Boring Logs

Current Boring Logs

Current Exploration

The borings were drilled using four different truck-mounted (CME-85, CS 2000, Ingersoll Rand A400, and Speedstar 30K) drill rigs. All four drill rigs were equipped with rotary-wash drilling system and automatic hammer. Two of the drill rigs (CME-85 and CS 2000) were supervised by Caltrans staff and the other two (Ingersoll Rand A400 and Speedstar 30K) were supervised by the CH2M HILL team. CH2M HILL, EMI, and JA staff logged core holes for those borings drilled by the CH2M HILL team.

Soil samples were collected every 5 feet using a split barrel standard penetration test (SPT) sampler, California ring sampler, and modified California ring sampler in alluvial soils. The SPT and the California ring samplers were driven using automatic pneumatic hammers equivalent to a 140-pound hammer falling freely for 30 inches. Blow counts were recorded in 6-inch intervals for a penetration of 18 inches. Blow counts noted on the boring logs record the blows for the last 12 inches of penetration. The sampling procedures generally followed SPT and ring sampling of soils (American Society for Testing and Materials [ASTM] D1586). In addition, representative bulk samples of the upper 5 to 6 feet were collected from the borings. The soil samples were described in general accordance with the Unified Soil Classification System (USCS), following methods in ASTM D2487 and D2488, and following the guidelines in the Soil and Rock Logging, Classification, and Presentation Manual (Caltrans, 2007). Representative samples were stored in tubes/plastic bags, and regularly transported to a warehouse facility for storage and later laboratory testing. The headspace of soil and rock samples was tested using a MiniRAE 3000 multi-gas monitor to screen for hydrogen sulfide, methane, carbon monoxide, oxygen, and volatile organic compounds (VOCs). All of the gas monitor screenings yielded results that were well below threshold limits. The primary purpose of the field VOC screenings was to ensure the health and safety of field personnel. The readings of the VOCs are presented in the remarks column of the boring logs.

Continuous-core samples were taken in bedrock. Rock core sampling procedures generally consisted of the collection of continuous-core specimens in approximately 5-foot-run intervals. Cascade Drilling obtained 10-foot-run core samples in some of the borings. Caltrans drill rigs used a 94-mm HQ core barrel, and Cascade drill rigs used a PQ core barrel to obtain the rock samples. The continuous rock cores were logged, noting the lithology, structure, recovery percentage, fractures per foot, rock quality designation (RQD), and coring rate following the guidelines in the *Soil and Rock Logging, Classification, and Presentation Manual* (Caltrans, 2007). Rock samples were collected in core boxes and transported for storage and laboratory testing.

RQD values provided in the boring logs are based on the sum of intact core pieces of 4 inches or greater length between two natural discontinuities. The majority of core samples obtained in this study are soft and weak and commonly do not meet the "sound core" definition for the ASTM standard RQD method (ASTM D 6032). These RQD values should not be used to evaluate the rock mass quality for soft and weak rock. The RQD values reported for hard rock in Zone 3 are valid for such analysis. However, the density of fracturing (reflected by different RQD percentages) in weak and hard rock may play a significant role in the secondary permeability of those materials and may directly influence the occurrence of groundwater and its flow.

The following exceptions to policy were obtained from Caltrans.

- Five new lab test abbreviations for tunnel related rock testing were included [CAI –
 Cerchar Abrasivity Index, CS&EM Compressive Strength and Elastic Moduli of Rock
 Core (ASTM D 7012), EM Elastic Moduli of Rock Core in Uniaxial Compression
 (ASTM D 3148), PTS Petrographic Thin Section Analysis, SD Slake Durability
 (ASTM D 4644)]
- New material graphic was used for fault gouge to differentiate it from other rock types encountered in the project study
- Boring numbers are designated as R-09-Z1B5 to identify them based on the different zones established for SR-710 Tunnel Technical Study
- Log of test borings (LOTBs) are exempt from the compliance with the Soil and Rock Logging, Classification, and Presentation Manual (Caltrans, 2007) for the purpose of geotechnical feasibility study

The exception documents obtained from Caltrans are presented in this appendix.

