

APPENDIX A.1

Current Boring Logs

GROUP SYMBOLS AND NAMES

Graphic / Symbol	Group Names	Graphic / Symbol	Group Names
	Well-graded GRAVEL		Lean CLAY
	Well-graded GRAVEL with SAND		Lean CLAY with SAND
	Poorly graded GRAVEL		Lean CLAY with GRAVEL
	Poorly graded GRAVEL with SAND		SANDY lean CLAY
	Well-graded GRAVEL with SILT		SANDY lean CLAY with GRAVEL
	Well-graded GRAVEL with SILT and SAND		GRAVELLY lean CLAY
	Well-graded GRAVEL with CLAY (or SILTY CLAY)		GRAVELLY lean CLAY with SAND
	Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		
	Poorly graded GRAVEL with SILT		SILT
	Poorly graded GRAVEL with SILT and SAND		SILT with SAND
	Poorly graded GRAVEL with CLAY (or SILTY CLAY)		SILT with GRAVEL
	Poorly graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)	SANDY SILT	
	SILTY GRAVEL		SANDY SILT with GRAVEL
	SILTY GRAVEL with SAND		GRAVELLY SILT
	CLAYEY GRAVEL		GRAVELLY SILT with SAND
	CLAYEY GRAVEL with SAND		
	SILTY, CLAYEY GRAVEL		
	SILTY, CLAYEY GRAVEL with SAND	ORGANIC lean CLAY with SAND	
	Well-graded SAND	ORGANIC lean CLAY with GRAVEL	
	Well-graded SAND with GRAVEL	SANDY ORGANIC lean CLAY	
	Poorly graded SAND	SANDY ORGANIC lean CLAY with GRAVEL	
	Poorly graded SAND with GRAVEL	GRAVELLY ORGANIC lean CLAY	
	Well-graded SAND with SILT	GRAVELLY ORGANIC lean CLAY with SAND	
	Well-graded SAND with SILT and GRAVEL		
	Well-graded SAND with CLAY (or SILTY CLAY)		Elastic SILT
	Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)		Elastic SILT with SAND
	Poorly graded SAND with SILT		Elastic SILT with GRAVEL
	Poorly graded SAND with SILT and GRAVEL		SANDY elastic SILT
	Poorly graded SAND with CLAY (or SILTY CLAY)		SANDY elastic SILT with GRAVEL
	Poorly graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)	GRAVELLY elastic SILT	
	SILTY SAND	GRAVELLY elastic SILT with SAND	
	SILTY SAND with GRAVEL		
	CLAYEY SAND		ORGANIC fat CLAY
	CLAYEY SAND with GRAVEL		ORGANIC fat CLAY with SAND
	SILTY, CLAYEY SAND		ORGANIC fat CLAY with GRAVEL
	SILTY, CLAYEY SAND with GRAVEL		SANDY ORGANIC fat CLAY
	PEAT		SANDY ORGANIC fat CLAY with GRAVEL
	COBBLES	GRAVELLY ORGANIC fat CLAY	
	COBBLES and BOULDERS	GRAVELLY ORGANIC fat CLAY with SAND	
	BOULDERS		

FIELD AND LABORATORY TESTS

- C** Consolidation (ASTM D 2435-04)
- CAI** Cerchar Abrasivity Index
- CL** Collapse Potential (ASTM D 5333-03)
- CR** Corrosion, Sulfates, Chlorides (CTM 643 - 99; CTM 417 - 06; CTM 422 - 06)
- CU** Consolidated Undrained Triaxial (ASTM D 4767-02)
- DS** Direct Shear (ASTM D 3080-04)
- EI** Expansion Index (ASTM D 4829-03)
- EM** Elastic Model with Compressive Strength (ASTM D 7102)
- M** Moisture Content (ASTM D 2216-05)
- OC** Organic Content (ASTM D 2974-07)
- P** Permeability (CTM 220 - 05)
- PA** Particle Size Analysis (ASTM D 422-63 [2002])
- PI** Liquid Limit, Plastic Limit, Plasticity Index (AASHTO T 89-02, AASHTO T 90-00)
- PL** Point Load Index (ASTM D 5731-05)
- PM** Pressure Meter
- PP** Pocket Penetrometer
- PTS** Petrographic Thin Section
- R** R-Value (CTM 301 - 00)
- SG** Specific Gravity (AASHTO T 100-06)
- SD** Slake Durability Index (ASTM D 4645)
- SL** Shrinkage Limit (ASTM D 427-04)
- SW** Swell Potential (ASTM D 4546-03)
- UC** Unconfined Compression - Soil (ASTM D 2166-06) Unconfined Compression - Rock (ASTM D 2938-95)
- UU** Unconsolidated Undrained Triaxial (ASTM D 2850-03)
- UW** Unit Weight (ASTM D 4767-04)
- VS** Vane Shear (AASHTO T 223-96 [2004])

SAMPLER GRAPHIC SYMBOLS

- Standard Penetration Test (SPT)
- Standard California Sampler
- Modified California Sampler
- Shelby Tube
- Piston Sampler
- NX Rock Core
- HQ Rock Core
- Bulk Sample
- Other (see remarks)

DRILLING METHOD SYMBOLS

- Auger Drilling
- Rotary Drilling
- Dynamic Cone or Hand Driven
- Diamond Core

WATER LEVEL SYMBOLS

- First Water Level Reading (during drilling)
- Static Water Level Reading (short-term)
- Static Water Level Reading (long-term)



REPORT TITLE

BORING RECORD LEGEND

DIST. 7	COUNTY L.A.	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER NA	PREPARED BY	DATE	PLATE NO.	

CONSISTENCY OF COHESIVE SOILS

Description	Shear Strength (tsf)	Pocket Penetrometer Measurement, PP, (tsf)	Torvane Measurement, TV, (tsf)	Vane Shear Measurement, VS, (tsf)
Very Soft	Less than 0.12	Less than 0.25	Less than 0.12	Less than 0.12
Soft	0.12 - 0.25	0.25 - 0.5	0.12 - 0.25	0.12 - 0.25
Medium Stiff	0.25 - 0.5	0.5 - 1	0.25 - 0.5	0.25 - 0.5
Stiff	0.5 - 1	1 - 2	0.5 - 1	0.5 - 1
Very Stiff	1 - 2	2 - 4	1 - 2	1 - 2
Hard	Greater than 2	Greater than 4	Greater than 2	Greater than 2

APPARENT DENSITY OF COHESIONLESS SOILS

Descriptor	SPT N_{60} - Value (blows / foot)
Very Loose	0 - 5
Loose	5 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	> 50

MOISTURE

Descriptor	Criteria
Dry	No discernable moisture
Moist	Moisture present but no visible water
Wet	Visible free water

PERCENT OR PROPORTION OF SOILS

Descriptor	Criteria
Trace	Particles are present but estimated to be less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

PARTICLE SIZE

Description		Size (in.)
Boulder		Greater than 12
Cobble		3 - 12
Gravel	Coarse	3/4 - 3
	Fine	1/5 - 3/4
Sand	Coarse	1/16 - 1/5
	Medium	1/64 - 1/16
	Fine	1/300 - 1/64
Silt and Clay		Less than 1/300

CEMENTATION

Descriptor	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

NOTE: This legend sheet provides descriptors and associated criteria for required soil description components only. Refer to Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010), Section 2, for tables of additional soil description components and discussion of soil description and identification.



REPORT TITLE

BORING RECORD LEGEND

DIST. 7	COUNTY L.A.	ROUTE 710	POSTMILE	EA 07-187900
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PROJECT OR BRIDGE NAME
SR 710 North Study

BRIDGE NUMBER NA	PREPARED BY	DATE	PLATE NO.
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ROCK GRAPHIC SYMBOLS	
	IGNEOUS ROCK
	SEDIMENTARY ROCK
	METAMORPHIC ROCK

BEDDING SPACING	
Description	Thickness / Spacing
Massive	Greater than 10 ft
Very Thickly Bedded	3 ft - 10 ft
Thickly Bedded	1 ft - 3 ft
Moderately Bedded	4 in. - 1 ft
Thinly Bedded	1 in. - 4 in.
Very Thinly Bedded	1/4 in. - 1 in.
Laminated	Less than 1/4 in.

WEATHERING DESCRIPTORS FOR INTACT ROCK						
Description	Diagnostic Features					General Characteristics
	Chemical Weathering-Discoloration and/or Oxidation		Mechanical Weathering-Grain Boundary Conditions (Disaggregation) Primarily for Granitics and Some Coarse-Grained Sediments	Texture and Leaching		
	Body of Rock	Fracture Surfaces		Texture	Leaching	
Fresh	No discoloration, not oxidized.	No discoloration or oxidation.	No separation, intact (tight).	No change	No leaching	Hammer rings when crystalline rocks are struck.
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.	Hammer rings when crystalline rocks are struck. Body of rock not weakened.
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 does not ring when rock is struck. Body of rock is slightly weakened.
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 semiarid 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.
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. Resistant minerals such as quartz may be present as "stringers" or "dikes."

CORE RECOVERY (REC) (%)
$\frac{\sum \text{Length of the recovered core pieces (in.)}}{\text{Total length of core run (in.)}} \times 100$

ROCK QUALITY DESIGNATION (RQD) (%)
$\frac{\sum \text{Length of intact core pieces} \geq 4 \text{ in.}}{\text{Total length of core run (in.)}} \times 100$

ROCK HARDNESS	
Description	Criteria
Extremely Hard	Cannot be scratched with a pocketknife or sharp pick. Can only be chipped with repeated heavy hammer blows.
Very Hard	Cannot be scratched with a pocketknife or sharp pick. Breaks with repeated heavy hammer blows.
Hard	Can be scratched with a pocketknife or sharp pick with difficulty (heavy pressure). Breaks with heavy hammer blows.
Moderately Hard	Can be scratched with pocketknife or sharp pick with light or moderate pressure. Breaks with moderate hammer blows.
Moderately Soft	Can be grooved 1/16 in. deep with a pocketknife or sharp pick with moderate or heavy pressure. Breaks with light hammer blow or heavy manual pressure.
Soft	Can be grooved or gauged easily by a pocketknife 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 gauged with fingernail, or carved with a pocketknife. Breaks with light manual pressure.

FRACTURE DENSITY	
Description	Observed Fracture Density
Unfractured	No fractures.
Very Slightly Fractured	Core lengths greater than 3 ft.
Slightly Fractured	Core lengths mostly from 1 to 3 ft.
Moderately Fractured	Core lengths mostly from 4 in. to 1 ft.
Intensely Fractured	Core lengths mostly from 1 to 4 in.
Very Intensely Fractured	Mostly chips and fragments.



REPORT TITLE				
BORING RECORD LEGEND				
DIST. 7	COUNTY L.A.	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER NA	PREPARED BY	DATE	PLATE NO.	

LOGGED BY J. Culotta	BEGIN DATE 3-18-13	COMPLETION DATE 3-19-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 2' 47.97224" / -118° 9' 57.31965" NAD83	HOLE ID A-13-001
DRILLING CONTRACTOR Jet Drilling, Inc			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 344.1 ft NAVD88
DRILLING METHOD Hollow-Stem Auger			DRILL RIG CME-75	BOREHOLE DIAMETER 8 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT (1.4"), Cal (2.5")			SPT HAMMER TYPE 140 lb. Auto Hammer, 30" Drop	HAMMER EFFICIENCY, ERI 72%
BOREHOLE BACKFILL AND COMPLETION Cement and Bentonite Grout			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS NE	TOTAL DEPTH OF BORING 105.4 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0		ASPHALT (2").												
	1		AGGREGATE BASE (12").												
342.10	2		Lean CLAY (CL); dark yellowish brown; moist; medium plasticity; homogeneous; (ARTIFICIAL FILL).		B01										
340.10	4		Lean CLAY with SAND (CL); dark yellowish brown; moist; mostly medium to low plasticity fines; some fine SAND; trace fine GRAVEL; homogeneous.		S02	4 8 11	19	100		18	107				CR, M, UW
338.10	6														
336.10	8														
334.10	10		Olive gray.		S03	3 6 7	13	100							
332.10	12														
330.10	14														
328.10	16		Very stiff.		S04	4 6 10	16	100		26	98	UU = 1.06			M, PI, UU, UW
326.10	18														
324.10	20		Trace gypsum and sandstone fragments.		S05	4 7 10	17	100							
322.10	22														
320.10	24														
	25														

(continued)

5 BR - STANDARD SR710N_CH_JET.GPJ CALTRANS LIBRARY DEC09-W CH LOGO.GLB 6/9/14



REPORT TITLE BORING RECORD				HOLE ID A-13-001
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY D. Jankly	DATE 4-18-13	SHEET 1 of 4	

5 BR - STANDARD SR710N_CH_JET.GPJ CALTRANS LIBRARY DEC09-W CH LOGO.GLB 6/9/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
318.10	25		Lean CLAY with SAND (CL) (continued). Hard; brown; trace brick fragments.		S06	7 11 13	24	100		17	115	UU = 2.07			M, PI, UU, UW
316.10	28		SILTY SAND (SM); dense; yellowish brown; moist; mostly coarse to fine SAND; little fines; few fine GRAVEL; stratified; weak cementation; (ALLUVIUM).												
314.10	30				S07	17 17 17	34	100							
312.10	32														
310.10	34														
308.10	35		Brown.		S08	32 29 18	47	100		18	106				DS, M, PA, UW
306.10	38		Lean CLAY (CL); brown; moist; mostly low plasticity fines; few coarse to fine SAND; homogeneous.												
304.10	40				S09	7 11 18	29	100		17					M, PA, PI
302.10	42														
300.10	43		SANDY SILT (ML); strong brown; moist; mostly non-plastic fines; some coarse to fine SAND; trace fine GRAVEL; homogeneous.		S10	15 27 39	66	100		14	122				M, PA, UW
298.10	45														
296.10	47														
294.10	49														
292.10	50				S11	14 13 27	40	72							
290.10	51														
	52														
	53														
	54		SILTY SAND (SM); light yellowish brown; moist; mostly medium and fine SAND; some fines; stratified; weak cementation.												
	55														

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-001
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY D. Jankly	DATE 4-18-13	SHEET 2 of 4	

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
288.10	55		SILTY SAND (SM) (continued).	▲	S12	37 50-4"		100		4	100				DS, M, UW
286.10	58		Poorly graded SAND with SILT (SP-SM); very dense; light yellowish brown; moist; mostly coarse to fine SAND; little coarse to fine GRAVEL; few fines; homogeneous; weak cementation.												
284.10	60			⊗	S13	71 100-5"		50							PA
278.10	65		Dark yellowish brown; mostly medium and fine SAND; few fine GRAVEL.												
276.10	68			▲	S14	28 60		100		6	130				M, UW
274.10	70		Well-graded SAND with SILT (SW-SM); very dense; yellowish brown; moist; mostly coarse to fine SAND; few fines; trace fine GRAVEL; stratified; weak cementation.												
272.10	72			⊗	S15	25 28 28	56	100		3					M, PA
270.10	74		SILTY SAND (SM); light olive brown; moist; mostly medium and fine SAND; some fines; trace fine GRAVEL; stratified; weak cementation.												
268.10	76			▲	S16	25 50		100		10	106				M, PA, UW
264.10	80		Very dense; yellowish brown; trace organic flecks.												
262.10	82			⊗	S17	21 34 34	68	100							

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-001	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
258.10	86	[Diagonal Hatching]	SEDIMENTARY ROCK (CLAYSTONE AND SANDSTONE); decomposed. Lean CLAY (CL); brown; moist; mostly low to medium plasticity fines; few fine SAND; homogeneous; (FERNANDO FORMATION).	▲	S18	17 43 50-5"		100		16	117		[Wavy Line]		DS, M, PA, UW
256.10	88														
254.10	90					⊗	S19	10 19 23	42	100					
250.10	94	[Diagonal Hatching]	SANDY lean CLAY (CL); brown; moist; mostly low to medium plasticity fines; some coarse to fine SAND; few fine GRAVEL; homogeneous.	▲	S20	23 83		100		10	129		[Wavy Line]		M, PI, UW
248.10	96														
246.10	98	[Dotted Pattern]	Poorly graded SAND (SP); very dense; yellowish brown; moist; mostly coarse to fine SAND; few fine GRAVEL; stratified; weak cementation.	⊗	S21	60 67		92					[Wavy Line]		
244.10	100														
240.10	104	[Diagonal Hatching]	CLAYEY SAND with GRAVEL (SC); brown; moist; mostly coarse to fine SAND; some low to medium plasticity fines; little fine GRAVEL; stratified; weak cementation.	▲	S22	160-5"		100				[Wavy Line]			
238.10	106		Bottom of borehole at 105.4 ft bgs												
	107		Boring terminated at a planned depth.												



REPORT TITLE BORING RECORD				HOLE ID A-13-001	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 4 of 4

LOGGED BY J. Lee/D. Jankly	BEGIN DATE 3-11-13	COMPLETION DATE 3-12-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 3' 24.91488" / -118° 9' 54.02971" NAD83	HOLE ID RC-13-002
DRILLING CONTRACTOR Jet Drilling, Inc			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 349.2 ft NAVD88
DRILLING METHOD Hollow-Stem Auger to 45'; Rotary Wire-Line to TD			DRILL RIG CME-75	BOREHOLE DIAMETER 8" to 45'; 3.8" to TD
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT (1.4"), Cal (2.5"), HQ (2.5"), NQ (2")			SPT HAMMER TYPE 140 lb. Auto Hammer, 30" Drop	HAMMER EFFICIENCY, ERI 72%
BOREHOLE BACKFILL AND COMPLETION Cement and Bentonite Grout			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS 32.0 ft	TOTAL DEPTH OF BORING 85.1 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
0	0		SANDY fat CLAY (CH); dark brown; moist; high plasticity; (ARTIFICIAL FILL).		B01										CR
347.20	1														
345.20	2														
	3														
343.20	4														
	5														
	6				S02	3	12	78							PI
	7														
341.20	8														
	9		CLAYEY SAND (SC); greenish gray; moist; mostly coarse to fine SAND; some medium plasticity fines; few fine GRAVEL; homogeneous; weak cementation.												
339.20	10				S03	5	14	78		18	112	UU = 0.6			M, PA, UU, UW
	11					6									
337.20	12					8									
	13														
335.20	14														
	15														
	16		Medium dense; brick fragment observed.		S04	4	14	72							PI
333.20	17					6									
	18					8									
331.20	19		SANDY lean CLAY (CL); dark brown; moist; mostly medium to high plasticity fines; some coarse to fine SAND; trace fine GRAVEL; (ALLUVIUM).												
	20				S05	4	16	89		20	109				M, PA, PI, UW
329.20	21					7									
	22					9									
327.20	23														
	24														
325.20	25														

(continued)

5 BR - STANDARD SR710N_CH_JET.GPJ CALTRANS LIBRARY DEC09-W CH LOGO.GLB 6/9/14



REPORT TITLE BORING RECORD				HOLE ID RC-13-002
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY D. Jankly	DATE 4-18-13	SHEET 1 of 4	

5 BR - STANDARD SR710N_CH_JET.GPJ CALTRANS LIBRARY DEC09-W CH LOGO.GLB 6/9/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
323.20	26		SANDY lean CLAY (CL) (continued).	S06	4 4 6	10	100								PI
321.20	28														
319.20	30		Dark gray.	S07	6 9 11	20	80			21	106	UU = 1.09			M, PI, UU, UW
317.20	32														
315.20	34		SILTY SAND (SM); dense to very dense; brown; wet; coarse to fine grained.												
313.20	36		Cobble or boulder encountered.	S08	36 50		100								
311.20	38														
309.20	40		SEDIMENTARY ROCK, (CLAYSTONE); massive; dark greenish gray; fresh; soft to moderately soft; slightly fractured, randomly oriented, tight; locally abundant bioturbation structures and soft sediment deformation features; (FERNANDO FORMATION).	S09	16 38 50-4"		100			26	98	UU = 3.35			M, PI, UU, UW
307.20	42														
305.20	44														
303.20	46			S10	18 38 50-5"		100								
301.20	48			C11			40	40							
299.20	50														
297.20	52														
295.20	54									15	114				M, PA, PI, UC=465psi, UW

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-002	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
293.20	56		SEDIMENTARY ROCK (continued).		C13			0	0						
291.20	58		At Elev 292.2', observed abundant bioturbation structures dipping 20 to 30 degrees, possibly indicative of bedding dip.												
289.20	60				C14			92	92						
287.20	62														
285.20	64														
283.20	66		At Elev 283.2', observed fault, dipping 40°, 1/16" thick lean CLAY lining, striated.		C15			93	80						
281.20	68		At Elev 282.2', observed abundant bioturbation structures dipping 20 to 30 degrees, possibly indicative of bedding dip.							18	114	UU = 0.99		UU	
279.20	70				C16			100	100						
277.20	72		At Elev 277.2', observed random fracture, dipping 40°, tight.												
275.20	74														
273.20	76				C17			97	97						
271.20	78		At Elev 272.2', observed abundant bioturbation structures dipping 20 to 30 degrees, possibly indicative of bedding dip.							13	115			PI, UC=482psi	
269.20	80				C18			0	0						
267.20	82														
265.20	84														
	85														

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-002	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks	
85			Bottom of borehole at 85.1 ft bgs													
263.20	86		Boring terminated at a planned depth.													
261.20	88		RQD values provided on the boring logs are based on intact core pieces obtained between two natural discontinuities. The majority of core obtained from this boring is typically very weak to weak and does not meet the "sound core" definition provided in the standard test method for RQD (ASTM D 6032). These RQD values should not be used to evaluate rock mass quality.													
259.20	90															
257.20	92															
255.20	94															
253.20	96															
251.20	98															
249.20	100															
247.20	102															
245.20	104															
243.20	106															
241.20	108															
239.20	110															
237.20	112															
235.20	114															
	115															



REPORT TITLE BORING RECORD				HOLE ID RC-13-002	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 4 of 4

LOGGED BY J. Lee/D. Jankly	BEGIN DATE 3-13-13	COMPLETION DATE 3-14-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 4' 8.476249" / -118° 9' 44.95765" NAD83	HOLE ID RC-13-003
DRILLING CONTRACTOR Jet Drilling, Inc			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 388.8 ft NAVD88
DRILLING METHOD Hollow-Stem Auger to 27'; Rotary Wash to TD			DRILL RIG CME-75	BOREHOLE DIAMETER 8" to 27'; 3.8" to TD
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT (1.4"), Cal (2.5"), HQ (2.5")			SPT HAMMER TYPE 140 lb. Auto Hammer, 30" Drop	HAMMER EFFICIENCY, ERI 72%
BOREHOLE BACKFILL AND COMPLETION Cement and Bentonite Grout			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS 17.0 ft	TOTAL DEPTH OF BORING 100.5 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
0	0		SILTY SAND with GRAVEL (SM); gray; moist; coarse to fine SAND; coarse to fine GRAVEL; (ARTIFICIAL FILL).		B01										
386.80	2		SEDIMENTARY ROCK, (CLAYEY SILTSTONE) very thinly bedded with fine SANDSTONE; light olive brown and strong brown; moderately weathered; very soft to soft; moderately fractured; (PUENTE FORMATION).												
384.80	4														
382.80	6				S02	18 40 41	81	100		25	93				DS, M, PI, UW
380.80	8														
378.80	10				S03	12 18 21	39	100		26					CR, M
376.80	12		SEDIMENTARY ROCK, (Poorly Indurated SILTY SANDSTONE); medium to fine grained; massive to very thickly bedded; pale yellow with strong brown oxidation; moderately weathered; (SILTY SAND (SM); moist; mostly fine SAND; some fines; weak cementation).												
374.80	14														
372.80	16		At Elev 373.8', observed bedding joint, dipping 90 to 85°.		S04	19 32 47	79	100		22	105	UU = 2.15			M, PA, UU, UW
370.80	18														
368.80	20		Dense.		S05	12 19 27	46	100							
366.80	22														
364.80	24														
362.80	26														
360.80	28														
358.80	30														
356.80	32														
354.80	34														
352.80	36														
350.80	38														
348.80	40														
346.80	42														
344.80	44														
342.80	46														
340.80	48														
338.80	50														
336.80	52														
334.80	54														
332.80	56														
330.80	58														
328.80	60														
326.80	62														
324.80	64														
322.80	66														
320.80	68														
318.80	70														
316.80	72														
314.80	74														
312.80	76														
310.80	78														
308.80	80														
306.80	82														
304.80	84														
302.80	86														
300.80	88														
298.80	90														
296.80	92														
294.80	94														
292.80	96														
290.80	98														
288.80	100														

(continued)

5 BR - STANDARD SR710N_CH_JET.GPJ CALTRANS LIBRARY DEC09-W CH LOGO.GLB 6/9/14



REPORT TITLE BORING RECORD				HOLE ID RC-13-003
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY D. Jankly	DATE 4-18-13	SHEET 1 of 4	

5 BR - STANDARD SR710N_CH_JET.GPJ CALTRANS LIBRARY DEC09-W CH LOGO.GLB 6/9/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks	
362.80	25		SEDIMENTARY ROCK (continued). Mostly medium to fine SAND.	S06	21 36 50	86	100		22	105					DS, PA	
	26			C07				0	0							
360.80	27															
	28															
358.80	29															
	30				C08				10	10						
356.80	31															
	32															
354.80	33															
	34															
352.80	35			C09				23	0							
	36															
350.80	37															
	38															
348.80	39															
	40			C10				0	0							
346.80	41															
	42															
344.80	43															
	44															
342.80	45		Very dense.	S11	50-5"			100							PA	
	46			C12					0	0						
340.80	47															
	48															
338.80	49															
	50															
336.80	51															
	52															
334.80	53															
	54															
	55															

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-003	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks	
332.80	56		Mostly fine SAND. At Elev 318.8', becomes pale olive to olive with strong brown oxidized zones.	X	S14	50-3"		100					X		PA	
	57					C15			0	0						
330.80	58															
	59															
328.80	60					C16			0	0						
	61															
326.80	62															
	63															
324.80	64															
	65															
322.80	66			X	S17	17 23 37	60	100		21					M, PA	
	67				C18			50	0							
320.80	68															
	69															
318.80	70				C19			50	0							
	71															
316.80	72															
	73															
314.80	74															
	75															
312.80	76				C20			15	0							
	77															
310.80	78															
	79															
308.80	80															
	81															
306.80	82			X	S21	31 34 35	69	100		23					M	
	83															
304.80	84				C22			0	0							
	85															

