APPENDIX A
GEOTECHNICAL INVESTIGATION

FIGURE A-1.0
UNIFIED SOIL CLASSIFICATION SYSTEM

KEY TO SYMBOLS AND DESCRIPTIONS FOR GEOTECHNICAL EXPLORATION LOGS

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 grave - sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amount of fines)	GM	Silty 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 of clayey fine sands or clayey silts and with slight plasticity.
			CL	Inorganic lays 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, fat clays
TAR IMPACTED SOILS				

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

SILT OR CLAY	SAND			GRAVEL		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		

No.200 No.40 No.10 No.4 3/4" 3" 12"

U.S. STANDARD SIEVE SIZE

Reference: The Unified Soil Classification System, Corps of Engineers, U.S. Army Technical Memorandum No. 3-357, Vol. 1, March, 1953 (Revised April, 1960)

Undisturbed Sample		Auger Cuttings	
Split Spoon Sample		Bulk Sample	
Rock Core		Crandall Sampler	
Dilatometer		PMT	Pressuremeter
NV	Noise/Vibration		No Recovery
Water Table at time of drilling		Water Table after drilling	

Correlation of Penetration Resistance with Relative Density and Consistency

SPT Sampler (140-lb hammer, 30-inch drop)

SAND & GRAVEL		SILT & CLAY	
No. of Blows	Relative Density	No. of Blows	Consistency
0 - 4	Very Loose	0 - 1	Very Soft
5 - 10	Loose	2 - 4	Soft
11 - 30	Medium Dense	5 - 8	Medium Stiff
31 - 50	Dense	9 - 15	Stiff
Over 50	Very Dense	16 - 30	Very Stiff
		Over 30	Hard

CRANDALL Sampler (140-lb hammer, 30-inch drop)[1]

SAND & GRAVEL		SILT & CLAY	
No. of Blows	Relative Density	No. of Blows	Consistency
0 - 7	Very Loose	0 - 2	Very Soft
8 - 16	Loose	3 - 7	Soft
17 - 47	Medium Dense	8 - 13	Medium Stiff
48 - 77	Dense	14 - 23	Stiff
Over 77	Very Dense	25 - 47	Very Stiff
		Over 47	Hard

Correlation of Penetration Resistance with Relative Density and Consistency (continued)

CRANDALL Sampler (300-lb hammer, 18-inch drop)[2]

SAND & GRAVEL		SILT & CLAY	
No. of Blows	Relative Density	No. of Blows	Consistency
0 - 5	Very Loose	0 - 2	Very Soft
6 - 12	Loose	3 - 5	Soft
13 - 36	Medium Dense	6 - 10	Medium Stiff
37 - 60	Dense	11 - 18	Stiff
Over 60	Very Dense	19 - 36	Very Stiff
		Over 36	Hard

CRANDALL Sampler (340-lb hammer, 18-inch drop)[3]

SAND & GRAVEL		SILT & CLAY	
No. of Blows	Relative Density	No. of Blows	Consistency
0 - 5	Very Loose	0 - 1	Very Soft
6 - 11	Loose	2 - 5	Soft
12 - 32	Medium Dense	6 - 9	Medium Stiff
33 - 53	Dense	10 - 16	Stiff
Over 53	Very Dense	17 - 32	Very Stiff
		Over 32	Hard

CRANDALL Sampler (380-lb hammer, 18-inch drop)[4]

SAND & GRAVEL		SILT & CLAY	
No. of Blows	Relative Density	No. of Blows	Consistency
0 - 4	Very Loose	0 - 1	Very Soft
5 - 10	Loose	2 - 4	Soft
11 - 29	Medium Dense	5 - 8	Medium Stiff
30- 47	Dense	9 - 14	Stiff
Over 47	Very Dense	15 - 29	Very Stiff
		Over 29	Hard

NOTES:

[1]For sampling performed by Tri-County and Fugro Rigs

[2]For sampling performed by C & L Rig #1

[3]For sampling performed by C & L Rig #2 prior to 3/8/2011

[4]For sampling performed by C & L Rig #2 after 3/8/2011

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Figure A-1.0

FIGURES A-1.1A THROUGH A-1.19C
LOGS OF ROTARY-WASH BORINGS (ACE PHASE)

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-1
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	399+12, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
7/30/2009	5 inches	214.5 feet

GROUND-WATER READINGS
Drilling mud bailed on 7/30/2009. Ground-water level measured at 32 feet below the ground surface 10 minutes after removal of drilling mud.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
210	5			14.7	111	27		⊠	
205	10	76		18.1	-			⊠	
200	15			22.6	101	18	90	⊠	
195	20	38		21.4	-		34	⊠	
190	25			20.2	97	17		⊠	
185	30	63		25.5	-			⊠	
180	35			28.2	95	28		⊠	
175	40								

4-inch thick Asphalt Concrete over 10-inch thick Concrete and Base Course

SM **FILL [Af]**
SILTY SAND - moist, yellowish brown, fine-grained, some clay pods

LAKEWOOD FORMATION [Qlw]

CL LEAN CLAY - very stiff to hard, moist, light brown, trace fine sand

(LL=39, PI=14)

Increased sand content

ML SANDY SILT - hard, moist, brownish gray, thin lenses of Silty Sand

SM SILTY SAND - medium dense to very dense, moist, light brown, fine to medium-grained

Alternating with thin layers of cleaner sand

▽ **SAN PEDRO FORMATION [Qsp]**

CL LEAN CLAY - very stiff to hard, wet, light brown

Bluish gray

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.1a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-1 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	399+12, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
7/30/2009	5 inches	214.5 feet

GROUND-WATER READINGS
Drilling mud bailed on 7/30/2009. Ground-water level measured at 32 feet below the ground surface 10 minutes after removal of drilling mud.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
		78		27.4	-			⊠			Trace fine to medium sand (LL=48, PI=24)
170	45			22.1	105	30		⊠		ML	SANDY SILT - hard, wet, greenish gray
165	50	81		26.6	-			⊠		SM	SILTY SAND - very dense, wet, greenish gray, fine-grained
160	55			-	-	15		○		CL	LEAN CLAY - very stiff, wet, greenish gray (Sample not recovered)
	60	80/11"		17.3	-			⊠		SM	SILTY SAND - very dense, wet, bluish gray, fine to coarse-grained, trace gravel
Tunnel	65					30		○		SP-SM	POORLY GRADED SAND with SILT - very dense, wet, bluish gray, fine to medium-grained, some gravel (Sample not recovered) Less gravel content
	70	50/6"		21.4	-		10	⊠			
135	75			19.3	108	68		⊠			Thin layer of coarse gravel
	80										

