-19 Sheet 1 of 2	
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	0.20-meter O.D.		
Drill Rig Type	Mobile B-61	Hammer Data	63.6 kg., 0.76-meter drop		
Sampling Method(s)	Dames & Moore Type-U, Standard Penetration Test			Job Number	00596-064-015
Approximate Groundwater Depth and Date Measured	Groundwater encountered at 10.7m			Total Depth Drilled (m)	30.5
Comments	- 136.4kg hammer used below 29.6m N565584.392; E1979007.134			Approximate Ground Surface Elevation (m)	105

Elevation (m)	Depth (m)	SAMPLES		Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (kN/m ³)	OTHER TESTS and REMARKS
		Type	Number						
0					CL	0.15-m thick Asphaltic Concrete Pavement			
					ML	FILL [Af]: Silty CLAY dark brown, slightly moist, stiff with some fine sand			
	2	1	A	4		Sandy SILT brown, moist, medium dense, fine with seams of silty clay and trace calcite inclusions			
				7					
				11					
					CH	CLAY brown, moist, stiff with some silt and trace calcite inclusions	42	11.9	LL=60, PI=31
		2	A	7					
				8					
				13					
	4		B						
					SP-SM	RECENT ALLUVIUM [Qal]: SAND with silt light brown, moist, medium dense, fine to medium with trace fine gravel			
		3	A	7					
				8					
				9					
-100			B						
		4	A	10		Grades dark brown, fine, with seams of fine sandy silt	6	17.7	-200 (7)
				13					
				14					
			B		SM	Silty SAND light gray to gray, moist, medium dense, fine to medium			SA (17)
		5	A	5					
				8					
				10					
			B						
		6	A	20		Grades with seams of silty clay	7	15.7	
				20					
				13					
-95			B						
		7	A	16		Grades wet			
				20					
				23					
			B						
		8	A	13		SAND light gray, wet, medium dense, fine to coarse with trace fine gravel	16	17.2	SA (3) DSCD
				27					
				40					
			B						
		9	A	12		Grades dense			
				18					
				24					
			B						
-90					SW-SM	SAND with silt			

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Northeast Interceptor Sewer Project - Contract Phase 1
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Figure B-3

Elevation (m)	Depth (m)	SAMPLES		Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (kN/m ³)	OTHER TESTS and REMARKS
		Type	Number						
16	16	█	10 A	23 50		light gray to gray, wet, dense, fine to coarse	14	19.0	SA (6)
18	18	□	11	5 8 10	SP	OLDER ALLUVIUM [Qoa1]: SAND light gray to gray, wet, medium dense, fine to medium			
20	20	█	12 A B	9 15 27			20	16.5	SA(3) DSCD
20	20	█	13 A B	10 17 19	SW-SM	SAND with silt light gray to gray, wet, dense, fine to coarse with trace fine gravel			SA (6)
22	22	█	14 A B	22 35 60	SP-SM	SAND with silt light gray to gray, wet, dense, fine to coarse with trace fine gravel	10	18.4	DSCD
24	24	█	15 A	20 50/.10m		Grades very dense with more gravel			
24	24	□	16	150/.08m		Grades with trace cobbles and boulders			
26	26	█	17 A	28 50/.08m		PUENTE FORMATION [Tp2]: Interbedded Silty SANDSTONE and Sandy SILTSTONE dark brown to light gray, dry, very dense, fine	15		
28	28	█	18	200/.15m					
30	30	█	19	200/.15m			19		
30	30	█	20	160/.10m					
32	32								
34	34								

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Figure B-3

Date(s) Drilled	5/3/99	Logged By	RRH	Boring B-20 Sheet 1 of 2	
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	0.20-meter O.D.		
Drill Rig Type	Mobile B-61	Hammer Data	63.6 kg./136.4kg., 0.76-m drop		
Sampling Method(s)	Dames & Moore Type-U, Standard Penetration Test			Job Number	00596-064-015
Approximate Groundwater Depth and Date Measured	Groundwater encountered at 12.6m			Total Depth Drilled (m)	23.2
Comments	- 136.4kg hammer used for sample #11 N565062.525; E1979205.831			Approximate Ground Surface Elevation (m)	105

Elevation (m)	Depth (m)	SAMPLES		Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (kN/m ³)	OTHER TESTS and REMARKS
		Type	Number						
0					SM	0.20-m thick Asphaltic Concrete Pavement FILL [Af]: Silty SAND brown, moist, medium dense, fine to medium with trace fine gravel			
2	1	A	15				7	15.8	-200 (42)
		B	18						
			24						
4	2	A	9		ML	RECENT ALLUVIUM [Qal]: Sandy SILT brown, moist, dense, fine			
		B	12						
			20						
6	3	A	17		SM	Silty SAND brown, moist, medium dense, fine with trace clay	3	15.8	DSCD
		B	20						
			21						
8	4	A	10						-200 (49)
			13						
			14						
10	5	A	25		SP-SM	SAND with silt brown, moist, dense, fine to medium	3	16.0	SA (9)
		B	35						
			65						
12	6	A	6		CL	Silty CLAY olive-gray, moist, very stiff with some fine to coarse sand			SA/HA (80)
			9						
			13						
14	7	A	20			Grades with layers of silty fine sand	33	13.7	DSCD
		B	25						
			35						
16	8	A	24		SM	OLDER ALLUVIUM [Qol]: Silty SAND greenish-gray, moist, very dense, fine to coarse Grades wet			SA (14)
			34						
			40						
18	9	A	35			Grades gray with trace fine gravel	17	17.8	DSCD
		B	55						
			65						

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Northeast Interceptor Sewer Project - Contract Phase 1
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Figure B-4

Elevation (m)	Depth (m)	SAMPLES		Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (kN/m ³)	OTHER TESTS and REMARKS
		Type	Number						
	16	▲	10 A	25 60		Grades olive-gray, very dense, fine to medium, without gravel			SA/HA (20)
	18	■	11 A	90 200	SP-SM	SAND with silt gray, wet, very dense, fine to coarse with some fine gravel	10	20.4	
	20	▲	12 A	35/.30m		Grades to trace gravel			SA (5)
-85	20	□	13	125 100/.10m					
	22	▲	14	140 100/.05m		PUENTE FORMATION [Tp2]: Sandy SILTSTONE olive-gray, moist, very dense with some fine sand			
	24	▲	15	250/.13m		Grades brown	20	15.8	
-80	26								
	28								
-75	30								
	32								
	34								

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Date(s) Drilled	6/03/99	Logged By	RRH
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	0.20-meter O.D.
Drill Rig Type	Mobile B-61	Hammer Data	63.6 kg./136.4kg., 0.76-m drop
Sampling Method(s)	Dames & Moore Type-U, Standard Penetration Test		
Approximate Groundwater Depth and Date Measured	Groundwater encountered at 16.2m		
Comments	136.4kg hammer used below 19m N566822.400; E1978117.861		

Boring B-40	
Sheet 1 of 2	
Job Number	00596-064-015
Total Depth Drilled (m)	24.7
Approximate Ground Surface Elevation (m)	115

Elevation (m)	Depth (m)	SAMPLES		Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (kN/m ³)	OTHER TESTS and REMARKS
		Type	Number						
0					CL	Asphaltic Concrete Pavement FILL [Af]: Sandy CLAY dark brown, moist, stiff, fine to medium with some silt and and brick debris			
2	1	A	5				21	15.4	
		B	8						
			10						
	2					Grades with more sand			
		A	3						
			6						
			9						
-110	3	A	15		SM	RECENT ALLUVIUM [Qal]: Silty SAND yellowish-brown, moist, medium dense, fine to coarse with trace fine gravel	13	15.0	
		B	20						
			20						
	4					Grades dense with some fine gravel and clay			
		A	8						
			15						
			18						
	5	A	15		CL	Silty CLAY brown, moist, very stiff with some fine to medium sand	19	16.5	
		B	18						
			21						
	6				SM	Silty SAND brown, moist, very dense, fine with trace clay			
		A	8						
			8						
			11						
-105	7	A	35		SP-SM	SAND with silt greenish-gray, moist, very dense, fine	5	16.3	DSCD SA (11)
			75/13m						
	8				CH	CLAY brown to olive-gray, moist, very stiff with silt and trace fine sand			LL=63, PI=45
		A	7						
			9						
			12						
	9	A	18				24	16.7	
		B	26						
			34		SP-SM	OLDER ALLUVIUM [Qol]: SAND with silt			

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Figure B-18

Report: DMG4PORT; Project File: G:\PHILIPPINE\GINTLO-1\NEISNEW.GPJ; Data Template: DMLA.GDT Printed: 11/5/01

Elevation (m)	Depth (m)	SAMPLES		Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (kN/m ³)	OTHER TESTS and REMARKS
		Type	Number						
	16	▲	10 A	43 50/.13m		yellowish-brown to greenish-gray, moist, very dense, fine to coarse with trace fine gravel			SA (7)
	17	■	11	40 75/.08m	SW-SM	SAND with silt greenish-gray, wet, very dense, fine to coarse with some fine to coarse gravel	11	19.3	SA (8)
	18	▲	12 A B	20 21 30	SP	SAND greenish-gray, wet, very dense, fine to coarse with some fine gravel			SA (3)
	20	■	13 A B	6 7 10	SM	Silty SAND yellowish-brown, wet, medium dense, fine to coarse with some clay and trace fine gravel	11	19.8	
-95	22	⊗	14	39 50/.08m		PUENTE FORMATION [Tp2]: Interbedded Silty SANDSTONE and Sandy SILTSTONE mottled yellowish-red, yellowish-brown, brown and dark gray moist, very dense, fine	23	16.0	
	23					Silty SANDSTONE gray, moist, very dense, fine			
	24	■	15	50/.13m			19	17.5	
-90	24	■	16	100/.03m		Grades light gray with trace iron staining			
	26								
	28								
-85	30								
	32								
	34								

Report: DMG4PORT; Project File: G:\PHILIPPINE\GINTLO-1\NEISNEW.GPJ; Data Template: DMLA.GDT Printed: 11/5/01



Figure B-18

Date(s) Drilled	6/04/99	Logged By	LS
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	0.20-meter O.D.
Drill Rig Type	Mobile B-61	Hammer Data	63.6 kg./136.4kg., 0.76-m drop
Sampling Method(s)	Dames & Moore Type-U, Standard Penetration Test		
Approximate Groundwater Depth and Date Measured	Groundwater encountered at 11.6m		
Comments	136.4kg hammer used below 24m N564808.560; E1979143.484		

Boring B-41	
Sheet 1 of 2	
Job Number	00596-064-015
Total Depth Drilled (m)	25.1
Approximate Ground Surface Elevation (m)	103

Elevation (m)	Depth (m)	SAMPLES		Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (kN/m ³)	OTHER TESTS and REMARKS
		Type	Number						
0					SM	0.28-m thick Asphaltic Concrete Pavement			
					ML	FILL [Af]: Silty SAND brown, moist, loose, fine			
	2	1	A	3 5 6		Sandy SILT mottled greenish-gray, yellowish-brown and reddish-brown, moist, medium dense, fine, micaceous			
					SP-SM	RECENT ALLUVIUM [Qal]: SAND with silt greenish-gray, dry, medium dense, fine, micaceous	6	17.2	
	4	2	A B	6 10 17					
	6	3	A B	5 8 11					
	8	4	A B	17 30 35			3	16.3	DSCD
	10	5	A B	20 32 36		Grades gray, very dense, fine to coarse, with some fine to coarse gravel and cobbles			Moderate rig chatter
	12	6	A B	27 51 44		Grades to trace gravel, without cobbles	3	17.2	SA (5)
					CH	CLAY dark gray to gray, moist, very stiff with silt and some fine sand			LL=52, PI=25
						Grades wet, with layers of silty fine sand			
	14	8	A	16 12 14			31	13.5	DSCD
					SP	OLDER ALLUVIUM [Qol]: SAND greenish-gray, wet, dense, fine to coarse with some fine to coarse gravel			SA (1)

Report: DMG4PORT; Project File: G:\PHILIPINE\GINTLO-1\NEW\GPJ; Data Template: DMLA.GDT Printed: 11/5/01

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LOG OF BORING
Subsurface Geotechnical and Hazardous Materials Investigation
Northeast Interceptor Sewer Project - Contract Phase 1
FOR: LADPW/GED



Figure B-19

Elevation (m)	Depth (m)	SAMPLES		Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (kN/m ³)	OTHER TESTS and REMARKS
		Type	Number						
	16	10	A	8			16	18.5	DSCD
			B	40					
	85	11	A	8	CL	Silty CLAY gray, moist, hard, with seams of silty fine to medium sand			LL=40, PI=16 SA/HA (85)
				33					
				50					
	18	12	A	9	SP	SAND greenish-gray, wet, medium dense, fine to coarse with trace fine gravel	13	18.5	DSCD SA (3)
			B	21					
				26					
	20	13	A	13		Grades dense			
				20					
				27					
	22	14	A	9		Grades gray, medium dense, fine to medium, without gravel	15	18.6	
				19					
				23					
	80	15		50/.13m		PUENTE FORMATION [Tp2]: Silty SANDSTONE mottled dark olive-gray and bluish-gray, moist very dense, fine			
	24	16		200/.10m		Grades gray	19	17.1	
		17		100/.08m					
	26								
	75								
	28								
	30								
	70								
	32								
	34								

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Figure B-19

Date(s) Drilled	6/08/99	Logged By	LS
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	0.2-meter O.D.
Drill Rig Type	Mobile B-61	Hammer Data	63.6 kg., 0.76-meter drop
Sampling Method(s)	Dames & Moore Type-U, Standard Penetration Test		
Approximate Groundwater Depth and Date Measured	Groundwater encountered at 10.7m		
Comments	N566094.112; E1978629.280		

Boring B-43	
Sheet 1 of 2	
Job Number	00596-064-015
Total Depth Drilled (m)	29.3
Approximate Ground Surface Elevation (m)	106

Elevation (m)	SAMPLES			Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (kN/m ³)	OTHER TESTS and REMARKS
	Type	Number	Blows per 0.15 meter						
0						0.13-m thick Asphaltic Concrete over 0.28-m thick Aggregate Base			
-105					CL	FILL [Af]: Silty CLAY olive gray, moist, medium stiff with some fine sand			LL=43, PI=22
2	▲	1 A	2 2 4						
	■	2 A	4 6 8		SP-SM	RECENT ALLUVIUM [Qal]: SAND with silt grayish-brown, moist, loose, fine, micaceous	16	20.7	
4	▲	3 A	20 50/15m		SM	Silty SAND grayish-brown, moist, very dense, fine to coarse with some fine to coarse gravel and seams of silty clay			
-100	■	4 A	23 46 60		SP-SM	SAND with silt greenish-gray, dry, dense, fine to coarse with trace fine gravel	6	16.4	DSCD
8	▲	5 A	12 17 10			Grades slightly moist, medium dense			SA (5)
	■	6 A	9 13 16		SM	Silty SAND gray, very moist, medium dense, fine, micaceous with seams of clayey silt	21	16.1	-200 (33)
-95	▲	7 A	6 6 10			Grades wet			-200 (46)
12	■	8 A	8 26 39		SW-SM	OLDER ALLUVIUM [Qoal]: SAND with silt gray, wet, medium dense, fine to coarse	18	17.0	DSCD
14	▲	9 A	8 15 33			Grades dense with some fine gravel and trace iron staining			SA (9)
					SP	SAND			

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LOG OF BORING
Subsurface Geotechnical and Hazardous Materials Investigation
Northeast Interceptor Sewer Project - Contract Phase 1
FOR: LADPW/GED



Figure B-21

Report: DMG4PORT; Project File: G:\PHILIPPINE\IS\GINTLO-1\NEISNEW\GPJ; Data Template: DMLA.GDT Printed: 11/5/01

Elevation (m)	Depth (m)	SAMPLES		Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (kN/m ³)	OTHER TESTS and REMARKS
		Type Number	Blows per 0.15 meter						
90	16	10 A	38 75/.13m			light gray, wet, very dense, fine to coarse with some fine gravel	7	19.8	SA (3)
	18	11 A	21 50						
	20	12 A	75 75						
	22	13 A	29 50/.13m			Grades fine to medium without gravel	17	17.2	
85	22	14	40 75/.13m						
	24	15 A B	22 18 26						
	26	16 A	52 75						
	28	17 A	24 50						
80	28	18	100/.13m			Interbedded Silty SANDSTONE and Sandy SILTSTONE dark brown to light gray, moist, very dense, fine, weathered	26	14.3	
	30	19	40 50						
	32								
	34								

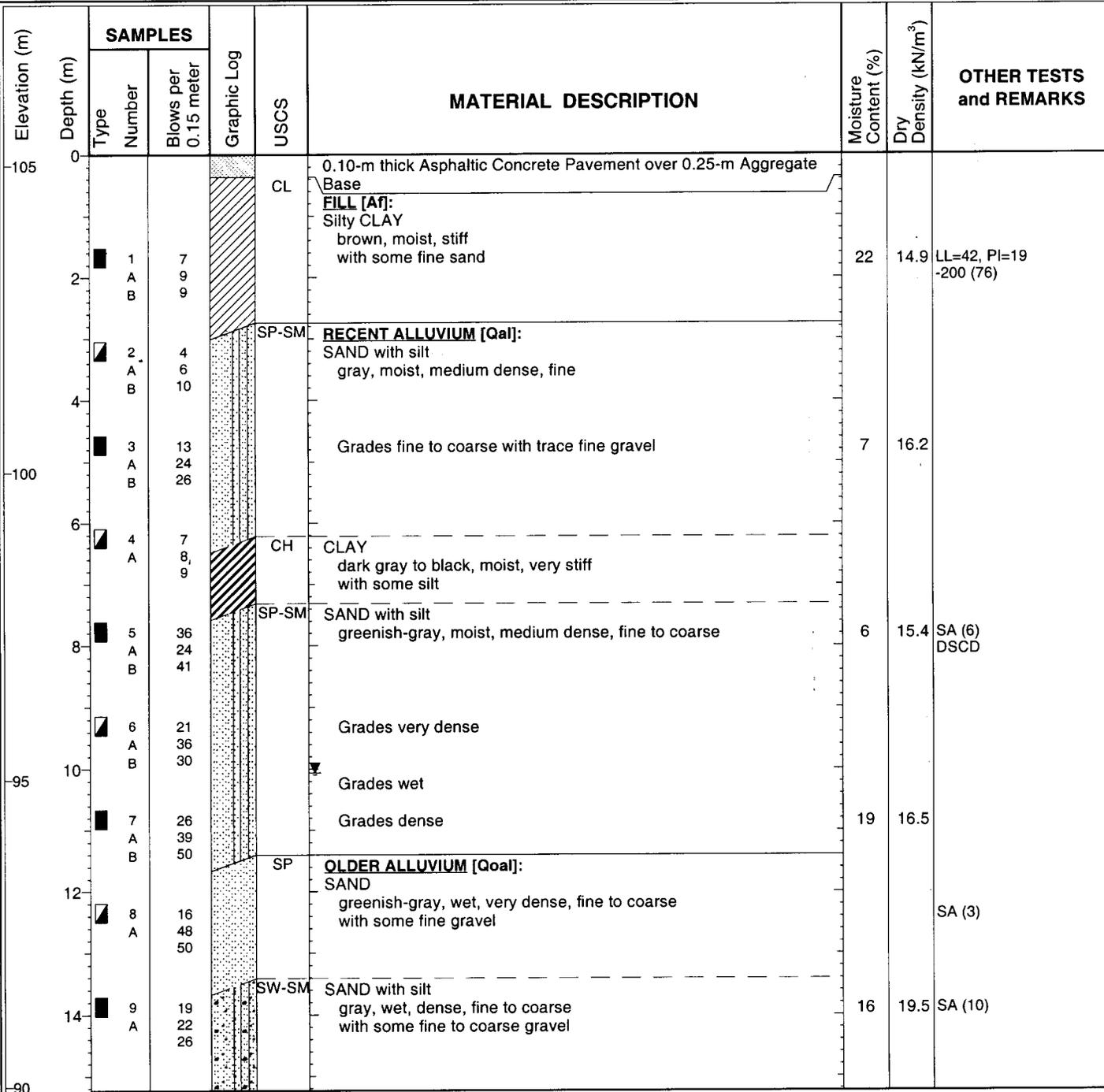
Report: DMG4PORT; Project File: G:\PHIL\P\NEIS\GINTLO-1\NEISNEW.GPJ; Data Template:DMLA.GDT Printed: 11/5/01



Figure B-21

Date(s) Drilled	6/08/99	Logged By	RRH
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	0.2-meter O.D.
Drill Rig Type	Mobile B-61	Hammer Data	63.6 kg./136.4kg., 0.76-m drop
Sampling Method(s)	Dames & Moore Type-U, Standard Penetration Test		
Approximate Groundwater Depth and Date Measured	Groundwater encountered at 10.1m		
Comments	136.4kg hammer used below 13m N565850.122; E1978799.114		

Boring B-44	
Sheet 1 of 2	
Job Number	00596-064-015
Total Depth Drilled (m)	29.3
Approximate Ground Surface Elevation (m)	105



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LOG OF BORING
Subsurface Geotechnical and Hazardous Materials Investigation
Northeast Interceptor Sewer Project - Contract Phase 1
FOR: LADPW/GED



Figure B-22

Report: DMG4PORT; Project File: G:\PHILIP\NEIS\GINTLO-1\NEISNEW.GPJ; Data Template: DMLA.GDT Printed: 11/5/01

Elevation (m)	Depth (m)	SAMPLES		Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (kN/m ³)	OTHER TESTS and REMARKS
		Type	Number						
16	16	A	10	19 22 26		Grades with fine gravel	8	20.6	SA (6)
18	18	A	11	14 19 28			24	16.4	
18	18		12	50/.10m		PUENTE FORMATION [Tp2]: Silty SANDSTONE dark gray to olive-gray, moist, very dense, fine weathered	16	17.9	
20	20		13	75/.13m		Grades olive-gray with moderate cementation	13	18.6	
22	22		14	75/.13m		(hydrocarbon-like odor noted)	14	18.0	
24	24		15	75/.10m		(slight hydrocarbon-like odor noted)			
24	24	X	16	75/.05m		(slight hydrocarbon-like odor noted)			
26	26		17	75/.08m		(slight hydrocarbon-like odor noted)	13	18.6	
28	28		18	100/.13m		Interbedded Silty SANDSTONE and Sandy SILTSTONE dark gray to olive gray, moist, very dense fine, weathered			
30	30		19	100/.10m		Grades mottled dark gray, olive-gray and light gray			

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Figure B-22

Boring Log B-82

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (p.p.m) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION
												Asphaltic cement concrete pavement.
	1			0	2 11 18	1				SW		FILL (Af) SAND with gravel (SW) Brown (7.5YR 5/6), moist, medium dense, fine to coarse subrounded to angular gravel, trace silt.
						2						
MA	2	5.5	18.0	0	13 50/0.08m	3				SP-SM		RECENT ALLUVIUM (Qal) SAND with silt and gravel (SP-SM) Yellowish brown (10YR 5/4), moist, very dense, fine to coarse sand, fine to coarse subangular gravel. Possible subhorizontal scour contact at base of coarse sand layer at 3.1 meters.
						4						
	3			0	11 23 34	5				SM		SILTY SAND (SM) Dark yellowish brown (10Y 4/6), moist, very dense, fine sand, little silt.
						5						
					18							SAND with silt and gravel (SP-SM) Light yellowish brown (10Y 6/4) to pale yellow (2.5Y 7/4), moist, very dense, fine to coarse sand, trace silt, weathered

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Northing/Easting: 564130.634 m / 1979366.707 m
 Surface Elevation: 100.50 m
 Logged By: WG

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 8-10-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA	4	5.5	18.5		26 100	7				SP-SM		granitic gravel and gray to dark green fine grained intrusive rock clasts (possible volcanics).	94
	5			0	18 26 32	8				SM		SILTY SAND (SM) Light yellowish brown (2.5Y 6/4), moist, very dense, fine to medium sand, little silt, clast supported.	93
MA	6	12.4	18.9	0	17 25 38	9				SM		OLDER ALLUVIUM (Qoal) SILTY SAND with gravel (SM) Dark greenish gray (N4) mottled light gray (N7) and reddish brown, moist, very dense, fine to medium grained sand, fine to coarse subangular gravel, trace to little silt, no reaction to HCL.	91
	7			1	50	10						Grades to wet.	90
	8	13.7	17.4	0	100/0.08m	11						BEDROCK - PUENTE FORMATION (Tp2) SANDSTONE Dark greenish gray (5G 4/1), moist, silty, low strength, weakly cemented, fine grained sand with 50 degree laminae of dark gray claystone and dark olive brown fine sandstone. Interbedded SILTSTONE and CLAYSTONE Olive gray (5Y 4/2), gray, and brown, moist, low strength, weakly cemented, trace to little fine gravel, parallel laminae dip steeply.	89

Northing/Easting: 564130.634 m / 1979366.707 m
 Surface Elevation: 100.50 m
 Logged By: WG

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 8-10-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-82
 Project No: 30182

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NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV_GDT_9/10/01_REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	9			0	50/0.10m	13							88
	10	20.7	16.3	0	100/0.13m	15						CLAYSTONE Black (5Y 2.5/2), moist, low to moderate strength, scattered cemented beds, scattered silty fine sandstone thin interbeds, numerous carbonized organic inclusions, bedded near horizontal with scattered silty fine sandstone and claystone contacts dipping 50 degrees, matrix strong, reacts strongly with HCL.	87
	11			3	31 50/0.10m NR	17						SANDSTONE Dark greenish gray (5GY 4/1), moist to wet, silty, low strength, weakly to noncemented, laminated with gray siltstone with sand layers, thinly bedded, slightly reactive with HCL.	85
					33								84
													83

Northing/Easting: 564130.634 m / 1979366.707 m
 Surface Elevation: 100.50 m
 Logged By: WG

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 8-10-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-82

DESCRIPTION

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIU (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA, Hyd, DS	12	18.0	17.3	10	100/0.10m								82
	13	8.0		1	23 50/0.08m							Grades to greenish gray (5GY 5/1) to (10Y 5/1), laminated with 6mm thick layer of gray (N6) calcareous cemented silt dipping 45 degrees.	81
D, UCS	14			1		20	85					SANDSTONE Gray (N 5), moist, high strength and strong cementation, fine sand, trace silt.	
												SANDSTONE Light gray (N6), moist, silty, low strength, weak cementation, fine grained sand.	80
	15			2		21	95					Grades with numerous strongly cemented sandstone layers up to 5 cm thick from 21.3 to 21.9 meters. Sandstone with near vertical fracture at 21.9 meters.	79
						22						Interbedded SANDSTONE and SILTSTONE Light gray (N6), moist, low strength, weak cementation, 3 to 10 mm thick near horizontal beds. Grades with numerous strongly cemented layers from 22.3 to 22.6 meters.	78
	16					23	90					Grades to highly cemented sandstone interbeds at 23 meters. Bedding at 40 degrees from 23.2 to 24.4 meter.	77

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Northing/Easting: 564130.634 m / 1979366.707 m
 Surface Elevation: 100.50 m
 Logged By: WG

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 8-10-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-82 Figure: A-32
 Project No: 30182 4 of 7

Boring Log B-82

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIV (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	17			2		80						Grades to gray (5Y 5/1) with scattered layers of black (5YR 2.5/1) siltstone.	76
						25						Bedding variable at 0 - 40 degrees, moderately to strongly cemented with scattered poorly cemented fissile siltstone at 25.5 meters.	75
PLI	18			2		26	90					SILTSTONE Very dark gray (5Y 3/1), sandy, low strength, weak cementation, moist, trace to little fine grained sand.	74
						27							
	19			3		28	90					Interbedded SANDSTONE and SILTSTONE Dark greenish gray (5GY 4/1), low strength, moderately to strongly cemented, moist, fine grained sand, little silt, scattered layers of black (5YR 2.5/1) siltstone, bedded at 20 to 45 degrees.	73
D, UCS						29							72
D, UCS, PA, CAI	20			1		29	90					Siltstone interbed at 29.1 meters, high strength, light gray, with sand pocket.	71
												SILTSTONE Dark gray (5Y 4/1), low to moderate strength, moderately cemented, moist, trace mica, scattered poorly cemented fissile layers.	

NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV_GDT_9/10/01_REV.3

Northing/Easting: 564130.634 m / 1979366.707 m
 Surface Elevation: 100.50 m
 Logged By: WG

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 8-10-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-82

DESCRIPTION

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI/D (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	21					95						Grades moderately to strongly cemented, with scattered black (5YR 2.5/1) siltstone laminae, numerous fractures from 30.8 to 32.0 meters.	70
	22			0		31							69
D, UCS, CAI, PA						32	60					SANDSTONE Gray (N5), silty, low to moderate strength, moderately cemented, moist, fine grained sand, trace mica, numerous fractures and weakly cemented interbeds. Grades to moderately to strongly cemented massive sandstone from 32.3 to 32.9 meters.	68
PLI	23			0		33							67
						34							66
D, UCS	24			2		35	80					SILTSTONE Dark gray (5Y 4/1), low to moderate strength, moist, little mica, occasional gray (N5) silty sandstone interbeds. Grades to moderately to strongly cemented, moderate to high strength, dipping 45 degrees from 35.1 to 35.5 meters. Intermittent fractured layers of silty sandstone from 35.8 to 36.1 meters.	65

Northing/Easting: 564130.634 m / 1979366.707 m
 Surface Elevation: 100.50 m
 Logged By: WG

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 8-10-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-82
 Project No: 30182

Figure: A-32
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NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV_GDT_9/10/01_REV_3

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIV (mm) #reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
						37						Boring terminated at 36.6 meters (bgs). Groundwater encountered at 10.1 meters (bgs) during drilling. Boring abandoned with bentonite grout and concrete surface seal.	64
						38							63
						39							62
						40							61
						41							60

Northing/Easting: 564130.634 m / 1979366.707 m
 Surface Elevation: 100.50 m
 Logged By: WG

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 8-10-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-83

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
												Asphaltic cement concrete pavement.	101
	1				6 8	1				SM		FILL (Af) SAND with silt and gravel (SM) Dry to moist, loose..	100
						2				ML		SANDY SILT with gravel (ML) Dry to moist, stiff, fine to coarse sand, fine to coarse angular gravel, nonplastic.	99
MA	2	1.4	16.4		5 11 15	3						RECENT ALLUVIUM (Qal) SAND with gravel (SP) Dry to moist, medium dense, fine to coarse sand, fine to coarse subrounded to subangular gravel, scattered angular gravel fragments.	98
	3				7 11 13	5				SP		Grades with fine to medium subrounded to subangular gravel and angular gravel fragments at 4.6 meters.	97
												SAND with silt (SP-SM) Light olive brown (2.5Y 5/3), moist, dense, fine sand, trace medium sand and mica, massive structure.	96

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Northing/Easting: 564316.465 m / 1979266.884 m
 Surface Elevation: 101.20 m
 Logged By: WG

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 8-10-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-83 Figure: A-33
 Project No: 30182 1 of 8

Boring Log B-83

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PII (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA, DS	4	3.2	16.5		16 27 36					SP-SM			95
	5				35 27 19	7						SAND with gravel (SP) Light olive brown (2.5Y 5/3), moist, dense, fine to coarse sand, fine to medium subrounded to angular gravel, trace mica and silt.	94
						8							93
MA	6	3.0	19.2		52 83 92	9				SP		Grades dark yellowish brown (10YR 4/6) and very dense at 9.2 meters, increased gravel with depth.	92
						10						Interbedded SILT (ML) and SILTY SAND (SM) Brownish yellow (10YR 6/6), very dense, fine sand, silt decreases and sand grades coarser with depth.	91
						11							90
-200	7				6 15 46					ML			
												SAND with gravel (SW) Brownish yellow (10YR 6/6), very dense, fine to coarse sand, fine to coarse subangular to subrounded gravel.	
										SW			

Northing/Easting: 564316.465 m / 1979266.884 m

Driller/Drill Rig: Spectrum/CME 75

Surface Elevation: 101.20 m

Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto

Logged By: WG

Date Completed: 8-10-00

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Boring Log B-83
Project No: 30182

Figure: A-33
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Boring Log B-83

DESCRIPTION

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIA (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	Elev. (meters)
MA, DS, Chem	8	11.5	19.3		21 68 100/0.13m							89
	9				5 22 45	13						88
	10	12.6	18.6		40 50/0.08m	14						87
	11				45 50/0.03m	15						86
						16						85
						17						84

OLDER ALLUVIUM (Goal)
SAND (SP)

Greenish gray (10GY 5/1) with pink potassium feldspar grains, wet, very dense, medium to coarse sand, trace fine sand, massive.

Grades olive brown (2.5Y 4/4), with weathered granitic gravel, trace mica and silt at 13.8 meters.

Grades light olive brown (10YR 5/4), without gravel at 15.2 meters.
Refusal due to boulder at 15.8 meters, moved boring 1.5 meters south.

SILTY SAND (SM)
Greenish gray (10B 4/1), wet, very dense, fine sand, scattered medium gray mottling.

SILT (ML)
Dark greenish gray (10Y 4/1) with 1 to 2 mm thick seams of light greenish gray (10GY 8/1) oriented 25 degrees from

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV.3

Northing/Easting: 564316.465 m / 1979266.884 m

Surface Elevation: 101.20 m

Logged By: WG

Driller/Drill Rig: Spectrum/CME 75

Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto

Date Completed: 8-10-00

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Boring Log B-83
Project No: 30182

Figure: A-33
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Boring Log B-83

DESCRIPTION

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	ROD (%)	Sample	USCS	Symbol	Elev. (meters)
	12	19.0	15.7		40 100/0.05m	19				ML		83
	13				75/0.13m	20						81
	14				100/0.08m NR	22				SM		79
	15				60/0.13m	23						78

horizontal, moist, hard, gray seams are weaker than surrounding material, trace mica.

SILTY SAND (SM)
Light greenish gray (10GY 6/1), moist, very dense, fine sand, trace mica, massive.

Grades gray (10Y 6/1) with decreased silt with depth.

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT_9/10/01 REV.3

Northing/Easting: 564316.465 m / 1979266.884 m

Driller/Drill Rig: Spectrum/CME 75

Surface Elevation: 101.20 m

Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto

Logged By: WG

Date Completed: 8-10-00

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Boring Log B-83

DESCRIPTION

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIU (open) reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
PLI D, UCS	16					100	50					BEDROCK - PUENTE FORMATION (Tp2) Interbedded SANDSTONE and SILTSTONE Greenish gray (5G 5/1) to dark greenish gray (5G 4/1), low to moderate strength, weakly to strongly cemented, fine sand, 1 to 20 mm thick interbed dip 35 degrees, reacts with HCL, highly fractured from 24.1 to 24.4 meters.	77
	17					54	0					Grades with trace silt and mica, no HCL reaction, slight hydrogen sulfide like odor at 24.4 meters.	
	18					83	77					SANDSTONE Greenish gray (5G 6/1), low to moderate strength, moderate to strongly cemented, fine sand, trace medium sand, massive, scattered dark greenish gray (10GY 4/1) siltstone interbeds (1 to 25 mm thick) dipping 30 degrees from horizontal.	76
	19					100	83					Interbedded SANDSTONE and SILTSTONE Dark greenish gray (10GY 4/1), moderate strength, moderately to strongly cemented, fine sand, trace medium sand, fractured, bedding at 30 degrees.	75
	20					100	100					SANDSTONE Moderate to high strength, strongly cemented, fine sand, trace medium sand, massive, scattered 1 cm wide flame structures, no HCL reaction.	74
	21					100	100					Interbedded SILTSTONE and SANDSTONE Dark greenish gray (10GY 5/1), low to moderate strength, moderately cemented, 1 to 40 mm thick bedding at 30 degrees from horizontal, no reaction to HCL, scattered claystone rip-up clasts.	73
							29						SANDSTONE Dark greenish gray (10GY 4/1), low strength, weakly cemented, no HCL reaction.
D, UCS												Interbedded SILTSTONE and SANDSTONE Dark greenish gray (5GY 3/1 to 10GY 4/1), fine sand, trace medium sand, low to high strength, weakly to strongly	

NEIS SOIL ROCK LOG NEIS.GPJ_CDM_BLLV.GDT 9/10/01 REV.3

Northing/Easting: 564316.465 m / 1979266.884 m
 Surface Elevation: 101.20 m
 Logged By: WG

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 8-10-00

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 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-83 Figure: A-33
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Boring Log B-83

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
D, UCS	22						100	91				cemented, some mica, numerous fractures 30 degrees from horizontal, thinly to thickly bedded, no HCL reaction, no odor.	71
	23					31						Grades with general repeating sequence of uniform fine grained sandstone with cap of parallel laminated siltstone at 30.7 meters. Some ripple cross bedding in sandstone beds. Slight scouring at base of sandstone beds.	70
	24					32	66	46				Grades with convoluted bedding at 31.9 meters. SANDSTONE Greenish gray (10GY 5/1), low to moderate strength, weakly to strongly cemented, fine sand, trace medium sand, massive, numerous dark greenish gray (5GY 3/1) weakly to moderately cemented silt layers up to 15 mm thick bedded at 30 degrees, no odor.	69
	25					33	74	37				Grades with some mica.	68
D, UCS						34							67
						35	86	30				SANDSTONE Greenish gray (5GY 5/1), low to moderate strength, weakly to moderately cemented, fine sand, trace medium sand, some mica, massive, no odor.	66

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Northing/Easting: 564316.465 m / 1979266.884 m
 Surface Elevation: 101.20 m
 Logged By: WG

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 8-10-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-83
 Project No: 30182

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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT 9/10/01 REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIU (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	30					36	22						59
	31					43	0	0				Grades with rip-up clasts, no definitive bedding angle at 42.9 meters.	58
						44						Boring terminated at 43.6 meters (bgs). Groundwater encountered at 10.7 meters (bgs) during drilling. Borehole abandoned with bentonite grout and concrete surface seal.	57
						45							56
						46							55
						47							54

Northing/Easting: 564316.465 m / 1979266.884 m
 Surface Elevation: 101.20 m
 Logged By: WG

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 8-10-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-83 Figure: A-33
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Boring Log B-84

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
												Asphaltic Cement Concrete Pavement. Portland Cement Concrete Pavement.	
	1				6 3 3	1				SC		FILL (Af) CLAYEY SAND with gravel (SC) Very dark grayish brown (10YR 3/2), moist, dense, fine to medium sand, fine to coarse subangular to angular gravel.	103
						2						SILTY SAND with gravel (SM) Light yellowish brown (2.5Y 5/4), moist, loose, fine to medium sand, fine to coarse subangular gravel.	
	2	3.2	19.4		6 12 28	3						Grades to medium dense at 2.9 meters.	101
MA	3				8 11 12	4						RECENT ALLUVIUM (Qal) SAND with silt and gravel (SP-SM) Yellowish brown (10YR 5/4), moist, medium dense to dense, fine subrounded gravel.	100
					19	5							99

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01 REV. 3

Northing/Easting: 564410.105 m / 1979218.678 m
 Surface Elevation: 103.99 m
 Logged By: WG

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 10-30-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-84
 Project No: 30182

Figure: A-34
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Boring Log B-84

DESCRIPTION

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIU (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	Elev. (meters)
MA	4	28	18.8		21 22							
	5				8 18 22	7						97
	6				9 15 20 NR	8				SP		96
	7				14 19 19	9						95
MA	8	12.5	20.1		29 40	10				SW-SM		94
						11						93

SAND (SP)
Yellowish brown (10YR 5/4), moist, dense, fine to medium sand, little fine to coarse subrounded gravel, trace silt.

SAND with silt and gravel (SW-SM)
Light yellowish brown (2.5Y 6/4), moist, dense, fine to coarse sand, subrounded fine gravel.

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Northing/Easting: 564410.105 m / 1979218.678 m

Driller/Drill Rig: BC2/CME 75

Surface Elevation: 103.99 m

Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto

Logged By: WG

Date Completed: 10-30-00

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Boring Log B-84
Project No: 30182

Figure: A-34
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Boring Log B-84

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIU (ppm) reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA	9				40							Grades wet.	
					40 40	13						OLDER ALLUVIUM (Goal) SAND with silt gravel (SP-SM) Interbedded light olive brown (2.5Y 5/4) and light yellowish brown (2.5Y 6/4), wet, very dense, fine to medium sand, fine subrounded gravel.	91
	10	18.2	18.2		38 50/0.08m	14			SP-SM				90
						15				SW		SAND (SW) Interbedded light olive brown (2.5Y 5/4) and light yellowish brown (10YR 5/6), wet, very dense, some fine subrounded gravel, trace silt.	89
	11				9 12 26	16						Interbedded SAND with silt (SW) and SAND with silt (SP) Light olive brown (2.5Y 5/4) to light yellowish brown (2.5Y 6/4), wet, very dense, trace fine subrounded gravel and silt in poorly graded fine to medium sand layers.	88
						17				SW			87

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV.3

Northing/Easting: 564410.105 m / 1979218.678 m
 Surface Elevation: 103.99 m
 Logged By: WG

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 10-30-00

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 Los Angeles, California

Boring Log B-84
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Boring Log B-84

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION
MA	12	15.7	18.2		14 28 46	19						BEDROCK - PUENTE FORMATION (Tp2) Interbedded CLAYSTONE and SANDSTONE Olive brown (2.5Y 4/3), moist, low strength, noncemented, high plasticity, completely weathered.
	13				100	20						CLAYSTONE Black (5Y 2.5/2), low to moderate strength, weakly cemented, with numerous secondary mineralization infilled fractures, beds up to 2 cm thick of noncemented sandstone dipping at 40 degrees.
	14	12.2	19.4		55 60/0.05m	21						SANDSTONE Interbedded greenish gray (10GY 5/1) and brown (10YR 5/3), low to moderate strength, weak to moderate cementation, moist, silty, fine to medium sand, black (5Y 2.5/2) to dark greenish gray (5GY 3/1) weakly cemented siltstone layer at 21 meters.
	15	18.0	18.6		100 150/0.05m	23						Grades with interbeds of greenish gray (10GY 5/1 and 6/1) siltstone and sandstone, beds up to 4 mm thick, strong HCL reaction, weak to moderate cementation.

NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV_GDT_9/10/01_REV.3

Northing/Easting: 564410.105 m / 1979218.678 m
 Surface Elevation: 103.99 m
 Logged By: WG

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 10-30-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-84

DESCRIPTION

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIP (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	ROD (%)	Sample	USCS	Symbol	Elev. (meters)
	16				100/0.13m	25						79
	17					26	96	96				78
	18					28	100	100				76
	19					29	100	90				75

SANDSTONE
Dark greenish gray (5GY 4/1), low strength, weakly to noncemented, moist, fine to medium sand, little silt.

Interbedded SANDSTONE and SILTSTONE
Dark greenish gray (5GY 4/1) with greenish gray (10GY 6/1) interbeds, moist, moderate strength with some low and high strength beds, moderately to strongly cemented, bedding at 20 degrees from horizontal, 0 to 45 degree fractures from 26 to 26.1 meters.
Grades massive, with trace silt at 26.8 meters.

Grades with organic odor at 27.1 meters.

Grades greenish gray (5GY 6/1), with strong reaction to HCL at 27.4 meters.

Grades with medium brown sandstone layers bedded at 30 degrees at 28.2 meters, fine to medium sand.

Grades with greenish gray (10GY 5/1) and greenish gray (5GY 6/1) sandstone interbeds, weakly cemented.

Grades with secondary carbonate infilled fractures, 45 to 50 degree dip, strong cementation at 29.7 meters.

Northing/Easting: 564410.105 m / 1979218.678 m

Driller/Drill Rig: BC2/CME 75

Surface Elevation: 103.99 m

Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto

Logged By: WG

Date Completed: 10-30-00

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Boring Log B-84
Project No: 30182

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Boring Log B-84

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
PLI, UCS	20					31	100	100				Grades to high strength, strong cementation, with little silt at 30.5 meters.	73
	21					32	100	100				Grades with a dark greenish gray (10GY 4/1) silty sandstone interbed at 31.8 meters, moderately cemented. SANDSTONE Greenish gray (10GY 6/1), moist, low strength, weakly cemented, fine to medium sand, little silt, no fractures, massive.	72
	22					33	100	100				Grades to high cementation, strong reaction to HCL at 33 meters.	71
	23					34	100	100				SANDSTONE Greenish gray (10YR 5/1), moist, silty, low to moderate strength, moderately cemented, fine to medium sand, massive, grades to less silt with depth, no reaction to HCL.	70
						35	98	98				SANDSTONE Greenish gray (10YR 5/1), moist, low to moderate strength, moderate cementation, fine to medium sand, little silt, grades coarser with depth.	69

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Northing/Easting: 564410.105 m / 1979218.678 m

Driller/Drill Rig: BC2/CME 75

Surface Elevation: 103.99 m

Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto

Logged By: WG

Date Completed: 10-30-00

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Boring Log B-84

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) -reading background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA	24					100	100					Grades with a very dark gray layer (7.5YR 3/1), laminated, dipping 10 to 40 degrees, at 36.1 meters.	
						37						SANDSTONE Greenish gray (10GY 5/1), moist, low strength, weak to moderate cementation, fine to medium sand, trace silt, massive.	67
	25					38	92	92				SILTSTONE Very dark gray (7.5YR 3/1), moist, low strength, weakly cemented, trace sand, slight musky odor.	
						39						Interbedded SANDSTONE and SILTSTONE Light greenish gray (10GY 5/1), brown (7.5YR 4/3), and very dark gray (7.5YR 3/1), moist, low to moderate strength, moderately to strongly cemented, interbeds 1 to 12 mm thick.	66
						40						Boring terminated at 39.6 meters (bgs). Groundwater encountered at 12.2 meters (bgs) during drilling. Piezometer constructed as shown on as-built diagram.	64
						41							63

NEIS SOIL ROCK LOG NEIS.GPJ CDM BLLV.GDT 9/2001 REV. 3

Northing/Easting: 564410.105 m / 1979218.678 m
 Surface Elevation: 103.99 m
 Logged By: WG

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 10-30-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-85

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) readings-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
												Portland cement concrete pavement with asphaltic cement concrete pavement overlay.	103
	1	2.7		1	17 12 10	1				SM		FILL (Af) SILTY SAND with gravel (SM) Brown, fine to medium sand, fine to coarse gravel.	102
						2				SP		SAND with gravel (SP) Brown (10YR 5/3), moist, medium dense, fine to medium sand, fine to coarse subangular to angular gravel, trace silt.	101
MA	2	2.9	16.5	0	10 12 18	3				SM		RECENT ALLUVIUM (Qal) SILTY SAND (SM) Brown (10YR 5/3), moist, dense, little fine to coarse subangular gravel.	100
	3	12.4		1	3 5 5	4				SM		SILTY SAND (SM) Dark olive brown (2.5Y 3/3), moist, loose to medium dense, fine sand, trace mica, sand grades coarser with depth.	99
						5				ML		SILT (ML) Dark grayish brown (2.5Y 4/2), moist, medium stiff to stiff, trace fine sand and organics, trace mica, slightly plastic.	98
												SAND (SP)	

NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV_GDT_9/10/01_REV.3

Northing/Easting: 564487.131 m / 1979183.65 m
 Surface Elevation: 103.07 m
 Logged By: KMR

Driller/Drill Rig: BC2/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 2-6-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-85

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIU (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA, DS	4	3.0	17.5	1	22 40 50					SP		Yellowish brown (10YR 5/4), moist, dense, fine to coarse sand, trace fine subrounded to subangular gravel.	97
						7						SAND with silt (SW-SM) Yellowish brown (10YR 5/4), moist, very dense, fine to coarse sand, trace fine gravel.	96
-200	5	5.1		0	40 50/0.05m					SW-SM			
						8							
						9						SAND (SP) Yellowish brown (10YR 5/4), moist, very dense, fine to coarse sand, trace fine to coarse gravel, scattered pockets of sandy silt and clay.	95
MA	6	3.1	19.2	0	12 22 50/0.10m					SP			94
						10						SAND with silt and gravel (SW-SM) Grayish brown (10YR 5/2), moist, very dense, fine to coarse sand, fine gravel.	93
	7	6.5		1	22 43 40					SW-SM			
						11							92
												SAND with silt (SP-SM) Pale brown (10YR 6/3), moist to wet, very dense, fine to	

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Northing/Easting: 564487.131 m / 1979183.65 m
 Surface Elevation: 103.07 m
 Logged By: KMR

Driller/Drill Rig: BC2/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 2-6-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	8	3.9	16.4	2	39 50	91				SP-SM		medium sand, trace coarse gravel, slight solvent-like odor. Driller notes strong petroleum odor. No measurable reading with LEL or PID meter.	91
	9	8.2		75	13 20 30	13				SP		SAND with gravel (SP) Grayish brown (10YR 5/2), wet, very dense, medium to coarse sand, fine to coarse subangular gravel, trace silt.	90
	10	7.2	21.9		14 25 32	14				GP		30 mm layer of crushed black (2.5Y 2.5/1) gravel/cobble at 14.1 meters..	89
MA	11	8.4			27 35 46	15				GP		GRAVEL with sand (GP) Brown (10YR 5/3), wet, very dense, fine to coarse subangular gravel, medium to coarse sand, trace fine sand.	88
-200, Chem						16				SW-SM		SAND with silt (SW-SM) Yellowish brown (10YR 5/4), wet, very dense, fine to coarse sand, some fine gravel.	87
						17				SW-SM		SAND with gravel (SW)	86

Northing/Easting: 564487.131 m / 1979183.65 m
 Surface Elevation: 103.07 m
 Logged By: KMR

Driller/Drill Rig: BC2/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 2-6-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-85

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	ROD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA, DS	12	6.7	20.4	6	14 20 22	18.5 - 19.5			SW	SW	Yellowish brown (10YR 5/4), wet, medium dense to dense, fine to coarse sand, subrounded gravel, trace silt.	85	
	13	11.5		0	10 12 18	19.5 - 20.5			SP	SP	SAND (SP) Olive brown (2.5Y 4/4), wet, medium dense to dense, medium to coarse sand, trace silt.	84	
MA	14	10.4	20.3	0	38 49 50	20.5 - 22.5			SW-SM	SW-SM	OLDER ALLUVIUM (Qoal) SAND with silt and gravel (SW-SM) Dark greenish gray (10GY 4/1), wet, dense, fine to coarse sand and gravel, scattered seams of dark brown (7.5YR 3/1) silt.	82	
AL	15	37.2		0	13 18 26	22.5 - 23.5			CL	CL	SILTY CLAY (CL) Greenish black (10Y 2.5/1), wet, hard, moderate to high plasticity, numerous silty fine sand lenses, trace mica and organics, scattered organic partings, thinly bedded near horizontal.	80	

Northing/Easting: 564487.131 m / 1979183.65 m
 Surface Elevation: 103.07 m
 Logged By: KMR

Driller/Drill Rig: BC2/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 2-6-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-85
 Project No: 30182

Figure: A-35
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Boring Log B-85

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	16	13.4	18.4	0	47 68/0.13m	25							79
										GM		SILTY GRAVEL with sand (GM) Dark greenish gray (10Y 3/1), wet, very dense, medium to coarse sand, fine to coarse subrounded to subangular gravel.	78
MA	17	12.9		0	12 30 50/0.08m	26						SAND with silt (SW-SM) Dark greenish gray (10Y 4/1), wet, very dense, fine to coarse sand, little fine subrounded to subangular gravel.	77
	18	11.2	20.7	0	80 100/0.05m	28						Grades to dark gray (10Y 4/1) with trace fine gravel.	76
MA	19	9.2		1	10 14 20	28				SW-SM		Grades dark greenish gray (10Y 4/1), with fine to coarse, subrounded to subangular gravel, dense.	75
	20	10.4	20.7	1	48 68 90	29						Grades very dense.	74
	21	13.2		3	5 10 50/0.13m								

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01 REV.3

Northing/Easting: 564487.131 m / 1979183.65 m Driller/Drill Rig: BC2/CME 85
 Surface Elevation: 103.07 m Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Logged By: KMR Date Completed: 2-6-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-85

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIU (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA, DS	22	7.8	20.3	1	48 60 90							Grades with mica.	73
	23	14.8		1	60/0.13m	31				SP-SC		50 mm silty fine sand (5GY 4/1) layer at 31.3 meters. SAND with clay and gravel (SP-SC) Very dark gray (2.5Y 3/1), wet, very dense, medium to coarse sand, fine to coarse gravel.	72
UCS	24					32	97	50				BEDROCK - PUENTE FORMATION (Tp2) SANDSTONE Dark greenish gray (10Y 4/1), moderate cementation and strength, massive, trace mica, thinly laminated. CLAYSTONE Very dark gray (10YR 3/1), low strength, massive. Interbedded CLAYSTONE and SANDSTONE Very dark gray (10YR 4/1) to gray (N6), low to moderate strength, weak to moderate cementation, bedding 20 to 25 degrees. CLAYSTONE Dark gray (10YR 4/1), weak cementation and low strength, with 40 mm layer of dark greenish gray (10Y 4/1) sandstone, organics throughout. SANDSTONE Dark greenish gray (10Y 3/1), low to moderate cementation and strength, trace mica, low strength claystone seam at 32.6 meters. CLAYSTONE Dark grayish brown (10YR 4/2), scattered sandstone interbeds, moderate cementation and strength, bedded seams at 20 to 25 degrees, organics throughout.	71
PLI, UCS	25					34	100	70				CLAYSTONE Very dark gray (10YR 3/1), massive, low to moderate strength, moderate cementation, scattered organics. Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1), low to moderate strength, moderate cementation, trace mica, with organics, at 33.9 meters 80 mm long seam of secondary mineralization (weak reaction to HCL), at 34 meters 2 mm infilled joint dipping at 50 degrees. Interbedded CLAYSTONE and SANDSTONE Very dark gray (10YR 3/1), dark brown (10YR 3/3), and greenish gray (N5), low to moderate strength, moderate cementation, with organics, numerous calcite seams (weak reaction to HCL), trace mica. CLAYSTONE Very dark gray (10YR 3/1), moderate cementation and strength, organics, trace mica, numerous secondary mineralization seams (weak reaction to HCL), near planar joint dipping at 60 degrees. Interbedded CLAYSTONE and SANDSTONE	70
PLI	26					35	100	80					69
													68

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01 REV. 3

Northing/Easting: 564487.131 m / 1979183.65 m
 Surface Elevation: 103.07 m
 Logged By: KMR

Driller/Drill Rig: BC2/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 2-6-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-85

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
PLI	27					100	85				[Symbol]	Very dark brown (10YR 3/1) and dark greenish gray (10Y 4/1), moderate cementation and strength, with organics, trace mica. CLAYSTONE Dark grayish brown (10YR 4/2), low to moderate strength, moderate cementation, bedding 20 to 25 degrees, grades to interbedded claystone and sandstone with depth. Interbedded CLAYSTONE and SANDSTONE Dark grayish brown (10YR 4/2) and dark greenish gray (10Y 4/1), low to moderate strength, moderate cementation, bedding 20 to 25 degrees, some organics, trace mica.	67
PLI						37					[Symbol]	SANDSTONE Light gray (N8), massive, strong cementation and high strength, strong reaction to HCL. Interbedded CLAYSTONE and SANDSTONE Dark grayish brown (10YR 4/7) and dark greenish gray (10Y 4/1), moderate cementation and strength, bedding at 35 to 40 degrees.	66
	28					38	100	90			[Symbol]	Interbedded CLAYSTONE and SANDSTONE Dark grayish brown (10YR 4/2) to dark greenish gray (10Y 4/1), moderate cementation and strength, bedding at 25 to 30 degrees, trace organics, trace mica, weak reaction to HCL.	65
MA, AL, Hyd						39					[Symbol]	SANDSTONE Greenish gray (10Y 6/1), massive, moderate cementation and strength, no reaction to HCL. CLAYSTONE Very dark brown (10YR 3/1), thinly laminated, moderate cementation and strength, bedding at 15 degrees, numerous organic nodules.	64
	29					40	100	95			[Symbol]	SANDSTONE Greenish gray (10Y 5/1), massive with grayish brown (10YR 4/2) claystone interbeds, moderate cementation and strength, dipping 25 to 30 degrees, claystone reacts weakly to HCL.	63
PLI, UCS						41					[Symbol]	SANDSTONE Dark greenish gray (10Y 4/1), massive, low to moderate strength, moderate cementation, dipping 15 to 20 degrees, 50 mm grayish brown (10YR 4/2) claystone interbed, no reaction to HCL.	62
												Boring terminated at 41.1 meters (bgs). Groundwater encountered at 12.2 meters (bgs) during drilling. Borehole backfilled with bentonite cement grout and concrete surface seal.	

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV. 3

Northing/Easting: 564487.131 m / 1979183.65 m
 Surface Elevation: 103.07 m
 Logged By: KMR

Driller/Drill Rig: BC2/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 2-6-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-86

Elev. (meters)

DESCRIPTION

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIU (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	5				12 17 21	7						GRAVEL with sand (GW) Dark greenish gray (5GY 4/1), moist, dense, subrounded metamorphic composition, fine to medium sand, trace silt, scattered cobbles inferred from drill action.	95
	6			1	17 33 44	8				GW			94
	7			1		9							93
	8			0	28 29 11	10						SILTY SAND (SM) Dark grayish brown (2.5Y 4/2), moist to wet, dense, fine to coarse sand, little subrounded fine gravel, trace mica.	92
MA						11				SM			91
													90

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT 9/10/01 REV.3

Northing/Easting: 564677.312 m / 1979109.864 m
 Surface Elevation: 101.95 m
 Logged By: DPD

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 11-3-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-86

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA	9			0	9 24 30	13				SW-SM		SAND with silt and gravel (SW-SM) Interbedded olive brown (2.5Y 4/4) and olive gray (5Y 5/2), wet, very dense, moderate plasticity silt.	89
	10			1	17 17 45	14				SW		SAND (SW) Olive gray (5Y 4/2), wet, very dense, fine to coarse sand, little fine subrounded gravel, trace silt and mica.	88
	11				35 50/0.10m	15				GW		GRAVEL with sand (GW) Interbedded dark greenish gray (5GY 4/1) and yellowish brown (10YR 5/6), wet, very dense, fine to coarse sand and subrounded gravel, trace to little clay in yellowish brown layers.	87
MA	12			0	28 48 60	16				SW-SM		OLDER ALLUVIUM (Qoal) SAND with silt (SW-SM) Dark greenish gray (5GY 4/1), wet, very dense, fine to coarse sand, trace coarse subrounded gravel.	86
						17							85
													84

NEIS SOIL ROCK LOG NEIS.GPJ CDM BLLV.GDT 9/20/01 REV.3

Northing/Easting: 564677.312 m / 1979109.864 m
 Surface Elevation: 101.95 m
 Logged By: DPD

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 11-3-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-86

DESCRIPTION

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	Elev. (meters)
	13			1	4 5 4	19				CH		83
	14				9 7 9 NR	21						81
	15			0	50/0.13m	22				SP		80
						23						79
												78

Interbedded SILTY CLAY (CH) and CLAYEY SILT (ML)
Dark greenish gray (5GY 4/1) to black (5Y 2.5/1), moist, stiff, trace to little fine sand, high plasticity clay, low to moderate plasticity silt, organic odor, numerous organic rich fibrous partings and seams, bedding at 10 to 20 degrees.

SAND (SP)
Dark greenish gray (5BG 4/1), moist, very dense, fine to medium sand, trace coarse sand, little fine to coarse subrounded gravel, trace silt and mica, cobbles inferred from drill action at 25.5 meters.

SAND with silt (SW-SM)
Dark greenish gray (5G 4/1), wet, very dense, fine to coarse

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV. 3

Northing/Easting: 564677.312 m / 1979109.864 m
 Surface Elevation: 101.95 m
 Logged By: DPD

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 11-3-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-86

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA	16				42 50/0.13m	25			SW-SM			sand, trace silt, trace fine to coarse subrounded gravel.	77
	17			1	48 50/0.05m	26						GRAVEL with sand (GW) Gray, wet, very dense, subrounded metamorphic/igneous clasts, fine to medium sand, cobbles inferred from drill action.	76
	18			1	38 50/0.10m	27							75
	19				60	28							74
	20					20	0						74
	21					28	40	0					74
	22					29	45	0					73
	23					38		13					72

Northing/Easting: 564677.312 m / 1979109.864 m
 Surface Elevation: 101.95 m
 Logged By: DPD
 Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 11-3-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-86
 Project No: 30182
 Figure: A-36
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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01 REV. 3

Boring Log B-86

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	24					31	20	12				<p>Cobbles inferred from drill action at 30.3 meters At 30.3 - 30.5 meters. Sandstone high strength, strong cementation, weak to no reaction to HCL.</p> <p>Drilling mud grades dark brown from 30.6 to 30.9 meters, silty clay layers with organic odor observed.</p>	71
						32						<p>BEDROCK - PUENTE FORMATION (Tp2) SILTSTONE Laminated very dark gray (10Y 3/1) and dark grayish brown (10Y 4/2), moist, low strength, weak to moderate cementation, no reaction to HCL.</p>	70
PLI	25					33	65	39				<p>SANDSTONE Greenish gray (5GY 5/1), fine to medium sand, low to moderate strength, silty, moderate cementation, massive.</p> <p>SILTSTONE Interbedded black (5Y 2.5/1) and olive gray (5Y 4/2), moderately cemented, 15 degree bedding, yellowish brown (10YR 5/8) inclusion at 32.7 meters.</p> <p>Grades laminated olive gray (5Y 4/2) and greenish gray (5GY 5/1) at 32.9 meters, trace organic inclusions, bedding dipping at 10 degrees.</p>	69
UCS	26					34	97	97				<p>SANDSTONE Greenish gray (5GY 5/1), fine sand, low to moderate strength, moderate cementation, massive, grades with 1 to 25 mm thick olive gray (5Y 4/2) and greenish gray (5GY 5/1) siltstone interbeds below 33.9 meters.</p> <p>5 cm thick olive gray (5Y 4/2) siltstone laminations dipping at 10 to 20 degrees at 34.5 meters.</p> <p>Grades marbled gray (N 6) to greenish gray (5GY 5/1).</p>	68
PA	27					35						<p>Fracture with silt/clay lining dipping at 30 degrees at 35.2 meters.</p> <p>15 cm thick laminated greenish gray (5GY 5/1) and olive gray (5Y 4/2) siltstone layers dipping at 15 degrees at 35.5 meters.</p> <p>Grades gray (5Y 4/1), moist, fine to medium sand grains, massive, 1 cm thick olive gray silt seam at 35.6 meters.</p>	67
													66

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01 REV. 3

Northing/Easting: 564677.312 m / 1979109.864 m
 Surface Elevation: 101.95 m
 Logged By: DPD

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 11-3-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01 REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
PLI, UCS	28					37	94	94				2 cm thick gray (5Y 4/1) fine sandstone layer at 36.7 meters, weak cementation.	65
PLI						38						Grades to laminated gray (5Y 4/1) sandstone and olive gray (5Y 4/2) siltstone, moist, moderately cemented bedding at 10 to 15 degrees, at 37.5 meters. Grades to gray (N 5) fine sand, moist, massive, moderately cemented, little silt, at 37.8 meters.	64
PLI, UCS						39						1 cm thick olive gray (5Y 4/2) siltstone interbeds at 38.2 meters.	
						40						Boring terminated at 38.6 meters (bgs). Groundwater encountered at 10.7 meters (bgs) during drilling. Boring abandoned with bentonite grout and concrete surface seal.	63
						41							62
													61
													60

Northing/Easting: 564677.312 m / 1979109.864 m
 Surface Elevation: 101.95 m
 Logged By: DPD

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 11-3-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-87

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
												Portland cement concrete pavement.	103
	1	30.4		0	2 1 2	1				SW-SM		FILL (Af) SAND with silt and gravel (SW-SM) Brown, moist.	
						2				ML		CLAYEY SILT (ML) Dusky red (2.5YR 3/2), moist, soft, trace fine to medium sand, low plasticity, trace organics, iron-oxide staining.	102
	2	4.2	16.2	0	20 21 22	3							101
						4				SP		RECENT ALLUVIUM (Qal) SAND (SP) Light olive brown (2.5Y 5/4), moist, medium dense, fine sand, trace silt and mica.	100
	3	4.0		0	7 9 11	5				SW-SM		SAND with silt (SW-SM) Olive (5Y 5/3), moist, medium dense, trace mica.	99
MA												SAND with silt (SW-SM) Very dark grayish brown (2.5Y 3/2), moist, medium dense.	98

NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV.GDT 9/10/01 REV. 3

Northing/Easting: 564941.245 m / 1979162.662 m
 Surface Elevation: 103.05 m
 Logged By: AJS/WG

Driller/Drill Rig: Spectrum/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 2-9-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-87

DESCRIPTION

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIU (ppm) #reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	4	3.3	16.8	0	19 13 28					SW-SM			97
						7				SP-SM		SAND with silt (SP-SM) Dark grayish brown (2.5Y 4/2), moist, medium dense, fine sand.	96
	5	2.5		0	7 11 14	8						SAND with silt (SW-SM) Olive brown (2.5Y 4/3), moist, medium dense, trace fine subangular gravel.	95
										SW-SM			
	6	2.6	18.6	0	30 41 59	9						Grades very dense, with solvent-like odor, dark greenish gray (10Y 3/1) silt inclusion at 9.4 meters.	94
						10						SAND with silt (SP-SM) Olive gray (5Y 5/2), moist, medium dense, trace fine subangular gravel.	93
MA	7	4.5		400	10 12 14	11				SP-SM		SAND with silt (SW-SM) Olive gray (5Y 5/2), wet, dense, trace fine angular gravel, tar-like hydrocarbons.	92

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Northing/Easting: 564941.245 m / 1979162.662 m
 Surface Elevation: 103.05 m
 Logged By: AJS/WG

Driller/Drill Rig: Spectrum/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 2-9-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-87
 Project No: 30182

Figure: A-37
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Boring Log B-87

DESCRIPTION

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA, AL, DS	12	29.6	14.8	52	13 11 13	18.5				CL		Dark greenish gray (10Y 3/1), moist, very stiff, low plasticity, trace to little fine sand.	85
						19							84
	-200	13	14.6	40	20 24 40	20				SW-SM		SAND with silt (SW-SM) Dark greenish gray (5G 4/1), wet, dense, fine to coarse sand, hydrogen sulfide like odor.	83
						21							82
	14	17.6	18.4	65	28 100/0.08m	22				ML		SILT with sand (ML) Dark grayish brown (2.5Y 4/2), moist, very dense, fine sand, trace medium sand, nonplastic.	81
						23							80
	15	17.2		24.5	26 50/0.08m	23				SM		SILTY SAND (SM) Olive gray (5Y 4/2), moist, very dense, fine to medium sand, nonplastic, scattered low to moderate plasticity brown silty clay pockets and seams.	80

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV. 3

Northing/Easting: 564941.245 m / 1979162.662 m
 Surface Elevation: 103.05 m
 Logged By: AJS/WG

Driller/Drill Rig: Spectrum/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 2-9-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-87

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (gpm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	16	15.0	18.9	70	38 100/0.10m							BEDROCK - PUENTE FORMATION (Tp2) Interbedded SANDSTONE, CLAYSTONE, and SILTSTONE Olive gray (5Y 4/2) to brown, low strength, weakly cemented, moist, fine sand.	79
	17	17.0		72	41 100/0.05m	25						Driller reports very hard material, slow drilling.	78
	18	15.5	19.2		57 150/0.03m	26							77
	19				58 150/0.03m NR	27							76
	20					28	36	0				SANDSTONE Greenish gray (5/10Y), low strength, weakly cemented, moist, no reaction to HCL, trace silt/clay.	75
	21					29	90	90				SANDSTONE Greenish gray (5GY 5/1), massive, low strength, weakly to moderately cemented, 2 to 3 mm thick interbeds dipping at 20 degrees at 29.7 meters.	74
												Interbedded SANDSTONE and SILTSTONE Brown (7.5YR 5/2), 1 to 5 mm thick bedding dipping at 25	

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV.3

Northing/Easting: 564941.245 m / 1979162.662 m
 Surface Elevation: 103.05 m
 Logged By: AJS/WG

Driller/Drill Rig: Spectrum/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 2-9-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-87
 Project No: 30182

Figure: A-37
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Boring Log B-87

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
ITS												degrees, sandstone grades to fine, moderate strength and cementation, 1 to 2 mm strongly cemented silt clasts, siltstone has slight reaction to HCL.	73
PLI	22					90	90					SANDSTONE Greenish gray (10GY 5/1), massive, moderate to high strength, moderately to strongly cemented, numerous mechanical fractures; 5 mm fracture infilled with carbonate, dipping at 15 degrees, at 30.1 meters. Grades to high strength at 30.2 meters, 2 to 3 mm fracture lined with carbonate, carbonate is striated and reacts moderately with HCL, voids along joint.	72
PLI, UCS	23					32	100	96				Interbedded SANDSTONE and SILTSTONE Light brownish gray (10YR 6/2), moderate strength and cementation, 1 to 5 mm thick interbed dipping at 5 degrees, no reaction to HCL. SANDSTONE Greenish gray (5GY 6/1), moderate strength and cementation, fine sand, massive, no reaction to HCL. SILTSTONE Dark greenish gray (5GY 6/1), moderate strength and cementation, massive, 1 to 2 mm clay interbed dipping at 80 degrees, no reaction to HCL.	71
	24					33	100	96				Interbedded SILTSTONE and SANDSTONE Dark greenish gray (5GY 6/1) and brown (10YR 5/3), fine to medium sand, moderate strength and cementation, bedding dips at 20 degrees, 1 to 8 mm thick bedding, generally 2 to 3 mm thick. SANDSTONE Greenish gray (5GY 6/1), high strength, strongly cemented grading to low strength and weak cementation with depth, massive, siltstone clasts at 33 meters, dipping 15 degrees at 33.4 meters, no reaction to HCL.	70
	25					34						SANDSTONE Greenish gray (5GY 5/1), moderate to high strength, moderately to strongly cemented, fine to medium grained, massive, infilled 1 to 2 mm thick joint dipping 45 degrees at 33.5 meters, no reaction to HCL.	69
						35	100	100				SANDSTONE Greenish gray (10GY 6/1), high strength, strongly cemented, massive, fine grained, weak reaction to HCL. SANDSTONE Greenish gray (5GY 5/1), massive, low to moderate strength, weakly to moderately cemented, 15 mm thick siltstone bed, no reaction to HCL.	68
PLI, UCS												Interbedded SILTSTONE and SANDSTONE Greenish gray (10GY 5/1), moderate to high strength, moderately to strongly cemented, 2 mm thick black seam (possibly organic), scattered siltstone clasts, no reaction to HCL. Siltstone, very dark grayish brown (2.5Y 3/2), moderate strength and cementation, 1 to 10 mm thick at 15 degrees, no reaction to HCL. SANDSTONE	

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Northing/Easting: 564941.245 m / 1979162.662 m Driller/Drill Rig: Spectrum/CME 85
 Surface Elevation: 103.05 m Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Logged By: AJS/WG Date Completed: 2-9-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-87 Figure: A-37
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Boring Log B-87

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIV (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	26					100	97					Greenish gray (5GY 5/1), low to moderate strength, moderate cementation, fine grained, massive, no reaction to HCL. SANDSTONE Greenish gray (5GY 6/1), low to moderate strength, weakly to moderately cemented, fine grained, massive, no reaction to HCL; 7 mm thick brown siltstone interbed dipping 15 degrees, at 36.3 meters. SANDSTONE Greenish gray (10GY 5/1), low to moderate strength, weakly to moderately cemented, grading to low strength at 36.8 meters, massive, no reaction to HCL. SANDSTONE Greenish gray (10GY 6/1), high strength, strongly cemented, massive, 1 mm thick 30 degree organic layer at 37.2 meters.	67
	27					65	65					SANDSTONE Greenish gray (10GY 5/1), moderate strength and cementation, massive, low to moderate reaction to HCL. SANDSTONE Greenish gray (10GY 6/1), high strength, strongly cemented, massive, minor infilled fractures dipping 30 to 40 degrees, 45 degree fracture with dark brown to black hydrocarbon seepage, low to moderate reaction to HCL.	66
	28					38	100	100				SANDSTONE Greenish gray (10GY 5/1), low strength, weakly cemented, no reaction to HCL. SANDSTONE Greenish gray (10GY 6/1), fine to medium sand, low to moderate strength, weakly to moderately cemented, massive to thinly bedded dipping at 28 degrees. SANDSTONE Bluish gray (5B 5/1), moderate to high strength, moderately to strongly cemented, massive, no reaction to HCL. SILTSTONE Dark greenish gray (5GY 4/1), high strength, strongly cemented, bedding 1 to 10 mm thick dipping at 15 degrees, no reaction to HCL. SANDSTONE Greenish gray (5GY 5/1), fine sand, moderate strength and cementation, massive, no reaction to HCL. SILTSTONE Dark greenish gray (5GY 4/1), laminations dipping 10 to 15 degrees.	65
						39						Boring terminated at 38.9 meters (bgs). Groundwater encountered at 11.5 meters (bgs) during drilling. Boring abandoned with bentonite grout and concrete surface seal.	64
						40							63
						41							62

Northing/Easting: 564941.245 m / 1979162.662 m
 Surface Elevation: 103.05 m
 Logged By: AJS/WG

Driller/Drill Rig: Spectrum/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 2-9-01

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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Boring Log B-88

DESCRIPTION

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
												Asphaltic cement concrete pavement. Portland cement concrete pavement.	
												FILL (Af) CLAYEY SILT (ML) Yellowish brown (10YR 5/4), moist, soft to medium stiff, trace fine sand.	103
AL	1	25.4		0	1 2 2	1				ML			102
												SILTY CLAY (CH) Yellowish brown (10YR 5/4), moist, medium stiff, trace fine sand and subangular gravel, moderate plasticity.	101
AL	2	31.2		0	1 2 4	3				CH			100
												RECENT ALLUVIUM (Qal) SAND with silt (SW-SM) Yellowish brown (10YR 5/4), moist, medium dense, fine to coarse sand.	99
	3	6.4		0	4 6 4	5							98

Northing/Easting: 565245.352 m / 1979141.747 m

Driller/Drill Rig: BC2/CME 85

Surface Elevation: 103.87 m

Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto

Logged By: DPD

Date Completed: 8-21-00

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Boring Log B-88
Project No: 30182

Figure: A-38
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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Boring Log B-88										Elev. (meters)		
Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample USCS		Symbol	DESCRIPTION
MA	4	3.6		0	11 12	7			SW-SM			97
	5	7.0		0	8 9 10	8			ML		Grades dark yellowish brown (10YR 4/6) with oxidation stains, trace subangular gravel at 7.5 meters. CLAYEY SILT (ML) Very dark gray (5Y 3/1), moist, stiff, trace fine to medium sand, 5 cm thick dark gray (5Y 4/1) slightly cemented sand seam at 9.1 meters, little fine gravel, low plasticity.	96
	6	16.4	17.3	0	4 5 15	9			CH		SILTY CLAY (CH) Dark greenish gray (5GY 4/1), moist, stiff, high plasticity.	95
	7	45.9		0	8 9 4	10			CH		Grades with 5 cm thick dark gray (5Y 4/1) sand seams at 10.5 meters.	94
AL						11			SP-SM		SAND with silt and gravel (SP-SM) Dark greenish gray (5Y 3/1), wet, medium dense, fine to medium sand, fine subangular gravel, trace to little coarse sand.	93
												92

Northing/Easting: 565245.352 m / 1979141.747 m

Driller/Drill Rig: BC2/CME 85

Surface Elevation: 103.87 m

Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto

Logged By: DPD

Date Completed: 8-21-00

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Boring Log B-88

DESCRIPTION

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	
MA	8	8.8	21.1	0	2 25 28	12.1						Grades medium dense to dense at 12.1 meters.
	9	17.0		0	4 5 8	13.6				SP-SM		Grades dark gray (5Y 4/1), with little mica at 13.6 meters.
	10				2 3 4 NR	15.0						
	11	8.9		0	17 31 34	17.0				SM		OLDER ALLUVIUM (Qoal) SILTY SAND (SM) Dark greenish gray (5G 4/1), wet, dense to very dense, fine to coarse sand.
												SAND with silt and gravel (SW-SM) Dark gray (N 4), wet, dense to very dense, fine to medium sand, angular gravel, trace mica.