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-003	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
302.80	86			✕	S23	70-4"		100							
300.80	88														
298.80	90			✕	S24	37 50-4"		100							
296.80	92														
294.80	94														
292.80	96			✕	S25	100-6"		100		23	104				DS, M, PA, UW
290.80	98														
288.80	100			✕	S26	66-6"		100							
286.80	102		Bottom of borehole at 100.5 ft bgs Boring terminated at a planned depth. RQD values provided on the boring logs are based on intact core pieces obtained between two natural discontinuities. The majority of core obtained from this boring is typically very weak to weak and does not meet the "sound core" definition provided in the standard test method for RQD (ASTM D 6032). These RQD values should not be used to evaluate rock mass quality.												
284.80	104														
282.80	106														
280.80	108														
278.80	110														
276.80	112														
274.80	114														
	115														



REPORT TITLE BORING RECORD				HOLE ID RC-13-003	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 4 of 4

LOGGED BY D. Jankly	BEGIN DATE 3-27-13	COMPLETION DATE 3-29-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 4' 20.38198" / -118° 9' 39.77389" NAD83	HOLE ID RC-13-004
DRILLING CONTRACTOR Cascade Drilling, LP			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 393.4 ft NAVD88
DRILLING METHOD Hollow-Stem Auger to 44'; Rotary Wire-line to TD			DRILL RIG Guspech Brut 22R	BOREHOLE DIAMETER 8" to 44'; 3.8" to TD
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT (1.4"), Cal (2.5"), HQ (2.5")			SPT HAMMER TYPE 140 lb. Auto Hammer, 30" Drop	HAMMER EFFICIENCY, ERI 78%
BOREHOLE BACKFILL AND COMPLETION Piezometer Installed on Completion			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS 9.5 ft	TOTAL DEPTH OF BORING 109.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
391.40	1		CLAYEY SAND (SC); brown; moist; mostly coarse to fine SAND; some medium plasticity fines; few fine GRAVEL; homogeneous; weak cementation (ALLUVIUM).		B01					17					CR, M
389.40	2														
387.40	3														
385.40	4		Loose.		S02	2	5	100							PA, PI
383.40	5														
381.40	6		SILTY, CLAYEY SAND (SC-SM); brown; moist to wet; mostly coarse to fine SAND; some medium plasticity fines; few fine GRAVEL; homogeneous; weak cementation.		S03	5	22	67		12	125				M, DS, PA, PI, UW
379.40	7														
377.40	8		Medium dense; Lacks GRAVEL.		S04	4	16	44							
375.40	9														
373.40	10		Brown; mostly medium to fine SAND.		S05	4	13	56		20	106				M, DS, PA, UW
371.40	11														
369.40	12														
	13														
	14														
	15														
	16														
	17														
	18														
	19														
	20														
	21														
	22														
	23														
	24														
	25														

(continued)

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REPORT TITLE BORING RECORD				HOLE ID RC-13-004
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY D. Jankly	DATE 4-18-13	SHEET 1 of 4	

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
367.40	26		Grayish brown. SILTY, CLAYEY SAND (SC-SM) (continued).	S06	5 10 13	23	28								CR
363.40	30		Mostly medium to fine SAND.	S07	6 11 15	26	67			20	111				M, DS, PA, UW
357.40	36		Wet; little fines.	S08	5 6 7	13	100								
353.40	40		SEDIMENTARY ROCK, (fine SANDY SILTSTONE); gray (unoxidized) and yellowish red (oxidized); moderately weathered; very soft to soft; slightly to very slightly fractured; very weak; (PUENTE FORMATION).	S09	42 44 50-5"		100			24	94				M, DS, PA, UW
347.40	46		SEDIMENTARY ROCK, (SILTY SANDSTONE); fine grained; massive to very thickly bedded; gray (unoxidized) and yellowish red (oxidized); moderately weathered; very soft to soft; poorly to moderately indurated; slightly to very slightly fractured.	C10			13	0							
343.40	50		At Elev 344.9', observed fracture zone, dipping 90 to 80°, tight. At Elev 344.4', becomes slightly weathered.	C11			80	0							
341.40	52		At Elev 342.6', observed bedding joint, dipping 20 to 10°, 10" thick sequence, laminated to very thinly bedded.							14					M, PA
339.40	54			C12			47	0							

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-004	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
55			SEDIMENTARY ROCK (continued).		C12			47	0						
337.40	56														
	57														
335.40	58		At Elev 336.4', observed bedding joint, dipping 20 to 10°, 2.6' thick sequence; CLAYSTONE, (gray); very thinly bedded with thin fine SANDSTONE, (yellowish red); moderately weathered; soft; slaking along bedding planes; beds are undulatory.												
	59														
333.40	60		At Elev 333.8', observed random fracture, dipping 70°, tight, iron oxide stained.		C13			48	0	19	111				M, PA, UC=102psi, UW
	61														
331.40	62		At Elev 332.4', observed CLAYSTONE bed fragments, disturbed by drilling.												
	63														
329.40	64				C14			0	0						
	65														
327.40	66														
	67														
325.40	68														
	69														
323.40	70		At Elev 324.4', observed bedding joint, dipping 30°, 1.3' sequence of coarse to fine SANDSTONE; gray with iron oxide staining along fractures.		C15			87	0	7					M, PA
	71		At Elev 323.4', observed fracture zone, dipping 70 to 60°, tight; iron oxide stained.												
321.40	72		At Elev 321.8', observed bedding joint, dipping 30 to 20°, laminations within very thickly bedded SANDSTONE.												
	73														
319.40	74		At Elev 319.9', observed bedding joint, dipping 30 to 20°, 1.5" thick laminated SANDSTONE bed with 1/4" thick gray CLAYSTONE bed in center.		C16			20	0						
	75		At Elev 319.8', observed fracture zone, dipping 90 to 70°, tight; iron oxide stained.												
317.40	76		At Elev 319.4', becomes medium to fine grained; with dusky red lining along fracture and bedding surfaces.												
	77														
315.40	78		At Elev 315.6', observed fracture zone, dipping 90 to 70°, tight; iron oxide stained.												
	79		At Elev 314.8', observed bedding joint, dipping 20 to 10°, 1/4" thick CLAYSTONE bed, gray.												
313.40	80		At Elev 314.5', observed bedding joint, dipping 5 to 0°, 1/4" thick CLAYSTONE bed, gray.		C17			97	0						
	81		At Elev 314.4', observed 12" thick; coarse to fine grained SANDSTONE.												
311.40	82		At Elev 313.4', observed bedding joint, dipping 10 to 0°, 1/2" thick CLAYSTONE bed, gray.							5	154				EM, M, UC=2,158psi, UW PL
	83		At Elev 313.3', observed bedding joint, dipping 10 to 0°, 1/2" thick CLAYSTONE bed, gray.												
309.40	84		At Elev 313.2', observed 12" thick; coarse to fine grained SANDSTONE.												
	85		At Elev 313.0', observed random fracture, dipping 70°, tight; iron oxide stained.												
			At Elev 312.2', observed 1.7' thick zone; strong brown; moderately hard; moderately to well indurated.		C18			100	0						

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-004	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER	PREPARED BY D. Jankly	DATE 4-18-13	SHEET 3 of 4		

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
307.40	86		At Elev 309.9', observed random fracture, dipping 50°, tight; iron oxide stained. At Elev 307.9', observed 4" thick fine SANDSTONE bed, micaceous.	C18				100	0						
305.40	88		SEDIMENTARY ROCK, (CLAYEY SANDSTONE) fine to medium grained; light greenish gray; slightly weathered; very soft; poorly indurated; slightly fractured. At Elev 305.6', observed random fracture, dipping 70°, tight; iron oxide stained.	C19				30	0						
299.40	94		SEDIMENTARY ROCK, (SILTSTONE) very thinly bedded with thin fine (SANDSTONE) beds; dark gray to strong brown; slightly to moderately weathered; very soft to soft; some minor shears with up to 1/4" offsets. At Elev 300.4', observed bedding joint, dipping 20 to 10°. At Elev 298.4', observed bedding joint, dipping 20 to 10°. Unit is 95% unoxidized; SANDSTONE (light gray to very dark gray) beds are locally laminated. SILTSTONE (very dark greenish gray to dark gray) beds are polished and striated with local slaking.	C20				83	0						
293.40	100		At Elev 294.4', observed bedding joint, dipping 25 to 15°. At Elev 293.4', observed random fracture, dipping 55°, smooth to slightly rough. At Elev 292.6', observed random fracture, dipping 55°, smooth to slightly rough.	C21				97	0						
291.40	102		At Elev 291.4', observed 5" thick, hard, moderately to well indurated zone.							15				SD	
289.40	104		SEDIMENTARY ROCK, (SANDSTONE); fine to medium grained; laminated to thinly bedded with thin interbeds of SILTSTONE; brown to very dark greenish gray; slightly weathered; very soft to soft; poorly indurated; slightly to moderately fractured. Siltstone beds are locally polished and striated and slaking. At Elev 288.4', observed bedding joint, dipping 25 to 15°. At Elev 286.8', observed fault, dipping 55°, smooth, minor offsets of SILTSTONE beds.	C22				92	0						
283.40	110		Bottom of borehole at 109.0 ft bgs Boring terminated at a planned depth. Piezometer Sensor Installed at 36.7' (El. 356.7') RQD values provided on the boring logs are based on intact core pieces obtained between two natural discontinuities. The majority of core obtained from this boring is typically very weak to weak and does not meet the "sound core" definition provided in the standard test method for RQD (ASTM D 6032). These RQD values should not be used to evaluate rock mass quality.												



REPORT TITLE BORING RECORD				HOLE ID RC-13-004	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 4 of 4

LOGGED BY D. Jankly	BEGIN DATE 2-25-13	COMPLETION DATE 3-5-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 4' 28.73972" / -118° 9' 39.96954" NAD83	HOLE ID RC-13-005
DRILLING CONTRACTOR Cascade Drilling, LP			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 425.0 ft NAVD88
DRILLING METHOD Hollow-Stem Auger to 81.5'; Rotary Wire-line to TD			DRILL RIG Guspech Brut 22R	BOREHOLE DIAMETER 8" to 81.5'; 3.8" to TD
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT (1.4"), Cal (2.5"), HQ (2.5")			SPT HAMMER TYPE 140 lb. Auto Hammer, 30" Drop	HAMMER EFFICIENCY, ERI 78%
BOREHOLE BACKFILL AND COMPLETION Piezometer Installed on Completion			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS 52.5 ft	TOTAL DEPTH OF BORING 225.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0		ASPHALT (4").												
	1		AGGREGATE BASE (6").												
423.00	2		SANDY fat CLAY (CH); yellowish brown; moist; mostly medium plasticity fines; little coarse to fine SAND; few fine GRAVEL; blocky; (ARTIFICIAL FILL).		B01										
421.00	4														
419.00	6				S02	4 5 6	11	67							PA, PI
417.00	8														
415.00	10		With some Puente Formation derived gravel. Gravel is generally very stiff to hard.		S03	3 5 10	15	67		28	89				M, PI, UW
413.00	12														
411.00	14														
409.00	16		Few fine SAND; few gravel as 10'.		S04	2 3 5	8	89		26					M, PA
407.00	18														
405.00	20		With trace asphaltic concrete debris.		S05	4 12 14	26	78		13	112				M, UW
403.00	22														
401.00	24		Concrete layer encountered. CLAYEY SAND (SC); medium dense; dark yellowish brown; moist; mostly medium to fine SAND; some fines; trace fine GRAVEL; homogeneous; weak cementation; (ALLUVIUM).												
	25														

(continued)

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REPORT TITLE BORING RECORD				HOLE ID RC-13-005
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY D. Jankly	DATE 4-18-13	SHEET 1 of 8	

5 BR - STANDARD SR710N_CH_CASCADE.GPJ CALTRANS LIBRARY DEC09-W CH LOGO.GLB 6/9/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
399.00	25		CLAYEY SAND (SC) (continued).	S06	7 8 5	13	33							PA
397.00	28		Poorly graded SAND with SILT and GRAVEL (SP-SM); dark yellowish brown; moist; some coarse to fine SAND; some coarse to fine GRAVEL; few fines; homogeneous; moderate cementation.	S07	13 26 29	55	78		6	118				M, DS, PA, UW
391.00	34		SILTY SAND (SM); medium dense; dark yellowish brown; moist to wet; mostly coarse to fine SAND; some fines; trace fine GRAVEL; homogeneous; weak cementation; micaceous.	S08	6 5 4	9	89							PA
387.00	38		Moist; mostly fine SAND.	S09	2 12 16	28	78		13	95				M, PA, UW
381.00	44		SANDY fat CLAY (CH); light olive brown; moist; mostly medium plasticity fines; little fine SAND; homogeneous.	S10	6 9 11	20	100		21					CR, M, PI
375.00	50		Light yellowish brown; mostly fine SAND; some fines; micaceous.	S11	2 9 19	28	89		19	107				M, DS, PA, UW

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-005	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 2 of 8

5 BR - STANDARD SR710N_CH_CASCADE.GPJ CALTRANS LIBRARY DEC09-W CH LOGO.GLB 6/9/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
369.00	56		SANDY fat CLAY (CH) (continued). Wet; trace fine GRAVEL.	S12	14 18 36	54	67								
367.00	58		Lean CLAY with SAND (CL); light olive brown; moist; mostly medium plasticity fines; little fine SAND; homogeneous.												
365.00	60		Hard.	S13	9 15 28	43	89			20	110	UU = 2.31			M, PI, UU, UW
361.00	64		Yellowish brown; moist to wet.												
359.00	66			S14	9 13 20	33	100								
355.00	70			S15	7 16 30	46	89			20	110				M, DS, PA, PI, UW
351.00	74		Strong brown; little medium to fine SAND; iron oxide and manganese staining.												
349.00	76			S16	6 10 15	25	78								PA, PI
345.00	80		SEDIMENTARY ROCK, (SILTSTONE and CLAYSTONE); thinly to very thinly bedded with thin interbeds of fine SANDSTONE: white to dark grayish brown; moderately weathered; very soft; moderately to intensely fractured; iron oxide stained: (PUENTE FORMATION).	S17	7 15 25	40	67			26	99	UU = 2.01			M, PI, UU, UW
343.00	82			C18			40	0							

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-005	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 3 of 8

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
339.00	86		SEDIMENTARY ROCK (<i>continued</i>). Bedding joint dipping 70°, slightly rough.	C19			72	30						
337.00	88													
335.00	90		At Elev 335.0', becomes soft.	C20			83	28						
333.00	92		At Elev 334.0', observed fracture zone, dipping 90 to 40°, 1/16" thick manganese and iron oxide staining; rough. At Elev 333.0', observed bedding joint, dipping 80°, slightly rough.	C21			83	27	2	158				M, PL, UW
329.00	96		At Elev 329.0', observed bedding joint, dipping 80 to 70°. At Elev 328.6', observed random fracture, dipping 90 to 40°, 1/8" thick lean CLAY lining; slightly rough. At Elev 328.0', observed 1' thick zone, very soft.	C22			82	0						
327.00	98													
325.00	100		At Elev 325.0', becomes grayish brown to strong brown (where oxidized); moderately to slightly weathered; At Elev 324.0', observed bedding joint, dipping 70 to 60°.	C23			62	0						CR
323.00	102													
321.00	104		At Elev 320.0', becomes moderately weathered; parting surfaces are generally moderately rough. At Elev 319.5', observed 6" thick very intensely fractured zone. 12" thick very intensely fractured zone.	C24			93	17						
319.00	106													
317.00	108													
315.00	110		At Elev 316.0', observed bedding joint, dipping 90°, tight. Gray to strong brown (where oxidized).	C25			47	0						
313.00	112		At Elev 313.8', observed fault, dipping 65°, 1/16" thick, lean CLAY lining; polished and striated. At Elev 313.0', observed random fracture, dipping 20°, tight. At Elev 312.7', observed random fracture, dipping 20°, tight.											
311.00	114													
	115		(continued)											



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DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 4 of 8

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks	
309.00	115		At Elev 310.0', observed bedding joint, dipping 70 to 60°, tight. Few iron oxide stained beds.		C25			47	0							
307.00	117		At Elev 308.4', observed fracture zone, dipping 90 to 60°, tight; moderately rough.													
305.00	118				C26			90	0							
303.00	120		At Elev 305.0', observed bedding joint, dipping 90°, 1" thick SANDSTONE bed.													
301.00	122		At Elev 303.0', observed bedding joint, dipping 90 to 70°, overturned bedding. Local lean CLAY lining along beds and random fractures.													
299.00	123		At Elev 302.0', observed fracture zone, dipping 60°, 1/16" thick lean CLAY lining, tight.		C27			87	20							
297.00	124		At Elev 301.0', observed little fine SANDSTONE beds up to 1.5" thick. Numerous minor, tight shears with up to 1/16" thick lean CLAY lining.													
295.00	125		At Elev 300.0', observed bedding joint, dipping 80°.													
293.00	126															
291.00	127															
289.00	128		At Elev 296.7', observed fracture zone, dipping 65°, tight.		C28			97	33							
287.00	129		At Elev 296.0', observed bedding joint, dipping 90°.													
285.00	130		At Elev 295.0', becomes dark olive gray to very dark grayish brown; slightly weathered; locally slaking, polished and striated bedding planes.													
283.00	131		At Elev 294.9', observed bedding joint, dipping 90 to 70°.							30					EM, M, SD, UC=137psi	
281.00	132		At Elev 293.0', observed random fracture, dipping 65 to 55°, 1/16" thick lean CLAY lining; slightly rough.		C29			97	53							
279.00	133															
277.00	134															
275.00	135															
273.00	136		At Elev 289.0', observed bedding joint, dipping 80°, tight. Scarce iron oxide staining along SANDSTONE beds; slight slaking along SILTSTONE bedding planes.													
271.00	137															
269.00	138		At Elev 287.0', observed random fracture, dipping 30 to 70°, tight.		C30			100	100	29						M, PL, SD
267.00	139															
265.00	140		At Elev 285.0', becomes slightly weathered to fresh; dark greenish gray (SANDSTONE) to very dark greenish gray (SILTSTONE).													
263.00	141															
261.00	142		PTS: Feldspathic wacke; 50% biotite, 20% quartz; 15% muscovite; 15% plagioclase.							27	102					M, PL, PTS, SD, UW
259.00	143															
257.00	144				C31			80	10							
255.00	145															

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-005	
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PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 5 of 8

5 BR - STANDARD SR710N_CH_CASCADE.GPJ CALTRANS LIBRARY DEC09-W CH LOGO.GLB 6/9/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
279.00	146		At Elev 279.7', observed bedding joint, dipping 80°, 2-3" thick fine SANDSTONE bed, dark greenish gray, very intensely fractured.	C31				80	10						
277.00	148			C32				70	20						
275.00	150		At Elev 275.0', observed abundant, randomly oriented, polished and striated, fracture and bedding plane surfaces. Offsets up to 1".												
273.00	152		At Elev 274.0', observed bedding joint, dipping 75 to 65°, 12" thick medium to fine grained SANDSTONE bed with faint internal SILTSTONE laminations.												
271.00	154		At Elev 273.0', becomes fresh.	C33				78	0						
269.00	156		At Elev 270.2', observed random fracture, dipping 70°, polished.												
267.00	158		At Elev 270.0', observed bedding joint, dipping 55 to 45°.												
265.00	160		At Elev 268.6', observed random fracture, dipping 70°, polished.	C34				60	0						
263.00	162		At Elev 268.0', observed bedding joint, dipping 55°, 1/2" thick, lean CLAY lined, sheared bed.												
261.00	164		At Elev 266.0', observed bedding joint, dipping 65°, tight.												
259.00	166		At Elev 263.2', observed random fracture, dipping 40°, tight.	C35				48	10						
257.00	168		At Elev 263.1', observed fault, dipping 80°, 1/16" thick, lean CLAY lining; smooth; 1" reverse offset.												
255.00	170		At Elev 260.0', observed bedding joint, dipping 70 to 60°, tight. Numerous polished and striated beds.	C36				79	0						
253.00	172		At Elev 257.4', observed bedding joint, dipping 70°, 5" thick fine SANDSTONE bed.												
251.00	174		At Elev 256.0', observed bedding joint, dipping 90 to 70°, tight, continuing polished and striated bedding planes.	C37				0	0						
				C38				60	0						
			At Elev 252.0', observed bedding joint, dipping 80 to 60°, tight.												
				C39				100	50						

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-005	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER	PREPARED BY D. Jankly	DATE 4-18-13	SHEET 6 of 8		

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
249.00	176		At Elev 249.0', observed bedding joint, dipping 90 to 60°, tight, locally overturned beds with abundant internal polished surfaces, offsets up to 1/2". Rock is siliceous to 182' (El.: 243').	C39				100	50						EM, M, SD, UC=316psi, UW
247.00	177			C40				100	57						
243.00	182		At Elev 243.8', observed random fracture, dipping 55°, tight, polished. At Elev 243.6', observed random fracture, dipping 55°, tight, polished.	C41				98	53		114				M, PA, PL, SD, UW
241.00	181														
239.00	186		At Elev 241.0', observed bedding joint, dipping 85°, abundant internal polished surfaces, offsets up to 1/4". Some slaking along bedding planes. At Elev 240.1', observed random fracture, dipping 50°, tight, polished. At Elev 239.7', observed random fracture, dipping 35°, tight, polished.	C42				97	58		116				PTS
237.00	187														
235.00	190		SEDIMENTARY ROCK, (SANDSTONE); fine grained; very thickly bedded with thin interbeds of SILTSTONE; dark greenish gray (SANDSTONE) and very dark greenish gray (SILTSTONE); fresh; soft; moderately to intensely fractured. At Elev 235.5', observed 6" thick SANDSTONE bed with internally sheared SILTSTONE rip-up clasts up to 2" dia. Continues to 192.8' (El.: 232.2').	C43				70	20						
233.00	192														
229.00	196		At Elev 232.2', observed bedding joint, dipping 85 to 75°, 2' thick SILTSTONE sequence; beds have up to 1/16" thick lean CLAY lining; polished. At Elev 230.0', observed 12" thick SANDSTONE bed with internally sheared SILTSTONE rip-up clasts up to 2" dia..	C44				83	50						
227.00	198														
223.00	202		SEDIMENTARY ROCK, (SILTY SANDSTONE) medium to fine grained; massive to very thickly bedded; dark bluish gray; fresh; moderately soft to moderately hard; poorly to moderately indurated; moderately fractured, up to 1/8" thick lean CLAY lining. At Elev 223.0', observed shear/fault zone, dipping 90 to 70°, 1/8" thick lean CLAY lining; tight. At Elev 222.0', observed fault, dipping 70°, 1/8" thick lean CLAY lining; tight.	C45				83	80						
221.00	204														

(continued)



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ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
205			SEDIMENTARY ROCK (<i>continued</i>).		C45			83	80						
219.00	206				C46			100	100	11	118				M, PA, UW
217.00	208														
215.00	210														
213.00	212		At Elev 214.0', becomes coarse to fine SAND to 212.5' (El.: 212.5').		C47			100	100						
211.00	214		At Elev 212.5', observed fault, dipping 85 to 60°, 1/8" thick lean CLAY lining; tight. At Elev 212.4', becomes medium to fine grained. At Elev 211.2', observed fault, dipping 70°, 1/8" thick lean CLAY lining; tight. At Elev 211.1', observed bedding joint, dipping 50°, 12" zone, thinly bedded with very thin to thin SILTSTONE.												
209.00	216		At Elev 209.5', observed fault, dipping 90 to 80°, 1/16" thick lean CLAY lining; tight.												
207.00	218		At Elev 208.5', observed fault, dipping 80°, 1/16" thick lean CLAY lining; tight. Offsets local SILTSTONE beds..		C48			93	52	14	113				M, UW
205.00	220		At Elev 206.7', observed fault, dipping 60°, 1/16" thick lean CLAY lining; tight. Truncates local SILTSTONE beds.. At Elev 206.5', observed bedding joint, dipping 50°, tight. At Elev 206.0', observed fault, dipping 70°, 1/16" thick lean CLAY lining; tight. Truncates local SILTSTONE beds. Rock becomes soft.												
203.00	222				C49			54	25						
201.00	224		At Elev 201.0', observed fracture zone, tight, with up to 1/8" thick lean CLAY lining.												
199.00	226		Bottom of borehole at 225.0 ft bgs Boring terminated at a planned depth. Piezometer Sensor Installed at 124.5' (El. 300.5') RQD values provided on the boring logs are based on intact core pieces obtained between two natural discontinuities. The majority of core obtained from this boring is typically very weak to weak and does not meet the "sound core" definition provided in the standard test method for RQD (ASTM D 6032). These RQD values should not be used to evaluate rock mass quality.												



REPORT TITLE BORING RECORD				HOLE ID RC-13-005	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
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BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 8 of 8

LOGGED BY J. Culotta	BEGIN DATE 3-20-13	COMPLETION DATE 3-22-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 5' 23.94852" / -118° 9' 11.19711" NAD83	HOLE ID R-13-006
DRILLING CONTRACTOR Jet Drilling, Inc			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 505.6 ft NAVD88
DRILLING METHOD Hollow-Stem Auger to 60'; Rotary Wash to TD			DRILL RIG CME-75	BOREHOLE DIAMETER 8" to 60'; 3.8" to TD
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT (1.4"), Cal (2.5"), HQ (2.5")			SPT HAMMER TYPE 140 lb. Auto Hammer, 30" Drop	HAMMER EFFICIENCY, ERI 72%
BOREHOLE BACKFILL AND COMPLETION Cement and Bentonite Grout			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS NE	TOTAL DEPTH OF BORING 120.8 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0		ASPHALT (2").												
	1		AGGREGATE BASE (3").												
503.60	2		SANDY SILTY CLAY (CL-ML); brown; moist; mostly low plasticity fines; some fine SAND; trace fine GRAVEL; homogeneous; (ALLUVIUM).		B01										
	3														
501.60	4														
	5														
499.60	6				S02	12	53	100		12	125				M, PA, UW
	7					24									
	8					29									
497.60	9														
	10				S03	9	21	100							
495.60	11					11									
	12					10									
493.60	13														
	14														
491.60	15				S04	11	32	100		15	120				M, DS, PA, PI, UW
489.60	16					13									
	17					19									
487.60	18														
	19														
485.60	20				S05	10	24	100							
	21					12									
483.60	22					12									
	23														
481.60	24														
	25														

(continued)

5 BR - STANDARD SR710N_CH_JET.GPJ CALTRANS LIBRARY DEC09-W CH LOGO.GLB 6/9/14



REPORT TITLE BORING RECORD				HOLE ID R-13-006
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY D. Jankly	DATE 4-18-13	SHEET 1 of 5	

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
479.60	25		SANDY SILTY CLAY (CL-ML) (continued).	▲	S06	11 15 19	34	89							
477.60	28														
475.60	30			⊗	S07	12 14 14	28	78		9					M, PA, PI
473.60	32														
471.60	34		Light olive brown; few fine SAND; stratified.												
469.60	36			▲	S08	13 19 27	46	72							PA
467.60	38														
465.60	40		Lean CLAY (CL); light olive brown; moist; mostly medium plasticity fines; few fine SAND; homogeneous.	⊗	S09	5 9 13	22	89							PA, PI
463.60	42														
461.60	44		SANDY SILT (ML); dark yellowish brown; moist; mostly fines; some fine SAND; homogeneous.	▲	S10	18 41 50	91	72		11	118				DS, M, PA, UW
459.60	46														
455.60	50		CLAYEY SAND (SC); very dense; dark brown; moist; mostly coarse and fine SAND; little low to medium plasticity fines; homogeneous; moderate cementation.	⊗	S11	33 39 50	89	100							PA, PI
453.60	52														
451.60	54		Well-graded SAND with SILT (SW-SM); strong brown; moist; mostly coarse to fine SAND; few fines; trace fine GRAVEL; homogeneous; weak cementation, some iron oxide staining.												