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(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-1.1b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-1 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	399+12, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
7/30/2009	5 inches	214.5 feet

GROUND-WATER READINGS
Drilling mud bailed on 7/30/2009. Ground-water level measured at 32 feet below the ground surface 10 minutes after removal of drilling mud.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
		50/3"		-	-			☒	
130	85								
125	90								
120	95								
115	100								
110	105								
105	110								
100	115								
95	120								

END OF BORING AT 81½ FEET

NOTES:

Hand augered upper 5 feet to avoid damage to utilities. Bailed drilling mud to 32 feet on 7/30/2009. Ground-water level measured at 32 feet below ground surface about 10 minutes after removal of drilling mud. Boring grouted with a cement-bentonite slurry from the bottom up and patched.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 340 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Elevation determined from topographic map provided by Parsons-Brinckerhoff, dated August 12, 2009.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.1c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-2
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	408+60, Rt 70 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
06/03/2009	5 inches	200 feet

GROUND-WATER READINGS
Drilling mud bailed on 6/3/2009. Ground-water level measured at 32 feet below the ground surface 15 minutes after removal of drilling mud

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
											7-inch thick Concrete, some concrete fragments
										CL-ML	**FILL [Af]** - SILTY CLAY - moist, light to dark brown, abundant rootlets
										ML	**QUATERNARY OLDER ALLUVIUM [Qalo]** SANDY SILT - very stiff, moist, light brown, slightly porous
195	5		0	17.0	108	14					
										CL	SANDY LEAN CLAY - stiff to hard, moist, brown
190	10		0	18.8	106	9					
185	15	36	0	-	-						
180	20		0	17.8	106	17	36			SC	CLAYEY SAND - medium dense, moist, light brown, fine-grained
											SAN PEDRO FORMATION [Qsp]
										CL	LEAN CLAY - very stiff to hard, moist, bluish gray
175	25	43	0	-	-						Thin layer of Clayey Sand
170	30		0	23.5	99	20					▽ Wet
165	35	60	0	-	-						
	40										

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
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Checked/Date: DLP

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.2a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-2 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	408+60, Rt 70 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
06/03/2009	5 inches	200 feet

GROUND-WATER READINGS
Drilling mud bailed on 6/3/2009. Ground-water level measured at 32 feet below the ground surface 15 minutes after removal of drilling mud

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
			0	32.2	88	24		⊠		SM	SILTY SAND - medium dense, wet, bluish gray, very fine-grained
										ML	SANDY SILT - very stiff, wet, bluish gray
155	45	28	0	-	-			⊠			Some dark brown Lean Clay
											Increased sand content
	50		0	-	-	23		○			(Sample not recovered)
										SP-SM	POORLY GRADED SAND with SILT - very dense, wet, bluish gray, fine to medium-grained
	55	73	0	-	-		10	⊠			
Tunnel	60		0	19.1	103	67		⊠			
	65	50/3"	0	-	-			⊠			Slightly darker gray, slight organic smell
	70		0	26.1	93	44		⊠			**FERNANDO FORMATION [Tf]**
125	75	61	0	-	-			⊠			SILTSTONE - weak, wet, greenish gray, massive
	80										

(CONTINUED ON FOLLOWING FIGURE)

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Checked/Date: DLP

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.2b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-2 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	408+60, Rt 70 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
06/03/2009	5 inches	200 feet

GROUND-WATER READINGS
Drilling mud bailed on 6/3/2009. Ground-water level measured at 32 feet below the ground surface 15 minutes after removal of drilling mud

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
			0	28.6	92	62		⊠	
115	85		0	32.5	87	45		⊠	
110	90		0	31.4	89	55		⊠	
105	95		0	34.5	86	56		⊠	
100	100		0	31.2	86	43		⊠	
95	105								
90	110								
85	115								
	120								

Clayey, unoxidized

Thinly bedded

6- to 8-inch thick cemented layer

18-inch thick cemented layer

END OF BORING AT 101 FEET

NOTES:

Hand augered upper 5 feet to avoid damage to utilities. Bailed drilling mud to 34.2 feet on 6/3/2009. Ground-water level measured at 32 feet below ground surface about 15 minutes after removal of drilling mud. Boring grouted with a cement-bentonite slurry from the bottom up and patched.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Elevation determined from topographic map provided by Parsons-Brinckerhoff, dated August 12, 2009.

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

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G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.3.1 GEOTECHNICAL DESIGN\3.2 ALL FIELD NOTES\GINT LOG\ACE PHASE BORINGS.GPJ 11/29/11

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.2c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-3
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	481+95, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
05/19/2009	5 inches	195.3 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/19/2009. Ground-water level measured at 16 feet below the ground surface 25 minutes after removal of drilling mud.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
Wilshire / La Brea Station	5		0	17.7	106	14		⊠	
	10	8	0	-	-			☒	
	15		0	16.8	109	17		⊠	
	20	11	0	-	-			☒	
	25		0	21.2	102	24		⊠	
	30	21	0	-	-		62	☒	
	35		0	21.7	103	36	52	⊠	
	40								

11-inch thick Asphalt Concrete over 3-inch thick Base Course and 3-inch thick Concrete

FILL [Af]

CH — FAT CLAY - moist, light gray to black, abundant rootlets, slight organic smell (LL=51, PI=34)

Less organic matter

LAKEWOOD FORMATION [Qlw]

CL — SANDY LEAN CLAY - medium stiff, moist, grayish green

SM — SILTY SAND - medium dense, moist, greenish gray, fine to medium-grained, some coarse

▽

SP-SM — POORLY GRADED SAND with SILT - wet, greenish gray, fine to medium-grained