TABLE A-1
Summary of Field Exploration

Soil Boring Number	Study Zone	Ground Surface Elevation ^a (feet)	Exploration Depth (feet)	Piezometer Installed?	Groundwater Table Elevation ^b (feet)
R-09-Z1B2	1	498.9	326 (inclined depth)	No	NM
R-09-Z1B3	1	343.2	303	Yes	313.3
R-09-Z1B4	1	388.6	325	Yes	353.2
R-09-Z1B5	1	442.2	502	Yes	419.5
R-09-Z1B6	1	447.2	400.5	Yes	425.7
R-09-Z1B7	1	480.5	300	Yes	440.5
R-09-Z1B8	1	419.6	200	Yes	394.6
R-09-Z2B1	2	451.0	150	Yes	437.1
R-09-Z2B2	2	601.1	285	No	NM
R-09-Z2B3	2	546.9	350	Yes	498.9
R-09-Z2B4	2	558.1	400	Yes	548.1
R-09-Z2B5	2	452.4	300	Yes	441.6
R-09-Z3B1	3	885.1	300	Yes	861.2
R-09-Z3B2	3	781.4	275	Yes	637.0
R-09-Z3B3	3	802.0	275	Yes	666.0
R-09-Z3B4	3	768.0	276	No	NM
R-09-Z3B5	3	698.2	402	Yes	675.7
R-09-Z3B6	3	750.0	326	Yes	698.8
R-09-Z3B7	3	596.7	326	Yes	582.2
R-09-Z3B8	3	594.3	275	Yes	NM ^c
R-09-Z3B9	3	624.3	300	Yes	550.4
R-09-Z3B10	3	626.8	375	Yes	578.3
R-09-Z3B11	3	533.1	275	Yes	375.1
R-09-Z3B12	3	501.0	275	Yes	488.2
R-09-Z4B4	4	454.4	277	Yes	408.1

Notes:

NM = Not Measured

^a Surveyed by Coast Surveying, Inc., June 2009, datum NAVD 88.

^b Because some of the piezometers were not developed, groundwater may not be stabilized at the time of reading.

^c Well cap stuck, could not access piezometer.



Soil & Rock Logging, Classification, and Presentation Manual Request for Exception

Name: Pratheep Piratheepan

Office: Office of Geotechnical Design South 1

District-EA: 07-187900

Project Name: SR-710 Tunnel Technical Study

Manual Section No.: Figure 5.2, Section 2.3

Description of Exception Being Requested:

Please see the annexed document for the requested exceptions.

- * Five new lab test abbreviation for tunnel related rock testings
- * New material graphic for fault gouge
- * Boring number format

Discussion of Why the Exception to Policy is Necessary:

Should the Manual be revised to allow for the exception? Please discuss.

The suggested laboratory testing abbreviations for rock samples are not included in the Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2007). These tests were necessary to characterize the rock for tunnel design purposes.

Material graphics for Fault Gouge also not included in the Caltrans Soil and Rock Logging Manual (2007). We would like to obtain the exception to show different material graphics for Fault Gouge material in the LOTB. Different material graphic will differentiate the Fault Gouge from the rock types encountered within the SR-710 Tunnel project study area.

Tunnel project area was divided into five zones. In order to differentiate borings in each zone, the zone numbers were included in the boring number. Boring numbers are designated as R-09-Z1B5 to identify them based on the different zones established for the SR-710 Tunnel Technical Study.

The above exceptions will be implemented by project consultant (CH2M HILL) and Caltrans Geotechnical Design South-1 in order to maintain the consistency in boring records and LOTBs.