(continued)



REPORT TITLE BORING RECORD				HOLE ID R-13-006	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 2 of 5

5 BR - STANDARD SR710N_CH_JET.GPJ CALTRANS LIBRARY DEC09-W CH LOGO.GLB 6/9/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
55			Well-graded SAND with SILT (SW-SM) (continued).		S12	100	100-5"	100		3	123				M, PA, UW
449.60	56														
	57														
447.60	58														
	59														
445.60	60		Very dense.		S13	43	100-5"	50							
	61														
443.60	62														
	63														
441.60	64		SEDIMENTARY ROCK, (SILTSTONE); thinly bedded with thin (CLAYSTONE) interbeds; olive and brownish yellow; moderately weathered; very soft to soft; (PUENTE FORMATION).												
	65														
439.60	66		At Elev 440.6', observed bedding joint, dipping 70 to 60°, iron oxide stained, slaking.		S14	18	34	100		27	97				M, PA, PI, UC=41.5psi, UW
	67														
437.60	68														
	69														
435.60	70				S15	15	24	100							CR
	71					27									
433.60	72														
	73														
431.60	74														
	75														
429.60	76		At Elev 430.6', becomes grayish brown and yellowish brown.		S16	40	100	100		22	104	UU = 2.63			PA, PI, SD, UU
	77				C17			17	0						
427.60	78														
	79														
425.60	80														
	81				C18			12	0						
423.60	82														
	83														
421.60	84														
	85														

(continued)



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DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
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5 BR - STANDARD SR710N_CH_JET.GPJ CALTRANS LIBRARY DEC09-W CH LOGO.GLB 6/9/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
419.60	85		SEDIMENTARY ROCK <i>(continued)</i> .												
415.60	90		At Elev 415.6', with few fine SANDSTONE beds.	S19	25 40 50-5"			88		29	95				CR, M, PA, PI, UC=35.6psi, UW
409.60	96		At Elev 410.6', observed bedding joint, dipping 90 to 80°, dark yellowish brown with gray laminations.	S20	22 41 50-4"			88		26	99				EM, M, UC= 73.5psi, UW
405.60	100		At Elev 405.6', becomes predominantly SILTSTONE; laminated; dark yellowish brown and yellowish red.	S21	21 27 43	70		100		29	94				M, SD, UW
399.60	106		At Elev 400.6', observed bedding joint, dipping 80 to 70°, iron oxide stained beds, slaking.	S22	22 43 50-4"			100		28	97	UU =1.83			M, PA, PI, UU, UW
395.60	110			S23	12 22 36			58	100						

(continued)



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DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY D. Jankly	DATE 4-18-13	SHEET 4 of 5	

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
389.60	116		At Elev 390.6', becomes slightly weathered. At Elev 390.5', observed bedding joint, dipping 20°, slaking.	S24	43	100-5"		91		24	103				M, PA, PI, UW
385.60	120		At Elev 385.6', becomes slightly weathered to fresh; very dark gray with greenish gray laminations; soft.	S25	70	100-4"		100							
	121		Bottom of borehole at 120.8 ft bgs												
383.60	122		Boring terminated at a planned depth.												
371.60	134														
361.60	144														



REPORT TITLE BORING RECORD				HOLE ID R-13-006	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER	PREPARED BY D. Jankly	DATE 4-18-13	SHEET 5 of 5		

LOGGED BY D. Jankly	BEGIN DATE 3-7-13	COMPLETION DATE 3-18-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 5' 16.55525" / -118° 9' 41.26998" NAD83	HOLE ID RC-13-007
DRILLING CONTRACTOR Cascade Drilling, LP			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 493.1 ft NAVD88
DRILLING METHOD Hollow-Stem Auger to 87'; Rotary Wire-line to TD			DRILL RIG IR-8400 to 53'; CME-85 to TD	BOREHOLE DIAMETER 8" to 87'; 3.8" to TD
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT (1.4"), Cal (2.5"), HQ (2.5")			SPT HAMMER TYPE 140 lb. Auto Hammer, 30" Drop	HAMMER EFFICIENCY, ERI 78%
BOREHOLE BACKFILL AND COMPLETION Piezometer Installed on Completion			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS 45.0 ft	TOTAL DEPTH OF BORING 271.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0		ASPHALT (3.5").												
	1		AGGREGATE BASE (3").												
491.10	2		SILTY SAND (SM); very dense; dark yellowish brown; moist; mostly coarse to fine SAND; some low plasticity fines; few fine GRAVEL; homogeneous, weak to moderate cementation; (ALLUVIUM).		B01										
	3														
489.10	4														
	5														
487.10	6				S02	19	50	75							
	7														
	8														
485.10	9														
	10				S03	13	44	78							PA
	11					16									
481.10	12					28									
	13														
	14														
479.10	15		Dense; strong brown; mostly medium to fine SAND; weak cementation.		S04	13	33	94							PA
	16					13									
	17					20									
	18														
475.10	19														
	20		Brown; dry; mostly fine SAND.		S05	8	38	67		5	103				M, PA, UW
	21					19									
	22		SANDY SILT (ML); brown; moist; mostly low plasticity fines; some medium to fine SAND; homogeneous.			19									
	23														
469.10	24		Poorly graded SAND with SILT (SP-SM); medium dense; strong brown; moist; mostly medium to fine SAND; few to												
	25														

(continued)

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REPORT TITLE BORING RECORD				HOLE ID RC-13-007
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY D. Jankly	DATE 4-18-13	SHEET 1 of 10	

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
467.10	26		little low plasticity fines; homogeneous; weak cementation. Poorly graded SAND with SILT (SP-SM) (continued).	S06	8 11 14	25	78								
465.10	28		SANDY SILTY CLAY (CL-ML); reddish brown; moist; mostly low plasticity fines; some medium to fine SAND; trace fine GRAVEL; homogeneous; <5% porosity to 1/16".												
463.10	30			S07	8 13 20	33	67							PA, PI	
459.10	34		SILTY SAND (SM); dense; strong brown; moist; mostly coarse to fine SAND; some low plasticity fines; little fine GRAVEL; homogeneous; weak to moderate cementation.												
457.10	36			S08	10 15 24	39	94							PA	
453.10	40		Moist to wet; lacks GRAVEL.												
451.10	42			S09	4 8 24	32	100	16	113					M, UW	
449.10	44		Well-graded SAND with SILT (SW-SM); very dense; brown; wet; mostly coarse to fine SAND; few low plasticity fines; few fine GRAVEL; homogeneous; weak cementation.												
447.10	46			S10	8 26 47	73	78							PA	
443.10	50		Poorly graded SAND with GRAVEL (SP); yellowish brown; wet; mostly coarse to medium SAND; little coarse to fine GRAVEL; homogenous; weak cementation.												
441.10	52			S11	11 40 30	70	33	16	112					M, UW	
439.10	54		SILTY SAND (SM); medium dense; brown; wet; mostly fine SAND; some low plasticity fines; homogeneous; weak cementation.												

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-007	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 2 of 10

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
55			SILTY SAND (SM) (continued).		S12	8 11 16	27	89							
437.10	56														
435.10	58														
433.10	60		SILTY SAND (SM); dark yellowish brown; wet; mostly medium to fine SAND; little low plasticity fines; trace fine GRAVEL; homogeneous; weak cementation.	✕	S13	50-6"		0							
431.10	62														
429.10	64														
427.10	66		Very dense.	✕	S14	20 24 18	42	89		21				M, PA	
425.10	68		SEDIMENTARY ROCK, (CLAYSTONE); massive; strong brown; decomposed; (SANDY fat CLAY (CH); strong brown; moist; mostly medium to high plasticity fines; trace fine SAND; homogeneous; (FERNANDO FORMATION)).												
423.10	70			▲	S15	12 27 45	72	100							
421.10	72														
419.10	74														
417.10	76			✕	S16	8 12 19	31	78						PA, PI	
415.10	78														
413.10	80		SEDIMENTARY ROCK, (CLAYSTONE); massive; light grayish brown to brown; moderately weathered; very soft; very slightly fractured, randomly oriented, tight; locally abundant bioturbation structures, possibly indicative of bedding. Local soft sediment deformation.	▲	S17	21 45 50-4"		75		26	99	UU = 3.34		M, PA, PI, UU, UW	
411.10	82														
409.10	84														
85			(continued)												



REPORT TITLE BORING RECORD				HOLE ID RC-13-007	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 3 of 10

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
407.10	86		SEDIMENTARY ROCK (<i>continued</i>).	S18	15 16 26	42	67							
405.10	88			C19			100	88						
403.10	90								19					M, PI
401.10	92		At Elev 402.1', observed											
399.10	94		At Elev 401.1', observed numerous tight, randomly oriented shears and fractures, polished and clay lined up to 1/16" thick.	C20			100	100						
397.10	96													
395.10	98		At Elev 396.1', becomes grayish brown to yellowish red, slightly fractured.	C21			97	97						
393.10	100								29	93				EM, M, UW, UC=134psi
391.10	102			C22			100	50						
389.10	104													
387.10	106		At Elev 388.3', observed fault, dipping 80°, 1/16" thick lean CLAY lining; tight.											
385.10	108		At Elev 387.3', observed fault, dipping 85°, 1/8" thick lean CLAY lining; tight.	C23			0	0						
381.10	112		At Elev 381.1', observed abundant bioturbation structures, elongated, 1/2" to 3" long and 1/8" to 1/2" thick.	C24			100	67						
379.10	114		At Elev 379.3', observed random fracture, dipping 70°, tight; smooth.											
	115		At Elev 378.7', observed random fracture, dipping 80°.											

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-007	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 4 of 10

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
377.10	116		tight; rough.	C24				100	67						PA, PI, UU
375.10	118			C25				80	70						
373.10	120		Thinly to very thinly bedded with few thin interbeds of fine SANDSTONE: gray and strong brown; slightly weathered; very soft; slightly fractured; some slaking along bedding planes.												
371.10	122		At Elev 373.1', observed bedding joint, dipping 20 to 10°.												
369.10	124			C26				70	63						M, PA, PI, SD
367.10	126									21					
365.10	128		At Elev 366.1', observed bedding joint, dipping 30 to 20°, tight. Rock becomes very soft to soft.	C27				100	90						
363.10	130		At Elev 363.1', observed bedding joint, dipping 30°, tight. CLAYSTONE is very dark gray.												
361.10	132		At Elev 361.9', observed fault, dipping 80°, 1/16" thick lean CLAY lining, smooth.	C28				90	90						
359.10	134		At Elev 359.6', observed contact, dipping 60 degrees, likely soft sediment deformation feature, material change below.												
357.10	136		Massive; very dark gray; slightly weathered to fresh; moderately soft to soft; very slightly fractured; locally abundant bioturbation structures (light bluish gray) and soft sediment deformation features.												EM, M, UW, UC=420psi
355.10	138		At Elev 357.7', observed SANDSTONE bed; strong brown; subhorizontal; majority has been washed out due to drilling.	C29				100	100		20	108			
353.10	140		At Elev 356.9', observed SANDSTONE bed; strong brown; subhorizontal; majority has been washed out due to drilling.												M, PA, SD, UW
351.10	142		At Elev 355.1', becomes very dark bluish gray, fresh.												
349.10	144		At Elev 354.3', observed random fracture, dipping 30°, tight, smooth to slightly rough.	C30				70	60						
			At Elev 354.1', observed random fracture, dipping 50°, tight, smooth to slightly rough.												
			At Elev 349.1', observed fault, dipping 60°, 1/16" thick lean CLAY lining, smooth to slightly rough.												

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-007	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 5 of 10

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
347.10	146			C30				70	60	21	107				EM, M, PL, UW, UC=274psi
345.10	148		At Elev 345.4', observed bedding joint, dipping 20 to 0°, 3" thick cemented SILTSTONE bed; moderately hard to hard. At Elev 345.1', becomes dark greenish gray with greenish gray bioturbation structures, unfractured.	C31				90	80						
341.10	152		At Elev 341.3', observed bedding joint, dipping 20 to 10°, undulatory SILTSTONE lamination.	C32				100	100		22	105			M, PA, PI, PL, SD, UW
335.10	158			C33				0	0						CR
333.10	160		At Elev 334.1', observed abundant bioturbation structures dipping less than 10 degrees.	C34				100	100		23	104			EM, M, UW, UC=148psi
327.10	166		PTS: Laminated siltstone; 68% biotite; 15% muscovite; 10% plagioclase; 7% quartz. At Elev 327.1', becomes greenish black.	C35				100	100						PTS
325.10	168			C36				100	100		24	100			EM, M, UW, UC=383psi
321.10	172		At Elev 322.1', observed abundant bioturbation structures dipping 10 to 20 degrees.	C37				100	100						
319.10	174									15	105				M, PA, PI, SD, UW

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-007
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY D. Jankly	DATE 4-18-13	SHEET 6 of 10	

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
317.10	176				C38			100	100						
315.10	178									23	103				EM, M, PL, UW, UC=74psi
311.10	182				C39			0	0						
311.10	182				C40			100	100						
309.10	184									23	105				EM, M, PL, SD, UW, UC=254psi
307.10	186														PA
307.10	186				C41			100	100						
305.10	188														
305.10	188														
303.10	190														
303.10	190														
301.10	192				C42			100	100						
301.10	192									22	100				CR, PA, PI, UC=397psi
299.10	194														
299.10	194														
297.10	196														
297.10	196														
295.10	198				C43			100	100						
295.10	198									20					EM, M, SD, UC=428psi
293.10	200				C44			100	100						
293.10	200														
291.10	202														
291.10	202														
289.10	204														
289.10	204														
205					C45			100	100						

At Elev 301.6', observed bedding joint, dipping 20 to 10°, some very fine SANDSTONE beds up to 1/4" thick, continues to 194' (El.: 231').
 At Elev 300.4', observed fault, dipping 20°, 1/16" thick lean CLAY lining, tight.
 Bedding joint dipping 25 to 30°, 12" thick zone of very thinly bedded to laminated SILTSTONE, slaking along bedding planes, smooth.

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-007	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 7 of 10

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks	
287.10	206		PTS: Laminated siltstone; 65% biotite; 15% muscovite; 10% plagioclase; 10% quartz. At Elev 282.1', observed abundant bioturbation structures dipping 15 to 20 degrees. At Elev 279.1', observed few shell fragments. At Elev 277.1', observed bedding joint, dipping 20 to 10°, 2" thick very fine SANDSTONE bed, greenish gray. At Elev 270.3', observed random fracture, dipping 60°, tight, slightly rough. At Elev 269.6', observed bedding joint, dipping 25 to 15°, 1.5' thick, thinly bedded to laminated SILTSTONE sequence; with 2-3" thick SANDSTONE bed, very dark bluish gray, at 224.3' (El.: 200.7'). SEDIMENTARY ROCK, (Fine SANDY SILTSTONE); massive; very dark greenish gray; fresh; very soft; poorly indurated; unfractured; with locally abundant bioturbation structures (light bluish gray) and soft sediment deformation features. At Elev 263.9', observed bedding joint, dipping 30 to 20°, 1" to 3" thick moderately indurated, moderately hard bed, dark grayish brown. At Elev 261.6', observed bedding joint, dipping 30 to 20°, 1" to 3" thick moderately indurated, moderately hard bed, dark grayish brown.	C45			100	100	22							PA, PI, SD
	207				C46			91	91							EM, M, UW, UC=439psi
285.10	208									23	103					PTS
283.10	210															
281.10	212				C47			82	82							
279.10	214															PA
277.10	216															
275.10	218				C48			100	100							
273.10	220															
271.10	222				C49			100	100							
269.10	224			C50			91	91								
267.10	226									19	109				M, SD, UW	
265.10	228															
263.10	230			C51			100	100								
261.10	232															
259.10	234			C52			100	100								

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-007	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 8 of 10

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
235	235													
257.10	236		SEDIMENTARY ROCK (<i>continued</i>). At Elev 257.8', observed bedding joint, dipping 20 to 10°, 2-3" thick SANDSTONE bed, very dark bluish gray.	C52			100	100						
255.10	238													
253.10	240			C53			100	100						
251.10	242													PA
249.10	244													
247.10	246			C54			100	100						
245.10	248													
243.10	250		At Elev 244.9', observed bedding joint, dipping 30 to 20°, 1" to 3" thick moderately indurated, moderately hard bed, dark grayish gray.						17	117				EM, M, UW, UC=285psi
241.10	252			C55			100	100						
239.10	254			C56			100	100						
237.10	256													
235.10	258								18	112				PA, UC=363psi
233.10	260		SEDIMENTARY ROCK, (SILTSTONE); massive; very dark greenish gray; fresh; soft; unfractured; locally abundant bioturbation structures (dark greenish gray) and soft sediment deformation features.											
231.10	262		At Elev 231.1', observed bedding joint, dipping 20 to 10°, 2-3" thick thinly bedded SILTSTONE.	C58			100	100						
229.10	264													
265														

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-007
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY D. Jankly	DATE 4-18-13	SHEET 9 of 10	

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
265			SEDIMENTARY ROCK (<i>continued</i>).		C58			100	100	20	107				PA, SD, UC=533psi
227.10	266				C59			100	100						
225.10	268		Abundant bioturbation structures dipping 20 degrees.												
223.10	270														
	271		Bottom of borehole at 271.0 ft bgs												
221.10	272		Boring terminated at a planned depth.												
	273		Piezometer Sensors Installed at 52' and 200' (El. 493.1', and 293.1')												
219.10	274		RQD values provided on the boring logs are based on intact core pieces obtained between two natural discontinuities. The majority of core obtained from this boring is typically very weak to weak and does not meet the "sound core" definition provided in the standard test method for RQD (ASTM D 6032). These RQD values should not be used to evaluate rock mass quality.												
217.10	276														
	277														
215.10	278														
	279														
213.10	280														
	281														
211.10	282														
	283														
209.10	284														
	285														
207.10	286														
	287														
205.10	288														
	289														
203.10	290														
	291														
201.10	292														
	293														
199.10	294														
	295														



REPORT TITLE BORING RECORD				HOLE ID RC-13-007	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 10 of 10

LOGGED BY J. Culotta	BEGIN DATE 3-25-13	COMPLETION DATE 3-25-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 6' 39.83764" / -118° 9' 3.307107" NAD83	HOLE ID A-13-008
DRILLING CONTRACTOR Jet Drilling, Inc			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 615.5 ft NAVD88
DRILLING METHOD Hollow-Stem Auger			DRILL RIG CME-75	BOREHOLE DIAMETER 8 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT (1.4"), Cal (2.5")			SPT HAMMER TYPE 140 lb. Auto Hammer, 30" Drop	HAMMER EFFICIENCY, ERI 72%
BOREHOLE BACKFILL AND COMPLETION Cement and Bentonite Grout			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS NE	TOTAL DEPTH OF BORING 96.5 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0		ASPHALT (3").												
	1		AGGREGATE BASE (9").												
613.50	2		SILTY SAND (SM); yellowish brown; moist; mostly coarse to fine SAND; little fines; few fine GRAVEL; homogeneous; weak cementation (ALLUVIUM).		B01										
611.50	4														
609.50	6				S02	5 7 8	15	100		10	114				M, PI, UW
607.50	8														
605.50	10		Loose.		S03	4 4 4	8	100							PA
603.50	12														
601.50	14														
599.50	16		Light olive brown; mostly medium to fine SAND.		S04	8 18 28	46	100		4	115				DS, PA
597.50	18														
595.50	20														
593.50	22		Very dense; trace GRAVEL, stratified.		S05	22 38 43	81	100							
591.50	24														
	25														

(continued)

5 BR - STANDARD SR710N_CH_JET.GPJ CALTRANS LIBRARY DEC09-W CH LOGO.GLB 6/9/14



REPORT TITLE BORING RECORD				HOLE ID A-13-008
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY D. Jankly	DATE 4-18-13	SHEET 1 of 4	

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
589.50	25		SILTY SAND (SM) (continued). Some fine SAND; few fine GRAVEL.	S06	22 38 50-5"		100		10	119				M, PA, UW
587.50	28													
585.50	30		Very dense; mostly coarse to fine SAND; little fine GRAVEL; little fines; stratified.	S07	18 20 25	45	78							PA
583.50	32													
581.50	34													
579.50	36			S08	32 95		17							
577.50	38													
575.50	40			S09	19 29 34	63	100							
573.50	42													
571.50	44													
569.50	46		Mostly fine SAND; some fines.	S10	11 16 32	48	100		13	111				DS, PA
567.50	48													
565.50	50		Poorly graded SAND with SILT (SP-SM); very dense; yellowish brown; moist; mostly coarse to fine SAND; little fine GRAVEL; few fines; stratified; weak cementation.	S11	32 28 33	61	100							PA
563.50	52													
561.50	54													
	55													

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-008	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 2 of 4

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ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
559.50	56		Poorly graded SAND with SILT (SP-SM) (continued).	▲	S12	45 50-5"		73		3	114				M, PA, UW
557.50	58		Well-graded SAND with SILT (SW-SM); very dense; yellowish brown; moist; mostly medium to fine SAND; few fines; trace fine GRAVEL; homogeneous; weak cementation.												
555.50	60			⊗	S13	18 20 26	46	100							PA
549.50	66			▲	S14	70 100		83		2	108				M, DS, PA, UW
547.50	68		SILTY SAND (SM); very dense; yellowish brown; moist; mostly coarse to fine SAND; little fines; trace GRAVEL; homogeneous; weak cementation.												
545.50	70			⊗	S15	35 69		100		2					CR, M
541.50	74		Well-graded SAND with SILT (SW-SM); yellowish brown; moist; mostly coarse to fine SAND; little coarse to fine GRAVEL; few fines; homogeneous; weak cementation.												
539.50	76			▲	S16	79 92		67		2	105				DS, M, PA, UW
535.50	80		Very dense; few GRAVEL, stratified.												
533.50	82			⊗	S17	30 71		50							

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-008	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
529.50	86		Well-graded SAND with SILT (SW-SM) (continued).	S18	100-2"			0							
527.50	88		SILTY SAND (SM); dense; dark yellowish brown; moist; mostly fine SAND; some fines; homogeneous; weak cementation.												
525.50	90			S19	14	34	100								
523.50	92					16									
521.50	94				18										
519.50	96			S20	20		67			9	118			M, PA, UW	
	97		Bottom of borehole at 96.5 ft bgs												
	98		Boring terminated at a planned depth.												
517.50	98														
515.50	100														
513.50	102														
511.50	104														
509.50	106														
507.50	108														
505.50	110														
503.50	112														
501.50	114														
	115														



REPORT TITLE BORING RECORD				HOLE ID A-13-008	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
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BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 4 of 4

LOGGED BY D. Jankly	BEGIN DATE 3-18-13	COMPLETION DATE 3-26-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 6' 44.52444" / -118° 9' 26.03744" NAD83	HOLE ID RC-13-009
DRILLING CONTRACTOR Cascade Drilling, LP			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 650.9 ft NAVD88
DRILLING METHOD Hollow-Stem Auger to 147'; Rotary Wire-line to TD			DRILL RIG CME-95 to 120'; CME-85 to TD	BOREHOLE DIAMETER 8" to 147'; 3.8" to TD
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT (1.4"), Cal (2.5"), HQ (2.5")			SPT HAMMER TYPE 140 lb. Auto Hammer, 30" Drop	HAMMER EFFICIENCY, ERI 78%
BOREHOLE BACKFILL AND COMPLETION Piezometer Installed on Completion			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS 92.0 ft	TOTAL DEPTH OF BORING 267.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0		ASPHALT (5").												
648.90	1		SILTY SAND (SM); loose; yellowish red; moist; mostly medium to fine SAND; some fines; few fine GRAVEL; homogeneous; weak cementation; (ALLUVIUM).		B01										
646.90	2														
644.90	3														
642.90	4		Poorly graded SAND (SP); yellowish brown; moist; mostly medium to fine SAND; few fines; homogeneous; weak cementation.		S02	2	5	100		10					M, PA
640.90	5					2									
638.90	6					3									
636.90	7		Well-graded SAND with SILT and GRAVEL (SW-SM); dense; yellowish brown; moist; mostly coarse to fine SAND; little fine GRAVEL; few fines; homogeneous; weak cementation.		S03	3	15	67		11	102				M, UW
634.90	8					6									
632.90	9					9									
630.90	10				S04	11	28	100							M, PA, UW
628.90	11					12									
626.90	12					16									
	13														
	14														
	15														
	16														
	17														
	18														
	19														
	20														
	21														
	22														
	23														
	24														
	25														

(continued)

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REPORT TITLE BORING RECORD				HOLE ID RC-13-009
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY D. Jankly	DATE 4-18-13	SHEET 1 of 10	

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
624.90	26		Well-graded SAND with SILT and GRAVEL (SW-SM) (continued). Very dense.	X	S06	30 50		100							
622.90	28														
620.90	30		Few fine GRAVEL.	▲	S07	26 26 27	53	67		3	105				DS, PA
618.90	32														
616.90	34		SANDY SILT (ML); strong brown; moist; mostly non-plastic fines; some fine SAND; homogeneous.												
614.90	36			X	S08	13 17 28	45	100							PI
612.90	38														
610.90	40		Yellowish brown.	▲	S09	15 22 28	50	67		9	98				M, PA, UW
608.90	42														
606.90	44														
604.90	46			X	S10	13 11 15	26	100							
602.90	48														
600.90	50		SILTY SAND (SM); brown; moist; mostly fine SAND; some non plastic fines; homogeneous; weak cementation.	▲	S11	16 17 39	56	94		3	101				DS, PA, PI
598.90	52														
596.90	54														
	55														