ML — SANDY SILT - stiff to very stiff, wet, light gray and brown

Greenish gray

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.3a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-3 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	481+95, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
05/19/2009	5 inches	195.3 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/19/2009. Ground-water level measured at 16 feet below the ground surface 25 minutes after removal of drilling mud.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
Wilshire / La Brea Station	45	32	0	-	-			☒		CL	SANDY LEAN CLAY - hard, wet, grayish green (LL=43, PI=20) Alternating with siltier layers
			0	26.5	97	29		⊠		CH	FAT CLAY - very stiff, wet, grayish green (LL=53, PI=30)
	50	35	0	-	-			☒		SM	SILTY SAND - dense, wet, greenish gray, fine-grained
	55		0	23.0	99	72		⊠		SP	**SAN PEDRO FORMATION [Qsp]** POORLY GRADED SAND - very dense, wet, greenish gray, fine to medium-grained Slight hydrogen sulfide detected on monitor
	60	55	0	-	-			☒			
	65		0	21.7	99	94/9"		⊠			Lenses of fine sand, trace silt
	70	75	0	-	-			☒			
	75		0	20.1	106	75/5"		⊠			Lenses of fine sand, trace silt
	80										

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.3b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-3 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	481+95, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
05/19/2009	5 inches	195.3 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/19/2009. Ground-water level measured at 16 feet below the ground surface 25 minutes after removal of drilling mud.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
115		76	0	-	-			☒	
110	85		0	25.3	95	75/5"		⊠	
105	90	41	0	-	-			☒	
100	95		0	37.6	81	90/10"		⊠	
95	100		0	56.5	62	90/9"		⊠	
90	105								
85	110								
80	115								
	120								

SM — SILTY SAND - very dense, wet, light gray, fine to coarse-grained

GM — SILTY GRAVEL - up to 1/4-inch in size

SP — POORLY GRADED SAND - very dense, wet, gray, fine-grained, some shell fragments

FERNANDO FORMATION [Tf]

SILTSTONE - weak to very weak, wet, light greenish gray, unoxidized, highly weathered, some very fine sand and clay lenses

3- to 4-inch cemented layer
Thinly bedded

END OF BORING AT 101 FEET

NOTES:

Hand augered upper 5 feet to avoid damage to utilities. Bailed drilling mud to 26 feet on 5/19/2009. Ground-water level measured at 16 feet below ground surface about 25 minutes after removal of drilling mud. Boring grouted with a cement-bentonite slurry from the bottom up and patched.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Elevation determined from topographic map provided by Parsons-Brinckerhoff, dated August 12, 2009.

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

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G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.3.1 GEOTECHNICAL DESIGN\3.2 ALL FIELD NOTES\GINT LOG\ACE PHASE BORINGS.GPJ 11/29/11

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.3c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-4
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	486+78, Rt 12 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
07/16/2009 to 07/20/2009	5 inches	195 feet

GROUND-WATER READINGS
Ground-water level measured at 28 feet below the ground surface 2 days after completion of drilling.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
											5-inch thick Asphalt Concrete over 6-inch thick Concrete
											FILL [Af]
										CL-ML	SILTY CLAY - moist, dark gray
190	5			20.2	106	10					**LAKEWOOD FORMATION [Qlw]**
										SC	CLAYEY SAND - loose to medium dense, moist, light brownish gray
185	10	23		16.2	-						(LL=45, PI=24)
180	15			21.0	105	10	33				Olive Increased sand and gravel content
											SAN PEDRO FORMATION [Qsp]
175	20	34		30.8	-					CL	LEAN CLAY - very stiff to hard, moist, bluish gray
170	25			28.1	93	22					Slight hydrogren sulfide odor detected in sample
											▼ Wet
165	30	39		33.6	-						Slightly increased sand content, with small cemented silt pods (LL=49, PI=26)
160	35										No sample due to pressure meter test
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.4a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-4 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	486+78, Rt 12 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
07/16/2009 to 07/20/2009	5 inches	195 feet

GROUND-WATER READINGS
Ground-water level measured at 28 feet below the ground surface 2 days after completion of drilling.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
				25.7	99	10		⊠		SM	SILTY SAND - wet, bluish gray, fine-grained
150	45	67		25.4	-			⊠		ML	SANDY SILT - hard, wet, bluish gray
145	50			21.9	107	21	41	⊠		SM	SILTY SAND - dense, wet, gray, fine-grained
	55	50/5"		19.4	-			⊠			
	60			-	-	22		○			(Sample not recovered)
	65										Sample skipped to prepare for pressure meter test
	70			21.3	106	23	10	⊠		SP-SM	POORLY GRADED SAND with SILT - medium dense, wet, gray, fine to medium-grained
	75	50/6"		-	-			▯		SW	WELL GRADED SAND with GRAVEL - very dense, wet, brown, fine to coarse-grained
											(Sample not recovered)
	80										4-inch diameter cobble

Tunnel

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.4b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-4 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	486+78, Rt 12 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
07/16/2009 to 07/20/2009	5 inches	195 feet

GROUND-WATER READINGS
Ground-water level measured at 28 feet below the ground surface 2 days after completion of drilling.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
				29.2	90	26		⊠	
110	85	50/5"		-	-			○	
105	90								
100	95								
95	100								
90	105								
85	110								
80	115								
	120								

SP — POORLY GRADED SAND - medium dense to very dense, wet, gray, fine-grained

4- to 6-inch diameter cobble

(Sample not recovered)

FERNANDO FORMATION [Tf]
SILTSTONE

No sample due to pressure meter test

No sample due to pressure meter test

END OF BORING AT 95 FEET

NOTES:

Hand augered upper 5 feet to avoid damage to utilities. Pressure meter tests performed at 35, 50, 90, and 95 feet. Ground-water level measured at 28 feet below ground surface 2 days after completion of drilling. Two separate 1-inch diameter ground-water monitoring wells extending to 30 feet and 60 feet, respectively, installed in borehole upon completion of drilling (see well construction diagram for G-4).

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 340 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Elevation determined from topographic map provided by Parsons-Brinckerhoff, dated August 12, 2009.