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV. 3

Northing/Easting: 565245.352 m / 1979141.747 m
 Surface Elevation: 103.87 m
 Logged By: DPD

Driller/Drill Rig: BC2/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 8-21-00

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NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV.3

Boring Log B-88										Elev. (meters)		
Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample		USCS	DESCRIPTION
MA	12	9.7		0	17 29 34							
	13			0	9 20 34	19				SW-SM		
	14	10.8	19.2	0	25 85 50	21					SILTY SAND (SM) Dark greenish gray (5G 4/1), wet, very dense, fine to medium sand.	
MA, DS	15					22	100	0			20 cm dark greenish gray (5G 4/1) diorite cobble/boulder encountered at 22.1 meters.	
	16					23	85	0		SM	Grades with fine to coarse subrounded gravel, cobbles inferred from drill action 22.5 to 23.3 meters.	
	17						40	0				

Northing/Easting: 565245.352 m / 1979141.747 m
 Surface Elevation: 103.87 m
 Logged By: DPD

Driller/Drill Rig: BC2/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 8-21-00

City of Los Angeles, Bureau of Engineering
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 Los Angeles, California

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	18					75	66					BEDROCK - PUENTE FORMATION (Tp2) CLAYSTONE Very dark brown (10YR 2/2), low strength, weakly cemented, hydrocarbon odor. Grades dark olive gray (5Y 3/2), low strength, stratified, with trace mica at 24.7 meters.	79
	19					0	0						78
	20					26	100	95				SILTSTONE Interbedded light gray (N6) and light gray (5Y 6/1), moderate strength and cementation, stratified, scattered very dark brown (10YR 2/2) claystone beds up to 5 cm thick, hydrocarbon odor.	77
	21					28	97	87				Interbedded SILTSTONE and SANDSTONE Gray (5Y 6/1) to dark gray (10YR 4/1), low to moderate strength, moderate cementation, thickly laminated. Grades with gray (N6), gray (5Y 6/1) and dark gray (10YR 4/1) interbeds. Grades with very dark brown (10YR 2/2) fractured claystone interbeds up to 5 cm thick.	76
PLI	22					29	65	0				SANDSTONE Gray (5Y 5/1), moderate strength and cementation, massive.	75
	23					60		30				SILTSTONE Interbedded gray (5Y 5/1) and dark gray (5Y 4/1), moderate strength and cementation, stratified, numerous very dark brown (10YR 2/2) fractured thin claystone interbeds.	74

Northing/Easting: 565245.352 m / 1979141.747 m
 Surface Elevation: 103.87 m
 Logged By: DPD

Driller/Drill Rig: BC2/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 8-21-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-88
 Project No: 30182

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Boring Log B-88

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIV (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	24					110	55					<p>SANDSTONE Gray (5Y 5/1), moderate strength, alternating layers of fine and fine to medium sand, trace fine gravel with a thick siltstone laminae.</p> <p>Grades with very dark brown fractured claystone layers, low strength, moderate cementation.</p> <p>Interbedded SANDSTONE and SILTSTONE Gray (5Y 5/1) to very dark grayish brown (10YR 3/7), moderate strength, moderately to strongly cemented.</p>	73
	25					32	100	80					72
UCS						33						<p>SANDSTONE Gray (5Y 5/1) to gray (N6), low to moderate strength, moderately to strongly cemented, fine to medium sand, massive, scattered very dark brown (10YR 2/2) fractured thin claystone interbeds.</p>	71
	26					50		0				<p>Interbedded SILTSTONE and SANDSTONE Gray (5Y 5/1) to very dark grayish green (10YR 3/2), moderate strength, moderately to strongly cemented.</p>	
	27					34	95	57				<p>SANDSTONE Light gray (5Y 6/1), low to moderate strength, moderately to strongly cemented, fine to medium sand, massive, scattered very dark brown (10YR 2/2) clay thin interbeds up to 3 mm thick.</p>	70
	28					35	95	95					69
UCS													68

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Northing/Easting: 565245.352 m / 1979141.747 m Driller/Drill Rig: BC2/CME 85
 Surface Elevation: 103.87 m Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Logged By: DPD Date Completed: 8-21-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-88 Figure: A-38
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NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	29					37	92	55				Grades light gray (N 7) with fine gravel at 36.2 meters.	
												Grades with little silt, trace mica at 36.6 meters.	67
UCS	30					38	95	74				Grades light gray (N 6) at 38.1 meters.	66
												8 cm laminated interbed of very dark grayish brown (10YR 3/2) and light gray (N 6) sandstone at 38.5 meters.	65
	31					40	93	74					64
												Interbedded SILTSTONE and SANDSTONE Light gray (N 6) to gray (5Y 5/1), moderate strength, moderately to strongly cemented, stratified, scattered fine gravel within siltstone layers, trace mica, hydrocarbon odor.	63
	32					41	96	90				SILTSTONE Interbedded gray (5Y 5/1) and very dark grayish brown (10YR 3/2), with fine grained sand, moderate strength, moderately to strongly cemented, stratified.	62

Northing/Easting: 565245.352 m / 1979141.747 m
 Surface Elevation: 103.87 m
 Logged By: DPD

Driller/Drill Rig: BC2/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 8-21-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

NEIS_SOIL_ROCK_LOG_NEIS_GP1_CDM_BLLV.GDT 9/10/01 REV. 3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIV (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
						43						8 cm thick gray (N 6) sandstone layer at 42.2 meters. Grades with a very dark brown (10YR 2/2) claystone thick interbeds.	61
						44							60
						45							59
						46							58
						47							57
													56

Northing/Easting: 565245.352 m / 1979141.747 m
 Surface Elevation: 103.87 m
 Logged By: DPD

Driller/Drill Rig: BC2/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 8-21-00

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 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-89

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)	
												Asphaltic cement concrete pavement.	105	
										FILL		FILL (Af) Crushed rock base coarse underlain by sand with silt, moist.		
	1	5.5		12	2 2 2	1						SAND with silt (SP-SM) Grayish brown (10YR 5/2), moist, loose, fine sand, trace mica.	104	
						2				SP-SM			103	
MA	2	6.9	14.3	18	5 5 6	3				SM		RECENT ALLUVIUM (Qal) SILTY SAND (SM) Light olive brown (2.5Y 5/3), moist, loose, fine sand.	102	
						4								
MA	3	7.7		2.2	6 11 11	5				SW-SM		SAND with silt (SW-SM) Olive (5Y 4/3), moist, medium dense, trace fine subangular gravel.	101	
												SILTY SAND (SM) Olive (5Y 4/3), moist, medium dense, fine to coarse sand, scattered sand with silt (SP-SM) layers.	100	

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BILLV_GDT_9/10/01_REV.3

Northing/Easting: 565480.717 m / 1979058.829 m Driller/Drill Rig: Spectrum/CME 85 / CME 75
 Surface Elevation: 105.14 m Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Logged By: AJS/KMR Date Completed: 2-8-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-89

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA	4	8.6	18.5	0.5	19 20 24	6.5 - 7.0			[Black bar]	SM			99
MA	5	47.7		0	4 4 3	7.5 - 8.0			[Black triangle]	ML		SILT (ML) Greenish black (10Y 2.5/1), moist, loose to medium stiff, little fine sand, trace mica and fine organics, low to no plasticity.	98
	6	27.3	15.2	0	25 32 38	8.5 - 9.5			[Black bar]			Grades with interbedded sand with silt (SP-SM) seams.	96
	7	22.3		0.5	5 4 5	10.0 - 11.0			[Black triangle]	SM		SILTY SAND (SM) Dark greenish gray (5BG 4/1), wet, dense, trace angular to subangular gravel; grades with hard clayey silt and clay interbeds at 9.5 meters.	95
						11.0 - 11.5			[Black triangle]			Interbedded SAND (SW) and SILT (ML) Dark greenish gray (5BG 4/1) sand and greenish black (10Y 2.5/1) silt, moist to wet, loose to stiff, sand layers with trace silt, silt layers with trace mica, layers approximately 30mm in thickness.	94
						11.5 - 12.0			[Black triangle]	SW			

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Northing/Easting: 565480.717 m / 1979058.829 m

Surface Elevation: 105.14 m

Logged By: AJS/KMR

Driller/Drill Rig: Spectrum/CME 85 / CME 75

Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto

Date Completed: 2-8-01

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

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Project No: 30182

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Boring Log B-89

Elev. (meters)

DESCRIPTION

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	Elev. (meters)
	8	21.2	16.8	1.2	7 11 14							93
						13						
MA	9	11.6		.6	10 17 20	14				SM		91
	10	12.1	19.8	1	26 25 36	15				SM		90
AL	11	33.4		0.6	5 4 3	17				ML		88

Sampler driven through cobble at 12.6 meters.

OLDER ALLUVIUM (Qoal)
SILTY SAND with gravel (SM)
Dark greenish gray (10Y 3/1), wet, dense, fine subangular gravel, hydrogen sulfide-like odor.

SILTY SAND with gravel (SM)
Dark greenish gray (10Y 3/1), wet, dense, scattered tar-like inclusions, hydrogen sulfide-like odor, hydrocarbon-like odor, grades less silty with depth.

CLAYEY SILT (ML)
Greenish black (10Y 2.5/1), moist, stiff, scattered sand (SW) seams, hydrogen sulfide-like odor, low plasticity.

Northing/Easting: 565480.717 m / 1979058.829 m

Driller/Drill Rig: Spectrum/CME 85 / CME 75

Surface Elevation: 105.14 m

Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto

Logged By: AJS/KMR

Date Completed: 2-8-01

City of Los Angeles, Bureau of Engineering
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Figure: A-39
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Boring Log B-89

DESCRIPTION

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIU (opt) reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	Elev. (meters)
	12	14.9	18.4	0.7	11 27 50	18.5						87
	13	11.5		0.7	5 12 26	20.0						86
	14	12.3	18.9	0.6	28 49 52	21.5				SW-SM		85
MA, DS	15	11.5		0	38 77	23.0						84
												83
												82

SAND with silt (SW-SM)
Dark greenish gray (10GY 4/1), wet, dense, fine to coarse sand, hydrogen sulfide-like odor.

Grades with little fine subangular to angular gravel.

BEDROCK - PUENTE FORMATION (Tp2)
CLAYSTONE
Dark olive brown, silty, low strength, wet, highly weathered, trace organics.

NEIS_SOIL_ROCK_LOG_NEIS_GPI_CDM_BLLV_GDT_9/10/01_REV.3

Northing/Easting: 565480.717 m / 1979058.829 m

Surface Elevation: 105.14 m

Logged By: AJS/KMR

Driller/Drill Rig: Spectrum/CME 85 / CME 75

Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto

Date Completed: 2-8-01

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Boring Log B-89

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIV (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	16	16.8	17.5	0	100				█		█	Grades very dark gray (2.5Y 3/2), slightly weathered, possible bedding at 10 to 20 degrees, weakly cemented, soft rock.	81
	17					26	70	49	█		█	<p>SILTSTONE Very dark gray (10YR 3/1), moderate cementation and strength, jointed, bedding dip at 3 to 5 degrees, trace mica, weak reaction to HCL.</p> <p>Interbedded SILTSTONE and SANDSTONE Dark gray (N 4), moderate cementation and strength, thinly bedded to laminated, fine sand, ripple bedding in sandstone.</p>	79
	18					28	100	90	█		█	<p>SILTSTONE Very dark gray (10YR 3/1), moderate to high strength, moderate cementation, bedding at 5 degrees, calcite seam at 27.6 meters.</p> <p>SILTSTONE Very dark gray (10YR 3/1), high strength, strongly cemented, thinly bedded to laminated, near vertical curvilinear and planar fractures with secondary mineralization, strong reaction to HCL.</p>	77
PA UCS, PLI	19					29	100	94	█		█	<p>SILTSTONE Very dark gray (10YR 3/1), moderate cementation and strength, bedding dipping at 5 to 10 degrees, no reaction to HCL.</p> <p>SANDSTONE Gray (N 5), moderate cementation and strength, bedding dipping at 10 to 25 degrees, possible crossbedding, trace mica.</p> <p>SANDSTONE Gray (10YR 5/1), fine sand, massive, moderate cementation and strength, trace mica.</p> <p>SILTSTONE Very dark gray (10YR 3/1), moderate cementation and strength, fractured, bedding dipping at 10 to 15 degrees, no reaction to HCL.</p> <p>Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and gray (N 5), moderate</p>	76

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV. 3

Northing/Easting: 565480.717 m / 1979058.829 m
 Surface Elevation: 105.14 m
 Logged By: AJS/KMR

Driller/Drill Rig: Spectrum/CME 85 / CME 75
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 2-8-01

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Boring Log B-89
 Project No: 30182

Figure: A-39
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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01 REV. 3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
CAI	20					100	100					cementation and strength, trace mica, thinly to thickly laminated. Grades with bedding dipping at 5 to 10 degrees, organic nodules, and little mica at 29.6 meters. SANDSTONE Dark gray (N 4), fine to medium grained, massive, moderate cementation and strength, grades finer with depth, scattered organic nodules, trace mica, 2 mm thick siltstone interbed at 30.3 meters.	75
	21					32	100	96				Interbedded SANDSTONE and SILTSTONE Dark gray (N 4) to very dark gray (10YR 3/1), thickly laminated, moderate cementation and strength, bedding dipping at 5 to 10 degrees, scattered organic nodules, weak reaction to HCL.	74
	22					33	100	90				Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and gray (10YR 5/1), laminated siltstone and massive sandstone, moderate cementation and strength, bedding dipping at 5 to 15 degrees, trace mica, organic nodules, siltstone reacts weakly to HCL. SANDSTONE Dark gray (N 4), massive, low to moderate strength, moderate cementation, trace mica, scattered organics. Siltstone interbed with inclusions at 32.9 meters. Inclusions react moderately to HCL. Very dark gray (10YR 3/1) siltstone interbed at 33.1 meters, moderate cementation and strength, no reaction to HCL.	73 72
UCS	23					34	95	91				SANDSTONE Dark gray (N 4), massive, moderate cementation and strength, trace mica, near vertical planar fracture from 33.6 to 33.8 meters. Very dark gray (10YR 3/1) siltstone interbed at 33.9 meters with moderate cementation and strength, 120mm thick bedding dipping at 5 to 10 degrees, scattered organic nodules, and weak reaction to HCL. Siltstone interbed (same as above) at 34.2 meters, 90mm thick. Siltstone interbed (same as above) at 34.5 meters, 30mm thick.	71
						35						SANDSTONE Gray (N 5), massive, moderate cementation and strength, micaceous, no reaction to HCL, increasing fines with depth. Very dark gray (10YR 3/1) siltstone interbed at 35.6 meters with moderate cementation and strength, 180mm in thickness, bedding dipping at 10 to 20 degrees, scattered organic nodules, weak reaction to HCL.	70

Northing/Easting: 565480.717 m / 1979058.829 m
 Surface Elevation: 105.14 m
 Logged By: AJS/KMR

Driller/Drill Rig: Spectrum/CME 85 / CME 75
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 2-8-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) <small>=reading-background</small>	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
UCS, PLI	24											Siltstone seam (as above) at 35.9 meters.	69
						100	100					Siltstone interbed (as above) at 36.4 meters, 5mm thick, sheared with slickensides.	
							37					SANDSTONE Dark gray (N 5), fine sand, high cementation and strength, trace mica, no reaction to HCL. Very dark gray (10YR 3/1) siltstone interbed at 36.8 meters, moderate cementation and strength, 30mm in thickness, dipping at 5 to 10 degrees, weak reaction to HCL.	68
												Siltstone clasts at 36.9 meters, 2 to 10 mm in diameter, subrounded to subangular, with carbon-like inclusions. Fracture at 37.3 meters, planar, dipping 20 to 30 degrees.	
							38					SANDSTONE light gray (N 7), high strength, strongly cemented, fine sand, strong reaction to HCL, grades silty with depth. SANDSTONE Dark gray (N 4), high strength, strongly cemented, trace mica, no reaction to HCL.	
											Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and dark gray (10YR 4/1), moderate to high strength, moderately to strongly cemented, dipping at 3 to 5 degrees, trace organics in siltstone, strong reaction to HCL in sandstone, weak reaction to HCL in siltstone.	67	
						39					Boring terminated at 38.1 meters (bgs). Groundwater encountered at 5 meters (bgs) during drilling. Piezometer constructed as shown on as-built diagram.	66	
						40							65
						41							64

Northing/Easting: 565480.717 m / 1979058.829 m
 Surface Elevation: 105.14 m
 Logged By: AJS/KMR

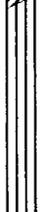
Driller/Drill Rig: Spectrum/CME 85 / CME 75
 Equipment/Hammer: H.S.A. Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 2-8-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-89
 Project No: 30182

Figure: A-39
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Boring Log B-90

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
												Asphalt cement concrete pavement.	
												Portland cement concrete pavement.	
	1			0	3 2 3	1				CL		FILL (Af) SANDY CLAY (CL) Dark reddish brown (2.5YR 3/4), moist.	104
										ML		SANDY SILT (ML) Dark grayish brown (2.5Y 4/3), moist.	
						2				SM		SILTY SAND (SM) Dark grayish brown (2.5YR 4/3), moist, loose, fine sand, trace mica.	103
AL	2	42.4	12.7	0	4 5 12	3				CH		SILTY CLAY (CH) Dark grayish brown (10YR 4/2), very stiff, moist, scattered black and rust colored staining, trace sand, high plasticity, porous with weathered relic root holes.	102
													101
MA	3			0	6 9 11	4				SP-SM		RECENT ALLUVIUM (Qa) SAND with silt (SP-SM) Light brownish gray (10YR 6/2), medium dense, moist, fine to medium sand, trace coarse sand and fine gravel.	100
						5							
												SANDY CLAYEY SILT (ML) Dark grayish brown (2.5YR 4/2), very stiff, moist, fine sand, little mica, trace subrounded gravel, no odor.	99

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01 REV.3

Northing/Easting: 565643.749 m / 1978939.905 m
 Surface Elevation: 104.75 m
 Logged By: WG

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 11-6-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-90

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
DS, MA	4	15.5	18.0	0	9 16 20					ML			
						7						SAND with silt (SP-SM) Light olive brown (2.5Y 5/3), moist, dense, fine sand.	98
-200	5			0	8 9 12					SP-SM			97
						8							
												SANDY SILTY CLAY (CL-ML) Dark greenish gray (10GY 4/1), moist, very stiff, fine sand, trace fine to coarse gravel, trace coarse sand, trace mica, low plasticity.	96
AL, MA, Hyd	6	21.6	17.7	0	9 17 25								95
										CL-ML			
	7			0	6 4 5							Grades to stiff, sand grades coarser with little medium to coarse sand at 10.7 meters.	94
						11							93

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01 REV. 3

Northing/Easting: 565643.749 m / 1978939.905 m
 Surface Elevation: 104.75 m
 Logged By: WG

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 11-6-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

NEIS SOIL ROCK LOG NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIV (ppm) - reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	8	13.5	19.3	0	42 50/0.08m	13						SAND with gravel (SW) Greenish gray (10G 5/1), very dense, wet, fine to coarse sand, fine to medium subrounded gravel, no odor.	92
	9			0	11 12 17	14						Grades to medium dense with trace silt at 13.7 meters.	91
	10	7.6	20.7	0	15 27 29	15				SW			90
	11				NR	16	0	0				Refusal at 15.7 meters on possible boulder, switched to HQ core drilling from 15.7 to 18.3 meters.	89
						17						Gravel/cobble fragments up to 80 mm in diameter noted in core barrel, shoe contains medium sand.	88
													87

Northing/Easting: 565643.749 m / 1978939.905 m
 Surface Elevation: 104.75 m
 Logged By: WG

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 11-6-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-90

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	12			0	10 10 20	18.4						Auger drilling resumed. Grades greenish gray (5GY 5/1), moist to wet at 18.4 meters.	86
DS, MA	13	12.7	18.2	0	9 35 50	20						<u>OLDER ALLUVIUM (Qoal)</u> SAND with silt (SP-SM) Greenish gray (5GY 5/1), wet, dense to very dense, fine to coarse sand, little fine subrounded to angular gravel, no odor.	85
-200	14			0	17 17 24	21.3						Grades to fine to coarse gravel (up to 20mm), hydrogen sulfide like odor at 21.3 meters.	83
	15				50 NR	23				SP-SM			82
													81

Northing/Easting: 565643.749 m / 1978939.905 m
 Surface Elevation: 104.75 m
 Logged By: WG

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 11-6-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01 REV. 3

Boring Log B-90

DESCRIPTION

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	Elev. (meters)
MA	16			0	35 19 35	25						80
Grades with trace coarse, subangular sand at 24.4 meters.												
DS, MA	17	16.3	17.3	0	12 100/0.08m	26						79
SAND with silt (SW-SM) Greenish gray (5GY 5/1), wet, dense to very dense, fine to coarse sand, hydrogen sulfide like odor.												
	18			0	50/0.13m	27				SW-SM		78
	19	22.3	17.3	0	35 40 50	28						77
Grades with no odor, sand grades finer with depth at 27.4 meters.												
MA	20			0	36 25 20	28						76
Grades with little fine subrounded gravel, hydrogen sulfide like odor at 28.2 meters.												
MA	21	12.1	19.8	0	45 50 50/0.08m	29						75
SILTY SAND (SM) Greenish gray (5GY 5/1), wet, very dense, fine to medium sand, little subrounded gravel up to 10 mm in diameter, wood fragment in sampler, no odor.												
MA	22			0	60/0.10m	29				SM		75
Grades with increased silt with depth. Changed to mud rotary drilling at 29.7 meters.												

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/1/001 REV. 3

Northing/Easting: 565643.749 m / 1978939.905 m
 Surface Elevation: 104.75 m
 Logged By: WG

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 11-6-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-90

DESCRIPTION

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	Elev. (meters)
	23			0	150/0.10m	31				SP	Interbedded SAND (SP) and SILT (ML) Olive gray (5Y 4/2), very dark gray (7.5YR 3/1), and light greenish gray (10GY 7/1), very dense to hard, bedding up to 40 mm thick, fine sand, scattered high plasticity clay seams with organics.	74
	24				34 50/0.10m NR	32	0	0			BEDROCK - PUENTE FORMATION (Tp2) SILTSTONE Dark greenish gray (5GY 3/1), low to moderate strength, moderately to strongly cemented, numerous near white silt partings and seams that react strongly to HCL, thinly bedded, with sheared structure, bedding dipping at 5 to 15 degree, joint dipping at 80 degrees at 32.5 meters (3 to 10 mm).	73
	25				NR	32	0	0				
	26					32	0	0				
	27					33	100	0				
	28					33	80	0			Water infilled fractures from 32.6 to 32.8 meters.	72
	29					33	84	27			Grades with 3 to 20 mm thick low angle bedding at 33.1 meters, no HCL reaction, calcium carbonate infilled joint, scattered high plasticity layers, slickensided. Grades dark greenish gray (10GY 3/1) and gray (5GY 3/1), laminated, 10 to 20 degree dip, scattered claystone partings with slickensides at 33.3 meters.	71
PLI						34					Grades with greenish gray (10GY 3/1) layers, crossbedding noted at 33.6 meters.	71
	30					35	100	100				
	31					35	98	74			Interbedded SANDSTONE and SILTSTONE Dark greenish gray (10GY 4/1, 5/1, and 3/1), moderate to high strength, moderately to strongly cemented, fine to medium sand, scattered dark inclusions, massive. Grades with interbedded dark greenish gray (10GY 3/1) siltstone layers, moderately to strongly cemented, from 34.4 to 35.1 meters. Grades with cross bedding, coarser sand with depth at 34.9 meters. Grades with 1 mm bedding, medium to coarse sand, moderately cemented at 35.3 meters.	70
ITS						35					Grades with interbedded siltstone layers (1 to 25 mm thick bedding), 20 degree dip, moderately cemented, from 35.7 to 36.4 meters.	69

Northing/Easting: 565643.749 m / 1978939.905 m

Driller/Drill Rig: BC2/CME 75

Surface Elevation: 104.75 m

Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto

Logged By: WG

Date Completed: 11-6-00

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Boring Log B-90
Project No: 30182

Figure: A-40
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NEIS_SOIL_ROCK_LOG_NEISGPJ_CDM_BLLV.GDT_9/1/001_REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) <small>reading-background</small>	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
PLI, UCS	32						85	85					
						37						Boring terminated at 36.6 meters (bgs). Groundwater encountered at 10.7 meters (bgs) during drilling. Boring abandoned with bentonite grout and concrete surface seal.	68
													67
						38							66
						39							65
						40							64
						41						63	

Northing/Easting: 565643.749 m / 1978939.905 m
 Surface Elevation: 104.75 m
 Logged By: WG

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 11-6-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-91

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
												Asphaltic cement concrete pavement. Portland cement concrete pavement.	105
										FILL		Crushed rock base coarse.	
	1	20.1		1	3 4 2	1				SM		FILL (Af) SILTY SAND (SM) Brown (7.5YR 4/2), moist, very loose, fine sand, little mica.	104
MA	2	6.4	17.3	1.1	5 10 14	3						RECENT ALLUVIUM (Qal) SAND with silt (SP-SM) Brown (7.5YR 5/2), moist, medium dense, fine sand, little mica.	102
	3	8.5		1.3	7 11 14	4				SP-SM		Grades to pale brown (10YR 6/3), fine to medium sand, trace subrounded to subangular gravel up to 20mm in diameter.	101
						5						SILTY SAND (SM) Dark grayish brown, moist, loose, fine sand, trace organics (roots).	100

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Northing/Easting: 565891.001 m / 1978769.935 m
 Surface Elevation: 105.29 m
 Logged By: WG

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 2-5-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-91
 Project No: 30182

Figure: A-41
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Boring Log B-91

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION
MA	4	12.8	15.1	1	487	7			[Black Triangle]	SM		
	5	7.2		1.1	643	8			[Black Triangle]	SW-SM		SAND with silt (SW-SM) Light brown (7.5YR 6/4), moist, loose, fine to coarse sand, little fine to coarse subangular gravel up to 30mm in diameter.
MA	6	6.1		1.7	937	9			[Black Triangle]			SAND with silt and gravel (SW-SM) Light brown (7.5YR 6/4) with iron oxide staining, dense, fine to coarse sand.
MA	7	14.8			715	11			[Black Triangle]	SW-SM		Grades greenish gray (5GY 5/1), wet, dense, little fine to coarse subrounded to subangular gravel up to 30mm in diameter, trace mica, hydrogen sulfide-like odor.
<p>OLDER ALLUVIUM (Goal) SAND with gravel (SP) Greenish gray, wet, very dense, medium to coarse sand, fine to coarse subrounded to subangular gravel up to 30mm in</p>												

Northing/Easting: 565891.001 m / 1978769.935 m
 Surface Elevation: 105.29 m
 Logged By: WG

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 2-5-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-91
 Project No: 30182

Figure: A-41
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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV_3

Boring Log B-91

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA	8	12.2	19.4	1.4	14 50/0.05m					SP		diameter, trace silt, hydrogen sulfide-like odor.	93
	9	28.1		1.2	7 11 20	13				SM		SILTY SAND (SM) Dark greenish gray (10GY 4/1), wet, dense, fine sand, little mica, scattered clayey silt seams and organic partings, strong hydrogen sulfide like odor, no reaction to HCL.	92
MA, DS	10	6.4	20.4		7 27 46	14				SW-SM		SAND with silt (SW-SM) Greenish gray (10GY 5/1), wet, dense, medium to coarse sand, little fine to coarse gravel up to 30 mm in diameter, hydrogen sulfide like odor, no reaction to HCL.	91
	11	9.8			5 28 50	15				SW-SM		Grades to very dense at 16.8 meters.	90
						16							89
						17							88

NEIS SOIL ROCK LOG NEIS.GPJ CDM_BLLV.GDT 9/20/01 REV. 3

Northing/Easting: 565891.001 m / 1978769.935 m

Surface Elevation: 105.29 m

Logged By: WG

Driller/Drill Rig: Spectrum/CME 75

Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto

Date Completed: 2-5-01

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Boring Log B-91
Project No: 30182

Figure: A-41
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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV_3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIU (ppm) <small>reading-background</small>	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	12	13.0	18.7	1.2	14 24 41	19							87
-200	13	18.2		1.3	16 25 50/0.13m	20						BEDROCK - PUENTE FORMATION (Tp2) SANDSTONE Brown (7.5YR 4/3), moist, silty, low strength, no to low cementation, fine sand, trace mica, silt has weak reaction to HCL. Grades with siltstone interbeds at 20.0 meters.	86
	14				50/0.08m	21						Grades to dark gray (10YR 4/1).	85
	15	19.1			16 50/0.13m	22							84
						23						SILTSTONE Dark greenish gray (10Y 4/1), moist, low to moderate strength, moderate cementation, fine sand, scattered fine sandstone interbeds.	83
													82

Northing/Easting: 565891.001 m / 1978769.935 m
 Surface Elevation: 105.29 m
 Logged By: WG

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 2-5-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-91
 Project No: 30182

Figure: A-41
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Boring Log B-91

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	16					82	81				[Symbol]	<p>SANDSTONE Dark greenish gray (10Y 3/1), moderate strength and cementation, massive, fine to medium sand, scattered very dark gray (10YR 3/1) siltstone interbeds up to 30 mm, bedding dipping at 40 degrees, 1 to 3 mm thick laminations.</p>	81
	17					140	50				[Symbol]	<p>Grades slightly to moderately porous with voids up to 2 mm in diameter at 25.6 meters, 5 mm thick sand bed dipping 15 degrees at 25.7 meters.</p>	80
	18					26	100	94			[Symbol]	<p>SILTSTONE Grayish brown (10YR 5/2), moderate strength, moderately to strongly cemented, scattered sandstone interbeds dipping at 20 degrees, scattered voids up to 2 mm in diameter, slight reaction to HCL.</p>	79
UCS						27					[Symbol]	<p>SANDSTONE Greenish gray (10Y 5/1), low strength, weakly to moderately cemented, fine to medium sand, massive. Interbedded SILTSTONE and SANDSTONE Moderate to high strength, moderately to strongly cemented, 1 to 30 mm thick bedding, fine sand, some flow of sand noted, dipping about 20 degrees, slight to moderate reaction to HCL in both siltstone and sandstone.</p>	78
	19					92	57				[Symbol]	<p>SANDSTONE Light greenish gray (5G 7/1), moderate to high strength, moderately cemented, strong reaction to HCL.</p> <p>SILTSTONE Grayish brown (10YR 5/2), high strength, moderate cementation, laminated, dipping 10 to 15 degrees. Interbedded SILTSTONE and SANDSTONE Brown (10YR 4/3) to light brownish gray (10YR 6/2), high strength, moderately to strongly cemented, fine sand, some flowing of sand, up to 20 mm thick bedding at 20 degrees, ripple laminations and crossbedding at 27.6 meters, fissile at 28.5 meters, slight reaction to HCL in siltstone.</p>	77
UCS, PLI						28					[Symbol]		77
	20					29	100	63			[Symbol]	<p>SANDSTONE Greenish gray (5G 6/1), low to moderate strength, weakly to moderately cemented, fine sand, massive bedding, scattered reddish brown siltstone rip-up/clasts, numerous interbeds from 29.1 to 29.3 meters, 2-4 mm fracture lined with high plasticity clay gouge at 29.1 meters.</p>	76
											[Symbol]	<p>SILTSTONE Greenish gray (5G 6/1), well laminated, 15-25 degree dip, vertical joints, sheared parallel and subparallel to bedding, no</p>	

NEIS_SOIL_ROCK_LOG_NEIS_GPI_CDM_BLLV_GDT_9/10/01_REV_3

Northing/Easting: 565891.001 m / 1978769.935 m
 Surface Elevation: 105.29 m
 Logged By: WG

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 2-5-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-91

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
UCS, PA	21					100	74					shearing along vertical joint, scattered sandstone interbeds, well developed slickensides parallel to bedding, siltstone had slight reaction to HCL. SANDSTONE Greenish gray (5GY 6/1), moderate to high strength, strongly cemented, massive, no reaction to HCL.	75
Chem						31						SILTSTONE Brown (10YR 5/3), thinly laminated, 10 to 20 degree dip, sandstone interbeds at 31.1 meters.	
PLI	22					32	100	96				SANDSTONE Dark olive gray (5Y 3/2), fine sand, massive, low to moderate strength, moderate cementation, scattered bedding dipping at 70 degrees, no reaction to HCL, siltstone interbeds from 31.1 to 31.4 meters.	74
UCS	23					33						SANDSTONE Greenish gray (10GY 5/1), low to moderate strength, weak to moderate cementation, fine sand, bedding at 70 degrees, scattered silt/sand pockets, weak reaction to HCL at 33.2 meters.	73
						34	86	80				SANDSTONE Greenish gray (10GY 5/1), moderate strength, moderate to strong cementation, massive, scattered light gray infilled joint 1 to 2 mm thick, massive.	72
												Strong reaction to HCL from 34.6 to 34.7 meters.	71
UCS, PA	24					35	84	75				Grades to fine to coarse sand at 35.0 meters, moderate reaction to HCL at 35.0 to 35.3 meters, High strength, strong cementation 35.1 - 35.4 meters. Grades low to moderate strength.	70
												Grades to fine sand at 35.9 meters, scattered bedding	

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01 REV.3

Northing/Easting: 565891.001 m / 1978769.935 m
 Surface Elevation: 105.29 m
 Logged By: WG

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 2-5-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-91
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Boring Log B-91

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIV (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
												dipping at 30 degrees.	69
						37						Boring terminated at 36.6 meters (bgs). Groundwater encountered at 10.4 meters (bgs) during drilling. Boring abandoned with bentonite grout and concrete surface seal.	68
						38							67
						39							66
						40							65
						41							64

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT 9/10/01 REV.3

Northing/Easting: 565891.001 m / 1978769.935 m
 Surface Elevation: 105.29 m
 Logged By: WG

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 2-5-01

City of Los Angeles, Bureau of Engineering
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 Los Angeles, California

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 Project No: 30182

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Boring Log B-92

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
												Asphaltic cement concrete pavement.	
												Portland cement concrete pavement.	106
	1			0	1 1 2	1				SM		FILL (Af) SILTY SAND (SM) Olive brown (2.5Y 4/3), moist, loose, fine sand, little mica, trace subrounded fine gravel.	
													105
													104
MA	2	7.4	18.9	0	5 9 19	3						RECENT ALLUVIUM (Qal) SILTY SAND with gravel (SM) Brown (10YR 5/3) to yellowish brown (10YR 5/4), moist, medium dense, medium to coarse sand, trace fine sand, little mica, fine gravel.	
													103
													102
MA	3			0	19 35 40	4				SM		Grades to pale brown (10YR 6/3) and very dense at 4.4 meters, fine to coarse sand, subangular granitic gravel.	
													101
												SAND with silt (SW-SM) Olive gray (5Y 6/2), moist, very dense, fine to coarse sand.	
					12	5							

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01 REV. 3

Northing/Easting: 566182.37 m / 1978567.574 m
 Surface Elevation: 106.34 m
 Logged By: DPD

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 8-16-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-92
 Project No: 30182

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Boring Log B-92

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA, DS	4	3.0	17.3	0	34 50					SW-SM			100
	5			0	12 14 16	7						SAND (SP) Brown (10YR 5/3), moist to wet, dense, medium to coarse sand, trace fine sand, trace silt and mica, scattered silty sand layers up to 1 to 2 cm thick.	99
	6	8.4	20.6	0	23 33 40	9						Becomes wet at 8.5 meters.	98
	7				6 23 33	11						Grades dark greenish gray (5G 4/1), with subangular fine gravel at 9.0 meters.	97
												OLDER ALLUVIUM (Qoal) GRAVEL with silt and sand (GP-GM) Dark greenish gray (10YR 5/3), wet, very dense, fine to coarse sand and gravel, subangular gravel.	96
													95

Northing/Easting: 566182.37 m / 1978567.574 m
 Surface Elevation: 106.34 m
 Logged By: DPD

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 8-16-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-92
 Project No: 30182

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NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV.GDT_9/10/01 REV. 3

Boring Log B-92

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA	8	7.5	21.6		24 75 86/0.08m							Grades with silt pockets up to 2 cm in diameter, weakly cemented at 12.1 meters.	94
	9			0	16 31 32	13							93
						14							92
-200	10	11.9	19.0	0	4 30 68	15						BEDROCK - PUENTE FORMATION (Tp2) SILTSTONE Gray (5Y 5/1), moist, sandy, low strength, weakly to noncemented, fine sand, scattered dark brown (10YR 3/3) thin clay interbeds.	91
						16							90
	11			0	75/0.10m	17						Grades without clay interbeds, low cementation, low strength, massive at 16.6 meters.	89

NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV_GDT_9/10/01_REV.3

Northing/Easting: 566182.37 m / 1978567.574 m Driller/Drill Rig: BC2/CME 75
 Surface Elevation: 106.34 m Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Logged By: DPD Date Completed: 8-16-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA, DS	12	12.1	19.2		53 100/0.02m	18.2			█			Grades with thick sandstone interbeds and slight hydrocarbon odor at 18.2 meters.	88
						19						SILTSTONE Dark gray (5Y 4/1), moist, sandy, low strength, numerous dark grayish brown (10YR 4/2) thin clay interbeds, fine sand.	87
MA, Hyd	13			0	31 66 50/0.02m	20			█				86
						21						SILTSTONE Dark olive gray (5Y 3/2), sandy, low strength, weakly cemented, moist, fine sand.	
	14	11.5	19.3	0	60 100/0.08m	21.5			█				85
						22							84
	15			0	50/0.10m	22.7			█			Grades with scattered to frequent high plasticity clay layers at 22.7 meters.	83

Northing/Easting: 566182.37 m / 1978567.574 m Driller/Drill Rig: BC2/CME 75
 Surface Elevation: 106.34 m Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Logged By: DPD Date Completed: 8-16-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-92

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RCD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA, Hyd	16	16.5	17.6		85 100/0.05m							SILTSTONE Black (5Y 2.5/1), moist, low to moderate strength, moderate cementation, fine sand, numerous laminated light gray (5Y 6/1) silty sandstone interbeds.	82
MA, Hyd	17	16.8	16.9			25							81
	18					33	21					Grades very dark gray (5Y 3/1) with gray (5Y 5/1) laminations at 25.6 meters.	
PLI						26	90	81				Grades interbedded with very dark gray (5Y 3/1) and dark gray (5Y 2/1) fine micaceous sandstone layers, moderate cementation at 26.0 meters.	80
						27						0.2 meter thick gray (5Y 5/1) silty sandstone layer at 26.8 meters.	
	19					27	96	86					79
						28						SANDSTONE Gray (5Y 5/1) to dark gray (5Y 4/1), moist, silty, low strength, weak cementation, fine to medium sand, scattered very dark gray (5Y 3/1) siltstone thin interbeds. Grades with a 3 mm thick cemented claystone bed dipping 30 degrees at 27.6 meters. Grades with siltstone interbeds up to 10 mm thick, bedding dip at 5 degrees, HCL reaction, single vertical joint confined to strongly cemented zone at 27.7 meters. Sandy siltstone interbeds dipping at 10 to 20 degrees at 28.1 meters.	78
PLI	20					29	100	80				Grades to highly jointed siltstone from 29.6 to 29.9 meters, very dark grayish brown (10YR 3/2), joint surfaces are	77

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV. 3

Northing/Easting: 566182.37 m / 1978567.574 m
 Surface Elevation: 106.34 m
 Logged By: DPD

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 8-16-00

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Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	21					88		44				<p>slickensided.</p> <p>SILTSTONE Gray (5Y 5/1) to dark gray (5Y 4/1), moist, moderate strength, moderately to strongly cemented, scattered very dark gray thin clayey interbeds.</p>	76
D, UCS, CAI	22					31	100					<p>SANDSTONE Light gray (10YR 7/1) to gray (10YR 6/1), moist, low to moderate strength, weak to moderate cementation, fine to medium sand, scattered very dark grayish brown (10YR 3/2) thin claystone interbeds with weak to moderate cementation, ripple laminae at 31.8 meters, moderate reaction to HCL at 31.4 meters.</p>	75
PLI, CAI	23					32	92	74				<p>Grades grayish brown (10YR 5/2) to light gray (10YR 7/1), with a curvilinear joint less than 0.1 mm thick at 32.2 meters, parallel to bedding.</p>	74
PLI						33						<p>Grades with a 10 cm near vertical joint at 33.3 meters.</p>	73
CAI, PA	24					34	96	77				<p>Grades low strength with interbedded siltstone, scattered dark grayish brown (10YR 4/2) thin claystone interbeds, parts readily along interbeds at 33.5 meters.</p>	72
CAI						35						<p>Clay seams more numerous with depth at 34.7 meters.</p>	71
PLI, CAI	25					35	100	50				<p>SILTSTONE Light brownish gray (10YR 6/2) to light gray (10YR 6/1), moist, clayey, low to moderate strength, weak to moderate cementation, trace fine sand.</p> <p>Grades with scattered dark grayish brown (10YR 4/2) clay thin interbeds at 35.5 meters.</p>	71

NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV_GDT_9/10/01_REV.3

Northing/Easting: 566182.37 m / 1978567.574 m
 Surface Elevation: 106.34 m
 Logged By: DPD

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 8-16-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-92 Figure: A-42
 Project No: 30182 6 of 8

Boring Log B-92

DESCRIPTION

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	Elev. (meters)
PLI D, UCS PLI	26					100	45					70
PLI CAI						37						69
MA AL, Hyd	27					38	100	50				68
						39						67
	28					40	100	85				66
						41						65
	29						90	32				

Grades moderate to high strength, moderate to strong cementation from 36.6 to 37.2 meters.

Clay thin interbeds grade more numerous with depth, at 5 to 8 cm intervals.

CLAYSTONE
Very dark grayish brown (10YR 3/2), moist, silty, low to moderate strength, weak cementation with intermittent strong cementation, sheared.

SILTSTONE
Light brownish gray (10YR 6/2) to light gray (10YR 6/1), moist, clayey, moderate strength, moderate to high cementation, trace fine sand.

Grades with an irregular curvilinear joint dipping 80 degrees, white precipitate along joint surface, no reaction to HCL. Grades laminated, with scattered dark grayish brown (10YR 4/2) clay thin interbeds, low strength at 39.8 meters.

Grades with alternating dark greenish gray (5GY 4/1) and light gray (10YR 6/1) layers at 41.3 meters.

Northing/Easting: 566182.37 m / 1978567.574 m
Surface Elevation: 106.34 m
Logged By: DPD

Driller/Drill Rig: BC2/CME 75
Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
Date Completed: 8-16-00

City of Los Angeles, Bureau of Engineering
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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIV (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
						43						Grades with alternating black (10YR 2.5/1) silt thin interbeds, hydrocarbon like odor at 42.1 meters.	64
						44						Boring terminated at 42.5 meters (bgs). Groundwater encountered at 8.5 meters (bgs) during drilling. Boring abandoned with bentonite grout and concrete surface seal.	63
						45							62
						46							61
						47							60
													59

Northing/Easting: 566182.37 m / 1978567.574 m
 Surface Elevation: 106.34 m
 Logged By: DPD

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 8-16-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-93

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIV (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
												Asphaltic cement concrete pavement.	
												Portland cement concrete pavement.	
	1	6.4		0	4 5 4	1				SM		FILL (Af) SILTY SAND (SM) Brown (10YR 4/3), moist, loose, fine sand, little mica.	108
						2				ML		SANDY SILT (ML) Very pale brown (10YR 7/4), moist, stiff, fine sand, little mica.	107
	2	4.6	14.8	1000+	4 5 12	3				SM		RECENT ALLUVIUM (Qal) SILTY SAND (SM) Very pale brown (10YR 7/4), moist, medium dense, fine sand, trace mica, solvent like odor.	106
						4							
	3	4.2		270	5 7 12	5				SP-SM		SAND with silt (SP-SM) Yellowish brown (10YR 5/4), moist, medium dense, fine sand, trace mica.	104
												SAND (SP)	103

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV. 3

Northing/Easting: 566387.34 m / 1978424.069 m Driller/Drill Rig: BC2/CME 75
 Surface Elevation: 108.45 m Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Logged By: DPD/KMR Date Completed: 2-2-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-93

DESCRIPTION

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA, DS	4	2.6	16.6	225	7 12 13							Yellowish brown (10YR 5/4), moist, medium dense, fine to medium sand, trace silt and mica.	102
	5	5.7		1000+	12 13 19	7				SP		Grades to fine sand at about 7.2 meters.	101
	6	7.0	16.6	1000+	15 22 37	8						SAND with silt (SP-SM) Dark gray (5Y 4/1), moist, dense, fine sand, trace mica, numerous 1 to 3 mm diameter organic pockets.	100
	7	21.9		1000+	7 7 16	9				SP-SM		OLDER ALLUVIUM (Qoal) SILT (MH) Very dark gray (5Y 3/1), moist, medium stiff, high plasticity.	99
						10				MH			98
						11				SW		SAND (SW) Gray, wet, loose, fine to coarse sand. SAND with gravel (SW) Brown (10YR 5/3), wet, dense, fine to coarse subrounded gravel, trace to little silt, petroleum-like hydrocarbons visible in matrix.	97

Northing/Easting: 566387.34 m / 1978424.069 m

Surface Elevation: 108.45 m

Logged By: DPD/KMR

Driller/Drill Rig: BC2/CME 75

Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto

Date Completed: 2-2-01

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

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Project No: 30182

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Boring Log B-93

DESCRIPTION

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	Elev. (meters)
Chem	8	12.0	18.9	1000+	27 36	13				SW		96
	9	9.8		1000+	50 61	14						95
	10	12.2	20.1	1000+	100/0.13m	15				SM		94
	11	20.2		1000+	33 36 41	17						92
												91

SILTY SAND with gravel (SM)
Brown (10YR 5/3), moist, very dense, fine to medium sand, fine to coarse subrounded gravel, trace coarse sand.

BEDROCK - PUENTE FORMATION (Tp2)
SILTSTONE
Yellowish brown (10YR 5/6) and dark brown (10YR 3/3) interbeds, moist, low to moderate strength, weakly to moderately cemented, low to high angle bedding, weathered to highly weathered.

SILTSTONE
Dark brown (10YR 3/3) with numerous light gray (5Y 7/2) siltstone seams, moderate strength and cementation, nonweathered, high angle bedding dip at about 40 degrees,

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV. 3

Northing/Easting: 566387.34 m / 1978424.069 m
 Surface Elevation: 108.45 m
 Logged By: DPD/KMR

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 2-2-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-93
 Project No: 30182

Figure: A-43
 3 of 7

Boring Log B-93

DESCRIPTION

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	Elev. (meters)
	12	14.9	17.8	1000+	53 83	19						90
	13	22.4		1000+	21 27 31	20						89
Chem	14	16.6	17.5	70	52 64	21						88
	15					22	100	0				87
	16					23	91	52				86
												85

numerous noncemented silty fine sand interbeds with organics.

SILTSTONE
 Grayish brown (10YR 5/2) with numerous very dark grayish brown (10YR 3/2) seams, thick laminae, moderate strength and cementation, nonweathered, laminae dip at 40 degrees, moderate plasticity.
 Grades with scattered 1-4mm fine grained, moderately cemented sandstone interbeds with slight reaction to HCL; readily breaks along bedding planes.

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV.3

Northing/Easting: 566387.34 m / 1978424.069 m
 Surface Elevation: 108.45 m
 Logged By: DPD/KMR

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 2-2-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-93

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	17					75	65					Grades massive.	84
						25						SANDSTONE Brown (7.5YR 4/2), moderate strength and cementation, silty, fine to medium sand, moderate reaction with HCL, slightly porous with voids up to 1mm; black claystone seams at 24.7, 24.8, and 25.0 meters.	
	18					92	45					SILTSTONE Grayish brown (10YR 5/2) interbedded with very dark brown (10YR 2/2), moderate strength and cementation, 6-76 mm interbeds dipping at 40 degrees, nonweathered, 1-2 mm fracture with 45 degree dip and clay gouge lining at 25.1 meters.	83
PLI	19					26	66	53				SILTSTONE Very dark grayish brown (10YR 3/2), wet, low strength, weakly cemented, sheared, massive; 60 mm layer of dark gray (10YR 4/1) siltstone at 25.3 meters; moderately fractured with numerous slickensides in various orientations from 25.2 to 25.6.	82
PLI						27						Grades very dark gray (7.5YR 3/1) at 25.6 meters with 1 to 5 mm siltstone seams, interbedded with dark gray (7.5Y 4/1) 10 to 50 mm thick layers, 35 to 40 degree bedding dip, moderate cementation, nonweathered. Very dark gray (7.5YR 4/1), 25 mm thick claystone layer at 25.8 meters, no reaction to HCL, low strength, weakly cemented. Grades laminated very dark gray (7.5YR 4/1), dark gray (7.5YR 3/1), brown (7.5 YR 4/2), fractured and sheared from 26.4 to 26.5 meters, no reaction to HCL, slickensides dip 30-45 degrees, curvilinear fracture from 26.8 to 27.0, 80-90 degree dip.	
	20					53	43					At 26.7 meters, grades moderate strength and cementation.	81
						28						SANDSTONE Dark gray (5Y 4/1), massive, fine sand with silt, moderate cementation, no reaction to HCL.	
						29						SILTSTONE Laminated very dark gray (7.5YR 4/1), dark gray (7.5YR 3/1), and brown (7.5YR 4/2), moderate cementation and strength, bedding dip at 40 to 45 degrees, nonweathered, fractured contact between sandstone and siltstone at 28 meters.	80
ITS	21					50	33					Dark gray (2.5Y 4/1) 0.12 meter thick siltstone layer, massive, at 29.1 meters, thinly bedded to laminated.	
												SANDSTONE Dark gray (2.5Y 4/1), massive, moderate strength and cementation, fine sand, no reaction to HCL, 4 to 5 mm dark greenish gray (10Y 3/1) interbeds dipping at 10-20 degrees.	79

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01 REV 3

Northing/Easting: 566387.34 m / 1978424.069 m
 Surface Elevation: 108.45 m
 Logged By: DPD/KMR

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 2-2-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-93

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
PLI	22					31	46	23				Laminated very dark gray (7.5YR 4/1), dark gray (7.5YR 3/1), brown (7.5YR 4/2), low to moderate strength, moderate cementation, bedding dip at 35 to 40 degrees, sheared along bedding with slickensides at 29.9 meters, weak reaction to HCL.	78
						32						5 mm sheared clay interbed dipping at 30 degrees, at 31.2 to 31.3 meters, moderate plasticity, sheared along bedding with polished surfaces, white precipitate that react strongly with HCL.	77
	23					32	63	45				Grades dark gray (7.5YR 3/1), interbedded bedding 35 to 40 degrees.	
	24					33	100	82				SANDSTONE Brown (7.5YR 4/3), massive, moderate strength and cementation, trace mica. 7 mm thick claystone layer at 32.5 meters.	76
						33						SILTSTONE Dark gray (7.5YR 3/1), low to moderate strength, moderate cementation, grades with very dark gray (7.5YR 4/1) siltstone interbeds.	
	25					34	90	82				SANDSTONE Black (7.5YR 2.5/1) laminated with brown (7.5YR 4/3) sandstone with organics, bedding dips 20 degrees.	75
						34						SILTSTONE Interbedded dark gray (7.5YR 3/1) and very dark gray (7.5YR 4/1), moderate strength and cementation, bedding at 25 to 30 degrees.	
						34						Strong hydrogen sulfide odor, bedding parallel to fractured seam at 33.9 meters, organics.	
						35						SANDSTONE Dark gray (5Y 4/1), low strength, weakly cemented, massive, trace mica, fine sand.	74
	26					35	94	91				Grades with thin to laminated bedding, strong hydrogen sulfide odor, massive, scattered porous zones at 34.7 meters.	73
												SILTSTONE Dark gray (7.5YR 3/1), moderate strength and cementation, thinly bedded.	

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01 REV.3

Northing/Easting: 566387.34 m / 1978424.069 m
 Surface Elevation: 108.45 m
 Logged By: DPD/KMR

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 2-2-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-93
 Project No: 30182

Figure: A-43
 6 of 7

Boring Log B-93

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) <small>=reading-background</small>	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	ROD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
						37					/	<p>SANDSTONE Dark gray (5Y 4/1) interbedded with brown (7.5YR 4/3), low strength, weakly cemented, massive to thinly bedded dipping at 30-40 degrees, scattered organics along bedding planes; fault with 30.5 mm apparent offset at 36.2 meters, 3-5 mm clay lining along fracture.</p>	-72
						38						<p>Boring terminated at 36.7 meters (bgs). Groundwater encountered at 10.8 meters (bgs) during drilling. Boring abandoned with bentonite grout and concrete surface seal.</p>	-71
						39							-70
						40							-69
						41							-68
													-67

Northing/Easting: 566387.34 m / 1978424.069 m
 Surface Elevation: 108.45 m
 Logged By: DPD/KMR

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 2-2-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-93 Figure: A-43
 Project No: 30182 7 of 7

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Boring Log B-94

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
												Asphaltic cement concrete pavement.	
												Portland cement concrete pavement.	
	1	5.3		0	3 3 3	1				SM		FILL (Af) SILTY SAND (SM) Light brown (7.5YR 3/2) moist, loose, fine sand.	109
						2						Grades brown (10YR 4/3) at 1.5 meters.	108
	2	9.0	14.6	3.2	7 9 10	3				SM		RECENT ALLUVIUM (Qal) SILTY SAND (SM) Pale brown (10YR 6/3), moist, loose to medium dense, fine sand.	107
	3	34.9		0	2 2 3	5				ML		CLAYEY SILT (ML) Olive brown (2.5YR 4/3), wet, medium stiff, low plasticity, trace mica, trace organics with oxidized seams.	105

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01 REV.3

Northing/Easting: 566525.812 m / 1978328.156 m
 Surface Elevation: 109.81 m
 Logged By: KMR/AJS

Driller/Drill Rig: Spectrum/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 1-30-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-94

DESCRIPTION

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA	4	6.4	15.4	3.4	11 14 20	7				SP-SM		SAND with silt (SP-SM) Brown (10YR 3/3), moist, dense, fine sand, trace mica.	103
	5	4.9		2.6	10 15 16	8						Grades light brownish gray (2.5Y 6/2) at 7.6 meters.	102
						9				SM		SILTY SAND (SM) Brown (10YR 4/3), moist, dense, fine sand, trace mica.	101
MA	6	6.8	15.7	0.7	12 12 20	10						OLDER ALLUVIUM (Qoal) Interbedded SILTY CLAY (CL-ML) and SAND (SP) Dark greenish gray (10Y 3/1) silt and dark gray (10YR 4/1) sand, moist, stiff to medium dense, medium to coarse sand with mica, moderate plasticity clay, 5 to 10 cm interbeds.	100
AL	7	19.0		2.6	3 6 12	11							99
													98

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Northing/Easting: 566525.812 m / 1978328.156 m
 Surface Elevation: 109.81 m
 Logged By: KMR/AJS

Driller/Drill Rig: Spectrum/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 1-30-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-94

DESCRIPTION

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	8	16.7	18.1	0	6 23 40	12.2			CL-ML		Grades with hydrocarbon-like odor. Sand grades with gravel at 12.2 meters.	97	
MA	9	10.9		4.5	18 28 35	14						96	
MA, DS	10	9.2	18.0	21.4	57 75	15			SP		SAND (SP) Greenish gray (10Y 5/1), wet, very dense, trace fine subrounded to subangular gravel.	95	
						16					SAND (SW) Gray (10YR 5/1), wet, very dense.	94	
	11	10.3		64	28 51	17			SW		Grades greenish gray (10Y 5/1) with trace fine subrounded to subangular gravel.	93	
											SILTY SAND (SM) Dark greenish gray (10Y 4/2), wet, very dense, trace fine subrounded to subangular gravel.	92	

NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV_GDT_9/10/01_REV.3

Northing/Easting: 566525.812 m / 1978328.156 m
 Surface Elevation: 109.81 m
 Logged By: KMR/AJS

Driller/Drill Rig: Spectrum/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 1-30-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-94

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PII (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA	12	10.4	20.4	376	10 71								91
	13A	8.3			25 100/0.13m								90
	13B	14.8				20						BEDROCK - PUENTE FORMATION (Tp2) Interbedded SILTSTONE, CLAYSTONE, and SANDSTONE Greenish black (10Y 2.5/1), dry to moist, low strength, weakly cemented, low angle bedding (20-25 degrees), trace organics, trace mica, 30 degree bedrock contact, highly weathered at 19.9 meters grading to slightly weathered at 21.3 meters.	89
	14	14.3	14.5		25 81 32								88
	15	19.7			30 73	23						Siltstone grades gray (N 5), claystone grades very dark gray (10YR 3/1), sandstone grades olive brown (2.5Y 4/3).	87
													86

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Northing/Easting: 566525.812 m / 1978328.156 m
 Surface Elevation: 109.81 m
 Logged By: KMR/AJS

Driller/Drill Rig: Spectrum/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 1-30-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-94

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	16					100	100					<p>SILTSTONE Dark greenish gray (10Y 4/1), low strength, weakly cemented, laminated bedding at 25 degrees.</p> <p>Interbedded SILTSTONE and SANDSTONE Dark greenish gray (10Y 4/1) siltstone to greenish gray sandstone, 1 to 30 mm interbeds, low strength, weakly cemented, fine sand, HCL reaction in siltstone, no HCL reaction in sandstone.</p>	85
	17					26	100	100				<p>SANDSTONE Greenish gray (10GY 6/1), low to moderate strength, weakly to moderately cemented, fine sand, massive.</p> <p>SILTSTONE Dark greenish gray (10Y 4/1), moderate cementation and strength, scattered 1 to 3 mm laminations of sandstone, about 25 degree bedding.</p> <p>SANDSTONE Greenish gray (10GY 6/1), low to moderate strength, weakly to moderately cemented, fine sand, massive, scattered 1 to 4 mm thick siltstone laminations, siltstone reacts to HCL, no reaction to HCL in sandstone.</p>	84
	18					0	0					<p>SILTSTONE Brown (7.5YR 4/2), low strength, weakly cemented, fractured, scattered friable layers, scattered sandstone interbeds, greenish gray (10GY 5/1), fine sand, 5 to 20 mm thick layers at 10 to 20 degree dip, weak HCL reaction in siltstone.</p>	82
-200 PLI PA	19					28	109	74				<p>Grades to high strength, strongly cemented at 28.5 meters.</p>	81
PLI	20					29	100	82				<p>Grades to interbedded SILTSTONE and SANDSTONE (as described above), 1 to 120 mm thick interbeds, 30 mm vertical joint at 29.3 meters, no displacement noted.</p> <p>SANDSTONE Greenish gray (10GY 5/1), moderate to high strength, moderately to strongly cemented, massive, fine sand, no HCL reaction. Grades to low strength, and weak to moderate cementation</p>	80

Northing/Easting: 566525.812 m / 1978328.156 m
 Surface Elevation: 109.81 m
 Logged By: KMR/AJS

Driller/Drill Rig: Spectrum/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 1-30-01

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Boring Log B-94 **Figure: A-44**
Project No: 30182 **5 of 7**

NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV_GDT_9/10/01_REV.3

Boring Log B-94

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
UCS ITS	21					31	100	80				at 29.7 meters. Interbedded SILTSTONE and SANDSTONE Brown (7.5YR 4/2) siltstone and greenish gray (10GY 5/1) sandstone, low to high strength, weakly to moderately cemented, fine sand, 1 to 4 mm thick laminations, 10 to 15 degree dip, weak HCL reaction in siltstone.	79
Chem												SANDSTONE Greenish gray (10GY 5/1), low strength, weakly cemented, fine sand, high loss of drilling fluid. Interbedded SILTSTONE and SANDSTONE Brown (7.5YR 4/2) siltstone and greenish gray (10GY 5/1) sandstone, low to moderate strength, weakly to moderately cemented, fine sand, massive bedding, scattered fissile and friable layers, scattered black flecks, weak HCL reaction in siltstone, no reaction to HCL in sandstone.	78
UCS	22					32	90	71				SANDSTONE Greenish gray (10GY 5/1), moderate strength and cementation, scattered 1 to 2 mm layers of siltstone, about 30 degree bedding.	77
PLI						33						SILTSTONE Brown (7.5YR 4/2), moderate strength and cementation, scattered 2 to 5 mm thick sandstone layers, cross bedding noted, weak reaction to HCL.	
	23					34	96	86				Interbedded SILTSTONE and SANDSTONE Brown (7.5YR 4/2) siltstone and greenish gray (10GY 5/1) sandstone, low strength, weakly cemented, fine sand, 1 to 10 mm bedding, weak HCL reaction in siltstone, 10 to 20 degree bedding. SANDSTONE Greenish gray (10GY 5/1), low strength, weakly cemented, massive, fine sand.	76
PLI													75
	24					35	0	0					74

NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV_GDT_9/10/01_REV_3

Northing/Easting: 566525.812 m / 1978328.156 m
 Surface Elevation: 109.81 m
 Logged By: KMR/AJS

Driller/Drill Rig: Spectrum/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 1-30-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-94
 Project No: 30182

Figure: A-44
 6 of 7

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	Boring Log B-94 DESCRIPTION	Elev. (meters)	
						37						Boring terminated at 36.6 meters (bgs). Groundwater encountered at 12.3 meters (bgs) during drilling. Five hundred gallons of drill fluids lost during coring operations. Boring abandoned with bentonite grout and concrete surface seal.	73	
													72	
						38								71
						39								70
						40								69
						41							68	

Northing/Easting: 566525.812 m / 1978328.156 m
 Surface Elevation: 109.81 m
 Logged By: KMR/AJS

Driller/Drill Rig: Spectrum/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 1-30-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-95

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) -reading background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
												Asphalt cement concrete pavement	
												FILL (Af) SILT (MH) Dark olive gray (5Y 3/2), moist, stiff, some fine sand.	113
	AL 1				4 5 13	1					MH		
												SILTY CLAY (CL) Black (5Y 2.5/1), moist, very stiff, trace fine sand and mica, trace fine gravel, numerous organic pockets up to 5 mm in diameter.	112
						2					CL		
	MA, AL 2	17.1	16.2		9 15 24	3						SANDY SILTY CLAY with gravel (CL) Brown (10YR 4/3), moist, hard, coarse gravel.	111
						4					CL		
	AL 3				11 12 14	5						Grades with numerous very pale brown stringers and tabular inclusions at 4.2 meters, scattered shell fragments. Grades to no gravel.	109
					17							RECENT ALLUVIUM (Qal) SILTY SAND (SM) Brown (10YR 4/3), moist, medium dense, fine to coarse sand, trace fine gravel, scattered hard fractured siltstone and claystone fragments, numerous white inclusions (reactive to	108

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Northing/Easting: 566738.211 m / 1978171.258 m
 Surface Elevation: 113.49 m
 Logged By: DPD

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 10-24-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Boring Log B-95										Elev. (meters)		
Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample		USCS	DESCRIPTION
MA	4	20.9	15.9		20 25						HCL); colluvium deposit.	107
	5				13 21 28	7				SM	SILTY SAND (SM) Yellowish brown (10YR 5/4), moist, dense, fine sand, trace mica.	106
MA	6	8.4	14.8		15 29 37	9				SM		105
MA	7				14 26 30	11				SW-SM	SAND with silt (SW-SM) Brown (10YR 4/3), moist, very dense, fine to medium sand, trace coarse sand, scattered layers of clayey fine to coarse sand.	103
										CL	SANDY CLAY (CL) Dark greenish gray (10BG 3/1), moist, very stiff to hard, trace fine sand and mica.	102

Northing/Easting: 566738.211 m / 1978171.258 m
 Surface Elevation: 113.49 m
 Logged By: DPD

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 10-24-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Boring Log B-95													
Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIV (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	8	26.1			12 28 50	12.5				SM		SILTY SAND (SM) Brown (10YR 4/3), moist to wet, dense, fine sand, trace mica, scattered layers of sand with fine gravel.	101
						13				SW		SAND with gravel (SW) Brown (10YR 4/3), wet, medium dense, fine to coarse sand, fine to coarse subrounded gravel.	100
AL	9				12 15 9	14				CL		OLDER ALLUVIUM (Qoal) CLAY (CL) Grayish brown (2.5Y 5/3), wet, very stiff, trace mica, numerous seams and layers of fine sand.	99
						15				SP-SM		SAND with silt and gravel (SP-SM) Light yellowish brown (2.5Y 6/4), wet, very dense, fine to coarse sand, fine subrounded gravel.	98
MA	10	11.9	19.0		100	16						SAND with silt (SP-SM) Olive brown (2.5Y 4/3), moist to wet, very dense, fine to medium sand, trace mica and silt, numerous sand with silt seams.	97
MA	11			2	12 41 51	17							96

Northing/Easting: 566738.211 m / 1978171.258 m
 Surface Elevation: 113.49 m
 Logged By: DPD

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 10-24-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

NEIS_SOIL_ROCK_LOG_NEISGPJ_CDM_BLLV_GDT_9/10/01_REV.3

Boring Log B-95										Elev. (meters)			
Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample		USCS	DESCRIPTION	
	12				7 16 28 38					SP-SM			95
AL	13			12	5 7 9	19 20						Grades to light yellowish brown (2.5Y 6/4) sand (SW) layers, medium dense, from 19.8 to 20 meters.	94
										CL	CLAY (CL) Light yellowish brown (2.5Y 6/4), moist to wet, very stiff, trace fine to coarse sand and silt.		93
MA	14	14.7	17.3	1	16 33 35	21					BEDROCK - PUENTE FORMATION (Tp2) SANDSTONE Yellowish brown (10YR 5/6), moist, silty, low strength, noncemented, fine to coarse sand, weathered, high plasticity clay gouge bed at 21.5 meters.		92
	15			1	26 50 50	22 23						Grades dark greenish gray (10G 3/1), fine sand, with numerous very pale brown (10YR 7/4) near horizontal siltstone interbeds, interbeds react strongly to HCL at 22.7 meters.	91 90

Northing/Easting: 566738.211 m / 1978171.258 m
 Surface Elevation: 113.49 m
 Logged By: DPD

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 10-24-00

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-95
 Project No: 30182

Figure: A-45
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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV_3

Boring Log B-95										Elev. (meters)		
Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample		USCS	Symbol
	16	14.9	17.9	2	10 33 50							Grades with a dark greenish gray (10G 4/1) clayey sandstone bed from 24.2 to 24.4 meters, noncemented.
MA	17			1	37 50/0.08m							<p>SANDSTONE Yellowish brown (10YR 5/6), moist, silty, low strength, moderately cemented, fine to coarse sand, weathered, scattered dark grayish brown claystone beds up to 5 cm thick.</p> <p>Grades dark greenish gray (10Y 4/1), with fine to medium sand at 25.8 meters.</p>
	18						75	0				<p>SANDSTONE Light gray (2.5Y N7), moist, high strength and cementation.</p>
	19						98	88				<p>SANDSTONE Gray (N5), moist, silty, low strength, weakly cemented, fine to medium sand, trace mica, no reaction to HCL.</p>
PLI	20						75	64				<p>Grades with a 1 mm thick bentonitic clay gouge infilled joint inclined at 40 degrees at 28.6 meters. Grades with interbedded dark brown (10YR 4/3) and gray (N5) siltstone, moist, low to moderate strength and weak to moderate cementation, bedding at about 40 degrees, from 28.5 to 28.7 meters, massive, no reaction to HCL.</p>

Northing/Easting: 566738.211 m / 1978171.258 m
 Surface Elevation: 113.49 m
 Logged By: DPD

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
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 Los Angeles, California

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV_GDT_9/10/01_REV.3

Boring Log B-95										Elev. (meters)		
Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample		USCS	Symbol
UCS	21					83	83					Grades dark greenish gray (5GY 4/1), with little mica at 30.6 meters. Grades with laminated dark brown (10YR 4/3) seams from 30.7 to 30.8 meters, 2-5 mm highly sheared clay seam dipping 5 to 10 degrees with slickensides at 31.1 and 31.5 meters. 2.5 cm thick brown (10YR 4/3) clay seam at 31.2 and 31.5 meters. Grades with dark brown (10YR 4/3) silt laminations between 31.2 and 31.5 meters.
PLI, UCS	22					31						Grades massive with weak to moderate cementation at 31.4 meters, sheared clay seam with slickensides along curvilinear surface dipping at 20 degrees at 31.8 meters.
	23					65	39					SILTSTONE Olive gray (10YR 5/1), moist, low strength, weak to moderate cementation, laminated with gray (10YR 5/1) silty sandstone layers, scattered 1 to 5 mm thick highly plastic sheared and slickensided clay layers dipping at 10 to 40 degrees.
	24					33						
PLI	25					100	75					SANDSTONE Dark gray (5Y 4/1), moderate strength and cementation, massive. SILTSTONE Olive gray (5Y 4/2), low to moderate strength, moderate cementation, low angle bedding, thickly laminated with gray (2.5Y N6) siltstone and dark gray (5Y 4/1) sandstone layers dipping at 10 to 20 degrees. Grades with 6 mm thick very dark brown (10YR 2/2) highly plastic clay seams at 34.5, 34.6, and 34.9 meters, sheared with slickensides, dipping at 10 to 25 degrees.
	26					34						Grades with 2.5 cm thick very dark brown (10YR 2/2) clay layers at 35.1 and 35.2 meters.
	27					35						SANDSTONE Gray (N5), low to moderate strength, moderate cementation, massive, no reaction to HCL from 35.7 to 38.1 meters.