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-009	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 2 of 10

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks		
594.90	56		SILTY SAND (SM) (continued). Dense; moist to wet; Minor free water.	X	S12	12	36	100									
	57					16											
592.90	58																
	59																
590.90	60		Moist.	▲	S13	24	64	89									
	61					29											
	62					35											
588.90	63																
	64																
586.90	65																
	66		Very dense.	X	S14	17	38	94									
584.90	67					19											
	68																
582.90	69																
	70		SANDY SILT (ML); brown; moist; mostly non-plastic fines; some fine SAND; homogeneous.	▲	S15	23		75		4	113			M, PA, UW			
580.90	71					44											
	72					50-4"											
578.90	73																
	74																
576.90	75																
	76		Very dense.	X	S16	20	50	100									
574.90	77					24											
	78																
572.90	79																
	80		SANDY SILT (ML); brown; moist; mostly non-plastic fines; some fine SAND; homogeneous.	▲	S17	29	80	67		12	110			DS, PA			
570.90	81					30											
	82					50											
568.90	83																
	84																
566.90	85																

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-009	
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BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 3 of 10

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
85			SANDY SILT (ML) (continued).												
564.90	86			X	S18	18 18 26	44	89							
562.90	88														
560.90	90		Some medium to fine SAND.	▲	S19	19 27 50	77	67							
558.90	92														
556.90	94														
554.90	96		Trace fine GRAVEL.	X	S20	22 30 45	75	100							
552.90	98														
550.90	100		SILTY SAND (SM); yellowish brown; wet; mostly coarse to fine SAND; little fines; trace fine GRAVEL; homogeneous; weak cementation.	▲	S21	18 36 50-2"		79		15	118			M, PA, UW	
548.90	102														
546.90	104														
544.90	106		Very dense; Locally stratified with two - 1" to 2" thick SILT lenses, low plasticity.	X	S22	30 44 50-5"		71							
542.90	108														
540.90	110		SANDY SILTY CLAY (CL-ML); dark yellowish brown; moist to wet; mostly low plasticity fines; some coarse to fine SAND; few fine GRAVEL; homogenous.	X	S23	50-4"		100		12	126			M, PA, UW	
538.90	112														
536.90	114														
115															

(continued)



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PROJECT OR BRIDGE NAME SR 710 North Study					
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ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
534.90	116		SANDY SILTY CLAY (CL-ML) (continued).	X	S24	26 50		58		14					M, PA, PI
532.90	118														
530.90	120			X	S25	50		33							
528.90	122														
526.90	124		SILTY SAND (SM); olive; wet; mostly fine SAND; some low plasticity fines; stratified with faintly darker horizons; weak cementation.	X	S26	50-3"		0							Flowing sands encountered
524.90	126														
522.90	128														
520.90	130		Very dense.	X	S27	47 45 50-5"		12							
518.90	132			X	S28	62 50 45	95	100		21					M, PA
516.90	134														
514.90	136														
512.90	138			X	S29	67 39-3"		78		21	110				Sampler bouncing M, PA, UW
510.90	140														
508.90	142		IGNEOUS ROCK, (QUARTZ DIORITE); medium grained; strong brown; decomposed to intensely weathered; (CLAYEY SAND (SC); very dense; moist; mostly coarse to medium SAND; some medium plasticity fines; moderate cementation); (Wilson Quartz Diorite).	X	S30	60 50-3"		44		12					CR, M
506.90	144														

(continued)



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5 BR - STANDARD SR710N_CH_CASCADE.GPJ CALTRANS LIBRARY DEC09-W CH LOGO.GLB 6/9/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
504.90	146		IGNEOUS ROCK (continued).												
502.90	148		IGNEOUS ROCK, (QUARTZ DIORITE); medium grained, phaneritic; strong brown; moderately weathered; moderately hard; intensely fractured; unit has abundant totally healed fractures, up to 1/8" thick. At Elev 502.4', observed fracture zone, dipping 60 to 40°, 1/8" thick lean CLAY lining; tight; slightly rough.		C32			86	0						
498.90	152		At Elev 498.9', observed fracture zone, dipping 70 to 40°, 1/16" thick lean CLAY and manganese lining; tight; slightly rough, locally slickensided.		C33			64	0						
494.90	156		At Elev 495.4', observed fault, dipping 60 to 35°, 1/16" thick lean CLAY lining; tight; slightly rough.												
492.90	158		At Elev 493.9', observed fracture zone, dipping 50 to 30°, manganese stained; tight; moderately rough to rough. At Elev 492.9', observed foliation joint, dipping 90 to 70°, 1/4" wide felsic vein; brownish yellow; moderately soft; tight; undulatory.		C34			92	0						
488.90	162		At Elev 489.9', observed foliation joint, dipping 80°, 3/8" wide felsic vein; brownish yellow; moderately soft; tight; undulatory. At Elev 488.9', observed fracture zone, dipping 50 to 30°, manganese stained; tight; moderately rough to rough.		C35			94	20						
484.90	166		At Elev 485.9', becomes moderately to intensely fractured.							5	141				M, PL, UW
482.90	168		At Elev 484.2', observed foliation joint, dipping 70°, 1/8" to 2" wide felsic vein; yellow; moderately soft; tight; undulatory; continues to 178.7' (El.: 472.2'). At Elev 483.9', becomes slightly weathered. At Elev 483.4', observed fracture zone, dipping 30 to 0°, numerous subhorizontal; manganese stained; tight fractures; moderately rough to rough.		C36			100	40	6	139				EM, M, UC=436psi, UW
478.90	172				C37			100	0						
476.90	174		At Elev 477.4', observed 1' thick; soft; easily friable zone.												

(continued)



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PROJECT OR BRIDGE NAME SR 710 North Study					
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ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
175			IGNEOUS ROCK (<i>continued</i>).												
474.90	176	[Cross-hatched pattern]	At Elev 475.3', observed random fracture, dipping 60°, 0 to 1/16" thick; lean CLAY and manganese lining; tight; moderately rough to rough.	C37				100	0				[Diamond pattern]		M, PL, UW
472.90	177		At Elev 473.9', becomes slightly to moderately weathered.	C38				100	30	2	139				
470.90	178		At Elev 471.9', observed random fracture, dipping 40°, manganese lined; tight; moderately rough.												
470.90	180		At Elev 470.9', observed random fracture, dipping 50°, manganese lined; tight; moderately rough.												
468.90	181		At Elev 470.4', observed shear/fault zone, dipping 70°, 1.5' thick gouge zone; rock is pulverized; shear plane in center is moderately rough, lined with 1/8" thick, black SANDY SILT; gouge zone varies, strong brown to black to white.												
468.90	182		At Elev 468.9', becomes intensely fractured.	C39				100	0						
466.90	183		At Elev 468.8', observed foliation joint, dipping 90 to 80°, 1/8" to 3/8" wide felsic vein; 2' long; yellow; moderately hard; tight.												
466.90	184		At Elev 467.9', observed fracture zone, dipping 70 to 30°, manganese lined; tight; moderately rough.												
464.90	185														
464.90	186														
462.90	187		At Elev 463.9', becomes hard, moderately fractured.	C40				100	60	2				CR, M	
462.90	188		At Elev 463.8', observed fracture zone, dipping 55 to 40°, manganese lined; tight; moderately rough; continues to 191' (El.: 459.9).											PTS	
460.90	189		At Elev 462.9', observed fault, dipping 50°, 1/2" thick SANDY lean CLAY lining; stepped and smooth; white. PTS: Sheared quartz diorite; 71% plagioclase; 15% biotite; 14% quartz.												
460.90	190														
458.90	191		At Elev 459.7', observed fault, dipping 30°, 1/8" thick; lean CLAY and manganese lining; tight; smooth to slightly rough.	C41				100	0	4	147				EM, M, UC=281psi, UW
458.90	192		At Elev 459.1', observed fault, dipping 0°, 1/8" thick; lean CLAY and manganese lining; tight; moderately rough.												
456.90	193		At Elev 458.9', becomes intensely fractured; typically tight and well healed, local manganese staining.												
456.90	194		At Elev 456.5', observed fault, dipping 10 to 0°, 1/2" thick SANDY lean CLAY gouge; stepped and smooth; white.												
454.90	195		At Elev 455.9', observed fault, dipping 80 to 60°, 1/16" to 3/8" thick black lean CLAY gouge; stepped and smooth.												
454.90	196		At Elev 455.1', observed fault, dipping 20°, 1/8" thick; lean CLAY and manganese lining; tight; smooth; rock is pulverized between faults at 195.8' and 196'.	C42				100	0						
452.90	197		At Elev 454.9', observed fault, dipping 60°, 1/8" thick; lean CLAY and manganese lining; tight; moderately rough.												
452.90	198		At Elev 453.9', becomes very intensely fractured to 207'; fractures are typically manganese lined and tight.												
450.90	199		At Elev 453.8', observed fracture zone, dipping 70 to 10°, manganese lined; tight; moderately rough; continues to 207' (El.: 443.9').												
450.90	200														
448.90	201														
448.90	202			C43				96	0						
446.90	203														
446.90	204														
205															

(continued)



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ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks		
444.90	206	Material Graphics	At Elev 446.3', observed fault, dipping 65°, 1/8" thick; lean CLAY and manganese lining; tight; smooth to slightly rough.	C43				96	0				Drilling Method	Casing Depth			
442.90	208		At Elev 443.9', becomes slightly weathered; hard; moderately to intensely fractured.	C44				100	66	2	148						EM, M, PL, UC=892psi, UW
440.90	210		At Elev 442.6', observed fault, dipping 60 to 50°, 1" to 2" thick lean CLAY gouge and manganese lining; tight; smooth to slightly rough. At Elev 441.6', observed random fracture, dipping 0°, manganese lined; tight; moderately rough. At Elev 440.9', observed random fracture, dipping 0°, manganese lined; tight; moderately rough.	C45				100	40		1	151					CAI, M, PL, UW PL
438.90	212		At Elev 439.7', observed random fracture, dipping 60°, manganese lined; tight; moderately rough. At Elev 438.9', becomes moderately hard.														
436.90	214		At Elev 437.8', observed fault, dipping 30 to 20°, 1/8" thick; lean CLAY lining; tight; smooth to slightly rough. At Elev 437.4', observed fault, dipping 30°, 1/8" thick; lean CLAY lining; tight; smooth to slightly rough. At Elev 437.3', observed fault, dipping 50°, 1/8" thick; lean CLAY lining; tight; smooth to slightly rough. At Elev 436.5', observed fracture zone, dipping 50 to 10°, manganese lined; tight; moderately rough; continues to 217' (El.: 433.9').		C46				100	40							
434.90	216		At Elev 433.9', becomes hard. At Elev 433.8', observed fracture zone, dipping 40 to 20°, manganese lined; tight; moderately rough; continues to 222' (El.: 428.9').														
432.90	218																
428.90	222			C47				100	46		3	149					M, PL, UW
426.90	224		At Elev 428.6', observed fracture zone, dipping 70 to 10°, manganese lined; tight; moderately rough; continues to 227' (El.: 423.9').														
424.90	226		At Elev 424.7', observed fault, dipping 40 to 20°, manganese lined; tight; moderately rough. At Elev 423.9', observed fracture zone, dipping 50 to 0°, spaced every 2" to 6"; manganese lined; tight; moderately rough; continues to 257.8' (El.: 393.1'). PTS: Sheared quartz diorite; 75% plagioclase; 13% quartz; 12% biotite.		C48				100	72							
422.90	228		At Elev 421.7', observed fault, dipping 60°, 1/8" thick SANDY lean CLAY lining; tight; smooth to slightly rough.								2	149					M, PL, UW
420.90	230		At Elev 419.9', observed fault, dipping 60°, 1/8" thick lean CLAY lining; tight; smooth to slightly rough.	C49					100	30		3				147	
418.90	232																
416.90	234																
205	205																

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-009	
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PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 8 of 10

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
414.90	236			C49				100	30						
412.90	238		At Elev 413.2', observed fault, dipping 20°, 1/8" thick SANDY lean CLAY lining; tight; smooth to slightly rough. At Elev 412.7', observed fault, dipping 20°, 1/16" thick SANDY lean CLAY lining; tight; smooth to slightly rough.	C50				96	0						
408.90	242			C51				100	30						
404.90	246									2					PL M, PL
402.90	248		At Elev 404.4', observed fault, dipping 20°, 1/2" thick SANDY lean CLAY lining; tight; smooth to slightly rough.	C52				100	60						EM, M, PL, UC=1593psi, UW
398.90	252			C53				36	36						
394.90	256		At Elev 396.9', observed fault, dipping 60 to 30°, 1/4" thick SANDY lean CLAY lining; tight; smooth to slightly rough. CLAY gouge to 255' (EL.: 395.9'). At Elev 396.3', observed fault, dipping 50°, 3/8" thick SANDY lean CLAY lining; tight; smooth to slightly rough. Main splay between 254' and 255'. At Elev 396.1', observed fault, dipping 30°, 1/16" thick lean CLAY lining; tight; smooth to slightly rough.	C54				100	40		2	149			EM, M, PL, UC=506psi, UW
392.90	258		At Elev 393.3', observed fracture zone, dipping 20 to 0°, manganese lined; tight; moderately rough. At Elev 393.1', observed fault, dipping 30°, 1/8" thick SANDY lean CLAY lining; tight; smooth to slightly rough. At Elev 393.0', observed fault, dipping 50°, 3/4" thick SANDY lean CLAY lining; tight; smooth to slightly rough.												
388.90	262		At Elev 389.5', observed fracture zone, dipping 60 to 0°, spaced every 2" to 6"; manganese lined; tight; moderately rough to rough; continues to 267' (EL.: 383.9').	C55				100	30						

(continued)



REPORT TITLE BORING RECORD				HOLE ID RC-13-009	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER	PREPARED BY D. Jankly			DATE 4-18-13	SHEET 9 of 10

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
384.90	266		PTS: Sheared tonalite; 67% plagioclase; 21% quartz; 12% biotite.		C55			100	30						PTS
	267		Bottom of borehole at 267.0 ft bgs												
382.90	268		Boring terminated at a planned depth.												
	269		Piezometer Sensors Installed at 100' and 199.5' (El. 550.4', and 451.4')												
380.90	270														
	271														
378.90	272														
	273														
376.90	274														
	275														
374.90	276														
	277														
372.90	278														
	279														
370.90	280														
	281														
368.90	282														
	283														
366.90	284														
	285														
364.90	286														
	287														
362.90	288														
	289														
360.90	290														
	291														
358.90	292														
	293														
356.90	294														
	295														



REPORT TITLE BORING RECORD				HOLE ID RC-13-009	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 10 of 10

LOGGED BY M. Herzberg	BEGIN DATE 3-4-13	COMPLETION DATE 3-8-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 7' 3.973722" / -118° 9' 22.46405" NAD83	HOLE ID O-13-010
DRILLING CONTRACTOR Boart Longyear Company			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 693.5 ft NAVD88
DRILLING METHOD Sonic			DRILL RIG 600 T Roto Sonic	BOREHOLE DIAMETER 4 in
SAMPLER TYPE(S) AND SIZE(S) (ID) 3.5" ID polytube; polybag			SPT HAMMER TYPE N/A	HAMMER EFFICIENCY, ERI N/A
BOREHOLE BACKFILL AND COMPLETION Piezometer Installed on Completion			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS 151.0 ft	TOTAL DEPTH OF BORING 272.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0		ASPHALT (8.5").												Hand Auger to 5'
691.46	1		Poorly graded SAND (SP); dark yellowish brown; moist; few fine, subangular GRAVEL; mostly medium to fine SAND; few nonplastic fines; weak cementation; soil development: A-horizon grading to Bk soil horizon. [ALLUVIUM].		O01			100							
689.46	2														
687.46	3														
685.46	4					O02			100						
683.46	5														
681.46	6		SILTY SAND with GRAVEL and COBBLES (SM); dark yellowish brown; moist; little fine, subangular GRAVEL; mostly medium to fine SAND; little nonplastic fines; micaceous; %5 COBBLES, GRANITE, very intensely weathered, soft, disturbed due to drilling.		O03			100							
679.46	7														
677.46	8														
675.46	9														
673.46	10					O04			100						
671.46	11		Coarse to fine SAND.												
669.46	12														
	13														
	14														
	15					O05			100			2			PA, M
	16														
	17														
	18														
	19														
	20														
	21														
	22														
	23														
	24				O06			100							
	25														

(continued)

5 BR - STANDARD SR710N_ECIOGGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14



REPORT TITLE BORING RECORD				HOLE ID O-13-010
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 1 of 10	

5 BR - STANDARD SR710N_ECIOLOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_EC1_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
667.46	25		(continued).	O06			100							
665.46	28		Increased fines.											
663.46	30		SILT with SAND and COBBLES (ML); dark yellowish brown; moist; trace angular GRAVEL; little medium to fine SAND; mostly low to medium plasticity, medium dry strength fines; COBBLES, GRANITE, moderately weathered, hard, ~3-4" diameter.	O07			100							
659.46	34		Poorly graded SAND (SP); dark yellowish brown; moist; trace angular GRAVEL; mostly fine SAND; trace nonplastic fines; weak cementation.	O08			100							
657.46	36		Poorly graded SAND (SP) thinly bedded with thin interbeds of SILT (ML) Poorly graded SAND (SP); brown; moist; mostly coarse to fine SAND; trace fines; some subangular GRAVEL; weak cementation. SILT (ML); light gray; moist; low plasticity; rapid dilatancy.	O09			100							
655.46	38		SILTY CLAY with GRAVEL (CL-ML); dark yellowish brown; moist; little fine, angular GRAVEL; trace fine SAND; mostly low plasticity fines.											
653.46	40		SILTY CLAY (CL-ML); pale yellow; moist; trace coarse, angular GRAVEL; few fine SAND; mostly low plasticity fines.						7				PA, M	
651.46	42		SILTY SAND (SM); yellowish brown; moist; mostly fine SAND; some nonplastic to low plasticity fines; few coarse to fine GRAVEL; slightly micaceous; moderate cementation.	O10			100							
649.46	44													
647.46	46		SILT (ML); dark yellowish brown; moist; few fine SAND; mostly low plasticity fines; micaceous.	O11			100							
645.46	48													
643.46	50			O12			100							
641.46	52													
639.46	54			O13			100							
	55		(continued)											



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DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 2 of 10	

5 BR - STANDARD SR710N_ECIOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_EC1_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
637.46	55		SILTY CLAY (CL-ML); yellowish brown; moist; mostly low plasticity fines.		O13			100							
	56														
	57		Poorly graded SAND with SILT (SP-SM); dark yellowish brown; moist; mostly coarse to fine SAND; few nonplastic fines; weak cementation.												
635.46	58		SILT (ML); dark yellowish brown; moist; few fine SAND; mostly low plasticity fines.		O14			100							
	59		Poorly graded SAND with SILT and COBBLES (SP-SM); brown; moist; mostly coarse to fine SAND; few nonplastic fines; weak cementation; 15% COBBLES, GRANITE, moderately soft to moderately hard, 3-4" diameter.							2					PA, M
633.46	60														
	61		Poorly graded SAND with SILT, GRAVEL, and COBBLES (SP-SM); brown; moist; little, fine, subangular GRAVEL; mostly coarse to fine SAND; few nonplastic fines; weak cementation; 15% COBBLES, GRANITE, moderately weathered, hard, ~3-4" diameter.		O15			100							
631.46	62														
	63														
629.46	64														
	65														
627.46	66				O16			100							
	67		SILT with SAND (ML); dark yellowish brown; moist; little fine SAND; mostly low plasticity fines.												
625.46	68														
	69														
623.46	70		Poorly graded SAND with GRAVEL (SP); brown; some fine, subangular GRAVEL; mostly coarse to fine SAND; few nonplastic fines; weak cementation.		O17			100							
	71														
621.46	72														
	73														
619.46	74				O18			100							
	75		SILT with SAND (ML); brown; moist; mostly nonplastic, low dry strength fines; micaceous.												
617.46	76														
	77		Poorly graded SAND with SILT (SP-SM); dark yellowish brown; moist; few GRAVEL; mostly coarse to fine SAND; few nonplastic fines; weak cementation.		O19			100							
615.46	78														
	79														
613.46	80														
	81		SILTY SAND (SM); dark yellowish brown; moist; trace coarse to fine GRAVEL; mostly coarse to fine SAND; some low plasticity fines; weak cementation.		O20			100							
611.46	82		Well-graded SAND with SILT and GRAVEL (SW-SM); yellowish brown; moist; little coarse to fine GRAVEL; mostly coarse to fine SAND; few nonplastic fines; weak cementation; slightly micaceous.												
	83														
609.46	84				O21			100							
	85														

(continued)



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BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 3 of 10	

5 BR - STANDARD SR710N_ECILOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECI_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
607.46	85		Well-graded SAND with SILT and GRAVEL (SW-SM) (continued).		O21			100		2					PA, M
	86		SANDY SILT (ML); light yellowish brown; moist; few GRAVEL; some medium to fine SAND; mostly low plasticity fines.		O22			100							
605.46	87		Poorly graded SAND with SILT (SP-SM); yellowish brown; moist; trace GRAVEL; mostly medium to fine SAND; few nonplastic fines; weak cementation; slightly micaceous.		O23			100							
	88														
	89														
603.46	90														
	91														
601.46	92														
	93		SILT (ML); brown; moist; trace fine SAND; mostly nonplastic, low dry strength fines; fines downward.		O24			50							
	94														
599.46	95		SILTY SAND (SM); pale brown; moist; trace GRAVEL; mostly medium to fine SAND; little nonplastic fines; weak cementation; slightly micaceous; fines upward to SAND with SILT.												
	96														
597.46	97														
	98		SILT (ML); brown; moist; trace fine SAND; mostly nonplastic, low dry strength fines; fines increase with depth, micaceous.		O25			100							
	99														
595.46	100														
	101		SILTY SAND (SM); yellowish brown; moist; trace fine GRAVEL; mostly medium to fine SAND; some nonplastic fines; weak cementation; micaceous.		O26			50							
	102														
593.46	103		SILT with SAND (ML); dark yellowish brown; moist; little fine SAND; mostly nonplastic fines; micaceous.		O27			100		7					PA, M
	104		Poorly graded SAND (SP); yellowish brown; moist; trace GRAVEL; mostly coarse to fine SAND; few fines; weak cementation.		O28			100							
	105		Fine SAND; trace nonplastic fines.												
589.46	106		SILTY CLAY (CL-ML); brown; moist; trace GRAVEL; few fine SAND; mostly low plasticity, high dry strength fines; fines downward.												
	107														
587.46	108		Poorly graded SAND with SILT (SP-SM); brown; moist; trace GRAVEL; mostly fine SAND; few nonplastic fines; weak cementation.												
	109		At Elev 584.5', observed ~2" thick SILTY SAND (SM) bed.												
585.46	110		SILTY SAND (SM); brown; moist; trace GRAVEL; mostly coarse to fine SAND; some low plasticity fines; weak cementation.		O29			100							
	111														
583.46	112		Poorly graded SAND (SP); brown; moist; trace GRAVEL; mostly coarse to fine SAND; few nonplastic fines; weak cementation.												
	113		At Elev 580.5', observed 2 inch thick fine SAND bed at the bottom of unit.												
581.46	114		SILTY SAND (SM) thickly bedded with thick interbeds of SILTY CLAY (CL-ML). SILTY SAND; brown; moist;												
	115														

(continued)



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5 BR - STANDARD SR710N_ECIOLOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
577.46	115		mostly coarse to fine SAND; some fines; few fine GRAVEL; weak cementation. SILTY CLAY; dark yellowish brown to brown; moist; mostly non to low plasticity fines; few fine SAND; slow to rapid dilatancy.. (continued).		O29			100							PA, PI, M
	116				O30			100		8					
575.46	117					O31			100						
573.46	118		SILTY CLAY (CL-ML); dark yellowish brown; moist; few fine SAND; mostly medium plasticity, low dry strength fines.												PA, PI
	119					O32			100						
571.46	120					O33			100						
569.46	121														
567.46	122		Lean CLAY (CL) thickly bedded with thick interbeds of SILTY SAND (SM); Lean CLAY; dark yellowish brown; moist; little medium to fine SAND; trace coarse to fine GRAVEL; low plasticity; slow to rapid dilatancy. SILTY SAND; moist; brown; mostly medium to fine SAND; some fines; few fine GRAVEL.												PA, M
	123					O34			100		8				
565.46	124														
563.46	125														
561.46	126														
559.46	127														PA, PI, M, CR
557.46	128														
555.46	129														
553.46	130														
551.46	131														
549.46	132									19					
	133														
	134														
	135														
	136														
	137														
	138														
	139														
	140														
	141														
	142														
	143														
	144														
	145														

(continued)



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PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 5 of 10	

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	145		(continued).											
547.46	146			O34			100		8					
545.46	148													
	149													
543.46	150			O35			100							PA
	151													
541.46	152													
	153													
539.46	154													
	155													
537.46	156													
	157													
535.46	158			O36			100							
	159													
533.46	160			O37			100							PA, M
	161								10					
531.46	162													
	163													
529.46	164													
	165													
527.46	166													PA, PI
	167													
525.46	168													
	169													
523.46	170													
	171		Fat CLAY (CH); yellowish brown; moist; mostly high plasticity fines.											
521.46	172		SILTY SAND (SM) thickly interbedded with thick interbeds of SILT (ML); SILTY SAND; yellowish brown; moist; mostly fine SAND; some low plasticity fines; weak cementation; slightly micaceous. SILT; yellowish brown; moist; mostly fines; little fine SAND; low plasticity; rapid dilatancy; slightly micaceous.	O38			100							PA
	173													
519.46	174													
	175													

(continued)



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5 BR - STANDARD SR710N_ECIOLOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_EC1_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	175		(continued).		O38			100							
517.46	176				O39			100							
515.46	178														
513.46	180		SANDY SILT (ML); yellowish brown; moist; trace fine GRAVEL; some fine SAND; mostly nonplastic fines; slightly micaceous.							20					PA, M
509.46	184														
507.46	186														
505.46	188				O40			100							
503.46	190														
501.46	192		SANDY lean CLAY (CL); reddish brown; moist; some medium to fine SAND; mostly low plasticity, medium dry strength fines; some pedogenic soil development.												PA, PI
499.46	194														
497.46	196		SANDY SILT (ML); yellowish brown; moist; some fine SAND; mostly nonplastic fines.		O41			100							
495.46	198														
493.46	200		SILTY SAND (SM); reddish brown; moist; trace fine GRAVEL; mostly medium to fine SAND; some nonplastic to low plasticity fines; moderate cementation; micaceous, some pedogenic soil development.							7					PA, PI, M, CR
491.46	202		Fat CLAY (CH); dark yellowish brown; moist; few fine SAND; mostly high plasticity, very high dry strength fines; slightly micaceous, parent material to pedogenic soil development in SILTY SAND (SM) above.												
489.46	204		CLAYEY SAND (SC); brown; moist; trace fine GRAVEL; mostly coarse to fine SAND; little low plasticity fines; moderate cementation.												
	205		Poorly graded SAND (SP); dark yellowish brown; moist; few fine GRAVEL; mostly coarse to fine SAND; few												