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-1.4c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-5
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	527+12, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
05/22/2009	5 inches	167.9 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/22/2009. Ground-water level measured at 16 feet below the ground surface 15 minutes after removal of drilling mud.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
Wilshire/ Fairfax Station	5		0	22.0	100	13	62	⊠		SM	6-inch thick Asphalt Concrete over 6-inch thick Concrete **FILL [Af]** SILTY SAND - moist, reddish brown, fine to medium-grained, some gravel
										ML	**QUATERNARY OLDER ALLUVIUM [Qalo]** SILT - very stiff, moist, reddish brown, some clay
										SC	CLAYEY SAND with SILT - moist, brownish orange, fine to coarse-grained
										SM	SILTY SAND - moist, brownish orange, fine to medium-grained
	10	7	0	-	-			⊠		ML	Thin layer of gravel SILT - medium stiff to very stiff, moist, reddish brown, sandy lenses, some clay
	15		0	15.3	110	18		⊠			Light gray, fine sandy lenses ▽ Wet
	20	19	0	-	-			⊠		CL-ML	**LAKEWOOD FORMATION [Qlw]** ***TAR IMPACTED SOILS*** SILTY CLAY - very stiff, wet, brown and dark gray (LL=49, PI=28) Some tar deposits
	25		1.1	20.6	95	42		⊠		CL	SANDY LEAN CLAY - very stiff to hard, wet, bluish gray, some tar (LL=49, PI=26)
	30	16	1.2	-	-		68	⊠			
	35		4.3	16.6	89	67		⊠			Heavy tar
	40										

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.5a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-5 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	527+12, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
05/22/2009	5 inches	167.9 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/22/2009. Ground-water level measured at 16 feet below the ground surface 15 minutes after removal of drilling mud.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
Wilshire/ Fairfax Station	45	77	50.6	-	-					SP	**SAN PEDRO FORMATION [Qsp]** POORLY GRADED SAND - very dense, black, fine-grained, heavy tar
			55.0	6.3	108	85/11"					
	50	92	35.6	-	-						
	55			-	-	87/7"					(Sample not recovered)
	60	70	42.0	-	-						
	65		144.0	5.0	110	75/5"					Some silt lenses, grayish brown
	70	92/10"	74.3	-	-						Some fine gravels
	75			-	-	100/4"					(Sample not recovered)
	80										

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(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.5b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-5 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	527+12, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
05/22/2009	5 inches	167.9 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/22/2009. Ground-water level measured at 16 feet below the ground surface 15 minutes after removal of drilling mud.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
85	85	68	62.4	-	-			☒	
			64	8.9	113	125		⊠	
80	90	48	72.6	-	-			○	
75	95			15.2	104	105		⊠	
70	100		40.1	20.1	100	120		⊠	
65	105								
60	110								
55	115								
50	120								

FERNANDO FORMATION [Tf]
SILTSTONE - weak to very weak, very dark gray, heavy tar, weathered

(Sample not recovered)

Gray, contains less tar

END OF BORING AT 101 FEET

NOTES:

Hand augered upper 5 feet to avoid damage to utilities. Bailed drilling mud to 30 feet on 5/22/2009. Ground-water level measured at 16 feet below ground surface about 15 minutes after removal of drilling mud. Boring grouted with a cement-bentonite slurry from the bottom up and patched.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Elevation determined from topographic map provided by Parsons-Brinckerhoff, dated August 12, 2009.

Field Tech: DW
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-1.5c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-6
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	532+10, Lt 35 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
08/17/2009	5 inches	164.2 feet

GROUND-WATER READINGS
Ground-water not encountered at time of drilling.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
Wilshire/ Fairfax Station	5			25.9	96	12		⊠			7-inch thick Asphalt Concrete and 7-inch thick Concrete over 5-inch thick Base Course
										ML	**FILL [Af]**
											SILT - moist, brown, some clay
										CL-ML	SILTY CLAY - moist, brown
										ML	**QUATERNARY OLDER ALLUVIUM [Qalo]**
											SANDY SILT - stiff to hard, moist, light brown, some clay
	10						71				
		44		-	-			⊠			Some sandier lenses
	15			17.2	107	10		⊠			Thin layer of Silty Sand with some tar pods
	20										Alternating thin layers of brownish gray Sandy Silt and Silty Sand, more tar pods
		46		-	-		60	⊠			***TAR IMPACTED SOILS***
										ML	SILT - very stiff to hard, moist, greenish gray, some tar pods, some clay
	25			23.3	95	22		⊠			
	30	46		-	-			⊠			Thin sandier lens
	35			14.0	110	39		⊠			**SAN PEDRO FORMATION [Qsp]**
										ML	SILT - very stiff, moist, greenish gray, some clay
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.6a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-6 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	532+10, Lt 35 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
08/17/2009	5 inches	164.2 feet

GROUND-WATER READINGS
Ground-water not encountered at time of drilling.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Wilshire/ Fairfax Station

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
		43		-	-						
	45			10.7	106	30				SM	SILTY SAND - medium dense, moist, gray and black, fine-grained, heavy tar
										SP	POORLY GRADED SAND - very dense, moist, black, fine to medium-grained, heavy tar
	50	50/5"		-	-						
	55			4.4	110	87					
	60	50/5"		-	-						Some fine gravel
	65			3.7	111	78					
95	70	87		-	-					ML	SILT - hard, moist, greenish gray, some fine sand, some clay (LL=44, PI=16)
										SP	POORLY GRADED SAND - very dense, moist, black, fine to medium-grained, heavy tar
90	75			6.2	115	91					
85	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.6b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-6 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	532+10, Lt 35 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
08/17/2009	5 inches	164.2 feet

GROUND-WATER READINGS
Ground-water not encountered at time of drilling.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
80	85	50/5"		-	-			☒	
75	90								
70	95								
65	100								
60	105								
55	110								
50	115								
45	120								

END OF BORING AT 81½ FEET

NOTES:

Hand augered upper 5 feet to avoid damage to utilities. Ground-water not encountered at time of drilling. Two separate 1-inch diameter ground-water monitoring wells extending to 17.5 feet and 45.5 feet, respectively, installed in borehole upon completion of drilling (see well construction diagram for G-6).

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 340 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Elevation determined from topographic map provided by Parsons-Brinckerhoff, dated August 12, 2009.