No -	
Pshive Karini	fa - E'C
Branch Chief	Office Chief
	(Advisory & Mandatory Standards)

Deputy Division Chief
(Mandatory Standards)

Date Approved

cc: Project File, GS Corporate

TOTAL PROJECT NO SHEETS Bull sound wen strock with homer, usouly can be bloken with anderster or by our homer light pleasure or by our homer blow without rottened to plane so deskiness and na planes, and not reference to plane and well-reference to plane, and well-reference to plane, and well-reference to strong and and the plane of the planes and the planes are planes and the planes are planes. Hammer rings when crystalline rocks are struck. Budy of rock not weakened. Hammer rings when crystalline rocks are struck. Honner does not ring when rock is struck, Bady of rock is slightly weakened. for Can be gradulated by hand. Resistant minerals such as quartz may be present as "atringers" or "dikes." General Characteristics Combination descriptors (such as "sightly weathered to fresh" are permissible where equal distribution of both weathering characteristics is present over significant intervals or where characteristics present ore "in between" the diagnostic (solvine, Monever, combination descriptors should not be used where significant, idealficable boxes sone be defineded, Only two adjacent descriptors may be combined. Yery intensely weathered to decomposed." LEGEND OF ROCK MATERIALS PLANS APPROVAL OATE

No State of Catalonia or 11s africes or opens

Doi not be responsels for the coarcy or
competiments of metronic copies of mits plus afree. REGISTERED CIVIL ENGINEER DATE. SEDIMENTARY ROCK METAMORPHIC ROCK IGNEOUS ROCK DIST COUNTY ROUTE Salubte min-erals may be mostly leached. Resembres a sail, partial or complete remannt rock structure may be preserved; leaching of salute minerals usually complete. Minor leaching of some solu-ble minercls may be noted. No solutioning. Leaching of soluble min-erols may be complete. Solutioning Texture and Solutioning Thickness / Spacing Greater than 10 ft Texture altered by chemical disintegra-tion (hydration, argillation). WEATHERING DESCRIPTORS FOR INTACT ROCK Generally preserved. 1-1/4" to 3-5/8" Preserved. change. Texture 3-5/8" to 1 ft Less than 3/8" 3/8" to 1-1/4" 3 to 16 # 10 3 61 No BEDDING SPACING GIVISION OF ENGINEERING SERVICES PATCOL NO. STRUCTURE DESIGN Partial separation, rack is trioble; in seniarid conditions granifies are disaggregated. Mechanical Weathering-Grain boundary condi-tions (disapprepation) primority for granities and some coarse-grained No visib e separation, intact (tight). No separation, intact (+ight). Partial separation of boundaries visible. Complete separation of grain boundaries (disaggregated). Very thickly bedded Very thinly bedded Moderately bedded Diagnost'c features Description hickly bedded Thinty bedded CALIFORNIA STRUCTURE DEGLIO DEPARTMENT OF TRANSPORTATION DESIGN BRANCH Lominated Massive All fracture surfaces or are discolared or oxidized, surfaces of friable. All fracture surfaces are discolared or oxidized. Ninor to complete discoloration or oxidation of most surfaces. discolaration oxidation. Fracture Chemical Weathering-Discoloration and/or oxidation Unioxial Compressive Strength (PSI) RELATIVE STRENGTH OF INTACT ROCK 20 14,500 - 30,000 005, +1 - 000, 3,500 - 7,000 700 - 3,500 150 - 700 > 30,000 4 150 Discolored or oxidized throughout, but resistant marcing such as quartz may be unalterest all feliaspars and fe-ligninarias are completely offered to clay, Discolaration or oxida-tion extends from frac-tures usually through-out; Fe-Mg minerals are "rusty," fedispon crystals are "cloudy," Discolaration or oxir-dation throughout; all feldspors and Fe-4g minerals are attered to cloy to some extent; or chemical affection or chemical affection operatorion, see grain boundary conditions. Discoloration or exidu-tion is limited to sur-face of, or short dis-tance from, tractures; some feldspar crystols are dult. No discolaration, not exidized. Body of Rock Extremely Strong Extremely Weak Wedium Strong very Strong Description Weathered Very Weak Slightly Intensely Strong Weck Fresh 20071 LOGGING, CLASSIF; CATION, AND PRESENTATION MANUAL (JUNE Boring northood & P Specimen can be grouved or gouged easily by a pocket knife or sharp pick with light pressure, can be scratched with fingernal, Breas with light to moderate manual pressure. Specimen can be readly indented, grouved or gouged with fingernal, or carved with a popular that the Beas with light manual pressure. Specimen cannot be scratched with a pocket knife or sharp pick; can only be chipped with repected heavy banner blows. Combination descriptors (such as "Very intensely to intensely fractured") are used where equal distribution of both fracture density characteristics is present over a significant interval or exposure, or where characteristics are in between the descriptor definitions, any by compined. Speciaten cannot be scratched with a packet knife or snarp pick. Breaks with repeated heavy hommer blows. Boring Date Wostiy chips and fragments with a few scottered short care lengths. Specimen can be scratched with packet haife or shorp pick with light or moderate pressure. Care texts, with anderate basemer pressure can be growed 1/6 deep with a pocket haife or shorp pick with moderate or heavy pressure. Breaks with light hanner blow or heavy monual pressure. Specimen can be scratched with a packet knife or sharp pick with difficulty (heavy pressure). Heavy hammer blows required to break specimen. Top Hole Ei. PERCENT CORE RECOVERY (REC.) & ROCK QUALITY DESIGNATION (RQD.) REC=88% ROD=0% REC=100X ROD=80X Lengths mostly in 4" to 1 foot ronge with most lengths about engths from 1 to 3 feet with few lengths less than 1 foot greater than 3 feet. Lengths average from 1 to 4" with scattered fragmented intervals with lengths less than 4". End drilled interval Begin drilled interval End drilled interval Begin drilled interval Begin dril ed intervo ind drilled interval Observed Fracture Density DENSITY ROCK HARDNESS REC = \(\overline{\chi_{\text{core}}}\) Length of the recovered core pieces (inches) \(\times\) 100% | 100% Lengths greater than 3 feet. × 1007 FRACTURE ENGINEERING SERVICES No froctures. ∑ Length of intact core pieces ≥ 4" Total length of core run (inches) REFERENCE: CALTRANS SOIL & ROCK Very intensely fractured Very slightly fractured Moderately fractured Intensely fractured Description Slight y fractured Moderately Soft Moderately Hard Extremely Hard Unfroctured Description Very Hard Very Soft R00 = -Hard Soft