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5 BR - STANDARD SR710N_ECILOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
487.46	206		finer; moderate cementation; slightly micaceous. SILTY CLAY (CL-ML); brown; moist; little fine SAND; mostly high plasticity fines; micaceous.	O41				100							
485.46	208		POORLY GRADED SAND with SILT (SP-SM); dark yellowish brown; moist; mostly fine SAND; little nonplastic fines; weak cementation; fines upward.	O42				100							
483.46	210		SILTY CLAY (CL-ML); brown; moist; little fine SAND; mostly high plasticity, high dry strength fines; micaceous.												
481.46	212		SANDY lean CLAY (CL); brown; moist; some medium to fine SAND; mostly low to medium plasticity, medium dry strength fines. At Elev 483.5', observed trace SAND. At Elev 482.6', observed coarse GRAVEL and possible decomposed cobble (IGNEOUS).												PA, PI
479.46	214		SILTY SAND (SM); brown; moist; trace fine GRAVEL; mostly medium to fine SAND; some low plasticity fines; weak cementation; pedogenic soil development (Bt Horizon) with visible fine to coarse GRAVEL, white clay to silt coating ped surfaces, very pale brown.												
477.46	216														
475.46	218		Color to grayish green, clay staining ped surfaces.	O43						10					PA, M
473.46	220		CLAYEY SAND (SC); brown; moist; mostly fine SAND; some low to medium plasticity fines; fines downward.	O44				100							PA, PI
471.46	222														
469.46	224														
467.46	226		SILTY SAND (SM); yellowish brown; moist; few coarse to fine GRAVEL; mostly coarse to fine SAND; little fines.												PA
465.46	228														
463.46	230														
461.46	232		Silty SAND with GRAVEL and COBBLES (SM); brown; moist; mostly coarse to fine SAND; little fines; little fine GRAVEL; micaceous; weak cementation; 5% COBBLES, GRANITE, intensely weathered, hard, broken due to drilling; fines downward.	O45				100							
459.46	234														PA

(continued)



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BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 8 of 10	

5 BR - STANDARD SR710N_ECIOGGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	235		(continued).		O45			100							
457.46	236				O46			100							
455.46	238		SANDY SILT (ML); brown; moist; trace GRAVEL; some medium to fine SAND; mostly medium plasticity, low dry strength fines. At Elev 455.2', observed increased clay content, color transitions to brown.												
453.46	240		Lean CLAY (CL) moderately bedded with thin beds of Poorly graded SAND (SP); Lean CLAY; brown; moist; low to medium plasticity; very slow dilatancy. Poorly graded SAND; brown; moist; mostly medium to fine SAND; few fines; weak cementation.												
451.46	242				O47			100		13				PA, PI, M	
449.46	244		Bedding fines downward.												
447.46	246				O48			100							
445.46	248														
443.46	250				O49			100							
441.46	252		SILTY SAND (SM); brown; moist; mostly medium to fine SAND; some fines; moderate cementation.												
439.46	254		CLAYEY SAND (SC); brown; moist; trace GRAVEL; mostly medium to fine SAND; some fines; moderate cementation; fines upwards.												
437.46	256														
435.46	258														
433.46	260														
431.46	262														
429.46	264				O50			100							
	265		(continued)												



REPORT TITLE BORING RECORD				HOLE ID O-13-010	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 9 of 10

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
265	265		CLAYEY SAND (SC) (continued).	O50				100							
427.46	266														
	267														
425.46	268		Poorly graded SAND with CLAY (SP-SC); dark yellowish brown; moist; mostly coarse to fine SAND; few low plasticity, low dry strength fines; weak cementation.												
	269														
423.46	270														
	271														
421.46	272		Borehole Terminated at Planned Depth												
	273		Piezometer Sensor Installed at 196' (El. 497.5'). Bottom of borehole at 272.0 ft bgs												
419.46	274														
	275														
417.46	276														
	277														
415.46	278														
	279														
413.46	280														
	281														
411.46	282														
	283														
409.46	284														
	285														
407.46	286														
	287														
405.46	288														
	289														
403.46	290														
	291														
401.46	292														
	293														
399.46	294														
	295														



REPORT TITLE BORING RECORD				HOLE ID O-13-010	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 10 of 10

LOGGED BY M. Herzberg	BEGIN DATE 3-8-13	COMPLETION DATE 3-8-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 7' 37.06099" / 118° 9' 16.22499" NAD83	HOLE ID A-13-015
DRILLING CONTRACTOR Martini Drilling Corporation			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 778.3 ft NAVD88
DRILLING METHOD Hollow-Stem Auger			DRILL RIG CME-75	BOREHOLE DIAMETER 8.5 in
SAMPLER TYPE(S) AND SIZE(S) (ID) 5-foot long split barrel; 3" dia			SPT HAMMER TYPE N/A	HAMMER EFFICIENCY, ERI N/A
BOREHOLE BACKFILL AND COMPLETION Grout Well Cement, Portland Cement			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS 67.8 ft	TOTAL DEPTH OF BORING 103.6 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0		ASPHALT (6").												Hand Auger to 5'
	1		AGGREGATE BASE (12").												
776.26	2		SILTY SAND (SM); dark yellowish brown; trace coarse to fine, subangular GRAVEL; coarse to fine SAND; little fines; weak cementation [ALLUVIUM].												
774.26	4														
772.26	6		SANDY lean CLAY (CL) dark yellowish brown; moist; trace fine subangular GRAVEL; some coarse to fine SAND; mostly low plasticity low to medium dry strength fines. At Elev 773.2', contains A-B horizon soil development. At Elev 773.0', contains moderate to strong Bt horizon development Moderately thick clay films on ped faces and thick clay films on clasts.	O01				100							PA, PI
770.26	8														
768.26	10														
766.26	12		SILTY CLAY with COBBLES (CL-ML); yellowish brown; moist; few fine SAND; mostly medium plasticity, low dry strength fines. 10% COBBLES, GRANITE, slightly weathered, moderately hard, broken due to drilling. At Elev 765.3', observed increase in CLAY content.	O02				90							
764.26	14														
762.26	16		SILTY SAND (SM); yellowish brown; moist; few fine GRAVEL; mostly coarse to fine SAND; little fines; weak cementation.	O03				90							PA
760.26	18		Poorly graded SAND with CLAY and GRAVEL (SP-SC); strong brown; moist; some coarse to fine GRAVEL; mostly coarse to fine SAND; little fines; moderate cementation; Bt horizon soil development.												
758.26	20		Poorly graded SAND (SP); dark yellowish brown; moist; few coarse to fine, subrounded GRAVEL; mostly coarse to fine SAND; few fines; weak cementation. At Elev 758.2', becomes oxidized, yellowish red.	O04				100							
756.26	22														
754.26	24														
	25														

(continued)

5 BR - STANDARD SR710N_ECIOGGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_EC1_LOGO.GLB 1/15/14



REPORT TITLE BORING RECORD				HOLE ID A-13-015
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 1 of 4	

5 BR - STANDARD SR710N_ECILOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECI_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	25		(continued).	O05			96							
752.26	26													
	27													
750.26	28													
	29													
748.26	30													
	31			O06			80							
746.26	32													
	33													
744.26	34													
	35													
742.26	36		Well-graded SAND with SILT and GRAVEL (SW-SM) yellowish brown; moist; little fine subangular GRAVEL; mostly coarse to fine SAND; few fines; weak cementation.	O07			84							PA
	37													
740.26	38													
	39													
738.26	40													
	41		Poorly graded SAND with GRAVEL (SP); yellowish brown; moist; little coarse to fine subangular GRAVEL, mostly coarse to fine SAND; few fines; weak cementation.	O08			100							
736.26	42													
	43		Poorly graded SAND (SP); yellowish brown; moist; mostly medium to fine SAND; few fines; weak cementation.											
734.26	44													
	45		Poorly graded SAND with GRAVEL(SP); dark yellowish brown; moist; little coarse to fine, subangular GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation; increasing GRAVEL with depth.	O09			30							
732.26	46													
	47													
730.26	48													
	49													
728.26	50													
	51		Poorly graded SAND (SP); yellowish brown; moist; few coarse to fine, subangular GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation; GRAVEL decreasing with depth.	O10			88							
726.26	52													
	53		Poorly graded SAND with SILT (SP-SM); yellowish brown; moist; mostly coarse to fine SAND; little nonplastic to low plasticity, low dry strength fines; moderate cementation.											
724.26	54													
	55													

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-015	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 2 of 4

5 BR - STANDARD SR710N_ECIOLOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_EC1_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
722.26	56		increasing with depth. Poorly graded SAND with SILT and COBBLES (SP-SM); yellowish brown; moist; few fine GRAVEL; mostly coarse to fine SAND; few fines; weak cementation; 10% COBBLES, GRANITE, slightly weathered, moderately hard, 3" dia; fines upward.	O11			76							PA
720.26	58		Poorly graded SAND (SP); yellowish brown; moist; few coarse to fine, subrounded GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation; fines upward.	O12			100							
718.26	60			O13			92							
716.26	62													
714.26	64		SILTY CLAY (CL-ML); yellowish brown; few fine SAND; mostly low to medium plasticity, low dry strength fines.											
	65		Poorly graded SAND (SP); yellowish brown; mostly fine SAND; few fines; moderate cementation; oxidized.											
712.26	66		Poorly graded SAND with SILT (SP-SM); yellowish brown; moist; mostly fine SAND; little fines; moderate cementation.	O14			94							
	67													
710.26	68		Poorly graded SAND (SP); pale brown; moist; few coarse to fine GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation.											
	69													
708.26	70		Poorly graded SAND (SP) moderately bedded with thin interbeds of SILTY CLAY (CL-ML) and thin to moderate interbeds of Poorly graded SAND with GRAVEL (SP); Poorly graded SAND; yellowish brown; moist; mostly fine SAND; few fines; weak cementation. SILTY CLAY; stiff; light brownish gray; moist; trace fine SAND; mostly low to medium plasticity, low dry strength fines; rapid dilatancy. Poorly graded SAND with GRAVEL, yellowish brown; moist, mostly coarse to fine SAND; little coarse to fine subrounded GRAVEL; few fines; weak cementation; larger GRAVEL are decomposed.	O15			94							
706.26	72													
704.26	74													
	75													
702.26	76		SILTY SAND with GRAVEL (SM); yellowish brown; moist; little fine GRAVEL; mostly coarse to fine SAND; little fines.	O16			78							PA, PI
	77		Fat CLAY (CH); brown; moist; few medium to fine SAND; mostly high plasticity, high dry strength fines. At Elev 702.2', observed strong Bt horizon, brown.											
700.26	78													
	79													
698.26	80		Poorly graded SAND (SP); dark yellowish brown; moist; mostly coarse to fine SAND; few fines; weak cementation; fines upward.	O17			92							
	81													
696.26	82		At Elev 697.0', observed possible bioturbated zone, observed Bt soil horizon fragments 2" in dimension.											
	83		At Elev 695.9', contains strong Bt soil development.											
694.26	84		SANDY SILTY CLAY (CL-ML); brown; moist; little medium to fine SAND; mostly medium plasticity, low dry strength fines; fines downward. At Elev 694.3', contains 1" clay lens.											
	85													

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-015	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 3 of 4

5 BR - STANDARD SR710N_ECIOLOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
692.26	86		Poorly graded SAND (SP); yellowish brown; moist; mostly medium to fine SAND; few fines.	O18				36							
690.26	87		SILTY CLAY (CL-ML); dark yellowish brown; moist; few fine SAND; mostly low to medium plasticity, low dry strength fines; coarsens downward.												
688.26	90		SEDIMENTARY ROCK (SANDSTONE), fine sand to medium sand, thinly bedded, dark yellowish orange, very intensely weathered, very soft, (SILTY SAND (SP); mostly SAND; few GRAVEL; little fines) [TOPANGA FORMATION].	O19				84							
686.26	92		Random fracture (clay, totally healed), dipping 40 to 50°.												
684.26	94		Random fracture (black clay, totally healed), dipping 30 to 40°.												
682.26	96		Random fracture (clay, totally healed), dipping 30 to 40°.	O20				100							
680.26	98		Joint (gray clay, totally healed), dipping 40 to 50°.												
678.26	100		Random fracture (gray clay, totally healed), dipping 30 to 40°.	O21				100							
676.26	102														
674.26	104		Random fracture (totally healed), dipping 40 to 50°, 1/10" wide fracture with thin clay films.												
672.26	106		Borehole Terminated at Planned Depth. Bottom of borehole at 103.6 ft bgs												
670.26	108														
668.26	110														
666.26	112														
664.26	114														
	115														



REPORT TITLE BORING RECORD				HOLE ID A-13-015	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 4 of 4		

LOGGED BY M. Herzberg	BEGIN DATE 3-6-13	COMPLETION DATE 3-6-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 7' 43.99556" / -118° 9' 16.8569" NAD83	HOLE ID A-13-016
DRILLING CONTRACTOR Martini Drilling Corporation			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 785.4 ft NAVD88
DRILLING METHOD Hollow-Stem Auger			DRILL RIG CME-75	BOREHOLE DIAMETER 8.5 in
SAMPLER TYPE(S) AND SIZE(S) (ID) 5-foot long split barrel; 3" dia			SPT HAMMER TYPE N/A	HAMMER EFFICIENCY, ERI N/A
BOREHOLE BACKFILL AND COMPLETION Grout, Portland Cement			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS Not Encountered	TOTAL DEPTH OF BORING 65.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0		ASPHALT (8.5").												Hand Auger to 5'
	1		AGGREGATE BASE (6").												
783.38	2		SANDY lean CLAY (CL); brown; moist; few fine SAND; mostly medium plasticity fines [ALLUVIUM].												
	3														
781.38	4														
	5														
779.38	6		SILTY SAND (SM); brown; moist; trace fine GRAVEL; mostly fine SAND; some fines; moderate cementation.		O01			96							PI
	7														
777.38	8														
	9														
775.38	10		SILTY CLAY with SAND (CL-ML); yellowish brown; moist; little fine SAND; mostly medium plasticity fines; oxidized.		O02			68							
	11														
773.38	12														
	13														
771.38	14		SILTY SAND (SM); yellowish brown; moist; few coarse, angular GRAVEL; mostly medium to fine SAND; little fines; moderate cementation; oxidized.		O03			100							PA
	15														
769.38	16		SILTY CLAY with SAND (CL-ML); yellowish brown; moist; some fine SAND; mostly medium plasticity fines; oxidized.												
	17														
767.38	18		Poorly graded SAND (SP); strong brown; moist; trace fine, angular GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation; oxidized.												
	19		Poorly graded SAND (SP) moderately bedded with thin interbeds of Poorly graded SAND with GRAVEL (SP) and COBBLES; Poorly graded SAND; brownish yellow; dry to moist; mostly fine to coarse SAND; trace fine GRAVEL; trace fines; weak cementation; oxidized;												
765.38	20		Poorly graded SAND with GRAVEL, strong brown; dry; mostly fine to coarse SAND; little fine to coarse GRAVEL; weak cementation; oxidized. < 5% COBBLES, GRANITE, very soft, 4" diameter.		O04			86							
	21														
763.38	22														
	23		Poorly graded SAND with SILT (SP-SM); light yellowish brown; moist; mostly SAND; little fines; weak cementation; oxidized.												
761.38	24		Poorly graded SAND with GRAVEL and COBBLES (SP); light yellowish brown; dry; little subangular GRAVEL; mostly coarse to fine SAND; trace fines;												
	25														

(continued)

5 BR - STANDARD SR710N_ECIOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_EC1_LOGO.GLB 1/15/14



REPORT TITLE BORING RECORD				HOLE ID A-13-016
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 1 of 3	

5 BR - STANDARD SR710N_ECIOLOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
759.38	25		weak cementation; 10% COBBLES, GRANITE, very hard, 3" diameter. <i>(continued)</i> .		O05			84							
757.38	28		SILTY SAND (SM); yellowish brown; moist; mostly fine SAND; some fines; weak cementation; micaceous.		O06			100							
	29		Poorly graded SAND (SP); light yellowish brown; moist; trace GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation.												
755.38	30		SILT (ML); yellowish brown; moist; few fine SAND; mostly fines; laminated; oxidized; micaceous.		O07			90							
753.38	32		Poorly graded SAND (SP) thickly bedded with moderate beds of Poorly graded GRAVEL with SAND (GP) and COBBLES. Poorly graded SAND; brown; moist; mostly SAND; few fine GRAVEL; trace fines; weak cementation; Poorly graded GRAVEL with SAND; brown; moist; mostly GRAVEL; little fine to medium SAND; trace fines; weak cementation. < 5% IGNEOUS COBBLES; GRANITE; very soft; ~ 4" diameter.		O08			100							
749.38	36				O09			60						PA	
747.38	38														Drill rig chatter
745.38	40				O10			100							
743.38	42				O11			100							
741.38	44				O12			100							
739.38	46				O13			60							
737.38	48				O14			80							hard drilling
735.38	50				O15			100							
733.38	52		SEDIMENTARY ROCK (SANDSTONE), fine sand to coarse sand, grayish orange, intensely weathered, (SILTY SAND (SM) moist; little fines, strong cementation) [TOPANGA FORMATION].												
731.38	54														

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-016	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 2 of 3

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
729.38	56		SEDIMENTARY ROCK (Sandstone) (continued).		O16			84							PA
727.38	58				O17			100							
725.38	60				O18			100							
723.38	62				O19			100							
721.38	64														
719.38	66		Borehole Terminated at Planned Depth. Bottom of borehole at 65.0 ft bgs												
717.38	68														
715.38	70														
713.38	72														
711.38	74														
709.38	76														
707.38	78														
705.38	80														
703.38	82														
701.38	84														



REPORT TITLE BORING RECORD				HOLE ID A-13-016	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 3 of 3

LOGGED BY C. Madden	BEGIN DATE 3-4-13	COMPLETION DATE 3-4-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 7' 46.87144" / -118° 9' 16.92348" NAD83	HOLE ID A-13-017
DRILLING CONTRACTOR Martini Drilling Corporation			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 788.7 ft NAVD88
DRILLING METHOD Hollow-Stem Auger			DRILL RIG CME-75	BOREHOLE DIAMETER 8.5 in
SAMPLER TYPE(S) AND SIZE(S) (ID) 5-foot long split barrel; 3" dia			SPT HAMMER TYPE N/A	HAMMER EFFICIENCY, ERI N/A
BOREHOLE BACKFILL AND COMPLETION Grout, Portland Cement			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS Not Encountered	TOTAL DEPTH OF BORING 100.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
0	0		ASPHALT (8.5").												Hand Auger to 5'
1	1		AGGREGATE BASE (12").												
786.70	2		SILTY SAND (SM); yellowish brown; moist; few coarse to fine GRAVEL; mostly fine SAND; little fines; weak cementation [ALLUVIUM].												
784.70	4														
782.70	6		Poorly graded SAND with SILT and GRAVEL (SP-SM); light yellowish brown; moist; little coarse to fine GRAVEL; mostly coarse to fine SAND; few fines; weak cementation; thickly laminated.	O01				100							
780.70	8														
778.70	10			O02				84							
776.70	12														
774.70	14														
772.70	16			O03				100						PA	
770.70	18		Poorly graded SAND with SILT and COBBLES (SP-SM) very thickly bedded with moderate beds of poorly graded SAND with SILT (SP-SM). Poorly graded SAND with SILT and COBBLES; light yellowish brown; moist; mostly coarse to fine SAND; few fines; trace GRAVEL; weak cementation; locally oxidized; 5% COBBLES, GRANITE, 3-4" diameter, very hard.												
768.70	20		Poorly graded SAND with SILT; yellowish brown; moist; mostly coarse to fine SAND; few fines; trace GRAVEL; weak cementation.	O04				82							
766.70	22														
764.70	24														
	25														

(continued)

5 BR - STANDARD SR710N_ECIOLOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14



REPORT TITLE BORING RECORD				HOLE ID A-13-017
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 1 of 4	

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	25		(continued).		O05			90							
762.70	26														
	27														
760.70	28														
	29														
758.70	30				O06			107							
	31														
756.70	32		Poorly graded SAND (SP); light yellowish brown; moist; mostly fine SAND; few fines; weak cementation; micaceous.												
	33		Poorly graded SAND with SILT (SP-SM) moderately bedded with thin interbeds of poorly graded GRAVEL with SAND (GP). Poorly graded SAND with SILT; brownish yellow; moist; mostly coarse to fine SAND; few fines; trace GRAVEL; weak cementation. Poorly graded GRAVEL with SAND (GP); brownish yellow; moist; mostly fine GRAVEL; few coarse to fine SAND; few fines; weak cementation.												
754.70	34														
	35				O07			80							
752.70	36		Poorly graded SAND (SP) with COBBLES moderately bedded with moderate beds of poorly graded SAND with GRAVEL (SP). Poorly graded SAND with COBBLES; yellowish brown; moist; mostly coarse to fine SAND; trace fines; little coarse to fine GRAVEL; 5% COBBLES, GRANITE, soft to hard, 3-9" diameter. Poorly graded SAND with GRAVEL; yellowish brown; moist; mostly coarse to fine SAND; little coarse to fine GRAVEL; trace fines.												
	37														
750.70	38														
	39														
748.70	40				O08			70							
	41														
746.70	42														
	43														
744.70	44														
	45														
742.70	46				O09			90							
	47														
740.70	48														
	49														
738.70	50				O10			34							
	51														
736.70	52		Poorly graded SAND with SILT (SP-SM); light yellowish brown; moist; trace fine GRAVEL; mostly medium to fine SAND; few fines; weak cementation; locally oxidized to brownish yellow.												
	53														
734.70	54														
	55														

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-017
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 2 of 4	

5 BR - STANDARD SR710N_ECIOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_EC1_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
732.70	56		Poorly graded SAND with SILT (SP-SM) (continued).	O11			82							PA
730.70	58		COBBLES moderately bedded with moderate beds of poorly graded GRAVEL with SAND (GP). COBBLES; 100% IGNEOUS COBBLES, GRANITE; 3-4" dia; soft to hard. Poorly graded GRAVEL with SAND; pale brown; moist; mostly GRAVEL; little coarse to fine SAND; trace fines; weak cementation.	O12			54							
728.70	60			O13			24							
726.70	62				O14			40						
722.70	66				O15			92						PA
718.70	70		Poorly graded SAND (SP); light yellowish brown; moist; trace coarse to fine GRAVEL; mostly medium to fine SAND; slight soil development at 70-72', oxidized, brown.	O14			40							
716.70	72													
714.70	74													
712.70	76		SILTY SAND (SM); light yellowish brown; moist; few fine GRAVEL; mostly medium to fine SAND; little fines; moderate cementation; micaceous.	O15			92							
710.70	78		Poorly graded SAND with GRAVEL (SP) moderately bedded with moderate beds of poorly graded GRAVEL with SAND (GP). Poorly graded SAND with GRAVEL; pale brown; moist; mostly coarse to fine SAND; some GRAVEL; trace fines; weak cementation. Poorly graded GRAVEL with SAND; pale brown; moist; mostly fine GRAVEL; some medium to fine SAND; trace fines; weak cementation.	O16			85							
708.70	80													
706.70	82													
704.70	84													

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-017
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 3 of 4	

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
85			(continued).		O17			94							
702.70	86														
700.70	88														
698.70	90				O18			94							
696.70	92														
694.70	94														
692.70	96		SEDIMENTARY ROCK (SANDSTONE), medium-grained, dark yellowish brown, decomposed, moderate cementation (Well graded SAND with GRAVEL (SW); mostly coarse to fine SAND; some coarse to fine GRAVEL; trace fines) [TOPANGA FORMATION].		O19			100						PA	
690.70	98														
688.70	100		Borehole Terminated at Planned Depth. Bottom of borehole at 100.0 ft bgs												
686.70	102														
684.70	104														
682.70	106														
680.70	108														
678.70	110														
676.70	112														
674.70	114														
	115														



REPORT TITLE BORING RECORD				HOLE ID A-13-017	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 4 of 4

LOGGED BY D. Jankly	BEGIN DATE 3-26-13	COMPLETION DATE 3-28-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 8' 27.62903" / -118° 9' 18.02278" NAD83	HOLE ID A-13-020
DRILLING CONTRACTOR Cascade Drilling, LP			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 799.9 ft NAVD88
DRILLING METHOD Hollow-Stem Auger			DRILL RIG CME-95	BOREHOLE DIAMETER 8 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT (1.4"), Cal (2.5")			SPT HAMMER TYPE 140 lb. Auto Hammer, 30" Drop	HAMMER EFFICIENCY, ERI 78%
BOREHOLE BACKFILL AND COMPLETION Piezometer Installed on Completion			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS 124.0 ft	TOTAL DEPTH OF BORING 149.8 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
0	0		AGGREGATE BASE (4").												
797.90	1		SILTY SAND (SM); dense; strong brown; moist; mostly coarse to fine SAND; some low plasticity fines; few coarse to fine GRAVEL; homogeneous; weak cementation; (ALLUVIUM).		B01										
795.90	2														
793.90	3														
791.90	4														
789.90	5														
787.90	6				S02	6	37	78							Rock clast encountered during sampling PA
785.90	7														
783.90	8		Mostly fine SAND; lacks GRAVEL.												
781.90	9														
779.90	10				S03	6	30	89		15	99				DS, M, UW
777.90	11														
775.90	12		SANDY SILT (ML); strong brown; moist; mostly low plasticity fines; some medium to fine SAND; homogeneous.												
	13														
	14														
	15														
	16				S04	7	29	94		19					CR, M, PA
	17														
	18														
	19														
	20														
	21														
	22				S05	12	58	100		7	100				M, DS, PA, UW
	23														
	24														
	25														

(continued)

5 BR - STANDARD SR710N_CH_CASCADE.GPJ CALTRANS LIBRARY DEC09-W CH LOGO.GLB 6/9/14



REPORT TITLE BORING RECORD				HOLE ID A-13-020
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY D. Jankly	DATE 4-18-13	SHEET 1 of 6	

5 BR - STANDARD SR710N_CH_CASCADE.GPJ CALTRANS LIBRARY DEC09-W CH LOGO.GLB 6/9/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
773.90	25		SILTY SAND (SM) (continued). Very dense; Trace fine GRAVEL.	X	S06	12 34 50-3"		100							
771.90	28		Poorly graded SAND with SILT (SP-SM); yellowish brown; moist; mostly coarse to fine SAND; little fine GRAVEL; few fines; homogeneous; weak cementation.												
769.90	30			X	S07	70-6"		100		5	111				Rock clast encountered during sampling M, PA, UW
767.90	32														
765.90	34														
763.90	36		Very dense.	X	S08	9 21 50-5"		100							
761.90	38														
759.90	40		SILTY SAND (SM); yellowish brown; moist; mostly fine SAND; some low plasticity fines; homogeneous; weak cementation.	X	S09	19 23 35	58	100		14	104				M, PA, DS, UW
757.90	42														
755.90	44														
753.90	46		Very dense.	X	S10	14 23 41	64	100		12					CR, M
751.90	48														
749.90	50		Poorly graded SAND (SP); yellowish brown; moist; mostly fine SAND; homogeneous; weak cementation.	X	S11	18 29 40	69	100		6	101				M, UW
747.90	52														
745.90	54		SANDY SILT (ML); yellowish brown; moist; mostly non-plastic fines; some fine SAND; stratified.												