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-7
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	535+47, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
05/27/2009	5 inches	159.5 feet

GROUND-WATER READINGS
Ground-water not encountered at time of drilling.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
											6-inch thick Asphalt Concrete over 1-1/2-inch thick Base Course and 5-inch thick Concrete
										SC	**FILL [Af]** CLAYEY SAND - slightly moist, light olive brown to light reddish brown
155	5		1.1	16.8	112	28				CL	**LAKEWOOD FORMATION [Qlw]** SANDY LEAN CLAY - hard, slightly moist, olive brown
150	10	16	1.3	-	-		51			ML	SANDY SILT - very stiff, slightly moist, olive brown with rust coloring, faint laminations
145	15		2.2	32.7	87	10				CH	FAT CLAY - stiff to very stiff, moist, olive (LL=59, PI=32)
140	20	20	2.6	-	-						
135	25		4.1	25.8	94	22	59			ML	SANDY SILT - stiff, moist, olive Greenish blue, some gravel
130	30	27	10.6	-	-					MH	**SAN PEDRO FORMATION [Qsp]** SANDY ELASTIC SILT - very stiff, moist, dark gray, slight gaseous odor (LL=55, PI=23)
125	35			-	-	19					(Sample not recovered)
120	40										

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(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: NH
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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.7a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-7 (Continued)**
DRILLING METHOD Rotary Wash	**BOREHOLE LOCATION** 535+47, Lt 25 feet	
DATES DRILLED 05/27/2009	**HOLE DIAMETER** 5 inches	**GROUND EL.** 159.5 feet

GROUND-WATER READINGS
Ground-water not encountered at time of drilling.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
Tunnel	45	25	11.6	-	-			⊠			
			11.9	38.8	81	13		⊠			Bluish green
	50	80		-	-			⊠			***TAR IMPACTED SOILS***
										SP	POORLY GRADED SAND - dense to very dense, black, fine-grained, heavy tar
	55			-	-	22		○			(Sample not recovered)
	60	86/11"	13.3	-	-			⊠			Trace medium sand
95	65		42.2	5.8	117	38		⊠			
90	70	88/9"	48.8	-	-			⊠			Trace subrounded pebbles
85	75		49.3	40.5	79	21		⊠		CH	FAT CLAY - very stiff, moist, bluish gray
										SP	POORLY GRADED SAND - very dense, black, fine-grained, heavy tar
80	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: NH
Checked/Date: DLP

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.7b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-7 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	535+47, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
05/27/2009	5 inches	159.5 feet

GROUND-WATER READINGS
Ground-water not encountered at time of drilling.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS	
		80/9"	68	-	-			☒		Trace subrounded gravel
75	85			-	-	50/3"		○		(Sample not recovered)
70	90	50/3"	63.3	-	-			☒		
65	95			-	-	50/5"		○		(Sample not recovered)
60	100	50/4"	17.7	-	-			⊠		Subrounded gravel up to 1/4 inch in size, faint laminations
55	105									END OF BORING AT 101 FEET
50	110									
45	115									
40	120									

NOTES:

Hand augered upper 5 feet to avoid damage to utilities. Ground-water not encountered at time of drilling. Boring grouted with a cement-bentonite slurry from the bottom up and patched.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Elevation determined from topographic map provided by Parsons-Brinckerhoff, dated August 12, 2009.

Field Tech: DW
Prepared/Date: NH
Checked/Date: DLP

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

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MTA Westside Subway Extension
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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.7c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-7A (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	535+70, Lt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
8/16/2010 - 8/17/2010	5 inches	160 feet

GROUND-WATER READINGS
Ground-water not encountered at time of drilling.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
75	85								
70	90								
65	95								
60	100								
55	105					36		⊠	
50	110					38		⊠	
45	115					24		⊠	
						53		⊠	
						90/9"		⊠	
	120					71		⊠	

Please refer to boring log G-7 for soil data from 0 to 100 feet (located approximately 10 feet east of G-7A)

Note: Contact between base of Older Alluvium and top of San Pedro Formation estimated at 50 feet bgs based on adjacent boring G-7.

SAN PEDRO FORMATION (Qsp)

ML — SANDY SILT - very stiff to hard, moist, olive gray, Pocket Pen: +4.5 tsf

Some tar deposits

Increasing in sand content

Alternating with thin layers of fine Sand

Slightly increased tar content

SP — POORLY GRADED SAND - very dense, moist, black, fine, some tar, strong hydrocarbon odor

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: LM
Checked/Date: DLP

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-1.8a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-7A (Continued)
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	535+70, Lt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
8/16/2010 - 8/17/2010	5 inches	160 feet

GROUND-WATER READINGS
Ground-water not encountered at time of drilling.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
35	125					150/2"				SP	POORLY GRADED SAND - very dense, moist, fine to medium grained, strong hydrocarbon odor Sample not recovered from 121.5 to 122.5 feet Some coarse gravel
						74					
						85					Grades to very fine to fine Sand
30	130					33				ML	**FERNANDO FORMATION (Tf)** SILT- hard, moist, olive, fine, strong hydrocarbon odor, Pocket Pen: 4.25 tsf
						34					Moist, olive gray, fine
25	135					51					
20	140					49					Core sample not recovered, Silt washed out of sampler
15	145					24					Occasional shell fragments
						67					Interbedded with thin layers of fine Sand, strong hydrocarbon odor
10	150					58					
5	155					53					
						59					
	160										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: LM
Checked/Date: DLP

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DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-7A (Continued)
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	535+70, Lt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
8/16/2010 - 8/17/2010	5 inches	160 feet

GROUND-WATER READINGS
Ground-water not encountered at time of drilling.

ELEVATION (ft)	DEPTH (ft)	BLOW COUNT* (blows/ft)	SAMPLE LOC.
		33	
		41	
-5	165		
		50	
		52	
-10	170		
		29	
-15	175		
		46	
		33	
-20	180		
-25	185		
-30	190		
-35	195		
	200		

SILT - olive green, slightly weathered, trace clay content

CLAYEY SILT - medium dark gray, poorly cemented, strong hydro-carbon odor, Pocket Pen: +4.5 tsf

Some tar seepage at bottom

Some small shell fragments

Sample not recovered from 165.5 to 166.5 feet

Less weathered, increased induration, same lithology as above

Medium dark gray, poorly cemented, strong hydrocarbon odor, Pocket Pen: +4.5 tsf

Sample not recovered from 168.4 to 170 feet

Sample not recovered from 169.5 to 170 feet

CLAYEY SILT - small broken shell fragments 1/16"-1/8", medium dark gray, poorly cemented, strong hydrocarbon odor, Pocket Pen: +4.5 tsf

Medium dark gray, poorly cemented, strong hydrocarbon odor, Pocket Pen: +4.5 tsf

Medium dark gray, poorly cemented, strong hydrocarbon odor, Pocket Pen: +4.5 tsf

Slightly increased tar content

END OF BORING AT 180 FEET

NOTES:
Water level not measured at time of drilling. After completion of initial drilling, borehole reamed to a diameter of 6 inches to a depth of 150 feet below ground surface. Three seperate 1-inch diameter monitoring wells extending to 87½ feet, 117½ feet, and 140 feet, respectively, installed in borehole upon completion of reaming (see well construction diagram for G-7A).