Northing/Easting: 566738.211 m / 1978171.258 m
 Surface Elevation: 113.49 m
 Logged By: DPD

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	26					50		0					
	27					100		100					77
PLI, UCS	28					37		92					76
	29					38		100				Grades weakly cemented, with 4 cm thick very dark brown (10YR 2/2) laminations, little mica, organic odor at 37.5 meters.	
UCS	30			3		38		100				Grades light gray (N7), high strength, strongly cemented, reacts strongly with HCL at 38.1 meters.	75
PLI, UCS						39						Grades dark greenish gray (5GY 4/1), high strength, strongly cemented, with organic odor, 7 cm thick very dark brown (10YR 3/2) clay layer at 39.1 meters.	
						39						Grades with 12 cm thick very dark grayish brown (10YR 3/2) clay layer at 39.4 meters.	74
						40						Boring terminated at 39.8 meters (bgs). Groundwater encountered at 12.5 meters (bgs) during drilling. Boring abandoned with bentonite grout and concrete surface seal.	73
						41							72

Northing/Easting: 566738.211 m / 1978171.258 m
 Surface Elevation: 113.49 m
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Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Boring Log B-97										Elev. (meters)		
Other Tests	Sample No.	Moisture Content (%)	Dry Density (KN/m ³)	PID (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample		USCS	Symbol
												Portland cement concrete pavement.
	1			0	3 3 3	1						FILL (Af) SAND with silt (SP-SM) Dark grayish brown (10YR 4/2) to very dark gray (10YR 3/1), moist, loose, fine sand, trace coarse sand, trace fine gravel, numerous brick fragments, 25 mm layer of black sand.
	2			4	19 18 23	2					SP-SM	
	3			0	9 10	3						RECENT ALLUVIUM (Qal) SANDY CLAYEY SILT (ML) Brown (10YR 4/3), moist, stiff to very stiff, fine sand, trace mica, low plasticity, weak reaction to HCL.
						4						
						5						

Northing/Easting: 566913.055 m / 1978068.536 m

Driller/Drill Rig: Spectrum/CME 85

Surface Elevation: 115.43 m

Equipment/Hammer: H.S.A. Mud Rotary NQ Core/63.5 kg CME Auto

Logged By: KMR

Date Completed: 2-27-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) = reading - background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	4			0	12 13 12	7			[Black bar]	ML			109
	5			0	4 6 8	8			[Black triangle]			SAND (SP) Pale brown (10YR 6/3), moist, dense, medium to coarse sand, trace fine gravel.	107
	6			0	15 16 27	9			[Black bar]	SP			106
	7			0	6 9 10	11			[Black triangle]	SP-SM		SAND with silt (SP-SM) Brown (10YR 4/3), moist, medium dense, fine sand, trace mica, no reaction to HCL.	105
												SILT with sand (ML) Dark grayish brown (2.5Y 4/2), moist, hard, trace mica, scattered fine sand partings, low plasticity, no reaction to HCL.	104

Northing/Easting: 566913.055 m / 1978068.536 m Driller/Drill Rig: Spectrum/CME 85
 Surface Elevation: 115.43 m Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Logged By: KMR Date Completed: 2-27-01

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 Los Angeles, California

Boring Log B-97 Figure: A-47
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NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV_GDT_9/10/01_REV_3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	8			0	11 20 15				[Black bar]	ML			103
	9				2 3 4	13			[Black bar]	SM		SILTY SAND (SM) Dark greenish gray (10Y 3/1), moist, loose, trace mica, scattered organic inclusions.	102
	10				20 37 50/0.13m	14			[Black bar]	SM		OLDER ALLUVIUM (Qoal) SAND with gravel (SP) Pale brown (10YR 6/3), moist, very dense, medium to coarse sand, fine to coarse subangular to angular gravel.	101
	11			0	13 14 15	15			[Black bar]	SP		Grades wet, medium dense, with trace mica.	100
						16							99
						17							98

Northing/Easting: 566913.055 m / 1978068.536 m Driller/Drill Rig: Spectrum/CME 85
 Surface Elevation: 115.43 m Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Logged By: KMR Date Completed: 2-27-01

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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV_GDT_9/10/01_REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	12			0	10 20 30	18.5			[Black bar]			SAND with silt (SP-SM) Brown (10YR 5/3), wet, dense to very dense, fine to coarse sand, little fine gravel, trace mica.	97
	13			0	33 60 NR	20			[Black triangle]	SP-SM			96
	14			0	33 35	21.5			[Black bar]			SAND (SP) Dark yellowish brown (10YR 4/4), wet, dense, medium to coarse grained, trace mica.	94
	15			0	6 13 15	23			[Black triangle]			CLAYEY SILT (ML) Brown (10YR 4/3), wet, very stiff, numerous calcite fragments, scattered light gray fine sand partings, trace carbon-like nodules, low plasticity.	93
										ML			92

Northing/Easting: 566913.055 m / 1978068.536 m
 Surface Elevation: 115.43 m
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Driller/Drill Rig: Spectrum/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV_3

Boring Log B-97										Elev. (meters)			
Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample		USCS	Symbol	DESCRIPTION
	16			0	9 14 21	25						Grades with trace mica and organics.	91
	17			0	41 100/0.03m	26				SP-SM		SAND with silt and gravel (SP-SM). Grayish brown (10YR 5/2), wet, very dense, medium to coarse sand, fine to coarse gravel.	90
	18			0	36 100/0.05m	28						BEDROCK - PUENTE FORMATION (Tp2) SILTSTONE Very dark gray (10YR 3/1), low strength, weak cementation, moderately weathered, trace mica.	89
	18			0	36 100/0.05m	27							88
					34 100/0.03m NR	29							87
													86

Northing/Easting: 566913.055 m / 1978068.536 m
 Surface Elevation: 115.43 m
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Driller/Drill Rig: Spectrum/CME 85
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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	19					100	75					<p>SANDSTONE Dark greenish gray (10Y 3/1), moderate cementation and strength, massive, no reaction to HCL.</p> <p>Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and dark gray (N 4), thinly bedded to laminated, moderate cementation and strength, dipping about 25 degrees, vertical 1 to 2 mm thick fracture with clay lining from 30.6 to 30.8 meters, fractures easily along clay partings in siltstone, weak reaction to HCL.</p>	85
ITS						31						<p>SANDSTONE Dark greenish gray (10Y 3/1), massive, moderate cementation and strength; 25 mm thick siltstone layer, very dark gray (10YR 3/1), moderate cementation and strength, dipping at 20 to 25 degrees, strong reaction to HCL, at 31.6 meters.</p>	84
UCS	20					32	81	64				<p>Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and dark gray (N 4), thinly bedded to laminated, moderate cementation and strength, dipping about 25 degrees, weak reaction to HCL; 60 mm sheared and fractured siltstone bed at 31.8 meters.</p> <p>SILTSTONE Very dark gray (10YR 3/1), bedded, moderate cementation and strength, dipping at 25 to 30 degrees, weak to moderate reaction to HCL.</p>	83
PA, PLI, CAI						33						<p>SANDSTONE Gray (N 5), fine to medium grained, massive, high strength, strong cementation, 0.12 m curvilinear joint dipping at 45 to 90 degrees at 32.5 meters, no reaction to HCL.</p>	
	21					34	93	88				<p>SANDSTONE Dark greenish gray (10Y 3/1), massive, moderate cementation and strength, no reaction to HCL.</p>	82
UCS						34						<p>SANDSTONE Dark greenish gray (10Y 4/1), fine to medium grained, massive, low to moderate strength, moderate cementation; siltstone interbeds and clasts at 33.5 and 33.8 meters, very dark gray (10YR 3/1) to dark grayish brown (10YR 4/2), moderate cementation and strength, dipping 10 to 20 degrees, subrounded to subangular clasts up to 20 mm thick.</p> <p>Fracture along bedding plane, dipping at 25 to 30 degrees, at 34.2 meters.</p>	81
PLI						35						<p>Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/10), moderate cementation and strength, dipping at 25 to 30 degrees, weak reaction to HCL.</p>	
PLI	22					35	86	73				<p>SANDSTONE Greenish gray (10Y 5/1), bedded, dipping at 25 to 30 degrees, low strength, no reaction to HCL, joints at 34.6 meters; siltstone interbeds from 34.9 to 35 meters.</p> <p>Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) siltstone and dark greenish gray (10Y 4/1) sandstone, bedded, low to moderate strength, moderate cementation, dipping at 15 to 30 degrees, numerous breaks along bedding planes in siltstone, weak reaction to HCL in siltstone.</p>	80

Northing/Easting: 566913.055 m / 1978068.536 m
 Surface Elevation: 115.43 m
 Logged By: KMR

Driller/Drill Rig: Spectrum/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
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 Los Angeles, California

NEIS_SOIL_ROCK_LOG_NEISGPJ_CDM_BLLV.GDT_9/10/01_REV 3

Boring Log B-97										Elev. (meters)		
Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample		USCS	Symbol
	23					100	98					Silt/clay clasts in silty sand matrix, thinly bedded to laminated, up to 10 mm thick, subrounded to subangular, weak reaction to HCL, at 36 meters.
						37						SANDSTONE Dark greenish gray (10Y 4/1), moderate cementation and strength, massive, no reaction to HCL. Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and gray (GLEY1 N6), thinly bedded to laminated, moderate cementation and strength in siltstone, high strength and strongly cemented sandstone, dipping at 25 to 30 degrees in siltstone, dipping at 5 to 15 degrees in sandstone, weak reaction to HCL in siltstone, strong reaction to HCL in sandstone. Siltstone seam, plastic, sheared, at 37.3 meters. Numerous siltstone clasts in fine sandstone matrix, 1 to 5 mm in diameter at 37.4.
						38						Vertical joint from 37.9 to 38 meters.
UCS	24					100	95					Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1), moderate cementation and strength, dipping about 20 degrees, scattered silt clasts, no reaction to HCL. SILTSTONE Very dark grayish brown (10YR 3/2), low to moderate strength, moderate cementation, weak reaction to HCL. SANDSTONE Gray (N 5), massive, noncemented and low strength, none to weak reaction to HCL. Interbedded layer of siltstone/sandstone, light brownish gray (2.5Y 6/2), noncemented, dipping at 45 to 50 degrees, no reaction to HCL. Interbedded SILTSTONE and SANDSTONE Light brownish gray (2.5Y 6/2) to very dark gray (10YR 3/1) and dark gray (N 4), low strength, weakly cemented, bedding dipping at 20 to 60 degrees, numerous silt clasts (varying color) up to 5 mm thick inclined parallel to bedding in sandstone.
PA						39						SANDSTONE Dark gray (N 4), massive, low strength, weakly cemented, fracture dipping at 40 degrees at 39.8 meters, scattered siltstone interbeds, no reaction to HCL. Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and gray (N 5), low to moderate strength, moderate cementation, bedding dipping at 20 to 25 degrees, fracture dipping at 40 to 50 degrees at 40.7 meters, weak reaction to HCL in siltstone.
	25					40	88	77				Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and dark gray (10YR 4/1), moderate cementation and strength, bedding dipping at 20 to 25 degrees, numerous silt clasts and siltstone inclusions (brown (10YR 4/2)) in sandstone, siltstone fractures easily along bedding plane, weak reaction to HCL in both siltstone and sandstone.
PLI						41						
	26					41	100	98				

Northing/Easting: 566913.055 m / 1978068.536 m
 Surface Elevation: 115.43 m
 Logged By: KMR

Driller/Drill Rig: Spectrum/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 2-27-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-97
 Project No: 30182

Figure: A-47
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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV_3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIV (ppm) =reading background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
PLI	27					43	96	90				<p>Near planar fracture, dipping 80 degrees, from 42.2 to 42.3 meters.</p> <p>Grades to SILTY SANDSTONE with scattered siltstone interbeds, massive to thinly bedded, dipping at 10 to 30 degrees, at 42.4 meters.</p> <p>SANDSTONE Gray (N 6), massive with scattered siltstone interbeds, high strength, strongly cemented, dipping at 30 to 40 degrees, strong reaction to HCL; siltstone inclusion at 42.8 meters, brown (10YR 4/3) and very dark grayish brown (10YR 3/2), 25 mm by 60 mm.</p> <p>Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) siltstone and dark greenish gray (N 4) sandstone, low to moderate strength, moderate cementation, bedding dips at 5 to 20 degrees, no reaction to HCL in sandstone, weak reaction to HCL in siltstone. Jointing in sandstone, dipping at 40 to 75 degrees, at 43.6 meters.</p>	73
UCS	28					44	65	41				<p>Grades with high strength, strongly cemented, strong reaction to HCL, in sandstone from 44 to 44.1 meters.</p> <p>SILTSTONE Very dark gray (10YR 3/1), interbedded, moderate cementation and strength, bedding dips at 20 to 25 degrees, planar fracture dipping at 60 to 75 degrees, weak reaction to HCL.</p>	72
UCS	29					46	100	98				<p>SANDSTONE Dark gray (N 4), fine to medium grained, massive, moderate to high strength, moderately to strongly cemented, no reaction to HCL.</p> <p>Thinly bedded to laminated siltstone interbed at at 45.5 and 45.7 meters, hard, weak to moderate reaction to HCL.</p> <p>SILTSTONE Very dark gray (10YR 3/1), moderate cementation and strength, bedding dipping at 20 to 25 degrees.</p> <p>SANDSTONE Dark gray (N 4), low to moderate strength, moderate cementation, massive, no reaction to HCL.</p> <p>Siltstone interbeds at 46.3 and 46.4 meters, very dark gray (10YR 3/1), moderate cementation and strength, weak reaction to HCL.</p>	71
PLI	30					47	100	99				<p>Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) siltstone and dark gray (N 4) sandstone, moderate cementation and strength, thinly bedded to laminated siltstone, dipping at 10 to 25 degrees, weak reaction to HCL in siltstone.</p> <p>SILTSTONE Dark gray (10YR 4/1) to very dark gray (10YR 3/1), low to moderate strength, moderate cementation, bedding dips at 10 to 30 degrees, numerous siltstone clasts up to 5 mm thick at 47.7 meters, no reaction to HCL.</p>	70

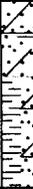
Northing/Easting: 566913.055 m / 1978068.536 m
 Surface Elevation: 115.43 m
 Logged By: KMR

Driller/Drill Rig: Spectrum/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 2-27-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-97 Figure: A-47
 Project No: 30182 8 of 9

NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV.GDT 9/10/01 REV 3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
						49						<p>SANDSTONE Gray (N 6), moderate to high strength, moderate to strong cementation, massive, scattered siltstone clasts at 47.9 meters.</p> <p>Interbedded SILTSTONE and SANDSTONE Dark gray (10YR 4/1) to very dark gray (10YR 3/1) siltstone and gray (N 3) sandstone, moderate cementation and strength, bedding dips at 10 to 30 degrees in siltstone, no reaction to HCL.</p>	67
						50							66
						51							65
						52							64
						53							63
													62

Boring terminated at 48.8 meters (bgs). Groundwater encountered at 16.8 meters (bgs) during drilling. Boring abandoned with bentonite grout and concrete surface seal.

Northing/Easting: 566913.055 m / 1978068.536 m
 Surface Elevation: 115.43 m
 Logged By: KMR

Driller/Drill Rig: Spectrum/CME 85
 Equipment/Hammer: H.S.A., Mud Rotary NQ Core/63.5 kg CME Auto
 Date Completed: 2-27-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (per cent) - reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
												Asphaltic cement concrete pavement.	103
	1	36.4		13	526	1				ML		FILL (Af) SILT (ML) Very dark grayish brown (10YR 3/2), moist, stiff, nonplastic.	102
MA	2	3.8		18	91113	3				SM		RECENT ALLUVIUM (Qal) SILTY SAND (SM) Brown (10YR 4/3), moist, medium dense, fine to medium sand.	100
						4						SAND with silt (SP-SM) Grayish brown (10YR 5/2), moist, dense, fine to medium sand.	99
MA	3	2.9		278	142230	5				SP-SM		SAND (SP) Brown (10YR 4/3), moist, medium dense, fine to medium sand, trace coarse sand, trace fine subrounded gravel; at 6.2 meters sandy silt (ML) layer, brown (10YR 4/3), moist, very stiff, low plasticity.	98

Northing/Easting: 564882.334 m / 1979165.916 m
 Surface Elevation: 103.07 m
 Logged By: MH

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A./63.5 kg CME Auto
 Date Completed: 5-23-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-103
 Project No: 30182

Figure: A-53
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Boring Log B-103

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) - reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	ROD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	4	18.1		38	10 12 o					SP			97
						7						SAND with gravel (SW) Gray (N6), moist, very dense, fine to coarse sand, fine to coarse subangular gravel.	96
	5	3.4		13	45 50					SW			95
												SAND with silt (SW-SM) Gray (N6), moist, very dense, trace fine to coarse subangular gravel.	
MA	6	3.8			29 40 31					SW-SM			94
												CLAYEY SILT (MH) Gray (N5), moist, very stiff, low plasticity, scattered layers of fine sand grading coarser with depth, strong hydrocarbon-like odor.	93
AL	7	39.1		11	5 o 17					MH			92

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV. 3

Northing/Easting: 564882.334 m / 1979165.916 m

Surface Elevation: 103.07 m

Logged By: MH

Driller/Drill Rig: BC2/CME 75

Equipment/Hammer: H.S.A./63.5 kg CME Auto

Date Completed: 5-23-01

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Boring Log B-103
Project No: 30182

Figure: A-53
2 of 5

Boring Log B-103

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) <small>reading-background</small>	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	8	28.0	212		7 9 15	13				SM		SILTY SAND (SM) Gray (N5), wet, medium dense, fine sand, grades coarser with depth, nonplastic silt, rapid dilatancy, strong hydrocarbon-like odor.	91
	9	10.7	624		9 30 33	14				SW		OLDER ALLUVIUM (Qoal) SAND (SW) Gray (N5), wet, very dense, fine to coarse sand, trace coarse subangular gravel, strong hydrocarbon-like odor.	90
	10	12.3	6.4		7 28 30	15						Weaker hydrocarbon-like odor.	89
	11	12.8	13		10 21 30	17				SP		SAND with gravel (SP) Gray (N5), wet, very dense, medium to coarse sand, trace fine gravel.	88
												SILTY SAND (SM) Dark gray (N4), wet, dense, fine to coarse sand, hydrogen sulfide-like odor.	87
													86

NEIS SOIL ROCK LOG NEIS.GPJ CDM BLLV.GDT 9/10/01 REV.3

Northing/Easting: 564882.334 m / 1979165.916 m

Surface Elevation: 103.07 m

Logged By: MH

Driller/Drill Rig: BC2/CME 75

Equipment/Hammer: H.S.A./63.5 kg CME Auto

Date Completed: 5-23-01

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Boring Log B-103
Project No: 30182

Figure: A-53
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Boring Log B-103

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PPD (gms) reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	ROD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA	12	17.1	7.1		9 10 21	18.5				SM			85
						19						SAND (SP) Gray (N5), wet, very dense, fine to medium sand, trace fine subrounded gravel.	84
MA	13	18.6	40		10 22 28	20				SP			83
	14	21.5	214		7 14 10	21.5						Sand grades finer, medium dense.	82
	15		17		6 13 50	23				Tp ₂		BEDROCK - PUENTE FORMATION (Tp₂) SILTSTONE Very dark grayish brown (10YR 3/2), dipping at 45 degrees, thinly bedded, weakly cemented, low strength, sandy interbeds, strong reaction to HCL.	81
												Interbedded SILTSTONE and SANDSTONE Very dark grayish brown (10YR 3/2) and gray (N5), near horizontal bedding, sandstone massive, siltstone thinly	80

Northing/Easting: 564882.334 m / 1979165.916 m

Surface Elevation: 103.07 m

Logged By: MH

Driller/Drill Rig: BC2/CME 75

Equipment/Hammer: H.S.A./63.5 kg CME Auto

Date Completed: 5-23-01

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Boring Log B-103
Project No: 30182

Figure: A-53
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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	16		495		12 15 50					Tp ₂		bedded, weakly cemented, low strength, scattered shell fragments in sandstone, weak reaction to HCL.	79
						25						Boring terminated at 24.8 meters (bgs) Groundwater encountered at 12.2 meters (bgs) during drilling. Boring backfilled with bentonite cement grout.	78
						26							77
						27							76
						28							75
						29							74

Northing/Easting: 564882.334 m / 1979165.916 m
 Surface Elevation: 103.07 m
 Logged By: MH

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A./63.5 kg CME Auto
 Date Completed: 5-23-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-103
 Project No: 30182

Figure: A-53
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Boring Log B-104

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) <small>reading-background</small>	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
												Portland cement concrete pavement.	
	1	21.7		0	134	0.5				SM		FILL (Af) SILTY SAND (SM) Dark gray (7.5YR 4/1), moist, loose, fine sand, trace mica.	104
						1						SANDY SILT (ML) Brown (10YR 4/3), moist, loose, fine sand, trace coarse sand, trace to little mica, numerous fine roots, nonplastic.	103
						2							
						3				ML			
-200, AL	2	25.6		0	233	3.5						Grades with dark greenish gray mottling (10Y 3/1), some organics, numerous oxidized root holes, scattered low plasticity sandy clayey silt (ML) seams and pockets.	101
						4							
MA	3	11.8		0	233	5.0				SM		RECENT ALLUVIUM (Qal) SILTY SAND (SM) Dark greenish gray (10Y 3/1), moist, loose, fine sand, little mica.	100
						5						SANDY CLAYEY SILT (ML) Dark greenish gray (10Y 3/1), moist, medium stiff, fine sand, trace mica, trace organics, low to moderate plasticity.	99

NEIS SOIL ROCK LOG NEIS.GPJ CDM BLLV.GDT 9/10/01 REV.3

Northing/Easting: 565138.385 m / 1979170.84 m Driller/Drill Rig: BC2/CME 75
 Surface Elevation: 104.43 m Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Logged By: KMR Date Completed: 5-7-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

NEIS SOIL ROCK LOG NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) - reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	4	27.1		5.5	24	7				ML			98
	5	28.4		9	134	8						Grades with scattered nonplastic silt pockets, scattered greenish gray high plasticity clay seams up to 5 mm thick with solvent-like odor, scattered black low plasticity clayey sand seams up to 5 mm thick.	97
												SILTY CLAY (CL) Dark greenish gray (10Y 4/1), moist, medium stiff.	96
AL	6	37.4		7	135	9				CL			95
	7	5.2		0	15 15 18	11						OLDER ALLUVIUM (Qoa1) SAND (SP) Greenish gray (10Y 5/1), moist, dense, fine to medium sand, trace coarse sand, trace coarse gravel.	94
													93

Northing/Easting: 565138.385 m / 1979170.84 m
 Surface Elevation: 104.43 m
 Logged By: KMR

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 5-7-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-104
 Project No: 30182

Figure: A-54
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Boring Log B-104

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppt) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	8	14.7		0	12 23 26	12.5				SP		Grades very dark gray (N3), wet.	92
	9	18.4		0	13 27 33	13.5							91
						14							90
MA	10	13.9		0	12 14 16	15.0				SP-SM		SAND with silt (SP-SM) Very dark gray (N3), wet, dense, fine to coarse sand, trace fine subangular gravel, trace silt.	89
						16							88
	11	30.4		0	1 5 14	17.0				SP		SAND (SP) Very dark gray (N3), wet, medium dense, fine to medium sand, trace coarse sand, trace silt; 30.5 mm clayey silt (ML) layer at 17.0 meters, wet, very stiff, low to moderate plasticity, slow dilatancy, little mica, trace fine to coarse sand	87
												SAND with silt and gravel (SP-SM)	

NEIS, SOIL, ROCK, LOG, NEIS, GPJ, CDM, BLLV, GDT, 9/20/01, REV. 3

Northing/Easting: 565138.385 m / 1979170.84 m Driller/Drill Rig: BC2/CME 75
 Surface Elevation: 104.43 m Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Logged By: KMR Date Completed: 5-7-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-104

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PD (pen) - reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA	12	13.0		0	21 34					SP-SM		Very dark gray (N3), wet, very dense, fine to coarse subangular sand, fine gravel.	
						19						SILTY SAND (SM) Very dark gray (N3), wet, very dense, fine sand.	-86
	13	21.2		0	8 9 10	20						Grades medium dense, fine to medium sand, trace coarse sand, trace mica and organics.	
										SM		Driller notes up to 0.6 meters of heave in augers.	-84
	14	9.8		0	7 8 16	21						6.4 mm very dark gray (10YR 3/1) silt seam at 21.3 meters.	-83
						22							
	15	9.1		0	27 37 50	23				SW		SAND (SW) Very dark gray (N3), moist, very dense, fine to coarse sand, trace gravel, trace silt.	-82
													-81

NEIS SOIL ROCK LOG NEIS.GPJ_CDM_BLLV.GDT_9/0001_REV.3

Northing/Easting: 565138.385 m / 1979170.84 m
 Surface Elevation: 104.43 m
 Logged By: KMR

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 5-7-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-104

Other Tests	Sample No.	Moisture Content (%)	Dry Density (tN/m ³)	RFD (open) <small>reading-background</small>	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	16				80/0.1 m					Tp ₂		BEDROCK - PUENTE FORMATION (Tp2) Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) to gray (N5), weakly cemented, low strength.	-80
						25						SILTSTONE Very dark gray (10YR 3/1), noncemented, low strength, moderate plasticity, weak reaction to HCL.	-79
	17					70	35					Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and dark gray (N4), dipping at 5 to 15 degrees, moderate cementation and strength, trace mica, siltstone fissile and parts easily along bedding planes, strong reaction to HCL in siltstone and sandstone. Clay gouge at 26.1 meters, with siltstone fragments up to 6 mm thick.	-78
	18					26	100	90				Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and dark gray (N4), dipping at 5 to 15 degrees, moderate cementation and strength, trace mica, siltstone fissile and parts easily along bedding planes, strong reaction to HCL in siltstone and sandstone. Clay gouge at 26.1 meters, with siltstone fragments up to 6 mm thick.	-78
	19					68	68	68		Tp ₂		SANDSTONE Dark gray (N4), dipping at 5 degrees, massive, high cementation and strength, strong reaction to HCL. Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and dark gray (N4), dipping at 5 to 15 degrees, moderate cementation and strength, trace mica, scattered organic nodules, siltstone fissile and parts easily along bedding planes, strong reaction to HCL in siltstone, low to no reaction to HCL in sandstone. Soft claystone nodule at 27.6 meters, gray sandstone pocket at 27.5 meters, strong reaction to HCL in siltstone and sandstone. Interbedded SANDSTONE Very dark gray (N3) and gray (N6) dipping at 10 degrees, moderate cementation and strength, and strong cementation and high strength, weak reaction to HCL. Strong reaction to HCL at 28.4 meters, near vertical, planar joint with thin secondary mineralization. Grades very dark brown (10YR 2/2) at 28.6 meters, dipping at 40 degrees, strong reaction to HCL, 2 mm siltstone interbed.	-77
	20					29	100	100				SANDSTONE Gray (N5) to dark gray (N4), massive, moderate cementation and strength, trace mica, no reaction to HCL; 13 mm thick siltstone interbed at 29.3 and 29.6 meters, dipping at 5 to 15 degrees, very dark gray (10YR 3/1); strong reaction to HCL at 29.6 meters.	-75
	21					100	100	100				SANDSTONE Gray (N5), massive, weak cementation and low strength, moderate reaction to HCL.	-75

Northing/Easting: 565138.385 m / 1979170.84 m
 Surface Elevation: 104.43 m
 Logged By: KMR

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 5-7-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-104 Figure: A-54
 Project No: 30182 5 of 8

NEIS, SOIL, ROCK, LOG, NEIS, GPJ, CDM, BLLV, GDT, 9/10/01, REV. 3

Boring Log B-104

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	22					31	100	100				<p>SILTSTONE Very dark gray (10YR 3/1), dipping at 5 degrees, massive, moderate to strong cementation and high strength, strong reaction to HCL.</p> <p>Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) to gray (N6), dipping 5 to 10 degrees, weak to moderate cementation and low strength, moderate to strong reaction to HCL.</p> <p>Sandstone interbed at 30.8 meters, dipping at 5 to 45 degrees.</p> <p>Siltstone grades strong cementation and high strength, moderate reaction to HCL; clay gouge at 30.9 and 31.1 meters, 5 to 10 mm thick; joint at 31.2 meters, dipping at 5 degrees, infilled with black tar-like inclusions, crystalline, hard, fissile.</p>	74
	23					32	100	100				<p>SANDSTONE Gray (N5), massive, weak cementation and low strength, no reaction to HCL; dark gray claystone interbeds at 30.9, 31.1, and 31.2 meters; staining from 31.2 to 31.3 meters; fracture filled with dark gray clay gouge, dipping at 15 to 20 degrees, at 31.8 meters.</p> <p>SANDSTONE Gray (N5), massive, strong cementation and high strength, numerous black organic nodules, moderate to strong reaction to HCL.</p>	73
	24					33					Tp ₁	<p>Siltstone interbed at 32.6 meters, very dark gray (10YR 3/1), dipping at 5 to 15 degrees, 0.12 m thick, strong cementation and high strength, numerous black organic nodules.</p> <p>Grades to moderately cemented, moderate strength.</p> <p>No recovery from 34.0 to 34.7 meters.</p>	72
PLI						34							71
	25					35	80	80				<p>SILTSTONE Very dark gray (10YR 3/1), dipping at 45 degrees, thinly bedded, moderate cementation and strength, strong reaction to HCL; 13 mm thick joint filled with siltstone, dipping at 70 degrees, at 34.9 meters.</p> <p>Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and gray (N5), dipping at 15 to 25 degrees, thinly bedded, moderate to strong cementation and moderate to high strength, strong reaction to HCL in siltstone and sandstone.</p>	70
UCS	26						94	66				<p>Sandstone grades dark greenish gray (N3), scattered black organic nodules up to 2 mm in diameter, weak reaction to</p>	69

NEIS SOIL ROCK LOG NEIS.GPJ CDM BLLV.GDT 10/1/01 REV.3

Northing/Easting: 565138.385 m / 1979170.84 m
 Surface Elevation: 104.43 m
 Logged By: KMR

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 5-7-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-104
 Project No: 30182

Figure: A-54
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Boring Log B-104

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PPD (spans) - resulting background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	ROD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
PLI	27					100	100					HCL; joint with siltstone lining at 35.8 meters. Joints and fissile shale interbeds at 35.9, 36.1, and 36.2 meters, dipping at 15 degrees.	68
						37						SANDSTONE Dark gray (N4), dipping 0 to 5 degrees, bedded, strong cementation and high strength, strong reaction to HCL; joint at 36.7 meters, infilled with clay gouge; joint at 36.8 meters, with secondary mineralization, perpendicular to bedding; weak claystone bed at 36.9 meters, 0.05 m thick. Interbedded SILTSTONE and CLAYSTONE Very dark gray (10YR 3/1), bedded, siltstone beds 25 mm thick, claystone beds 13 mm thick, strong cementation and high strength, moderate reaction to HCL.	67
	28					38	83	83				SILTSTONE Very dark gray (10YR 3/1), dipping at 5 degrees, bedded, strong cementation and high strength, moderate reaction to HCL, partings every 6 mm along bedding.	
						39						Grades to weak reaction to HCL; crossbedding at 38.1 meters, joint with about 10 mm parting, perpendicular to bedding, at 38.4 meters; crossbedding at 38.5 to 38.6 meters, dipping at 5 degrees.	66
						39						Scattered sandstone interbeds up to 20 mm thick, clay gouge at 39.3 and 39.4 meters.	
	29					40	88	88				SANDSTONE Dark gray (N4), bedded, weak cementation and low strength, weak reaction to HCL. Interbedded SANDSTONE and SILTSTONE Very dark grayish brown (10YR 3/2) to very dark gray (10YR 3/1), bedded 0.1 to 0.2 meters thick, dipping at 5 degrees, sandstone moderate cementation and strength, scattered organic nodules, strong reaction to HCL; siltstone strong cementation and high strength, 6 mm partings, strong reaction to HCL; clay gouge at 39.8 and 41.8 meters.	65
						41						No reaction to HCL in sandstone at 40.8 meters.	64
	30					41	100	100				Sandstone grades weakly to noncemented at 41.2 meters, low strength, no reaction to HCL. Grades dark gray (N4) at 41.3 meters.	63

Tp₂

Northing/Easting: 565138.385 m / 1979170.84 m
 Surface Elevation: 104.43 m
 Logged By: KMR

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 5-7-01

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 Los Angeles, California

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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01 REV. 3

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV. 3

Boring Log B-104										Elev. (meters)			
Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample		USCS	Symbol	DESCRIPTION
						43					Tp ₁	<p>Sandstone grades to weak to no cementation and low strength at 42.3 meters.</p> <p>Sandstone grades gray (N5), moderate cementation and strength, at 42.5 meters.</p> <p>Boring terminated at 42.7 meters (bgs). Groundwater encountered at 12.2 meters (bgs). Boring backfilled with bentonite cement grout and concrete surface seal.</p>	62
						44							61
						45							60
						46							59
						47							58
													57

Northing/Easting: 565138.385 m / 1979170.84 m
 Surface Elevation: 104.43 m
 Logged By: KMR

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 5-7-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-104
 Project No: 30182

Figure: A-54
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NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV_GDT_9/10/01_REV_3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (KN/m ³)	PI (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
												Portland cement concrete pavement.	
	1	27.5		0	1 2 3	1				SM		FILL (Af) SILTY SAND (SM) Very dark grayish brown (10YR 3/2), moist, loose, fine sand, some mica, scattered organics.	104
												Grades with trace medium sand.	103
	2	6.9		0	2 4 6	2				SP-SM		SAND with silt (SP-SM) Dark grayish brown (10YR 4/2), moist, loose to medium dense, fine to medium sand, some mica, trace organics.	102
MA													101
	3	5.1		0	15 20 30	3				SP		RECENT ALLUVIUM (Qal) SAND (SP) Grayish brown (10YR 5/2), moist, dense to very dense, medium sand, trace fine and coarse sand, trace organics.	100
													99
										CH		SILTY CLAY (CH) Dark greenish gray (10Y 3/1), moist, soft, numerous organics, high plasticity.	

Northing/Easting: 565673.692 m / 1978921.661 m

Driller/Drill Rig: BC2/CME 75

Surface Elevation: 104.74 m

Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto

Logged By: KMR

Date Completed: 5-11-01

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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Boring Log B-105								Elev. (meters)					
Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)		RQD (%)	Sample	USCS	Symbol	DESCRIPTION
	4			0	16 50	6.5						SAND (SP) Dark gray (N4), moist, very dense, fine to medium sand, trace coarse sand, trace fine gravel and silt, scattered high plasticity clay seams.	98
	5			0	5 8 14	7.6				SP		Clayey Silt (ML) layer, dark greenish gray (10Y 3/1), moist, very stiff, low plasticity, some mica, 0.3 meters thick, at 7.6 meters.	97
	6	30.5		0	13 6 6	8.7						SILTY CLAY (CL) Dark greenish gray (10Y 3/1), moist, stiff, some mica, low to moderate plasticity.	96
AL	7	28.0		0	12 16 14	9.8						Silty sand (SM) layer, dark greenish gray (10Y 4/1), wet, medium dense to dense, fine sand, some mica, 0.34 meters thick, at 10.7 meters; contact with silt layer bedded at 10 to 15 degrees.	95
						11						SAND (SP) Gray (N5), wet, medium dense, medium to coarse sand, trace fine subangular gravel, 19 mm thick layer of clayey silt in shoe.	94
													93

Northing/Easting: 565673.692 m / 1978921.661 m
 Surface Elevation: 104.74 m
 Logged By: KMR

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 5-11-01

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NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV_GDT_9/10/01_REV_3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	8	17.3		0	5 0 0	13				SP			92
	9	17.3			8 22 33	14						Grades with fine subangular gravel, some fine sand, without medium sand.	91
	10	17.0		0	8 10 25	15				SW		SAND (SW) Dark gray (N4), wet, dense, trace fine subrounded gravel, trace silt.	90
	11	17.8		0	4 50 50	17				SP-SM		OLDER ALLUVIUM (Qoal) SAND with SILT (SP-SM) Dark greenish gray (10Y 4/1), wet, very dense, fine to medium sand.	88
													87

Northing/Easting: 565673.692 m / 1978921.661 m
 Surface Elevation: 104.74 m
 Logged By: KMR

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 5-11-01

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NEIS SOIL ROCK LOG NEIS GPJ CDM_BLLV.GDT 9/10/01 REV. 3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	12	16.2		0	21 48 50							Grades with trace mica, trace fine subrounded gravel.	86
	13	14.5		0	4 15 26	19				SP-SM		SAND with silt (SP-SM) Dark gray (N4), wet, dense, fine to medium sand, trace fine subangular gravel, trace mica.	85
	14	15.8		0	6 14 19	20				SP		SAND (SP) Dark gray (N4), wet, medium dense, fine to medium sand, trace coarse sand, slight hydrocarbon-like odor.	84
	15	17.0		0	26 41 50	21						SAND with silt (SP-SM) Very dark gray (N3), wet, very dense, fine sand, trace mica, trace fine gravel, strong hydrogen sulfide-like odor.	83
MA						22							82
						23							81

Northing/Easting: 565673.692 m / 1978921.661 m
 Surface Elevation: 104.74 m
 Logged By: KMR

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 5-11-01

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NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV_GDT_9/10/01_REV_3

Boring Log B-105										Elev. (meters)		
Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample		USCS	Symbol
	16	13.8		0	26 50/0.125 m					SP-SM		Grades dark gray (N4), fine to coarse sand.
	17					25						
	18					26	25	25				BEDROCK - PUENTE FORMATION (Tp2) SANDSTONE Gray (N5), massive, weakly cemented, low strength, weak reaction to HCL.
	19					27	100	45				
	20					28	60	40				SILTSTONE Very dark gray (10YR 3/1), dipping at 10 to 25 degrees, moderate cementation and strength, parting along bedding, fissile, weak reaction to HCL. Grades with sandstone interbeds, up to 13 mm thick, moderate cementation and strength, at 27.8, 28, 28.1 meters; clay gouge at 28.1 meters.
PLI	21					29	78	75				Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1), dipping at 10 to 15 degrees, laminated, moderate cementation and strength, parting along bedding planes, weak reaction to HCL.
												Sandstone grades gray (N5) at 29.2 meters, vertical joint. Grades with numerous black organic nodules up to 2 mm in diameter, strong reaction to HCL, at 29.7 meters. 25 mm thick noncemented sandstone layer, weak reaction to HCL, at 30 meters; 10 mm sandstone interbeds with

Northing/Easting: 565673.692 m / 1978921.661 m
 Surface Elevation: 104.74 m
 Logged By: KMR

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
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NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV_GDT_9/10/01_REV_3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
CAI, PLI	22					27	16					apparent offset up to 20 mm, shear dipping at 40 to 45 degrees, from 30.1 to 30.2 meters; sheared/jointed from 30.4 to 30.5 meters.	
						31						SANDSTONE Light gray (N7), massive, strong cementation and high strength, iron oxide staining, strong reaction to HCL. Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1), dipping at 15 to 20 degrees, moderate cementation and strength, scattered black tar-like nodules, weak to strong reaction to HCL.	74
	23					32	0	0					73
	24					67	67					Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and gray (N5), dipping at 65 degrees, up to 60 mm thick, moderate cementation and strength in siltstone, weak cementation and low strength in sandstone, no reaction to HCL in sandstone, weak reaction to HCL in siltstone.	72
	25					33	92	92				SANDSTONE Gray (N5), horizontally bedded, weakly cemented, low strength, no reaction to HCL.	
PLI	26					100	100					SANDSTONE Gray (N5), horizontally bedded, weakly cemented, low strength, no reaction to HCL.	
	27					83	83					Claystone interbeds up to 5 mm thick, at 33.4 and 33.5 meters.	71
	28					40	40						70
	29					35	100	100				Interbedded SILTSTONE and SANDSTONE Dark grayish brown (10YR 3/2) and gray (N5), dipping 15 to 20 degrees, massive, moderate cementation and strength, weak reaction to HCL. Grades bedded 2 to 60 mm thick at 35.1 meters. Planar structure at 35.2 meters. Numerous organic nodules at 35.3 and 35.7 meters.	
	30					100	100					Grades bedded up to 150 mm thick at 35.8 meters, moderate	69

Northing/Easting: 565673.692 m / 1978921.661 m
 Surface Elevation: 104.74 m
 Logged By: KMR

Driller/Drill Rig: BC2/CME 75
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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01 REV. 3

		Boring Log B-105										Elev. (meters)
Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	
UCS												to strong cementation and high strength, weak to strong reaction to HCL. Numerous organics in sandstone.
PLI	31					37	85	85				Grades very dark gray (10YR 3/1) and very dark gray (10YR 3/2), siltstone fissile with 6 mm partings. Shearing at 36.9, 37.2, and 37.3 meters.
PA	32					38	62	62				Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1), dipping at 10 degrees, bedded, sandstone beds 1 to 10 mm thick, strong cementation and high strength, strong reaction to HCL; fracture with clay gouge at 38.1 meters; shearing at 38.3 and 38.7 meters.
PLI						39				TP ₂		SANDSTONE Gray (N5), dipping at 10 degrees, bedded, weak cementation and low strength, weak reaction to HCL.
	33					40	20	20				SILTSTONE Very dark gray (10YR 3/1), dipping at 10 degrees, bedded, strong cementation and high strength, weak reaction to HCL.
	34					41	23	23				SANDSTONE Gray (N5), dipping at 10 degrees, bedded, weak cementation and low strength, weak reaction to HCL.
	35					41	17	0				Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and gray (N5), dipping at 10 degrees, thinly bedded, weak cementation and low strength, weak reaction to HCL.

Northing/Easting: 565673.692 m / 1978921.661 m Driller/Drill Rig: BC2/CME 75
 Surface Elevation: 104.74 m Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Logged By: KMR Date Completed: 5-11-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
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Boring Log B-105

DESCRIPTION

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	Elev. (meters)
	36						0	0				
	37					47	47			TP ₂		62
						43						61
						44						60
						45						59
						46						58
						47						57
<p>Boring terminated at 42.7 meters (bgs). Groundwater encountered at 10.8 meters (bgs) during drilling. Boring backfilled with bentonite cement grout and concrete surface seal.</p>												

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV. 3

Northing/Easting: 565673.692 m / 1978921.661 m
 Surface Elevation: 104.74 m
 Logged By: KMR

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 5-11-01

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Boring Log B-106

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIV (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
						1					●	Asphaltic cement concrete pavement. Portland cement concrete pavement.	105
						2						Casing advanced without sampling from 0 to 19.8 meters.	104
						3							103
						4							102
						5							101
													100

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV. 3

Northing/Easting: 565817.449 m / 1978821.644 m
 Surface Elevation: 105.04 m
 Logged By: KMR

Driller/Drill Rig: Ruen Drilling/Christenson C1500
 Equipment/Hammer: NQ Core/No Hammer
 Date Completed: 5-24-01

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Boring Log B-106
 Project No: 30182

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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01 REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIV (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
						7						Casing advanced without sampling from 0 to 19.8 meters.	99
						8							98
						9							97
						10							96
						11							95

Northing/Easting: 565817.449 m / 1978821.644 m Driller/Drill Rig: Ruen Drilling/Christenson C1500
 Surface Elevation: 105.04 m Equipment/Hammer: NQ Core/No Hammer
 Logged By: KMR Date Completed: 5-24-01

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NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV. 3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
						13						Casing advanced without sampling from 0 to 19.8 meters.	93
						14							92
						15							91
						16							90
						17							89

Northing/Easting: 565817.449 m / 1978821.644 m
 Surface Elevation: 105.04 m
 Logged By: KMR

Driller/Drill Rig: Ruen Drilling/Christenson C1500
 Equipment/Hammer: NQ Core/No Hammer
 Date Completed: 5-24-01

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Boring Log B-106

DESCRIPTION

Elev. (meters)

87

86

85

84

83

82

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION
	1					19	90	90				
UCS						20			GM			<p>OLDER ALLUVIUM (Qoa) SILTY GRAVEL (GM) BEDROCK - PUENTE FORMATION (Tp2) Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and gray (N5), dipping at 10 to 25 degrees in siltstone, sandstone massive and fine grained, bedding 6 to 89 mm thick, moderately cemented, moderate strength, partings along bedding in siltstone, strong reaction to HCL in siltstone, weak reaction to HCL in sandstone, scattered black organic nodules; fissile clay interbed at 20.1 meters; carbon-like seam, dipping at 5 to 10 degrees, 3 mm thick, at 20.2 meters.</p>
	2					21	100	100				<p>SANDSTONE Gray (10YR 5/1), massive, moderately cemented, low to moderate strength, medium to coarse grained, weak to no reaction to HCL; numerous black organic nodules and jointed at 20.6 meters. Sandstone grades fine to coarse grained, little mica, at 21.4 meters.</p>
	3					22						<p>Initiated oriented coring at 22.9 meters.</p>
	4					23	67	50				<p>Sandstone grades medium to coarse grained, strong reaction to HCL at 22.9 meters; no recovery from 23.3 to 23.5 meters.</p>
UCS						24	75	67				<p>Grades to weak reaction to HCL; siltstone interbed at 23.8 meters, very dark gray (10YR 3/10), dipping at 30 to 35 degrees, moderately cemented, low to moderate strength.</p>

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV. 3

Northing/Easting: 565817.449 m / 1978821.644 m
 Surface Elevation: 105.04 m
 Logged By: KMR

Driller/Drill Rig: Ruen Drilling/Christenson C1500
 Equipment/Hammer: NQ Core/No Hammer
 Date Completed: 5-24-01

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Boring Log B-106
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Boring Log B-106

DESCRIPTION

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	5					100	100					Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and gray (10YR 5/1), siltstone dipping at 30 to 35 degrees, sandstone massive, moderately cemented, moderate strength, sandstone medium to coarse grained, weak reaction to HCL; brown (7.5YR 4/2) siltstone bed at 24.7 meters; joint dipping at 45 degrees at 24.4 meters.	81
	6					25						SANDSTONE Gray (10YR 5/1), massive, moderately cemented, moderate strength, medium to coarse grained, little mica, weak to strong reaction to HCL; joint dipping at 40 degrees at 25 meters; joint dipping at 45 to 50 degrees with secondary mineralization along surface, weak reaction to HCL at 25.1 meters.	80
	7					26	100	100				Grades to weak reaction to HCL at 26.0 meters.	79
	8					27							78
	9					28	100	88				Sandstone grades gray (N5), fine to medium grained, weak to strong reaction to HCL. Grades strongly cemented and high strength at 27.5 meters. Grades with numerous black organic inclusions, little mica, weak reaction to HCL at 27.7 meters; Grades moderate strength and cementation at 28 meters; joint dipping 45 degrees with intersecting planes at 28.7 meters, 90 degree intersect angle.	77
ITS, PA						29	79	79				Grades with weak to no reaction to HCL at 29.0 meters.	76
						97	97					Grades with scattered black grains.	

Tp₁

NEIS SOIL ROCK LOG NEIS.GPJ CDM BILLY.GDT 10/1/01 REV.3

Northing/Easting: 565817.449 m / 1978821.644 m Driller/Drill Rig: Ruen Drilling/Christenson C1500
 Surface Elevation: 105.04 m Equipment/Hammer: NQ Core/No Hammer
 Logged By: KMR Date Completed: 5-24-01

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 Los Angeles, California

Boring Log B-106

DESCRIPTION

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	Elev. (meters)
PLI	10					31	93	88				75
UCS	11					32	60	60				73
	12					33	50	50		Tr		72
	13					34	100	100				71
	14					35	95	95				70

Grades with gray (N5) sandstone interbeds at 30.8, 31.3, and 31.5 meters, dipping at 40 to 45 degrees.

Interbedded SANDSTONE
 Gray (N5) and gray (10YR 5/1), moderate to strongly cemented, moderate to high strength, medium to coarse grained, numerous organics, strong reaction to HCL; at 32 meters, grades weak to moderate cementation and low to moderate strength.
 Grades to dipping at 40 to 45 degrees at 32.1 meters, bedding 3 to 6 mm thick, weak to no reaction to HCL.
 No recovery from 32.5 to 32.8 meters.

Sandstone interbeds at 32.8 and 33.6 meters, very dark gray (10YR 3/1), dipping at 15 to 30 degrees, moderately cemented, moderate strength, scattered black organic nodules, weak reaction to HCL; no recovery from 33.2 to 33.5 meters.

SILTSTONE
 Very dark gray (10YR 3/1), dipping at 15 to 20 degrees, moderately cemented, moderate strength, weak to strong reaction to HCL; sandstone interbeds at 33.7 and 33.8 meters, gray (N5), dipping at 25 to 30 degrees, moderately cemented, moderate strength, scattered organics, weak reaction to HCL.

SANDSTONE
 Gray (2.5Y 5/1), massive, moderately cemented, moderate strength, scattered siltstone pockets, no reaction to HCL; joints with very dark gray (10YR 3/1), siltstone at 33.8 meters, 25 mm by 50 mm; siltstone interbeds at 33.9, 34.6, 34.8, and 34.9 meters, very dark gray (10YR 3/1), dipping at 15 to 20 degrees, moderately cemented, moderate strength, weak to strong reaction to HCL.

Interbedded SILTSTONE and SANDSTONE
 Very dark gray (10YR 3/1), dipping at 25 to 30 degrees, moderately cemented, moderate strength, siltstone fissile, parts along bedding planes, strong reaction to HCL; nodule of pale yellow (2.5Y 7/4) claystone at 35.3 meters.

SANDSTONE
 Gray (N5), massive, strongly cemented, high strength, strong reaction to HCL.
Interbedded SILTSTONE and SANDSTONE

Northing/Easting: 565817.449 m / 1978821.644 m
 Surface Elevation: 105.04 m
 Logged By: KMR

Driller/Drill Rig: Ruen Drilling/Christenson C1500
 Equipment/Hammer: NQ Core/No Hammer
 Date Completed: 5-24-01

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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BILLY.GDT_10/1/01_REV.3

Boring Log B-106

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION
	15					92	92					Very dark gray (10YR 3/1), siltstone dipping at 15 to 40.-degrees, sandstone massive, moderately cemented, low to moderate strength, sandstone weak to no reaction to HCL, siltstone strong reaction to HCL; numerous black organic nodules from 36.3 to 36.6 meters.
						37						Sandstone grades to dark gray (N4) at 36.6 meters. Siltstone dipping at 25 to 30 degrees, sandstone dipping at 5 degrees at 36.9 meters.
UCS	16					100	98					Grades with siltstone dipping at 35 to 40 degrees, fissile, scattered black organics and calcite with bedding at 37.2 meters.
						38						SANDSTONE Gray (N5), dipping at 45 to 50 degrees, moderately cemented, moderate strength, no reaction to HCL; 6 mm thick siltstone interbed at 38.2 meters, moderately cemented, moderate strength, fissile, strong reaction to HCL; partings/joints along bedding at 38.3, 38.4, and 38.5 meters, dipping at 50 degrees.
PA	17					39	80					Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1), dipping at 40 to 45 degrees, moderately cemented, moderate strength, scattered black organics, weak reaction to HCL; vertical joint at 38.8 meters, near planar, dipping at 80 to 90 degrees, sheared with polished surfaces throughout. Grades with 25 to 30 degree dip angles at 39.0 meters, fissile, breaks easily along joint sets. Grades with numerous 90 degree joints at 39.3 meters.
						40						Grades with dark gray (10YR 4/1) layers, parting along bedding in siltstone dipping at 15 to 20 degrees; joint dipping at 75 to 80 degrees at 39.9 meters.
PA	18					97	97					Sheared with polished bedding planes at 40.5 and 40.7 meters.
						41						SANDSTONE Gray (N5), massive, strongly cemented, high strength, strong reaction to HCL; joint set dipping at 45 degrees at 40.9 meters.
UCS	19					88	72					SANDSTONE Gray (2.5Y 5/1), massive, moderately cemented, low to moderate strength, no reaction to HCL; sandstone interbeds at 41.4, 41.5, and 41.8 meters, very dark gray (10YR 3/1), dipping at 25 to 30 degrees, weak reaction to HCL, numerous black organic inclusions. Grades gray (N5) at 41.7 meters.

TP₂

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_10/101 REV.3

Northing/Easting: 565817.449 m / 1978821.644 m
 Surface Elevation: 105.04 m
 Logged By: KMR

Driller/Drill Rig: Ruen Drilling/Christenson C1500
 Equipment/Hammer: NQ Core/No Hammer
 Date Completed: 5-24-01

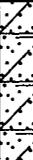
City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

CDM Camp Dresser & McKee Inc.

Boring Log B-106
 Project No: 30182

Figure: A-56
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Boring Log B-106

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
PLI	20					100	100			P ₂			63
						43						Boring terminated at 42.7 meters (bgs). Groundwater depth not inferred during drilling. Boring backfilled with bentonite cement grout and surface seal.	62
						44							61
						45							60
						46							59
						47							58

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01 REV.3

Northing/Easting: 565817.449 m / 1978821.644 m
 Surface Elevation: 105.04 m
 Logged By: KMR

Driller/Drill Rig: Ruen Drilling/Christenson C1500
 Equipment/Hammer: NQ Core/No Hammer
 Date Completed: 5-24-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-107

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIU (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
												Asphaltic cement concrete pavement. Portland cement concrete pavement.	
												FILL (Af) SANDY SILT (ML) Dark grayish brown (10YR 4/2), moist, very stiff, fine sand, trace organics, trace to no clay, nonplastic to low plasticity.	108
-200	1	24.0		150	9 11	1				ML			
						2							
MA	2	7.5		289	6 10	3				SM		RECENT ALLUVIUM (Qal) SILTY SAND (SM) Yellowish brown (10YR 5/4), moist, medium dense, fine sand, trace organics.	106
						4						SAND with silt (SP-SM) Brown (10YR 5/3), moist, dense, fine to medium sand.	105
	3	4.7		60	11 18 20	5				SP-SM			104
												SAND (SP) Brown (10YR 5/3), moist, dense, fine to medium sand, little coarse sand, trace organics.	103

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT 9/1001 REV.3

Northing/Easting: 566417.018 m / 1978404.312 m Driller/Drill Rig: BC2/CME 75
 Surface Elevation: 108.62 m Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Logged By: MH Date Completed: 5-18-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-107

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	4	5.3		53	18 20 21					SP			102
						7						SILTY SAND (SM) Dark grayish brown (10YR 5/2), moist, dense, fine sand, trace mica, trace organics, scattered dark gray silt with sand partings.	
	5	26.2		102	18 17 14					SM			101
						8							
MA	6	14.9		45	18 21 26							Grades with numerous dark gray sand with silt partings.	100
						9							99
						10				SP-SM		SAND with silt (SP-SM) Dark grayish brown (2.5Y 4/1), wet, very dense.	98
	7	13.8		29	28 29 24								
						11				SW		OLDER ALLUVIUM (Qoal) SAND (SW) Dark grayish brown (2.5Y 4/1), wet, very dense.	97
												SILTY CLAY (CL) Dark grayish brown (10YR 4/2) to dark greenish gray (10Y	

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Northing/Easting: 566417.018 m / 1978404.312 m Driller/Drill Rig: BC2/CME 75
 Surface Elevation: 108.62 m Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Logged By: MH Date Completed: 5-18-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-107

DESCRIPTION

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	Elev. (meters)
	8	24.3		40	11 12 21	13				CL		96
AL	9	26.4		18	11 14 15	14						95
	10	24.5		4.9	13 22 27	15				SM		93
	11	19.4		4.1	47 50	17				TP ₂		91

3/1), moist, hard, numerous organics, moderate plasticity.

Grades very stiff with low to moderate plasticity.

SILTY SAND (SM)
Dark grayish brown (10YR 4/2), wet, medium dense, fine sand, trace mica.

BEDROCK - PUENTE FORMATION (Tp2)
SILTSTONE
Dark yellowish brown (10YR 4/4), bedding at 10 to 20 degrees, moist, weakly cemented, low strength, nonplastic, little organics, trace mica, trace medium to coarse sand, weathered with iron oxide staining.

SANDSTONE
Dark grayish brown (10YR 4/2), wet, weakly to noncemented, low strength, fine to medium sand, little mica, some silt.