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-020	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 2 of 6

5 BR - STANDARD SR710N_CH_CASCADE.GPJ CALTRANS LIBRARY DEC09-W CH LOGO.GLB 6/9/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
743.90	56		SANDY SILT (ML) (continued).	S12	13 29 44	73	100			17					M, PA, PI
741.90	58		Poorly graded SAND with SILT (SP-SM); yellowish brown; moist; mostly coarse to fine SAND; few low plasticity fines; homogeneous; weak cementation.												
739.90	60			S13	42 50-2"		100								Rock clast encountered during sampling
737.90	62														
735.90	64														
733.90	66		Very dense; little fine GRAVEL.	S14	41 50-5"		100								Rock clast encountered during sampling PA
731.90	68														
729.90	70		Lacks GRAVEL.	S15	34 50		58			8	108				M, DS, UW
727.90	72														
725.90	74														
723.90	76		Trace coarse to fine GRAVEL.	S16	48 50-3"		100								Rock clast encountered during sampling
721.90	78														
719.90	80			S17	50-3"		0								
717.90	82														
715.90	84														

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-020	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 3 of 6

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
713.90	85		Poorly graded SAND with SILT (SP-SM) (continued). Few coarse to fine GRAVEL.	X S18	50	50		67							Rock clast encountered during sampling
711.90	88		Well-graded SAND with SILT (SW-SM); very dense; yellowish brown; moist; mostly coarse to fine SAND; little fine GRAVEL; few fines; homogeneous; weak cementation.												
709.90	90			X S19	32	90	89							PA	
707.90	91					43									
705.90	94		SILTY SAND (SM); very dense; yellowish brown; moist; mostly medium to fine SAND; some low plasticity fines; few fine GRAVEL; homogeneous; weak cementation.												
703.90	95			▲ S20	22	50	83		10	104				M, UW	
701.90	98		Poorly graded SAND with GRAVEL (SP); dark yellowish brown; moist; mostly medium to fine SAND; little coarse to fine GRAVEL; homogeneous; weak cementation.												
699.90	100			X S21	15	62	100							PA	
697.90	101					29									
695.90	102		Very dense.												
693.90	103			▲ S22	50-5"		20								Rock clast encountered during sampling
689.90	104		Very dense.												
687.90	105			X S23	50	50/3	100								
685.90	106					50/3"									

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-020
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY D. Jankly	DATE 4-18-13	SHEET 4 of 6	

5 BR - STANDARD SR710N_CH_CASCADE.GPJ CALTRANS LIBRARY DEC09-W CH LOGO.GLB 6/9/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
683.90	116		Poorly graded SAND with GRAVEL (SP) <i>(continued)</i> .	S24	50		100							
681.90	118													
679.90	120			S25	50-3"		100		5				M	
677.90	122		SILTY SAND (SM); very dense; dark yellowish brown; moist; mostly coarse to fine SAND; little fine GRAVEL; little fines; homogeneous; weak cementation.											
675.90	124			S26	50-3"		33		10				M, PA	
673.90	126			S27	42 50-3"		78							
671.90	128													
669.90	130			S28	50-4"		50							
667.90	132													
665.90	134		Lean CLAY with SAND (CL); dark yellowish brown; moist; mostly medium plasticity fines; little medium to fine SAND.											
663.90	136			S29	12 29 23	52	100							
661.90	138		Hard.	S30	12 28 50-4"		75		23	104	UU = 2.93		M, PA, PI, UU, UW	
659.90	140		SANDY lean CLAY (CL); yellowish brown; moist; mostly low plasticity fines; some medium to fine SAND; stratified.											
657.90	142			S31	9 18 37	55	44		21				M, PA, PI	
655.90	144													

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-020	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 5 of 6

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
653.90	146	[Material Graphic: Poorly graded SAND with GRAVEL (SP)]	Poorly graded SAND with GRAVEL (SP); very dense; dark yellowish brown; moist; mostly medium to fine SAND; little coarse to fine GRAVEL; homogeneous; weak cementation.	X	S32	50-4"		0					[Drilling Method: Standard]		
651.90	148														
649.90	150		Bottom of borehole at 149.8 ft bgs	X	S33	47 50-3"		0							
647.90	152		Boring terminated at a planned depth. Piezometer Sensor Installed at 147' (El. 652.9')												
645.90	154														
643.90	156														
641.90	158														
639.90	160														
637.90	162														
635.90	164														
633.90	166														
631.90	168														
629.90	170														
627.90	172														
625.90	174														
	175														



REPORT TITLE BORING RECORD				HOLE ID A-13-020	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 6 of 6

LOGGED BY J. Culotta/ J. Lee	BEGIN DATE 3-26-13	COMPLETION DATE 3-27-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 6' 8.040517" / -118° 9' 4.076669" NAD83	HOLE ID A-13-021
DRILLING CONTRACTOR Jet Drilling, Inc			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 577.9 ft NAVD88
DRILLING METHOD Hollow-Stem Auger			DRILL RIG CME-75	BOREHOLE DIAMETER 8 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT (1.4"), Cal (2.5")			SPT HAMMER TYPE 140 lb. Auto Hammer, 30" Drop	HAMMER EFFICIENCY, ERI 72%
BOREHOLE BACKFILL AND COMPLETION Cement and Bentonite Grout			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS NE	TOTAL DEPTH OF BORING 110.8 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
0	0		ASPHALT (2").												
	1		AGGREGATE BASE (2").												
575.90	2		Fat CLAY (CH); dark brown; moist; mostly medium to high plasticity fines; few fine SAND; homogeneous; (TOPSOIL).		B01										
573.90	4		SEDIMENTARY ROCK, (SILTSTONE); thinly bedded; yellowish brown; intensely weathered; very soft. (TOPANGA FORMATION).												
571.90	6				S02	9 13 17	30	100							
569.90	8														
567.90	10		At Elev 567.9', becomes soft; caliche along bedding surfaces.		S03	20 42 50-5"		100							
565.90	12		At Elev 567.4', observed bedding joint, dipping 20°.												
563.90	14														
561.90	16		At Elev 562.9', observed bedding joint, dipping 30°, iron oxide and manganese stained beds.		S04	10 15 29	44	89							
559.90	18														
557.90	20		At Elev 557.9', with some CLAYSTONE beds. Becomes grayish brown with yellowish brown oxidation; moderately weathered.		S05	24 72		67		21	99				M, PA, PI, UC=54psi, UW
555.90	22		At Elev 557.4', observed bedding joint, dipping 20°.												
553.90	24														
	25														

(continued)

5 BR - STANDARD SR710N_CH_JET.GPJ CALTRANS LIBRARY DEC09-W CH LOGO.GLB 6/9/14



REPORT TITLE BORING RECORD				HOLE ID A-13-021
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY D. Jankly	DATE 4-18-13	SHEET 1 of 4	

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
551.90	25		At Elev 552.9', becomes laminated to thinly bedded. SEDIMENTARY ROCK (continued).		S06	21 24 34	58	67							
549.90	28		SEDIMENTARY ROCK, (SANDY SILTSTONE); very thinly bedded; grayish brown to yellowish brown (where oxidized); intensely weathered; soft; intensely to moderately fractured.												
547.90	30				S07	40 100-3"		100		27	91				M, UW
543.90	34		SEDIMENTARY ROCK, (CLAYSTONE); massive; yellowish brown; intensely weathered; very soft; iron oxide and manganese staining, trace caliche.												
541.90	36				S08	4 7 16	23	78							
537.90	40		At Elev 538.1', with some coarse to fine grained SANDSTONE beds. At Elev 537.9', observed bedding joint, dipping 20 to 15°.		S09	34 40 50-4"		100		28	84	UU =3.53			M, PA, PI, UU, UW
533.90	44		SEDIMENTARY ROCK, (SILTSTONE); very thinly bedded; dark grayish brown to yellowish brown (where oxidized); moderately weathered; soft to moderately hard; intensely fractured; iron oxide and manganese staining.												
531.90	46				S10	34 28 28	56	100							
527.90	50				S11	74 100-3"		100							

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-021	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 2 of 4

5 BR - STANDARD SR710N_CH_JET.GPJ CALTRANS LIBRARY DEC09-W CH LOGO.GLB 6/9/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
55			SEDIMENTARY ROCK (continued).												
521.90	56				S12	34 74		100							
519.90	58														
517.90	60		At Elev 517.9', observed bedding joint, dipping 35°, few 1/8" to 1/4" thick, hard, slightly rough bedding planes.	▲	S13	25 100-4"		75		22	92				M, PA, UC=13psi, UW
515.90	62														
513.90	64														
511.90	66		At Elev 512.9', becomes soft; trace caliche.	▲	S14	42 100-4"		100		22					M, CR
509.90	68														
507.90	70		At Elev 507.9', with some CLAYSTONE beds. Becomes strong brown and dark gray.	▲	S15	25 50		100		30	86				M, PI, SD, UW
505.90	72														
503.90	74														
501.90	76		At Elev 502.9', observed bedding joint, dipping 30°.	▲	S16	34 43 50-4"		100		22					M, PA
499.90	78														
497.90	80			▲	S17	105 100-2"		100		20	92				EM, M, UC=38.6psi, UW
495.90	82														
493.90	84														
	85														

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-021	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks	
491.90	86		At Elev 492.9', observed bedding joint, dipping 35 to 25°, few caliche lined joints.	⊗	S18	14 17 29	46	100		22					CR, M	
489.90	88															
487.90	90				▲	S19	55 100-4"		100		24	91				M, PA, PI, SD, UC=20psi, UW
485.90	92															
483.90	94			⊗	S20	100-5"		80								
481.90	96															
479.90	98															
477.90	100		At Elev 477.9', with some coarse to fine grained SANDSTONE beds.	▲	S21	40 100-3"		100		23	97			M, PA, UW		
475.90	102															
473.90	104			⊗	S22	100-5"		100								
471.90	106															
469.90	108															
467.90	110			▲	S23	40 100-3"		100		30	91			M, UW		
465.90	112		Bottom of borehole at 110.8 ft bgs Boring terminated at a planned depth.													
463.90	114															
	115															



REPORT TITLE BORING RECORD				HOLE ID A-13-021	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY D. Jankly		DATE 4-18-13	SHEET 4 of 4

LOGGED BY M. Herzberg	BEGIN DATE 3-18-13	COMPLETION DATE 3-18-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 7' 5.807651" / -118° 9' 25.39573" NAD83	HOLE ID A-13-022
DRILLING CONTRACTOR Martini Drilling Corporation			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 696.3 ft NAVD88
DRILLING METHOD Hollow-Stem Auger			DRILL RIG CME-75	BOREHOLE DIAMETER 8.5 in
SAMPLER TYPE(S) AND SIZE(S) (ID) 5-foot long split barrel; 3" dia			SPT HAMMER TYPE N/A	HAMMER EFFICIENCY, ERI N/A
BOREHOLE BACKFILL AND COMPLETION Grout, Portland Cement			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS Not Encountered	TOTAL DEPTH OF BORING 110.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
0	0		ASPHALT (6").												Hand Auger to 5'
	1		AGGREGATE BASE (12").												
694.34	2		SANDY SILT (ML); brown; moist; some fine SAND; mostly nonplastic fines; pedogenic soil development (A-horizon) at top of unit, dark brown [ALLUVIUM].												
692.34	4														
690.34	6		At Elev 690.9', observed soil development (laminated Bt) , variegated light yellowish brown and yellowish brown.	O01				100							PA
688.34	8														
686.34	10			O02				70							
684.34	12		Poorly graded SAND with COBBLES (SP); dark yellowish brown; moist; few fine GRAVEL; mostly coarse to fine SAND; few nonplastic fines; 20% COBBLES, GRANITE, hard, broken due to drilling.												
682.34	14		SILTY SAND (SM); brown; moist; mostly fine SAND; little fines; weak cementation; slightly micaceous, coarsens downward.												
680.34	16		Poorly graded SAND with SILT (SP-SM); brown; moist; mostly fine SAND; few fines; weak cementation.	O03				100							
678.34	18		GRAVEL lens, 2" diameter.												
676.34	20		Poorly graded SAND with COBBLES (SP); dark yellowish brown; moist; few coarse to fine, subangular GRAVEL; mostly coarse to fine SAND; few nonplastic fines; micaceous, fines increase downward; COBBLES, GRANITE, decomposed, broken due to drilling.	O04				68							
674.34	22														
672.34	24														
	25														

(continued)

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BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
670.34	26		Poorly graded SAND with SILT and GRAVEL (SP-SM); dark yellowish brown; moist; some coarse to fine, subangular GRAVEL; mostly coarse to fine SAND; few fines; weak cementation.	O05			84							PA
668.34	28													
666.34	30		Poorly graded SAND with COBBLES (SP); dark yellowish brown; moist; few coarse to fine, subangular GRAVEL; mostly coarse to fine SAND; trace non plastic fines; micaceous, fines increase downward; COBBLES, GRANITE, decomposed, broken due to drilling.	O06			90							
664.34	32		Poorly graded SAND (SP); brown; moist; mostly fine SAND; few fines; weak cementation; micaceous.											
662.34	34		Poorly graded SAND with SILT (SP-SM); dark brown; moist; trace GRAVEL; mostly coarse to fine SAND; few fines; moderate cementation.											
660.34	36		Poorly graded SAND with SILT, GRAVEL and COBBLES (SP-SM); dark yellowish brown; moist; little coarse to fine, subangular GRAVEL; mostly coarse to fine SAND; few nonplastic fines; weak cementation; micaceous, fines increase downward; 5% COBBLES, GRANITE, decomposed, disturbed due to drilling.	O07			90							
658.34	38													
656.34	40													
654.34	42			O08			84							
652.34	44													
650.34	46			O09			90							PA
648.34	48													
646.34	50			O10			88							
644.34	52													
642.34	54													

(continued)



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5 BR - STANDARD SR710N_ECIOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_EC1_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
640.34	56		(continued).		O11			90							
638.34	58														
636.34	60				O12			100							
634.34	62		Poorly graded SAND with SILT (SP-SM); dark bluish gray; moist; trace GRAVEL; mostly coarse to fine SAND; few fines; fines upward.												
630.34	66		SILTY SAND with COBBLES (SM); dark yellowish brown; moist; mostly coarse to fine SAND; little nonplastic fines; weak cementation; 5% COBBLES, decomposed, soft, disturbed due to drilling.		O13			80							
626.34	70		Poorly graded SAND (SP); dark yellowish brown; moist; few coarse to fine, subangular GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation.		O14			84							
620.34	76		SILTY SAND (SM); dark yellowish brown; moist; mostly medium to fine SAND; some fines; moderate cementation; micaceous.		O15			96						PA	
618.34	78		Poorly graded SAND (SP); dark yellowish brown; moist; few coarse to fine, subangular GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation; fines upward.												
616.34	80				O16			76							
612.34	84		Increased coarse GRAVEL.												

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ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
610.34	85		Poorly graded SAND (SP) (continued).		O17			84							
608.34	88				O18			88							
602.34	93		SANDY lean CLAY (CL) moderately bedded with moderate beds of Poorly graded SAND with SILT and GRAVEL (SP-SM). SANDY lean CLAY; yellowish brown; moist; some coarse to fine SAND; mostly low to medium plasticity, medium dry strength, slow dilatancy fines; micaceous. Poorly graded SAND with SILT and GRAVEL; yellowish brown; moist; mostly fine to coarse SAND; little fine to coarse GRAVEL; few fines; weak cementation; possible decomposed COBBLES at bedding contacts, disturbed by drilling.		O19			100						PA	
600.34	96				O20			100							
590.34	106					O21			100						
588.34	108														
586.34	110		Borehole Terminated at Planned Depth. Bottom of borehole at 110.0 ft bgs												



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LOGGED BY M. Herzberg	BEGIN DATE 3-11-13	COMPLETION DATE 3-14-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 7' 6.682608" / -118° 9' 25.34212" NAD83	HOLE ID O-13-023
DRILLING CONTRACTOR Boart Longyear Company			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 698.1 ft NAVD88
DRILLING METHOD Sonic			DRILL RIG 600 T Roto Sonic	BOREHOLE DIAMETER 4 in
SAMPLER TYPE(S) AND SIZE(S) (ID) 3.5" ID polytube; polybag			SPT HAMMER TYPE N/A	HAMMER EFFICIENCY, ERI N/A
BOREHOLE BACKFILL AND COMPLETION Grout, Portland Cement			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS 161.0 ft	TOTAL DEPTH OF BORING 270.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0		ASPHALT (8.5").												Hand Auger to 5', first run is re-drill of hand augered soil
	1		AGGREGATE BASE (13").												
696.11	2		Poorly graded SAND with SILT (SP-SM); yellowish brown; moist; few coarse to fine, subangular GRAVEL; mostly medium to fine SAND; few nonplastic fines; slight calcium carbonate coating on clasts [ALLUVIUM].		O01			100							
	3														
694.11	4		SILTY CLAY with SAND (CL-ML); yellowish brown; moist; little fine SAND; mostly low plasticity fines.		O02			100							
	5														
692.11	6		Poorly graded SAND with SILT and GRAVEL (SP-SM); yellowish brown; moist; mostly fine SAND; little coarse to fine GRAVEL; few nonplastic fines; weak cementation.		O03			100							
	7														
690.11	8		Poorly graded SAND with SILT (SP-SM); yellowish brown; moist; trace coarse to fine, subrounded GRAVEL; mostly medium to fine SAND; few nonplastic fines; weak cementation; micaceous.		O04			100							
	9														
688.11	10		SILTY CLAY (CL-ML); dark yellowish brown; moist; few fine SAND; mostly low plasticity fines; slightly oxidized.		O05			100							
	11														
686.11	12		Poorly graded SAND (SP); dark yellowish brown; moist; trace coarse to fine, subrounded GRAVEL; mostly medium to fine SAND; trace nonplastic fines.		O06			100							
	13														
684.11	14		SILTY SAND (SM); yellowish brown; moist; mostly fine SAND; little nonplastic fines.		O07			100							
	15														
682.11	16		SILT with SAND (ML); yellowish brown; moist; little fine SAND; mostly nonplastic fines; slightly micaceous.		O08			100							
	17														
680.11	18		SILTY CLAY (CL-ML); dark yellowish brown; moist; few fine SAND; mostly medium plasticity, low dry strength fines.		O09			100							
	19														
678.11	20		Well-graded SAND with SILT and GRAVEL (SW-SM); yellowish brown; moist; little fine, subangular GRAVEL; mostly coarse to fine SAND; few nonplastic fines; GRAVEL concentrated at top and bottom of unit. Becomes coarser with depth, faint fining upward sequence.		O10			100		2				PA, M	
	21														
676.11	22				O11			100							
	23														
674.11	24														
	25														

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ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
672.11	25		Well-graded SAND with SILT and GRAVEL (SW-SM) (continued).		O06			100							
	26		6 ft thick pedogenic soil development, moderately developed A horizon; dark brown; increased silt.		O07			100							
670.11	27														
	28														
	29														
668.11	30														
	31														
666.11	32		At Elev 666.1', becomes dark yellowish brown.		O08			100							
	33														
664.11	34														
	35		Poorly graded SAND (SP); light olive brown; moist; trace fine GRAVEL; mostly fine SAND; few fines; weak cementation.		O09			100							
662.11	36		Poorly graded SAND with GRAVEL (SP); yellowish brown; moist; little coarse to fine, subangular GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation.												
	37														
660.11	38		Poorly graded SAND with SILT (SP-SM); dark yellowish brown; moist; few fine GRAVEL; mostly coarse to fine SAND; few fines; weak cementation; oxidized possible soil development.		O10			100							
	39														
658.11	40		Poorly graded SAND with GRAVEL (SP); yellowish brown; moist; little GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation.												
	41														
656.11	42		Poorly graded SAND with SILT (SP-SM); dark yellowish brown; moist; few coarse to fine GRAVEL; mostly medium to fine SAND; few fines; weak cementation.		O11			100							
	43		Poorly graded SAND with GRAVEL (SP); dark yellowish brown; moist; little GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation.							4				PA, M	
654.11	44		SILTY SAND with GRAVEL (SM); yellowish brown; moist; little fine GRAVEL; mostly coarse to fine SAND; little fines; weak cementation.												
	45														
652.11	46														
	47														
650.11	48														
	49														
648.11	50														
	51														
646.11	52														
	53		At Elev 645.7', observed COBBLE; METAMORPHIC; ~3-4" diameter; gneissic texture; decomposed. At base of fining upward sequence.		O14			100							
644.11	54		Poorly graded SAND with SILT and GRAVEL (SP-SM); pale brown; moist; little coarse to fine, subangular GRAVEL; mostly medium to fine SAND; few fines;												
	55														

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ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
642.11	56		weak cementation. Poorly graded SAND (SP); dark yellowish brown; moist; few coarse to fine GRAVEL; mostly medium to fine SAND; few fines; weak cementation.	O14				100							
	57			O15				100							
640.11	58		SILTY SAND (SM); dark yellowish brown; moist; trace GRAVEL; mostly fine SAND; some fines; weak cementation; micaceous. SILTY SAND (SM) (continued).												
	59			O16				100							
638.11	60		Poorly graded SAND with SILT (SP-SM); dark yellowish brown; moist; trace GRAVEL; mostly medium to fine SAND; few nonplastic fines; weak cementation; micaceous.												
	61														
636.11	62		Poorly graded SAND with GRAVEL and COBBLES (SP); dark yellowish brown; moist; little fine, subangular GRAVEL; mostly coarse to fine SAND; weak cementation; 5% COBBLES, DIORITE, decomposed, soft, disturbed due to drilling. At Elev 639.2', becomes yellowish brown.							4				PA, M	
	63			O17				100							
634.11	64														
	65														
632.11	66														
	67														
630.11	68			O18				100							
	69														
628.11	70														
	71														
626.11	72		SILTY SAND with COBBLES (SM), light olive brown, few fine GRAVEL; mostly fine to medium SAND; little fines; weak cementation; 5% COBBLES, DIORITE, decomposed, soft, disturbed due to drilling.	O19				100							
	73														
624.11	74														
	75														
622.11	76		Poorly graded SAND with COBBLES (SP); dark yellowish brown; moist; few GRAVEL; mostly medium to fine SAND; few nonplastic fines; weak cementation; 5% COBBLES, GRANITE, fresh, hard, 3" diameter.	O20				100							
	77														
620.11	78														
	79														
618.11	80		SILTY SAND with COBBLES (SM); light gray; moist; trace GRAVEL; mostly medium to fine SAND; little fines; moderate cementation; 10% COBBLES, GRANITE, decomposed, hard, ~3-4" diameter.	O21				100							
	81														
616.11	82		SILTY SAND with GRAVEL and COBBLES (SM); yellowish brown; moist; little coarse to fine GRAVEL; mostly coarse to fine SAND; little fines; moderate cementation; fines upward; 5% COBBLES, GRANITE, decomposed, disturbed due to drilling.												
	83														
614.11	84			O22				100							
	85														

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ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
85			(continued).		O22			100		5					PA, M
612.11	86		SILTY SAND with GRAVEL (SM); dark yellowish brown; moist; little coarse to fine GRAVEL; mostly coarse to fine SAND; little fines; weak cementation; micaceous.		O23			100							
610.11	87														
608.11	88		At Elev 608.2', becomes increasing coarse.												
606.11	89														
604.11	90		Poorly graded SAND (SP); dark yellowish brown; moist; few GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation; fining upward.		O24			100							
602.11	91														
600.11	92		Poorly graded SAND (SP); moderately bedded with thin interbeds of SILTY SAND (SM). Poorly graded SAND; yellowish brown; moist; mostly fine to coarse SAND; few fines; trace GRAVEL; weak cementation; micaceous. SILTY SAND; dark yellowish brown; moist; mostly fine SAND; little nonplastic fines; weak cementation; slightly micaceous.		O25			100							
598.11	93														
596.11	94		SANDY SILTY CLAY (CL-ML); dark yellowish brown; moist; few fine GRAVEL; some medium to fine SAND; mostly low plasticity fines; micaceous.							16					PA, PI, M
594.11	95														
592.11	96		Poorly graded SAND (SP); dark yellowish brown; moist; few fine GRAVEL; mostly medium to fine SAND; trace fines; weak cementation; coarsens upwards.												Switch from polytube sampling to polybag sampling
590.11	97														
588.11	98		SILTY SAND (SM); brown; moist; trace fine GRAVEL; mostly medium to fine SAND; little fines; weak cementation.		O26			100							
586.11	99														
584.11	100		Poorly graded SAND (SP); yellowish brown; moist; few fine GRAVEL; mostly coarse to fine SAND; few fines; weak cementation.												
	101														
	102		SILTY SAND (SM); yellowish brown; moist; mostly coarse to fine SAND; little fines; weak cementation.		O27			100							
	103														
	104		Lean CLAY (CL); dark yellowish brown; moist; some fine SAND; mostly low plasticity, low dry strength fines; coarsens downward.												
	105														
	106		Poorly graded SAND with SILT (SP-SM); dark yellowish brown; moist; mostly fine SAND; few fines; weak cementation.												
	107														
	108		Brown; few GRAVEL; medium to fine SAND.												
	109														
	110														
	111														
	112														
	113														
	114														
	115														