*Number of blows required to drive the Crandall sampler 12 inches using a 300 pound automatic downhole hammer falling 18 inches.

Shelby Tubes were driven from:
161.0 to 162.5 feet
167.3 to 169.0 feet
170.0 to 172.0 feet
173.0 to 174.8 feet
175.0 to 176.0 feet

Each Shelby Tube represents the distance in inches in drive penetration

Field Tech: AR
Prepared/Date: LM
Checked/Date: DLP

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-1.8c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-8
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	580+25, Lt 62 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
07/12/2009	5 inches	140 feet

GROUND-WATER READINGS
Drilling mud bailed on 7/12/2009. Ground-water level measured at 24 feet below the ground surface 15 minutes after removal of drilling mud.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
135	5			25.2	96	15		⊠	
130	10	47		21.0	-			☒	
125	15			21.5	101	14		⊠	
120	20	15		26.3	-			☒	
115	25			27.4	91	9		⊠	
110	30	22		31.9	-		73	☒	
105	35			37.4	81	24		⊠	
	40								

4-inch thick Asphalt Concrete over 6-inch thick Concrete

CL — **FILL [Af]**
LEAN CLAY - moist, brown and gray

CL — **QUATERNARY YOUNGER ALLUVIUM [Qal]**
LEAN CLAY - stiff to hard, moist, brown

QUATERNARY OLDER ALLUVIUM [Qalo]
LEAN CLAY - stiff to hard, moist, light olive gray, siltier, (postulated contact)

▽

ML — SANDY SILT - stiff, wet, brown

CL — LEAN CLAY - wet, brown and gray

(LL=48, PI=24)

SAN PEDRO FORMATION [Qsp]

CH — FAT CLAY with SAND - very stiff to hard, wet, gray

(LL=65, PI=36)

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(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.9a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-8 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	580+25, Lt 62 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
07/12/2009	5 inches	140 feet

GROUND-WATER READINGS
Drilling mud bailed on 7/12/2009. Ground-water level measured at 24 feet below the ground surface 15 minutes after removal of drilling mud.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
		24		34.5	-			☒			
95	45			28.7	94	34		⊠			
90	50	65		28.1	-			☒		CL	LEAN CLAY - very stiff to hard, wet, green and gray (LL=40, PI=18)
	55			17.4	113	25		⊠			Increased gravel, less clay content
	60	50/6"		15.0	-			☒		ML	SANDY SILT - hard, wet, greenish gray, some clay
Tunnel	65			16.6	111	56		⊠			
	70	45		34.7	-			☒			
	75			30.0	89	25		⊠			
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.9b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-8 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	580+25, Lt 62 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
07/12/2009	5 inches	140 feet

GROUND-WATER READINGS
Drilling mud bailed on 7/12/2009. Ground-water level measured at 24 feet below the ground surface 15 minutes after removal of drilling mud.

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ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
		38		37.6	-			☒	
55	85								
50	90								
45	95								
40	100								
35	105								
30	110								
25	115								
	120								

END OF BORING AT 81½ FEET

NOTES:

Hand augered upper 5 feet to avoid utilities. Drilling mud bailed on 7/12/2009. Ground-water level measured at 24 feet below ground surface about 15 minutes after removal of drilling mud. Boring grouted with a cement-bentonite slurry from the bottom up and patched.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 340 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Elevation determined from topographic map provided by Parsons-Brinckerhoff, dated August 12, 2009.

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.9c

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DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-9
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	586+37, Lt 40 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
06/28/2009	5 inches	144.7 feet

GROUND-WATER READINGS
Drilling mud bailed on 6/28/2009. Ground-water level measured at 21 feet below the ground surface 15 minutes after removal of drilling mud.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
											4-inch thick Asphalt Concrete over 8-inch thick Concrete and Base Course
										CH	**QUATERNARY YOUNGER ALLUVIUM [Qal]** FAT CLAY - stiff, moist, dark gray, slightly porous (LL=75, PI=45)
140	5			27.4	93	9		⊠			
											Light brownish gray
135	10	26		-	-		32	⊠		SM	SILTY SAND - medium dense, moist, light brown, fine to coarse-grained, some clay, some gravel
130	15			23.1	103	6		⊠		CL	SANDY LEAN CLAY - medium stiff, moist, light brown with red mottling
											Bluish gray (LL=40, PI=21)
125	20	37		-	-		60	⊠		▽	**QUATERNARY OLDER ALLUVIUM [Qalo]**
										SM	SILTY SAND - dense, wet, bluish gray, some gravel
										CL	LEAN CLAY - stiff, wet, bluish gray, alternating with sandier seams
120	25			22.2	105	10		⊠			
											Light brown
115	30	16		-	-			⊠			(LL=38, PI=18)
										ML	SANDY SILT - stiff to hard, wet, brown
110	35			25.1	101	11		⊠			
											Increased clay content
105	40										

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(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.10a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-9 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	586+37, Lt 40 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
06/28/2009	5 inches	144.7 feet

GROUND-WATER READINGS
Drilling mud bailed on 6/28/2009. Ground-water level measured at 21 feet below the ground surface 15 minutes after removal of drilling mud.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
		30		-	-		71	☒			
100	45			21.9	100	10		⊠			
95	50	42		-	-			☒			**SAN PEDRO FORMATION [Qsp]**
										ML	SILT - very stiff, wet, greenish gray, some clay
90	55			32.5	89	15		⊠			
85	60	43		-	-			☒		CL	LEAN CLAY - stiff, wet, greenish gray (LL=39, PI=18)
80	65			-	-	12		⊠			
75	70	50/5"		-	-			☒		SC	CLAYEY SAND - very dense, wet, greenish gray, fine to coarse-grained, some small gravel
										CL	SANDY LEAN CLAY - hard, wet, brownish gray, some slate gravel
70	75			-	-	32		○			(Sample not recovered)
	80										Alternating with sandier lenses