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV. 3

Northing/Easting: 566417.018 m / 1978404.312 m

Surface Elevation: 108.62 m

Logged By: MH

Driller/Drill Rig: BC2/CME 75

Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto

Date Completed: 5-18-01

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Boring Log B-107
Project No: 30182

Figure: A-57
3 of 8

Boring Log B-107

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) - reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	12			1.8	50								90
	13				50	19						SILTSTONE Very dark gray (10YR 3/1), moist, weakly cemented, low strength, nonplastic, little fine to medium sand, trace mica; scattered 10 to 20 mm thick sandstone interbeds, moderate strength and cementation.	89
						20							88
MA	14	16.6		2.6	50	21				TP ₂			87
						22							
	15			3.4	11 50	23						SANDSTONE Very dark gray (10YR 3/1), moist, weakly to noncemented, low strength, fine to medium sand, numerous weakly cemented siltstone interbeds.	86
												CLAYSTONE Very dark gray (10YR 3/1), thinly bedded (6 mm), moist, nonplastic, weakly to moderately cemented, low to moderate	85

NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV_GDT_9/10/01_REV_3

Northing/Easting: 566417.018 m / 1978404.312 m
 Surface Elevation: 108.62 m
 Logged By: MH

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 5-18-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-107
 Project No: 30182

Figure: A-57
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NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV. 3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
AL	16	19.5	2.6		47 50	25						strength, parts easily along bedding planes.	84
AL	17	27.2	2.6		10 20 40	26				TP ₂		Interbedded SILTSTONE and CLAYSTONE Very dark gray (10YR 3/1), moist, weakly to noncemented, low strength, little fine sand, siltstone low to moderate plasticity, claystone high plasticity.	83
	18		2.6		50	27						SILTSTONE Very dark gray (10YR 3/1), thinly bedded to massive, weakly cemented, low strength, little fine sand, parts easily on bedding planes, strong reaction to HCL.	82
	19			11	50	28							81
						29							80
													79

Northing/Easting: 566417.018 m / 1978404.312 m
 Surface Elevation: 108.62 m
 Logged By: MH

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 5-18-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-107
 Project No: 30182

Figure: A-57
 5 of 8

Boring Log B-107

DESCRIPTION

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (KN/m ³)	PIB (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	20					100	0					SILTSTONE Dark gray (N4) to very dark grayish brown (10YR 3/2), bedded, weakly cemented, low strength, highly sheared, weak reaction to HCL.	
	21					40	0					Interbedded SILTSTONE and SANDSTONE Very dark grayish brown (10YR 3/2) and dark gray (N4), bedded, weakly to moderately cemented, low to moderate strength, weak reaction to HCL.	78
	22					31	0					No recovery from 31.2 to 32 meters.	
	23					33	0						77
	24					32	15	0				SILTSTONE Very dark grayish brown (10YR 3/2), dipping at 55 degrees, bedded, highly cemented, high strength, joint dipping at 20 degrees, strong reaction to HCL.	
						33						No recovery from 32.2 to 33.4 meters.	76
	25					100	50					Interbedded SILTSTONE and SANDSTONE Very dark grayish brown (10YR 3/2) and dark gray (N4), dipping at 45 to 65 degrees, bedded, weakly cemented, low strength, sheared with polished surfaces, fissile siltstone, weak reaction to HCL.	75
PLI						34						Interbedded SILTSTONE and SANDSTONE Very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2), dipping at 20 degrees, bedded, moderately to strongly cemented, moderate to high strength, weak to strong reaction to HCL.	
UCS	26					100	75					Interbedded SILTSTONE and SANDSTONE Dark grayish brown (10YR 4/2), dipping at 30 degrees, bedded, moderately cemented, low to moderate strength, joint infilled with sand dipping at 70 degrees, weak reaction to HCL; 20 mm apparent offset along fracture, dipping 70 degrees, at 35.2 meters.	74
UCS						35							
PA	27					90	86					SANDSTONE Dark grayish brown (10YR 4/2), dipping at 30 degrees, bedded, moderately cemented, moderate strength, weak reaction to HCL. SILTSTONE Very dark grayish brown (10YR 3/2), dipping at 30 degrees, bedded, strongly cemented, high strength, joint dipping at 80	73

Tp

NEIS, SOIL, ROCK LOG, NEIS.GPJ, CDM, BILLY.GDT, 10/1/01 REV. 3

Northing/Easting: 566417.018 m / 1978404.312 m
 Surface Elevation: 108.62 m
 Logged By: MH

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 5-18-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-107

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	pD (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	28					97	83					degrees, strong reaction to HCL. Interbedded SILTSTONE and SANDSTONE Very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2), dipping at 50 to 80 degrees, bedded, moderately to strongly cemented, moderate to high strength, sheared along intersecting joint planes, weak to strong reaction to HCL.	72
						37						No recovery from 36.2 to 36.4 meters. Interbedded SILTSTONE and SANDSTONE Very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2), siltstone dipping at 45 degrees, sandstone dipping at 30 degrees, bedded, weakly to moderately cemented, low to moderate strength, weak to strong reaction to HCL; 2 mm by 20 mm joint infilled with sandstone at 36.7 meters; 5 mm by 60 mm joint filled with sandstone at 37 meters; 5 mm by 70 mm joint dipping at 70 degrees at 37.2 meters; 2 mm by 50 mm joint dipping at 70 degrees at 37.8 meters.	71
	29					38	100	90				Interbedded SILTSTONE and SANDSTONE Very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2), dipping at 30 degrees, bedded, moderately cemented, moderate strength, numerous organic nodules, weak reaction to HCL.	70
						39						SANDSTONE Dark grayish brown (10YR 4/2), dipping at 45 degrees, massive, moderately cemented, moderate strength, weak reaction to HCL.	
PA	30					40	10	0			TP ₁	Interbedded SILTSTONE and SANDSTONE Very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2), dipping at 45 degrees, bedded, moderately cemented, moderate strength, weak reaction to HCL; 10 mm siltstone clast at 39.4 meters; 5 mm joint at 39.5 meters. SANDSTONE Dark gray (N4), massive, strongly cemented, high strength, strong reaction to HCL.	69
						41						No recovery from 39.6 to 41.1 meters.	68
PLI	31					41	70	70				Grades dark grayish brown (10YR 4/2). SILTSTONE Very dark grayish brown (10YR 3/2), dipping at 55 degrees, bedded, moderately cemented, moderate strength, weak reaction to HCL; no recovery from 41.5 to 41.6 meters; apparent reverse joint in siltstone dipping at 80 to 90 degrees, at 41.3 meters. SANDSTONE	67

NEIS_SOIL_ROCK_LOG_NEIS.GPJ CDM_BLLV.GDT 9/10/01 REV. 3

Northing/Easting: 566417.018 m / 1978404.312 m
 Surface Elevation: 108.62 m
 Logged By: MH

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 5-18-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-107

Elev. (meters)

DESCRIPTION

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	32					43	100	100				Dark grayish brown (10YR 4/2) to grayish brown (10YR 5/2), dipping at 35 degrees, bedded, moderately cemented, moderate strength, trace organics, weak reaction to HCL; fracture zone, from 41.7 to 41.8 meters 1 to 3 mm joint filled with clay dipping at 65 degrees. Interbedded SILTSTONE and SANDSTONE Very dark grayish brown (10YR 4/2), dipping at 45 degrees, bedded, weakly to moderately cemented, low to moderate strength, strong reaction to HCL. Boring terminated at 42.7 meters (bgs). Groundwater encountered at 10.5 meters (bgs). Boring backfilled with bentonite cement grout and concrete surface seal.	66
						44							65
						45							64
						46							63
						47							62
													61

Northing/Easting: 566417.018 m / 1978404.312 m
 Surface Elevation: 108.62 m
 Logged By: MH

Driller/Drill Rig: BC2/CME 75
 Equipment/Hammer: H.S.A., Mud Rotary HQ Core/63.5 kg CME Auto
 Date Completed: 5-18-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-107
 Project No: 30182

Figure: A-57
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NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Boring Log B-108

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIV (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
						1					■	Asphaltic cement concrete pavement. Portland cement concrete pavement.	111
						2						Casing advanced without sampling from 0 to 21.3 meters.	110
						3							109
						4							108
						5							107
													106

NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV_GDT_9/10/01 REV. 3

Northing/Easting: 566631.95 m / 1978254.793 m
 Surface Elevation: 111.49 m
 Logged By: KMR

Driller/Drill Rig: Ruen Drilling/Christenson C1500
 Equipment/Hammer: NQ Core/No Hammer
 Date Completed: 5-22-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-108
 Project No: 30182

Figure: A-58
 1 of 8

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) <small>-reading-background</small>	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
						7						Casing advanced without sampling from 0 to 21.3 meters.	105
													104
						8							103
													102
						9							101
						10						100	
						11							

Northing/Easting: 566631.95 m / 1978254.793 m
 Surface Elevation: 111.49 m
 Logged By: KMR

Driller/Drill Rig: Ruen Drilling/Christenson C1500
 Equipment/Hammer: NQ Core/No Hammer
 Date Completed: 5-22-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT 9/10/01 REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PID (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
						13						Casing advanced without sampling from 0 to 21.3 meters.	99
						14							98
						15							97
						16							96
						17							95
													94

Northing/Easting: 566631.95 m / 1978254.793 m
 Surface Elevation: 111.49 m
 Logged By: KMR

Driller/Drill Rig: Ruen Drilling/Christenson C1500
 Equipment/Hammer: NQ Core/No Hammer
 Date Completed: 5-22-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-108

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) - reading background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	1					19							93
	2					22	94	94				<p>BEDROCK - PUENTE FORMATION (Tp2)</p> <p>SANDSTONE Gray (N5) and yellowish brown (10YR 5/6), dipping at 25 degrees, weak to moderately cemented, low to moderate strength, medium grained, no reaction to HCL.</p> <p>Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and dark gray (N4), dipping at 30 to 40 degrees, bedding 3 to 75 mm thick, moderately cemented, moderate strength, scattered black organic nodules, no reaction to HCL.</p> <p>Sheared along bedding with slickensides at 22.3 meters. 46 mm fissile joint infilled with clay dipping at 80 degrees at 22.8 meters and 23.3 meters.</p>	90
	3					23	96	91				<p>Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and gray (N5), dipping at 30 to 40 degrees, laminated, weakly to moderately cemented, low to moderate strength, little mica, strong reaction to HCL, scattered black organic nodules; joint with polished surface</p>	88

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Northing/Easting: 566631.95 m / 1978254.793 m
 Surface Elevation: 111.49 m
 Logged By: KMR

Driller/Drill Rig: Ruen Drilling/Christenson C1500
 Equipment/Hammer: NQ Core/No Hammer
 Date Completed: 5-22-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-108

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	4					100	98					along bedding plane at 23.8 meters, joint/shear with polished slickensides, dipping at 15 degrees, at 24.0 meters.	87
PLI						25						Joint along bedding at 24.9 meters.	86
UCS	5					26	100	97				SANDSTONE Dark gray (N4), massive, weak to moderately cemented, low to moderate strength, little mica, weak reaction to HCL.	85
PLI						27						Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and dark gray (N4), dipping at 35 to 40 degrees, bedding 6 to 75 mm thick, moderately cemented, moderate strength, trace mica, scattered black organic nodules, weak to strong reaction to HCL; joint along bedding at 26.7 meters.	85
	6					100	100					SANDSTONE Gray (N5), massive, weakly cemented, low strength, no reaction to HCL.	84
						28						SANDSTONE Dark gray (N4), massive, moderately cemented, low to moderate strength, medium grained, no reaction to HCL.	83
UCS, PA	7					29	90	90				Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and gray (N5), dipping at 35 to 40 degrees, bedding 3 to 25 mm thick, moderately cemented, moderate strength, weak reaction to HCL in sandstone, strong reaction to HCL in siltstone; organic and clay nodules, typically 3 mm by 15 mm, at 29.5 meters.	82

NEIS SOIL ROCK LOG NEIS.GPJ CDM BLLV.GDT 10/1/01 REV. 3

Northing/Easting: 566631.95 m / 1978254.793 m
 Surface Elevation: 111.49 m
 Logged By: KMR

Driller/Drill Rig: Ruen Drilling/Christenson C1500
 Equipment/Hammer: NQ Core/No Hammer
 Date Completed: 5-22-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-108

DESCRIPTION

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	8					100	100					Joint at 30.3 meters; no recovery from 30.3 to 30.5 meters.	81
						31						SANDSTONE Dark gray (N4), massive, weakly to moderately cemented, low to moderate strength, medium to coarse grained, no reaction to HCL.	
PLI, ITS	9					32						Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) and gray (N5), dipping at 30 to 40 degrees, moderately cemented, moderate strength, strong reaction to HCL in siltstone, weak reaction to HCL in sandstone.	80
													79
PLI	10					33	44	44		Tp ₂		SANDSTONE Dark gray (N4), massive, moderately cemented, low to moderate strength, no reaction to HCL; no recovery from 33.2 to 33.5 meters.	78
													78
UCS	11					34	100	100				Interbedded SILTSTONE and SANDSTONE Siltstone, very dark gray (10YR 3/1), dipping at 20 to 25 degrees, moderately cemented, low to moderate strength, weak to strong reaction to HCL; sandstone, gray (N5), massive, moderately cemented, moderate strength, medium to coarse grained, weak to no reaction to HCL.	77
												Siltstone seam, sheared along bedding, 3 mm thick, with polished surfaces, at 34.4 meters. Grades with scattered black organic nodules at 34.5 meters.	77
PLI PA	12					35	97	97				Joint dipping at 75 to 80 degrees at 35.0 meters. Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1), dipping at 25 to 30 degrees in siltstone, dipping at 35 to 40 degrees in sandstone, 6 to 100 mm thick, moderately cemented, moderate strength, scattered black organic nodules, strong reaction to HCL in siltstone, weak reaction to HCL in sandstone. Interbedded SANDSTONE and SILTSTONE Gray (N5) and very dark gray (10YR 3/1), moderately cemented, moderate strength; sandstone, massive, no	76

Northing/Easting: 566631.95 m / 1978254.793 m

Surface Elevation: 111.49 m

Logged By: KMR

Driller/Drill Rig: Ruen Drilling/Christenson C1500

Equipment/Hammer: NQ Core/No Hammer

Date Completed: 5-22-01

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Boring Log B-108
Project No: 30182

Figure: A-58
6 of 8

Boring Log B-108

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	13					37	97	97				reaction HCL, siltstone bedded at 30 degrees, strong reaction to HCL.	75
						37						Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1), dipping at 20 to 25 degrees, 6 to 40 mm thick bedding, moderately cemented, moderate strength, sandstone medium grained, strong reaction to HCL in siltstone, weak reaction to HCL in sandstone; parting along bedding at 36.7 meters; scattered black organic nodules from 36.8 to 36.9 meters.	74
PLI UCS	14					38	100	100				SANDSTONE Gray (N6), massive, strongly cemented, high strength, strong reaction to HCL.	73
UCS						39				TP ₁		SANDSTONE Very dark gray (10YR 3/1) to gray (N5), dipping at 30 degrees, 6 to 50 mm thick, moderately cemented, moderate strength, scattered organic nodules, weak reaction to HCL.	72
	15					40	92	92				Interbedded SILTSTONE and SANDSTONE Very dark gray (10YR 3/1) to dark gray (N4), dipping at 20 to 30 degrees, 6 to 40 mm thick bedding, moderately cemented, low to moderate strength, sandstone fine to medium grained, strong reaction to HCL in siltstone, weak to no reaction to HCL in sandstone; at 39.7 meters siltstone reacts weakly to HCL.	71
PLI UCS	16					41	100	80				At 41.1 meters sandstone grades gray (10YR 5/1), massive.	70
												SILTSTONE Gray (10YR 5/1), dipping at 30 degrees, 6 to 40 mm thick, moderately cemented, moderate strength, scattered black organic nodules, weak reaction to HCL. SANDSTONE Gray (N5), massive, strongly cemented, high strength, strong	

NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV_GDT_9/0/001_REV.3

Northing/Easting: 566631.95 m / 1978254.793 m Driller/Drill Rig: Ruen Drilling/Christenson C1500
 Surface Elevation: 111.49 m Equipment/Hammer: NQ Core/No Hammer
 Logged By: KMR Date Completed: 5-22-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-108 Figure: **A-58**
 Project No: 30182 7 of 8

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIV (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
												reaction to HCL.	
												SANDSTONE Gray (N5), massive, weakly cemented, low strength, no reaction to HCL; disturbed from drilling.	69
						43						Boring terminated at 42.7 meters (bgs) Groundwater not observed during drilling Boring abandoned with bentonite cement grout and concrete surface seal.	68
						44							67
						45							66
						46							65
						47							64

Northing/Easting: 566631.95 m / 1978254.793 m Driller/Drill Rig: Ruen Drilling/Christenson C1500
 Surface Elevation: 111.49 m Equipment/Hammer: NQ Core/No Hammer
 Logged By: KMR Date Completed: 5-22-01

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Boring Log B-115

DESCRIPTION

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
												Asphaltic cement concrete pavement.	
	1	35.8		0	2 2 2	1						FILL (Af) CLAYEY SILT (ML) Very dark grayish brown (10YR 3/2), moist, soft, low plasticity, trace mica, numerous root holes lined with iron oxide staining.	101
AL	2	39.0		0	1 1 2	2				ML		At 3.0 meters, grades low to moderate plasticity, scattered dark brown organic inclusions, scattered fine sand partings.	100
	3	43.1		0	2 2 2	3							99
						4							98
						5							97
												RECENT ALLUVIUM (Qal) CLAYEY SILT (ML) Very dark grayish brown (10YR 3/2), moist, stiff, scattered dark brown organic inclusions, and moderate to high plasticity	

Northing/Easting: 564749.685 m / 1979117.829 m

Surface Elevation: 102.01 m

Logged By: MH

Driller/Drill Rig: Spectrum/CME 75

Equipment/Hammer: H.S.A./63.5 kg CME Auto

Date Completed: 7-20-01

City of Los Angeles, Bureau of Engineering
Northeast Interceptor Sewer, Phase II
Los Angeles, California

Boring Log B-115
Project No: 30182

Figure: A-64
1 of 6

Boring Log B-115

DESCRIPTION

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) = reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	4			0	2 3 6					ML		silty clay partings, scattered sand with silt seams.	
						7						GRAVEL with silt and sand (GP-GM) Gray (2.5Y 6/1), moist, very dense, fine to medium sand, fine to coarse subangular to angular gravel.	95
MA	5	7.8		2.1	9 33 45	8				GP-GM			94
						9						SAND with silt (SW-SM) Grayish brown (2.5Y 5/2), moist, medium dense, fine to medium sand.	93
MA	6	6.5		0.7	13 14 15					SW-SM			
						10						SANDY SILT (ML) Dark greenish gray (10Y 3/1), moist, loose, non plastic, fine sand, numerous fine to medium sand interbeds dipping at 25 degrees, scattered roots.	92
	7			0	3 2 4	11				ML			91
												SAND with silt and gravel (SP-SM) Dark greenish gray (10Y 3/1), wet, dense, fine to coarse subrounded sand, fine subangular gravel.	

NEIS_SOIL_ROCK_LOG_N:SGPJ_CDM_BLLV.GDT:9/10/01 REV.3

Northing/Easting: 564749.685 m / 1979117.829 m
 Surface Elevation: 102.01 m
 Logged By: MH

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A./63.5 kg CME Auto
 Date Completed: 7-20-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-115

DESCRIPTION

Elev. (meters)

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA	8	11.5		0	13 20 22	13			SP-SM				
	9	9.3		0.7	15 19 21	14			SW			OLDER ALLUVIUM(Qoal) SAND with gravel (SW) Dark gray (N4), wet, dense, fine to coarse sand and subangular gravel.	89
	10	11.1		0	27 50/0.13m	15			SP			SAND with gravel (SP) Dark greenish gray (10Y 4/1), wet, very dense, medium to coarse subangular sand and fine to coarse subangular to angular gravel.	87
	11	8.5		0	21 72 84	17			GW-GM			GRAVEL with silt and sand (GW-GM) Dark gray (N4), wet, very dense, fine to coarse grained gravel and sand, subangular to angular.	86
												SAND with silt (SW-SM) Dark gray (N4), wet, very dense, fine to coarse sand.	85

NEIS_SOIL_ROCK_LOG_N:\S.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Northing/Easting: 564749.685 m / 1979117.829 m
 Surface Elevation: 102.01 m
 Logged By: MH

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A./63.5 kg CME Auto
 Date Completed: 7-20-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-115										Elev. (meters)	
Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIU (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample		USCS
MA	12	12.4			20 32 33	19			SW-SM		SILTY CLAY (CL) Dark greenish gray (5GY 3/1), moist, very stiff, low to moderate plasticity, trace mica, trace organics, numerous white inclusions.
AL	13	27.0			4 5 14	20			CL		
MA	14	15.1			15 44 50/0 13m	22			SM		SILTY SAND (SM) Dark gray (N4), wet, very dense, trace mica, slight hydrogen sulfide-like odor, scattered 3 mm thick silt partings, trace to little fine subangular gravel.
	15	10.0			19 20 40	23					Grades to medium to coarse sand, trace fine gravel.
											SAND with silt (SP-SM) Gray (N5), wet, very dense, fine to medium sand, hydrogen sulfide-like odor.

NEIS_SOIL_ROCK_LOG_N:\S\GPJ_CDM_BLLV\GDT_9/10/01_REV.3

Northing/Easting: 564749.685 m / 1979117.829 m Driller/Drill Rig: Spectrum/CME 75
 Surface Elevation: 102.01 m Equipment/Hammer: H.S.A./63.5 kg CME Auto
 Logged By: MH Date Completed: 7-20-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

NEIS_SOIL_ROCK_LOG_N: S.GPJ_CDM_BLLV.GDT_9/10/01_REV.3

Boring Log B-115										Elev. (meters)		
Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIU (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample		USCS	Symbol
	16	14.1			21 56 100	25			SP-SM			
	17				100/0.08m	26						PUENTE FORMATION (Tp2) SANDSTONE Gray (N5), low strength, weak to moderate cementation, strong reaction to HCL, massive, fine to medium grained, trace coarse grains, no bedding observed.
	18					27	93					At 27.0 meters, grades dark gray (N4), weak reaction to HCL, bedded with low and moderate strength interbeds.
	19					28	93					At 27.7 meters, grades moderate to high strength, moderate cementation. At 28.0 meters, grades low strength, weak cementation. At 28.3 meters, grades low to moderate strength and cementation, weak reaction to HCL. massive.
	20					29						

Northing/Easting: 564749.685 m / 1979117.829 m Driller/Drill Rig: Spectrum/CME 75
 Surface Elevation: 102.01 m Equipment/Hammer: H.S.A./63.5 kg CME Auto
 Logged By: MH Date Completed: 7-20-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

NEIS_SOIL_ROCK_LOG_NEIS_GPJ_CDM_BLLV_GDT_9/10/01_REV_3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIV (ppm) - reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	21					31	100					At 30.2 meters, grades low strength, weak cementation.	71
						32						At 32.0 meters, grades to dark grayish brown (10YR 4/2) SILTSTONE with interbeds dipping at 25 degrees, low to moderate strength, weak to moderate cementation.	70
						33						Boring terminated at 32.6 meters (bgs). Groundwater encountered at 12.2 meters (bgs) during drilling. Boring abandoned with bentonite grout and concrete surface seal.	69
						34							68
						35							67

Northing/Easting: 564749.685 m / 1979117.829 m
 Surface Elevation: 102.01 m
 Logged By: MH

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A./63.5 kg CME Auto
 Date Completed: 7-20-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-120

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PI (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
												Asphaltic cement concrete pavement.	
Chem	1	2.9		0	94/0.15m	1			X	SP		RECENT ALLUVIUM (Qal) SAND (SP) Grayish brown (2.5Y 5/2), moist, very dense, fine to medium sand, trace fine to coarse subangular gravel.	100
MA, Chem	2	2.1		0	64 65 68	3			X	GP		GRAVEL with sand (GP) Grayish brown (2.5Y 5/2), moist, very dense, fine to medium sand, fine to coarse subangular gravel.	99
Chem	3	2.2		0	102/0.15m	4			X	SP		SAND (SP) Grayish brown (2.5Y 5/2), moist, very dense, fine to medium sand, trace coarse sand, trace fine subangular gravel.	98
						5						SILTY SAND with gravel (SM) Yellowish brown, (10YR 5/4), moist, very dense, fine to medium sand, trace coarse sand, fine to coarse subangular gravel.	97
													96
													95

NEIS SOIL ROCK LOG NEIS.GPJ CDM_BLLV.GDT 9/20/01 REV.3

Northing/Easting: 564048.234 m / 1979390.759 m
 Surface Elevation: 100.77 m
 Logged By: MH

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A./63.5 kg CME Auto
 Date Completed: 8-3-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

Boring Log B-120

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) =reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
MA, Chem	4	4.5		0	99/0 15m	7			☒	SM			94
	5	15.0		0	100/0.13m	8			☒			PUENTE FORMATION (Tp2) SILTSTONE Very dark gray (10YR 3/1), low strength, weak cementation, 35 degree dip, thin laminar bedding less than 1 mm thick.	93
	6			0	72 99	9			☒			Grades very dark gray (10YR 3/1) to brown (10YR 4/3), 30 degree dip.	92
	7			0	105/0 15m	10			☒			SANDSTONE Dark green (N4), low strength, weak cementation, thinly bedded.	91
					51	11							90
													89

NEIS_SOIL_RCCK_LOG_N: S.G.P.J_CDM_BILLV.GDT 9/10/01 REV 3

Northing/Easting: 564048.234 m / 1979390.759 m
 Surface Elevation: 100.77 m
 Logged By: MH

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A./63.5 kg CME Auto
 Date Completed: 8-3-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

NEIS_SOIL_ROCK_LOG_NEIS.GPJ_CDM_BLLV.GDT 9/10/01 REV. 3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (kN/m ³)	PIB (ppm) -reading-background	Penetration Resistance (blows / 0.15m)	Depth (meters)	Recovery (%)	RQD (%)	Sample	USCS	Symbol	DESCRIPTION	Elev. (meters)
	8			0	100/0.08m				X		/		
						13						Boring terminated at 12.2 meters (bgs) Groundwater not observed during drilling Boring backfilled with bentonite chips.	88
						14							87
						15							86
						16							85
						17							84
													83

Northing/Easting: 564048.234 m / 1979390.759 m
 Surface Elevation: 100.77 m
 Logged By: MH

Driller/Drill Rig: Spectrum/CME 75
 Equipment/Hammer: H.S.A./63.5 kg CME Auto
 Date Completed: 8-3-01

City of Los Angeles, Bureau of Engineering
 Northeast Interceptor Sewer, Phase II
 Los Angeles, California

**CITY OF LOS ANGELES
DEPARTMENT OF GENERAL SERVICES
STANDARDS DIVISION**

AVENUE 45 - ARROYO DRIVE RELIEF SEWER

LAB NO. 140-5498

2006 FEB -9 AM 8:26

GEOTECHNICAL DIVISION
ENGINEERING

**W.O NO. E2000462
FEBRUARY 2006**

GEOTECHNICAL SERVICES FILE: 00-072

KEY TO SYMBOLS

Symbol Description

Symbol Description

STRATA



Silty sands, sand-silt mixtures



BEDROCK - Sandstone interbedded with siltstone



Silty gravels, gravel-sand-silt mixtures



BEDROCK - Sandstone



AC pavement.



BEDROCK - Claystone interbedded with sandstone



BEDROCK - Claystone



Inorganic clays or low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays



Interbedded sandstone/clay shale bedrock or claystone interbedded with sandstone bedrock

Notes:

1. The Notice to Proceed with the subsurface investigation was given by GED to Standards on 09/29/2005.
2. Exploratory borings were drilled on 10/24, 10/25, 10/26, 11/02, 11/16, 11/22, 11/30, 12/07, 12/08, and 12/13/2005 with a CME-75HT drill rig using 8" diameter hollow stem augers.
3. Groundwater, perched groundwater and groundwater seepage were encountered at locations and depths indicated on the logs during the drilling of this project.
4. Boring locations were provided by Geotechnical Services and verified by Standards. Test boring location coordinates were either provided by GED or estimated by Standards using a hand held Trimble GPS device.
5. Abbreviations used on logs:

N/o = north of	NCF = north curb face	NE = northeast
S/o = south of	SCF = south curb face	NW = northwest
E/o = east of	ECF = east curb face	SE = southeast
W/o = west of	WCF = west curb face	SW = southwest
C/L = center line		PL = property line
AC = asphalt concrete		PCC = Portland cement concrete
OVA = organic vapor analyzer		LEL = lower explosive limit
PPM = parts per million		HT = high torque
6. The stratification lines indicated on the boring maps and profiles represent the approximate boundary between material types and the transition may be gradual.
7. The materials, boundaries, and conditions have been established only at the boring locations, and are not necessarily representative of subsurface conditions elsewhere across the site.

KEY TO SYMBOLS

Symbol Description

Symbol Description

STRATA

	BEDROCK - Shale interbedded with sandstone
	Inorganic clays of high plasticity, fat clays
	BEDROCK - Claystone interbedded with siltstone, completely weathered, soil-like
	BEDROCK - Claystone interbedded with siltstone
	BEDROCK - Silty sandstone, severely weathered
	BEDROCK - Shale, slightly to moderately weathered
	BEDROCK - Shale
	BEDROCK - Siltstone interbedded with claystone and sandstone

	Concrete seal.
	Assorted cuttings.
	Bentonite pellets.
	Silica sand, blank PVC.
	Slotted PVC pipe.
	Slotted pipe w/ sand.
	Silica sand, no pipe (end plug).
	End of well installation.

MISCELLANEOUS

	Water table at date indicated.
	Water seep at date indicated.
	Boring continues.
	Drill rejection.

SAMPLERS

	Split Spoon.
	No sample recovery.

MONITOR WELL DETAILS

	Flush-mount cover.
--	--------------------

UNIFIED SOIL CLASSIFICATION SYSTEM *

MAJOR DIVISIONS		GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of material is LARGER than No.200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No.4 sieve size)	CLEAN GRAVELS (Little or no fines)	 GW Well graded gravels, gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amount of fines)	 GP Poorly graded gravels or gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amount of fines)	 GM Silt gravels, gravel-sand-silt mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No.4 sieve size)	CLEAN SANDS (Little or no fines)	 SW Well graded sands, gravelly sands, little or no fines.
		CLEAN SANDS (Little or no fines)	 SP Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	 SM Silty sands, sand-silt mixtures.
		SANDS WITH FINES (Appreciable amount of fines)	 SC Clayey sands, sand-clay mixtures.
		SANDS WITH FINES (Appreciable amount of fines)	 ML Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
	FINE GRAINED SOILS (More than 50% of material is SMALLER than No.200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)	 CL Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			 OL Organic silts and organic silty clays of low plasticity.
 MH Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.			
SILTS AND CLAYS (Liquid limit GREATER than 50)		 CH Inorganic clays of high plasticity, fat clays.	
		 OH Organic clays of medium to high plasticity, organic silts.	
		 Pt Peat and other highly organic soils.	

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

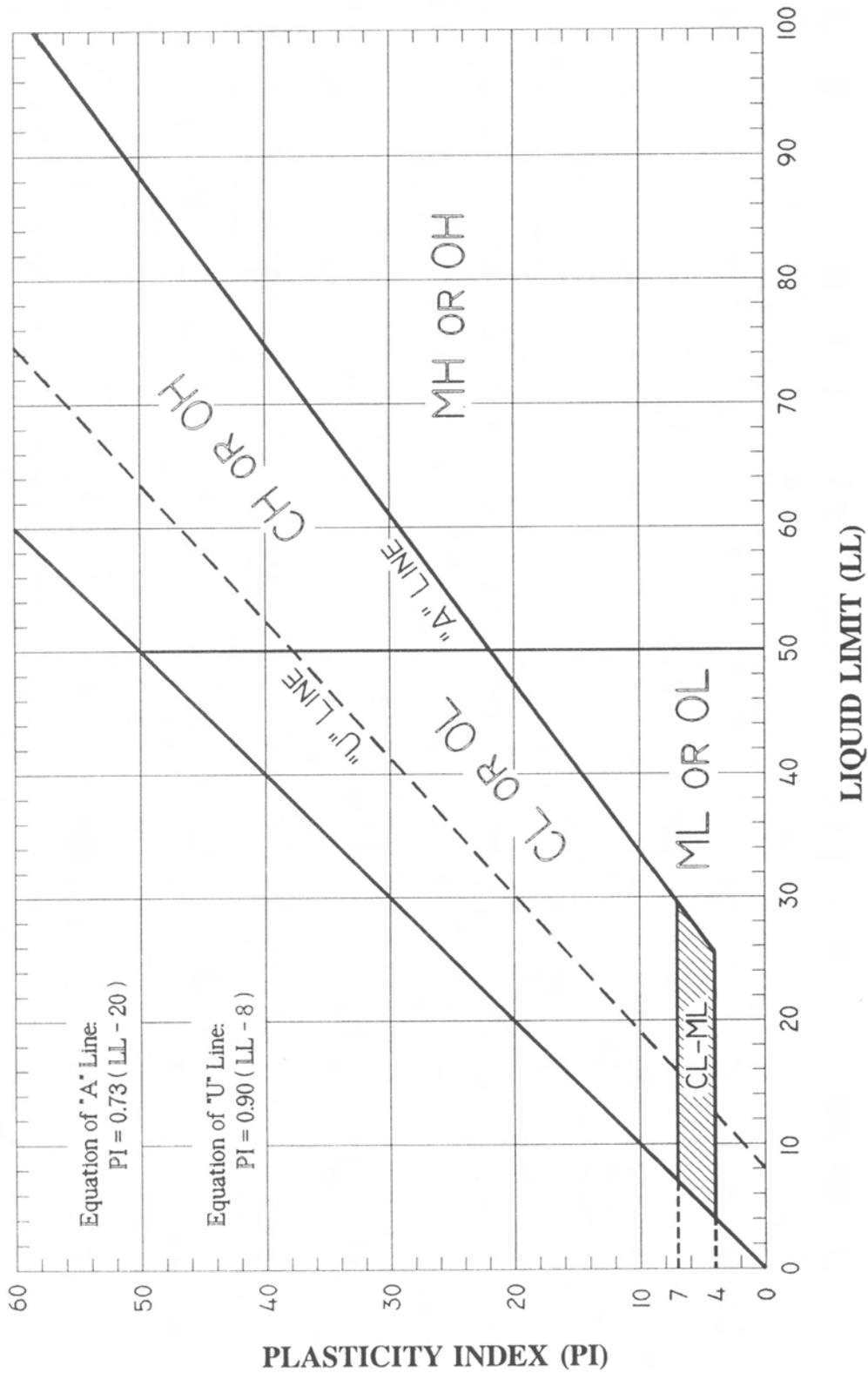
P A R T I C L E S I Z E L I M I T S

SILT OR CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		
	No.200	No.40	No.10	No.4	3/4 in.	3 in.	12 in.
	U. S. S T A N D A R D S I E V E S I Z E						

* Reference:
 The Unified Soil Classification System, Corps of Engineers,
 U.S. Army Technical Memorandum No. 3-357, Vol. I, March 1953.
 (Revised April, 1960)

CITY OF LOS ANGELES
DEPARTMENT OF GENERAL SERVICES
 STANDARDS DIVISION
 2319 DORRIS PLACE
 LOS ANGELES CA 90031
 (213) 485-2242

CLASSIFICATION OF FINE-GRAINED SOILS *



* Reference:
U.S. Army Corps of Engineers

CITY OF LOS ANGELES
DEPARTMENT OF GENERAL SERVICES
 STANDARDS DIVISION
 2319 DORRIS PLACE
 LOS ANGELES CA 90031
 (213) 483-2242

LOG OF TEST BORING

LAB. NO.: 140- 5498

PROJECT: AVENUE 45 - ARROYO DR. RELIEF SEWER

BORING NO.: A-1

ELEVATION: 436.5'

DRILLING DATE: 11/22/2005

BORING LOCATION: 5' W/o WCF Ave. 49 & 4' N/o Dead End of Ave. 49 S/o Figueroa St.

DRILL RIG TYPE: CME-75HT using 8" diameter hollow stem augers

DEPTH TO STANDING WATER: 24'

DEPTH TO WATER SEEPAGE: None

DRILLER: Adams

LOGGER: Roth

ENGINEER: Noreen

ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	LEL (%)	OVA (PPM)	USCS	Field Description	Moist. %	Dry Dens. Pcf
0				SM/GM	Brown silty sand with gravel/silty gravel with sand. Moist and dense. Bulk soil sample taken from 0 to 5' depth.		
435							
5	3/6 14/6	0	0		Gravel content increased at 5' depth with a few cobbles present.	3.2	99
430							
10	13/6 29/6	0	0			1.1	128
425							
15	9/6 11/6	0	0			3.8	120
420							
20	24/6 26/6	0	0			4.5	127
415							
25	11/6 20/6	0	0			3.6	123
410							
27	27/6 23/3	0	0			5.4	125
25	50/3	0	0		Encountered groundwater at 24' depth. No rings retained for Split Spoon sample at 25' depth.		
30	14/6 19/6	0	0			9.2	135
405					BEDROCK- Brown to gray Sandstone interbedded with siltstone, fine to medium grained, slight to moderate weathering, weak to very strong, weak to strong silica cement. No rings retained for Split Spoon sample at 30' depth.		
35	50/5	0	0				
400	51/3	0	0		No rings retained for Split Spoon sample at 35' depth.		
					--- Encountered groundwater at 24' depth. ---		

LOG OF TEST BORING

LAB. NO.: 140- 5498 **PROJECT:** AVENUE 45 - ARROYO DR. RELIEF SEWER

BORING NO.: A-1 **ELEVATION:** 436.5' **DRILLING DATE:** 11/22/2005

BORING LOCATION: 5' W/o WCF Ave. 49 & 4' N/o Dead End of Ave. 49 S/o Figueroa St.

DRILL RIG TYPE: CME-75HT using 8" diameter hollow stem augers

DEPTH TO STANDING WATER: 24' **DEPTH TO WATER SEEPAGE:** None

DRILLER: Adams **LOGGER:** Roth **ENGINEER:** Noreen

ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	LEL (%)	OVA (PPM)	USCS	Field Description	Moist. %	Dry Dens. Pcf
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 5px;">40</div> <div style="margin-bottom: 5px;">395</div> <div style="margin-bottom: 5px;">45</div> <div style="margin-bottom: 5px;">390</div> <div style="margin-bottom: 5px;">50</div> <div style="margin-bottom: 5px;">385</div> <div style="margin-bottom: 5px;">55</div> <div style="margin-bottom: 5px;">380</div> <div style="margin-bottom: 5px;">60</div> <div style="margin-bottom: 5px;">375</div> <div style="margin-bottom: 5px;">65</div> <div style="margin-bottom: 5px;">370</div> <div style="margin-bottom: 5px;">70</div> <div style="margin-bottom: 5px;">365</div> <div style="margin-bottom: 5px;">75</div> <div style="margin-bottom: 5px;">360</div> </div>					Test Boring Location Coordinates: Northing: 4149316.4 Easting: 4227030.5 ---		

LOG OF TEST BORING

LAB NO.: 140- 5498 **PROJECT:** AVE 45-ARROYO DR. RELIEF SEWER-WELL INSTALLATION

BORING NO.: A-1 **ELEV.:** 436.5' **DATE:** 11/22/2005

BORING LOCATION: 5' W/o WCF Ave. 49 & 4' N/o Dead End of Ave. 49 S/o Figueroa St.

DRILL RIG TYPE: CME-75HT using 8" diameter hollow stem augers

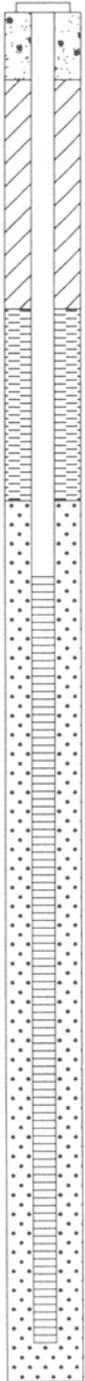
DRILLER: Adams

LOGGER: Roth

ENGINEER: Noreen

DEPTH TO WATER: 24'

DEPTH TO WATER SEEPAGE: None

ELEVATION / DEPTH (ft)	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	USCS	Field Description
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">0</div> <div style="margin-bottom: 10px;">435</div> <div style="margin-bottom: 10px;">5</div> <div style="margin-bottom: 10px;">430</div> <div style="margin-bottom: 10px;">10</div> <div style="margin-bottom: 10px;">425</div> <div style="margin-bottom: 10px;">15</div> <div style="margin-bottom: 10px;">420</div> <div style="margin-bottom: 10px;">20</div> <div style="margin-bottom: 10px;">415</div> <div style="margin-bottom: 10px;">25</div> <div style="margin-bottom: 10px;">410</div> <div style="margin-bottom: 10px;">30</div> <div style="margin-bottom: 10px;">405</div> <div style="margin-bottom: 10px;">35</div> <div style="margin-bottom: 10px;">400</div> </div>			<p>SM/ GM</p>	<p>Brown silty sand with gravel/silty gravel with sand. Moist and dense. Bulk soil sample taken from 0 to 5' depth.</p> <p>Gravel content increased at 5' depth with a few cobbles present.</p> <p>Encountered groundwater at 24' depth. No rings retained for Split Spoon sample at 25' depth.</p> <p>BEDROCK- Brown to gray Sandstone interbedded with siltstone, fine to medium grained, slight to moderate weathering, weak to very strong, weak to strong silica cement. No rings retained for Split Spoon sample at 30' depth.</p> <p>No rings retained for Split Spoon sample at 35' depth.</p> <p style="text-align: center;">---</p> <p style="text-align: center;">Encountered groundwater at 24' depth.</p> <p style="text-align: center;">---</p> <p style="text-align: center;">Installed a 2" PVC monitoring well to a depth of 36'; 20' slotted pipe</p>

LOG OF TEST BORING

LAB NO.: 140- 5498 **PROJECT:** AVE 45-ARROYO DR. RELIEF SEWER-WELL INSTALLATION

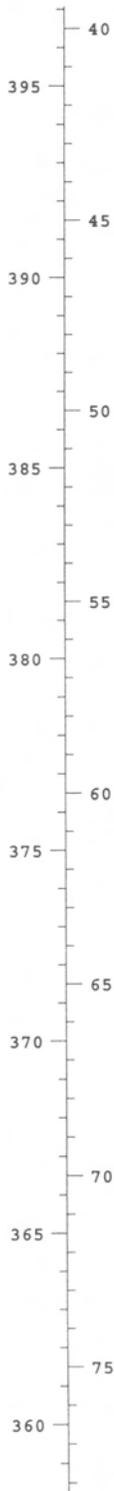
BORING NO.: A-1 **ELEV.:** 436.5' **DATE:** 11/22/2005

BORING LOCATION: 5' W/o WCF Ave. 49 & 4' N/o Dead End of Ave. 49 S/o Figueroa St.

DRILL RIG TYPE: CME-75HT using 8" diameter hollow stem augers

DRILLER: Adams **LOGGER:** Roth **ENGINEER:** Noreen

DEPTH TO WATER: 24' **DEPTH TO WATER SEEPAGE:** None

ELEVATION / DEPTH (ft)	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	USCS	Field Description
 <p style="font-size: small;">40 395 45 390 50 385 55 380 60 375 65 370 70 365 75 360</p>				<p>and 15' solid pipe. Backfill: 36' to 13' depth - #3 sand, 13' to 8' depth - bentonite pellets, 8' to 2' depth - soil cuttings, 2' to grade - PCC</p>

LOG OF TEST BORING

LAB. NO.: 140- 5498 **PROJECT:** AVENUE 45 - ARROYO DR. RELIEF SEWER
BORING NO.: A-7 **ELEVATION:** 460.3' **DRILLING DATE:** 12/07/2005
BORING LOCATION: 8' S/o NCF Carlota Bl. and 130' E/o ECF Ave. 55
DRILL RIG TYPE: CME-75HT using 8" diameter hollow stem augers
DEPTH TO STANDING WATER: 19' **DEPTH TO WATER SEEPAGE:** None
DRILLER: Adams **LOGGER:** Roth **ENGINEER:** Noreen

ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	LEL (%)	OVA (PPM)	USCS	Field Description	Moist. %	Dry Dens. Pcf
460 - 0				GM/SM	6" AC pavement in fair condition Brown silty gravelly sand/sandy gravel with cobbles. Moist and dense. Bulk soil sample taken from 0 to 2½' depth.		
455 - 5	10/6 9/6	0	0		Split Spoon sample at 5' depth not recovered.		
450 - 10	9/6 9/6	0	0			2.1	117
445 - 15	12/6 23/6	0	0		No rings retained for Split Spoon sample @ 15' depth.	1.2	
440 - 20	3/6 3/6	0	0		Encountered perched groundwater @ 19' depth Split Spoon sample at 20' depth not recovered.		
435 - 25	38/6 12/2	0	2		BEDROCK- Dark gray claystone interbedded with sandstone, fine grained sand, slight weathering, friable to moderately strong. No rings retained for Split Spoon sample @ 25' depth.	16.0	
430 - 30	50/4	0	0		BEDROCK- Dark gray claystone, slight weathering, friable to moderately strong. Split Spoon sample @ 30' depth retained only 3 rings.	15.1	105
	50/2	0	0		Split Spoon sample @ 32½' depth retained only 3 rings.	14.8	103
425 - 35	50/2	0	0		BEDROCK- Dark gray claystone interbedded with sandstone, fine grained sand beds up to 1 cm, slight weathering, moderately strong. Split Spoon sample @ 35' depth retained only 3 rings.	16.7	101
	50/1	0	0			16.9	

LOG OF TEST BORING

LAB. NO.: 140- 5498 **PROJECT:** AVENUE 45 - ARROYO DR. RELIEF SEWER
BORING NO.: A-7 **ELEVATION:** 460.3' **DRILLING DATE:** 12/07/2005
BORING LOCATION: 8' S/o NCF Carlota Bl. and 130' E/o ECF Ave. 55
DRILL RIG TYPE: CME-75HT using 8" diameter hollow stem augers
DEPTH TO STANDING WATER: 19' **DEPTH TO WATER SEEPAGE:** None
DRILLER: Adams **LOGGER:** Roth **ENGINEER:** Noreen

ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	LEL (%)	OVA (PPM)	USCS	Field Description	Moist. %	Dry Dens. Pcf
420	50/3	0	0		BEDROCK- Dark gray claystone, slight weathering, friable. No rings retained for Split Spoon sample @ 37½' depth.	18.7	93
	50/2	0	17		BEDROCK- Dark gray claystone interbedded with sandstone, fine grained sand, slight weathering, friable to moderately strong.	20.9	94
415	50/3	0	0		Split Spoon sample @ 40' depth retained only 2 rings. Split Spoon sample @ 42½' depth retained only 3 rings. No rings retained for Split Spoon sample @ 45' depth.		
410	50/3	0	0		No rings retained for Split Spoon sample @ 50' depth.		
405	50/5	0	0		Split Spoon sample @ 55' depth retained only 4 rings.	15.2	112
400	50/1	0	0		Split Spoon sample at 60' depth not recovered.		
					--- Encountered perched water @ 19' depth. ---		
395					Test Boring Location Coordinates: Northing: 4149910.9 Easting: 4229156.0 ---		
390					Note: 6" diameter flight augers used for the top five feet for safety reasons.		
385							

LOG OF TEST BORING

LAB NO.: 140- 5498

PROJECT: AVE 45-ARROYO DR. RELIEF SEWER-WELL INSTALLATION

BORING NO.: A-7

ELEV.: 460.3'

DATE: 12/07/2005

BORING LOCATION: 8' S/o NCF Carlota Bl. and 130' E/o ECF Ave. 55

DRILL RIG TYPE: CME-75HT using 8" diameter hollow stem augers

DRILLER: Adams

LOGGER: Roth

ENGINEER: Noreen

DEPTH TO WATER: 19'

DEPTH TO WATER SEEPAGE: None

ELEVATION / DEPTH (ft)	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	USCS	Field Description
<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> <p>460 0</p> <p>455 5</p> <p>450 10</p> <p>445 15</p> <p>440 20</p> <p>435 25</p> <p>430 30</p> <p>425 35</p> </div> </div>			<p>GM/ SM</p>	<p>6" AC pavement in fair condition</p> <p>Brown silty gravelly sand/sandy gravel with cobbles. Moist and dense. Bulk soil sample taken from 0 to 2½' depth.</p> <p>Split Spoon sample at 5' depth not recovered.</p> <p>No rings retained for Split Spoon sample @ 15' depth.</p> <p>Encountered perched groundwater @ 19' depth Split Spoon sample at 20' depth not recovered.</p> <p>BEDROCK- Dark gray claystone interbedded with sandstone, fine grained sand, slight weathering, friable to moderately strong. No rings retained for Split Spoon sample @ 25' depth.</p> <p>BEDROCK- Dark gray claystone, slight weathering, friable to moderately strong. Split Spoon sample @ 30' depth retained only 3 rings.</p> <p>Split Spoon sample @ 32½' depth retained only 3 rings.</p> <p style="text-align: center;">---</p> <p style="text-align: center;">Encountered perched water @ 19' depth.</p> <p style="text-align: center;">---</p> <p>Installed a 2" PVC monitoring well to a depth of 35' 20' slotted pipe and 15' solid pipe. Backfill: 35' to 13' depth - #3 sand, 13' to 8' depth</p>

LOG OF TEST BORING

LAB NO.: 140- 5498 **PROJECT:** AVE 45-ARROYO DR. RELIEF SEWER-WELL INSTALLATION

BORING NO.: A-7 **ELEV.:** 460.3' **DATE:** 12/07/2005

BORING LOCATION: 8' S/o NCF Carlota Bl. and 130' E/o ECF Ave. 55

DRILL RIG TYPE: CME-75HT using 8" diameter hollow stem augers

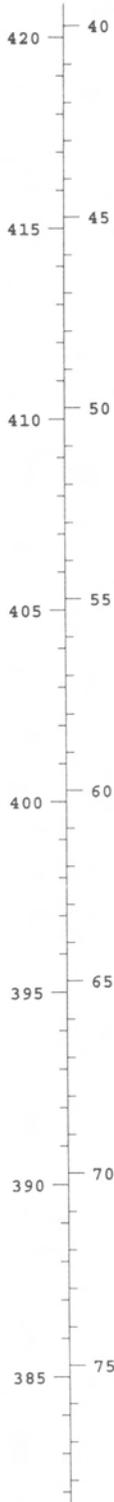
DRILLER: Adams

LOGGER: Roth

ENGINEER: Noreen

DEPTH TO WATER: 19'

DEPTH TO WATER SEEPAGE: None

ELEVATION / DEPTH (ft)	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	USCS	Field Description
 <p style="font-size: small;">420 — 40 415 — 45 410 — 50 405 — 55 400 — 60 395 — 65 390 — 70 385 — 75</p>				<p>- bentonite pellets, 8' to 2' depth - soil cuttings, 2' to grade - PCC (soil cuttings were used for backfill from 35' depth to bottom of test boring)</p>



Earth Mechanics, Inc.

Geotechnical and Earthquake Engineering

TECHNICAL DATA REPORT FOR THE PROPOSED 710 FREEWAY TUNNELS FEASIBILITY

TASK 3.1 - SOIL BORING PROGRAM

Prepared For:

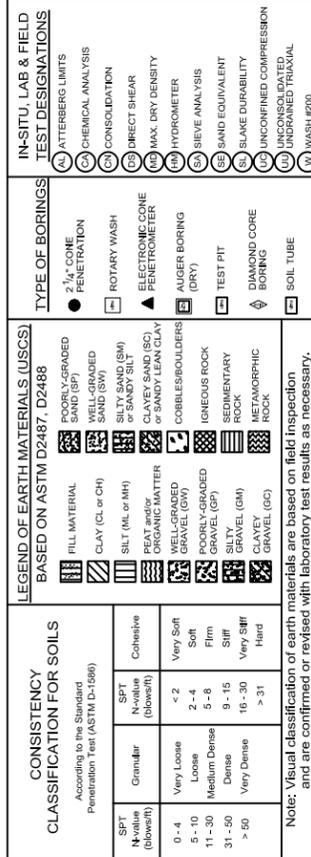
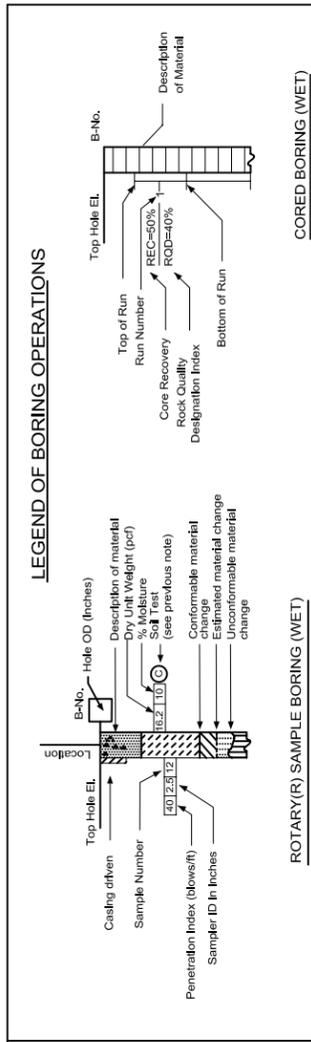
Parsons Brinckerhoff Quade & Douglas, Inc.
444 South Flower Street, Suite 3700
Los Angeles, CA 90071

Prepared By:

Earth Mechanics, Inc.
17660 Newhope Street, Suite E
Fountain Valley, California 92708

March 20, 2006

EMI Project No. 05-109



WEATHERING DESCRIPTORS

Modified from United States Bureau of Reclamation, Engineering Geology Field Manual.

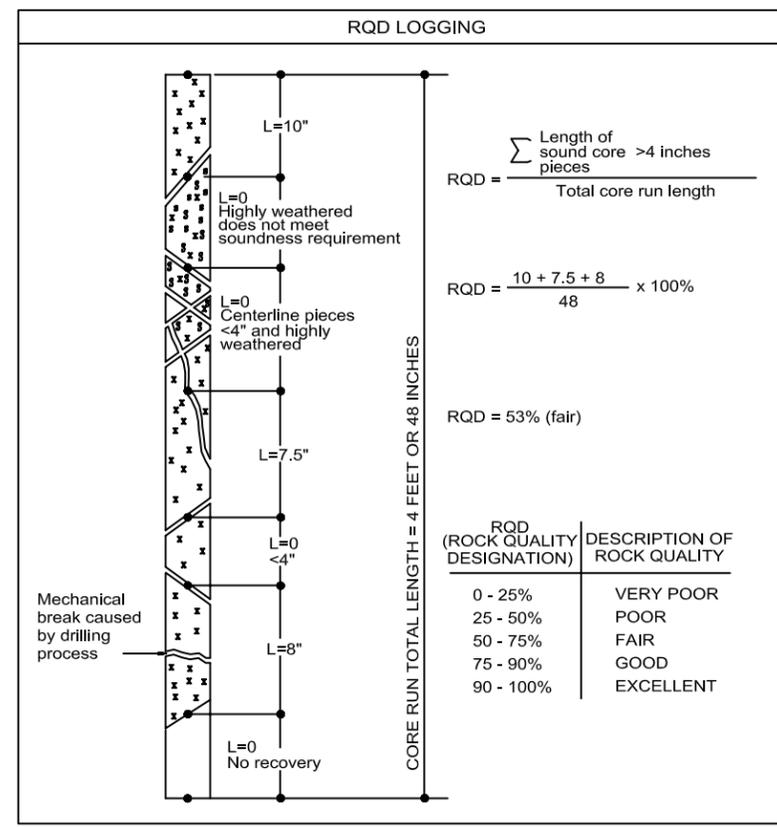
Descriptors	Diagnostic features					General characteristics (strength, excavation, etc.) §
	Chemical weathering-Discoloration and/or oxidation		Mechanical weathering-Grain boundary conditions (disaggregation) primarily for granitics and some coarse-grained sediments	Texture and solutioning		
	Body of rock	Fracture surfaces †		Texture	Solutioning	
Fresh	No discoloration, not oxidized.	No discoloration or oxidation.	No separation, intact (tight).	No change.	No solutioning.	Hammer rings when crystalline rocks are struck. Almost always rock excavation except for naturally weak or weakly cemented rocks such as siltstones or shales.
Slightly weathered to fresh ●						
Slightly weathered	Discoloration or oxidation is limited to surface of, or short distance from, fractures; some feldspar crystals are dull.	Minor to complete discoloration or oxidation of most surfaces.	No visible separation, intact (tight).	Preserved.	Minor leaching of some soluble minerals may be noted.	Hammer rings when crystalline rocks are struck. Body of rock not weakened. With few exceptions, such as siltstones or shales, classified as rock excavation.
Moderately to slightly weathered ○						
Moderately weathered	Discoloration or oxidation extends from fractures usually throughout; Fe-Mg minerals are "rusty," feldspar crystals are "cloudy."	All fracture surfaces are discolored or oxidized.	Partial separation of boundaries visible.	Generally preserved.	Soluble minerals may be mostly leached.	Hammer rings when crystalline rocks are struck. Body of rock is slightly weakened. Depending on fracturing, usually is rock excavation except in naturally weak rocks such as siltstones or shales.
Intensely to moderately weathered ◐						
Intensely weathered	Discoloration or oxidation throughout; all feldspars and Fe-Mg minerals are altered to clay to some extent; or chemical alteration produces in-situ disaggregation, see grain boundary conditions.	All fracture surfaces are discolored or oxidized, surfaces friable.	Partial separation, rock is friable; in semi-arid conditions granitics are disaggregated.	Texture altered by chemical disintegration (hydration, argillation).	Leaching of soluble minerals may be complete.	Dull sound when struck with hammer, usually can be broken with moderate to heavy manual pressure or by light hammer blow without reference to planes of weakness such as incipient or hairline fractures, or veinlets. Rock is significantly weakened. Usually common excavation.
Very intensely weathered						
Decomposed	Discolored or oxidized throughout, but resistant minerals such as quartz may be unaltered; all feldspars and Fe-Mg minerals are completely altered to clay.		Complete separation of grain boundaries (disaggregated).	Resembles a soil, partial or complete remnant rock structure may be preserved; leaching of soluble minerals usually complete.		Can be granulated by hand. Always common excavation. Resistant minerals such as quartz may be present as "stringers" or "dikes."

Note: This chart and its horizontal categories are more readily applied to rocks with feldspars and mafic minerals. Weathering in various sedimentary rocks, particularly limestones and poorly indurated sediments, will not always fit the categories established. This chart and weathering categories may have to be modified for particular site conditions or alteration such as hydrothermal effects; however, the basic framework and similar descriptors are to be used.

● Combination descriptors are permissible where equal distribution of both weathering characteristics are present over significant intervals or where characteristics present are "in between" the diagnostic feature. However, dual descriptors should not be used where significant, identifiable zones can be delineated. When given as a range, only two adjacent terms may be combined. "Decomposed to slightly weathered," or "moderately weathered to fresh" are not acceptable.

† Does not include directional weathering along shears or faults and their associated features. For example, a shear zone that carried weathering to great depths into a fresh rock mass would not require the rock mass to be classified as weathered.

§ These are generalizations and should not be used as diagnostic features for weathering or excavation classification. These characteristics vary to a large extent based on naturally weak materials or cementation and type of excavation.



FRACTURE DENSITY

Modified from United States Bureau of Reclamation, Engineering Geology Field Manual.

FRACTURE DENSITY - Based on the spacing of all natural fractures in an exposure or core recovery lengths in boreholes; excludes mechanical breaks, shears, and shear zones; however, shear-distributed zones (fracturing outside the shear) are included. Descriptors for fracture density apply to all rock exposures such as tunnel walls, dozer trenches, outcrops, or foundation cut slopes and inverts, as well as boreholes. Descriptive criteria presented below are based on borehole cores where lengths are measured along the core axis, for other exposures the criteria is distance measured between fractures (size of blocks).

UNFRACTURED: No fractures.
 VERY SLIGHTLY FRACTURED: Core recovered mostly in lengths greater than 3 ft.
 SLIGHTLY TO VERY SLIGHTLY FRACTURED *
 SLIGHTLY FRACTURED: Core recovered mostly in lengths from 1 to 3 ft. with few scattered lengths less than 1 ft or greater than 3 ft.
 MODERATELY TO SLIGHTLY FRACTURED *
 MODERATELY FRACTURED: Core recovered mostly in 0.3 to 1.0 ft lengths with most lengths about 0.6 ft.
 INTENSELY TO MODERATELY FRACTURED *
 INTENSELY FRACTURED: Lengths average from 0.1 to 0.3 ft with scattered fragmented intervals. Core recovered mostly in lengths less than 0.3 ft.
 VERY INTENSELY TO INTENSELY FRACTURED *
 VERY INTENSELY FRACTURED: Core recovered mostly as chips and fragments with a few scattered short core lengths.

* Combinations of fracture densities (e.g. Very intensely to intensely fractured, or Moderately to slightly fractured) are used where equal distribution of both fracture density characteristics are presently over a significant interval or exposure, or where characteristics are "in between" the descriptor definitions.

ROCK HARDNESS/STRENGTH DESCRIPTORS

Descriptor	Criteria
Extremely hard	Core, fragment, or exposure cannot be scratched with knife or sharp pick; can only be chipped with repeated heavy hammer blows.
Very hard	Cannot be scratched with knife on sharp pick. Core on fragment breaks with repeated heavy hammer blows.
Hard	Can be scratched with knife or sharp pick with difficulty (heavy pressure). Heavy hammer blow required to break specimen.
Moderately hard	Can be scratched with knife or sharp pick with light or moderate pressure. Core or fragment breaks with moderate hammer blow.
Moderately soft	Can be grooved 1/16 inch deep by knife or sharp pick with moderate or heavy pressure. Core or fragment breaks with light hammer blow or heavy manual pressure.
Soft	Can be grooved or gouged easily by knife or sharp pick with light pressure, can be scratched with fingernail. Breaks with light to moderate manual pressure.
Very soft	Can be readily indented, grooved or gouged with fingernail, or carved with a knife. Breaks with light manual pressure.

Any bedrock unit softer than "very soft" is to be described using ASTM D-2488 consistency descriptors.

Note: Although "sharp pick" is included in these definitions, descriptions of ability to be scratched, grooved or gouged by a knife is the preferred criteria.

Modified from United States Bureau of Reclamation, Engineering Geology Field Manual.

BEDDING, FOLIATION, OR FLOW TEXTURE DESCRIPTORS

Descriptors	Thickness / Spacing
Massive	Greater than 10 ft
Very thickly (bedded, foliated, or banded)	3 to 10 ft
Thickly	1 to 3 ft
Moderately	0.3 to 1 ft
Thinly	0.1 to 0.3 ft
Very thinly	0.03 (3/8 in) to 0.1 ft
Laminated (intensely foliated or banded)	Less than 0.03 ft (3/8 in)

Modified from United States Bureau of Reclamation, Engineering Geology Field Manual.

- Notes:**
- All elevations refer to datum shown on USGS quadrangle maps for Pasadena and Los Angeles.
 - Discontinuities inclinations are measured with respect to the horizontal.
 - Color designation and numbers are from the Munsell color charts for soils.
 - Laboratory test data are provided in Appendix C of Technical Memorandum for Route 710 Tunnel Feasibility in Cities of Pasadena, South Pasadena, and Alhambra (Earth Mechanics, Inc 2006).
 - Core photos are provided in Appendix B of Technical Memorandum for Route 710 Tunnel Feasibility in Cities of Pasadena, South Pasadena, and Alhambra (Earth Mechanics, Inc 2006).

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DESIGNED BY G. J. GUNARANJAN	DATE 03-13-06
LAYOUT BY G. J. GUNARANJAN	DATE 03-13-06
CHECKED BY M. KAPUSKAR	DATE 03-14-06
APPROVED BY	DATE



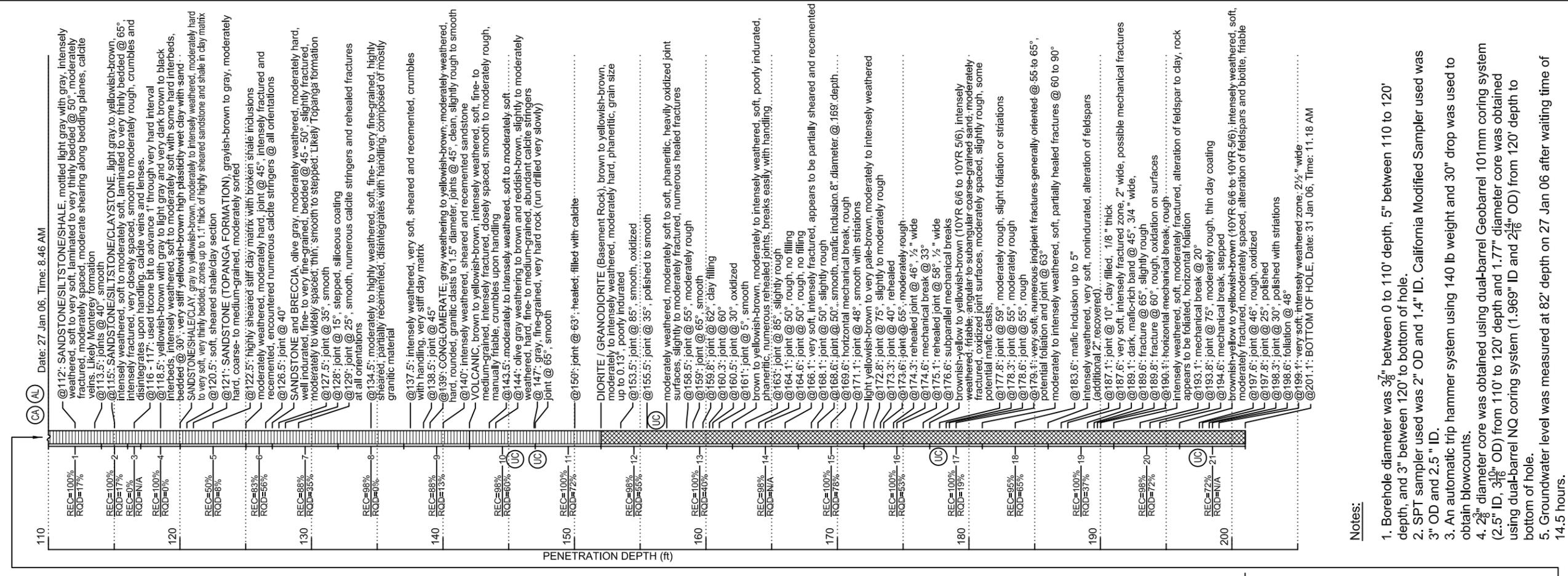
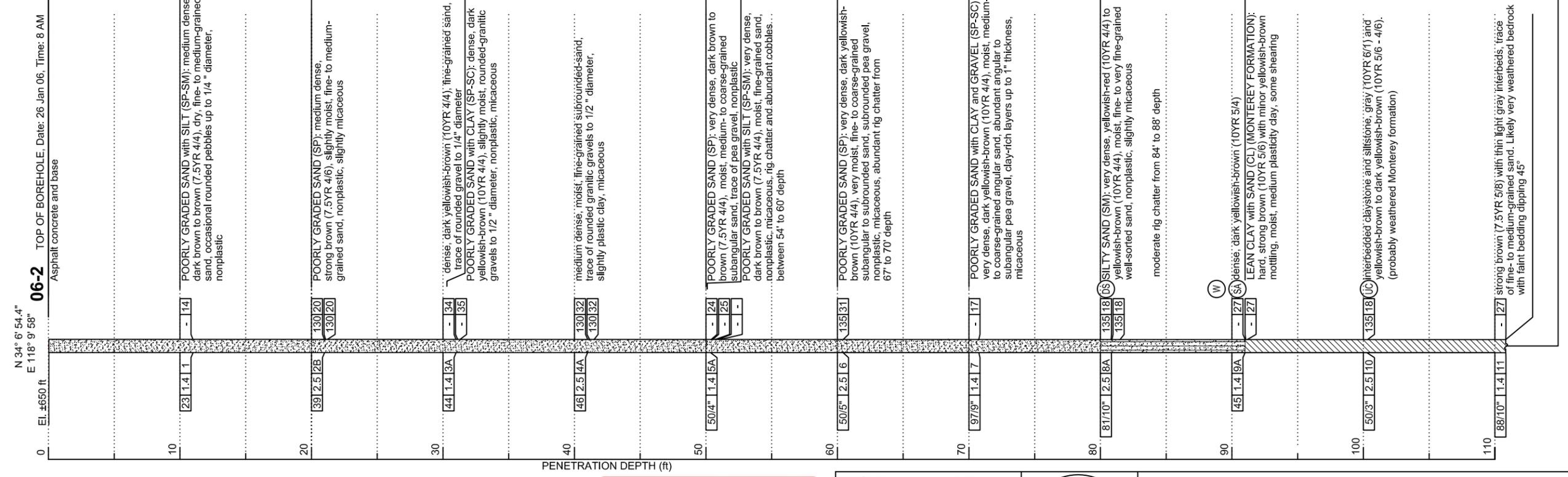
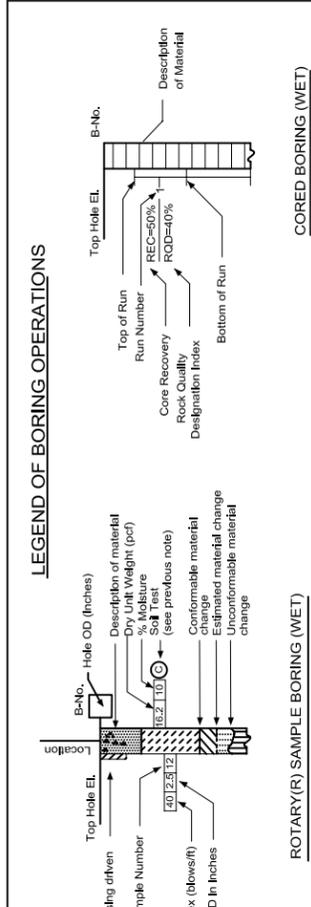
ROUTE 710 TUNNEL FEASIBILITY LOG OF TEST OF BORINGS NO. 2

CONSISTENCY CLASSIFICATION FOR SOILS	
According to the Standard Penetration Test (ASTM D-1586)	
SPT N-value (blows/ft)	Consistency
0 - 4	Very Soft
5 - 10	Soft
11 - 20	Medium Dense
21 - 30	Dense
31 - 50	Very Dense
> 50	Hard

LEGEND OF EARTH MATERIALS (USCS)	
BASED ON ASTM D2487, D2488	
	POORLY-GRADED SAND (SP)
	WELL-GRADED SAND (SW)
	SILTY SAND (SM)
	CLAYEY SAND (SC)
	SILTY CLAY (ML)
	CLAYEY SILTY SAND (SM-CL)
	ORGANIC SILT (OL)
	ORGANIC CLAY (OL)
	POORLY-GRADED GRAVEL (GP)
	WELL-GRADED GRAVEL (GW)
	SILTY GRAVEL (GM)
	CLAYEY GRAVEL (GC)
	COBBLES/BOULDERS
	IGNEOUS ROCK
	SEDIMENTARY ROCK
	METAMORPHIC ROCK

TYPE OF BORINGS	
	CONE PENETRATION
	ROTARY WASH
	ELECTRONIC CONE PENETROMETER
	AUGER BORING
	TEST PIT
	DIAMOND CORE BORING
	SOIL TUBE

IN-SITU, LAB & FIELD TEST DESIGNATIONS	
	ATTERBERG LIMITS
	CHEMICAL ANALYSIS
	CONSOLIDATION
	DIRECT SHEAR
	MAX. DRY DENSITY
	HYDROMETER
	SIEVE ANALYSIS
	SAND EQUIVALENT
	SLAKE DURABILITY
	UNCONFINED COMPRESSION BORING
	UNCONSOLIDATED UNDRAINED TRIAXIAL TEST
	WASH #200



TOP OF BOREHOLE, Date: 26 Jan 06, Time: 8 AM
 N 34° 6' 54.4" E 118° 9' 58" 06-2
 EI. ±650 ft
 Asphalt concrete and base

DATE: 27 Jan 06, Time: 8:46 AM
 (CA) (AL)
 @112': SANDSTONE/SILTSTONE/SHALE, mottled light gray with gray, intensely fractured, soft to very soft, laminated to very thinly bedded @ 50', moderately veined. Likely Monterey formation
 @113.5': joints @ 40', smooth
 @115': SANDSTONE/SILTSTONE/CLAYSTONE, light gray to yellowish-brown, intensely fractured, soft to moderately soft, laminated to moderately rough, crumbles and disintegrates upon handling, calcite veins and lenses.
 @116 - 117': used tricone bit to advance 1' through very hard interval
 @118.5': yellowish-brown with gray to light gray and very dark brown to black interbeds, intensely weathered, soft to moderately soft with some hard interbeds, bedded @ 30', very stiff yellowish-brown high plasticity wet clay with sand
 SANDSTONE/SHALE/CLAY, gray to yellowish-brown, moderately to intensely weathered, moderately hard to very soft, very finely bedded, zones up to 1.1' thick of highly sheared sandstone and shale in clay matrix
 @120.5': soft, sheared shale/clay section
 @121': SANDSTONE (TOPANGA FORMATION), grayish-brown to gray, moderately hard, coarse- to medium-grained, moderately soft
 @122.5': highly sheared stiff clay matrix with broken shale inclusions moderately weathered, moderately hard, joint @ 45', intensely fractured and cemented, encountered numerous calcite stringers @ all orientations
 SANDSTONE and BRECCIA, olive gray, moderately weathered, moderately hard, well indurated, fine- to very fine-grained, bedded @ 45 - 50', slightly fractured, moderately to widely spaced, thin, smooth to stepped. Likely Topanga formation
 @127.5': joint @ 35', smooth
 @129': joint @ 25', smooth, numerous calcite stringers and reheated fractures at all orientations
 @134.5': moderately to highly weathered, soft, fine- to very fine-grained, highly sheared, partially recemented, disintegrates with handling, composed of mostly granitic material
 @137.5': intensely weathered, very soft, sheared and cemented, crumbles with handling, very stiff clay matrix
 @138.5': joint @ 45'
 @139': CONGLOMERATE, gray weathering to yellowish-brown; moderately weathered, hard, rounded, granitic clasts to 1.5' diameter, joints @ 45', clean, slightly rough to smooth
 @140': intensely weathered, sheared and cemented sandstone
 VOLCANIC, brown to yellowish-brown, intensely weathered, soft, fine- to medium-grained, intensely fractured, closely spaced, smooth to moderately rough, manually friable, crumbles upon handling
 @143.5': moderately to intensely weathered, soft to moderately soft
 @144': olive gray weathering to brown and reddish-brown, slightly to moderately weathered, hard, fine- to medium-grained, abundant calcite stringers
 @147': gray, fine-grained, very hard rock (run drilled very slowly) joint @ 65', smooth
 @150': joint @ 63', heated, filled with calcite
 DIORITE / GRANODIORITE (Basement Rock), brown to yellowish-brown, moderately to intensely weathered, moderately hard, phaneritic, grain size up to 0.13', poorly indurated
 @153.5': joint @ 85', smooth, oxidized
 @155.5': joint @ 35', polished to smooth
 moderately weathered, moderately soft to soft, phaneritic, heavily oxidized joint surfaces, slightly to moderately fractured, numerous healed fractures
 @158.5': joint @ 55', moderately rough
 @159': joint @ 65', smooth
 @160.5': joint @ 62', clay filling
 @161': joint @ 5', smooth
 @160.5': joint @ 30', oxidized
 brown to yellowish-brown, moderately to intensely weathered, soft, poorly indurated, phaneritic, micaceous reheated joints, breaks easily with handling
 @163': joint @ 85', slightly rough
 @164.1': joint @ 50', rough, no filling
 @164.6': joint @ 50', rough, no filling
 @166.1': very soft, intensely fractured, appears to be partially sheared and recemented
 @168.1': joint @ 50', slightly rough
 @168.6': joint @ 50', smooth, mafic inclusion 8" diameter @ 169' depth
 @169.6': horizontal mechanical break, rough
 @171.1': joint @ 48', smooth with striations
 light yellowish-brown to very pale-brown, moderately to intensely weathered
 @172.8': joint @ 75', slightly to moderately rough
 @173.3': joint @ 40', reheated
 @173.6': joint @ 65', moderately rough
 @174.3': reheated joint @ 46', 1/2" wide
 @174.6': mechanical break @ 33'
 @175.1': reheated joint @ 58', 1/2" wide
 @176.6': subparallel mechanical breaks
 brownish-yellow to yellowish-brown (10YR 6/6 to 10YR 5/6), intensely fractured, friable, angular to subangular coarse-grained sand, moderately weathered, oxidized joint surfaces, moderately spaced, slightly rough, some potential mafic clasts
 @177.8': joint @ 59', moderately rough, slight foliation or striations
 @178.3': joint @ 55', moderately rough
 @178.6': joint @ 55', rough
 @179.1': very soft, numerous incipient fractures generally oriented @ 55- to 65', potential foliation and joint @ 63' moderately to intensely weathered, soft, partially healed fractures @ 60 to 90'
 @183.6': mafic inclusion up to 5" intensely weathered, very soft, nonindurated, alteration of feldspars (additional 2" recovered)
 @187.1': joint @ 10', clay filled, 1/8" thick
 @187.6': very soft, intensely fractured zone, 2' wide, possible mechanical fractures
 @189.1': dark, mafic-rich band @ 45', 3/4" wide
 @189.6': fracture @ 65', slightly rough
 @189.8': fracture @ 60', rough, oxidation on surfaces
 @190.1': horizontal mechanical break, rough
 intensely weathered, soft, moderately fractured, alteration of feldspar to clay, rock appears to be foliated, horizontal foliation
 @193.1': mechanical break @ 20'
 @193.8': joint @ 75', moderately rough, thin clay coating
 @194.6': mechanical break, stepped
 brownish-yellow to yellowish-brown (10YR 6/6 to 10YR 5/6); intensely weathered, soft, moderately fractured, moderately spaced, alteration of feldspars and biotite, friable
 @197.6': joint @ 46', rough, oxidized
 @197.8': joint @ 25', polished
 @198.3': joint @ 30', polished with striations
 @198.6': foliation @ 48'
 @199.1': very soft, intensely weathered zone; 2 1/2" wide
 @201.1': BOTTOM OF HOLE, Date: 31 Jan 06, Time: 11:18 AM

Notes:
 1. Borehole diameter was 3 3/8" between 0 to 110' depth, 5" between 110 to 120' depth, and 3" between 120' to bottom of hole.
 2. SPT sampler used was 2" OD and 1.4" ID, California Modified Sampler used was 3" OD and 2.5" ID.
 3. An automatic trip hammer system using 140 lb weight and 30" drop was used to obtain blowcounts.
 4. 2 1/2" diameter core was obtained using dual-barrel Geobore 101mm coring system (2.5" ID, 3 1/16" OD) from 110' to 120' depth and 1.77" diameter core was obtained using dual-barrel NQ coring system (1.969" ID and 2 1/16" OD) from 120' depth to bottom of hole.
 5. Groundwater level was measured at 82' depth on 27 Jan 06 after waiting time of 14.5 hours.