3150e (- 03110.4 3150

19 13341

Alvation saith

DATA STATE PRINTS DEAD INC.

EA HEDUEST

\$34541

SON REDUCED TO A SAN

SERVICES

GEOTECHNICAL

PREDANCO BY

C1 10.8 HOCK ELCOND

\$314 TEST

LOG OF TEST BORINGS

ROCK LEGEND

LOG OF TEST BORINGS ROCK LEGEND CAS, 164 AEVISION DATES DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN POST WILL DESIGN BRANCH CALIFORNIA
DEPARTMENT OF TRANSPORTATION REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL (JUNE 2007) POR SECOND SCHE IN SECOND LEGEND OF ROCK MATERIALS SEDIMENTARY ROCK WETAWORPHIC ROCK GEOTECHNICAL SERVICES IGNEOUS ROCK FAURT GOOGE AR CHECKED BY Porticle Size Analysis (ASTM D 422) Petrographia Thin Section Analysis pressive Strength and Elastic Lii of Rock Care (ASTM D 7012 Elastic Moduli of Rock Core in Diaxial Compression (ASTM D 3148) Organic Content-% (ASTM D 2974) FIELD AND LABORATORY TESTING Collepse Potential (ASTM D 5333) Moisture Content (ASTM D 2216) Plosticity Index (AASHTO T 90) Liquid Limit (AASHTO T 89) Specific Gravity (AASHTO 7 100) Point Load Index (ASTM D 5731) Stake Durability (ASTM D 4644) Expansion Index (ASTM D 4829) Shrinkage Limit (ASTM D 427) Unconfined Compression-Soil (ASTM D 2166) Unconfined Compression-Rock (ASTM D 2938) Swell Potential (ASTM D 4546) Consolidation (ASTM D 2435) Compaction Curve (CTM 216) Corrosivity Testing (CTN 643, CTM 422, CTM 417) Direct Shear (ASTM D 3080) Sand Equivalent (CTM 217) Vone Shedr (AASHTO T 223) Unit Weight (ASTM D 4767) Unconsolidated Undrained Triaxia: (ASTM B 2850) Cerchar Abrasivity index Consolidated Undrained Trioxial (ASTN D 4767) Permeability (CTM 220) Pocket Penetrometer R-Value (CTM 301) Pressure Weter Pocket Torvone ENGINEERING SERVICES # **(3) (3) (3)** 333 3 (5) (3) (0) **3**€€€ 41 LOTS ROCK LEGING