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-1.10b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-9 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	586+37, Lt 40 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
06/28/2009	5 inches	144.7 feet

GROUND-WATER READINGS
Drilling mud bailed on 6/28/2009. Ground-water level measured at 21 feet below the ground surface 15 minutes after removal of drilling mud.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
Tunnel	85	29		-	-		39	☒	
	90			24.3	93	34		⊠	
	95	22		-	-			☒	
45	100								
40	105								
35	110								
30	115								
25	120								

Thin layer of Silty Sand

CL-ML SILTY CLAY - very stiff, wet, brown and gray

END OF BORING AT 91½ FEET

NOTES:

Bailed drilling mud to 27 feet on 6/28/2009. Ground-water level measured at 21 feet below ground surface about 15 minutes after removal of drilling mud. Seepage observed at 15 feet. Boring grouted with a cement-bentonite slurry from the bottom up and patched.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 340 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Elevation determined from topographic map provided by Parsons-Brinckerhoff, dated August 12, 2009.

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.10c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-10
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	608+80, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
06/18/2009	5 inches	173.5 feet

GROUND-WATER READINGS
Drilling mud bailed on 6/18/2009. Ground-water level measured at 41 feet below the ground surface 10 minutes after removal of drilling mud.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
170	0										6-inch thick Asphalt Concrete over 7-inch thick Concrete
										SM	**FILL [Af]** SILTY SAND with GRAVEL - moist, brown, fine to coarse-grained
165	5			13.6	97	5		⊠		CL	**QUATERNARY YOUNGER ALLUVIUM [Qal]** SANDY LEAN CLAY - medium stiff to hard, moist, brown, trace slate gravel (LL=30, PI=13)
160	10			16.9	105	7		⊠			
155	15	39		-	-			⊠		CL	**QUATERNARY OLDER ALLUVIUM [Qalo]** SANDY LEAN CLAY - moist, brown, (postulated contact) (LL=38, PI=19)
150	20			19.1	108	14		⊠			
145	25	35		-	-			○		SC	(Sample not recovered) CLAYEY SAND with GRAVEL - medium dense to very dense, moist, brown, fine to coarse-grained
140	30			9.5	122	25		⊠			
135	35	76		-	-		19	⊠			
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.11a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-10 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	608+80, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
06/18/2009	5 inches	173.5 feet

GROUND-WATER READINGS
Drilling mud bailed on 6/18/2009. Ground-water level measured at 41 feet below the ground surface 10 minutes after removal of drilling mud.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS	
				10.6	112	38		⊠		▽ Wet
130	45	50/4"		-	-			○		Sample not recovered 6-inch diameter cobble
125	50			18.0	108	19	42	⊠		Less gravel (LL=28, PI=9)
120	55	27		-	-		50	⊠		SM SILTY SAND - medium dense, wet, brown, fine to coarse-grained Thin layer of Lean Clay
115	60			24.3	101	22		⊠		CL LEAN CLAY - very stiff to hard, wet, gray
110	65	35		-	-		86	⊠		
Tunnel	70			16.1	110	41		⊠		Some slate gravel (LL=40, PI=21)
	75	44		-	-			⊠		
	80									

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.11b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-10 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	608+80, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
06/18/2009	5 inches	173.5 feet

GROUND-WATER READINGS
Drilling mud bailed on 6/18/2009. Ground-water level measured at 41 feet below the ground surface 10 minutes after removal of drilling mud.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
Tunnel				16.2	113	25		⊠	
85	85								
80	90								
75	95								
70	100								
65	105								
60	110								
55	115								
	120								

END OF BORING AT 81 FEET

NOTES:

Hand augered upper 6 feet to avoid damage to utilities. Bailed drilling mud to 42 feet on 6/18/2009. Ground-water level measured at 41 feet below ground surface about 10 minutes after removal of drilling mud. Boring grouted with a cement-bentonite slurry from the bottom up and patched.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 340 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Elevation determined from topographic map provided by Parsons-Brinckerhoff, dated August 12, 2009.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-1.11c

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G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.3.1 GEOTECHNICAL DESIGN\3.2 ALL FIELD NOTES\GINT LOG\ACE PHASE BORINGS.GPJ 11/29/11

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-11
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	640+20, Lt 31 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
06/15/2009	5 inches	220.5 feet

GROUND-WATER READINGS
Seepage observed at 30 feet on 6/15/2009.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Wilshire / Rodeo Station

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
	5			19.8	100	6	65	⊠			12-inch thick Asphalt Concrete
										SM	**FILL [Af]** SILTY SAND - moist, brown and gray, fine to medium-grained Thin layer of Gravelly Sand, possibly side of utility trench
										ML	**QUATERNARY YOUNGER ALLUVIUM [Qal]** SILT with SAND - medium stiff to stiff, moist, light brown, some clay
	10	14		-	-			⊠			
										CL	**QUATERNARY OLDER ALLUVIUM [Qalo]** SANDY LEAN CLAY - stiff to hard, moist, light brown, some slate gravel
	15			20.5	105	14		⊠			
	20	44		-	-			⊠			(LL=40, PI=21)
										SM	SILTY SAND with GRAVEL - dense, moist, brown, fine to coarse-grained
	25			8.6	125	42		⊠			Trace gravel
	30	11		-	-		77	⊠		ML	SILT with SAND - stiff, moist, brown, some clay
										SM	SILTY SAND with GRAVEL - medium dense to very dense, moist, brown, fine to coarse-grained
	35			7.6	128	26		⊠			
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

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Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.12a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-11 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	640+20, Lt 31 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
06/15/2009	5 inches	220.5 feet