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 Geotechnical and Earthquake Engineering
 17660 Newhope Street, Suite E
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 Phone: 714-751-3826
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DESIGNED BY G. J. GUNARANJAN	DATE 03-13-06
LAYOUT BY G. J. GUNARANJAN	DATE 03-13-06
CHECKED BY M. KAPUSKAR	DATE 03-14-06
APPROVED BY	DATE



ROUTE 710 TUNNEL FEASIBILITY LOG OF TEST OF BORINGS NO. 4

BASELINE GROUND WATER ASSESSMENT OF THE RAYMOND BASIN FINAL REPORT

EXECUTIVE SUMMARY

Prepared For:

RAYMOND BASIN MANAGEMENT BOARD

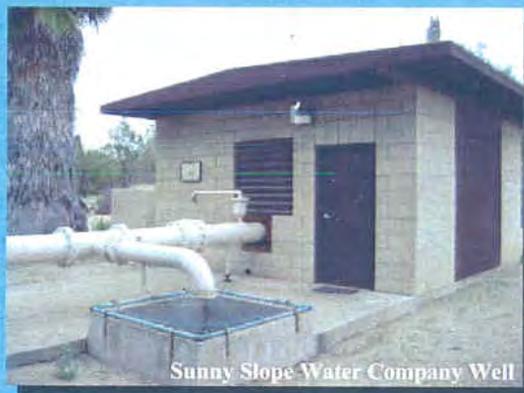


February 2, 2004

Prepared By:

GEOSCIENCE

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Summary of Construction Information for Raymond Basin Purveyor Wells

State Well Number	Purveyor	Well Name Abbreviation	Local Well Name	Completion Date	Total Borehole Depth [ft bgs]	Casing Depth [ft bgs]	Ground Surface Elevation [ft amsl]	Casing Diameter ID [inches]	Perforated Interval		Status	Recommended for Monthly Monitoring
										[ft bgs]		
01N12W34E01	City of Alhambra	ALH-2	Well 2	1-Aug-31	734	734	702	-	138-410; 425-703	inactive	yes	
01N12W34E04	City of Alhambra	ALH-6	Well 6	1-May-24	300	-	-	18	-	destroyed	no	
01N11W30A01	City of Arcadia	ARC-7	Well 7	1-Jul-02	1,210	970	-	20	330-450; 480-730; 855-880; 930-950	new	yes	
01N11W20Q03	City of Arcadia	ARC-ANO	Anoakia	24-Apr-01	1,050	938	694	18	395-455; 495-565; 595-635; 818-838; 888-928	active	yes	
01N11W30H01	City of Arcadia	ARC-CHAP6A	Chapman 6A	1-Jan-23	476	424	633	26	54-75; 170-190; 194-211; 245-252; 254-257; 336-359; 386-396; 396-405	active	yes	
01N12W30D01	City of Arcadia	ARC-CHAP6B	Chapman 6B	-	-	-	-	-	-	active	yes	
01N11W30R03	City of Arcadia	ARC-HUG1	Hugo Reid 01	21-Mar-68	910	810	587	16	280-810	active	yes	
01N11W21G02	City of Arcadia	ARC-ORA1A	Orange Grove 01A	24-Apr-21	464	464	604	22	180-432	active	yes	
01N11W21H02	City of Arcadia	ARC-ORA2A	Orange Grove 02A	26-Nov-28	530	-	604	-	200-500	active	yes	
01N11W21G01	City of Arcadia	ARC-ORA3A	Orange Grove 3	1-Jan-15	501	-	610	20	-	inactive	yes	
01N11W21G03	City of Arcadia	ARC-ORA4A	Orange Grove 4A	24-Apr-21	466	466	-	24	220-460	inactive	yes	
01N11W21G05	City of Arcadia	ARC-ORA5A	Orange Grove 05	6-Feb-62	600	600	610	16	260-278; 302-328; 360-400; 416-470; 550-580	active	yes	
01N11W21H03	City of Arcadia	ARC-ORA6	Orange Grove 06	4-Jul-64	600	600	587	18	256-410; 446-474; 484-498; 512-546; 552-566	inactive	yes	
01N11W30R01	City of Arcadia	ARC-RAN6	Rancho 6	31-May-41	704	-	587	20	158-682	inactive	yes	

Table 2

Summary of Construction Information for Raymond Basin Purveyor Wells

State Well Number	Purveyor	Well Name Abbreviation	Local Well Name	Completion Date	Total Borehole Depth [ft bgs]	Casing Depth [ft bgs]	Ground Surface Elevation [ft amsl]	Casing Diameter ID [inches]	Perforated Interval [ft bgs]		Status	Recommended for Monthly Monitoring
01N11W29M01	City of Arcadia	ARC-RAN8A	Rancho 8A	22-Jul-53	620	620	-	20; 18	156-167; 174-179; 251-262; 290-306; 319-322; 405-418; 436-494; 534-542; 582-589	destroyed	no	
01N12W26A01	California American Water Company	CA-LAM	Lamanda	16-Sep-28	690	-	756	24	268-674	active	yes	
01N12W35B02	California American Water Company	CA-LOM2	Lombardy	22-Dec-95	990	900	672	15.375	310-380; 450-620; 740-880	active	yes	
01N12W35E03	California American Water Company	CA-LOM1	Lombardy 1920	15-May-20	478	325	-	18	155-165; 219-240; 246-250; 293-312; 345-348; 350-353; 360-370	unknown	no	
01N12W34E02	California American Water Company	CA-OAK	Oak Knoll Circle	30-Jun-21	300	-	744	18	119-135; 155-164; 167-183; 210-285	non-operable	yes	
01N12W25E01	California American Water Company	CA-OSW	Oswego	19-Jul-21	399	399	719	16	-	non-operable	yes	
01N12W34C01	California American Water Company	CA-PAT	Patton	25-Jul-23	501	-	728	18	85-171; 181-256; 283-300; 324-332; 361-371; 377-412; 413-459; 474-480	non-operable	yes	
01N12W26R01	California American Water Company	CA-WIN	Winston	23-May-24	378	378	683	20	125-140; 191-198; 280-366	active	yes	
01N12W26A02	Other	CROWN	Crown	1-Jul-35	400	-	765	12	382-388	inactive	yes	
01N12W25R02	Other	ELCAMPO	El Campo	14-Feb-22	300	300	634	12	105-110; 112-122; 209-234; 245-247; 251-259; 264-269	destroyed	no	
01N11W30Q03	East Pasadena Water Company	EPWC-1	Well 1	-	-	-	591	-	-	inactive	yes	
01N12W25R02	East Pasadena Water Company	EPWC-3	Well 3	14-Feb-22	300	300	634	12	105-110; 112-122; 209-234; 245-247; 251-259; 264-269	inactive	yes	
01N11W30Q02	East Pasadena Water Company	EPWC-4	Well 4	-	-	-	-	-	-	inactive	yes	
01N11W30J01	East Pasadena Water Company	EPWC-7	Well 7	1-Aug-23	550	-	601	12; 10	300-532	active	yes	

Table 2

Summary of Construction Information for Raymond Basin Purveyor Wells

State Well Number	Purveyor	Well Name Abbreviation	Local Well Name	Completion Date	Total Borehole Depth [ft bgs]	Casing Depth [ft bgs]	Ground Surface Elevation [ft amsl]	Casing Diameter ID [inches]	Perforated Interval		Status	Recommended for Monthly Monitoring
									[ft bgs]	[ft bgs]		
01N11W30K01	East Pasadena Water Company	EPWC-8	Well 8	1-Mar-37	730	730	634	20	216-707		active	yes
01N12W33H01	Other	GRAVES	Graves	1-Apr-26	247	-	758	16	121-233		inactive	yes
01N12W34H01	Huntington Library	HL-CAN	Library/Canyon	31-Dec-26	504	-	640	24	96-116; 130-148; 179-188; 217-227; 267-305; 328-336; 406-433; 464-476		active	yes
01N12W34A01	Huntington Library	HL-HIL	Hill	1-May-17	380	380	491	18	-		inactive	yes
01N12W35C01	Huntington Library	HL-ORL	Orlando	13-May-31	550	550	493	18	184-208; 214-238; 272-280; 310-328; 354-368; 414-426; 432-436; 454-460; 478-482; 496-502; 510-514; 522-526; 530-534		active	yes
01N12W35E01	Huntington Library	HL-ROS	Roscoe Moss	10-Nov-00	845	830	-	16	270-380; 400-810		active	yes
01N12W13E03	Kimmeloa Irrigation District	KID-3	K-3	7-Apr-65	700	700	965	14; 10	286-585		active	yes
01N11W07N01	Kimmeloa Irrigation District	KID-GLN	Glen	1-Jul-23	357	-	-	-	-		unknown	no
01N12W13L01	Kimmeloa Irrigation District	KID-WAG	Wagner	1-Jan-25	375	-	-	-	-		inactive	yes
01N12W13K01	Kimmeloa Irrigation District	KID-WIL	Wilcox	14-Sep-22	586	586	875	14	410-454; 472-494; 536-546; 556-566		active	yes
01N12W05P02	Lincoln Avenue Water Company	LAWC-2	Well 2	1-Jul-17	455	455	1,202	20	-		destroyed	no
01N12W05P01	Lincoln Avenue Water Company	LAWC-3	Well 3	31-Jul-24	507	507	1,203	20	185-205; 220-346; 426-494		inactive	yes
01N12W08A01	Lincoln Avenue Water Company	LAWC-4	Well 4	1-Oct-29	980	-	1,190	24; 12; 10	240-722		destroyed	no

Table 2

Summary of Construction Information for Raymond Basin Purveyor Wells

State Well Number	Purveyor	Well Name Abbreviation	Local Well Name	Completion Date	Total Borehole Depth [ft bgs]	Casing Depth [ft bgs]	Ground Surface Elevation [ft amsl]	Casing Diameter ID [inches]	Perforated Interval		Status	Recommended for Monthly Monitoring
									[ft bgs]	[ft bgs]		
01N12W05Q02	Lincoln Avenue Water Company	LAWC-5	Well 5	1-Jan-71	-	-	1,204	-	-	-	inactive	yes
01N12W06M05	La Canada Irrigation District	LCID-1	Well 1	26-Nov-24	492	-	1,192	20	200-250; 271-273; 301-306; 331-333; 358-360; 368-376; 381-384; 390-404; 444-448; 452-465; 474-480	-	active	yes
01N13W01J02	La Canada Irrigation District	LCID-6	Well 6	23-Mar-70	550	550	1,196	16	310-406; 442-490	-	active	yes
01N12W09Q01	Las Flores Water Company	LFWC-1	Well 1	17-Jul-19	505	505	1,129	16	191-270; 277-360; 369-377	-	inactive	yes
01N12W08H02	Las Flores Water Company	LFWC-2	Mtn View Well 2	1-Jan-26	540	540	1,155	18	-	-	inactive	yes
01N11W07N02	Other	MIR-BRO	Brown	14-Sep-22	633	480	-	20; 14	-	-	inactive	yes
01N11W07N01	Other	MIR-SHA	Shaw	1-Jul-23	357	-	-	-	-	-	inactive	yes
01N12W13H01	Other	OSBORN	Osborn	-	-	-	-	-	-	-	inactive	yes
01N12W05N03	City of Pasadena	P-52	Well 52	24-Nov-77	647	640	1,077	20	250-367; 372-556	-	inactive	yes
01N12W24R01	City of Pasadena	P-58	Well 58	30-Sep-98	795	465	-	20	380-410; 430-450	-	active	yes
01N12W25D01	City of Pasadena	P-59	Well 59	26-Jan-99	800	790	-	20	380-430; 460-490; 515-650; 690-770	-	active	yes
01N12W05M01	City of Pasadena	P-ARR	Arroyo	22-Aug-30	668	660	1,093	26	127-302; 306-331; 367-372; 398-404; 457-489; 498-506 508-524; 538-554; 568-594; 598-627	-	inactive	yes
01N12W20B03	City of Pasadena	P-BAN	Bangham	24-Mar-93	710	680	922	20	540-660	-	inactive	yes
01N12W09E01	Pasadena Cemetery	PCA-2-3	Well 2-3	1-Oct-22	780	730	1,188	16; 12	250-317; 340-612	-	active	yes

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Summary of Construction Information for Raymond Basin Purveyor Wells

State Well Number	Purveyor	Well Name Abbreviation	Local Well Name	Completion Date	Total Borehole Depth [ft bgs]	Casing Depth [ft bgs]	Ground Surface Elevation [ft amsl]	Casing Diameter ID [inches]	Perforated Interval [ft bgs]		Status	Recommended for Monthly Monitoring
01N12W05G01	Pasadena Cemetery	PCA-4	Well 4	1-Jan-25	421	-	1,297	18	250-287; 300-302; 304-318; 320-385; 397-402	destroyed	no	
01N11W30D04	City of Pasadena	P-CHA	New Chapman	1-May-67	692	642	701	20	111-119; 158-159.5; 179-200; 303-310; 356-364; 412-417	inactive	yes	
01N12W20B01	City of Pasadena	P-COP	Copelin	13-Aug-21	700	700	917	26	188-220; 228-258; 276-282; 316-344; 484-495; 512-536; 540-553; 650-668	inactive	yes	
01N12W23G01	City of Pasadena	P-CRA	Craig	28-Sep-24	1,089	1,077	875	26	270-303; 310-319; 324-386; 434-535; 550-589; 593-623; 635-690; 717-753; 793-803; 807-822; 850-906; 925-931; 949-968; 1005-1009; 1022-1038; 1051-1056	inactive	yes	
01N12W11I01	City of Pasadena	P-EAT51	Eaton 51	-	-	-	1,110	-	-	inactive	yes	
01N12W21K01	City of Pasadena	P-GAR	Garfield	17-May-21	720	629	898	26	192-257; 295-327; 355-360; 387-419; 602-620; 624-629	inactive	yes	
01N12W25B01	City of Pasadena	P-JOU	Jourdan	5-Nov-26	729	729	709	26	169-436	inactive	yes	
01N12W23L01	City of Pasadena	P-MON	Monte Vista	19-May-25	738	738	845	12	296-307; 317-330; 342-367; 386-491; 494-509; 517-534; 541-586; 598-605; 612-631; 637-651; 665-676; 699-719	inactive	yes	
01N12W33G02	City of Pasadena	P-OHIO	Ohio	-	249	-	-	-	95-125; 137-241	destroyed	no	
01N12W17D01	City of Pasadena	P-SHE	Sheldon	1-Jan-21	196	196	1,049	18	-	non-operable	yes	
01N12W20A01	City of Pasadena	P-SUN	Sunset	27-May-24	751	751	934	26	245-325; 334-390; 396-415; 434-447; 472-483; 509-526; 535-543; 555-564; 564-613; 671-697; 697-728	inactive	yes	
01N12W05N01	City of Pasadena	P-VEN	Ventura	25-Apr-24	489	489	1,070	26	102-141; 164-218; 242-244; 260-312; 410-468	targeted for treatment	no	
01N12W21K02	City of Pasadena	P-VIL	Villa	21-Sep-25	953	940	882	26	212-426; 450-468; 472-492; 518-523; 527-564; 595-612; 624-638; 729-741; 794-840	non-operable	yes	

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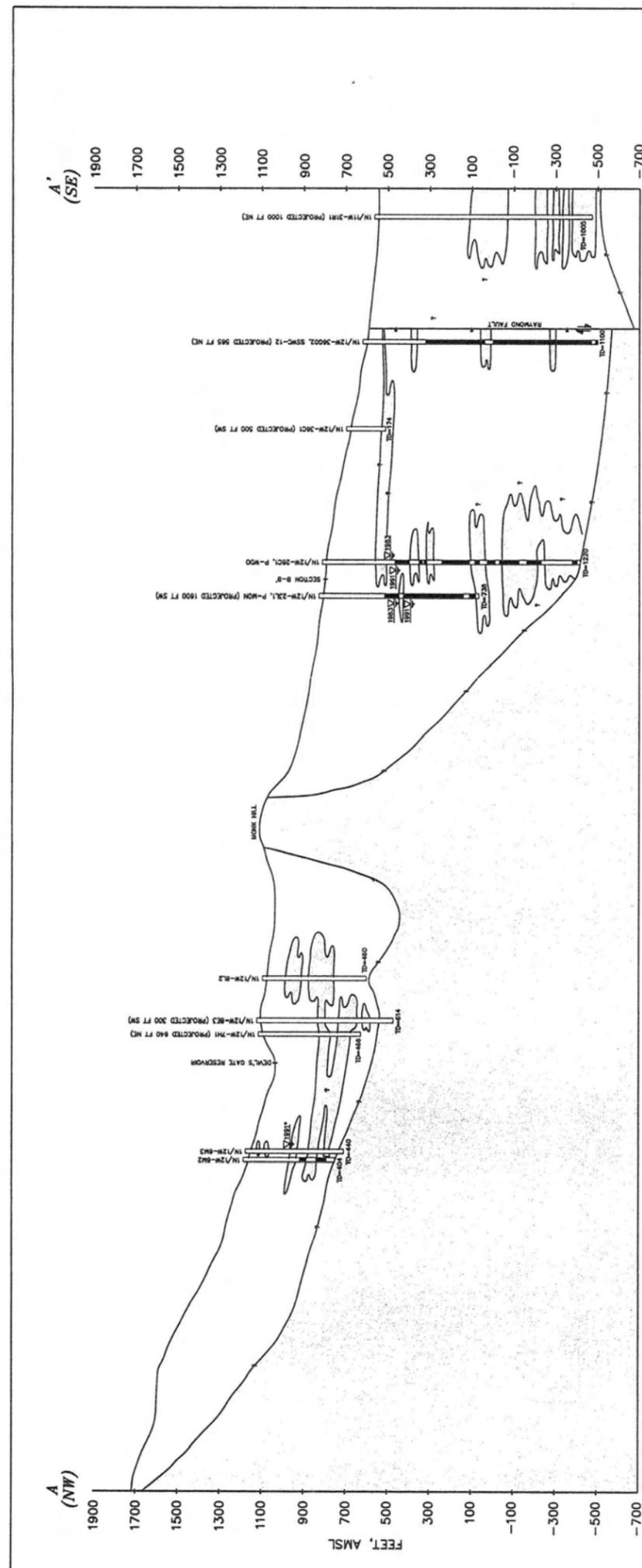
State Well Number	Purveyor	Well Name Abbreviation	Local Well Name	Completion Date	Total Borehole Depth [ft bgs]	Casing Depth [ft bgs]	Ground Surface Elevation [ft amsl]	Casing Diameter ID [inches]	Perforated Interval [ft bgs]		Status	Recommended for Monthly Monitoring
01N12W08D02	City of Pasadena	P-WIN	Windsor	1-Jul-69	600	573	1,153	20	316-351; 353-356; 468-472; 474-477; 498-503; 536-561	targeted for treatment	no	
01N12W26C01	City of Pasadena	P-WOO	Woodbury	7-Jun-30	1,220	-	791	26	264-319; 330-333; 336-368; 372-382; 384-403; 428-441; 460-475; 492-501; 539-558; 566-573; 581-611; 615-641; 648-682; 703-708; 712-718; 760-770; 789-797; 807-844; 856-883; 896-912; 947-962; 967-1014; 1178-1187	active	yes	
01N12W09R01	Rubio Canon Land Water Association	RCLWA-2	Well 2	1-Aug-18	625	624	1,109	16	-	destroyed	no	
01N12W08H03	Rubio Canon Land Water Association	RCLWA-4	Well 4	1-Mar-24	650	626	1,153	20	160-170; 195-325; 335-347	active	yes	
01N12W08H01	Rubio Canon Land Water Association	RCLWA-5	Well 5	1-May-26	611	-	1,140	-	190-360; 370-425; 435-490	destroyed	no	
01N12W09K01	Rubio Canon Land Water Association	RCLWA-6	Well 6	16-Jun-48	704	704	1,133	20	215-275; 328-345; 420-426; 440-446; 476-500; 516-519; 540-546; 580-586; 681-686	destroyed	no	
01N12W08H04	Rubio Canon Land Water Association	RCLWA-7	Well 7	1-Jan-86	-	-	1,160	-	-	active	yes	
01N12W28N01	Other	ROYAL	Royal Laundry	1-Aug-31	352	-	794	-	-	unknown	no	
01N12W36E02	San Gabriel County WD	SGCWD-3	Well 3	1-Jan-24	437	-	626	18	-	inactive	yes	
01N12W36E01	San Gabriel County WD	SGCWD-4	Well 4	12-Dec-28	512	500	626	26	208-480	destroyed	no	
01N11W21C04	City of Sierra Madre	SM-1	Well 1	15-Dec-20	459	459	-	26	-	inactive	yes	
01N11W21C01	City of Sierra Madre	SM-2	Well 2	29-Sep-15	-	446	-	26	270-330	inactive	yes	
01N11W21C03	City of Sierra Madre	SM-3	Well 3	26-Dec-42	650	-	707	20	240-275; 298-352; 363-636	active	yes	

Table 2

Summary of Construction Information for Raymond Basin Purveyor Wells

State Well Number	Purveyor	Well Name Abbreviation	Local Well Name	Completion Date	Total Borehole Depth [ft bgs]	Casing Depth [ft bgs]	Ground Surface Elevation [ft amsl]	Casing Diameter ID [Inches]	Perforated Interval		Status	Recommended for Monthly Monitoring
									[ft bgs]	[ft bgs]		
01N11W21C02	City of Sierra Madre	SM-4	Well 4	28-Oct-54	662	662	704	20	240-256; 280-642	active	yes	
01N11W21C06	City of Sierra Madre	SM-5	Well 5	27-Jul-61	662	662	707	20	275-380; 389-488; 502-640	active	yes	
01N11W21C07	City of Sierra Madre	SM-6	Well 6	-	650	650	649	20	275-457; 465-504; 524-635	active	yes	
01N12W36H01	Sunny Slope	SSWC-1	Well 1	Spring 1896	580	-	606	12	-	inactive	yes	
01N12W36H03	Sunny Slope	SSWC-11	Well 11	15-Feb-88	800	800	603	18	300-570; 610-780	active	yes	
01N12W36G02	Sunny Slope	SSWC-12	Well 12	1-Dec-89	1,100	1,080	603	18	300-570; 610-1080	active	yes	
01N12W36G01	Sunny Slope	SSWC-2	Well 2	1-Jan-17	356	-	-	12	-	destroyed	no	
01N12W36H02	Sunny Slope	SSWC-3	Well 3	1-Sep-14	445	-	598	16	-	destroyed	no	
01N12W36K01	Sunny Slope	SSWC-5	Well 5	-	438	-	-	-	-	destroyed	no	
01N12W36A01	Sunny Slope	SSWC-6	Well 6	-	664	-	614	-	-	inactive	yes	
01N12W06M06	Valley Water Company	VWC-1	Well 1	1-Jun-14	450	450	1,162	16	155-214; 224-244; 252-258; 322-352	active	yes	
01N12W06M04	Valley Water Company	VWC-2	Well 2	1-Oct-21	500	465	1,171	20	-	active	yes	
01N12W06M01	Valley Water Company	VWC-3	Well 3	1-Jan-31	591	591	1,180	20	-	active	yes	
01N12W06M09	Valley Water Company	VWC-4	Well 4	15-Jul-25	592	592	1,265	20	262-408; 442-454; 459-466; 472-490; 524-540	active	yes	

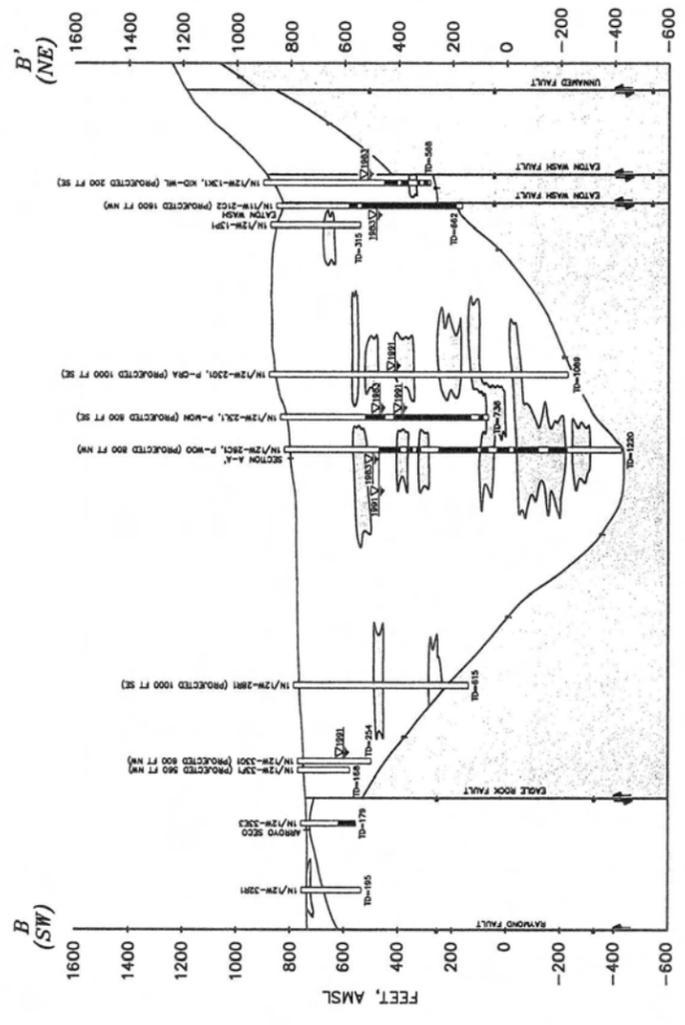
Table 2



GEOLGIC CROSS SECTION A-A'



- LEGEND**
- WELL SCREEN INTERVAL (UNKNOWN IF NOT INDICATED)
 - SEDIMENTS CONSISTING PREDOMINANTLY OF QUATERNARY SAND AND GRAVEL
 - SEDIMENTS CONSISTING PREDOMINANTLY OF QUATERNARY SILT AND CLAY
 - BEDROCK BASEMENT CONSISTING OF PRE-CAMBRIAN AND PRE-CRETACEOUS GRANITIC AND METAMORPHIC ROCKS
 - BEDROCK BASEMENT CONSISTING OF MIDDLE MIOCENE MARINE ROCK
 - GEOLOGIC CONTACTS AND FAULTS QUERIED WHERE INFERRED
- SOURCE OF GEOLOGY AND FAULTS: CALIFORNIA DEPARTMENT OF WATER RESOURCES
 WATER RESOURCES DIVISION, REGIONAL GEOLOGICAL SURVEY, OCT. 1969, U.S. GEOLOGICAL SURVEY
 PROFESSIONAL PAPER 1338, RECENT REVERSE FAULTING IN THE
 TRANSVERSE RANGES, CALIFORNIA (1987)
- 1883 1983 GROUND WATER ELEVATIONS
 1991 1991 GROUND WATER ELEVATIONS
- SOURCE OF GROUND WATER ELEVATIONS: RAYMOND BASIN MANAGEMENT BOARD,
 2003; LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS, 2003; CALIFORNIA
 DEPARTMENT OF WATER RESOURCES, 2003
- 0 2000 4000
 Horizontal Scale in Feet



GEOLGIC CROSS SECTION B-B'

COMPLIANCE AND SENTINEL WELL INSTALLATION REPORT

Eastern Shallow and Southern Deep Portions of the Interim Remedial Action

El Monte Operable Unit

**Prepared on behalf of the
East Side Performing Settling Defendants**

Prepared by:



GeoSyntec Consultants
924 Anacapa Street, Suite 4A
Santa Barbara, California 93101
(805) 897-3800

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April 20, 2006



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BORING

DCMW-1B

SHEET 1 OF 16

START DRILL DATE Nov 12, 04
FINISH DRILL DATE Nov 23, 04
LOCATION El Monte California
PROJECT El Monte RD/RA
NUMBER HX0113E-07

ELEVATION DATA:
GROUND SURF. 277.30'AMSL
TOP OF CASING 276.79'AMSL
DATUM Vertical: NGVD29

GS FORM:
 WELL BORE 01/04

BOREHOLE LOG

DEPTH (ft-bgs)	DESCRIPTION 1) Unit/Formation, Mem.7) Plasticity 2) Soil/Rock Name 8) Density/Consistency 3) Color 9) Structure 4) Moisture 10) Other (Mineralization, 5) Grain Size Discoloration, Odor, etc.) 6) Percentage	GRAPHIC LOG	WELL LOG	GROUNDWATER OR STRUCTURE	ELEVATION (ft)	SAMPLE					COMMENTS 1) Rig Behavior 2) Air Monitoring	
						SAMPLE NO.	TYPE	BLOWS PER 6"	RECOVERY (%)	PID READING (ppm)		TIME (00:00)
0	4" Asphalt @ surface											0' - 1.5' bgs: Concrete
1.5												1.5' - 381' bgs: Portland Cement/Bentonite Gel Mixture
5	Silty SAND (SM); dark yellowish brown (10YR 4/4); medium dense; moist; fine to medium sand; No HC odor or HC staining (NHCO/S); (0,60,40)											0' - 390' bgs: 4" Blank Schedule 80 PVC
10												
15												
20	Silty SAND with gravel (SM); yellowish brown (10YR 5/4); moist; fine to medium sand; 15% fine gravel; 2" layer of coarse sand @ 21"; NHCO/S; (15,70,15)								100	0.0	1020	
25	Well graded SAND (SW); trace sand; yellowish brown (10YR 5/4); medium dense; moist; fine to coarse sand; (0,90,10)								100		1030	
26	Poorly graded SAND (SP); fine sand (0,100,0)								100	0.0		
30	Silty SAND (SM); brown (10YR 4/3); medium dense; moist; fine to medium sand; trace coarse sand; NHCO/S; (0,80,20)								90	0.0	1053	

CONTRACTOR WDC
EQUIPMENT 50K
DRILL MTHD Mud Rotary
DIAMETER 10"
LOGGER Kevin Coffman

NORTHING 3771598.43
EASTING 402442.01
COORDINATE SYSTEM:
REVIEWER David Zell

NOTES: DATUM HORIZONTAL: UTM Zone 11

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

07-WELL BORE EL MONTE RD/RA.GPJ GEOSYNTEC.GDT 10/18/05



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BORING

DCMW-1B

SHEET 2 OF 16

START DRILL DATE Nov 12, 04

ELEVATION DATA:

FINISH DRILL DATE Nov 23, 04

GROUND SURF. 277.30'AMSL

LOCATION El Monte California

TOP OF CASING 276.79'AMSL

PROJECT El Monte RD/RA

DATUM Vertical: NGVD29

NUMBER HX0113E-07

GS FORM:
WELL BORE 01/04

BOREHOLE LOG

DEPTH (ft-bgs)	DESCRIPTION 1) Unit/Formation, Mem.7) Plasticity 2) Soil/Rock Name 8) Density/Consistency 3) Color 9) Structure 4) Moisture 10) Other (Mineralization, 5) Grain Size Discoloration, Odor, etc.) 6) Percentage	GRAPHIC LOG	WELL LOG	GROUNDWATER OR STRUCTURE	ELEVATION (ft)	SAMPLE					COMMENTS 1) Rig Behavior 2) Air Monitoring	
						SAMPLE NO.	TYPE	BLOWS PER 6"	RECOVERY (%)	PID READING (ppm)		TIME (00:00)
	Same as Above											
	Well graded SAND (SW); strong brown (7.5YR 5/6); dense; moist; fine to coarse sand											
35	Silt with sand (ML); olive brown (2.5Y 4/3); firm; moist; non plastic; 15% fine sand; (0.15,85) Silty SAND (SM); grayish brown (2.5Y 5/2); dense; moist; fine to medium sand; (0.60,40) Alternating between Well graded SAND (SW) and Silty SAND (SM)							80	0.0	1105		
40	Well graded SAND (SW); trace gravel; brown (10YR 5/3); dense; moist; fine to coarse sand; 10% fine gravel; (10,90,0)							60		1115		
45	Poorly graded SAND (SP); medium to coarse sand Well graded SAND with gravel (SW); gray (2.5Y 5/1); dense; moist; fine to coarse sand; 15% fine gravel; (15,85,0) Silty SAND (SM); trace gravel; gray (2.5Y 5/1); dense; moist; fine to medium sand; 5% fine gravel; (5,65,30) Well graded GRAVEL with sand (GW); gray (2.5Y 6/1); very dense; moist; fine to coarse gravel up to 2"; 15% coarse sand; (85,15,0)							67	0.0			
	Well graded SAND (SW); trace gravel; gray (2.5Y 6/1); dense; moist; fine to coarse sand; 5% fine gravel; (5,95,0) Increased fine gravel to 15%							100				
50	Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); dense; moist; fine sand; (0,100,0) Silty SAND (SM); trace gravel; yellowish brown (10YR 5/4); dense; moist; fine to medium sand; trace coarse sand; 5% fine gravel; (5,60,35)							100	0.0	1135		
								50	0.0	1240		
55	Silty SAND with gravel (SM); brown (10YR 4/3); dense; moist; fine to medium sand; 15% fine gravel; (15,70,15)											
60	Silty SAND (SM); trace gravel; dark yellowish brown (10YR 4/4); very dense; moist; fine to medium sand; 5% fine gravel; (5,60,35)											

07-WELL BORE EL MONTE RD/RA.GPJ GEOSYNTEC.GDT 10/18/05

CONTRACTOR WDC
EQUIPMENT 50K
DRILL MTHD Mud Rotary
DIAMETER 10"
LOGGER Kevin Coffman

NORTHING 3771598.43
EASTING 402442.01
COORDINATE SYSTEM:
REVIEWER David Zell

NOTES: DATUM HORIZONTAL: UTM Zone 11

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS



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BORING

DCMW-1B

SHEET 3 OF 16

START DRILL DATE Nov 12, 04
FINISH DRILL DATE Nov 23, 04
LOCATION El Monte California
PROJECT El Monte RD/RA
NUMBER HX0113E-07

ELEVATION DATA:
GROUND SURF. 277.30'AMSL
TOP OF CASING 276.79'AMSL
DATUM Vertical: NGVD29

GS FORM:
 WELL BORE 01/04

BOREHOLE LOG

DEPTH (ft-bgs)	DESCRIPTION 1) Unit/Formation, Mem.7) Plasticity 2) Soil/Rock Name 8) Density/Consistency 3) Color 9) Structure 4) Moisture 10) Other (Mineralization, 5) Grain Size Discoloration, Odor, etc.) 6) Percentage	GRAPHIC LOG	WELL LOG	GROUNDWATER OR STRUCTURE	ELEVATION (ft)	SAMPLE					COMMENTS 1) Rig Behavior 2) Air Monitoring	
						SAMPLE NO.	TYPE	BLOWS PER 6"	RECOVERY (%)	PID READING (ppm)		TIME (00:00)
	Same as Above								100	0.0		
	Well graded SAND (SW); trace gravel; dark yellowish brown (10YR 4/4); very dense; wet; fine to coarse sand; 5% fine gravel; (5,95,0) 2" layer of Silty SAND (SM) @ 62.5'								62.5	0.0	1302	
65	Silty SAND (SM); trace gravel; dark yellowish brown (10YR 4/4); very dense; moist; fine sand; 5% fine gravel; (5,75,20)								100	0.0	1310	
70	Well graded SAND (SW); trace gravel; dark yellowish brown (10YR 4/4); very dense; moist; fine to coarse sand; 5% fine gravel; (5,95,0) medium to coarse sand @ 73'								92	0.0		
	Well graded SAND with gravel (SW); yellowish brown (10YR 5/4); very dense; moist; fine to coarse sand; 25% fine gravel; (25,75,0) decreasing to 15% fine gravel								100	0.0	1324	
75	Poorly graded SAND (SP); medium sand								92	0.0		
	Well graded SAND with gravel (SW); yellowish brown (10YR 5/4); dense; moist; fine to coarse sand; 15% fine gravel; (15,85,0) 1" SILT (ML) layer @ 80.5'								100	0.0	1336	
80	Well graded SAND (SW); trace gravel; yellowish brown (10YR 5/4); dense; moist; fine to coarse sand; 10% fine gravel; (10,90,0) Poorly graded SAND (SP); medium sand								100	0.0	1342	
	Well graded SAND with gravel (SW); yellowish brown (10YR 5/4); medium dense; wet; fine to coarse sand; 15% fine gravel; (15,85,0)								90	0.0		
85	Same as Above except trace gravel; 10% fine to coarse gravel up to 1.5"; (10,90,0)								92	0.0	1357	
90	Poorly graded SAND (SP); trace gravel; brown (7.5YR 4/4); medium dense; wet; medium sand; trace coarse sand; 5% fine											

07-WELL BORE EL MONTE RDRA.GPJ GEOSYNTEC.GDT 10/18/05

CONTRACTOR WDC
EQUIPMENT 50K
DRILL MTHD Mud Rotary
DIAMETER 10"
LOGGER Kevin Coffman
NORTHING 3771598.43
EASTING 402442.01
COORDINATE SYSTEM:
REVIEWER David Zell

NOTES: DATUM HORIZONTAL: UTM Zone 11

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS



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BORING

DCMW-1B

SHEET 4 OF 16

START DRILL DATE Nov 12, 04
FINISH DRILL DATE Nov 23, 04
LOCATION El Monte California
PROJECT El Monte RD/RA
NUMBER HX0113E-07

ELEVATION DATA:
GROUND SURF. 277.30'AMSL
TOP OF CASING 276.79'AMSL
DATUM Vertical: NGVD29

GS FORM:
 WELL BORE 01/04

BOREHOLE LOG

DEPTH (ft-bgs)	DESCRIPTION 1) Unit/Formation, Mem.7) Plasticity 2) Soil/Rock Name 8) Density/Consistency 3) Color 9) Structure 4) Moisture 10) Other (Mineralization, 5) Grain Size Discoloration, Odor, etc.) 6) Percentage	GRAPHIC LOG	WELL LOG	GROUNDWATER OR STRUCTURE	ELEVATION (ft)	SAMPLE					COMMENTS 1) Rig Behavior 2) Air Monitoring	
						SAMPLE NO.	TYPE	BLOWS PER 6"	RECOVERY (%)	PID READING (ppm)		TIME (00:00)
	gravel; (5,95,0)											
	Poorly graded GRAVEL with sand (GP); fine gravel; 20% medium sand								83	0.0		
	Poorly graded SAND with gravel (SP); brown (7.5YR 4/4); medium dense; wet; fine to medium sand; 15% fine gravel; (15,85,0)								83		1415	
95	Well graded SAND (SW); trace fine gravel								94		1420	
	Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); medium dense; wet; fine sand; (0,100,0)								94	0.0	1430	
	Well graded SAND with gravel (SW); fine to coarse sand; 20% fine to coarse gravel								100	0.0	1450	
	Poorly graded SAND (SP); brown; dense; wet; fine sand; trace medium sand								75	0.0	1500	
	Silty SAND (SM); dark yellowish brown (10YR 4/6); dense; wet; fine sand; (0,75,25)								0			
	Well graded SAND with gravel (SW); brown (10YR 5/3); medium dense; wet; fine to coarse sand; 20% fine to coarse gravel up to 1.5"; (20,80,0)								100	0.0	1450	
	Silty SAND (SM); trace gravel; dark yellowish brown (10YR 4/6); wet; fine to medium sand; 5% fine gravel; (5,70,25)								100	0.0	800	
110	Same as Above except fine sand; no gravel; (0,80,20)											
	Well graded SAND with gravel (SW); grayish brown (10YR 5/2); wet; fine to coarse sand; 20% fine to coarse gravel up to 1.5"; (20,80,0)											
115	SILT (ML); olive brown (2.5Y 4/3); wet; non plastic; varved layers; (0,0,100)											
	Poorly graded SAND (SP); olive brown; medium sand											
	SILT (ML); olive brown (2.5Y 4/3); non plastic; verved layers; (0,0,100)											
	Silty SAND (SM); olive brown; fine sand; (0,60,40)											
120	SILT (ML); olive brown (2.5Y 4/3); non											

07-WELL BORE EL MONTE RD/RA.GPJ GEOSYNTEC.GDT 10/18/05

CONTRACTOR WDC
EQUIPMENT 50K
DRILL MTHD Mud Rotary
DIAMETER 10"
LOGGER Kevin Coffman
NORTHING 3771598.43
EASTING 402442.01
COORDINATE SYSTEM:
REVIEWER David Zell

NOTES: DATUM HORIZONTAL: UTM Zone 11

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS



GEO SYNTEC CONSULTANTS

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BORING

DCMW-1B

SHEET 5 OF 16

START DRILL DATE Nov 12, 04

ELEVATION DATA:

FINISH DRILL DATE Nov 23, 04

GROUND SURF. 277.30'AMSL

LOCATION El Monte California

TOP OF CASING 276.79'AMSL

PROJECT El Monte RD/RA

DATUM Vertical: NGVD29

NUMBER HX0113E-07

GS FORM:
 WELL BORE 01/04

BOREHOLE LOG

DEPTH (ft-bgs)	DESCRIPTION 1) Unit/Formation, Mem.7) Plasticity 2) Soil/Rock Name 8) Density/Consistency 3) Color 9) Structure 4) Moisture 10) Other (Mineralization, 5) Grain Size Discoloration, Odor, etc.) 6) Percentage	GRAPHIC LOG	WELL LOG	GROUNDWATER OR STRUCTURE	ELEVATION (ft)	SAMPLE					COMMENTS 1) Rig Behavior 2) Air Monitoring	
						SAMPLE NO.	TYPE	BLOWS PER 6"	RECOVERY (%)	PID READING (ppm)		TIME (00:00)
	plastic; (0,0,100)											
	Poorly graded SAND (SP); dark bluish gray (2GLE Y 4/5B); fine sand; (0,100,0)								100	0.0	815	
	Silty SAND (SM); dark bluish gray (2GLE Y 4/5B); non plastic; fine sand; (0,65,35)											
125	Poorly graded SAND (SP); light brownish gray (10YR 6/2); medium sand; (0,100,0)								100	0.0	825	
	SILT (ML); dark bluish gray (2GLE Y 3/5B); non plastic; (0,0,100)								95	0.0	832	
130	Poorly graded SAND (SP); light olive brown (2.5Y 5/4); fine to medium sand; (0,100,0)								95	0.0	842	
135	SILT with sand (ML); dark bluish gray (2GLE Y 3/5B); wet; low plasticity; fine to medium sand; layers up to 3" thick of Poorly graded SAND (SP) and Silty SAND (SM)								40	0.0	851	
140	Silty SAND (SM); dark bluish gray (2GLE Y 3/5B); wet; fine sand; (0,65,35)								95	0.0	901	
145	Silty SAND (SM); yellowish brown (10YR 5/4); wet; non plastic; fine sand; (0,70,30)								40	0.0	915	
150												

07-WELL BORE EL MONTE RDRA.GPJ GEOSYNTEC.GDT 10/18/05

CONTRACTOR WDC
EQUIPMENT 50K
DRILL MTHD Mud Rotary
DIAMETER 10"
LOGGER Kevin Coffman

NORTHING 3771598.43
EASTING 402442.01
COORDINATE SYSTEM:
REVIEWER David Zell

NOTES: DATUM HORIZONTAL: UTM Zone 11

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BORING

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SHEET 6 OF 16

START DRILL DATE Nov 12, 04
FINISH DRILL DATE Nov 23, 04
LOCATION El Monte California
PROJECT El Monte RD/RA
NUMBER HX0113E-07

ELEVATION DATA:
GROUND SURF. 277.30'AMSL
TOP OF CASING 276.79'AMSL
DATUM Vertical: NGVD29

GS FORM:
 WELL BORE 01/04

BOREHOLE LOG

DEPTH (ft-bgs)	DESCRIPTION 1) Unit/Formation, Mem.7) Plasticity 2) Soil/Rock Name 8) Density/Consistency 3) Color 9) Structure 4) Moisture 10) Other (Mineralization, 5) Grain Size Discoloration, Odor, etc.) 6) Percentage	GRAPHIC LOG	WELL LOG	GROUNDWATER OR STRUCTURE	ELEVATION (ft)	SAMPLE					COMMENTS 1) Rig Behavior 2) Air Monitoring	
						SAMPLE NO.	TYPE	BLOWS PER 6"	RECOVERY (%)	PID READING (ppm)		TIME (00:00)
	Silty SAND (SM); trace gravel; yellowish brown (10YR 5/4); fine sand; 10% fine gravel; (10,60,30)											Worker Air Space = 0.0ppm
155	Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); fine sand; (0,100,0) fine to medium sand; 10% fine to coarse gravel up to 1.5" @ 156.6'							100	0.0	926		
160	Well graded SAND with gravel (SW); yellowish brown (10YR 5/4) - pale brown (10YR 6/3); wet; fine to coarse sand; 15% fine gravel; caliche deposits; (15,85,0)							83	0.0			
165	Well graded SAND (SW); trace gravel; yellowish brown (10YR 5/4); fine to coarse sand; 10% fine gravel; (10,90,0) increased fine gravel to 15%							100	0.0	940		
	SILT (ML); dark yellowish brown (10YR 4/4); wet; non plastic; (0,0,100)							33	0.0	950		
170	Silty SAND (SM); yellowish brown (10YR 4/4); wet; fine sand; (0,60,40) Same as Above except moist							100	0.0	1000		
175	Poorly graded SAND (SP); brown (10YR 4/3); wet; fine sand; (0,100,0) 2" layer of 15% fine gravel @ 173.5' interspersed 2" layers of SM & ML							50	0.0	1020		
	Poorly graded SAND (SP); brown (10YR 5/3); very dense; moist; fine sand; (0,100,0)							100	0.0	1027		
180	Alternating between Silty SAND (SM) and SILT with sand (ML); brown (10YR 4/3); wet; non plastic to low plasticity; fine sand; (0,70,30) & (0,20,80)							50	0.0	1038		

07-WELL BORE EL MONTE RD/RA.GPJ GEOSYNTEC.GDT 10/18/05

CONTRACTOR WDC
EQUIPMENT 50K
DRILL MTHD Mud Rotary
DIAMETER 10"
LOGGER Kevin Coffman
NORTHING 3771598.43
EASTING 402442.01
COORDINATE SYSTEM:
REVIEWER David Zell

NOTES: DATUM HORIZONTAL: UTM Zone 11

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BORING

DCMW-1B

SHEET 7 OF 16

START DRILL DATE Nov 12, 04
FINISH DRILL DATE Nov 23, 04
LOCATION El Monte California
PROJECT El Monte RD/RA
NUMBER HX0113E-07

ELEVATION DATA:
GROUND SURF. 277.30'AMSL
TOP OF CASING 276.79'AMSL
DATUM Vertical: NGVD29

GS FORM:
 WELL BORE 01/04

BOREHOLE LOG

DEPTH (ft-bgs)	DESCRIPTION 1) Unit/Formation, Mem.7) Plasticity 2) Soil/Rock Name 8) Density/Consistency 3) Color 9) Structure 4) Moisture 10) Other (Mineralization, 5) Grain Size Discoloration, Odor, etc.) 6) Percentage	GRAPHIC LOG	WELL LOG	GROUNDWATER OR STRUCTURE	ELEVATION (ft)	SAMPLE					COMMENTS 1) Rig Behavior 2) Air Monitoring	
						SAMPLE NO.	TYPE	BLOWS PER 6"	RECOVERY (%)	PID READING (ppm)		TIME (00:00)
	Same as Above except trace fine gravel								100	0.0	1125	
185	Poorly graded SAND (SP); yellowish brown (10YR 5/4); very dense; moist; fine sand; (0,100,0)								100	0.0	1140	
	SILT with sand (ML); olive brown (2.5Y 4/3); firm; wet; non plastic; fine sand; (0,20,80)											
	Poorly graded SAND (SP); wet; fine to medium sand											
	SILT with sand (ML); (2.5Y 4/3); firm; wet; non plastic; fine sand; (0,20,80)								40	0.0	1152	
190	Poorly graded SAND (SP); dark yellowish brown (10YR 4/6); very dense; wet; fine to medium sand; (0,100,0)											
	SILT (ML); trace sand; olive brown (2.5Y 4/4); firm; wet; low plasticity; fine sand; (0,10,90)								94	0.0	1205	
	Silty SAND (SM); olive brown (2.5Y 4/4); wet; fine sand; (0,60,40)											
195	Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); wet; fine to medium sand; (0,100,0)								100	0.0	1215	
	Same as Above except fine sand											
200									100	0.0	1222	
205									95	0.0	1233	
	SILT (ML); trace sand; olive brown (2.5Y 4/3); firm; wet; 5-10% fine sand; non plastic; (0,5,95)											
	increased fine sand to 15%								95	0.0	1245	
210												

07-WELL BORE EL MONTE RDRA.GPJ GEOSYNTEC.GDT 10/18/05

CONTRACTOR WDC
EQUIPMENT 50K
DRILL MTHD Mud Rotary
DIAMETER 10"
LOGGER Kevin Coffman

NORTHING 3771598.43
EASTING 402442.01
COORDINATE SYSTEM:
REVIEWER David Zell

NOTES: DATUM HORIZONTAL: UTM Zone 11

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BORING

DCMW-1B

SHEET 8 OF 16

START DRILL DATE Nov 12, 04
FINISH DRILL DATE Nov 23, 04
LOCATION El Monte California
PROJECT El Monte RD/RA
NUMBER HX0113E-07

ELEVATION DATA:
GROUND SURF. 277.30'AMSL
TOP OF CASING 276.79'AMSL
DATUM Vertical: NGVD29

GS FORM:
 WELL BORE 01/04

BOREHOLE LOG

DEPTH (ft-bgs)	DESCRIPTION 1) Unit/Formation, Mem. 7) Plasticity 2) Soil/Rock Name 8) Density/Consistency 3) Color 9) Structure 4) Moisture 10) Other (Mineralization, Discoloration, Odor, etc.) 5) Grain Size 6) Percentage	GRAPHIC LOG	WELL LOG	GROUNDWATER OR STRUCTURE	ELEVATION (ft)	SAMPLE					COMMENTS 1) Rig Behavior 2) Air Monitoring	
						SAMPLE NO.	TYPE	BLOWS PER 6"	RECOVERY (%)	PID READING (ppm)		TIME (00:00)
	Silty SAND (SM); olive brown; fine sand; (0,80,20)											
215	CLAY (CL); dark bluish gray (2GLE Y 4/10B); firm; wet; low to medium plasticity; (0,0,100)							95	0.0	1255		
	Poorly graded SAND (SP); dark bluish gray (2GLE Y 4/5B); wet; fine to medium sand; (0,100,0)							95	0.0	1300		
220	Silty SAND (SM); dark bluish gray (2GLE Y 4/5B); wet; non plastic; fine sand; (0,75,25)							100	0.0	1308		
	Poorly graded SAND (SP); dark greenish gray (1GLE Y 3/10Y); wet; fine to medium sand; (0,100,0)											
	occasional 3" layers of Silty SAND (SM)							90	0.0	1315		
225	Poorly graded SAND (SP); dark greenish gray (1GLE Y 4/10Y); wet; medium sand											
	10% fine to coarse gravel up to 1" @ 228'							100	0.0	1322		
230	Poorly graded SAND (SP); trace gravel; dark greenish gray (1GLE Y 4/10Y); wet; medium to coarse sand; 10% fine gravel; (10,90,0)							100	0.0	1332		
235	Poorly graded GRAVEL with sand (GP); greenish gray (1GLE Y 5/10Y); wet; fine gravel; 20% medium to coarse sand; (80,20,0)							75	0.0	1340		
	2" layer of SILT (ML) @ 238'											
	Poorly graded SAND (SP); trace gravel; pale brown (10YR 6/3); wet; medium to coarse sand; 5% fine gravel; (5,95,0)											
240												

07-WELL BORE EL MONTE RD/RA.GPJ GEOSYNTEC.GDT 10/18/05

CONTRACTOR WDC
EQUIPMENT 50K
DRILL MTHD Mud Rotary
DIAMETER 10"
LOGGER Kevin Coffman

NORTHING 3771598.43
EASTING 402442.01
COORDINATE SYSTEM:
REVIEWER David Zell

NOTES: DATUM HORIZONTAL: UTM Zone 11

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS



GEO SYNTEC CONSULTANTS

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 Santa Barbara, California 93101
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BORING

DCMW-1B

SHEET 9 OF 16

START DRILL DATE Nov 12, 04

ELEVATION DATA:

FINISH DRILL DATE Nov 23, 04

GROUND SURF. 277.30'AMSL

LOCATION El Monte California

TOP OF CASING 276.79'AMSL

PROJECT El Monte RD/RA

DATUM Vertical: NGVD29

NUMBER HX0113E-07

GS FORM:
 WELL BORE 01/04

BOREHOLE LOG

DEPTH (ft-bgs)	DESCRIPTION 1) Unit/Formation, Mem. 7) Plasticity 2) Soil/Rock Name 8) Density/Consistency 3) Color 9) Structure 4) Moisture 10) Other (Mineralization, 5) Grain Size Discoloration, Odor, etc.) 6) Percentage	GRAPHIC LOG	WELL LOG	GROUNDWATER OR STRUCTURE	ELEVATION (ft)	SAMPLE					COMMENTS 1) Rig Behavior 2) Air Monitoring	
						SAMPLE NO.	TYPE	BLOWS PER 6"	RECOVERY (%)	PID READING (ppm)		TIME (00:00)
	Poorly graded SAND with gravel (SP); light olive brown (2.5Y 5/3); wet; medium to coarse sand; 25% fine to coarse gravel up to 1.5"; (25,75,0)								25	0.0	1347	
245	2" layer of SILT (ML) @ 245'								100	0.0	1408	
	Poorly graded SAND (SP); light olive brown (2.5Y 5/3); wet; fine to medium sand; (0,100,0)								90	0.0	1420	
250												
	Silty SAND (SM); light olive brown (2.5Y 5/3); wet; fine sand; (0,60,40)								70	0.0	1430	
255	Same as Above except trace fine gravel; (10,60,30)											
	SILT (ML); trace fine sand; wet; non plastic											
	Silty SAND (SM); trace gravel; olive brown (2.5Y 4/3); wet; fine sand; 10% fine gravel; (10,60,30)											
	Same as Above except no gravel; (0,65,35)								100	0.0	1445	
260	SILT (ML); olive brown (2.5Y 4/3); moist; non plastic; (0,0,100)											
	SILT with sand (ML); olive brown (2.5Y 4/3); wet; non plastic; 15% fine sand; (0,15,85)								70	0.0	1453	
265	Poorly graded SAND (SP); trace silt; olive brown (2.5Y 4/3); fine sand; (0,95,5)											
	Poorly graded SAND (SP); light olive brown (2.5Y 5/4); wet; fine sand; (0,100,0)								80	0.0	1500	
270												

07-WELL BORE EL MONTE RD/RA.GPJ GEOSYNTEC.GDT 10/18/05

CONTRACTOR WDC
EQUIPMENT 50K
DRILL MTHD Mud Rotary
DIAMETER 10"
LOGGER Kevin Coffman

NORTHING 3771598.43
EASTING 402442.01
COORDINATE SYSTEM:
REVIEWER David Zell

NOTES: DATUM HORIZONTAL: UTM Zone 11

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS



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BORING

DCMW-1B

SHEET 10 OF 16

START DRILL DATE Nov 12, 04

ELEVATION DATA:

FINISH DRILL DATE Nov 23, 04

GROUND SURF. 277.30'AMSL

LOCATION El Monte California

TOP OF CASING 276.79'AMSL

PROJECT El Monte RD/RA

DATUM Vertical: NGVD29

NUMBER HX0113E-07

GS FORM:
WELL BORE 01/04

BOREHOLE LOG

DEPTH (ft-bgs)	DESCRIPTION 1) Unit/Formation, Mem. 7) Plasticity 2) Soil/Rock Name 8) Density/Consistency 3) Color 9) Structure 4) Moisture 10) Other (Mineralization, 5) Grain Size Discoloration, Odor, etc.) 6) Percentage	GRAPHIC LOG	WELL LOG	GROUNDWATER OR STRUCTURE	ELEVATION (ft)	SAMPLE					COMMENTS 1) Rig Behavior 2) Air Monitoring	
						SAMPLE NO.	TYPE	BLOWS PER 6"	RECOVERY (%)	PID READING (ppm)		TIME (00:00)
	Poorly graded SAND with gravel (SP); olive brown (2.5Y 4/4); wet; medium to coarse sand; 20% fine to coarse gravel up to 1.75"; (20,80,0)								80	0.0	1510	
275	Well graded SAND with gravel (SW); trace silt; trace cobble; light olive brown (2.5Y 5/3); fine to coarse sand; 20% fine to coarse gravel up to 3.0"; 5% cobble >3"; (20,70,5)								69	0.0	1526	
280	Well graded SAND with gravel (SW); light olive brown (2.5Y 5/3); fine to coarse sand; 20% fine gravel; (20,80,0)								69	0.0	1536	
285									69		1550	
	Silty SAND (SM); dark yellowish brown (10YR 4/4); wet; fine sand; (0,70,30)								80	0.0	800	
290	Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); wet; fine to medium sand; (0,100,0)								0		807	No Recovery - Rock in shoe
295	Well graded SAND (SW); yellowish brown (10YR 5/4); wet; fine to coarse sand								100	0.0	818	
	Same as Above except with 15% fine to coarse gravel up to 1.5" @ 296'								100		828	
300	Well graded SAND with gravel (SW); yellowish brown (10YR 5/4); fine to coarse sand; 25% fine to coarse gravel up to 1.25"; (25,75,0)											

07-WELL BORE EL MONTE RD/RA.GPJ GEOSYNTEC.GDT 10/18/05

CONTRACTOR WDC
EQUIPMENT 50K
DRILL MTHD Mud Rotary
DIAMETER 10"
LOGGER Kevin Coffman

NORTHING 3771598.43
EASTING 402442.01
COORDINATE SYSTEM:
REVIEWER David Zell

NOTES: DATUM HORIZONTAL: UTM Zone 11

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BORING

DCMW-1B

SHEET 11 OF 16

START DRILL DATE Nov 12, 04
FINISH DRILL DATE Nov 23, 04
LOCATION El Monte California
PROJECT El Monte RD/RA
NUMBER HX0113E-07

ELEVATION DATA:
GROUND SURF. 277.30'AMSL
TOP OF CASING 276.79'AMSL
DATUM Vertical: NGVD29

GS FORM:
 WELL BORE 01/04

BOREHOLE LOG

DEPTH (ft-bgs)	DESCRIPTION 1) Unit/Formation, Mem.7) Plasticity 2) Soil/Rock Name 8) Density/Consistency 3) Color 9) Structure 4) Moisture 10) Other (Mineralization, 5) Grain Size Discoloration, Odor, etc.) 6) Percentage	GRAPHIC LOG	WELL LOG	GROUNDWATER OR STRUCTURE	ELEVATION (ft)	SAMPLE					COMMENTS 1) Rig Behavior 2) Air Monitoring		
						SAMPLE NO.	TYPE	BLOWS PER 6"	RECOVERY (%)	PID READING (ppm)		TIME (00:00)	
												silt and rock in shoe	
305	SILT (ML); trace sand; yellowish brown (10YR 5/4); hard; wet; non plastic; 5% fine sand; (0,5,95)									30		837	
	Same as Above except dark yellowish brown (1YR 4/4)									100	0.0	851	
										100	0.0	904	
310	SILT with sand (ML); brown (10YR 4/3); hard; moist; non plastic; 15% fine to medium sand; (0,15,85)									90	0.0	925	Worker Air Space = 0.0ppm
	increasing fine to medium sand content									90	0.0	935	
315	SAND-SILT mixture (SM); trace gravel; brown (10YR 4/3); moist; non plastic; fine to medium sand; 5% fine gravel; (5,50,45)									90	0.0	950	
	Poorly graded SAND (SP) grading to Silty SAND (SM); yellowish brown (10YR 5/4); fine to medium sand												
320	SILT with sand (ML); dark yellowish brown (10YR 4/4); firm; moist; low plasticity; 15% fine to medium sand; (0,15,85)									100	0.0	1005	
	SILT (ML); trace sand; brown (10YR 4/3); hard; most; low plasticity; 5% fine sand; (0,5,95)												
325	increased fine sand content to 20% @ 325'												
330	SILT (ML); trace sand; brown (10YR 4/3); hard; moist; low plasticity; 7% fine sand; (0,7,93)									100	0.0	1020	

07-WELL BORE EL MONTE RD/RA.GPJ GEOSYNTEC.GDT 10/18/05

CONTRACTOR WDC
EQUIPMENT 50K
DRILL MTHD Mud Rotary
DIAMETER 10"
LOGGER Kevin Coffman

NORTHING 3771598.43
EASTING 402442.01
COORDINATE SYSTEM:
REVIEWER David Zell

NOTES: DATUM HORIZONTAL: UTM Zone 11

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS



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BORING

DCMW-1B

SHEET 12 OF 16

START DRILL DATE Nov 12, 04
FINISH DRILL DATE Nov 23, 04
LOCATION El Monte California
PROJECT El Monte RD/RA
NUMBER HX0113E-07