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ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
582.11	115		Poorly graded SAND with SILT (SP-SM) (continued). Yellowish brown.	O28			100							
	116		Brown; little GRAVEL; fines upward.											
580.11	117		SANDY SILTY CLAY (CL-ML); brown; moist; some fine SAND; mostly low plasticity fines; micaceous.	O29			100							
	118		SILTY SAND (SM); dark yellowish brown; moist; trace GRAVEL; mostly medium to fine SAND; some fines; moderate cementation.											
578.11	119		SANDY SILTY CLAY (CL-ML); dark yellowish brown; moist; some fine SAND; mostly low plasticity fines; micaceous.											
	120													
576.11	121		Lean CLAY (CL); dark yellowish brown; moist; trace SAND; mostly low plasticity fines.											
	122													
574.11	123		SILTY SAND (SM); brown; moist; few fine GRAVEL; mostly medium to fine SAND; some fines.											
	124													
572.11	125		At Elev 573.6', observed thin bed with slight soil development, dark yellowish brown.											
	126													
570.11	127		Poorly graded SAND with SILT (SP-SM); dark yellowish brown; moist; few fine GRAVEL; mostly medium to fine SAND; few fines; weak cementation.	O30			100							
	128													
568.11	129													
	130													
566.11	131													
	132			O31			100							
564.11	133													
	134													
562.11	135			O32			100							
	136													
560.11	137													
	138													
558.11	139													
	140													
556.11	141		Poorly graded SAND (SP); brown; moist; mostly fine SAND; trace fines; weak cementation; coarsens upward.											
	142								21					
554.11	143		SILT with SAND (ML); brown; moist; trace fine GRAVEL; little fine SAND; mostly nonplastic fines; micaceous.											PA, PI, M, CR water added to facilitate drilling
	144													
	145													

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ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
552.11	145		SANDY SILT (ML); brown; moist; some medium to fine SAND; mostly nonplastic fines.	O33			100							
550.11	147		Poorly graded SAND (SP); brown; moist; mostly fine SAND; few fines; weak cementation; coarsens upwards.											
548.11	148		SILTY SAND (SM); dark yellowish brown; moist; mostly medium to fine SAND; some fines; moderate cementation.	O34			100							
546.11	149		SILT with SAND (ML); dark yellowish brown; moist; little fine SAND; mostly nonplastic fines.											
544.11	150		Well-graded SAND with SILT and GRAVEL (SW-SM); dark yellowish brown; moist; little coarse to fine GRAVEL; mostly coarse to fine SAND; few fines; weak cementation; fining downward with localized areas of increased GRAVEL.											
542.11	151													
540.11	152													
538.11	153			O35			100							
536.11	154								9				PA, M	
534.11	155													
532.11	156													
530.11	157			O36			100							
528.11	158			O37			100							
526.11	159													
524.11	160													
	161													
	162													
	163													
	164													
	165													
	166													
	167													
	168													
	169													
	170													
	171													
	172													
	173													
	174													
	175													

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ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
522.11	175		Well-graded SAND with SILT and GRAVEL (SW-SM) (continued).	O37				100							
520.11	176														
	177														
	178														
	179		At Elev 519.1', contains increased coarse GRAVEL.												
518.11	180		SILTY SAND (SM) moderately bedded with moderate beds of Poorly graded SAND with SILT (SP-SM).							10					PA, M
	181		SILTY SAND; mottled olive brown and dark yellowish brown; moist; mostly medium to fine SAND; some fines; micaceous; weak cementation. Poorly graded SAND with SILT; dark yellowish brown; moist; mostly medium to fine SAND; few fine GRAVEL; few fines; weak cementation; micaceous.												
516.11	182														
	183														
514.11	184			O38				100							
	185														
512.11	186														
	187														
510.11	188														
	189														
508.11	190														
	191		Poorly graded SAND (SP); dark yellowish brown; moist; few fine GRAVEL; mostly medium to fine SAND; few fines; weak cementation; slightly micaceous.												
506.11	192		At Elev 506.7', observed local clay rich zones.												
	193														
504.11	194														
	195														
502.11	196														
	197														
500.11	198		Fat CLAY (CH); dark reddish brown; moist; mostly high plasticity, very high dry strength fines; strong pedogenic soil development.	O39				100							
	199		Lean CLAY with SAND (CL); brown; moist; little fine SAND; mostly low to medium plasticity, medium dry strength fines; little pedogenic soil development but same parent material as above.							15					PA, PI, M, CR
498.11	200														
	201														
496.11	202		SILTY CLAY with SAND (CL-ML); dark yellowish brown; moist; little fine SAND; mostly medium plasticity fines; possible parent material to above soils, micaceous.												
	203														
494.11	204		Fat CLAY with SAND (CH); dark reddish brown; moist; trace fine GRAVEL; little SAND; mostly high plasticity, very high dry strength fines; some soil development, slightly micaceous.												
	205		At Elev 494.1', contains decreasing soil development, brown												

(continued)



REPORT TITLE BORING RECORD				HOLE ID O-13-023	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 7 of 10

5 BR - STANDARD SR710N_ECIOGGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
205	205		Fat CLAY with SAND (CH) (continued).		O39			100							
492.11	206		At Elev 492.1', contains decreasing soil development, dark yellowish brown.												
490.11	208														
488.11	210														
486.11	212		SANDY fat CLAY (CH); light olive brown; moist; some fine SAND; mostly high plasticity, very high dry strength fines.												
484.11	214		Fat CLAY (CH); reddish brown; moist; few coarse to fine SAND; mostly high plasticity, very high dry strength fines; some manganese accumulation.												
482.11	216		CLAYEY SAND (SC); reddish brown; moist; mostly medium to fine SAND; some low to medium plasticity fines; moderate cementation; strong soil pedogenic development.		O40			100							
480.11	218		Becomes strong brown; coarsens downward.							11				PA, PI, M	
478.11	220														
476.11	222		Fat CLAY with SAND (CH); brown; moist; trace GRAVEL; mostly high plasticity, high dry strength fines; some pedogenic soil development.		O41			100							
474.11	224														
472.11	226		At Elev 473.1', becomes reddish brown.												
470.11	228														
468.11	230				O42			100							
466.11	232														
464.11	234														
235	235														

(continued)



REPORT TITLE BORING RECORD				HOLE ID O-13-023
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 8 of 10	

5 BR - STANDARD SR710N_ECIOGGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
235	235		Fat CLAY with SAND (CH) <i>(continued)</i> .	O42			100							
462.11	236		CLAYEY SAND (SC); reddish brown; moist; mostly medium to fine SAND; some low to medium plasticity fines; moderate cementation; some SAND grains visible in soil development.											
460.11	237													
458.11	238		At Elev 458.1', becomes mottled with light olive brown.	O43			100		13					PA, PI, M
456.11	239													
454.11	240													
452.11	241													
450.11	242		SILTY CLAY (CL-ML); brown; moist; mostly low plasticity fines; locally light olive brown.											
448.11	243													
446.11	244													
444.11	245													
442.11	246													
440.11	247													
438.11	248		IGNEOUS ROCK, (QUARTZ DIORITE), dark yellowish brown, decomposed, (Lean CLAY with SAND (CL); moist; mostly fines; some coarse to fine SAND; very soft to soft) [WILSON QUARTZ DIORITE].	O44			100							
436.11	249													
434.11	250													
	251													
	252													
	253													
	254		Grayish black, horizontal, Lean CLAY lens.	O45			100							
	255													
	256													
	257													
	258													
	259													
	260		IGNEOUS ROCK, (QUARTZ DIORITE), very light gray, slightly weathered, moderately hard.	O46			100							
	261													
	262													
	263													
	264													
	265													

(continued)



REPORT TITLE BORING RECORD				HOLE ID O-13-023
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 9 of 10	

5 BR - STANDARD SR710N_ECIOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
432.11	266	[Cross-hatched pattern]	IGNEOUS ROCK (continued).		O46			100							
430.11	268														
428.11	270														
426.11	272														
424.11	274														
422.11	276		Borehole Terminated at Planned Depth. Bottom of borehole at 270.0 ft bgs												
420.11	278														
418.11	280														
416.11	282														
414.11	284														
412.11	286														
410.11	288														
408.11	290														
406.11	292														
404.11	294														
	295														



REPORT TITLE BORING RECORD				HOLE ID O-13-023	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 10 of 10

LOGGED BY M. Herzberg	BEGIN DATE 3-19-13	COMPLETION DATE 3-19-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 7' 11.04237" / -118° 9' 25.31084" NAD83	HOLE ID A-13-024
DRILLING CONTRACTOR Martini Drilling Corporation			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 715.6 ft NAVD88
DRILLING METHOD Hollow-Stem Auger			DRILL RIG CME-75	BOREHOLE DIAMETER 8.5 in
SAMPLER TYPE(S) AND SIZE(S) (ID) 5-foot long split barrel; 3" dia			SPT HAMMER TYPE N/A	HAMMER EFFICIENCY, ERI N/A
BOREHOLE BACKFILL AND COMPLETION Grout, Portland Cement			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS Not Encountered	TOTAL DEPTH OF BORING 125.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0		ASPHALT (6").												Hand Auger to 5'
	1		AGGREGATE BASE (12").												
713.59	2		SILTY SAND (SM); dark yellowish brown; moist; mostly fine SAND; little fines; moderate cementation; soil development (A-horizon) in top 1.5' of unit, very dark grayish brown: [ALLUVIUM].												
	3														
711.59	4														
	5														
709.59	6			O01				62							
	7														
707.59	8														
	9														
705.59	10														
	11		SILTY CLAY (CL-ML); dark yellowish brown; moist; trace fine GRAVEL; few coarse to fine SAND; mostly low to medium plasticity fines; micaceous; some soil development (A-horizon).												
703.59	12														
	13														
701.59	14														
	15														
699.59	16		SILTY SAND (SM); dark yellowish brown; moist; trace fine GRAVEL; mostly medium to fine SAND; some fines; weak cementation; micaceous.												
	17														
697.59	18														
	19														
695.59	20														
	21														
693.59	22														
	23														
691.59	24														
	25														

(continued)

5 BR - STANDARD SR710N_ECIOGGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_EC1_LOGO.GLB 1/15/14



REPORT TITLE BORING RECORD				HOLE ID A-13-024
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 1 of 5	

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
689.59	25		Mostly coarse to fine SAND; little fines; moderate cementation; micaceous. SILTY SAND (SM) (continued).	O05			80							
687.59	28		Few coarse to fine, subangular GRAVEL.	O06			100							
685.59	30		Poorly graded SAND with SILT and GRAVEL (SP-SM); yellowish brown; moist; little coarse to fine, subangular GRAVEL; mostly coarse to fine SAND; few fines; weak cementation; fines downward.	O07			64							
683.59	32													
681.59	34													
679.59	36			O08			27						PA	
677.59	38			O09			100							
675.59	40			O10			64							
673.59	42			O11			100							
671.59	44		Poorly graded SAND (SP); dark yellowish brown; moist; trace fine GRAVEL; mostly medium to fine SAND; few fines; weak cementation; micaceous.	O12			68							
669.59	46		Poorly graded SAND with GRAVEL (SP); yellowish brown; moist; little coarse to fine GRAVEL; mostly coarse to fine SAND; few fines; weak cementation.	O13			100							
667.59	48		SILTY SAND (SM); dark yellowish brown; moist; mostly medium to fine SAND; little fines; weak cementation; micaceous.	O14			82							
665.59	50		Trace coarse to fine, subangular GRAVEL; coarse to fine SAND.											
663.59	52													
661.59	54													
	55													

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-024	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 2 of 5

5 BR - STANDARD SR710N_ECIOLOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_EC1_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
659.59	56		SANDY SILT (ML); dark yellowish brown; moist; some medium to fine SAND; mostly nonplastic fines.	O15			80							PA
	57		At Elev 659.0', contains SILT lens; trace SAND; brown.											
657.59	58		Poorly graded SAND with GRAVEL and COBBLES (SP); yellowish brown; moist; little coarse to fine, subangular GRAVEL; mostly medium to fine SAND; trace nonplastic fines; weak cementation; fines upward; 5% COBBLES, GRANITE, moderately soft to moderately hard, broken due to drilling.	O16			64							
655.59	60													
653.59	62													
651.59	64													
649.59	66			O17			80							
647.59	68													
645.59	70			O18			40							
643.59	72													
641.59	74		SILTY SAND with GRAVEL (SM); dark yellowish brown; moist; little coarse to fine, subangular GRAVEL; mostly coarse to fine SAND; little fines; weak cementation.	O19			100							
	75		SANDY SILT with GRAVEL (ML); yellowish brown; moist; little GRAVEL; some medium to fine SAND; mostly low plasticity fines; slightly micaceous.	O20			100							PA
639.59	76		Poorly graded SAND with GRAVEL (SP); dark yellowish brown; moist; little coarse to fine, subangular GRAVEL; mostly coarse to fine SAND; trace nonplastic fines.											
	77		At Elev 640.6', becomes oxidized, yellowish red.											
637.59	78			O21			84							
635.59	80													
	81		Poorly graded SAND (SP); dark yellowish brown; moist; few coarse to fine GRAVEL; mostly medium to fine SAND; few fines; weak cementation.	O22			42							
633.59	82		SILTY SAND (SM); dark yellowish brown; moist; mostly fine SAND; little fines; weak cementation; micaceous.											
	83		Poorly graded SAND with COBBLES (SP); dark yellowish brown; moist; few coarse to fine GRAVEL; mostly medium to fine SAND; few nonplastic fines; 5% COBBLES, GRANITE, soft, 3-4" diameter.											
631.59	84		At Elev 632.2', contains fine grained lens.											

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-024	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 3 of 5

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
629.59	85	[Material Graphic: Well-graded sand with silt and gravel]	Well-graded SAND with SILT, GRAVEL, and COBBLES (SW-SM); dark yellowish brown; moist; little coarse to fine GRAVEL; mostly coarse to fine SAND; few nonplastic fines; 30% COBBLES, GRANITE, soft to moderately soft, 3-4" diameter.	O23			168					PA		
627.59	88			O24			60							
625.59	90			O25			14							
623.59	92													
621.59	94													
619.59	95	[Material Graphic: Silty sand]	SILTY SAND (SM); yellowish brown; moist; mostly fine SAND; little fines; weak cementation; slightly micaceous. Poorly graded SAND (SP); dark yellowish brown; moist; few coarse to fine GRAVEL; mostly coarse to fine SAND; weak cementation.	O26			100					PA		
617.59	98			O27			40							
615.59	100	[Material Graphic: Silty sand]	SILTY SAND (SM); dark yellowish brown; moist; mostly fine SAND; little fines; weak cementation; micaceous.	O28			100							
613.59	102													
611.59	104	[Material Graphic: Silty sand]	SILTY SAND (SM); dark yellowish brown; moist; trace fine GRAVEL; mostly medium to fine SAND; some low plasticity fines; moderate cementation; micaceous.	O29			86							
609.59	106													
607.59	108	[Material Graphic: Poorly graded sand with gravel]	Poorly graded SAND with GRAVEL (SP); dark yellowish brown; moist; little coarse to fine GRAVEL; mostly coarse to fine SAND; few fines; weak cementation.	O30			94							
605.59	110													
603.59	111	[Material Graphic: Silty sand]	SILTY SAND (SM); dark yellowish brown; moist; mostly fine SAND; little fines; moderate cementation.											
601.59	114													
	115													

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-024
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 4 of 5	

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
599.59	115		(continued).		O31			50							
597.59	116														
595.59	117														
593.59	118														
591.59	119														
	120		Poorly graded SAND (SP); dark yellowish brown; moist; few fine GRAVEL; mostly medium to fine SAND; trace fines; weak cementation.		O32			20							
	121		SILTY SAND (SM); dark yellowish brown; moist; mostly fine SAND; little fines; moderate cementation; micaceous.												
	122														
	123														
	124														
	125														
589.59	126		Borehole Terminated at Planned Depth. Bottom of borehole at 125.0 ft bgs												
	127														
	128														
	129														
	130														
	131														
	132														
	133														
	134														
	135														
	136														
	137														
	138														
	139														
	140														
	141														
	142														
	143														
	144														
	145														



REPORT TITLE BORING RECORD				HOLE ID A-13-024	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 5 of 5

LOGGED BY M. Herzberg	BEGIN DATE 3-20-13	COMPLETION DATE 3-20-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 7' 11.69519" / -118° 9' 25.30382" NAD83	HOLE ID A-13-025
DRILLING CONTRACTOR Martini Drilling Corporation			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 720.9 ft NAVD88
DRILLING METHOD Hollow-Stem Auger			DRILL RIG CME-75	BOREHOLE DIAMETER 8.5 in
SAMPLER TYPE(S) AND SIZE(S) (ID) 5-foot long split barrel; 3" dia			SPT HAMMER TYPE N/A	HAMMER EFFICIENCY, ERI N/A
BOREHOLE BACKFILL AND COMPLETION Grout, Portland Cement			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS Not Encountered	TOTAL DEPTH OF BORING 125.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0		ASPHALT (6").												Hand Auger to 5'
	1		AGGREGATE BASE (12").												
718.94	2		SILTY SAND (SM); dark brown; moist; few fine, subangular to subrounded GRAVEL; mostly coarse to fine SAND; some fines; moderate cementation; A-horizon soil development; fines downward [ALLUVIUM].												
716.94	4														
714.94	6			O01				74							PA
712.94	8														
710.94	10			O02				90							
708.94	12		Dark yellowish brown.												
706.94	14														
704.94	16			O03				100							
702.94	18														
700.94	20														
698.94	22			O04				84							
696.94	24		SILTY CLAY with SAND (CL-ML); dark yellowish brown; moist; little medium to fine SAND; mostly low plasticity, medium dry strength fines; A/B soil horizon development, very few thin clay films on clasts; fines downward.												
	25														

(continued)

5 BR - STANDARD SR710N_ECIOGGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14



REPORT TITLE BORING RECORD				HOLE ID A-13-025
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 1 of 5	

5 BR - STANDARD SR710N_ECIOGGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_EC1_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
694.94	26		SANDY SILTY CLAY (CL-ML); dark brown; moist; trace fine, subangular GRAVEL; some medium to fine SAND; mostly low plasticity, low dry strength fines; some laminar Bt soil horizon development.	O05			100							PA, PI
692.94	28		Dark yellowish brown; some fine SAND; Bt soil horizon development; micaceous.											
688.94	32		Poorly graded SAND with SILT (SP-SM); dark yellowish brown; moist; mostly fine SAND; few fines; weak cementation.	O06			100							
686.94	33		SILTY SAND (SM); dark yellowish brown; moist; mostly fine SAND; little fines; moderate cementation.											
684.94	35		SANDY SILTY CLAY (CL-ML); dark yellowish brown; moist; little fine SAND; mostly low plasticity, low dry strength fines.	O07			100							PA, PI
682.94	36		SILTY SAND (SM); dark yellowish brown; moist; mostly fine SAND; some nonplastic fines; moderate cementation. At Elev 685.3', contains fine SAND lens. At Elev 685.1', contains fine SAND lens.											
680.94	40			O08			100							
678.94	42													
676.94	43		Poorly graded SAND (SP); yellowish brown; moist; trace coarse to fine GRAVEL; mostly medium to fine SAND; few fines; weak cementation; bottom contact is angular, possible FAULT; some pedogenic soil development (A-horizon). At Elev 677.6', contains coarse decomposed IGNEOUS GRAVEL.	O09			100							PA
674.94	44		SILTY CLAY with SAND (CL-ML); yellowish brown; moist; little fine SAND; mostly low plasticity, low dry strength fines.											
672.94	47		Well-graded SAND with GRAVEL (SW); dark yellowish brown; moist; little coarse to fine GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation; fines upward. At Elev 674.9', becomes oxidized, brown.											
670.94	50			O10			100							
668.94	51		Poorly graded SAND with GRAVEL and COBBLES (SP); yellowish brown; moist; little coarse to fine GRAVEL; mostly coarse to fine SAND; trace nonplastic fines; 5% COBBLES, GRANITE PORPHYRY, decomposed, soft, disturbed due to drilling.											
666.94	52													
	53													
	54													
	55													

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-025	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 2 of 5

5 BR - STANDARD SR710N_ECIOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	55		(continued).	O11			100							
664.94	56		SILTY SAND (SM); dark yellowish brown; moist; mostly fine SAND; little fines; weak cementation; fines downward.											
	57													
662.94	58													
	59													
660.94	60			O12			100							
	61													
658.94	62													
	63		Poorly graded SAND (SP); yellowish brown; moist; trace coarse to fine GRAVEL; mostly medium to fine SAND; few fines; weak cementation; fines downward.											
656.94	64													
	65		SILTY CLAY (CL-ML); dark yellowish brown; moist; few fine SAND; mostly low plasticity, low dry strength fines.	O13			100							
654.94	66		SILTY SAND (SM); yellowish brown; moist; mostly fine SAND; little fines; weak cementation; fines downward.											
	67													
652.94	68													
	69													
650.94	70		At Elev 650.7', observed coarse GRAVEL bed.	O14			100							
	71		Poorly graded SAND (SP); yellowish brown; moist; trace coarse to fine, subangular GRAVEL; mostly coarse to fine SAND; few fines; weak cementation; fines downward.											
648.94	72		At Elev 649.6', becomes oxidized, brown.											
	73													
646.94	74													
	75			O15			100							
644.94	76		At Elev 644.9', becomes dark yellowish brown.											
	77													
642.94	78													
	79													
640.94	80		At Elev 641.9', becomes oxidized, strong brown, 1-2" thick. At Elev 641.3', becomes oxidized, strong brown, 1-2" thick.	O16			84							
	81		COBBLES, GRANITE; decomposed; soft; 3-4" diameter.											
638.94	82													
	83		Poorly graded SAND with SILT (SP-SM); yellowish brown; moist; mostly fine SAND; little fines; moderate cementation; fines downward.											
636.94	84													
	85													

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-025	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 3 of 5

5 BR - STANDARD SR710N_ECILOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
634.94	86		Poorly graded SAND with SILT and GRAVEL (SP-SM); yellowish brown; moist; little coarse to fine, subangular GRAVEL; mostly coarse to fine SAND; few fines; weak cementation.	O17				100							PA
632.94	88														
630.94	90														
628.94	92				O18			82							
626.94	94		Poorly graded SAND with GRAVEL (SP); dark yellowish brown; moist; little coarse to fine, subrounded GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation.												
	95		At Elev 625.9', becomes dark yellowish brown.												
624.94	96			O19				100							
	97		SILTY SAND (SM) thinly to moderately bedded with thin to moderate beds of Poorly graded SAND (SP). SILTY SAND: dark yellowish brown; moist; mostly medium to fine SAND; some fines; weak cementation; micaceous. Poorly graded SAND; dark yellowish brown; moist; mostly medium to fine SAND; few fines; trace coarse to fine subrounded GRAVEL; weak cementation.												
622.94	98														
620.94	100			O20				100							
618.94	102														
616.94	104														
614.94	106			O21				100							PA
612.94	108														
610.94	110		Poorly graded SAND (SP); dark yellowish brown; moist; few coarse to fine, subangular GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation.												
608.94	112			O22				70							
606.94	114		SANDY SILTY CLAY (CL-ML); yellowish brown; moist; some fine SAND; mostly low plasticity, low dry strength fines.												

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-025	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 4 of 5

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
604.94	115		Poorly graded SAND (SP); dark yellowish brown; moist; trace coarse to fine, subangular GRAVEL; mostly medium to fine SAND; few fines; weak cementation; coarsens upward.	O23				100							
602.94	116		SANDY SILTY CLAY (CL-ML) moderately interbedded with moderate interbeds of Poorly Graded SAND (SP) and SILTY SAND (SM). SANDY SILTY CLAY; dark yellowish brown; moist; mostly fines, low plasticity, low dry strength; some fine SAND. Poorly Graded SAND; yellowish brown; moist; mostly medium to fine SAND; few fines; micaceous. SILTY SAND; dark yellowish brown; mostly medium to fine SAND; little fines; weak cementation.												
600.94	117														
598.94	118			O24				100							
596.94	119														
	120		Poorly graded SAND with SILT (SP-SM); dark yellowish brown; moist; few fine GRAVEL; mostly coarse to fine SAND; little fines; weak cementation.												
	121														
	122														
	123														
	124														
	125														
594.94	126		Borehole Terminated at Planned Depth. Bottom of borehole at 125.0 ft bgs												
	127														
592.94	128														
	129														
590.94	130														
	131														
588.94	132														
	133														
586.94	134														
	135														
584.94	136														
	137														
582.94	138														
	139														
580.94	140														
	141														
578.94	142														
	143														
576.94	144														
	145														



REPORT TITLE BORING RECORD				HOLE ID A-13-025	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 5 of 5

LOGGED BY M. Herzberg	BEGIN DATE 3-21-13	COMPLETION DATE 3-21-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 7' 13.23076" / -118° 9' 25.28736" NAD83	HOLE ID A-13-026
DRILLING CONTRACTOR Martini Drilling Corporation			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 736.1 ft NAVD88
DRILLING METHOD Hollow-Stem Auger			DRILL RIG CME-75	BOREHOLE DIAMETER 8.5 in
SAMPLER TYPE(S) AND SIZE(S) (ID) 5-foot long split barrel; 3" dia			SPT HAMMER TYPE N/A	HAMMER EFFICIENCY, ERI N/A
BOREHOLE BACKFILL AND COMPLETION Grout, Portland Cement			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS 40.0 ft	TOTAL DEPTH OF BORING 110.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
0			ASPHALT (6").												Hand Auger to 5'
1			AGGREGATE BASE (12").												
734.07	2		Poorly graded SAND (SP); yellowish brown; moist; trace fine GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation [ALLUVIUM].												
732.07	4														
730.07	6		Poorly graded SAND with COBBLES (SP); yellowish brown; moist; trace coarse to fine GRAVEL; mostly coarse SAND; trace fines; weak cementation; 20% COBBLES, GRANITE, moderately weathered, moderately hard, 3-4" diameter.	O01			16								
728.07	8														
726.07	10		SILTY CLAY (CL-ML); yellowish brown; moist; few fine SAND; mostly low plasticity, low dry strength fines.	O02			100								
724.07	12														
722.07	14		Poorly graded SAND with SILT and GRAVEL (SP-SM); yellowish brown; moist; some coarse to fine GRAVEL; mostly coarse to fine SAND; few fines; weak cementation. At Elev 722.8', observed decreasing GRAVEL.												
720.07	16			O03			100							PA	
718.07	18		At Elev 718.6', contains fine SAND lens, 3" thick.												
716.07	20		At Elev 717.1', becomes pale brown.												
714.07	22		Poorly graded SAND (SP); yellowish brown; moist; few coarse to fine, subangular GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation. At Elev 715.5', contains increased coarse GRAVEL.	O04			24								
712.07	24														
	25														

(continued)

5 BR - STANDARD SR710N_ECIOGGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14



REPORT TITLE BORING RECORD				HOLE ID A-13-026
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 1 of 4	

5 BR - STANDARD SR710N_ECIOGGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_EC1_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
710.07	26		Poorly graded SAND (SP) (<i>continued</i>). At Elev 710.1', contains increased coarse GRAVEL.	O05			32							
708.07	28													
706.07	30		Poorly graded SAND (SP); dark yellowish brown; moist; few coarse to fine, subangular GRAVEL; mostly coarse to fine SAND; few fines; weak cementation.	O06			90							
704.07	32													
702.07	34													
700.07	36		SILTY SAND (SM); dark yellowish brown; moist; mostly fine SAND; little fines; moderate cementation. At Elev 700.9', contains SILTY CLAY (CL-ML); dark yellowish brown; weak to moderate soil development.	O07			86							PA
698.07	38		SILTY SAND with COBBLES (SM); dark yellowish brown; moist; mostly medium to fine SAND; little fines; weak cementation; 10% COBBLES, DIORITE, decomposed, very soft, disturbed due to drilling.											
696.07	40		Poorly graded SAND with GRAVEL (SP); yellowish brown; moist; little coarse to fine, subangular to subrounded GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation; coarsens downward.	O08			86							Water encountered between 40-43'
694.07	42		SILTY CLAY (CL-ML); dark yellowish brown; moist; few medium to fine SAND; mostly low plasticity, low dry strength fines; coarsens downward.											
692.07	44													
690.07	46		Poorly graded SAND (SP); dark yellowish brown; moist; mostly fine SAND; trace fines; weak cementation. Fat CLAY (CH); dark yellowish brown; moist; mostly high plasticity, medium dry strength fines.	O09			100							
688.07	48		Poorly graded SAND with SILT and COBBLES (SP-SM); dark yellowish brown; moist; trace fine GRAVEL; mostly medium to fine SAND; little fines; weak cementation; 10% COBBLES, GRANITE, decomposed, soft, disturbed due to drilling; coarsens downward. At Elev 689.4', contains few coarse to fine GRAVEL.											
686.07	50		SILTY SAND (SM); dark yellowish brown; moist; mostly fine SAND; little fines; weak cementation.	O10			40							
684.07	52		Poorly graded SAND (SP); dark yellowish brown; moist; mostly fine SAND; few fines; weak cementation.											
682.07	54		Poorly graded SAND (SP); dark yellowish brown; moist; mostly medium to fine SAND; trace fines; weak cementation. At Elev 684.2', contains SILTY SAND lens, 2" thick.											