GROUND-WATER READINGS
Seepage observed at 30 feet on 6/15/2009.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
		64		-	-		24	☒			Less gravel content
	45			17.4	101	15		⊠			Fine
	50	51		-	-			☒			
	55			26.9	99	16		⊠			Some siltier lenses
	60	61		-	-			☒			6-inch diameter cobble Alternating with lenses of Poorly Graded Sand, fine to medium-grained
	65			26.7	97	14		⊠		CL-ML	SILTY CLAY - stiff to hard, moist, brown
150	70	36		-	-			☒			
145	75			19.5	109	25		⊠			
	80										

Wilshire / Rodeo Station

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.12b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-11 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	640+20, Lt 31 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
06/15/2009	5 inches	220.5 feet

GROUND-WATER READINGS
Seepage observed at 30 feet on 6/15/2009.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
140		74		-	-			☒	
	85								
135				14.4	117	32		⊠	
	90								
130		55		-	-			☒	
	95								
125									
	100								
120									
	105								
115									
	110								
110									
	115								
105									
	120								

CL — SANDY LEAN CLAY - hard, moist, brown and gray, some small gravel

END OF BORING AT 91½ FEET

NOTES:

Hand augered upper 5 feet to avoid damage to utilities.
Seepage observed at 30 feet on 6/15/2009. Drill mud level dropped overnight to 29 feet.
Two separate 1-inch diameter ground-water monitoring wells extending to 32.5 feet and 60 feet, respectively, installed in borehole upon completion of drilling (see well construction diagram for G-11).

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 340 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Elevation determined from topographic map provided by Parsons-Brinckerhoff, dated August 12, 2009.

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

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G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.3.1 GEOTECHNICAL DESIGN\3.2 ALL FIELD NOTES\GINT LOG\ACE PHASE BORINGS.GPJ 11/29/11

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.12c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-12
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	645+13, Lt 35 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
06/17/2009	5 inches	227 feet

GROUND-WATER READINGS
Drilling mud bailed on 6/17/2009. Ground-water level measured at 28 feet below the ground surface 10 minutes after removal of drilling mud.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
Wilshire / Rodeo Station	5			10.2	104	5		⊠			9-inch thick Asphalt Concrete over 8-inch thick Concrete
										SM	**FILL [Af]** - SILTY SAND - moist, brown and gray, fine to medium-grained, some clay, some 2-inch long shell fragments
										ML	**QUATERNARY YOUNGER ALLUVIUM [Qal]** SILT - medium stiff, moist, light brown, occasional slate gravel, some clay
	10	15		-	-			⊠		CL	SANDY LEAN CLAY - stiff to hard, moist, light brown
											(LL=47, PI=23)
	15			16.9	109	4		⊠			Slightly increased sand content, medium stiff
	20	42		-	-		68	⊠		CL	**QUATERNARY OLDER ALLUVIUM [Qalo]** SANDY LEAN CLAY - moist, light brown, (postulated contact)
											Slightly increased sand content
	25			15.8	113	14		⊠		SC	CLAYEY SAND - medium dense, moist, reddish brown, fine to coarse-grained
											▽ Wet
	30	26		-	-		46	⊠			Thin layer of Sandy Lean Clay
	35			15.0	114	10		⊠			
	40									SM	SILTY SAND with GRAVEL - very dense, wet, brown, fine to coarse-grained

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

(CONTINUED ON FOLLOWING FIGURE)

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.13a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-12 (Continued)
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	645+13, Lt 35 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
06/17/2009	5 inches	227 feet

GROUND-WATER READINGS
Drilling mud bailed on 6/17/2009. Ground-water level measured at 28 feet below the ground surface 10 minutes after removal of drilling mud.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
Wilshire / Rodeo Station	45	50/5"		-	-		16	⊠			
				7.6	114	38		⊠			
	50	30		-	-			⊠		CL	LEAN CLAY - very stiff to hard, wet, brown, some slate gravel
	55			14.9	114	25		⊠			
	60	33		-	-			⊠			(LL=35, PI=17)
	65			25.1	96	18		⊠			Siltier
	70	36		-	-			⊠			
	75			17.0	112	30		⊠			
150	80										

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.13b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-12 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	645+13, Lt 35 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
06/17/2009	5 inches	227 feet

GROUND-WATER READINGS
Drilling mud bailed on 6/17/2009. Ground-water level measured at 28 feet below the ground surface 10 minutes after removal of drilling mud.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
145	85	50/5"		-	-			☒	
140	90								
135	95								
130	100								
125	105								
120	110								
115	115								
110	120								

Thin layer of Clayey Sand, fine to coarse-grained

END OF BORING AT 81½ FEET

NOTES:

Hand augered upper 6 feet to avoid damage to utilities. Bailed drilling mud to 29 feet on 6/17/2009. Ground-water level measured at 28 feet below ground surface about 10 minutes after removal of drilling mud. Boring grouted with a cement-bentonite slurry from the bottom up and patched.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Elevation determined from topographic map provided by Parsons-Brinckerhoff, dated August 12, 2009.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: AR
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-1.13c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-13
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	710+88, feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
05/28/2009	5 inches	281.3 feet

GROUND-WATER READINGS
Ground-water level measured at 27 feet below the ground surface on 6/1/2009 after 4 day hiatus in drilling.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
280	0									SM	**FILL [Af]** SILTY SAND - moist, brown
											QUATERNARY YOUNGER ALLUVIUM [Qal]
	5									ML	SANDY SILT - stiff, moist, very dark brown, shale fragments
275			0.3	-	-	9	51				
	10	13	0.2	-	-					CL	SANDY LEAN CLAY - stiff, moist, brown, shale fragments up to 3/4-inch in size
270											
	15										**QUATERNARY OLDER ALLUVIUM [Qalo]**
			0.5	13.7	114	5	47			SC	CLAYEY SAND with GRAVEL - loose to dense, moist, reddish brown, fine-grained, trace shale fragments
265											
	20	45	0.3	-	-		17				Increased sand content, very dark gray with rust mottling
260											
	25			-	-	4					(Sample not recovered), low blow count due to heavy rig chatter caused by gravel in cuttings
255											▼ Wet
											Abundant shale fragments
	30	63	0.2	-	-					SM	SILTY SAND - moist, brown to reddish brown, trace shale fragments
250											
	35									CH	FAT CLAY - hard, wet, gray with brown mottling, shale fragments, trace fine sand
245			0	27.4	94	27					
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: NH
Checked/Date: DLP

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.14a