ELEVATION DATA:
GROUND SURF. 277.30'AMSL
TOP OF CASING 276.79'AMSL
DATUM Vertical: NGVD29

GS FORM:
 WELL BORE 01/04

BOREHOLE LOG

DEPTH (ft-bgs)	DESCRIPTION 1) Unit/Formation, Mem.7) Plasticity 2) Soil/Rock Name 8) Density/Consistency 3) Color 9) Structure 4) Moisture 10) Other (Mineralization, 5) Grain Size Discoloration, Odor, etc.) 6) Percentage	GRAPHIC LOG	WELL LOG	GROUNDWATER OR STRUCTURE	ELEVATION (ft)	SAMPLE					COMMENTS 1) Rig Behavior 2) Air Monitoring	
						SAMPLE NO.	TYPE	BLOWS PER 6"	RECOVERY (%)	PID READING (ppm)		TIME (00:00)
	SILT with sand (ML); dark yellowish brown (10YR 4/4); hard; moist; non plastic; 15% fine sand; (0,15,85)											
	Poorly graded SAND (SP) grading to Silty SAND (SM); yellowish brown (10YR 5/4); wet; fine to medium sand								100	0.0	1050	
335	SILT (ML); trace sand; yellowish brown (10YR 5/4); firm; moist; low plasticity; 10% fine sand; (0,10,90)											
	CLAY (CL); olive brown; firm; wet; medium plasticity; (0,0,100)								60	0.0	1145	
	Silty SAND (SM); olive brown (2.5Y 4/3); moist; fine to medium sand; (0,70,30)											
340	Poorly graded SAND (SP); pale brown (10YR 6/3); very dense; moist; fine sand; (0,100,0)											
	CLAY (CL); trace sand; dark yellowish brown (10YR 4/4); moist; medium plasticity; 5% fine sand; (0,5,95)								100	0.0	1200	
	Silty SAND (SM); yellowish brown (10YR 5/4); wet; fine to medium sand; (0,70,30)											
	interspersed 1" layers of medium SP								75	0.0	1212	
345	Poorly graded SAND with gravel (SP); trace silt; light yellowish brown (10YR 6/4); wet; medium to coarse sand; 20% fine to coarse gravel up to 1.5"; (20,75,5)											
	Same as Above except fine to medium sand; (20,80,0)								80	0.0	1230	
350									50	0.0	1250	
	Poorly graded SAND with gravel (SP); brown (10YR 5/3); wet; fine to medium sand; 15% fine gravel; (15,85,0)											
355									0		1300	No Recovery
	cobbles reported by driller											
	smooth soil reported by driller											
360	SILT (ML); dark yellowish brown (10YR 4/4); hard; moist to wet; non plastic;								100	0.0	0850	

07-WELL BORE EL MONTE RDRA.GPJ GEOSYNTEC.GDT 10/18/05

CONTRACTOR WDC
EQUIPMENT 50K
DRILL MTHD Mud Rotary
DIAMETER 10"
LOGGER Kevin Coffman
NORTHING 3771598.43
EASTING 402442.01
COORDINATE SYSTEM:
REVIEWER David Zell

NOTES: DATUM HORIZONTAL: UTM Zone 11

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS



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BORING

DCMW-1B

SHEET 13 OF 16

START DRILL DATE Nov 12, 04

ELEVATION DATA:

FINISH DRILL DATE Nov 23, 04

GROUND SURF. 277.30'AMSL

LOCATION El Monte California

TOP OF CASING 276.79'AMSL

PROJECT El Monte RD/RA

DATUM Vertical: NGVD29

NUMBER HX0113E-07

GS FORM:
 WELL BORE 01/04

BOREHOLE LOG

DEPTH (ft-bgs)	DESCRIPTION 1) Unit/Formation, Mem.7) Plasticity 2) Soil/Rock Name 8) Density/Consistency 3) Color 9) Structure 4) Moisture 10) Other (Mineralization, 5) Grain Size Discoloration, Odor, etc.) 6) Percentage	GRAPHIC LOG	WELL LOG	GROUNDWATER OR STRUCTURE	ELEVATION (ft)	SAMPLE				COMMENTS 1) Rig Behavior 2) Air Monitoring		
						SAMPLE NO.	TYPE	BLOWS PER 6"	RECOVERY (%)		PID READING (ppm)	TIME (00:00)
	(0,0,100) SILT (ML); dark yellowish brown (10YR 4/4); hard; moist to wet; non plastic; (0,0,100)											
365	Silty SAND (SM); dark yellowish brown (10YR 4/4); wet; fine to medium sand; (0,60,40)							60	0.0	0915		
	Poorly graded SAND (SP); yellowish brown (10YR 5/4); wet; fine sand; (0,100,0)							85	0.0	0930		
370	Poorly graded GRAVEL (GP); trace medium sand; fine gravel; (95,5,0) Silty SAND (SM); dark yellowish brown (10YR 4/4); wet; fine sand; (0,85,15)							60		0950		
	Same as Above except trace fine gravel; (5,60,35)											
375	Poorly graded SAND (SP); brown; medium sand; (0,100,0)											
	Silty SAND (SM); trace gravel; yellowish brown (10YR 5/4); wet; fine to medium sand; 5% fine gravel; (5,65,30)							80	0.0	1000		
380	increasing fine gravel content to 15%											
	Poorly graded SAND with gravel (SP); yellowish brown (10YR 5/4); wet; medium sand; 15% fine to coarse gravel up to 1.5"; (15,85,0)							60	0.0	1012		381' - 385' bgs: Bentonite Chip Seal
385												
	Silty SAND (SM); brown (7.5YR 4/4); wet; fine sand; trace coarse sand; (0,65,35)							100	0.0	1028		385' - 386' bgs: Transition Sand #0/30 386' - 415' bgs: Filter Sand Pack #3
390												

07-WELL BORE EL MONTE RD/RA.GPJ GEOSYNTEC.GDT 10/18/05

CONTRACTOR WDC
EQUIPMENT 50K
DRILL MTHD Mud Rotary
DIAMETER 10"
LOGGER Kevin Coffman

NORTHING 3771598.43
EASTING 402442.01
COORDINATE SYSTEM:
REVIEWER David Zell

NOTES: DATUM HORIZONTAL: UTM Zone 11

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS



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BORING

DCMW-1B

SHEET 15 OF 16

START DRILL DATE Nov 12, 04

ELEVATION DATA:

FINISH DRILL DATE Nov 23, 04

GROUND SURF. 277.30'AMSL

LOCATION El Monte California

TOP OF CASING 276.79'AMSL

PROJECT El Monte RD/RA

DATUM Vertical: NGVD29

NUMBER HX0113E-07

GS FORM:
WELL BORE 01/04

BOREHOLE LOG

DEPTH (ft-bgs)	DESCRIPTION 1) Unit/Formation, Mem.7) Plasticity 2) Soil/Rock Name 8) Density/Consistency 3) Color 9) Structure 4) Moisture 10) Other (Mineralization, Discoloration, Odor, etc.) 5) Grain Size 6) Percentage	GRAPHIC LOG	WELL LOG	GROUNDWATER OR STRUCTURE	ELEVATION (ft)	SAMPLE					COMMENTS 1) Rig Behavior 2) Air Monitoring	
						SAMPLE NO.	TYPE	BLOWS PER 6"	RECOVERY (%)	PID READING (ppm)		TIME (00:00)
	Poorly graded SAND (SP); dark yellowish brown (10YR 4/6); wet; fine to medium sand; (0,100,0)											
	CLAY (CL); light olive brown (2.5Y 5/3); medium plasticity											
	Silty SAND (SM); olive brown (2.5Y 4/3); fine to medium sand; (0,70,30)											
425	Poorly graded SAND (SP); dark yellowish brown; wet; fine sand											425' - 465' bgs: Portland Cement
	SILT with sand (ML); olive brown (2.5Y 4/3); low plasticity; 15% fine sand											
	SILT (ML); olive brown; low plasticity; (0,0,100)											
430	Poorly graded SAND (SP); brown (10YR 4/3); wet; fine to medium sand											
	SILT (ML); trace sand; olive brown (2.5Y 4/4); hard; moist; non plastic; fine sand; (0,5,95)											
435	CLAY (CL); olive brown; firm; wet; medium plasticity											
	Silty SAND (SM); light olive brown (2.5Y 5/4); moist; fine sand; (0,70,30)											
440	CLAY (CL); olive brown; firm; wet; medium plasticity											
	Alternating 6"-1' layers of SILT (ML); trace sand & Silty SAND (SM); light olive brown (2.5Y 5/4; wet; fine sand; varved layers; (0,95,5) & (0,70,30)											
445	Poorly graded SAND with silt (SP); light olive brown (2.5Y 5/3); wet; fine sand; (0,90,10)											
	CLAY (CL); olive brown; firm; wet; medium plasticity											
450	Poorly graded SAND with silt (SP); light olive brown (2.5Y 5/3); wet; fine sand; varved layers; (0,90,10)											

07-WELL BORE EL MONTE RD/RA.GPJ GEOSYNTEC.GDT 10/18/05

CONTRACTOR WDC
EQUIPMENT 50K
DRILL MTHD Mud Rotary
DIAMETER 10"
LOGGER Kevin Coffman

NORTHING 3771598.43
EASTING 402442.01
COORDINATE SYSTEM:
REVIEWER David Zell

NOTES: DATUM HORIZONTAL: UTM Zone 11

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS



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BORING

DCMW-1B

SHEET 16 OF 16

START DRILL DATE Nov 12, 04
FINISH DRILL DATE Nov 23, 04
LOCATION El Monte California
PROJECT El Monte RD/RA
NUMBER HX0113E-07

ELEVATION DATA:
GROUND SURF. 277.30'AMSL
TOP OF CASING 276.79'AMSL
DATUM Vertical: NGVD29

GS FORM:
 WELL BORE 01/04

BOREHOLE LOG

DEPTH (ft-bgs)	DESCRIPTION 1) Unit/Formation, Mem.7) Plasticity 2) Soil/Rock Name 8) Density/Consistency 3) Color 9) Structure 4) Moisture 10) Other (Mineralization, 5) Grain Size Discoloration, Odor, etc.) 6) Percentage	GRAPHIC LOG	WELL LOG	GROUNDWATER OR STRUCTURE	ELEVATION (ft)	SAMPLE					COMMENTS 1) Rig Behavior 2) Air Monitoring
						SAMPLE NO.	TYPE	BLOWS PER 6"	RECOVERY (%)	PID READING (ppm)	
	Poorly graded SAND with silt (SP); light olive brown (2.5Y 5/3); wet; fine sand; varved layers; (0,90,10)							95	0.0	0920	
	SILT with sand (ML); light olive brown (2.5Y 5/4); moist; wet; fine sand; (0,20,80)										
455	Poorly graded SAND (SP); light yellowish brown; wet; medium sand; (0,100,0) SILT (ML); trace sand; olive brown; firm; moist; non plastic; fine sand; (0,10,90) Silty SAND (SM); dark greenish gray (1GLE Y 4/10GY); wet; fine sand; (0,65,35) CLAY (CL); dark greenish gray (1GLE Y 4/10GY); hard to very hard; moist; medium plasticity							95	0.0	0950	
	Silty SAND (SM); brown (10YR 4/3); moist to wet; fine sand; (0,70,30)										
460	CLAY (CL); dark bluish gray (2GLE Y 4/10B); hard; moist; medium plasticity							100	0.0	1000	
	Poorly graded SAND (SP); yellowish brown (10YR 5/4); wet; fine to medium sand; 2" layer of oxidation; (0,100,0) Well graded SAND with gravel (SW); pale brown (10YR 6/3); wet; fine to coarse sand; 15% fine to coarse gravel up to 1.5"; (15,85,0)										
465											End of Boring @ 465' bgs
470											
475											
480											

07-WELL BORE EL MONTE RDRA.GPJ GEOSYNTEC.GDT 10/18/05

CONTRACTOR WDC
EQUIPMENT 50K
DRILL MTHD Mud Rotary
DIAMETER 10"
LOGGER Kevin Coffman
NORTHING 3771598.43
EASTING 402442.01
COORDINATE SYSTEM:
REVIEWER David Zell

NOTES: DATUM HORIZONTAL: UTM Zone 11
 SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

COMPLIANCE MONITORING PLAN

Eastern Shallow and Southern Deep Portions of the Interim Remedial Action

El Monte Operable Unit

**Prepared on behalf of the
East Side Performing Settling Defendants**

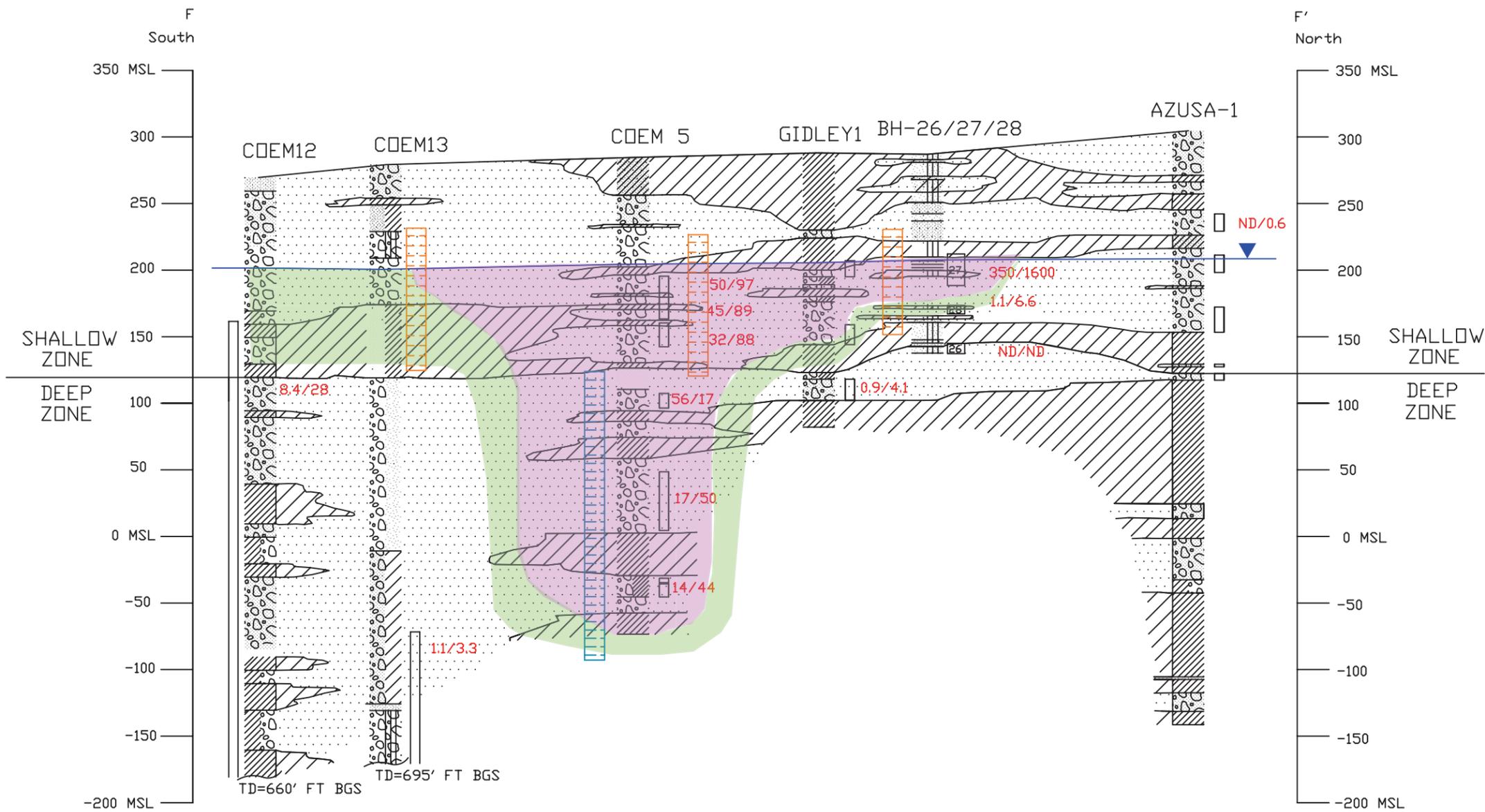
Prepared by:



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www.geosyntec.com

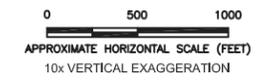
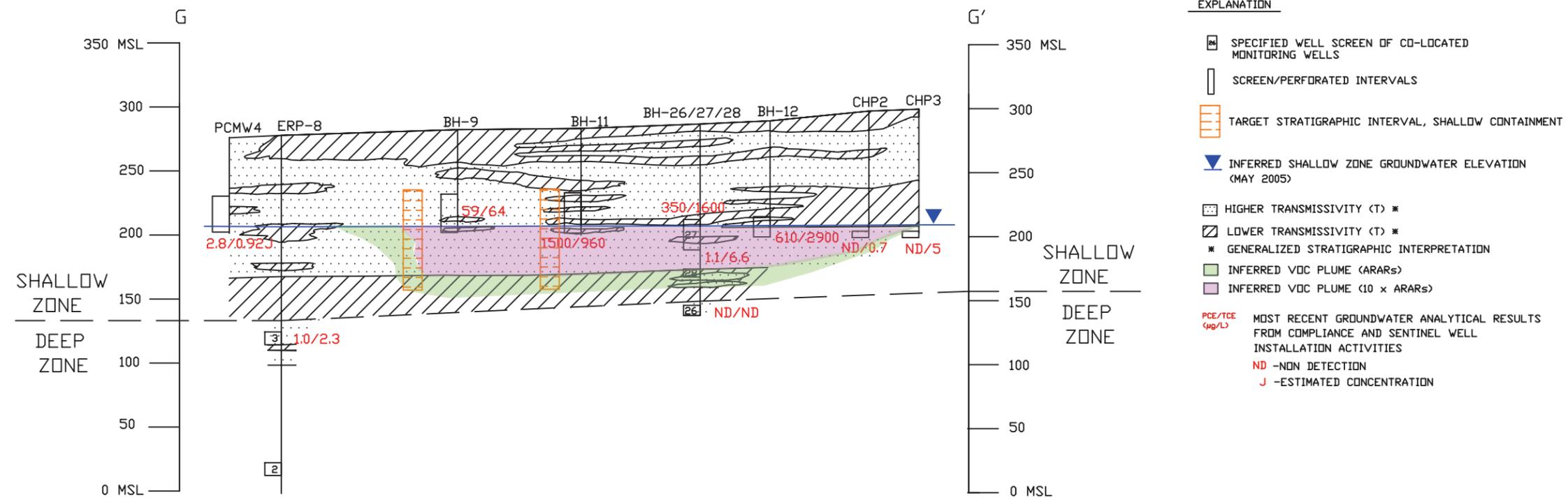
October 17, 2006



- EXPLANATION**
- USCS GRAPHICAL REPRESENTATION OF DWR WELL LOGS
 - SCREEN INTERVAL AND PORT NUMBER OF MULTI-PORT MONITORING WELLS
 - SPECIFIED WELL SCREEN OF CO-LOCATED NEWLY INSTALLED MONITORING WELLS
 - SCREEN/PERFORATED INTERVALS
 - TARGET STRATIGRAPHIC INTERVAL, SHALLOW CONTAINMENT
 - TARGET STRATIGRAPHIC INTERVAL, DEEP CONTAINMENT
 - INFERRED SHALLOW ZONE GROUNDWATER ELEVATION (MAY 2005)
 - HIGHER TRANSMISSIVITY (T) *
 - LOWER TRANSMISSIVITY (T) *
 - * GENERALIZED STRATIGRAPHIC INTERPRETATION
 - INFERRED VDC PLUME (ARARs)
 - INFERRED VDC PLUME (10 x ARARs)
- PCE/TCE (µg/L)**
- ND -NON DETECTION
 - J -ESTIMATED CONCENTRATION



 924 Anacapa Street, Suite 4A Santa Barbara, California 93101 (805) 897-3800/899-8689 (Fax)	PROJECT	EL MONTE		FIGURE:
	JOB NUMBER:	HX0113		3-8
	DRAWN BY:	D.LANGERE		DATE:
				JULY 2005



 924 Anacapa Street, Suite 4A Santa Barbara, California 93101 (805) 897-3800/899-8689 (Fax)	PROJECT		FIGURE:
	EL MONTE		
JOB NUMBER:	DRAWN BY:	DATE:	
HX0113	D.LANGERE	JULY 2005	

157280
pt. 1 of 3

SFUND RECORDS CTR
157280

**REMEDIAL INVESTIGATION
OF GROUNDWATER CONTAMINATION
IN THE SAN FERNANDO VALLEY**

REMEDIAL INVESTIGATION REPORT

Submitted to:

**City of Los Angeles
Department of Water and Power
Under Cooperative Agreement with
United States Environmental Protection Agency**

Prepared by:

**James M. Montgomery, Inc.
365 Lennon Lane
Walnut Creek, CA 94598**

December 1992

**JAMES M. MONTGOMERY
CONSULTING ENGINEERS, INC.**

(PAGE 1 OF 5)

581 LENNON LANE, WALNUT CREEK, CALIFORNIA 94598 / (415) 933-2250

BORING/WELL NUMBER POVPB-4

CLIENT LADWP

DATE STARTED 10/26/89 COMPLETED 10/26/89

PROJECT San Fernando Valley RI

ELEVATION 381.00 feet AMSL

GEOLOGIST H. Moaddel, HLA

DEPTH feet	TIME	SAMP. NO.	HNU-PID	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	COMMENTS
0						SILTY SAND (SM) dark brown, moist, low plasticity, fine-grained sand, with clay	
5	11:14		0.0		SM		
10	11:16 11:19		0.0				
15						brown, fine to medium grained	
20	11:26 11:29						
25	11:34 11:35					increase in clay content	

METHOD OF DRILLING Dual Wall - Air Perc

WELL COMPLETION DEPTH 114.80 ft

HOLE DIAMETER 9-7/8"

WELL DIAMETER 4"

TOTAL DEPTH 119 ft

WELL MATERIAL 304-SS & Low Carbon



Harding Lawson Associates
Engineers and Geoscientists

Log of Boring POVPB-4 (sheet 1 of 5) PLATE
San Fernando Valley RI
San Fernando, California

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(PAGE 2 OF 5)

581 LENNON LANE, WALNUT CREEK, CALIFORNIA 94598 / (415) 933-2258

BORING/WELL NUMBER POVPB-4

CLIENT LADWP

DATE STARTED 10/26/89 COMPLETED 10/26/89

PROJECT San Fernando Valley RI

ELEVATION 381.00 feet AMSL

GEOLOGIST H. Moaddel, HLA

DEPTH feet	TIME	SAMP. NO.	MNU-PID	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	COMMENTS
30	11:38 11:55	1			SM		
35	11:58 12:00 12:02						
40	12:05 12:08					increase in medium-grained sand content	
45	12:13 12:26					SILTSTONE AND GRAVELLY SANDSTONE (BEDROCK) light brown, thinly laminated siltstone, with interbedded gravelly fine- to medium-grained sandstone, material slightly well indurated	Possible alluvium-bedrock contact at 45 feet
50	12:20 12:50						

METHOD OF DRILLING Dual Wall - Air Perc

WELL COMPLETION DEPTH 114.80 ft

MOLE DIAMETER 9-7/8"

WELL DIAMETER 4"

TOTAL DEPTH 119 ft

WELL MATERIAL 304-SS & Low Carbon



Harding Lawson Associates
Engineers and Geoscientists

Log of Boring POVPB-4 (sheet 2 of 5)
San Fernando Valley RI
San Fernando, California

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(PAGE 3 OF 5)

581 LENNON LANE, WALNUT CREEK, CALIFORNIA 94596 / (415) 933-2250

BORING/WELL NUMBER POVPB-4

CLIENT LADWP

DATE STARTED 10/26/89 COMPLETED 10/26/89

PROJECT San Fernando Valley RI

ELEVATION 381.00 feet AMSL

GEOLOGIST H. Moaddel, HLA

DEPTH feet	TIME	SAMP. NO.	MNU-PID	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	COMMENTS
55							
60	12:50 13:04					increase in gravel content CLAYSTONE (BEDROCK) light brown, wet, weak, friable, with thinly laminated siltstone and gravel lenses, slightly indurated	
65							
70	13:14 13:32						
75	13:42 14:08	3				SILTY SANDSTONE (BEDROCK) light brown, moist, weakly cemented, fine grained, with gravel, very slightly indurated SILTSTONE (BEDROCK) light brown, moist, weakly cemented, poorly consolidated, friable, with	

METHOD OF DRILLING Dual Wall - Air Perc

WELL COMPLETION DEPTH 114.80 ft

HOLE DIAMETER 9-7/8"

WELL DIAMETER 4"

TOTAL DEPTH 119 ft

WELL MATERIAL 304-SS & Low Carbon



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Log of Boring POVPB-4 (sheet 3 of 5)

PLATE

San Fernando Valley RI
San Fernando, California

9314-9

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(PAGE 4 OF 5)

581 LENNON LANE, WALNUT CREEK, CALIFORNIA 94598 / (415) 933-2258

BORING/WELL NUMBER POVPB-4
 DATE STARTED 10/26/89 COMPLETED 10/26/89
 ELEVATION 381.00 feet AMSL

CLIENT LADWP
 PROJECT San Fernando Valley RI
 GEOLOGIST H. Moaddel, HLA

DEPTH feet	TIME	SAMP. NO.	HNU-PID	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	COMMENTS
80	14:15		0.0			fine-grained sand and gravel	
85						increase in fine-grained sand content	
90	14:30 14:54	4				saturated	<u>Ground water encountered at 89 feet.</u>
95						lenses of dark gray siltstone	
100	15:08 16:54		0.0				Hydropunch sample taken.
105							

METHOD OF DRILLING Dual Wall - Air Perc WELL COMPLETION DEPTH 114.80 ft
 HOLE DIAMETER 9-7/8" WELL DIAMETER 4"
 TOTAL DEPTH 119 ft WELL MATERIAL 304-SS & Low Carbon



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 Engineers and Geoscientists

Log of Boring POVPB-4 (sheet 4 of 5)
 San Fernando Valley RI
 San Fernando, California

DRAWN NK JOB NUMBER 9372,020.11 APPROVED [Signature] DATE 1/90 REVISED _____ DATE _____

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(PAGE 5 OF 5)

591 LENNON LANE, WALNUT CREEK, CALIFORNIA 94598 / (415) 933-2250

BORING/WELL NUMBER POVPB-4

CLIENT LADWP

DATE STARTED 10/26/89 COMPLETED 10/26/89

PROJECT San Fernando Valley RI

ELEVATION 381.00 feet AMSL

GEOLOGIST H. Moaddel, HLA

DEPTH feet	TIME	SAMP. NO.	MNU-PID	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	COMMENTS
105	17:02 17:03					light gray silt and clay	
110	17:12 17:20						
115	17:29 17:31					SILTY SANDSTONE (BEDROCK) light gray, saturated, composed of well sorted, fine-grained sand and silt, poorly cemented, friable	
120	17:37						Borehole terminated at 119 feet on 10/26/89. Boring converted to monitoring Well PO-VPB-4 on 10/26/89. Ground water measured at 66.64 feet on 10/26/89.
125							
130							

METHOD OF DRILLING Dual Wall - Air Perc

WELL COMPLETION DEPTH 114.80 ft

HOLE DIAMETER 9-7/8"

WELL DIAMETER 4"

TOTAL DEPTH 119 ft

WELL MATERIAL 304-SS & Low Carbon



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Log of Boring POVPB-4 (sheet 5 of 5) PLATE
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San Fernando, California

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591 LENNON LANE, WALNUT CREEK, CALIFORNIA 94598 / (415) 933-2268

BORING/WELL NUMBER POVPB-9

CLIENT LADWP

DATE STARTED 10/31/89 COMPLETED 10/31/89

PROJECT San Fernando Valley RI

ELEVATION 369.00 feet AMSL

GEOLOGIST P. Patterson, HLA

DEPTH Feet	TIME	SAMP. NO.	HNU-PID	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	COMMENTS
0	10:56					SILTY SAND (SM) dark brown, fine- to coarse-grained sand, with silt and gravel	
5	10:58 11:01				SM		
10			1.0		SM	increase in fine to medium grained sand content	
15			0.5			increase in medium-grained sand content, decrease in silt content	
20	11:05 11:19	1	0.7			SILTSTONE (BEDROCK) yellow-brown, moist, weakly cemented, low hardness	Possible alluvium-bedrock contact at 18 feet.
25			0.0			SANDSTONE (BEDROCK) yellow-brown, weakly cemented, consolidated, moderately hard, fine-grained sand	

METHOD OF DRILLING Dual Wall - Air Perc

WELL COMPLETION DEPTH 59.24 ft

HOLE DIAMETER 9-7/8"

WELL DIAMETER 4"

TOTAL DEPTH 58 ft

WELL MATERIAL 304-SS & Low Carbon



Harding Lawson Associates
Engineers and Geoscientists

Log of Boring POVPB-9 (sheet 1 of 3) PLATE
San Fernando Valley RI
San Fernando, California

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(PAGE 2 OF 3)

591 LENNON LANE, WALNUT CREEK, CALIFORNIA 94598 / (415) 933-2258

BORING/WELL NUMBER POVPB-9

CLIENT LADWP

DATE STARTED 10/31/89 COMPLETED 10/31/89

PROJECT San Fernando Valley RI

ELEVATION 369.00 feet AMSL

GEOLOGIST P. Patterson, HLA

DEPTH Feet	TIME	SAMP. NO.	MNU-PID	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	COMMENTS
30	11:27 11:31		4.5	[Dotted Pattern]			
35			0.5			weak, friable sandstone	
40	11:38 12:01	2	0.5			saturated sandstone with siltstone interbeds	☒ Ground water encountered at 39 feet.
45			0.0				
50	12:15 14:00		0.4				

METHOD OF DRILLING Dual Wall - Air Perc

WELL COMPLETION DEPTH 59.24 ft

HOLE DIAMETER 9-7/8"

WELL DIAMETER 4"

TOTAL DEPTH 58 ft

WELL MATERIAL 304-SS & Low Carbon



Harding Lawson Associates
Engineers and Geoscientists

Log of Boring POVPB-9 (sheet 2 of 3)
San Fernando Valley RI
San Fernando, California

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JOB NUMBER
9372,020.11

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1/90

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385 LENNON LANE, WALNUT CREEK, CALIFORNIA 94598 / (415) 975-3400

BORING/WELL NUMBER PO-C03 (AKA PO-VPB-03)
 DATE STARTED 7/28/90 COMPLETED 7/31/90
 ELEVATION feet AMSL

CLIENT LADWP
 PROJECT San Fernando Valley RI
 GEOLOGIST B. Mossman, HLA

DEPTH feet	TIME	SAMP. NO.	HNU-PID	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	COMMENTS
0						SILTY SAND (SM) brown, dry, fine grained, with silt	Solid stem auger (16-inch-diameter) drilled to 16.5 feet Conductor casing (14-inch-diameter) set from 0-16.5 feet 0-16.5 feet logged from cuttings.
5					SM		
10							
15							
19:32 19:30 19:38						increasing silt content, fine- to coarse-grained sand, subangular to rounded, granitic composition with mafic rock fragments	Begin mud rotary at 16.5 feet
20							
25						decrease in silt content (approximately 20%)	

METHOD OF DRILLING Direct Mud Rotary WELL COMPLETION DEPTH 234 ft
 HOLE DIAMETER 12-1/4" WELL DIAMETER 4"
 TOTAL DEPTH 274 ft WELL MATERIAL LCS & 304-SS



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Log of Boring PO-C03
 San Fernando Valley RI
 Los Angeles County, California

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(PAGE 2 OF 11)

365 LENNON LANE, WALNUT CREEK, CALIFORNIA 94598 / (415) 975-3400

BORING/WELL NUMBER PO-C03

CLIENT LADWP

DATE STARTED 7/28/90 COMPLETED 7/31/90

PROJECT San Fernando Valley RI

ELEVATION feet AMSL

GEOLOGIST B. Mossman, HLA

DEPTH feet	TIME	SAMP. NO.	HNU-PID	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	COMMENTS
30					SP SM	SAND (SP) brown, predominantly coarse-grained sand, little to no silt SILTY SAND (SM) brown, fine- to medium-grained, with silt	rig chatter
35							chatter
40	13:50 13:57				SP	GRAVELLY SAND (SP) brown, medium- to coarse-grained, subangular, with fine- to medium-grained, rounded gravel as interbeds, minor fine-grained sand and silt, granitic composition	some broken grains intermittent chatter
45						gravelly interbeds	
50							chatter

METHOD OF DRILLING Direct Mud Rotary
 HOLE DIAMETER 12-1/4"
 TOTAL DEPTH 274 ft

WELL COMPLETION DEPTH 234 ft
 WELL DIAMETER 4"
 WELL MATERIAL LCS & 304-SS



Harding Lawson Associates
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Log of Boring PO-C03
San Fernando Valley RI
Los Angeles County, California

(sheet 2 of 11)

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385 LENNON LANE, WALNUT CREEK, CALIFORNIA 94598 / (415) 975-3400

BORING/WELL NUMBER PO-C03

CLIENT LADWP

DATE STARTED 7/28/90 COMPLETED 7/31/90

PROJECT San Fernando Valley RI

ELEVATION feet AMSL

GEOLOGIST B. Mossman, HLA

DEPTH feet	TIME	SAMP. NO.	HNU-PID	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	COMMENTS
55				[Dotted Pattern]		GRAVELLY SAND (SP)	
60	14:09 14:19				SP	increasing gravel content and grain angularity	lots of chatter and heavy chatter with some intermittent smooth spots
70						minor silt	
75	14:30						

METHOD OF DRILLING Direct Mud Rotary
 HOLE DIAMETER 12-1/4"
 TOTAL DEPTH 274 ft

WELL COMPLETION DEPTH 234 ft
 WELL DIAMETER 4"
 WELL MATERIAL LCS & 304-SS



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Engineering and Environmental Services

Log of Boring PO-C03
 San Fernando Valley RI
 Los Angeles County, California

(sheet 3 of 11) PLATE

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DATE
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365 LENNON LANE, WALNUT CREEK, CALIFORNIA 94598 / (415) 975-3400

BORING/WELL NUMBER PO-C03
 DATE STARTED 7/28/90 COMPLETED 7/31/90
 ELEVATION feet AMSL

CLIENT LADWP
 PROJECT San Fernando Valley RI
 GEOLOGIST B. Mossman, HLA

DEPTH feet	TIME	SAMP. NO.	HNU-PID	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	COMMENTS
80	14:38					GRAVELLY SAND (SP)	
85							
90							increasing gravel content (approximately 40%), fine- to medium-grained, rounded
95							
100	14:50 15:01				SP	occasional gravelly intervals	
105							

METHOD OF DRILLING Direct Mud Rotary WELL COMPLETION DEPTH 234 ft
 HOLE DIAMETER 12-1/4" WELL DIAMETER 4"
 TOTAL DEPTH 274 ft WELL MATERIAL LCS & 304-SS



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Log of Boring PO-C03
 San Fernando Valley RI
 Los Angeles County, California

(sheet 4 of 11)

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(PAGE 5 OF 11)

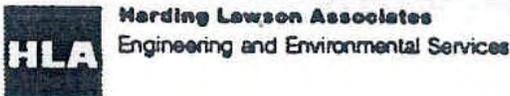
385 LENNON LANE, WALNUT CREEK, CALIFORNIA 94598 / (415) 975-3488

BORING/WELL NUMBER PO-C03
 DATE STARTED 7/28/90 COMPLETED 7/31/90
 ELEVATION feet AMSL

CLIENT LADWP
 PROJECT San Fernando Valley RI
 GEOLOGIST B. Mossman, HLA

DEPTH feet	TIME	SAMP. NO.	HWU-PID	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	COMMENTS
105				[Dotted pattern]		GRAVELLY SAND (SP)	chatter with intermittent heavy chatter and some small smooth intervals
110							
115							
120	15:16 15:21						
125							
130						increasing silt content	

METHOD OF DRILLING Direct Mud Rotary WELL COMPLETION DEPTH 234 ft
 HOLE DIAMETER 12-1/4" WELL DIAMETER 4"
 TOTAL DEPTH 274 ft WELL MATERIAL LCS & 304-SS



Log of Boring PO-C03 (sheet 5 of 11) PLATE
 San Fernando Valley RI
 Los Angeles County, California

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(PAGE 6 OF 11)

365 LENNON LANE, WALNUT CREEK, CALIFORNIA 94598 / (415) 975-3488

BORING/WELL NUMBER PO-C03

CLIENT LADWP

DATE STARTED 7/28/90 COMPLETED 7/31/90

PROJECT San Fernando Valley RI

ELEVATION feet AMSL

GEOLOGIST B. Mossman, HLA

DEPTH feet	TIME	SAMP. NO.	HNU-PID	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	COMMENTS
135					ML	SANDY SILT (ML) brown, silt with fine- to medium-grained sand	
140	15:32 15:43				SP	GRAVELLY SAND (SP) brown, fine- to coarse-grained, with fine-grained rounded gravel	smooth drilling
145						gravelly interval	chatter
150						SANDY SILT (ML) orange-brown, clayey silt, with some fine- to coarse-grained sand	heavy chatter
155							

METHOD OF DRILLING Direct Mud Rotary

WELL COMPLETION DEPTH 234 ft

HOLE DIAMETER 12-1/4"

WELL DIAMETER 4"

TOTAL DEPTH 274 ft

WELL MATERIAL LCS & 304-SS



Harding Lawson Associates
Engineering and Environmental Services

Log of Boring PO-C03

(sheet 6 of 11)

**San Fernando Valley RI
Los Angeles County, California**

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(PAGE 7 OF 11)

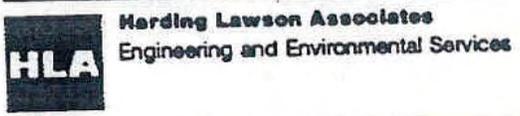
385 LENNON LANE, WALNUT CREEK, CALIFORNIA 94598 / (415) 975-3400

BORING/WELL NUMBER PO-C03
 DATE STARTED 7/28/90 COMPLETED 7/31/90
 ELEVATION feet AMSL

CLIENT LADWP
 PROJECT San Fernando Valley RI
 GEOLOGIST B. Mossman, HLA

DEPTH feet	TIME	SAMP. NO.	HWU-PID	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	COMMENTS
160	18:48 18:25				ML	SANDY SILT (ML) increasing clayey silt content	smooth, slow drilling
165					SP	SAND (SP) brown, predominantly medium- to coarse-grained sand, with minor fine-grained gravel, trace of fine-grained sand and silt, occasional gravelly interval	
170							fairly constant chatter
175							
180						increasing silt content, brown-orange	

METHOD OF DRILLING Direct Mud Rotary WELL COMPLETION DEPTH 234 ft
 HOLE DIAMETER 12-1/4" WELL DIAMETER 4"
 TOTAL DEPTH 274 ft WELL MATERIAL LCS & 304-SS



Log of Boring PO-C03 (sheet 7 of 11) PLATE
 San Fernando Valley RI
 Los Angeles County, California

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(PAGE 8 OF 11)

365 LENNON LANE, WALNUT CREEK, CALIFORNIA 94598 / (415) 975-3400

BORING/WELL NUMBER PO-C03
 DATE STARTED 7/28/90 COMPLETED 7/31/90
 ELEVATION feet AMSL

CLIENT LADWP
 PROJECT San Fernando Valley RI
 GEOLOGIST B. Mossman, HLA

DEPTH feet	TIME	SAMP. NO.	HNU-PID	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	COMMENTS
185						SAND (SP)	
190					ML	SILT (ML) orange-brown, with fine- to medium-grained sandy intervals	smooth, slow drilling
195							
200	17:50 7:30						chatter with intermittent heavy chatter
205					SP	GRAVELLY SAND (SP) brown-orange, medium- to coarse-grained, with fine-grained gravel, some silt	
210							

METHOD OF DRILLING Direct Mud Rotary WELL COMPLETION DEPTH 234 ft
 HOLE DIAMETER 12-1/4" WELL DIAMETER 4"
 TOTAL DEPTH 274 ft WELL MATERIAL LCS & 304-SS



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Engineering and Environmental Services

Log of Boring PO-C03
 San Fernando Valley RI
 Los Angeles County, California

(sheet 8 of 11)

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JOB NUMBER
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365 LENNON LANE, WALNUT CREEK, CALIFORNIA 94598 / (415) 975-3400

BORING/WELL NUMBER PO-C03

CLIENT LADWP

DATE STARTED 7/28/90 COMPLETED 7/31/90

PROJECT San Fernando Valley RI

ELEVATION feet AMSL

GEOLOGIST B. Mossman, HLA

DEPTH feet	TIME	SAMP. NO.	HNU-PID	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	COMMENTS
210				[Stippled Pattern]		GRAVELLY SAND (SP) decreasing silt content bouldery zone	heavy chatter
215						clayey silt interbed	fairly smooth
220	7:41 7:52					decrease in clayey silt, brown-orange	consistent chatter
225							
230							
235							

METHOD OF DRILLING Direct Mud Rotary

WELL COMPLETION DEPTH 234 ft

HOLE DIAMETER 12-1/4"

WELL DIAMETER 4"

TOTAL DEPTH 274 ft

WELL MATERIAL LCS & 304-SS



Harding Lawson Associates
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Log of Boring PO-C03

(sheet 9 of 11) PLATE

**San Fernando Valley RI
Los Angeles County, California**

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JOB NUMBER
9372,043.16

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DATE
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DATE

**JAMES M. MONTGOMERY
CONSULTING ENGINEERS, INC.**

(PAGE 10 OF 11)

365 LENNON LANE, WALNUT CREEK, CALIFORNIA 94598 / (415) 975-3400

BORING/WELL NUMBER PO-C03

CLIENT LADWP

DATE STARTED 7/28/90 COMPLETED 7/31/90

PROJECT San Fernando Valley RI

ELEVATION feet AMSL

GEOLOGIST B. Mossman, HLA

DEPTH feet	TIME	SAMP. NO.	HNU-PID	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	COMMENTS
240						GRAVELLY SAND (SP)	
240						SLATE (BEDROCK) dark gray-brown, deeply weathered, weak, moderately hard	smooth drilling bedrock inferred from decrease in drilling rate
245							
250							slow, smooth drilling, with minor chatter
255							
260	11:04 13:00					increasing shale fragments	

METHOD OF DRILLING Direct Mud Rotary

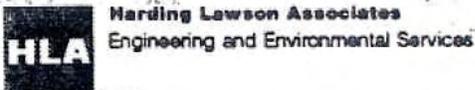
WELL COMPLETION DEPTH 234 ft

HOLE DIAMETER 12-1/4"

WELL DIAMETER 4"

TOTAL DEPTH 274 ft

WELL MATERIAL LCS & 304-SS



Log of Boring PO-C03
San Fernando Valley RI
Los Angeles County, California

(sheet 10 of 11) PLATE

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JOB NUMBER
9372, 043.16

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DATE
2/91

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DATE

006682/01

**JAMES M. MONTGOMERY
CONSULTING ENGINEERS, INC.**

385 LENNON LANE, WALNUT CREEK, CALIFORNIA 94598 / (415) 975-3400

BORING/WELL NUMBER PO-C03
 DATE STARTED 7/28/90 COMPLETED 7/31/90
 ELEVATION feet AMSL

CLIENT LADWP
 PROJECT San Fernando Valley RI
 GEOLOGIST B. Mossman, HLA

DEPTH feet	TIME	SAMP. NO.	HNU-PID	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	COMMENTS
265						SLATE (BEDROCK)	
270							slow drilling some chatter
275	19:35						Boring terminated at 273.75 feet. Boring converted to Monitoring Well PO-C03-235 on 8/2/90.
280							
285							

METHOD OF DRILLING Direct Mud Rotary WELL COMPLETION DEPTH 234 ft
 HOLE DIAMETER 12-1/4" ^{PHD} WELL DIAMETER 4"
 TOTAL DEPTH 274 ft WELL MATERIAL LCS & 304-SS



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Engineering and Environmental Services

Log of Boring PO-C03
 San Fernando Valley RI
 Los Angeles County, California

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(PAGE 3 OF 3)

581 LENNON LANE, WALNUT CREEK, CALIFORNIA 94598 / (415) 933-2250

BORING/WELL NUMBER POVPB-9

CLIENT LADWP

DATE STARTED 10/31/89 COMPLETED 10/31/89

PROJECT San Fernando Valley RI

ELEVATION 369.00 feet AMSL

GEOLOGIST P. Patterson, HLA

DEPTH feet	TIME	SAMP. NO.	MNU-PID	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	COMMENTS
55	14:15		0.0				Borehole terminated at 58 feet on 10/31/89. Boring converted to monitoring Well PO-VPB-9 on 10/31/89. Ground water measured at 39 feet on 10/31/89.
60							
65							
70							
75							

METHOD OF DRILLING Dual Wall - Air Perc

WELL COMPLETION DEPTH 59.24 ft

HOLE DIAMETER 9-7/8"

WELL DIAMETER 4"

TOTAL DEPTH 58 ft

WELL MATERIAL 304-SS & Low Carbon



Harding Lawson Associates
Engineers and Geoscientists

Log of Boring POVPB-9 (sheet 3 of 3) PLATE
San Fernando Valley RI
San Fernando, California

DRAWN
HK

JOB NUMBER
9372,020.11

APPROVED

DATE
1/90

REVISED

DATE

LAW/CRANDALL, INC.

geotechnical, environmental & construction materials consultants

VOLUME 1

DRAFT REPORT

GEOTECHNICAL INVESTIGATION

PROPOSED METRO PASADENA LINE

UNION STATION IN LOS ANGELES TO EAST OF
SIERRA MADRE VILLA AVENUE IN PASADENA, CALIFORNIA

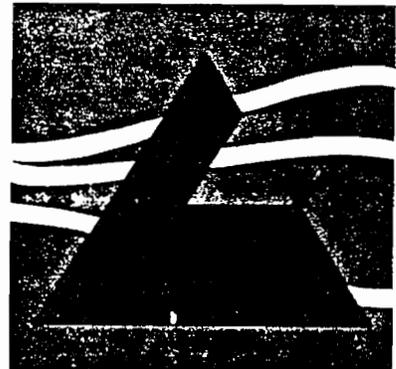
FOR THE

LOS ANGELES COUNTY TRANSPORTATION COMMISSION

(LACTC)

(L92045.AE4)

FEBRUARY 26, 1993



JOB L92045.AE4 DATE 2/24/93 F.T. GMC DR. nh O.E. JB NY CHKD

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.	SAMPLE LOC.	DESCRIPTION
310	5			13.0	105	11	SM	ARTIFICIAL FILL (af) (to 5') SILTY SAND - fine, some Gravel, greyish brown
305	10	5		5.1	115	12	SP	ALUVIUM (Qal) SAND - fine, light brown
300	15	50	100 (5" pen)	9.4	118	50		PUENTE FORMATION (Toss) INTERBEDDED SILTSTONE AND SANDSTONE - fine-grained, thinly bedded, weathered, light brown and rust brown Well cemented bed, hard
295	20	5	100 (9" pen)	18.2	110	35		Well bedded
290	25	10		19.4	106	100		
285	30		100 (10" pen)					SILTSTONE - Sandstone interbeds, fine-grained, well bedded, light grey and grey
280	35	5		12.6	104	60		
275	40							

BORING 47
 Coordinates
 N-4,138,920
 E-4,219,490
 DATE DRILLED: December 21, 1992
 EQUIPMENT USED: 5" - Diameter Rotary Wash
 TIME DRILLED: Start: 7:00 am; Finish: 3:10 pm

ELEVATION 314

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW / CRANDALL, INC. 

JOB L92045.AE4 DATE 2/24/93 F.T. GMC DR. nh O.E. JB CHKD

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.	SAMPLE LOC.
270	45	60	100 (10" pen)				
265	50	15	100 (6" pen)				
260	55			18.8	115	120	
255	60	5	80 (11" pen)				
250	65	5		16.0	112	90	
245	70	5	100 (10" pen)				
240	75	5		16.5	112	85	
235	80			16.7	107	120	

BORING 47 (Continued)
 DATE DRILLED: December 21, 1992
 EQUIPMENT USED: 5" - Diameter Rotary Wash
 TIME DRILLED: Start: 7:00 am; Finish: 3:10 pm



INTERBEDDED SILTSTONE and SANDSTONE - Clayey, thinly bedded, grey

SILTSTONE - few Sandstone interbeds, fine-grained, well bedded, grey

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW / CRANDALL, INC.

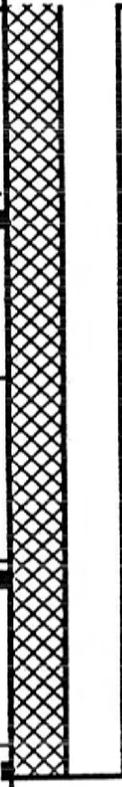
JOB L92045.AE4 DATE 2/24/93 F.T. EMC DR. nh O.E. JB *MS* CHKD

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 47 (Continued)

DATE DRILLED: December 21, 1992
 EQUIPMENT USED: 5" - Diameter Rotary Wash
 TIME DRILLED: Start: 7:00 am; Finish: 3:10 pm

ELEVATION	DEPTH (ft.)	OVA (ppm)	*N VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
230	85	40	120 (10" pen)				
225	90		50 (1" pen)	18.0	110	113	
220	95			16.7	111	129	
215	100			17.5	112	150	
210	105						



Well cemented bed, very hard

NOTE:

Drilling mud used in drilling process. To obtain future water level measurements and sampling, installed 2" - diameter PVC pipe to a depth of 100'. Pipe perforated between depths of 10' and 90'. Backfilled with Sand to within 10' of ground surface. A bentonite plug was place between depth of 5' and 8' and was grouted with cement above 5'. Top is capped. Water level measured at a depth of 23-1/2' on 12/30/92 and at 23' on 1/27/93.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight = 400 lbs.; Stroke = 24"

LOG OF BORING

LAW / CRANDALL, INC.



JOB L92045.AE4 DATE 12/3/92 F.T. GMC DR. K O.E. MS CHKD *MS*

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
345	5			1.7	117	4	SW
				13.3	97	< 1	SM
		10		16.8	109	1	
				13.2	105	2	
340	10			12.5	100	2	SC
		25		11.9	112	2	
335	15						
				10.7	103	2	
330	20						SM
							SW
325	25			2.7	121	4	
		50		3.4	119	10	
320	30			2.8	107	12	
		10					
315	35						

BORING 48

Coordinates
N-4,140,920
E-4,220,210

DATE DRILLED: November 19, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:40 am; Finish: 9:50 am
ELEVATION 350



ARTIFICIAL FILL (af) (to 22-1/2')
SAND - well graded, about 20% Gravel and Cobbles (to 6" in size), light brown
SILTY SAND - fine, some Sandstone fragments, brown
Layer of Clayey Silt
Large amount of Sandstone fragments

CLAYEY SAND - fine to coarse, some Gravel and Cobbles, brown
Pieces of concrete and brick
About 20% pieces of concrete and brick
Layer of Cobbles (to 12" in size)
Large chunks of concrete

SILTY SAND - fine, pieces of decayed wood, and concrete

ALLUVIUM (Qal)
SAND - well graded, about 20% Gravel and Cobbles (to 6" in size), light brownish grey
Few Boulders (to 18" in size), about 30% Gravel and Cobbles

NOTE: Water not encountered. Raveling from 23' to 31' (to 4' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,600 lbs.; Below 25' = 800 lbs.
Stroke = 12"

LOG OF BORING

LAW / CRANDALL, INC.



JOB L92045.AE4 DATE 1/5/93 F.T. AR DR. K O.E. MS ~~CHKD~~ ~~SAK~~

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.	SAMPLE LOC.	DESCRIPTION
350	5			6.3	119	12	SM	ARTIFICIAL FILL (at to 18')
				11.7	121	9		SILTY SAND - fine to medium, some coarse, about 10% Gravel, light brown
				6.2	122	14		Fine to coarse Sand, about 25% Gravel
				8.4	111	15		
345	10	5		8.6	116	35		
								Pieces of glass
340	15	5	24					Some pieces of decayed wood
				8.7	130	90		
335	20	10	52				SM	ALLUVIUM (Qal)
							SP	SILTY SAND - fine to medium, light brown
								SAND - fine to medium, about 25% Gravel, light greyish brown
				7.7	110	90		
330	25		75 (7" pen)				SW	SAND - well graded, about 35% Gravel, light brown
				3.8	121	90		
325	30		78					
				11.3	129	113		
320	35							
315	40		85				SP SM	SAND and SILTY SAND - fine to medium, some coarse, about 5% Gravel, light brown

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW / CRANDALL, INC.



BORING 49

Coordinates
N-4,141,470
E-4,220,675

DATE DRILLED: December 15 & 16, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:00 am; Finish: 11:00 am (12/15)
Start: 7:00 am; Finish: 11:00 am (12/16)
ELEVATION 354

BORING 49 (Continued)

DATE DRILLED: December 15 & 16, 1992
 EQUIPMENT USED: 5" - Diameter Rotary Wash
 TIME DRILLED: Start: 7:00 am; Finish: 11:00 am (12/15)
 Start: 7:00 am; Finish: 11:00 am (12/16)

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
270		5		16.8	107	75	[Diagram showing soil profile with layers and a well labeled 'SW' at 60' depth]
85		55	75 (6" pen)				
265							
90		5		10.1	123	60	
260							
95		5	75				
255							
100		5		8.6	119	150	
250							
105							

SAND - well graded, some Gravel, light brownish grey

Layer of Silty Sand
 Layer of Sandy Silt

Layer of Sandy Silt

NOTE: Drilling mud used in drilling process. To obtain future water level measurements and sampling, installed 2" - diameter PVC pipe to a depth of 100'. Pipe perforated between depths of 20' and 100'. Backfilled with Sand to within 12' of ground surface. Bentonite plug placed between depths of 8' and 12' and was grouted with cement above 8'. Water level measured in the well at a depth of 60' on 12/30/92.

* Number of blows required to drive Law/Crandall Sampler 12".
 Driving Weight = 400 lbs.; Stroke = 24"

LOG OF BORING

LAW / CRANDALL, INC.



BORING 53

DATE DRILLED: December 28 & 30, 1992
 EQUIPMENT USED: 5" - Diameter Rotary Wash
 TIME DRILLED: Start: 6:30 am; Finish: 3:45 pm (12/28)
 Start: 6:30 am; Finish: 1:30 pm (12/30)
 ELEVATION 367

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
365				5.8	125	18	SW GW
	5			5.0	131	40	SW GW
360				5.2	129	45	
	10						
355		10	38				
	15	5		4.1	120	40	
350							
	20	5	100 (10" pen)				
345							
	25			9.7	115	150	
340							
	30		100 (10" pen)				
335							
	35						
330				7.6	123	55	
40							

ARTIFICIAL FILL (af) (to 2')
 SAND and GRAVEL - well graded, some Cobbles, light brown

ALLUVIUM (Qa1)
 SAND and GRAVEL - well graded, large amount of Cobbles, light greyish brown

Some Boulders (to 18" in size)

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

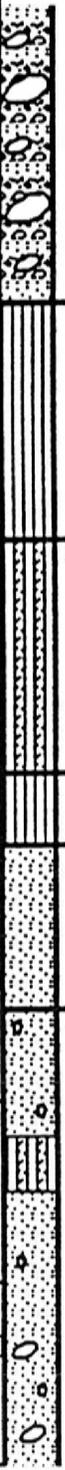
LAW / CRANDALL, INC.



JOB L92045.AE4 DATE 1/14/93 F.T. GMC DR. k O.E. JB *MS* CHKD *SK*

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lb./cu. ft.)	BLOWS/FT.	SAMPLE LOC.
325		20	60 (4" pen)				
45							
320				11.6	127	90	
50							
315		5	21				
55							
310				16.7	115	35	
60							
305		35	35				
65							
300		5		16.6	116	50	
70							
295		350	75 (6" pen)				
75							
290							
80							



BORING 53 (Continued)
 DATE DRILLED: December 28 & 30, 1992
 EQUIPMENT USED: 5" - Diameter Rotary Wash
 TIME DRILLED: Start: 6:30 am; Finish: 3:45 pm (12/28)
 Start: 6:30 am; Finish: 1:30 pm (12/30)

ML OLDER ALLUVIUM (Qal)
 CLAYEY SILT - some sand, light greyish brown

SM SILTY SAND - fine, light greyish brown
 Thin layers of Clayey Silt and Sand

ML CLAYEY SILT - some Sand, light greyish brown

SP SAND - fine, thin layers of Silty Sand, light greyish brown

SW SAND - well graded, about 10% Gravel, light greyish brown

Layer of Silty Sand

Some Cobbles (to 8" in size)

(CONTINUED ON FOLLOWING PLATE)

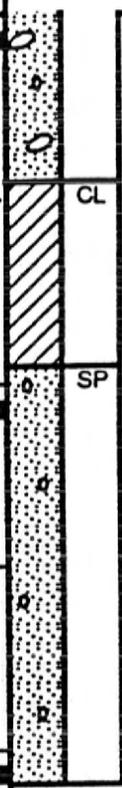
LOG OF BORING

JOB L92045-AE4 DATE 1/14/93 F.T. GMC DR. K O.E. JB CHKD AK

BORING 53 (Continued)

DATE DRILLED: December 28 & 30, 1992
 EQUIPMENT USED: 5" - Diameter Rotary Wash
 TIME DRILLED: Start: 6:30 am; Finish: 3:45 pm (12/28)
 Start: 6:30 am; Finish: 1:30 pm (12/30)

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
285				15.7	113	75	
85	280	190	80 (8" pen)				CL
90	275	110		15.5	114	65	SP
95	270	120	100 (4" pen)				
100	265			17.7	112	300	
105							



CL SANDY CLAY - light bluish grey

SP SAND - fine to coarse, some Gravel, light bluish grey
 Thin layers of Sandy Silt and Silty Sand

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE: Drilling mud used in drilling process. To obtain future water level measurements and sampling, installed 2" - diameter PVC pipe to a depth of 98'. Pipe perforated between depths of 18' and 98'. Backfilled with Sand to within 13' of ground surface. Bentonite plug placed between depths of 10' and 13' and was grouted with cement above 10'. Water level measured in the well at a depth of 38' on 1/8/93.

* Number of blows required to drive Law/Crandall Sampler 12".
 Driving Weight = 400 lbs.; Stroke = 12"

LOG OF BORING

LAW / CRANDALL, INC.



JOB L92045.AE4 DATE 1/19/93 F.T. GMC DR. K O.E. MS CHKD *MS*

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.	SAMPLE LOC.
380	5			—	—	60	□
375	10		90	8.8	125	40	■
370	15			6.5	126	50	■
365	20		70 (5" pen)				□
360	25			—	—	150	□
355	30	5	100 (6" pen)				□
350	35			8.1	133	100	■
345	40	10	40				□

BORING 56
 DATE DRILLED: December 22 & 23, 1992
 EQUIPMENT USED: 5" - Diameter Rotary Wash
 TIME DRILLED: Start: 6:30 am; Finish: 3:30 pm (12/22)
 Start: 6:00 am; Finish: 3:45 pm (12/23)
 ELEVATION 385

SP GW

ALLUVIUM (Qa)
 SAND and GRAVEL - well graded, some Cobbles and Boulders, light brownish grey

Some Boulders

SP GM

SAND and SILTY GRAVEL - fine to coarse, some Cobbles and Boulders, light brownish grey

16" Boulder

Few Cobbles (to 12" in size)

Layer of fine Sand

CL

OLDER ALLUVIUM (Qal)
 SANDY CLAY - some Silt, few Gravel, light brown

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

JB

BORING 56 (Continued)

DATE DRILLED: December 22 & 23, 1992
 EQUIPMENT USED: 5" - Diameter Rotary Wash
 TIME DRILLED: Start: 6:30 am; Finish: 3:30 pm (12/22)
 Start: 6:00 am; Finish: 3:45 pm (12/23)

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
340	45	10		18.7	112	28	
	45	45	14				
335	50	85		17.5	114	72	
330	55	500+	100 (9" pen)				
325	60	10		28.6	94	60	
320	65	120	100 (6" pen)				
315	70	5		18.4	105	129	
310	75	50	100 (5" pen)				
305	80	5		16.3	110	160	

PUENTE FORMATION (Top)
 INTERBEDDED SANDSTONE and SILTSTONE - fine grained, well bedded, light brown and yellowish brown

NOTE:
 Drilling mud used in drilling process. To obtain future water level measurements and sampling, installed 2" - diameter PVC pipe to a depth of 75'. Pipe perforated between depths of 15' and 75'. Backfilled with Sand to within 11' of ground surface. A bentonite plug was placed between depth of 9' and 11' and was grouted with cement above 9'. Top is capped. Water level measured at a depth of 35-1/2' on 12-30-92.

SILTSTONE - well bedded, locally well cemented, light brown

* Number of blows required to drive Law/Crandall Sampler 12".
 Driving Weight = 400 lbs.; Stroke = 24"

SANDSTONE - fine grained, well bedded, light grey

LOG OF BORING

LAW / CRANDALL, INC.



JOB L92045.AE4 DATE 1/5/93 F.T. GMC DR. K O.E. MSB CHKD YJK

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	DESCRIPTION
				9.1	99	5	ML	ARTIFICIAL FILL (af) (to 3') SANDY SILT - some Clay, light greyish brown
400	5	10		10.9	93	5	ML	TOPSOIL CLAYEY SILT - some fine Sand, few roots, light brown Few Gravel
395	10			11.9	99	8	ML	
			31				CL	SILTY CLAY - few Gravel, brown
390	15	10		28.1	89	15	SW	ALLUVIUM (Qal) SAND - well graded, about 40% Gravel and Cobbles, light brown
			45					PUENTE FORMATION (Toss) SILTSTONE - moderately well bedded, fractured, light brownish grey
385	20	15		31.5	91	30		Less fractured, well bedded, light grey
380	25	5		24.5	98	55		Light brown
375	30	10		26.6	102	30		
370	35	15		13.4	113	133		SANDSTONE - fine grained, poorly bedded to massive, light brown Siltstone interbeds
365	40	5		30.8	94	133		

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW / CRANDALL, INC.

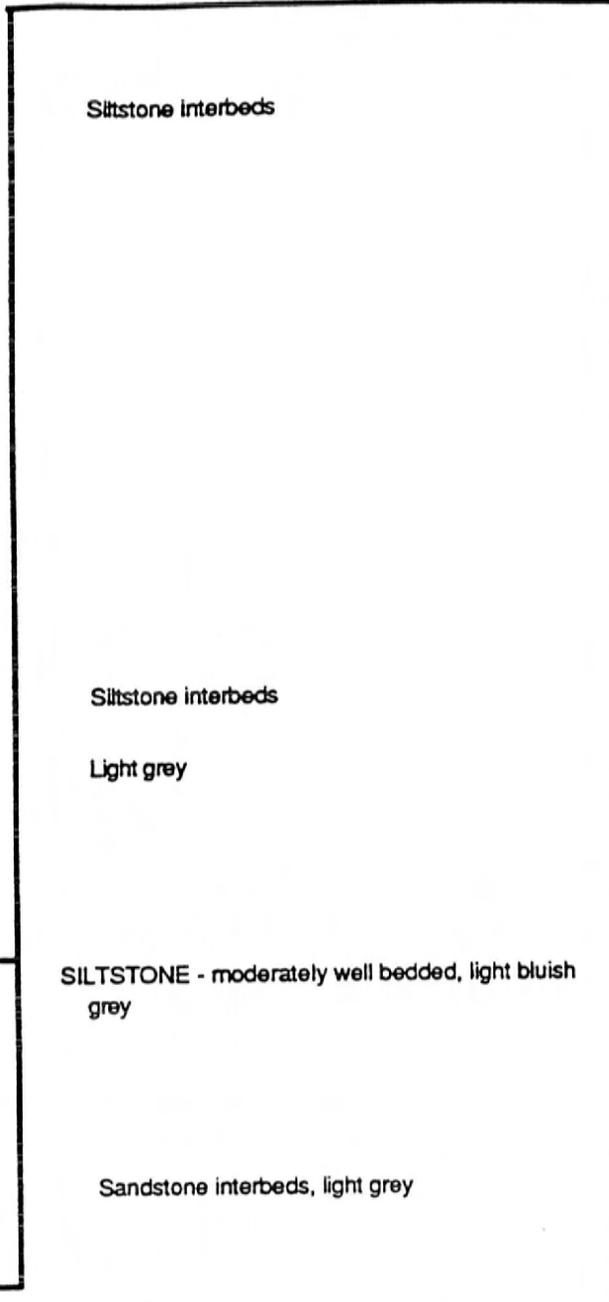
JOB L92045.AE4 DATE 1/5/93 F.T. GMC DR. K O.E. MS *CHKD BK*

BORING 57 (Continued)

DATE DRILLED: December 4, 1992
 EQUIPMENT USED: 5" - Diameter Rotary Wash
 TIME DRILLED: Start: 7:30 am; Finish: 12:00 pm

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
360	45			14.3	115	109	
355	50			16.2	114	87	
350	55	5		15.6	116	98	
345	60	10		15.6	114	120	
340	65			15.0	117	120	
335	70	10		16.4	113	80	
330	75	25		16.3	112	120	



NOTE: Drilling mud used in drilling process. Mud removed after completion of drilling. Water level not established.

* Number of blows required to drive Law/Crandall Sampler 12".
 Driving Weight = 400 lbs.; Stroke = 24"

LOG OF BORING

LAW / CRANDALL, INC.



JOB L92045.AE4 DATE 1/28/93 F.T. AR DR. k O.E. MS/MS/CHKD BJK

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	DESCRIPTION
415				13.9	108	< 1		3" Asphaltic Paving - 11" Concrete
		25		14.7	110	1	ML	ARTIFICIAL FILL (af) (to 4') SANDY SILT - fine to medium, some Gravel, pieces of brick and wood, brown
	5			13.4	113	2	ML	TOPSOIL SANDY SILT - brown
410				5.7	120	12	SM	ALLUVIUM (Qal) SILTY SAND - fine to coarse, about 15% Gravel and Cobbles (to 9" in size), light brown
	10			4.1	106	8	SP SM	SAND and SILTY SAND - fine to coarse, about 20% Gravel and Cobbles (to 9" in size), light brown
405								
	15	10		24.7	96	5		PUENTE FORMATION (Tps) SILTSTONE - moderately well bedded, fractured, light brownish grey
400								
	20	50		22.1	104	10		Less fractured
395								
	25	10		12.7	116	20		Light brown
390		35		17.9	110	26		

NOTE: Water not encountered. Raveling from 7' to 14-1/2' (to 3-1/2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,680 lbs.; Below 25' = 840 lbs.; Stroke = 12"

LOG OF BORING

LAW / CRANDALL, INC.



JOB L92045.AE4 DATE 12/3/92 F.T. GMC DR. K O.E. MS CHKD BJC

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 59

DATE DRILLED: November 25, 1992
 EQUIPMENT USED: 24" - Diameter Bucket
 TIME DRILLED: Start: 7:00 am; Finish: 9:10 am
 ELEVATION 421

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
420				5.7	115	3	SM ML
415	5			—	—	—	SW
		20		7.4	102	11	
410	10	20		7.8	101	38	
405	15	150		24.7	104	9	
400	20	20		20.9	103	68	
395	25	5		41.0	84	17	
390	30	5		22.6	102	25	

ARTIFICIAL FILL (af) (to 1/2')
 SILTY SAND - fine, light brown
 ALLUVIUM (Qal)
 SANDY SILT - few Gravel and Cobbles (to 12" in size), a 14" Boulder, light brown
 SAND - well graded, about 30% Gravel and Cobbles, light brown
 Brown

PUENTE FORMATION (Tps)
 INTERBEDDED SANDSTONE and SILTSTONE - fine grained, well bedded, light brown and grey

Bedding: N40E, 11SE
 Bedding: N72E, 12SE
 Bedding: N63E, 14SE

Bedding: N54E, 14SE

Bedding: N52E, 20SE
 Bedding: N52E, 13SE

Bedding: N84W, 16SW

Bedding: N47E, 13SE

NOTE: Slight water seepage encountered at a depth of 25'. Raveling from 3' to 8' (to 3" in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
 Driving Weight: 0' to 24' = 1,600 lbs.; Below 24' = 800 lbs.
 Stroke = 12"

LOG OF BORING

LAW / CRANDALL, INC.



JOB L92045.AE4 DATE 1/14/93 F.T. AR DR. K O.E. MS *MS* CHKD *JB*

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	TN VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
465	5	30		9.5	91	3	ML
460	10	25		9.6	94	3	ML
455	15	65		12.5	106	9	
450	20	250		21.1	88	14	
				6.5	106	53	
				8.2	122	43	
				10.4	120	25	

BORING 60

DATE DRILLED: November 25, 1992
 EQUIPMENT USED: 24" - Diameter Bucket
 18" - Diameter Bucket
 TIME DRILLED: Start: 11:40 am; Finish: 4:28 pm
 ELEVATION 470

ML ARTIFICIAL FILL (af) (to 3-1/2')
 SANDY SILT - some Sandstone fragments, light brown

ML TOPSOIL
 SANDY SILT - some Clay, porous, massive, brown

PUENTE FORMATION (Toss)
 SANDSTONE - fine grained, few Siltstone interbeds, massive to poorly bedded, light brown
 Bedding: N62E, 32SE
 Diatomaceous Siltstone interbeds

Bedding: N72W, 52SW

(BORING TERMINATED DUE TO DIFFICULT DRILLING THROUGH BEDROCK)

NOTE: Water not encountered. Raveling from 2-1/2' to 5' (to 3' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
 Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

LAW / CRANDALL, INC. 