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-026	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 2 of 4

5 BR - STANDARD SR710N_ECIOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_EC1_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
680.07	56		Poorly graded SAND with SILT (SP-SM); dark yellowish brown; moist; mostly medium to fine SAND; few fines; weak cementation. At Elev 680.9', grades to fine SAND.	O11			86							PA
678.07	58													
676.07	60		Poorly graded SAND (SP); dark yellowish brown; moist; trace coarse to fine GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation. At Elev 677.3', contains increased fine GRAVEL in top of unit. At Elev 675.8', consists of fine to medium SAND.	O12			82							Borehole heaving between 60-65'
672.07	64		Poorly graded SAND with SILT (SP-SM); dark yellowish brown; moist; trace coarse to fine GRAVEL; mostly coarse to fine SAND; few fines; weak cementation.											
670.07	66		Poorly graded SAND (SP); yellowish brown; moist; trace fine, subangular GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation; fines upward.	O13			76							
668.07	68													
666.07	70		At Elev 667.4', contains increased silt.											
664.07	72		SILTY SAND (SM); brown; moist; mostly fine SAND; little fines; moderate cementation.	O14			72							
662.07	74		SILT with SAND (ML); dark yellowish brown; moist; trace fine GRAVEL; little medium to fine SAND; mostly nonplastic, low dry strength fines. At Elev 662.9', with with few coarse to fine GRAVEL and increase in fines.											
660.07	76		Poorly graded SAND with SILT (SP-SM); yellowish brown; moist; trace fine GRAVEL; mostly medium to fine SAND; few fines; weak cementation.	O15			26							PA
658.07	78													
656.07	80													
654.07	82		SILTY CLAY (CL-ML); yellowish brown; moist; few fine SAND; mostly low plasticity, low dry strength fines. At Elev 655.8', contains poorly graded SAND lens, 4" thick. At Elev 655.1', contains poorly graded SAND with SILT.	O16			24							

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-026	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 3 of 4

5 BR - STANDARD SR710N_ECIOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
650.07	85		Poorly graded SAND (SP); yellowish brown; moist; mostly coarse to fine SAND; trace fines; weak cementation; fines upward.		O17			72							
	86														
	87		SILT with SAND (ML); dark yellowish brown; moist; little fine SAND; mostly low plasticity, low dry strength fines.												
648.07	88		Poorly graded SAND (SP); yellowish brown; moist; mostly coarse to fine SAND; trace fines; weak cementation; fines upward to fine SAND with SILT.		O18			100							
	89														
646.07	90		SANDY SILTY CLAY (CL-ML); yellowish brown; moist; some fine SAND; mostly low plasticity, low dry strength fines.		O19			72							
	91														
644.07	92		SILTY CLAY (CL-ML); yellowish brown; moist; few fine SAND; mostly low plasticity, low dry strength fines.												
	93														
642.07	94		Fat CLAY with SAND (CH); strong brown; moist; little medium to fine SAND; mostly high plasticity, medium dry strength fines; strong Bt soil horizon development [DECOMPOSED BEDROCK]. At Elev 642.8', observed leached lens, light yellowish brown, ~1" thick.		O20			100							
	95		At Elev 642.5', observed leached lens, light yellowish brown, ~1" thick.												
640.07	96		SANDY lean CLAY (CL); dark brown; moist; some medium to fine SAND; mostly low to medium plasticity, low to medium dry strength fines; coarsens upward.. At Elev 639.4', observed light yellowish brown, ~1" thick.		O21			100							PA, PI
	97														
638.07	98														
	99														
636.07	100				O22			100							
	101														
634.07	102														
	103														
632.07	104		SEDIMENTARY ROCK (SILTSTONE), moderate yellowish brown, intensely weathered, soft, (SILT (ML); yellowish brown; moist; mostly nonplastic fines; few fine SAND) [TOPANGA FORMATION].		O23			100							
	105														
630.07	106														
	107														
628.07	108														
	109														
626.07	110		Borehole Terminated at Planned Depth. Bottom of borehole at 110.0 ft bgs												
	111														
624.07	112														
	113														
622.07	114														
	115														



REPORT TITLE BORING RECORD				HOLE ID A-13-026
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 4 of 4	

LOGGED BY M. Herzberg	BEGIN DATE 3-22-13	COMPLETION DATE 3-22-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 7' 15.90845" / -118° 9' 25.36406" NAD83	HOLE ID A-13-027
DRILLING CONTRACTOR Martini Drilling Corporation			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 751.9 ft NAVD88
DRILLING METHOD Hollow-Stem Auger			DRILL RIG CME-75	BOREHOLE DIAMETER 8.5 in
SAMPLER TYPE(S) AND SIZE(S) (ID) 5-foot long split barrel; 3" dia			SPT HAMMER TYPE N/A	HAMMER EFFICIENCY, ERI N/A
BOREHOLE BACKFILL AND COMPLETION Grout, Portland Cement			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS 55.0 ft	TOTAL DEPTH OF BORING 100.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0		ASPHALT (6").												Hand Auger to 5'
	1		AGGREGATE BASE (12").												
749.89	2		Well-graded SAND with SILT, GRAVEL and COBBLES (SW-SM); yellowish brown; moist; little coarse to fine GRAVEL; mostly coarse to fine SAND; little fines; 5% COBBLES GRANITE, decomposed, micaceous, disturbed due to drilling [ALLUVIUM].												PA
747.89	3														
745.89	4														
	5														
743.89	6				O01			100							
	7														
741.89	8														
	9														
739.89	10		Decreased GRAVEL and increased fines.		O02			78							
	11														
737.89	12		SANDY SILTY CLAY (CL-ML); pale brown; moist; some fine SAND; mostly low plasticity fines.												
	13		Poorly graded SAND (SP); yellowish brown; moist; few coarse to fine GRAVEL; mostly coarse to fine SAND; few fines.												
735.89	14														
	15														
733.89	16				O03			88							
	17														
731.89	18		SANDY SILTY CLAY (CL-ML); dark yellowish brown; moist; some fine SAND; mostly low plasticity fines.												
	19		Poorly graded SAND with GRAVEL (SP); yellowish brown; moist; little coarse to fine GRAVEL; mostly coarse to fine SAND; few fines.												
729.89	20														
	21				O04			90							
727.89	22		COBBLES, ~60 to 100%, GRANITE, disturbed due to drilling; yellowish brown; with coarse to fine, angular GRAVEL and fine SAND.												
	23														
	24		Poorly graded SAND with GRAVEL(SP), thinly interbedded with thin beds of SILTY SAND (SM). Poorly graded SAND with GRAVEL; dark yellowish brown; mostly fine to coarse SAND; little fine to coarse GRAVEL; weak cementation. SILTY SAND; yellowish												
	25														

(continued)

5 BR - STANDARD SR710N_ECIOGGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14



REPORT TITLE BORING RECORD				HOLE ID A-13-027
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 1 of 4	

5 BR - STANDARD SR710N_ECIOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_EC1_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
725.89	26	[Material Graphic: Sand with silt and gravel]	brown, mostly fine SAND; little fines; weak cementation.	O05			50							PA
723.89	27		Poorly graded SAND with SILT, GRAVEL, and COBBLES (SP-SM); dark yellowish brown; moist; some coarse to fine GRAVEL; mostly coarse to fine SAND; few fines; 15% COBBLES, GRANITE, intensely weathered, soft to moderately soft, ~3-4" diameter.											
721.89	30	[Material Graphic: Sand with silt]	Poorly graded SAND; (SP); dark yellowish brown; moist; few coarse to fine GRAVEL; mostly coarse to fine SAND; few fines.	O06			90							
719.89	31													
717.89	32													
715.89	35	[Material Graphic: Sand with silt]		O07			80							
713.89	36													
711.89	39		At Elev 713.4', observed increased coarse GRAVEL.											
709.89	40	[Material Graphic: Sand with silt]	Poorly graded SAND (SP); yellowish brown; moist; trace GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation.	O08			88							
707.89	41													
705.89	45	[Material Graphic: Silty sand with gravel]	SILTY SAND with GRAVEL (SM); dark yellowish brown; moist, little coarse to fine, subangular GRAVEL; mostly coarse to fine SAND; little fines.	O09			34						PA	
703.89	46													
701.89	50	[Material Graphic: Sand with cobbles]	Poorly graded SAND with COBBLES (SP); yellowish brown; moist; trace fine, angular GRAVEL; mostly medium to fine SAND; few nonplastic fines; 5% COBBLES, GRANITE, decomposed, soft, disturbed due to drilling.	O10			88							
699.89	51													
697.89	54		At Elev 697.8', becomes fine grained, increasing SILT.											

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-027	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
695.89	56		Poorly graded SAND (SP); yellowish brown; moist; trace GRAVEL; mostly coarse to fine SAND; few fines; weak cementation; fines upward.	O11			58							
693.89	57		SILTY CLAY with SAND (CL-ML); dark yellowish brown; moist; little medium to fine SAND; mostly low plasticity, low to medium dry strength fines. At Elev 694.9', contains slight soil development (A-horizon), dark yellowish brown.											
691.89	58		Poorly graded SAND (SP); yellowish brown; moist; mostly medium to fine SAND; few fines; weak cementation; micaceous.											
689.89	59		Fat CLAY (CH); yellowish brown; moist; mostly high plasticity, high dry strength fines; micaceous.	O12			100							
688.79	60		SILTY SAND (SM); yellowish brown; moist; mostly medium to fine SAND; little fines; soil development (A-horizon?), color grades to dark brown to brown; micaceous.											
687.89	61		Poorly graded SAND (SP); yellowish brown; moist; trace fine GRAVEL; mostly medium to fine SAND; few fines; weak cementation. At Elev 688.0', observed GRAVEL, coarse to fine.											
685.89	62		At Elev 687.1', observed SILTY SAND (SM) lens, mostly fine SAND; little SILT. SILTY SAND (SM); dark yellowish brown; moist; mostly fine SAND; little fines; moderate cementation; micaceous, coarsens downward.	O13			74							PA
683.89	63		At Elev 684.1', contains few coarse SAND and trace fine GRAVEL. SANDY SILT (ML); brown; moist; some fine SAND; mostly low plasticity fines; micaceous.											
681.89	64		Lean CLAY with SAND (CL); yellowish brown; moist; some fine SAND; mostly low to medium plasticity, low to medium dry strength fines; micaceous. At Elev 681.6', becomes dark brown. At Elev 680.9', becomes brown.	O14			100							
677.89	65													
675.89	66													
673.89	67													
671.89	68													
669.89	69													
667.89	70													
	71													
	72													
	73													
	74													
	75													
	76													
	77													
	78													
	79													
	80													
	81													
	82													
	83													
	84													
	85													

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-027	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 3 of 4

5 BR - STANDARD SR710N_ECIOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
665.89	86		Increasing SAND. Lean CLAY with SAND (CL) (continued).	O17				100							
663.89	88														
659.89	92		CLAYEY SAND (SC); dark yellowish brown; moist; mostly medium to fine SAND; some fines; moderate cementation.	O18				100							
655.89	96		SEDIMENTARY ROCK (SILTSTONE), grayish orange variegated with orange; decomposed; soft; (SANDY Lean CLAY (CL); moist; some medium to fine SAND; mostly low to medium plasticity fines) [TOPANGA FORMATION].	O19				100							PA, PI
651.89	100		Boring Terminated at Planned Depth. Bottom of borehole at 100.0 ft bgs												



REPORT TITLE BORING RECORD				HOLE ID A-13-027	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 4 of 4		

LOGGED BY M. Herzberg	BEGIN DATE 3-7-13	COMPLETION DATE 3-7-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 7' 42.57908" / -118° 9' 16.73893" NAD83	HOLE ID A-13-034
DRILLING CONTRACTOR Martini Drilling Corporation			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 783.7 ft NAVD88
DRILLING METHOD Hollow-Stem Auger			DRILL RIG CME-75	BOREHOLE DIAMETER 8.5 in
SAMPLER TYPE(S) AND SIZE(S) (ID) 5-foot long split barrel; 3" dia			SPT HAMMER TYPE N/A	HAMMER EFFICIENCY, ERI N/A
BOREHOLE BACKFILL AND COMPLETION Grout, Portland Cement			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS 82.5 ft	TOTAL DEPTH OF BORING 85.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0		ASPHALT (6").												Hand Auger to 5'
	1		AGGREGATE BASE(12").												
781.71	2		CLAYEY SAND with GRAVEL (SC); dark yellowish brown; moist; little coarse to fine GRAVEL; mostly coarse to fine SAND; some fines; moderate cementation [ALLUVIUM].												
779.71	3														
	4														
777.71	5		SANDY lean CLAY with GRAVEL (CL); brown; moist; few coarse to fine GRAVEL; some medium to fine SAND; mostly low plasticity, medium dry strength fines. At Elev 778.5', observed A-horizon soil development', brown, medium dry strength.		O01			95							PA, PI
	6														
775.71	7		CLAYEY SAND with GRAVEL (SC); dark yellowish brown; moist; little coarse to fine, subangular GRAVEL; mostly coarse to fine SAND; some fines; strong cementation; coarse GRAVEL are intensely weathered.												
	8														
773.71	9		CLAYEY SAND (SC); brown; moist; few coarse to fine GRAVEL; mostly coarse to fine SAND; little fines; moderate cementation; coarsens downward. At Elev 776.6', contains weak B-horizon soil development. At Elev 775.2', with little GRAVEL.		O02			100							
	10														
771.71	11		Poorly graded SAND with GRAVEL and COBBLES (SP); dark yellowish brown to brown; moist; little fine, subangular GRAVEL; mostly medium to fine SAND; few fines; weak cementation; fine GRAVEL appears to be crushed COBBLE; 5% COBBLES, GRANITE, intensely weathered, moderately soft, ~3-4" diameter.		O03			100							
	12														
769.71	13														
	14														
767.71	15		Coarse GRAVEL are intensely weathered.		O04			100							
	16														
765.71	17														
	18		At Elev 765.9', contains Bt soil development.		O05			100							
	19														
763.71	20														
	21		Well-graded SAND with SILT, GRAVEL, and COBBLES (SW-SM); dark yellowish brown; moist; some coarse to fine, subrounded GRAVEL; mostly coarse to fine SAND; few fines; weak cementation; 10% COBBLES, DIORITE, intensely to moderately weathered, moderately soft, disturbed by drilling.		O06			100							
	22														
761.71	23														
	24														
759.71	25														

(continued)

5 BR - STANDARD SR710N_ECIOGGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_EC1_LOGO.GLB 1/15/14



REPORT TITLE BORING RECORD				HOLE ID A-13-034
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 1 of 4	

5 BR - STANDARD SR710N_ECIOGGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_EC1_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
757.71	25		(continued).	O08			60							PA
755.71	28		Poorly graded SAND with COBBLES (SP); yellowish brown; moist; little coarse to fine, subrounded GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation; 20% COBBLES, DIORITE, intensely to moderately weathered, moderately soft to moderately hard, broken due to drilling.	O09			100							
753.71	30			O10			100							
751.71	31		SILTY CLAY (CL-ML); yellowish brown; moist; trace fine GRAVEL; few fine SAND; mostly low to medium plasticity, low dry strength fines. At Elev 751.8', contains increased oxidation.											local soft drilling
749.71	33		Poorly graded SAND (SP); yellowish brown; few coarse to fine, subrounded GRAVEL; mostly coarse to fine SAND; few fines; weak cementation; coarsens upwards. At Elev 750.7', contains increased GRAVEL. At Elev 750.2', observed increasing silt.	O11			100							
747.71	35		Poorly graded SAND with COBBLES (SP); yellowish brown; few coarse to fine, subrounded GRAVEL; mostly coarse to fine SAND; little fines; GRAVEL increases downward; weak cementation. 5% COBBLES, GRANITE, moderately weathered, moderately soft; 5% COBBLES, DIORITE, decomposed, very soft. COBBLES disturbed due to drilling.	O12			88							
745.71	36													
743.71	37		At Elev 744.8', becomes light yellowish brown.											
741.71	39			O13			90							
739.71	40		At Elev 743.1', contains increased GRAVEL.											
737.71	41		At Elev 741.6', contains increased GRAVEL.											
735.71	42			O14			68							PA local hard drilling
733.71	43		SILTY SAND with GRAVEL (SM); yellowish brown; moist; little coarse to fine GRAVEL; mostly coarse to fine SAND; little fines; weak cementation.											
731.71	44			O15			48							
729.71	45		Poorly graded SAND with GRAVEL (SP); yellowish brown; little coarse to fine, subrounded GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation.											
	46			O16			100							50-54' very soft drilling
	47													
	48													
	49													
	50													
	51													
	52													
	53													
	54		At Elev 730.5', contains decreased GRAVEL.											local hard drilling
	55		(continued)											



REPORT TITLE BORING RECORD				HOLE ID A-13-034
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 2 of 4	

5 BR - STANDARD SR710N_ECIOGGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_EC1_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
727.71	55		At Elev 728.7', contains decreased GRAVEL. Poorly graded SAND (SP) <i>(continued)</i> .		O17			100							
725.71	57		At Elev 726.5', contains decreased GRAVEL.												
723.71	59		CLAYEY SAND (SC); dark yellowish brown; moist; few coarse to fine, angular GRAVEL; mostly medium to fine SAND; some low to medium plasticity, low dry strength fines; Has strong Bt soil horizon development [COLLUVIUM].		O18			100							
717.71	65		At Elev 716.9', contains moderate Bt soil horizon development.		O19			100							PA, PI
713.71	69		At Elev 715.3', becomes slightly oxidized, yellowish brown to bottom of unit.												
711.71	70		Moderate B-horizon soil development in decomposed bedrock.		O20			100							
707.71	74		SEDIMENTARY ROCK (CONGLOMERATE), fine sand to coarse sand, light gray, very intensely weathered, very soft, (Well graded SAND with GRAVEL and SILT (SW-SM), mostly SAND; little coarse to fine GRAVEL; few fines). [TOPANGA FORMATION].		O21			92							PA Drill chatter, hard drilling
703.71	80		Very pale orange, intensely weathered, soft.		O22			100							
699.71	84		Practical Refusal at 84.5'.		O23			44							

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-034	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 3 of 4

5 BR - STANDARD SR710N_ECIOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
697.71	85		Bottom of borehole at 85.0 ft bgs												
695.71	86														
693.71	87														
691.71	88														
689.71	89														
687.71	90														
685.71	91														
683.71	92														
681.71	93														
679.71	94														
677.71	95														
675.71	96														
673.71	97														
671.71	98														
669.71	99														
	100														
	101														
	102														
	103														
	104														
	105														
	106														
	107														
	108														
	109														
	110														
	111														
	112														
	113														
	114														
	115														



REPORT TITLE BORING RECORD				HOLE ID A-13-034	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 4 of 4

LOGGED BY M. Herzberg	BEGIN DATE 3-5-13	COMPLETION DATE 3-5-13	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 34° 7' 45.53762" / -118° 9' 16.92735" NAD83	HOLE ID A-13-035
DRILLING CONTRACTOR Martini Drilling Corporation			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 787.2 ft NAVD88
DRILLING METHOD Hollow-Stem Auger			DRILL RIG CME-75	BOREHOLE DIAMETER 8.5 in
SAMPLER TYPE(S) AND SIZE(S) (ID) 5-foot long split barrel; 3" dia			SPT HAMMER TYPE N/A	HAMMER EFFICIENCY, ERI N/A
BOREHOLE BACKFILL AND COMPLETION Grout, Portland Cement			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS Not Encountered	TOTAL DEPTH OF BORING 73.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
0	0		ASPHALT (6.5").												Hand Auger to 5'
	1		AGGREGATE BASE (13").												
785.19	2		SILTY CLAY (CL-ML); yellowish brown; moist; few fine SAND; mostly low plasticity fines; micaceous [ALLUVIUM].												
783.19	4														
781.19	6		A-horizon soil development.		O01			100							PI
779.19	8														
777.19	10		Trace SAND; Laminar Bt soil development.		O02			100							
775.19	12														
773.19	14														
771.19	16		SILTY SAND with GRAVEL (SM); light yellowish brown; moist; little fine GRAVEL; mostly coarse to fine SAND; little fines; weak cementation; micaceous.		O03			100							PA
769.19	18		SILT with SAND (ML); brown; moist; little fine SAND; mostly fines; micaceous.												
767.19	20		Poorly graded SAND (SP); black; moist; trace fine GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation; laminated.												
765.19	22		Poorly graded SAND with GRAVEL (SP); dark yellowish brown; moist; little fine GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation; micaceous.		O04			35							
763.19	24														
	25														

(continued)

5 BR - STANDARD SR710N_ECIOLOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14



REPORT TITLE BORING RECORD				HOLE ID A-13-035
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900
PROJECT OR BRIDGE NAME SR 710 North Study				
BRIDGE NUMBER	PREPARED BY M. Strane	DATE	SHEET 1 of 3	

5 BR - STANDARD SR710N_ECIOLOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
761.19	25		Poorly graded SAND with COBBLES (SP); dark yellowish brown; moist; few GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation; slightly micaceous, slight oxidization at top of unit; 10% COBBLES, GRANITE, decomposed, soft to very soft, disturbed due to drilling.	O05			100							
759.19	28		SILT with SAND (ML); dark yellowish brown; moist; little fine SAND; mostly fines; micaceous.	O06			100							
757.19	30			O07			100							
755.19	32		At Elev 756.0', becomes oxidized, dark yellowish brown and very pale brown. Poorly graded SAND with GRAVEL (SP); dark yellowish brown; moist; some coarse to fine GRAVEL; mostly coarse to fine SAND; trace fines; weak cementation; fines upward. At Elev 754.1', becomes oxidized.	O08			100							
753.19	34		At Elev 752.2', becomes strong brown.	O09			44							
751.19	36		Poorly graded SAND (SP); dark yellowish brown; moist; few fine GRAVEL; mostly coarse to fine SAND; few fines; weak cementation.	O10			100							
749.19	38		At Elev 749.4', observed dark yellowish brown, <5% IGNEOUS COBBLES, intensely weathered, 3-4" diameter.	O11			40							
747.19	40		At Elev 745.5', observed SILT lens, brown.	O12			100							
745.19	42		At Elev 744.8', becomes dark yellowish brown.	O13			100							
743.19	44		At Elev 744.2', observed <5% IGNEOUS COBBLES, GRANITE, decomposed, very soft, ~6" diameter.	O14			100							
741.19	46			O15			84							
739.19	48													
737.19	50		SEDIMENTARY ROCK (SANDSTONE), coarse sand to fine sand, very pale orange, very intensely weathered, soft, (SILTY SAND (SM), brown; moist; trace fine GRAVEL; mostly coarse to fine SAND; some fines; strong cementation) [TOPANGA FORMATION].	O15			84							
735.19	52													
733.19	54													

(continued)



REPORT TITLE BORING RECORD				HOLE ID A-13-035	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 2 of 3

5 BR - STANDARD SR710N_ECIOLOGS_REVBYCH2M.GPJ CALTRANS LIBRARY DEC09-W_ECJ_LOGO.GLB 1/15/14

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
731.19	56		SEDIMENTARY ROCK (Sandstone) (continued).		O16			100							
729.19	58		Becomes decomposed; (Poorly graded SAND with SILT (SP-SM); brown; friable).		O17			68							
727.19	60				O18			34							
725.19	62				O19			48							PA very hard drilling
723.19	64		(SANDSTONE), intensely weathered, soft, (SILTY SAND with GRAVEL (SM), mostly coarse to fine SAND; some coarse to fine GRAVEL; little fines).		O20			40							very hard drilling
721.19	66				O21			64							
719.19	68		Decomposed, grayish brown.		O22			100							
717.19	70														
715.19	72		Dark yellowish orange, intensely weathered, oxidized.												
713.19	74		Practical Refusal at 73 ft. Bottom of borehole at 73.0 ft bgs												Refusal
711.19	76														
709.19	78														
707.19	80														
705.19	82														
703.19	84														



REPORT TITLE BORING RECORD				HOLE ID A-13-035	
DIST. 07	COUNTY LA	ROUTE 710	POSTMILE	EA 07-187900	
PROJECT OR BRIDGE NAME SR 710 North Study					
BRIDGE NUMBER		PREPARED BY M. Strane		DATE	SHEET 3 of 3