JOB L92045-AE4 DATE 12/3/92 F.T. GMC DR. k O.E. MS CHKD BJK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
							SM ML	ARTIFICIAL FILL (af) (to 1')
		10		0.6	93	3	ML	SILTY SAND and SANDY SILT - fine, brown
								OLDER ALLUVIUM (Qal0)
				2.9	115	7	SP SM	SANDY SILT - brown
								SAND and SILTY SAND - fine to coarse, about 20% Gravel and Cobbles (to 8" in size), brown
540	5	10		2.2	120	11		
				6.1	120	14		About 30% Gravel and Cobbles
535	10	25		2.8	121	11	SW	SAND - well graded, about 20% Gravel and Cobbles (to 8" in size), light brown
								Lenses of Silty Sand
530	15			3.4	107	15		
								About 35% Gravel and Cobbles (to 8" in size)
525	20	10		6.1	102	14		Lenses of Silt
520	25			7.1	113	19		Greyish brown
								About 15% Gravel and Cobbles
515	30	15		4.3	113	33		

BORING 66
 Coordinates
 N-4,152,715
 E-4,229,300
 DATE DRILLED: November 24, 1992
 EQUIPMENT USED: 24" - Diameter Bucket
 TIME DRILLED: Start: 7:30 am; Finish: 9:40 am
 ELEVATION 545

NOTE: Slight water seepage encountered at a depth of 24'. Slight raveling throughout boring (to 10" in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
 Driving Weight: 0' to 25' = 1,680 lbs.; Below 25' = 840 lbs.
 Stroke = 12"

LOG OF BORING

LAW / CRANDALL, INC.

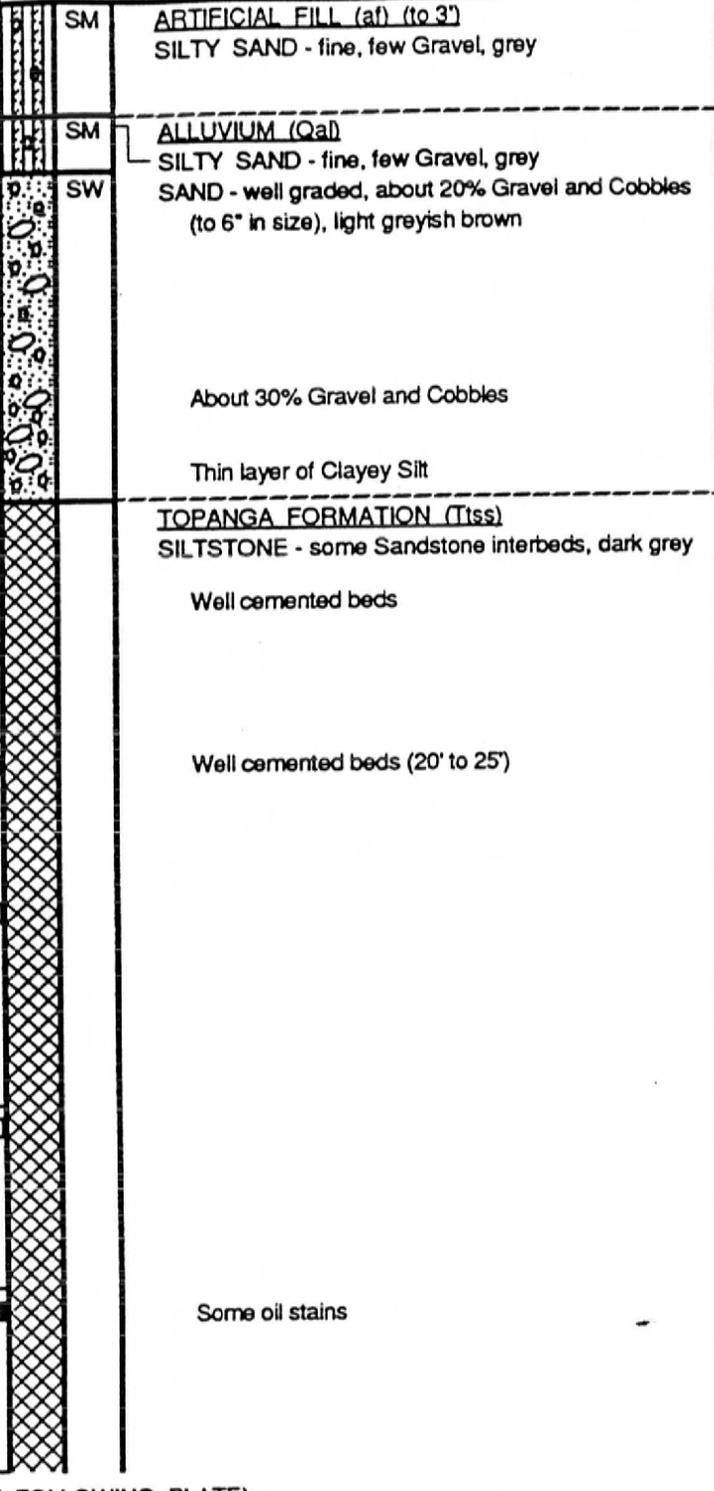


JOB L92045.AE4 DATE 1/28/93 F.T. AR DR. K O.E. MS CHKD *[Signature]*

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
505	5			11.3	89	4	SM
				23.4	86	15	SM
				—	—	14	SW
				15.9	116	20	
500	10			9.4	116	25	
495	15		100 (5" pen)				
				9.8	96	150	
490	20			24.4	99	240	
485	25			—	—	1200	
480	30			—	—	600	
475	35			22.5	107	400	
470	40						

BORING 69 Coordinates N-4,152,800 E-4,232,050
 DATE DRILLED: February 8, 9 & 10, 1993
 EQUIPMENT USED: 5" - Diameter Rotary Wash
 TIME DRILLED: Start: 7:00 am; Finish: 8:45 am (2/8)
 Start: 7:00 am; Finish: 2:25 pm (2/9)
 ELEVATION 510 Start: 6:40 am; Finish: 12:20 pm (2/10)



(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW / CRANDALL, INC.



JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. K O.E. MS. *MS* CHKD *JB*

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
465	45		100 (1/2" pen)	-	-	600	☐
460	50			-	-	600	☐
455	55			10.6	116	240	■
450	60	15	100 (5" pen)				■
445	65	5		13.2	117	400	■
440	70	30	100 (5" pen)				■
435	75	10		11.0	122	171	■
430	80						■

BORING 69 (Continued)

DATE DRILLED: February 8, 9 & 10, 1993
 EQUIPMENT USED: 5" - Diameter Rotary Wash
 TIME DRILLED: Start: 7:00 am; Finish: 8:45 am (2/8)
 Start: 7:00 am; Finish: 2:25 pm (2/9)
 Start: 6:40 am; Finish: 12:20 pm (2/10)

Dark grey to black

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW / CRANDALL, INC.



JOB L92045.AE4 DATE 1/5/93 F.T. AR DR. K O.E. MS/MS CHKD *MS*

BORING 69 (Continued)

DATE DRILLED: February 8, 9 & 10, 1993
 EQUIPMENT USED: 5" - Diameter Rotary Wash
 TIME DRILLED: Start: 7:00 am; Finish: 8:45 am (2/8)
 Start: 7:00 am; Finish: 2:25 pm (2/9)
 Start: 6:40 am; Finish: 12:20 pm (2/10)

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
425	85	30		13.4	111	171	
			100 (4" pen)				
420	90	100		11.2	115	171	
415	95	10	100 (3" pen)				
410	100			11.6	117	400	
405	105						



SANDSTONE - fine grained, bedded, grey

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE:

Drilling mud used in drilling process. To obtain future water level measurements and sampling, installed 2"- diameter PVC pipe to a depth of 100'. Pipe perforated between depths of 5' and 100'. Backfilled with Sand to within 5' of ground surface. Bentonite plug placed between depths of 1' and 5' and was grouted with cement above 1'. Water level measured in the well at 7-1/2' on 2/15/93.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight = 400 lbs.; Stroke = 12"

LOG OF BORING

LAW / CRANDALL, INC.



JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. K O.E. MS CHKD JK

BORING 73

DATE DRILLED: December 28, 1992
 EQUIPMENT USED: 24" - Diameter Bucket
 TIME DRILLED: Start: 7:00 am; Finish: 4:00 pm
 ELEVATION 573

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
570	330			13.8	112	< 1	ML CL
	335			25.3	88	2	
565	5	305		28.9	88	< 1	ML CL
	370			17.9	90	1	
	450			19.4	86	< 1	
560	10						ML CL
	500+			6.6	112	1	
555	15						ML CL
	460			26.3	91	2	
550	20						ML CL
	120			21.4	98	2	
545	25						ML CL
	150			19.6	99	6	
540	30						ML CL
	15			12.8	121	20	
535	35						ML CL
	40						

ARTIFICIAL FILL (af) (to 12-1/2')
 SANDY SILT and SANDY CLAY - some Siltstone fragments, pieces of brick and plastic, brown and grey

Roots (to 3/4")

SILTSTONE FRAGMENTS - brown

Contact: N75E, 2NW

LANDSLIDE DEBRIS (Q_{ls})
 SANDSTONE - massive, caliche infilling in fractures (up to 1" wide), fractures randomly oriented

Joint: N48E, 57NW

SILTSTONE - Clayey, highly sheared, dark brown
 Bedding: N35W, 24SW

Highly fractured, sheared, discontinuous bedding

OLDER LANDSLIDE DEBRIS (Q_{iso})
 INTERBEDDED SILTSTONE and SANDSTONE - clayey, fine grained, highly sheared, discontinuous bedding, light grey and dark brown

NOTE:
 Water seepage encountered at depths of 26' and 28'. Slight caving at 23' (to 4' in diameter).
 *Numbers of blows required to drive Law/Crandall Sampler 12".
 Driving Weight: 0' to 25' = 3,200 lbs.
 Below 25' = 1,600 lbs.; Stroke = 12"

LOG OF BORING

LAW / CRANDALL, INC.



JOB L92045-AE4 DATE 1/20/93 F.T. AR DR. K O.E. MS CHKD *MS*

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
		10		27.7	97	6	ML SM
		10		7.7	120	20	
625	5	45		7.6	117	8	
620	10	140		10.5	109	6	
615	15	70		10.3	112	10	
610	20	200		19.0	109	8	
605	25	225		10.7	114	8	
600	30	70		14.7	107	14	
595	35	40		9.6	118	25	
590	40	30		9.1	114	60	

BORING 74

DATE DRILLED: December 18 & 22, 1992
 EQUIPMENT USED: 24" - Diameter Bucket
 TIME DRILLED: Start: 7:00 am; Finish: 1:30 pm (12/18)
 Start: 1:30 pm; Finish: 4:10 pm (12/22)
 ELEVATION 630



ARTIFICIAL FILL (af) (to 2')
 SANDY SILT and SILTY SAND - fine to medium, some Siltstone fragments, brown

LANDSLIDE DEBRIS (Qls)
 SANDSTONE - fine grained, massive, yellowish brown

Many roots
 SILTSTONE - Clayey, bedded
 Bedding: N40W, 22SW
 Joint: N10W, 40SW

SANDSTONE - fine grained, massive, light brown

Bedding: N80W, 17SW (Siltstone interbed)

Bedding: N40W, 24SW (Siltstone interbed, polished bedding surface)

Zone of incoherent Sandstone and Siltstone, jumbled appearance
 Trend of zone: N10W, 22SW

INTERBEDDED SANDSTONE and SILTSTONE - well bedded, discontinuous structure, light grey and light brown

Bedding discontinuous, randomly oriented Clay pods, incoherent structure

Well cemented bed
 Zone of highly sheared and fractured Siltstone (8" thick): N32W, 48NE

OLDER LANDSLIDE DEBRIS (Qlso)
 SANDSTONE - fine grained, siliceous, massive, yellowish brown

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW / CRANDALL, INC.



JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. K O.E. MS *MS* CHKD *JK*

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.	SAMPLE LOC.
585	45	40		21.7	103	20	
580	50	50		18.9	97	16	
575	55						
		15		12.1	116	35	
570	60	20		12.2	120	35	
565	65	5		13.9	115	20	
560	70	10		13.2	118	60	
555	75	20		16.2	112	18	
550	80						

BORING 74 (Continued)
 DATE DRILLED: December 18 & 22, 1992
 EQUIPMENT USED: 24" - Diameter Bucket
 TIME DRILLED: Start: 7:00 am; Finish: 1:30 pm (12/18)
 Start: 1:30 pm; Finish: 4:10 pm (12/22)



Bedding: N43W, 28SW
 SILTSTONE - Clayey, well bedded, fractured caliche in filling, dark brown to black

Bedding: N38W, 27SW
 Randomly oriented shears

Bedding: N62W, 18SW
 SANDSTONE - fine to medium grained, siliceous, fractured, randomly oriented, Clay seams, grey

Sheared Clay seam (4" to 8" thick, continuous assend hole): N78E, 13NW
 Siltstone bed, sheared, discontinuous: N75E, 12NW
 Shear: N5W, 32SW
 Randomly oriented shears
 Well cemented beds, brown

Grey

SILTSTONE - some fine Sand, well bedded, moderately fractured, grey and dark grey

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW / CRANDALL, INC.



JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. K O.E. MS *W* CHKD *JK*

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 74 (Continued)

DATE DRILLED: December 18 & 22, 1992
 EQUIPMENT USED: 24" - Diameter Bucket
 TIME DRILLED: Start: 7:00 am; Finish: 1:30 pm (12/18)
 Start: 1:30 pm; Finish: 4:10 pm (12/22)

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE	STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
545	85	35		16.4	113	20		
540	90	15		14.0	117	67		
535	95			9.6	126	60		



Interbeds of siliceous Siltstone and Clayey Siltstone, highly fractured, well bedded, light grey and dark grey

NOTE:

Water seepage encountered at a depth of 58'. Caving and sloughing from 60' to 64' due to water seepage.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight: 0' to 25' = 1,680 lbs. 25' to 50' = 840 lbs.; 50' to 75' = 1,300 lbs.; Below 75' = 1,800 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.



JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. K O.E. MS CHKD *MS* BK

Coordinates
N-4,154,815
E-4,240,470

BORING 80

DATE DRILLED: January 11, 1993
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 10:45 am; Finish: 12:25 pm
ELEVATION 682

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	DESCRIPTION
680				13.3	112	1	SM ML	ARTIFICIAL FILL (af) (to 3') SILTY SAND and SANDY SILT - about 15% Gravel and Cobbles (to 8" in size), brown
	5			14.6	113	< 1	ML	OLDER ALLUVIUM (Qalo) SANDY SILT - brown Thin layers of Silty Sand
675		10		14.9	113	< 1		Some Gravel and Cobbles
	10	5		12.7	118	1		
				14.8	109	1		
670							SM	SILTY SAND - fine to medium, light brown
	15	5		14.1	119	11		
665							SP	SAND - fine to medium, light brown
	20	5		4.3	122	40		
660							SW	SAND - well graded, about 15% Gravel and Cobbles, light brown
							SP	SAND - fine to medium, some Gravel, light brown
	25	10		4.1	99	12		

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 10' = 1,039 lbs.; 10' to 19' = 745 lbs.
Below 19' = 416 lbs.; Stroke = 12"

LOG OF BORING

LAW / CRANDALL, INC.



JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. K O.E. MS CHKD *SK*

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	DESCRIPTION
								6" Asphaltic Paving
		240		10.5	117	4	ML SM	ARTIFICIAL FILL (af) (to 5') SANDY SILT and SILTY SAND - fine to medium, brown
		80		11.7	92	6		
685	5	110		10.0	121	5	SM	OLDER ALLUVIUM (Qal _o) SILTY SAND - fine to medium, some Gravel, grey
		200		8.6	118	6		Fine to coarse
680	10	25		8.2	110	6	SP	SAND - fine to medium, some coarse, few Gravel, light greyish brown
							SW	SAND - well graded, about 15% Gravel and Cobbles, light greyish brown
675	15	40		7.8	124	10	ML	SANDY SILT - light brown
							SM	SILTY SAND - fine to medium, light brown
670	20	30		10.1	120	8		

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,600 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.



JOB L92045.AE4 DATE 1/20/93 F.T. GMC DR. K O.E. MS MS CHKD JK

BORING 82 (Continued)

DATE DRILLED: January 8, 1993
 EQUIPMENT USED: 5" - Diameter Rotary Wash
 TIME DRILLED: Start: 6:30 am; Finish: 12:30 pm

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
655		25		7.2	122	67	
	45			6.2	134	84	
650							
	50	5		13.9	115	35	
645							
	55	10		8.5	129	72	
640							
	60	15		4.5	120	65	
635							
65							



ML SANDY SILT - few Gravel, light brown

SM SILTY SAND - fine to medium, light brown

NOTE: Drilling mud used in drilling process. Mud removed at completion of drilling. Water level not established.

* Number of blows required to drive Law/Crandall Sampler 12".
 Driving Weight = 400 lbs.; Stroke = 24"

LOG OF BORING

LAW/CRANDALL, INC.



JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. K O.E. MS/MS CHKD 2013

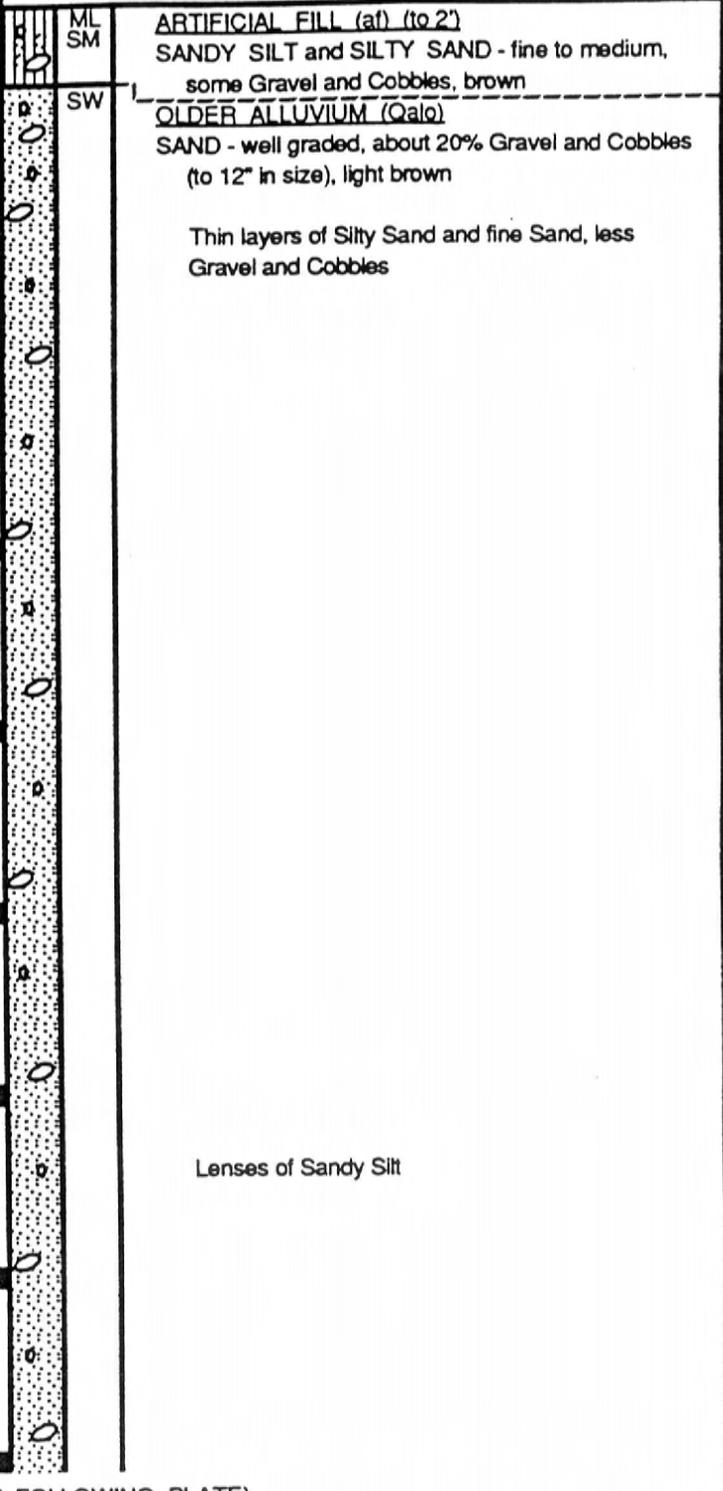
Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
		5		10.7	103	1	ML SM
				6.5	113	2	SW
825	5	10		9.4	118	2	
				12.0	104	1	
820	10	5		11.4	117	3	
				7.8	113	4	
815	15	5					
				10.7	94	12	
810	20	5					
				6.7	117	6	
805	25						
				6.1	125	22	
800	30	10					
				5.5	109	14	
795	35	5					
				4.2	122	17	
790	40	15					

BORING 90

Coordinates
N-4,164,650
E-4,243,010

DATE DRILLED: December 2, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 6:45 am; Finish: 10:30 am
ELEVATION 830



ARTIFICIAL FILL (af) (to 2')
SANDY SILT and SILTY SAND - fine to medium,
some Gravel and Cobbles, brown

OLDER ALLUVIUM (Qalo)
SAND - well graded, about 20% Gravel and Cobbles
(to 12" in size), light brown

Thin layers of Silty Sand and fine Sand, less
Gravel and Cobbles

Lenses of Sandy Silt

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW / CRANDALL, INC.



JOB L92045,AE4 DATE 1/20/93 F.T. AR DR. K O.E. MS *MS* CHKD *JK*

BORING 90 (Continued)

DATE DRILLED: December 2, 1992
 EQUIPMENT USED: 24" - Diameter Bucket
 TIME DRILLED: Start: 6:45 am; Finish: 10:30 am

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
785	45	10		9.5	121	14	
780	50	15		5.2	120	13	
775	55	10		9.1	112	20	
770	60	15		2.7	121	25	



Layer of Silty Sand and fine Sand

NOTE: Water not encountered. Raveling from 2-1/2' to 5-1/2' (to 2-1/2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
 Driving Weight: 0' to 25' = 1,680 lbs.; Below 25' = 840 lbs.
 Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.



JOB L92045.AE4 DATE 1/28/93 F.T. AR DR. K O.E. MS *MS* CHKD *JK SF*

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.	SAMPLE LOC.	DESCRIPTION
875	5			7.6	96	3	SM	5" Asphaltic Paving - 4-1/2" Base Course
	15			8.3	109	2	SW	TERRACE DEPOSITS (Qt)
870	5			11.0	113	2		SILTY SAND - fine to medium, some coarse, about 15% Gravel and Cobbles (to 7" in size), dark brown
	10	20		13.8	104	3		SAND - well graded, about 20% Gravel and Cobbles (to 12" in size), light brown
865								Thin layers of Silty Sand
	15	15		12.0	105	3		About 15% Gravel and Cobbles
860							ML	SANDY SILT - light brown
	20	5		12.5	110	5	SW	Layer of Silty Sand
855								SAND - well graded, thin layers of Silty Sand, about 20% Gravel and Cobbles (to 10" in size), light brown
	25			5.0	107	6		
850								About 15% Gravel and Cobbles
	30			5.4	118	16		
845								Thin layers of fine to medium Sand
	35			6.2	107	14		
840								
	40			5.2	109	17		

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW / CRANDALL, INC.



JOB L92045.AE4 DATE 1/28/93 F.T. AR DR. K O.E. MS *My* CHKD *JB BK*

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
835							
	45			5.6	108	14	
830							
	50			2.8	115	17	
825							
	55			6.6	114	18	
820							
	60			2.9	116	9	SM
815							
	65			3.6	119	24	
810							ML
	70			4.1	107	14	SP
805							ML
	75			3.4	108	14	SP
800							ML
	80			25.4	99	5	

BORING 93 (Continued)

DATE DRILLED: January 20, 1993
 EQUIPMENT USED: 24" - Diameter Bucket
 TIME DRILLED: Start: 7:00 am; Finish: 4:30 pm

Layer of Silty Sand

NOTE:

Water not encountered. Raveling from 3' to 79' (to 2-1/2" in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".

Driving Weight: 0' to 25' = 1,680 lbs.; Between 25' and 50' = 840 lbs.; Between 50' and 75' = 1,640 lbs. Below 75' = 1,740 lbs.; Stroke = 12"

20" Boulder

SILTY SAND - fine to coarse, about 20% Gravel and Cobbles (to 8" in size), light brown

ML SANDY SILT - brown

SP SAND - fine to medium, light greyish brown

ML SANDY SILT - brown

SP SAND - fine to coarse, light brown

ML SANDY SILT - brown

LOG OF BORING

LAW/CRANDALL, INC.





**PHASE II GEOTECHNICAL FEASIBILITY
OF THE PROPOSED
INTERSTATE 710 FREEWAY EXTENSION
THROUGH THE MONTEREY HILLS
LOS ANGELES COUNTY, CALIFORNIA
CONTRACT NO. 07A0406, TASK ORDER NO. 2**

PREPARED FOR:

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PREPARED BY:

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Irvine, California 92618

March 25, 1999
Project No. 201769-01

APPENDIX A

BORING LOGS

Field Procedure for the Collection of Disturbed Samples

Disturbed soil samples were obtained in the field using the following methods.

Bulk Samples

Bulk samples of representative earth materials were obtained from the exploratory excavations. The samples were bagged and transported to the laboratory for testing.

The Standard Penetration Test (SPT) Spoon

Disturbed drive samples of earth materials were obtained by means of a Standard Penetration Test spoon sampler. The sampler is composed of a split barrel with an external diameter of 2 inches and an unlined internal diameter of 1-3/8 inches. The spoon was driven into the ground 12 to 18 inches with a 140-pound hammer free-falling from a height of 30 inches in general accordance with ASTM D 1586-84. The blow counts were recorded for every 6 inches of penetration; the blow counts reported on the logs are those for the last 12 inches of penetration. Soil samples were observed and removed from the spoon, bagged, sealed and transported to the laboratory for testing.

Field Procedure for the Collection of Relatively Undisturbed Samples

Relatively undisturbed soil samples were obtained in the field using the following method.

The Modified Split-Barrel Drive Sampler

The sampler, with an external diameter of 3.0 inches, was lined with 1-inch long, thin brass rings with inside diameters of approximately 2.4 inches. The sample barrel was driven into the ground with the weight of a hammer or the kelly bar of the drill rig in general accordance with ASTM D 3550-84. The driving weight was permitted to fall freely. The approximate length of the fall, the weight of the hammer or bar, and the number of blows per foot of driving are presented on the boring logs as an index to the relative resistance of the materials sampled. The samples were removed from the sample barrel in the brass rings, sealed, and transported to the laboratory for testing.

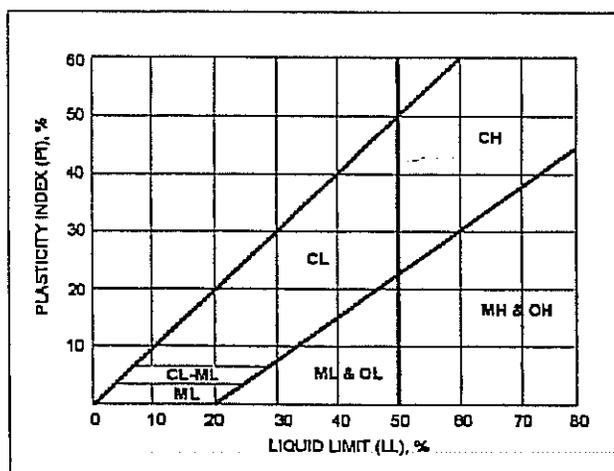
U.S.C.S. METHOD OF SOIL CLASSIFICATION

MAJOR DIVISIONS	SYMBOL	TYPICAL NAMES	
COARSE-GRAINED SOILS (More than 1/2 of soil >No. 200 sieve size)	GRAVELS (More than 1/2 of coarse fraction > No. 4 sieve size)	GW	Well graded gravels or gravel-sand mixtures little or no fines
		GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS (More than 1/2 of coarse fraction <No. 4 sieve size)	SW	Well graded sands or gravelly sands, little or no fines
		SP	Poorly graded sands or gravelly sands, little or no fines
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (More than 1/2 of soil <No. 200 sieve size)	SILTS & CLAYS Liquid Limit <50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS Liquid Limit >50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
HIGHLY ORGANIC SOILS	Pt	Peat and other highly organic soils	

CLASSIFICATION CHART (Unified Soil Classification System)

CLASSIFICATION	RANGE OF GRAIN SIZES		
	U.S. Standard Sieve Size	Grain Size in Millimeters	
BOULDERS	Above 12"	Above 305	
COBBLES	12" to 3"	305 to 76.2	
GRAVEL	3" to No.4	76.2 to 4.76	
	Coarse Fine	3" to 3/4" 3/4" to No. 4	76.2 to 19.1 19.1 to 4.76
SAND	No. 4 to No. 200	4.76 to 0.074	
	Coarse	No. 4 to No. 10	4.76 to 2.00
	Medium	No. 10 to No. 40	2.00 to 0.420
	Fine	No. 40 to No. 200	0.420 to 0.074
SILT & CLAY	Below No. 200	Below 0.074	

GRAIN SIZE CHART



PLASTICITY CHART

Ninyo & Moore

U.S.C.S. METHOD OF SOIL CLASSIFICATION

DEPTH (feet)	SAMPLES	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED _____	BORING NO. _____	SAMPLE _____
							GROUND ELEVATION _____	SHEET <u>1</u> OF <u>1</u>	METHOD OF DRILLING _____
							DRIVE WEIGHT _____	DROP _____	
							SAMPLED BY _____	LOGGED BY _____	REVIEWED BY _____
							DESCRIPTION/INTERPRETATION		
0							Auger (A)		
							Solid line denotes formation change.		
							Modified split-barrel drive sampler (C)		
							No recovery with modified Split-Barrel Drive Sampler (B)		
							Dutch cone test (D)		
5							Seepage		
							Rock Cores (E)		
							Groundwater encountered during drilling.		
							Groundwater measured after drilling.		
							Piston (I)		
							Dashed line denotes lithologic change		
10							Standard Penetration Test (P)		
							No recovery with a standard penetration test (T)		
							Shelby tube sample (R)		
							Distance pushed in inches/Length of sample recovered in inches.		
							No recovery with Shelby tube sampler (X)		
15							Attitudes: Strike/Dip		
							b: Bedding		
							c: Contact		
							j: Joint		
							f: Fracture		
							F: Fault		
							cs: Clay Seam		
							s: Shear		
							bss: Basal Slide Surface		
							sf: Shear Fracture		
							sz: Shear Zone		
							sbs: Sheared Bedding Surface		
20							The total depth line is a solid line that is drawn at the level of the last entry.		



BORING LOG		
EXPLANATION OF BORING LOG		
PROJECT NO. SAMPLE	DATE Rev.3/95	FIGURE

DEPTH (feet) SAMPLES
 Driven

DATE DRILLED 2/3/99 BORING NO. B-1
 GROUND ELEVATION 594' ±(MSL) SHEET 1 OF 3
 METHOD OF DRILLING 8" diameter hollow stem auger (Al Roy Drilling)
 DRIVE WEIGHT 140 lbs. DROP 30 inches
 SAMPLED BY BDF LOGGED BY BDF REVIEWED BY CAP

DEPTH (feet)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0					CL	ASPHALT CONCRETE: Approximately 3 inches thick.
15	15	16.6	78.8		CL	ALLUVIUM: Brown, damp, loose, sandy CLAY.
8	8		Firm; trace gravel; root hairs.			
			Moist.			
15	76	18.4	102.4			Hard; angular rock fragments up to approximately 1/4 inch in diameter.
15	31					Reddish brown.

	BORING LOG		
	Interstate 710 Extension Los Angeles County, California		
	PROJECT NO. 201769-01	DATE 3/99	FIGURE A-1

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>2/3/99</u> BORING NO. <u>B-1</u>	
	Bulk	Driven						GROUND ELEVATION <u>594' ±(MSL)</u>	SHEET <u>2</u> OF <u>3</u>
METHOD OF DRILLING <u>8" diameter hollow stem auger (AI Roy Drilling)</u>									
DRIVE WEIGHT <u>140 lbs.</u> DROP <u>30 inches</u>									
SAMPLED BY <u>BDF</u> LOGGED BY <u>BDF</u> REVIEWED BY <u>CAP</u>									
DESCRIPTION/INTERPRETATION									
20			48	22.7	100.6		CL	ALLUVIUM: (Continued) Reddish brown, moist, hard, sandy CLAY; few gravel; angular and rounded rock fragments up to approximately 1/4 inch in diameter.	
25			24					Variable moisture; very stiff.	
30			35	20.5	105.5			Gradually increasing moisture; fewer rock fragments.	
35			21					Irregular pockets of finer grained material with higher moisture.	
								Light brown.	
								TOPANGA FORMATION: Light brown, moist, weakly cemented, sandy SILTSTONE; intensely weathered.	



BORING LOG		
Interstate 710 Extension Los Angeles County, California		
PROJECT NO. 201769-01	DATE 3/99	FIGURE A-2

DEPTH (feet)	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED	BORING NO.	
							2/3/99	B-1	
							GROUND ELEVATION	SHEET	OF
							594' ±(MSL)	3	3
							METHOD OF DRILLING 8" diameter hollow stem auger (AJ Roy Drilling)		
							DRIVE WEIGHT	DROP	
							140 lbs.	30 inches	
							SAMPLED BY	LOGGED BY	REVIEWED BY
							BDF	BDF	CAP
							DESCRIPTION/INTERPRETATION		
40		58	23.2	101.2			TOPANGA FORMATION: (Continued) Light brown, moist, weakly cemented, sandy SILTSTONE; intensely weathered; iron oxide stains; manganese stains. Light reddish brown; weakly indurated; clayey SILTSTONE; iron oxide stains along fractures of variable orientation.		
45		26					@ 45.0': Groundwater encountered during drilling.		
60		60	27.4	98.7			Total Depth = 51.5 feet. Groundwater encountered during drilling at approximately 45 feet. Backfilled and patched on 2/3/99.		
55									



BORING LOG		
Interstate 710 Extension Los Angeles County, California		
PROJECT NO. 201769-01	DATE 3/99	FIGURE A-3

DEPTH (feet)	BULK SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>2/4/99</u>	BORING NO. <u>B-2</u>
							GROUND ELEVATION <u>676' ±(MSL)</u>	SHEET <u>1</u> OF <u>2</u>
							METHOD OF DRILLING <u>30" diameter bucket auger (Al Roy Drilling)</u>	
							DRIVE WEIGHT <u>See end of log</u>	DROP <u>12 inches</u>
							SAMPLED BY <u>SMJ</u> LOGGED BY <u>SMJ</u> REVIEWED BY <u>CAP</u>	

DESCRIPTION/INTERPRETATION

0							ASPHALT CONCRETE: Approximately 4 to 5 inches thick.	
						GP		
						ML	AGGREGATE BASE: Gray, moist, dense, sandy GRAVEL; approximately 3 inches thick.	
							FILL: Orange-brown, moist, stiff, clayey SILT; angular rock fragments up to approximately 4 inches in diameter.	
							TOPANGA FORMATION: Orange-brown, moist, weakly to moderately indurated, clayey SILTSTONE to silty CLAYSTONE; highly fractured and jointed; weathered; extensive iron oxide staining; beds up to approximately 4 inches thick; blocky weathering.	
5		10	20.2	101.5			@ 3.0': (B:N89°W/28°N). @ 4.0': Interbeds of dark greenish gray, moist, moderately indurated, siltstone; micaceous; beds range from approximately 1/6 inch to 4 inches thick; (B:N90°W/31°N). @ 4.9': (B:N89°E/35°N). @ 5.1': (J:N56°W/54°S). @ 6.4': (B:N74°E/30°N) (J:N71°E/60°S).	
							@ 8.5': (J:N55°W/75°N). @ 9.0': <u>Clay seam</u> ; dark gray; micaceous; soft; approximately 1/32 to 1/16 inch thick; slickensides; (CS:N85°E/35°N).	
10		11	22.1	97.0			@ 10.5'-13.6': Micaceous silt between bedding surfaces; soft; dark gray. @ 10.6': Gypsum vein; approximately 1/4 inch thick. @ 10.9': (B:N90°W/36°N).	
							@ 13.6': Less weathered; well indurated. @ 13.8': (B:N70°W/35°N); <u>Clay seam</u> ; approximately 1/32 inch thick along bedding. @ 14.5': (J:N52°W/50°S) (B:N68°W/35°N); siliceous beds of siltstone approximately 1/8 inch thick. @ 14.7': (J:N20°E/69°W); gypsum vein approximately 1/16 inch thick; (GV:N60°W/65°S). @ 15.6': (B:N80°W/35°N) (J:N75°W/52°S).	
15		19/10"	19.2	97.9				
							@ 20.0': Groundwater measured after drilling and downhole logging.	

	<h2>BORING LOG</h2>		
	Interstate 710 Extension Los Angeles County, California		
	PROJECT NO. 201769-01	DATE 3/99	FIGURE A-4

DEPTH (feet)	BLOWNS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED	BORING NO.
						2/4/99	B-2
						GROUND ELEVATION	SHEET
						676' ±(MSL)	2 OF 2
						METHOD OF DRILLING	
						30" diameter bucket auger (Al Roy Drilling)	
						DRIVE WEIGHT	DROP
						See end of log	12 inches
						SAMPLED BY	LOGGED BY
						SMJ	SMJ
						REVIEWED BY	CAP
						DESCRIPTION/INTERPRETATION	
20	9	20.2	98.0			<p>TOPANGA FORMATION: (Continued) Orange-brown, moist, moderately to well indurated, clayey SILTSTONE; highly fractured and jointed; extensive iron oxide staining; beds up to approximately 4 inches thick.</p> <p>@ 24.0': Heavy seepage.</p>	
25	18	24.4	100.3			<p>Total Depth = 26.0 feet. Seepage encountered at approximately 24 feet. Downhole logged to approximately 18 feet. Groundwater measured after downhole logging at 20 feet. Backfilled on 2/4/99.</p> <p><u>Drive Weights:</u> 0-30': 3,350 lbs.</p>	
35							



BORING LOG		
Interstate 710 Extension Los Angeles County, California		
PROJECT NO. 201769-01	DATE 3/99	FIGURE A-5

DEPTH (feet)	Bulk	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>2/9/99</u>	BORING NO. <u>B-3</u>
	Driven						GROUND ELEVATION <u>485' ±(MSL)</u>	SHEET <u>1</u> OF <u>4</u>
							METHOD OF DRILLING <u>8" diameter hollow stem auger (A & R Drilling)</u>	
							DRIVE WEIGHT <u>140 lbs.</u>	DROP <u>30 inches</u>
							SAMPLED BY <u>BDF</u> LOGGED BY <u>BDF</u> REVIEWED BY <u>CAP</u>	
DESCRIPTION/INTERPRETATION								

0						SC	ASPHALT CONCRETE: Approximately 5 inches thick.	
							ALLUVIUM: Reddish brown, moist, medium dense, clayey SAND; trace root hairs.	
5		39	12.9	113.9				
						SM	Light brown, moist, dense, silty SAND; few gravel up to approximately 1/2 inch in diameter; voids up to approximately 1/4 inch in diameter.	
		73	10.1	109.4			Gravel layer.	
10						SC	Reddish brown, moist, dense, clayey SAND.	
		79	8.1	108.0				
						SM	Reddish brown, moist, dense, silty SAND; few gravel.	
15								
		70	7.0	119.1				
		37	10.3	95.6			Medium dense; silty fine sand; trace gravel.	

	BORING LOG		
	Interstate 710 Extension Los Angeles County, California		
	PROJECT NO. 201769-01	DATE 3/99	FIGURE A-6

DEPTH (feet) SAMPLES b Driven

DATE DRILLED 2/9/99 BORING NO. B-3

GROUND ELEVATION 485' ±(MSL) SHEET 2 OF 4

METHOD OF DRILLING 8" diameter hollow stem auger (A & R Drilling)

DRIVE WEIGHT 140 lbs. DROP 30 inches

SAMPLED BY BDF LOGGED BY BDF REVIEWED BY CAP

DEPTH (feet)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20					SM	<u>ALLUVIUM: (Continued)</u> Reddish brown, moist, medium dense, silty fine SAND; trace gravel.
25	61	14.6	89.1		SP	Reddish brown, moist, medium dense, fine SAND.
					CL	Reddish brown, moist to wet, very stiff, sandy CLAY.
	25	20.8	98.6			
35	77	20.9	102.9			<u>PUENTE FORMATION:</u> Light yellowish brown, moderately indurated, clayey SILTSTONE; manganese staining.
	57	27.7	88.5			Greenish to yellowish gray; well indurated; iron oxide stains.



BORING LOG		
Interstate 710 Extension Los Angeles County, California		
PROJECT NO. 201769-01	DATE 3/99	FIGURE A-7

PTH (feet)	Bulk	SAMPLES	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>2/9/99</u>	BORING NO. <u>B-3</u>
	Driven							GROUND ELEVATION <u>485' ±(MSL)</u>	SHEET <u>3</u> OF <u>4</u>
METHOD OF DRILLING <u>8" diameter hollow stem auger (A & R Drilling)</u>								DRIVE WEIGHT <u>140 lbs.</u>	DROP <u>30 inches</u>
SAMPLED BY <u>BDF</u>								LOGGED BY <u>BDF</u>	REVIEWED BY <u>CAP</u>
DESCRIPTION/INTERPRETATION									

40								PUENTE FORMATION: (Continued) Greenish to yellowish gray, well indurated, clayey SILTSTONE; iron oxide and manganese staining.	
45		86/11"	31.2	93.1	R			@ 44.0': Groundwater encountered during drilling. Saturated.	
50		80	27.3	91.1				Color varies to light pink; bedding dips approximately 20-30°; iron oxide staining; clay laminations along bedding.	
55									
90			30.7	92.2				Yellowish gray.	



BORING LOG		
Interstate 710 Extension Los Angeles County, California		
PROJECT NO. 201769-01	DATE 3/99	FIGURE A-8

DEPTH (feet)	BULK SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>2/10/99</u>	BORING NO. <u>B-4</u>
	Bulk	Driven						GROUND ELEVATION <u>545' ±(MSL)</u>	SHEET <u>1</u> OF <u>3</u>
METHOD OF DRILLING <u>8" diameter hollow stem auger (A & R Drilling)</u>								DRIVE WEIGHT <u>140 lbs.</u>	DROP <u>30 inches</u>
SAMPLED BY <u>BDF</u>								LOGGED BY <u>BDF</u>	REVIEWED BY <u>CAP</u>
DESCRIPTION/INTERPRETATION									

0							GM	ASPHALT CONCRETE: Approximately 4 inches thick.	
							CL	AGGREGATE BASE: Gray, damp, dense, sandy GRAVEL with silt; approximately 4 inches thick.	
								ALLUVIUM: Brown, damp, very stiff, sandy CLAY; trace gravel.	
		39	18.3	74.3					
5									
		35	19.1	70.7				Few gravel.	
								Moist.	
10									
		58	20.1	91.5				Hard; pinhole voids.	
15							SC	Light brown, moist, medium dense, clayey SAND; few gravel.	
		43	12.9	111.4					
							SP-SM	Light brown, moist, medium dense, poorly graded SAND with silt.	
		68/11"	7.1	116.8					



BORING LOG		
Interstate 710 Extension Los Angeles County, California		
PROJECT NO. 201769-01	DATE 3/99	FIGURE A-10

DATE DRILLED 2/10/99 BORING NO. B-4
 GROUND ELEVATION 545' ±(MSL) SHEET 2 OF 3
 METHOD OF DRILLING 8" diameter hollow stem auger (A & R Drilling)
 DRIVE WEIGHT 140 lbs. DROP 30 inches
 SAMPLED BY BDF LOGGED BY BDF REVIEWED BY CAP

DEPTH (feet)	SAMPLE Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20						SP-SM	<u>ALLUVIUM</u> : (Continued) Light brown, moist, medium dense, poorly graded SAND with silt.
						SC	Light brown, moist, medium dense, clayey SAND.
		105	8.4	103.4		SM	Light brown, moist, dense, silty SAND; gravel up to approximately 2 inches in diameter.
25						SC	Light brown, moist, medium dense to dense, clayey SAND.
		88/11"	6.9	109.4		SW-SM	Reddish brown, moist, dense, well graded SAND with silt; gravel up to approximately 2 inches in diameter.
							@ 33.0': Groundwater encountered during drilling.
		58/6"	15.3	111.1			Saturated.
35						CL	Reddish brown, saturated, hard, silty CLAY.
		71	23.5	102.4			



BORING LOG		
Interstate 710 Extension Los Angeles County, California		
PROJECT NO. 201769-01	DATE 3/99	FIGURE A-11

DEPTH (feet)	Bulk	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>2/10/99</u>	BORING NO. <u>B-4</u>
	Driven						SAMPLES	GROUND ELEVATION <u>545' ±(MSL)</u>
							METHOD OF DRILLING <u>8" diameter hollow stem auger (A & R Drilling)</u>	
							DRIVE WEIGHT <u>140 lbs.</u>	DROP <u>30 inches</u>
							SAMPLED BY <u>BDF</u> LOGGED BY <u>BDF</u> REVIEWED BY <u>CAP</u>	
DESCRIPTION/INTERPRETATION								

40						CL	<u>ALLUVIUM: (Continued)</u> Reddish brown, saturated, hard, silty CLAY; grades to light yellowish brown.	
45		42	28.4	95.0			<u>TOPANGA FORMATION:</u> Light yellowish brown, saturated, moderately indurated, clayey SILTSTONE; highly fractured; oxidized along fractures.	
50		110	20.7	103.0			Thin bedded siltstone and claystone dipping approximately 5-10°; thicker beds of fine-grained sandstone.	
55							Total Depth = 50.5 feet. Groundwater encountered during drilling at approximately 33 feet. Backfilled with bentonite slurry and patched on 2/10/99.	

	BORING LOG		
	Interstate 710 Extension Los Angeles County, California		
	PROJECT NO. 201769-01	DATE 3/99	FIGURE A-12

A vertical orange bar is located to the left of the title text.

**GEOTECHNICAL DATA REPORT
AVENUE 45 – ARROYO DRIVE RELIEF SEWER
LOS ANGELES, CALIFORNIA
FOR LADPW/GED**

**URS JOB NO. 29401785
FEBRUARY 28, 2006**

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GP POORLY GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM SILTY SANDS, SAND - SILT MIXTURES
				SC CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
			CL INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
			OL ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS	
			CH INORGANIC CLAYS OF HIGH PLASTICITY	
			OH ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
HIGHLY ORGANIC SOILS				PT PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Dual symbols are used to indicate gravels or sand with 5-12% fines and soils with fines classifying as CL-ML. Symbols separated by a slash indicate borderline soil classifications.

Symbol Descriptions

- Approximate depth of perched water or groundwater
- Dry** No sign of water and soil is dry to touch
- Moist** Signs of water and soil is relatively dry to touch
- Wet** Signs of free water at surface of sample and soil is definitely wet to touch

Soil Consistency (Granular Soils)

SPT Blow Count	Description
<4	Very Loose
4 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
>50	Very Dense

Soil Consistency (Cohesive Soils)

< 2	Very Soft
2 - 4	Medium Stiff
4 - 8	Medium Dense
8 - 15	Stiff
15 - 30	Very Stiff
> 30	Hard

Rock And Other Material Symbols (examples)

- Asphalt
- Puente Formation

Laboratory and Field Test Abbreviations

- CORR** Corrosivity test
- DSCD** Consolidated drained direct shear test (normal pressure and shear strength results shown)
- PID** Photoionization detector
- LL=29** Liquid limit (Atterberg limits test)
- PERM** Permeability test
- PI=11** Plasticity Index (Atterberg limits test)
- R-value** R-Value Test(result in parentheses)
- SA** Sieve Analysis (-200 result in parentheses)
- UC** Unconfined Compressive Strength test
- (0,21.4,0,0)** (Methane/LEL in %,O2 in %,CO in ppm, H2S in ppm)
- 200** Percent passing #200 sieve (test result in parentheses)
- Petrographic Analysis**
- Cerchar Abrasivity Index**

KEY TO LOG OF BORING
 AVENUE 45 - ARROYO DRIVE RELIEF SEWER
 LOS ANGELES, CALIFORNIA
 FOR: LADPW/GED

FIGURE 3



KEY TO DESCRIPTIVE TERMS FOR ROCK

ROCK STRENGTH

<u>Description</u>	<u>Criteria</u>
Extremely Strong	Can only be chipped with many hammer blows
Very Strong	Specimen fractures with many hammer blows
Strong	Specimen can be broken with one moderate hammer blow. Cannot be scrapped with knife
Moderately Strong	Can be scrapped with knife with effort and indented with pick.
Weak	Can be peeled with knife.
Friable	Material crumbles in hand

ROCK WEATHERING

<u>Description</u>	<u>Criteria</u>
Fresh	No discoloration. Hammer rings when rock is struck.
Slightly Weathered	Discoloration is surficial or within fractures only. Hammer rings when rock is struck.
Moderately Weathered	Discoloration extends throughout specimen. Hammer does not ring when rock is struck.
Intensely Weathered	Discoloration extends throughout specimen with mineral alteration. Rock produces dull sound when struck with hammer.
Decomposed	Discoloration extends throughout specimen except for more resistant minerals. Structure intact. Can be broken by hand.

ROCK HARDNESS

<u>Description</u>	<u>Criteria</u>
Extremely Hard	Cannot be scratched with knife. Chipped only with repeated heavy hammer blows.
Very Hard	Cannot be scratched with knife. Core breaks with repeated heavy hammer blows.
Hard	Can be scratched with knife with difficulty. Breaks with one heavy hammer blow.
Moderately Hard	Can be scratched with knife. Breaks with one moderate hammer blow.
Moderately Soft	Can be grooved 2 mm deep with knife. Breaks with moderate manual pressure.
Soft	Can be grooved or gouged easily with knife. Breaks with light to moderate manual pressure.
Very Soft	Can be grooved with fingernail or carved with a knife. Breaks with light manual pressure.

ROCK BEDDING THICKNESS

<u>Description</u>	<u>Thickness</u>
Massive	> 10 feet
Very Thickly Bedded	3 to 10 feet
Thickly Bedded	1 to 3 feet
Moderately Bedded	0.3 to 1 feet
Thinly Bedded	0.1 to 0.3 feet
Very Thinly Bedded	0.5 inches to 0.1 feet
Laminated	< 0.5 inches

ROCK FRACTURING

<u>Description</u>	<u>Spacing</u>
Very Slightly Fractured	Core recovered mostly in lengths greater than 3 feet
Slightly Fractured	Core recovered mostly in lengths from 1 to 3 feet
Moderately Fractured	Core recovered mostly in lengths from 4 inches to 1 foot
Intensely Fractured	Core recovered mostly in lengths from 1 inch to 4 inches
Very Intensely Fractured	Core recovered mostly in lengths less than 1 inch

KEY TO LOG OF BORING
AVENUE 45 - ARROYO DRIVE RELIEF SEWER
LOS ANGELES, CALIFORNIA
FOR: LADPW/GED

FIGURE 3



BORING C-1

Sheet 1 of 4

Date(s) Drilled	11/14/2005-11/15/2005	Logged By	J. Gratzner/G. Garcia
Drilling Method	HSA/Continuous Core	Drill Bit Size/Type	HQ 3.8 inches (O.D.), #6
Drill Rig Type	CME-75; Hammer 140-lbs/30-inch drop	Diameter of Borehole (in.)	8-inch in soils and 4-inch in bedrock
Drilling Contractor	Tri-County	Core Type/ Diameter (in.)	HQ-3 Wireline
Depth to Water and Date Measured	No groundwater encountered.	Size and Type of Casing	8-inch HSA in soils
Type and Depths of Backfill	Cement-Bentonite Grout		
Comments	N4150023.0; E4228403.2		
Job Number	29401785		
Total Depth Drilled (ft)	60.0		
Approximate Ground Surface Elevation (ft)	463.2		

Elevation (ft)	Depth (ft)	ROCK CORE							MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, ft/hr)	FIELD NOTES AND LAB TESTS
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/ Number	Lithology				
460	0								3-inch thick Asphaltic Concrete Pavement		1115	LEL/O2/CO/H2S
	1								FILL: Silty SAND (SM) dark olive-gray (5Y 3/2), moist, fine			8: Bedding J: Joint S: Shear Fr: Fracture
	2											
	3											
	4											
	5								Grades dense, with trace brick fragments and clay chunks			0/20.7/0/0 PID = 10
	6								(Cal sampler blow count/6" - 21,24,45)			
	7											
455	8											
	9											
	10								Grades brown, loose, with siltstone fragments			0/20.6/0/0 PID = 37
	11								(Cal sampler blow count/6" - 11,9,6)			
	12								Grades dark olive-gray (10YR 5/3)			
	13								ALLUVIUM: SAND (SP) light grayish-brown (10YR 6/2), loose, moist, fine			

This log is part of the report prepared by URS for this project and should be read together with the report. This summary applies only at the location of the exploration and at the time of drilling or excavation. Subsurface conditions may differ at other locations and may change at this location with time. Data presented are a simplification of actual conditions encountered.

LOG OF BORING
AVENUE 45 - ARROYO DRIVE RELIEF SEWER
LOS ANGELES, CALIFORNIA
FOR: LADPW/GED **FIGURE 4**



Report: DMG10; Project File: G:\INESA\PROJECTS\SEWER-STORM\AVENUE 45-ARROYO\ARROYO.GPJ; Data Template: DMLA.GDT Printed: 2/22/06

Elevation (ft)	Depth (ft)	ROCK CORE							MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, ft/hr)	FIELD NOTES AND LAB TESTS
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/ Number	Lithology				
450												
	14											
	15							(Cal sampler blow count/6"- 7,8,11)				0/20.6/0/0 PID = 0
	16											
	17											Drill Chatter
445	18											
	19											
	20							Grades gray (N5), very dense, fine to coarse, with gravel				0/20.5/1/0 PID = 0
	21							(Cal sampler blow count- 50/5")				Drill Chatter
	22											
440	23							Silty SAND (SM) gray (N5), very dense, moist, fine to coarse, with gravel				
	24											
	25							(Cal sampler blow count- 50/3")				0/20.4/2/0 PID = 0
	26											
	27											
435	28											
	29	1	1	68		0		PUENTE FORMATION: Silty CLAYSTONE			1509	Start rock coring @ 29'



FIGURE 4

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Elevation (ft)	Depth (ft)	ROCK CORE						Lithology	MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, ft/hr)	FIELD NOTES AND LAB TESTS
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/Number					
30							NR	olive-gray (5Y 3/2), thickly bedded, moderately weathered, weak to moderately strong, moderately fractured			0/20.5/1/0 PID = 0	
31				1				Olive-gray SILTSTONE			LL=65, PI=28, Residual Direct Shear	
32				7								
33	430			4		1		← Locally laminated @ 32' - 32.2' ← Hairline fracturing ← Medium dark gray (N4) siltstone bed, 1/2" thick				
34		2		100	23		1	1. B: 50° from horizontal			0/20.4/2/0 PID = 0	
35				0			1	Becomes grayish-brown (5YR 3/2), weak to moderately strong, closely to moderately fractured, fractures stained with iron-oxide, locally laminated @ 34' to 34.2'	1559 808		11/15/05, Resume coring @ 34' UC	
36				3			2					
37				>10			3	1. B: 45° from horizontal 2. B: Contorted bedding 3. B: 45° from horizontal 4. B: 40° from horizontal				
38	425			>10				Intensely fractured zone 37.4'-38.2'				
39		3		100	22		4					
40				2			1	1. B: 50° from horizontal			850 857	
41		4		95	40		1	Iron oxide stained fractures ← Becomes moderately bedded			0/20.6/0/0 PID = 0	
42				5			1					
43	420			0			2	1. B: 45° from horizontal 2. B: 45° from horizontal 3. B: 45° from horizontal, iron oxide stain 4. B: 45° from horizontal, iron oxide stain			914 925	
44				3			3				UC, Petrographic Analysis	
45				>10				Very intensely fractured zone 44.4'-44.7', iron oxide stains				
		5		100	10	30	4					
				8			1	← Becomes dusky brown (5YR 2/2), fractures stained with iron-oxide			957 1008	
				10			1				0/20.7/0/0 PID = 0	



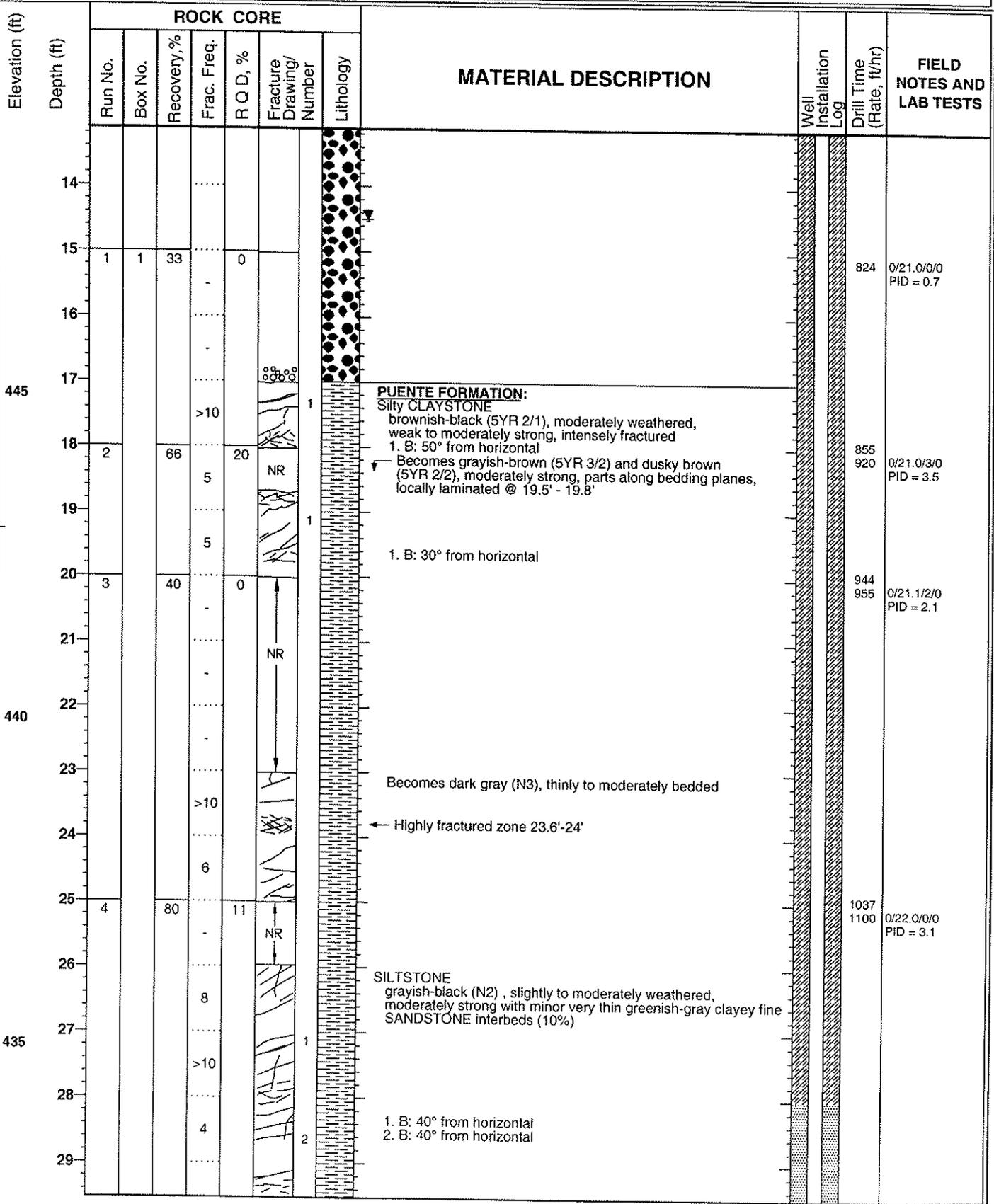
FIGURE 4

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Elevation (ft)	Depth (ft)	ROCK CORE						Lithology	MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, ft/hr)	FIELD NOTES AND LAB TESTS
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/Number					
46								1. B: 60° from horizontal				
47					4							
48					4							
415	48		3		6		2	2. B: 60° from horizontal M			Petrographic Analysis	
49					6			3. B: 60° from horizontal				
50					2							
51		6		100	0	20		sandstone bed, 3/4" thick Becomes brownish-gray (5YR 4/1), closely to moderately bedded		1044	1052 0/20.8/0/0, UC PID = 0	
52					5		1	1. B: 45° from horizontal				
53					2			2. B: 50° from horizontal				
410	53				5		2	2. B: 50° from horizontal				
54					6		3	3. B: 50° from horizontal				
55					>10		4	3" wide highly fractured zone at 54.5'			UC	
56		7		100	1	53	5	4. B: 50° from horizontal				
57					10		6	5. B: 50° from horizontal		1126		
58			4		1		1	6. B: 50° from horizontal		1134	0/20.6/0/0 PID = 0	
405	58				3			Becomes interbedded brownish-gray (5YR 4/1) SILTSTONE(50%) and medium dark gray (N4) CLAYSTONE(50%), hairline fractures @ 58'				
59					6			Trace hairline fractures at 58'				
60					6		2	1. B: 50° from horizontal, disconformity 2. B: 50° from horizontal		1206	0/20.5/0/0 PID = 0	
61												
62												



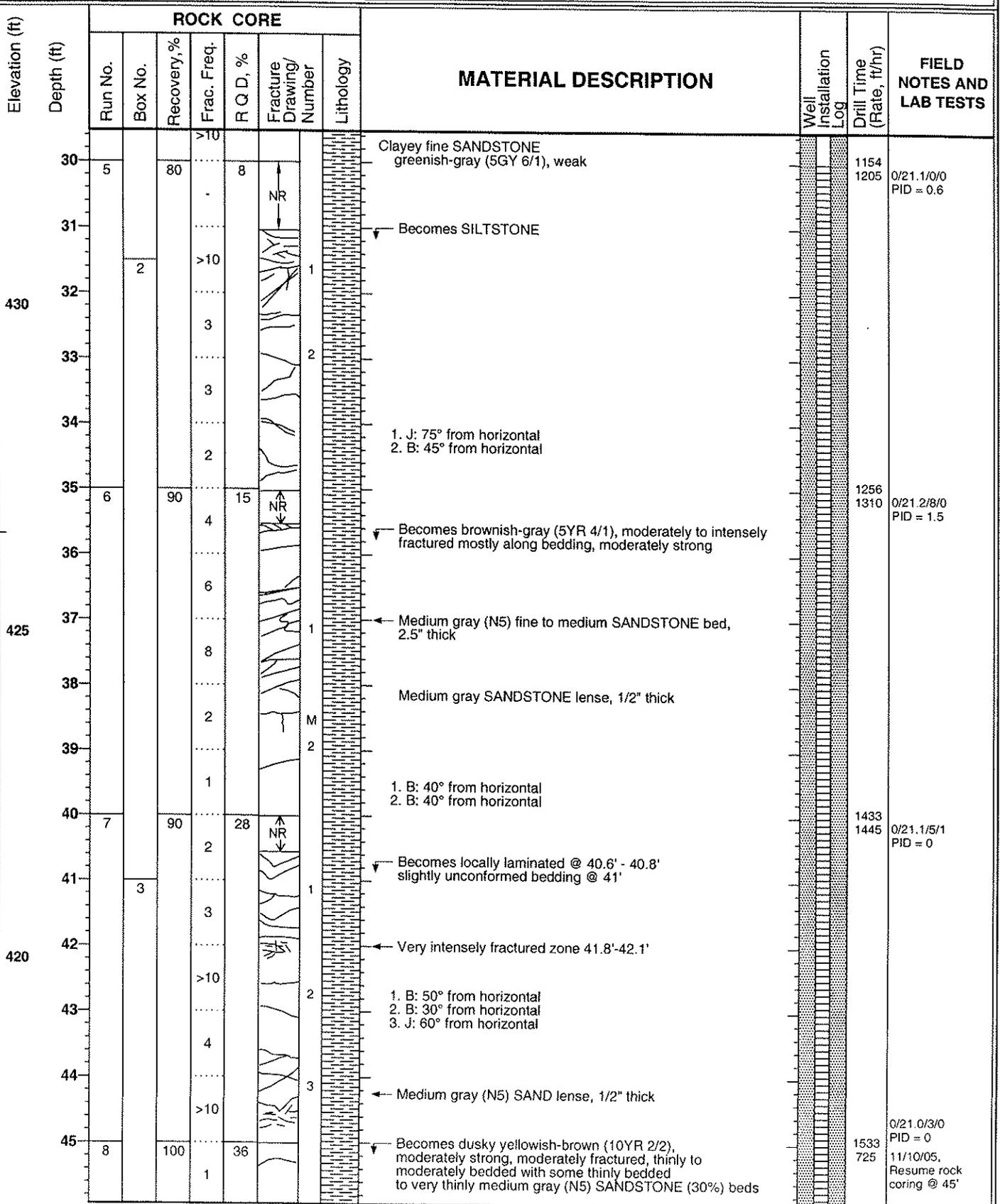
FIGURE 4



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FIGURE 5



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FIGURE 5

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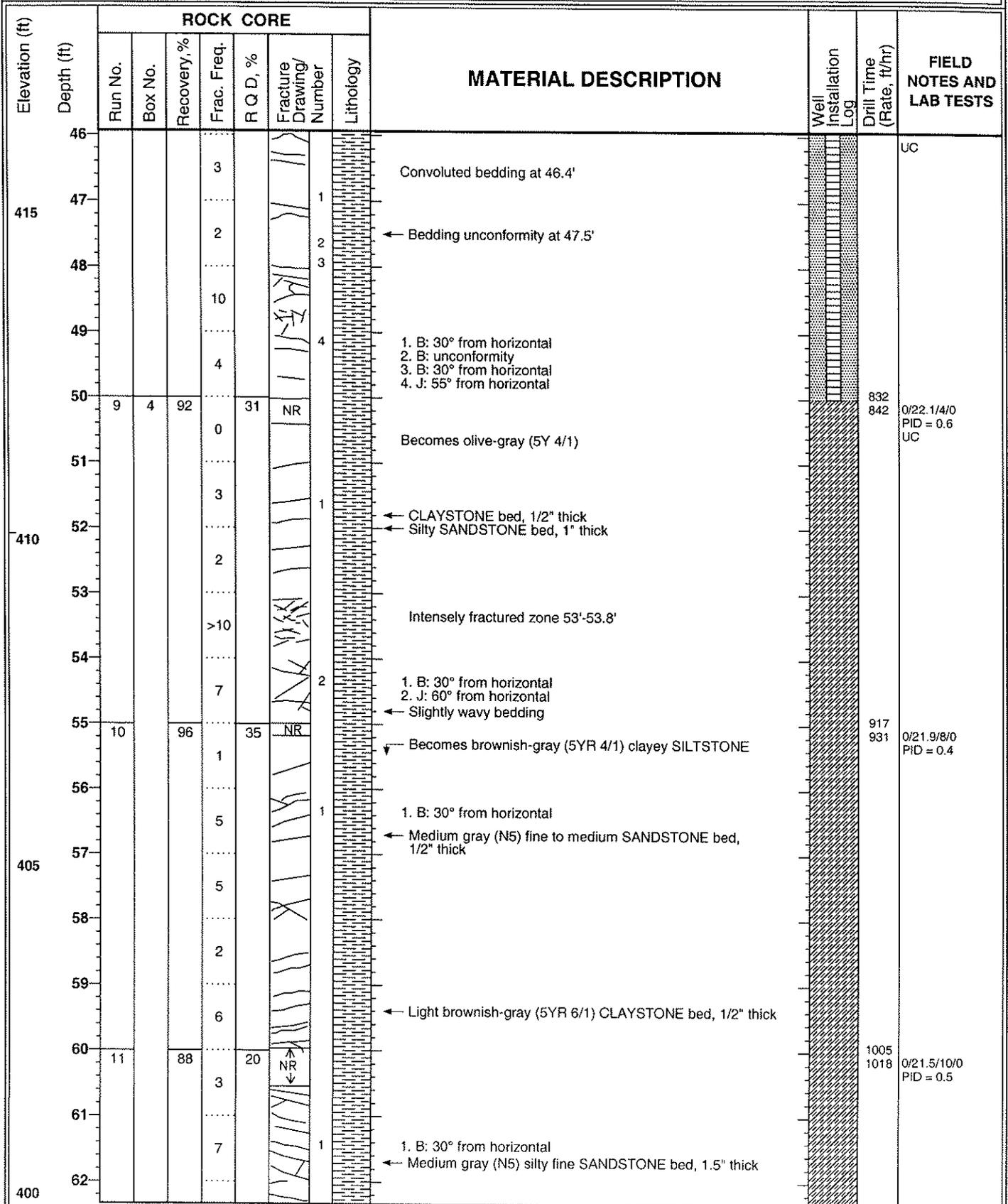


FIGURE 5

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Elevation (ft)	Depth (ft)	ROCK CORE						MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, ft/hr)	FIELD NOTES AND LAB TESTS
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/ Number				
63			5		10			← Intensely fractured zone 62.8'-63'	Well Installation Log	1052 1108	0/21.9/8/0 PID = 0.3
64					>10		← Very intensely fractured zone 63.5'-64.3'				
65		12		96	33	NR	↓ Becomes SILTSTONE with some olive-gray CLAYSTONE (25%) interbeds, very thin to thinly bedded				
66					4		← convoluted bedding				
67					3						
68					2		unconformed bedding @ 67.4'				
69					3						
70					2		1. B: 40° from horizontal 2. B: unconformity 3. B: 40° from horizontal, discontinuous 4. J: 70° from horizontal				
71											
72											
73											
74											
75											
76											
77											
78											



FIGURE 5

Date(s) Drilled	11/2/2005-11/3/2005	Logged By	J. Gratzer	BORING C-3 Sheet 1 of 5	
Drilling Method	HSA/Continuous Core	Drill Bit Size/Type	HQ 3.8 inches (O.D.), #2, #6		
Drill Rig Type	Simco 3500	Diameter of Borehole (in.)	8-inch in soils and 4-inch in bedrock		
Drilling Contractor	Tri-County	Core Type/ Diameter (in.)	HQ-3 Wireline		
Depth to Water and Date Measured	No groundwater encountered.	Size and Type of Casing	8-inch HSA in soils		
Type and Depths of Backfill	Cement-Bentonite Grout			Job Number	29401785
Comments	N4150342.8; E4229995.4			Total Depth Drilled (ft)	65.0
				Approximate Ground Surface Elevation (ft)	478.0

Elevation (ft)	Depth (ft)	ROCK CORE							MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, ft/hr)	FIELD NOTES AND LAB TESTS
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/ Number	Lithology				
0									4-inch thick Asphaltic Concrete Pavement		815	LEL/O2/CO/H2S
1									ALLUVIUM: Silty SAND with gravel (SM) dark grayish-brown (10YR 3/2), moist, fine to medium			B: Bedding J: Joint S: Shear Fr: Fracture
2												
3												
475												
4												
5												
6												0/20.8/0/0 PID = 0
7												
470												
8												
9												
10												0/20.5/8/0 PID = 0
11												
12												
465												
13												

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LOG OF BORING
AVENUE 45 - ARROYO DRIVE RELIEF SEWER
LOS ANGELES, CALIFORNIA
FOR: LADPW/GED

FIGURE 6



Elevation (ft)	Depth (ft)	ROCK CORE						MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, ft/hr)	FIELD NOTES AND LAB TESTS
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/Number				
460	14							Granitic GRAVEL and COBBLE with coarse SAND, trace boulders		0/20.2/1/0 PID = 0	
	15								1015		
	16										
	17									Change to #6 drill bit	
	18										
	19										
	20										
	21								1101	0/20.4/0/0 PID = 0	
455	22										
	23										
	24										
	25							1140 1230	0/20.2/0/0 PID = 0.5		
450	26										
	27										
	28										
	29										

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FIGURE 6

Elevation (ft)	Depth (ft)	ROCK CORE						MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, ft/hr)	FIELD NOTES AND LAB TESTS
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/Number				
30	1	1	84	0		NR	<p>← Gravel along horizontal contact of bedrock</p> <p>PUENTE FORMATION: CLAYSTONE moderate yellowish-brown (10YR 5/4), moist, massive, weak to moderately strong, trace siltstone fragments</p>	1246	0/20.7/0/0 PID = 0 Cored material is soil or soil-like and does not meet soundness criteria for RQD CORR PERM 0/19.9/0/0 PID = 1.1 Switch to #2 bit		
31								1251			
32											
33											
445	33										
34											
35	2		0					1311	0/19.9/0/0 PID = 1.1 Switch to #2 bit 1341		
36											
37											
38											
440	38										
39											
40	3		0					1449	0/19.8/1/0 UC 0/19.9/0/0 Switch to #6 bit		
41								1510			
42											
43											
435	43										
44											
45	4		20					1559	11/3/05, Resume coring @ 45'		
								715			

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FIGURE 6

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Elevation (ft)	Depth (ft)	ROCK CORE						MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, ft/hr)	FIELD NOTES AND LAB TESTS	
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/ Number					Lithology
46												
47												
430	48											
	49				1		M	Silty CLAYSTONE pale brown (5YR 5/2), intensely weathered, laminated to very thinly bedded				
	50	5		80	0	NR				750 815	0/20.2/1/0 PID = 3.1	
	51			>10		NR		← Becomes dark yellowish-brown (10YR 4/2) SILTSTONE laminated to thinly bedded, parts along bedding planes moderately weathered, moderately strong				
	52			>10		1						
	53			7		2		Intensely fractured zone 51'-52.5'				
425	53			7		3		1. B: 50° from horizontal, iron oxide stained 2. J: Parallel to core axis 3. B: 20° from horizontal 4. B: 20° from horizontal, iron oxide stained				
	54			>10		4		← Hairline fractures @ 54 - 54.5'				
	55	6	2	90	0	NR						
	56			>10		NR		← Becomes silty fine SANDSTONE, very thickly bedded, intensely fractured ← Gypsum infilled fractures			854 942	SA(97) LL=60; PI=33 0/19.8/1/0 PID = 1.1
	57			4								
	58			6								
420	58			10								
	59			10		1		1. Fr: 25° from horizontal, smooth				
	60	7		84	0	NR						
	61					NR		← Becomes interbedded silty fine SANDSTONE (50%) and SILTSTONE (50%)			1010 1021	0/20.0/4/0 PID = 1.5
	62			8		1		1. Fr: 25° from horizontal, iron oxide stained, smooth 2. B: 30° from horizontal				



FIGURE 6

Report: DMG10; Project File: G:\NESA\PROJECTS\SEWER-STORM\AVENUE 45-ARROYO\ARROYO.GPJ; Data Template: DMLA.GDT Printed: 2/22/06

Elevation (ft)	Depth (ft)	ROCK CORE							MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, ft/hr)	FIELD NOTES AND LAB TESTS
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/ Number	Lithology				
415	63			5								
	64			>10				Hairline fracturing 63.5'-65'				
	65			>10		3		3. J: parallel to core axis		1038	0/19.8/0/0 PID = 1.2	
410	68											
	69											
	70											
	71											
	72											
405	73											
	74											
	75											
	76											
	77											
400	78											



FIGURE 6

Date(s) Drilled	11/16/2005	Logged By	J. Gratzer	BORING C-4 Sheet 1 of 4	
Drilling Method	HSA/Continuous Core	Drill Bit Size/Type	HQ 3.8 inches (O.D.), #2		
Drill Rig Type	CME-75; Hammer 140-lbs/30-inch drop	Diameter of Borehole (in.)	8-inch in soils and 4-inch in bedrock		
Drilling Contractor	Tri-County	Core Type/Diameter (in.)	HQ-3 Wireline		
Depth to Water and Date Measured	Groundwater encountered at 11.6 feet on January 5, 2006.	Size and Type of Casing	8-inch HSA in soils		
Type and Depths of Backfill	See Well Installation Detail				
Comments	N4151010.2; E4230811.3			Job Number	29401785
				Total Depth Drilled (ft)	60.0
				Approximate Ground Surface Elevation (ft)	481.9

Elevation (ft)	Depth (ft)	ROCK CORE							MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, ft/hr)	FIELD NOTES AND LAB TESTS
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/Number	Lithology				
0	0								6-inch thick Asphaltic Concrete Pavement		740	O2/CO/H2S
1	1								FILL: Silty SAND (SM) dark grayish-brown (10YR 4/2), moist, fine to medium, with fine gravel and trace coarse sand			B: Bedding J: Joint S: Shear Fr: Fracture
480	2											
3	3											
4	4											
5	5								Becomes dense, with fine to coarse gravel (Cal sampler blow count- 50/2")			O/20.8/0/0 No Recovery
6	6											
475	7											
8	8											
9	9											
10	10								(Cal sampler blow count/6" - 31,50/4")			O/20.8/0/0 PID = 0
11	11											
470	12								ALLUVIUM: SAND (SP) grayish-brown (10YR 5/2), very dense, wet, fine to medium, with trace fine gravel			
13	13											

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LOG OF BORING
AVENUE 45 - ARROYO DRIVE RELIEF SEWER
LOS ANGELES, CALIFORNIA
FOR: LADPW/GED

FIGURE 7



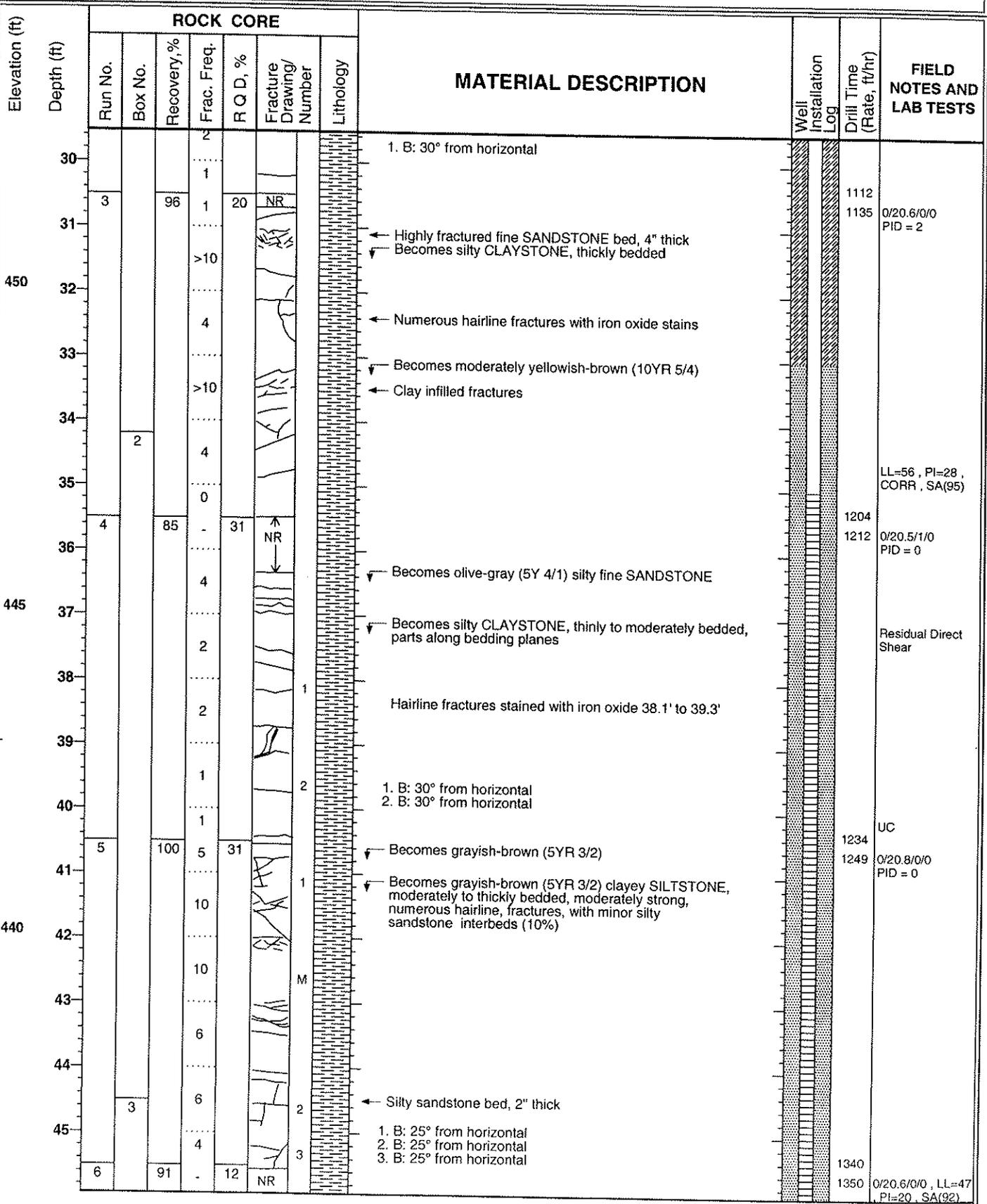
Report: DMG10; Project File: G:\NIESA\PROJECTS\SEWER-STORM\AVENUE 45-ARROYO\ARROYO.GPJ; Data Template: DMILA.GDT Printed: 2/22/06

Elevation (ft)	Depth (ft)	ROCK CORE						MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, ft/hr)	FIELD NOTES AND LAB TESTS
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/Number				
14								SAND (SP) grayish-brown (10YR 5/2), very dense, wet, fine to medium, with trace fine gravel			
15								(Cal sampler blow count/6" - 46,50/1")			0/20.7/0/0 PID = 0
16											
17											
18											
19											
20								(Cal sampler blow count/6" - 30,50/2")			0/20.6/1/0 PID = 0
21								PUENTE FORMATION: Sandy SILTSTONE dark yellowish-brown (5YR 5/2), intensely weathered, laminated to very thinly bedded			
22											
23											
24		1	1	95	17	NR					
25				0				Dark yellowish-brown (10YR 4/2) Silty CLAYSTONE, weak			1021 Start coring @ 24'
26				0				Becomes olive-gray (5Y 4/1), moderately weathered, moderately to intensely fractured, thickly bedded, moderately strong to strong, some hairline fractures, iron oxide stains within fractures			
27				6				1. B: 20° from horizontal			
28		2		73	36	M					1048 1059
29								Becomes light olive-gray (5Y 5/2) clayey SILTSTONE with some CLAYSTONE (25%) interbeds, moderately bedded, moderately strong, numerous hairline fractures			0/21.0/0/0 PID = 1.3

Report: DMG10; Project File: G:\NESAPROJECTS\SEWER-STORM\AVENUE 45-ARROYO\ARROYO.GPJ; Data Template:DMLA.GDT Printed: 2/22/06



FIGURE 7



Report: DMG10; Project File: G:\NESA\PROJECTS\SEWER-STORM\AVENUE 45-ARROYO\ARROYO.GPJ; Data Template: DMLA.GDT Printed: 2/22/06



FIGURE 7

Elevation (ft)	Depth (ft)	ROCK CORE						MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, ft/hr)	FIELD NOTES AND LAB TESTS
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/Number				
46											
435	47			7				↓ Becomes light olive-gray (5Y 6/1) and olive-gray (5Y 4/1), moderately strong to strong, moderately to intensely fractured, slightly weathered, fractures stained with iron oxide ← Numerous parallel hairline fractures from 46.7' to 47.4'			PID = 0
	48			>10							
	49			>10							
	50	7		100		90	1	1. B: 15° from horizontal ← Medium dark gray (N4) silty fine SANDSTONE bed, 3.5" thick ↓ Becomes olive-gray (5Y 3/2) fine sandy SILTSTONE Parallel hairline fractures from 50' to 53.5', very thickly bedded	1413	LL=48, PI=19, SA(92)	
	51			0					1428	0/20.4/1/0, UC PID = 0	
430	52			1						Cerchar Test, Indirect Tensile Strength Test	
	53			1							
	54		4	0				↓ Becomes silty fine SANDSTONE			
	55	8		44		0			1451	0/20.5/0/0 PID = 0	
	56								1501		
425	57						NR				
	58							← Medium gray (N5) fine SANDSTONE bed, 3" thick ↓ Becomes silty CLAYSTONE			
	59			7							
	60			>10			1	1. B: 15° from horizontal		0/20.6/1/0 PID = 0	
	61								1534		
420	62										

Report: DMG10; Project File: G:\NES\PROJECTS\SEWER-STORM\AVENUE 45-ARROYO\ARROYO.GPJ; Data Template:DMLA.GDT Printed: 2/22/06



FIGURE 7

BORING C-5

Sheet 1 of 4

Date(s) Drilled	11/3/2005-11/8/2005	Logged By	J. Gratzer
Drilling Method	HSA/Continuous Core	Drill Bit Size/Type	HQ 3.8 inches (O.D.), #6
Drill Rig Type	Simco 3500	Diameter of Borehole (in.)	8-inch in soils and 4-inch in bedrock
Drilling Contractor	Tri-County	Core Type/ Diameter (in.)	HQ-3 Wireline
Depth to Water and Date Measured	Groundwater encountered at 6.9 feet on January 5, 2006.	Size and Type of Casing	8-inch HSA in soils
Type and Depths of Backfill	See Well Installation Detail		
Comments	N4151735.3; E4231524.5		

Job Number	29401785
Total Depth Drilled (ft)	60.0
Approximate Ground Surface Elevation (ft)	493.7

Elevation (ft)	Depth (ft)	ROCK CORE							MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, f/hr)	FIELD NOTES AND LAB TESTS
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/ Number	Lithology				
	0								3-inch thick Asphaltic Concrete Pavement			LEL/O2/CO/H2S
	1								ALLUVIUM: Silty SAND (SM) dark brown (10YR 3/3), moist, fine, with gravel			B: Bedding J: Joint S: Shear Fr: Fracture
	2											
	3								Granitic GRAVEL and COBBLE with coarse sand		1550	
490	4											
	5										1604	
	6										1612	0/20.8/0/0 PID = 1.4
	7											
485	8											
	9											0/20.6/0/0 PID = 0
	10											
	11										1634	11/4/05, Resume coring @ 10'
	12											
	13											

Report: DMG10; Project File: G:\NESA\PROJECTS\SEWER-STORM\AVENUE 45-ARROYO\ARROYO.GPJ; Data Template: DMLA.GDT Printed: 2/22/06

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LOG OF BORING
AVENUE 45 - ARROYO DRIVE RELIEF SEWER
LOS ANGELES, CALIFORNIA
FOR: LADPW/GED

FIGURE 8



Report: DMG10; Project File: G:\INES\PROJECTS\SEWER-STORM\AVENUE 45-ARROYO\ARROYO.GPJ; Data Template: DMLA.GDT Printed: 2/22/06

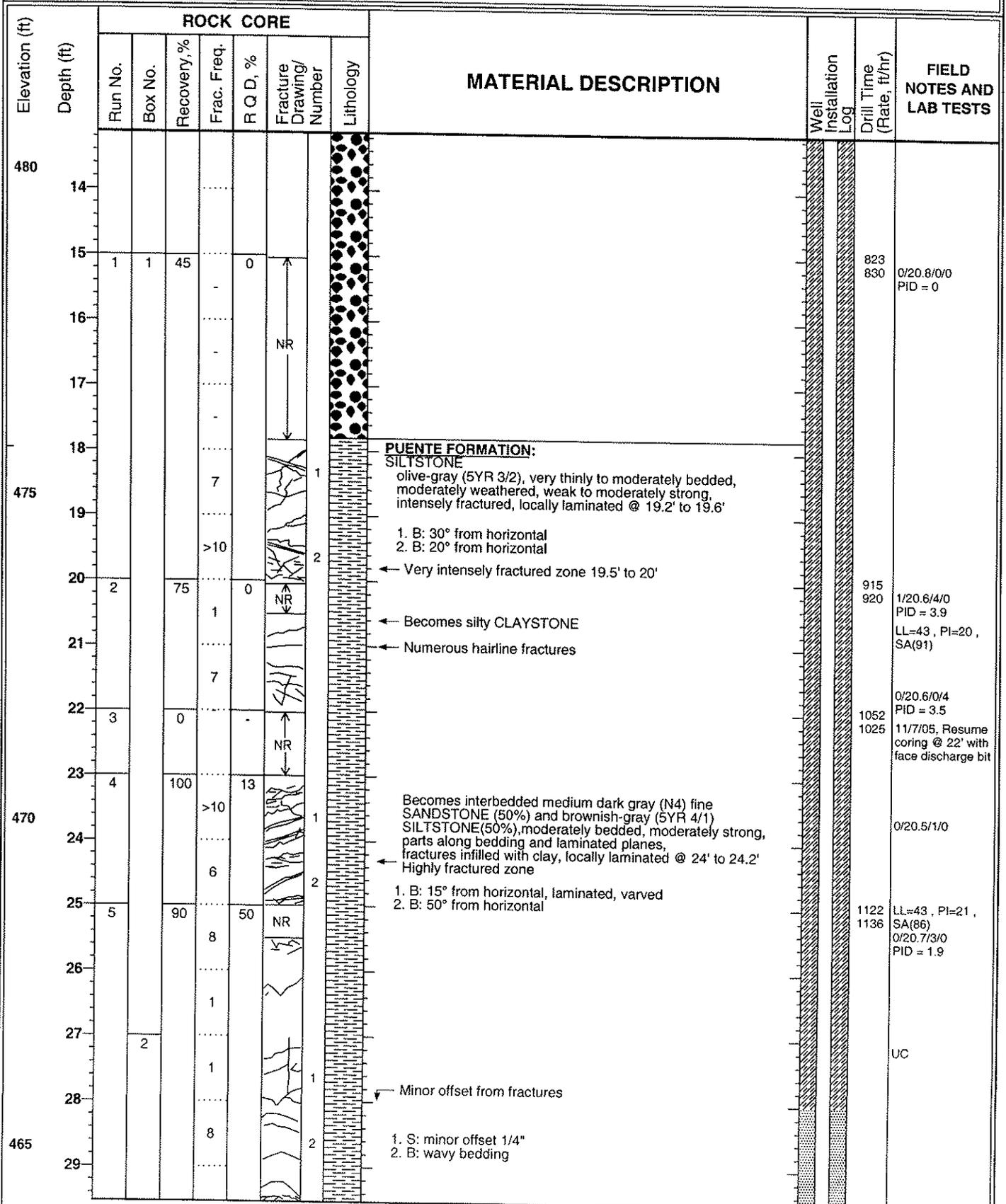
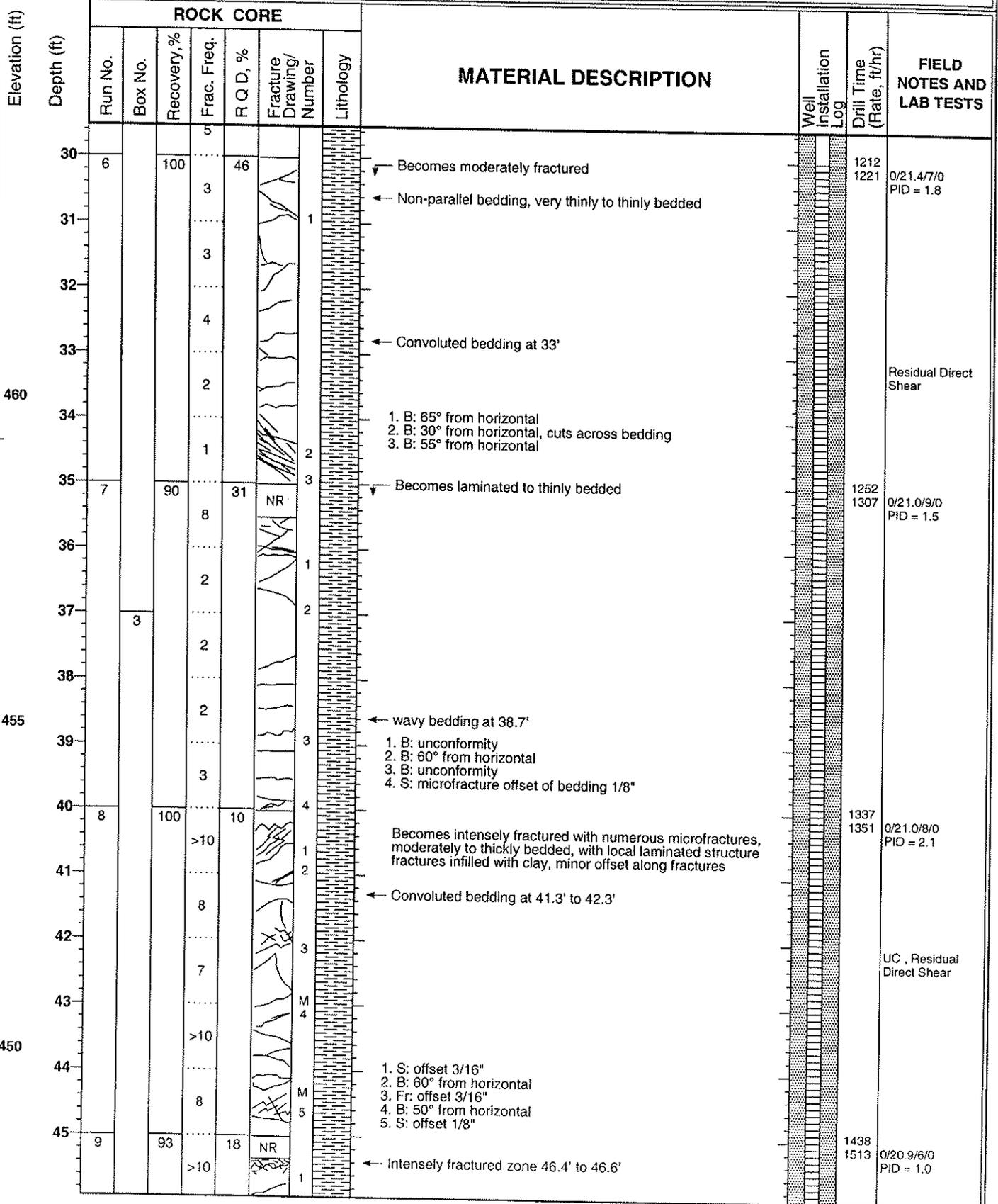


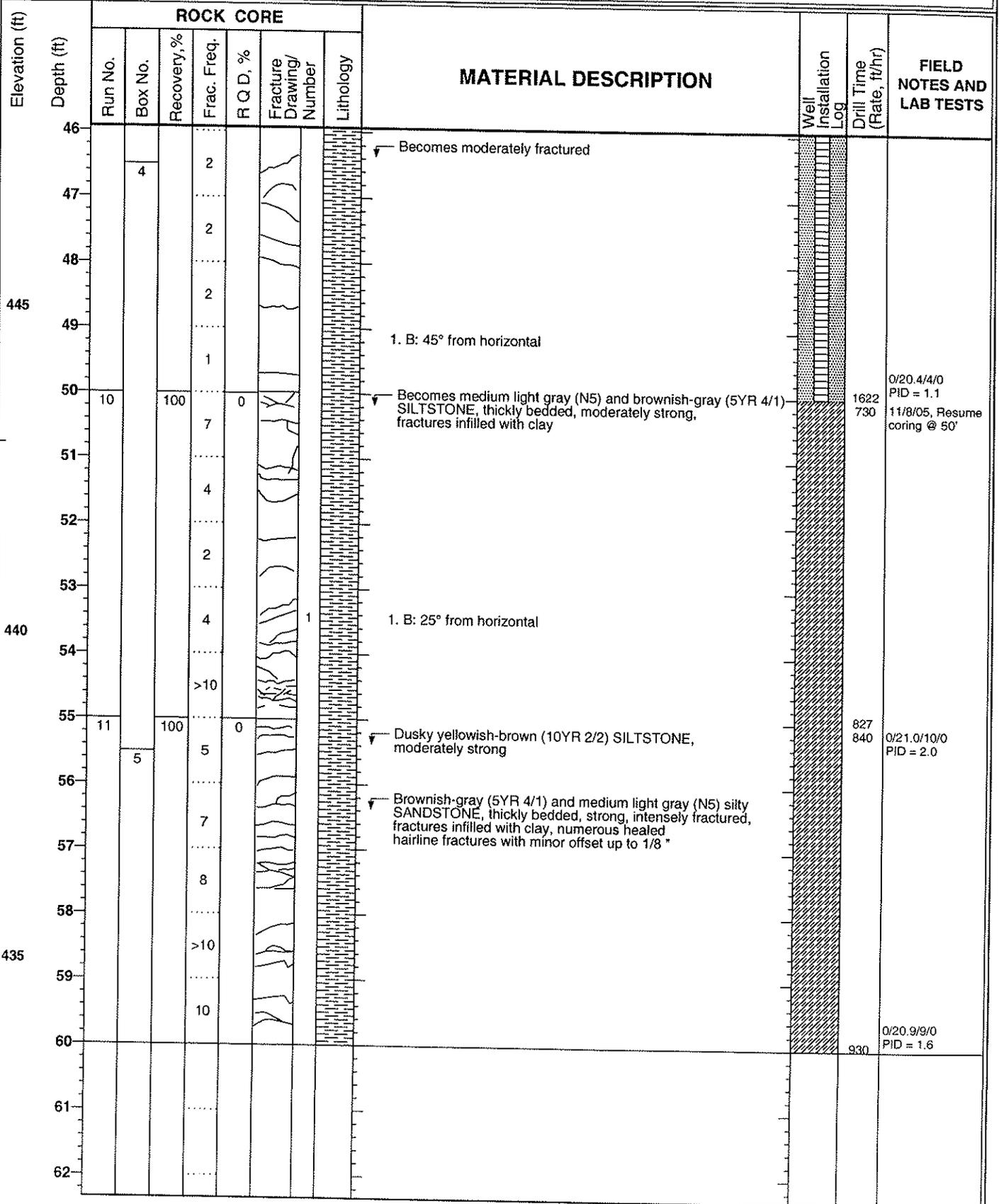
FIGURE 8



Report: DMG10; Project File: G:\INSA\PROJECT\SEWER-STORM\AVENUE 45-ARROYO\ARROYO.GPJ; Data Template: DMLA.GDT Printed: 2/22/06



FIGURE 8



Report: DMG10; Project File: G:\INESA\PROJECTS\SEWER-STORM\VENUE 45-ARROYO\ARROYO.GPJ; Data Template: DMLA.GDT Printed: 2/22/06



FIGURE 8

Date(s) Drilled	10/31/2005-11/1/2005	Logged By	J. Gratzer	BORING C-6 Sheet 1 of 4	
Drilling Method	HSA/Continuous Core	Drill Bit Size/Type	HQ 3.8 inches (O.D.), #2		
Drill Rig Type	Simco 3500	Diameter of Borehole (in.)	8-inch in soils and 4-inch in bedrock		
Drilling Contractor	Tri-County	Core Type/Diameter (in.)	HQ-3 Wireline		
Depth to Water and Date Measured	No groundwater encountered.	Size and Type of Casing	8-inch HSA in soils		
Type and Depths of Backfill	Cement-Bentonite Grout				
Comments	N4150198.8; E4230425.2			Job Number	29401785
				Total Depth Drilled (ft)	60.0
				Approximate Ground Surface Elevation (ft)	477.7

Elevation (ft)	Depth (ft)	ROCK CORE							MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, ft/hr)	FIELD NOTES AND LAB TESTS	
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/Number	Lithology					
0	0								ALLUVIUM: Silty SAND (SM) dark grayish-brown (10YR 4/2), moist, fine		1312	LEL/O2/CO/H2S	
1	1												B: Bedding J: Joint S: Shear Fr: Fracture
2	2												
475	3												
4	4												
5	5												
6	6												0/20.8/0/0 PID = 0
7	7												
470	8												
9	9												
10	10												
11	11											1412	0/20.7/0/0 PID = 0
12	12												
465	13												

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LOG OF BORING
AVENUE 45 - ARROYO DRIVE RELIEF SEWER
LOS ANGELES, CALIFORNIA
FOR: LADPW/GED

FIGURE 9



Report: DMG10; Project File: G:\INESA\PROJECTS\SEWER-STORM\AVENUE 45-ARROYO\ARROYO.GPJ; Data Template: DMLA.GDT Printed: 2/22/06

Elevation (ft)	Depth (ft)	ROCK CORE						MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, ft/hr)	FIELD NOTES AND LAB TESTS
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/Number				
14											
15	1	1	53		0		PUENTE FORMATION: CLAYSTONE moderate yellowish-brown (10YR 5/4), moderately bedded, intensely weathered, weak to moderately strong, intensely fractured, parts along bedding		1420	0/20.4/8/0 PID = 0	
16						NR			1430	Start coring @ 15'	
17											
18								1. Fr: widely spaced, iron oxide stained 2. B: 30° from horizontal			
19							3. B: 35° from horizontal				
20	2		90		53		4. Fr: closely spaced, iron oxide stains		1455		
21						NR	Becomes moderate olive-brown (5Y 4/4) SILTSTONE, moderately weathered, moderately strong 1. B: 20° from horizontal	1515	0/20.4/0/0 PID = 0		
22							Closely spaced hairline fractures from 21.8' to 25'				
23							2. B: 25° from horizontal				
24							3. Fr: widely spaced				
25	3		70		0		4. Fr: 30° from horizontal, smooth		1539	0/20.4/0/0 PID = 0	
26						NR		721	11/1/05, Resume coring @ 15'		
27							Becomes interbedded medium yellowish-brown (10YR 5/4) fine SANDSTONE (50%) and CLAYSTONE (50%), thickly bedded, moderately weathered, moderately strong 1. Fr: 60° from horizontal ← Parallel hairline fractures				
28	2						Intensely fractured zone from 28' to 29'				
29							2. B: 20° from horizontal				

Report: DMG10; Project File: G:\NESA\PROJECTS\SEWER-STORM\AVENUE 45-ARROYO\ARROYO.GPJ; Data Template: DMLA.GDT Printed: 2/22/06



FIGURE 9

Report: DMG10; Project File: G:\INESA\PROJECTS\SEWER-STORM\A\VENUE 45-ARROYO\ARROYO.GPJ; Data Template: DMLA_GDT Printed: 2/22/06

Elevation (ft)	Depth (ft)	ROCK CORE						Lithology	MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, ft/hr)	FIELD NOTES AND LAB TESTS
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/Number					
30	4		56	0		NR				822 840	0/20.6/0/0 PID = 0	
31												
32												
445	33			>10				← Very intensely fractured, iron oxide stains				
	34			>10			1 2 3 4	1. B: 20° from horizontal 2. J: parallel to core axis, iron oxide stain 3. Fr: vertical 4. Fr: 25° from horizontal				
	35	5	66	0		NR		← Becomes light olive-gray (5Y 5/2), moderately fractured				
	36							Very intensely fractured zone from 34.7' to 35'		909 925	0/20.4/0/0 PID = 0	
	37											
440	38			6			1 2	1. J: 85° from horizontal, iron oxide stain 2. B: 25° from horizontal				
	39			>10				← Hairline fractures				
	40	6	90	8		NR		Becomes olive-gray (5Y 3/2), intensely fractured 3. Fr: 50° from horizontal				
	41							Very intensely fractured zone from 39.4' to 40'		955 1011	0/20.3/0/0 PID = 0.5	
	42			>10			1	← Becomes light olive-gray (5Y 5/2) silty fine SANDSTONE, moderately fractured				
	43	3		>10				Intensely fractured zone from 41.5' to 42.7'				
435	44			>10				← Becomes grayish-brown (5YR 3/2) SILTSTONE, strong, slightly weathered				
	45	7	65	0		NR		Numerous hairline fractures from 42.5' to 44'		1036 1110	0/20.4/0/0 PID = 0	
							2	2. Fr: 50° from horizontal				
				2			3	3. J: 80° from horizontal				



FIGURE 9

Report: DMG10; Project File: G:\NESAPROJECTS\SEWER-STORM\VENUE 45-ARROYO\ARROYO.GPJ; Data Template: DMLA.GDT Printed: 2/22/06

Elevation (ft)	Depth (ft)	ROCK CORE						Lithology	MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, ft/hr)	FIELD NOTES AND LAB TESTS	
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/Number						
46							NR						
47								← Becomes moderate yellowish-brown (10YR 5/4) fine SANDSTONE, massive, very strong, intensely fractured					
48				10			1	1. Fr: 10° from horizontal 2. J: vertical					
49				7			2	← Becomes medium dark gray (N4) SILTSTONE, strong, siliceous				Cerchar Test	
50		8		93	8		3	3. Fr: 25° from horizontal, iron oxide stains 4. Fr: vertical, iron oxide staining, mineralization					
51				>10			4				1142 1212	2/20.8/0/0 PID = 0	
52				>10			NR	← Very intensely fractured zone from 50' to 50.2'					
53				>10			1	← Becomes dark gray (N3) interbedded fine SANDSTONE (50%) and SILTSTONE (50%), slightly weathered, strong					
54				>10			2	1. Fr: 30° from horizontal					
55				>10			3	2. B: 60° from horizontal					
56				>10			4	← Becomes very thinly bedded and moderately fractured from 52.4' to 52.7'				Petrographic Analysis	
57				3			3	3. Fr: 35° from horizontal					
58				>10			4	4. Fr: 50° from horizontal					
59		9		95	8		NR	← Becomes grayish-brown (5YR 3/2) CLAYSTONE, slightly weathered					
60				>10			1	1. Fr: 70° from horizontal				1234	0/20.6/0/0 PID = 0.9
61				8			2	2. Fr: 20° from horizontal					
62				>10			3						
63				3			3	← Becomes grayish-brown (5YR 3/2) SILTSTONE, moderately fractured					
64				8			M	3. Fr: hairline fracture					
65													
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68													
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189													

Date(s) Drilled	11/17/2005	Logged By	J. Gratzer	BORING C-7 Sheet 1 of 4	
Drilling Method	HSA/Continuous Core	Drill Bit Size/Type	HQ 3.8 inches (O.D.), #6		
Drill Rig Type	CME-75; Hammer 140-lbs/30-inch drop	Diameter of Borehole (in.)	8-inch in soils and 4-inch in bedrock		
Drilling Contractor	Tri-County	Core Type/ Diameter (in.)	HQ-3 Wireline		
Depth to Water and Date Measured	No groundwater encountered.	Size and Type of Casing	8-inch HSA in soils		
Type and Depths of Backfill	Cement-Bentonite Grout				
Comments	N4149491.8; E4227250.1			Job Number	29401785
				Total Depth Drilled (ft)	60.0
				Approximate Ground Surface Elevation (ft)	439.7

Elevation (ft)	Depth (ft)	ROCK CORE							MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, ft/hr)	FIELD NOTES AND LAB TESTS
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/ Number	Lithology				
0									ALLUVIUM: Sandy SILT (ML) yellowish-brown (10YR 5/4), moist, fine, with trace gravel		1028	LEL/O2/CO/H2S
1												B: Bedding J: Joint S: Shear Fr: Fracture
2												
3												
4												
435	5								Grades with increase in gravel and cobble			Drill Chatter
6												
7												
8												
9												
430	10											
11												
12												
13												

Report: DMG10; Project File: G:\NESA\PROJECTS\SEWER-STORM\AVENUE 45-ARROYO\ARROYO.GPJ; Data Template: DMLA.GDT Printed: 2/22/06

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LOG OF BORING
AVENUE 45 - ARROYO DRIVE RELIEF SEWER
LOS ANGELES, CALIFORNIA

FOR: LADPW/GED

FIGURE 10



Report: DMG10; Project File: GANESAPROJECTS\SEWER-STORM\AVENUE 45-ARROYO\ARROYO.GPJ; Data Template: DMLA_GDT Printed: 2/22/06

Elevation (ft)	Depth (ft)	ROCK CORE							MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, ft/hr)	FIELD NOTES AND LAB TESTS
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/Number	Lithology				
425	14											
	15											
	16											
	17											
	18											
	19											
420	20											
	21										Driller Indicates bedrock @21'	
	22											
	23											
	24	1	1	100		63					1248 Start coring @ 24'	
415	25				3							
	26				1						Residual Direct Shear	
	27				6							
	28				0							
	29	2		95		70	NR				1258 1302 0/20.8/0/0 PID = 1.3	

PUEENTE FORMATION:
Clayey fine SANDSTONE
grayish-olive (10Y 4/2), moderately to thickly bedded,
moderately weathered, weak to moderately strong,
moderately fractured

← Becomes interbedded clayey SANDSTONE (50%) and
CLAYSTONE (50%), numerous hairline fractures
from 27.6' to 28.2'

1. B: 55° from horizontal

← Becomes clayey fine SANDSTONE, very thickly bedded,
moderately weathered



FIGURE 10

Elevation (ft)	Depth (ft)	ROCK CORE						MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, ft/hr)	FIELD NOTES AND LAB TESTS
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/Number				
410	30				4						UC
	31				2			← Becomes dark yellowish-orange (10YR 6/6), fractures stained with iron oxide			
	32				1						
	33				1			← Becomes medium light gray (N6), strong to very strong, siliceous			UC
	34		2		1						UC
	35	3		95	46	NR		← Becomes greenish-gray (5GY 6/1) silty fine SANDSTONE, thickly bedded, moderately strong		1312 1325	Cerchar Test, Indirect Tensile Strength Test 0/20.6/0/0, Petrographic Analysis PID = 0
405	36				2						
	37				2			← Becomes olive-gray (5Y 3/2), with claystone rip-up clasts			
	38				1			← Becomes greenish-gray (5GY 6/1) silty fine SANDSTONE, weak to moderately strong 1. B: 15° from horizontal			
	39				1						
	40	4		100	35					1340 1410	0/20.7/0/0 PID = 0
	41				2			← Becomes olive-gray (5Y 3/2) SILTSTONE			UC
	42				5			← Pale yellowish-brown nodule, 1" diameter ← Becomes greenish-gray silty fine SANDSTONE			
	43		3		4			← Becomes olive-gray (5Y 3/2) silty CLAYSTONE			UC
	44				0						
	45	5		100	76			← Becomes CLAYSTONE with minor silty sandstone interbeds (5%), thinly to moderately bedded, parts along bedding planes			0/20.7/0/0, UC PID = 0
395	45				4						

Report: DMG10; Project File: G:\NES\PROJECTS\SEWER-STORM\VENUE 45-ARROYO\ARROYO.GPJ; Data Template: DMLA.GDT Printed: 2/22/06



FIGURE 10

Report: DMG10; Project File: G:\INESA\PROJECTS\SEWER-STORM\AVENUE 45-ARROYO\ARROYO.GPJ; Data Template: DMLA.GDT Printed: 2/22/06

Elevation (ft)	Depth (ft)	ROCK CORE						MATERIAL DESCRIPTION	Well Installation Log	Drill Time (Rate, f/hr)	FIELD NOTES AND LAB TESTS
		Run No.	Box No.	Recovery, %	Frac. Freq.	R Q D, %	Fracture Drawing/Number				
46							2				
47							0	← Discontinuous bedding			
48							1	← Silty sandstone lense			
49		6		100		76	3	1. B: 45° from horizontal 2. B: 45° from horizontal, disconformity 3. B: 45° from horizontal		1442	0/20.4/1/0 PID = 0
390	49						5	↙ Becomes interbedded silty fine SANDSTONE (50%) and CLAYSTONE (50%), moderately strong to strong, moderately to slightly fractured			
50							1				UC
51							0				
52			4				1				
53							2	↙ Increase in lithic fragments and rip-up clasts in sandstone bed from 52' to 53'			
54							0				UC
385	54	7		100		55	3	1. B: 45° from horizontal 2. B: 45° from horizontal 3. B: 45° from horizontal, slightly distorted		1506 1515	0/20.4/2/0 PID = 0
55							2	↙ Becomes interbedded fine to medium SANDSTONE (60%) and CLAYSTONE, moderately fractured			
56							1				
57							2				
58							3	← Wavy bedding, discordant bedding			
59							5	← Reverse graded fine to medium sandstone			
380	59	8		100			0				UC
60							5	1. B: 50° from horizontal 2. B: 55° from horizontal 3. B: 50° from horizontal		1540	
61							2			1545	
62							1	1. B: 55° from horizontal		1551	0/20.3/0/0 PID = 0



FIGURE 10



GEOLOGIC ASPECTS OF TUNNELING IN THE LOS ANGELES AREA*

By R. F. Yerkes, J. C. Tinsley, and K. M. Williams

INTRODUCTION

In July 1975 the U.S. Department of Transportation commissioned a study of geologic and hydrologic aspects of downtown Los Angeles and adjacent areas as they would affect tunneling for subways. The objective is to collect, evaluate, and integrate available information as an initial basis for more detailed feasibility, alignment, and design studies. Although a considerable volume of relevant surface and shallow subsurface data was obtained from public and private files, much of it originally was collected for other purposes, most is unpublished, and none has been integrated into a three-dimensional study for the purpose at hand. Thus, the report is not intended to be site-specific, as the required quantity and quality of data are not available. Instead, the report describes the general range, types, and distribution of tunneling conditions represented, and locates and describes the geologic-hydrologic factors that bear on route selection, more detailed geotechnical investigations, and excavation techniques.

The methods and limitations of the report are described and compared to a geologic investigation designed for the purpose of planning tunnels. The report then presents a brief summary of the geologic setting of the area, maps and sections that show surficial and shallow subsurface geology in units that characterize inferred tunneling conditions, the approximate position of the water table as of November 1974, the known or inferred distribution of faults and other potential hazards to tunneling, the location and content of wells and borings used as control points, and the location and magnitude of instrumentally recorded earthquakes through 1976. Finally, significant gaps in data are discussed.

A geologic investigation designed for planning tunnels would 1) assess the regional tectonic-geologic setting where relevant, such as in areas of seismic activity and active faults, review the general lithology and structure of the local area, and summarize case histories of existing tunnels; and 2) include field studies designed to assess alternative routes and plan for more detailed drill-hole investigations appropriate to the terrain, specific alignments, and ground-water conditions. The objective of such site-specific studies would be to determine 1) the engineering properties of the materials to be excavated--what methods of excavation would be most efficient and what difficulties or hazards should be anticipated, and 2) how the materials will behave after excavation.

METHODS AND LIMITATIONS

The present report is a compilation of data initially collected by others largely for other purposes. Surficial geology (sht. 1) was adapted chiefly from Lamar (1970, pl. 1), supplemented by the studies of Hoots (1931), Jennings and Strand (1969), Thomas, Landry, and Turney (1961), and Byer (1968). Each of these investigations was made for purposes other than mapping and describing geotechnical properties relevant to tunneling. Similarly, the wells and boreholes mapped, were, with the exception of the shallow borings along Freeways and the "Wiltshire Corridor" (section A-D, sht. 4), drilled for purposes other than obtaining geotechnical properties of materials at depth.

Such relevant detailed data as mineral type, grain-size range, distribution and relative density, percentage, type and size of rock fragments, permeability and porosity, type and degree of cementation, type, orientation, and distribution of joints, width and attitude of faults and type of material within the fault zone, details of weathering, details of rock structure, hardness, unusual water conditions,

and many others, commonly are not collected systematically during general-purpose geologic investigations of the sort upon which this report is based. Consequently, the inferred correlation between geologic aspects and tunneling conditions is based chiefly on generalized lithologic descriptions of the units where exposed to weathering, plus topical studies by Terzaghi (1950), Brandt, Stone, Smith, Willis, and Pastuhof (1970), Proctor (1971, 1973), Peck, Hendron, and Mohraz (1972), and Heuer (1974, 1977).

Precision

The topographic contours of the base maps generally are accurate to one-half contour interval; the contour interval is 20 ft for the Hollywood and Los Angeles quadrangles (the area south of lat 34°07'30") and 40 ft for the Burbank and Pasadena quadrangles (north of lat 34°07'30"). On these base maps the true relative horizontal location of features originally observed by others cannot be more precise than about 100 ft.

The water-table and bedrock contour maps were derived by interpolation between irregularly-spaced, locally sparse wells and borings. Because of errors in location of the wells, plus irreducible errors in vertical control, the true location in space of a point on a given contour cannot be more precise than about 150 ft horizontally and 25 ft vertically. The sections were derived by projection from the mapped data; therefore the precision of location of features on the sections is dependent on that of the maps, as well as on imprecise control for vertical projection.

GEOLOGIC-TECTONIC SETTING

The structural setting of the map area (fig. 1) includes parts of several structural blocks that make up the Los Angeles basin area and is traversed by elements (York Boulevard, Elysian Park, and Hollywood faults, sht. 1-A) of major zones of faults that in general form the south boundary of the western Transverse Ranges (for example, the south boundary of the Santa Monica and San Gabriel Mountains). (See Lamar, 1970, 1975; Yerkes and others, 1974, for additional details).

Unlike most of the structural features of coastal California, which trend northwest-southeast, those of the Transverse Ranges, such as the Santa Monica Mountains, all trend east-west. The continuing earthquakes, faulting and mountain-building activity in the western Transverse Ranges are believed to reflect the influence of relative motions along the San Andreas fault. Because of the configuration of the San Andreas in this part of California, the relative motion of the crustal blocks adjoining the fault results in strong north-south compressive stresses over a broad area of southern California, including the western Transverse Ranges. The compression is reflected in the Southern California uplift (Castle and others, 1976) and relieved in part by movement of the faults concentrated near the south boundary of the western Transverse Ranges. Some of these faults are seismically active (fig. 2). The 1971 San Fernando earthquake (magnitude 6.5) occurred on one element of the zone; the 1973 Point Mugu earthquake (M 6.0) occurred on a western continuation of the zone that includes the Hollywood fault; and elements of the boundary zone coincide with the south limit of the Southern California uplift. Geologic evidence at all scales indicates that faulting and related tectonic deformation have been continuing in this part of southern California for several million years; there is no reason to expect significant changes in the rate or mode of deformation.

The oldest bedrock units of the map area (sht. 1) consist of deeply-weathered, generally soft and crumbly

*Prepared in cooperation with the U.S. Department of Transportation

Map No.	Operator ^{1/}	Designation or Purpose	Elev. (feet)	Total Depth (feet)	Geology ^{2/} (depths in feet)	Bedrock Type	Remarks (depths in feet)
2721 B	LACFCD	storm drain	344±	18	0-18: bedrock	sandstone & siltstone	
2730 A	LACFCD	storm drain	395±	22	0-22: Qa1o		7: Water encountered, 4/23/68.
2730 B	LACFCD	storm drain	418±	7	0-7: bedrock	sandstone	Boring terminated due to hardness of sandstone.
2730 C	LACFCD	storm drain	456±	13	0-13: bedrock	sandstone	
2731 A	PC	foundation	570	101	0-6: Qa1o 6-101: bedrock	sandstone & shale	Sandstone and shale interbedded with an average dip and strike of 41°-S35°W.
2731 C	LACFCD	storm drain	458±	22	0-2: Qa1o 2-22: bedrock	sandstone & siltstone	Sandstone and siltstone weathered. 12: Water encountered, 4/23/68.
2731 G	LACFCD	storm drain	478±	26	0-26: Qa1o		9: Water encountered, 4/23/68.
2731 H	LACFCD	storm drain	370±	21	0-21: Qa1o		9: Water encountered, 4/23/68.
2740 A	LACFCD	storm drain	536	11	0-5: af 5-11: Qa1		
2741 A	PC	foundation	472	22	0-4: af 4-10: Qa1/Qa1o 10-22: bedrock	sandstone	Sandstone with shale lenses.
2741 B	LACFCD	storm drain	479	15	0-15: af		
2741 C	LACFCD	storm drain	455	17	0-6: af 6-17: Qa1		16: Water encountered, 4/4/72.
2741 F	LACFCD	storm drain	503	13	0-13: af		
2750 A	Caltrans	foundation	368	44	0-43: Qa1 43-44: bedrock	sandstone	Sandstone very dense.
2750 B	Caltrans	foundation	369	45	0-41: Qa1 41-45: bedrock	sandstone	37-41: Qa1 dense. 16: Ground water surface, 6/17/58.
2750 C	SBOC	Park 1	425	2300	0-600: no log 600-2300: bedrock		
2750 D	Caltrans	foundation	354	13	0-10: Qa1 10-13: bedrock	sandstone	Sandstone very dense.
2750 E	Caltrans	foundation	356	30	0-14: Qa1 14-30: bedrock	sandstone, siltstone & shale	0-4: Some cobbles. Interbedded sandstone, siltstone, and shale.
2750 F	Caltrans	foundation	354	50	0-27: Qa1 27-50: bedrock	sandstone, siltstone & shale	Interbedded sandstone, siltstone, and shale. Bedrock with odor of H ₂ S.
2750 G	Caltrans	foundation	346	36	0-33: Qa1 33-36: bedrock	sandstone	Sandstone very dense. 30: Caving.
2750 H	Caltrans	foundation	350	23	0-11: Qa1 11-23: bedrock	sandstone & shale	

Map No.	Operator ^{1/}	Designation or Purpose	Elev. (feet)	Total Depth (feet)	Geology ^{2/} (depths in feet)	Bedrock Type	Remarks (depths in feet)
2760 A	Pacific Fruit Express Co.	Foundation	330	121	0-106: Qa1 106-121: bedrock	sandstone & shale	Sandstone with shale at base.
2760 B	DMP	water	333 [±]	108	0-108: Qa1/Qa1o		80-108: Boulders.
2760 C	DMP	water	328	68	0-68: Qa1/Qa1o		20: Ground water, 1974.
2760 F	Ice plant	Foundation	328	121	0-105: Qa1/Qa1o 105-121: bedrock	shale	85-105: Some cobbles to 5 inches.
2760 G	DMP	water	335	164	0-130: Qa1/Qa1o 130-164: bedrock	sandstone & shale	10-40, 85-102, 120-130: Boulders. 10° dip in bedrock.
2761 A	Caltrans	foundation	337	60	0-60: Qa1/Qa1o		32: Ground water surface, 3/25/58.
2771 A	Caltrans	foundation	325	70	0-64: Qa1/Qa1o 64-70: bedrock	shale	Shale very dense. 43: Ground water encountered, 12/31/52
2771 C	DMP	water	325	112	0-103: Qa1/Qa1o 103-112: bedrock	shale	36-59: Boulders.
2771 G	DMP	water	300 [±]	85	0-82: Qa1/Qa1o 82-85: bedrock		
2771 H	DMP	water	345 [±]	66	0-66: Qa1/Qa1o	?	
2771 I	DMP	water	353 [±]	114	0-81: Qa1/Qa1o 81-114: bedrock	Sandstone & siltstone	12-16: Boulders.
2771 J	DMP	water	315 [±]	89	0-86: Qa1/Qa1o 86-89: bedrock	sandstone	40-52: Boulders.
2771 S	DMP	water	355 [±]	82	0-66: Qa1/Qa1o 66-82: bedrock	?	18-54: Boulders. "Soft shale sandstone."
2781 A	DMP	water	363 [±]	62	0-50: Qa1/Qa1o 50-62: bedrock	shale	4-40: Boulders.
2781 D	DMP	water	367	84	0-38: Qa1/Qa1o 38-84: bedrock	shale & sandstone	Shale and sandstone interbedded.
3903 M	DMP	water	470 [±]	606	0-606: Qa1/Qa1o		39-256: Boulders. 103: Water encountered, 7/1/53.
3903 N	DMP	water	486	619	0-619 Qa1/Qa1o		549-592: Sulfur.

Map No.	Operator ^{1/}	Designation or Purpose	Elev. (feet)	Total Depth (feet)	Geology ^{2/} (depths in feet)	Bedrock Type	Remarks (depths in feet)
3947 E	DMP	water	441 [±]	150	0-142: Qa1o 142-150: bedrock	granite	142-150: Granite decomposed.
3947 F	DMP	water	442 [±]	173	0-167: Qa1o 167-178: bedrock	granite	167-176: "Shale & rotten granite."
3947 H	DMP	water	430 [±]	241	0-228: Qa1o 228-241: bedrock	shale	228-241: Shale hard. 30-33, 194-202: Boulders.
3947 J	DMP	water	439 [±]	463	0-188: Qa1o 188-463: bedrock	shale	188-463: Shale very hard.
3948 A	DMP	water	406	260	0-225: Qa1o 225-260: bedrock	sandstone, siltstone, & shale	164-225: Some cobbles and boulders. 257: Interbedded sandstone, siltstone, shale, numerous faults, fractures, gouge.
3948 B	DMP	water	395 [±]	360	0-280: Qa1o 280-350: bedrock	sandstone, siltstone, and shale	338, 345: "Fault gouge, with bedrock fragments".
3948 C	DMP	water	361	256	0-238: Qa1/Qa1o 238-256: bedrock	shale	21-238: Boulders to 14 inches.
3948 D	DMP	water	416	217	0-170: Qa1o 170-217: bedrock	sandstone and shale	170-217: Abundant fractures and minor faults. 183: Bituminous remains. 153-170: Some cobbles. 75-105: Some boulders.
3948 H	DMP	water	373 [±]	128	0-128: Qa1/Qa1o	shale	
3949 A	DMP	water	343 [±]	190	0-186: Qa1/Qa1o 186-190: bedrock	shale	
3949 B	DMP	water	340 [±]	205	0-205: Qa1/Qa1o 205+: bedrock	shale	
3949 C	DMP	water	345 [±]	137	0-131: Qa1/Qa1o 131-137: bedrock	sandstone & shale	
3949 D	Caltrans	foundation	381	52	0-52: Qa1/Qa1o	sandstone	No water.
3949 E	Caltrans	foundation	367	50	0-45: Qa1/Qa1o 45-50: bedrock	sandstone	Sandstone very dense.
3949 F	PC	foundation	425 [±]	57	0-13: af 13-51: Qa1o 51-57: bedrock	sandstone	No caving. 12: Water seepage, 10/26/70.
3953 A	LACFCD	storm drain	715	13	0-13: Qa1o	granite	Granite decomposed.
3953 B	LACFCD	storm drain	759	13	0-3: Qa1o 3-13: bedrock	granite	
3954 A	DMP	water	602 [±]	534	0-534: Qa1o	granite	258-286: Some boulders.
3954 B	Caltrans	foundation	619	50	0-25: Qa1o 25-50: bedrock	granite	Granite decomposed. No water.

Map No.	Operator ^{1/}	Designation or Purpose	Elev. (feet)	Total Depth (feet)	Geology ^{2/} (depths in feet)	Bedrock Type	Remarks (depths in feet)
3954 D	Caltrans	foundation	640	25	0-25: Qa1o	granite	21-25: Boulders. No water. Granite decomposed. No water.
3954 E	Caltrans	foundation	638	23	0-21: Qa1o 21-23: bedrock		
3958 A	DMP	water	365 [±]	96	0-96: Qa1/Qa1o		
3958 C	DMP	water	394 [±]	202	0-202: Qa1o		
3958 G	DMP	water	378 [±]	155	0-136: Qa1/Qa1o 136-155: bedrock	shale	52: Water encountered, 4/18/55.
3958 H	DMP	water	378 [±]	268	0-257: Qa1o 257-268: bedrock	shale & sandstone	60-240: Some boulders. 60: Water encountered, 7/17/58.
3958 J	DMP	water	381 [±]	239	0-222: Qa1o 222-239: bedrock	shale	42-222: Boulders. 60: Water encountered, 5/13/58.
3958 K	DMP	water	510 [±]	567	0-170: Qa1o 170-567: bedrock	shale	Shale with sandstone and chert interbeds. 146-160: Cobbles to 8 inches.
3959 A	DMP	water	381 [±]	98	0-98: Qa1/Qa1o		
3959 B	Caltrans	foundation	366	51	0-51: Qa1/Qa1o		
3959 C	DMP	water	355 [±]	365	0-21: af 21-209?: Qa1/Qa1o 209?-365: bedrock	shale	21-209: Boulders. 209-330: "Clay or shale." 330-360: "Shale hard."
3959 D	DMP	water	350	213	0-132: Qa1/Qa1o 132-213: bedrock	shale & siltstone	Bedrock dips 16°-33°. 30: Water table, 7/18/57.
3959 E	DMP	water	362 [±]	245	0-3: af 3-236: Qa1/Qa1o 236-245: bedrock	shale	19-236: Boulders. 56: Water table, 10/10/57.
3959 F	Caltrans	foundation	363	65	0-65: Qa1/Qa1o	?	Bedrock: "consolidated sand and clay."
3959 G	Caltrans	foundation	361	51	0-48: Qa1/Qa1o 48-51: bedrock?		
3959 H	Caltrans	foundation	360	35	0-24: Qa1/Qa1o 24-35: bedrock	siltstone	24-35: Siltstone dense.
3959 J	Caltrans	foundation	369	23	0-19: Qa1/Qa1o 19-23: bedrock	sandstone	25: Ground water surface, 10/2/58.
3963 A	Caltrans	foundation	756	33	0-33: Qa1o		No water.
3964 A	Caltrans	foundation	628	57	0-57: Qa1o		No water.
3964 B	Caltrans	foundation	621	47	0-47: Qa1o		15-30: Cobbles and very dense. No water.
3964 C	Caltrans	foundation	638	30	0-20: Qa1o 20-30: bedrock	granite	Granite decomposed. No water.
3964 D	LACFCD	storm drain	650	36	0-5: af 5-36: bedrock	granite	Granite badly decomposed.

Map No.	Operator ^{1/}	Designation or Purpose	Elev. (feet)	Total Depth (feet)	Geology ^{2/} (depths in feet)	Bedrock Type	Remarks (depths in feet)
3964 E	LACFCD	storm drain	665	17	0-17: bedrock	granite	0-17: Granite badly decomposed. 15: Fracture zones serpentinized?
3964 F	LACFCD	storm drain	667	52	0-6: af 6-52: bedrock	granite	Granite badly decomposed.
3965 A	Caltrans	foundation	628	79	0-79: Qalo	No water.	
3965 B	DWP	water	593 ⁺	20	0-20: Qalo	0-5: Some cobbles to 4 inches.	
3968 A	Caltrans	foundation	424	40	0-40: Qalo	No water.	
3968 B	PC	foundation	402	35	0-2: af 2-35: Qalo	26: Water level, 3/14/66.	
3968 C	LACFCD	storm drain	430	22	0-22: Qalo		
3969 A	LACFCD	storm drain	429	26	0-4: af 4-26: Qalo		No caving. 6: Water encountered, 1/11/67.
3969 B	PC	foundation	406	25	0-2: af 2-22: Qalo 22-25: bedrock	sandstone	No caving. 4: Water encountered, 1/11/67.
3969 C	LACFCD	storm drain	406	25	0-2: af 2-22: Qalo 22-25: bedrock	sandstone	No caving. 4: Water encountered, 1/11/67. Same log filled for 3969 B & C.
3974 A	PC	foundation	700 ⁺	16	0-12: Qalo 12-16: bedrock	granite	12-16: Granite decomposed.
3974 B	PC	foundation	680 ⁺	38	0-10: Qalo 10-38: bedrock	granite	10-38: Granite decomposed. No caving.
3974 C	PC	foundation	682	35	0-33: Qalo 33-35: bedrock	granite	2: Water seepage, 11/18/68. 33-35: Granite decomposed.
3974 D	PC	foundation	678 ⁺	40	0-2: af 2-40: Qalo		39: Water level, 11/2/66.
3975 A	Caltrans	foundation	740	115	0-115: bedrock	granite	0-115: Granite decomposed. No water.
3975 B	Caltrans	foundation	705	81	0-5: Qalo 5-81: bedrock	granite	5-81: Granite moderately decomposed. No water.
3975 C	Caltrans	foundation	656	66	0-66: Qalo		No water.
3975 D	Caltrans	foundation	658	70	0-70: Qalo		No water
3975 E	Caltrans	foundation	681	51	0-51: Qalo		Dense at base of Qalo.
3975 F	Caltrans	foundation	641	62	0-62: Qalo		No water.
3975 G	Caltrans	foundation	643	52	0-52: Qalo		No water.
3975 H	PC	foundation	573	55	0-55: Qalo		Very dense at base of Qalo. No water.
3975 J	PC	foundation	582	51	0-37: Qalo 37-51: bedrock	granite	No caving. 34: Slight water seepage, 8/18/70. 37-51: Granite decomposed. 21: Water seepage, 8/19/70.

Map No.	Operator ^{1/}	Designation or purpose	Elev. (feet)	Total Depth (feet)	Geology ^{2/} (depths in feet)	Bedrock Type	Remarks (depths in feet)
3977 B	LACFCD	storm drain	481	26	0-26: Qalo		
3977 C	LACFCD	storm drain	474	27	0-27: Qalo		19: Water seepage, 11/2/72.
3977 D	LACFCD	storm drain	461	36	0-29: Qalo 29-36: bedrock	sandstone & siltstone	0-29: "Putrid" odor in top half. 29-36: Siltstone with inter-bedded sandstone.
3977 E	LACFCD	storm drain	465	20	0-9: af 9-20: Qalo		
3977 F	LACFCD	storm drain	452	29	0-15: Qalo 15-29: bedrock	shale & sandstone	Shale with sandstone interbeds. 8: Water encountered, 11/1/72.
3977 G	PC	foundation	460	26	0-7: Qalo 7-26: bedrock	shale	7-26: Shale fractured and with thin sandstone beds.
3977 H	PC	foundation	453	21	0-21: Qalo		Below 18: Caving. 18: Water seepage, 2/3/69.
3977 I	DMP	water	480 [±]	70	0-45: Qalo 45-70+: bedrock?	conglomerate & shale	45-70: "Conglomerate." 70-70+: Shale.
3977 J	Calwin Oil Co.	Well #1	480 [±]	6138	0-40: Qalo 40-6138: bedrock	shale, sandstone, & conglomerate	
3977 K	LACFCD	storm drain	440	19	0-2: af 2-5: Qalo 5-19: bedrock	shale & siltstone	5-7: Siliceous shale with 30° dip. 7-19: siltstone with minor siliceous shale.
3978 B	LACFCD	storm drain	579	17	0-2: af 2-17: bedrock	shale & sandstone	2-6: Shale with sandstone lenses.
3978 C	LACFCD	storm drain	560	20	0-7: af 7-16: Qalo 16-20: bedrock	shale & sandstone	16-20: Shale with sandstone interbeds. No caving.
3979 A	LACFCD	storm drain	534	20	0-17: Qalo 17-20: bedrock	sandstone	11: Water seepage, 1/14/67. 17-20: Sandstone with clay lenses.
3979 B	LACFCD	storm drain	510	22	0-22: Qalo		9: Water encountered, 1/12/67
3979 C	LACFCD	storm drain	589	8	0-8: bedrock	siltstone & shale	11: Water seepage, 1/14/67. Below 11: Sloughing. 0-8: Siltstone and shale laminated.
3979 D	LACFCD	storm drain	508	14	0-2: Qalo 2-14: bedrock	siltstone	2-14: Siltstone with minor sandstone lenses.
3979 E	LACFCD	storm drain	495	19	0-7: af 7-18: Qalo 18-19: bedrock	sandstone	
3979 F	LACFCD	storm drain	466	25	0-25: Qalo		16: Water seepage, 1/12/67.
3979 G	LACFCD	storm drain	448	25	0-25: Qalo		13: Water encountered, 1/12/67.

Map No.	Operator ^{1/}	Designation or Purpose	Elev. (feet)	Total Depth (feet)	Geology ^{2/} (depths in feet)	Bedrock Type	Remarks (depths in feet)
3986 A	DMP	water	528 [±]	91	0-85: Qalo 85-91: bedrock	granite	85-91: Granite "rotten."
3986 B	DMP	water	530 [±]	151	0-150: Qalo 150-151: bedrock	?	
3986 C	DMP	water	582 [±]	144	0-144: Qalo	granite	96-100: Granite decomposed.
3986 E	DMP	water	528 [±]	102	0-96: Qalo 96-102: bedrock		
3987 A	DMP	water	480 [±]	214	0-74: Qalo 74-214: bedrock?	shale	74-170: "Sand and shale." 170-214: Hard shale.
3987 B	DMP	water	480 [±]	214	0-74: Qalo 74-214: bedrock?	shale	74-170: "Sand and shale." 170-214: Hard shale. Same log filed for 3987 A & B.
3987 C	DMP	water	482 [±]	253	0-164: Qalo 164-205: bedrock?	granite	164-205: Granite decomposed. 205-253: "Cemented sand."
3987 D	LACFCD	storm drain	486	34	0-34: Qalo		12-18: H ₂ S odor 13: Water seepage, 11/3/72.
3987 F	DMP	water	483 [±]	278	0-278: Qalo		124-129: Boulders.

^{1/}

- ARCO: Atlantic Richfield Company
- BOGCO: Burmah Oil and Gas Company
- Caltrans: California Department of Transportation
- CE: U.S. Army Corps of Engineers
- DMP: Los Angeles City Department Water and Power
- DWR: California Department Water Resources
- Hosp: Hospital
- LACFCD: Los Angeles County Flood Control District
- LACIB: Los Angeles City public building
- LACOB: Los Angeles County public building
- MTA: Metropolitan Transit Authority (of 1962)
- NPC: Neaves Petroleum Company
- PC: Private consultant or contractor
- SB0C: Seaboard Oil Company
- SOCAL: Standard Oil Company of California
- TEXACO: Texaco, Incorporated
- VOCO: Ventura Oil Company
- WS: William Sullivan
- WSP 139: U.S. Geological Survey Water Supply Paper 139

^{2/}

- af: Artificial fill and colluvium
- Qal: Alluvium
- Qalo: Old alluvium
- Qsp: San Pedro Formation (Thomas and others, 1961)