Soil & Rock Logging, Classification, and Presentation Manual Request for Exception

Name:

Shiva Karimi

Office:

Office of Geotechnical Design South 1

District-EA:

07 -187900

Project Name:

SR-710 Tunnel Technical Study

Manual Section No.:

Appendix C

Description of Exception Being Requested:

Office of Geotechnical Design South-1, Branch D requests for exception for preparation of the Log of Test Borings (total of 25 borings) for SR-710 Tunnel Technical Study to be based on Caltrans GINT Template web released on 2008.

Discussion of Why the Exception to Policy is Necessary:

SR-710 Tunnel Technical Study is a unique and unusual geotechnical exploration conducted for the purpose of feasibility study, route selection, and to comply with the request of stakeholders involved in this project. The LOTBs will be included in the feasibility report and not in any contract plans. Final alignment of SR-710 Tunnel may or may not fall along the boring locations.

The Feasibility study is due by March 30, 2010, and the limited available funds will have to be spent on completing the critical components of the study.

The above exception will be implemented by project consultant (CH2M HILL) and Caltrans Geotechnical Design South -1.

Should the Manual be revised to allow for the exception? Please discuss.

No.

Branch Chief

Office Chief

(Advisory & Mandatory Standards)

Deputy Division Chief (Mandatory Standards)

Date Approved

cc: Project File, GS Corporate

STUDY ONLY: IF A PRETERS
REPORT IS PRODUCED IN F
THIS EXCEPTION WILL NOT
APPLY

ale I	GROUP SYMBOLS AND NAMES c/Symbol Group Names Graphic/Symbol Group Names					
	GW	Well-graded GRAVEL Well-graded GRAVEL with SAND	Graphic	, ayınını	Lean CLAY Lean CLAY with SAND	
25.50	GP	Poorly graded GRAVEL Poorly graded GRAVEL with SAND		CL	Lean CLAY with GRAVEL SANDY lean CLAY SANDY lean CLAY with GRAVEL GRAVELLY lean CLAY GRAVELLY lean CLAY	
	GW-GM	Well-graded GRAVEL with SILT Well-graded GRAVEL with SILT and SAND		CL-ML	SILTY CLAY SILTY CLAY with SAND SILTY CLAY with GRAVEL SANDY SILTY CLAY	
	GW-GC	Well-graded GRAVEL with CLAY (or SILTY CLAY) Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)	12		SANDY SILTY CLAY with GRAVEL GRAVELLY SILTY CLAY GRAVELLY SILTY CLAY with SAND	
1000	GP-GM	Poorly graded GRAVEL with SILT Poorly graded GRAVEL with SILT and SAND		440	SILT SILT with SAND SILT with GRAVEL	
2000	GP-GC	Poorly graded SRAVEL with CLAY (or SILTY CLAY) Poorly graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		ML	SANDY SILT SANDY SILT with GRAVEL GRAVELLY SILT GRAVELLY SILT with SAND	
10000	GM	SILTY GRAVEL SILTY GRAVEL with SAND		OL	ORGANIC lean CLAY with SAND ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY	
100	GC	GLAYEY GRAVEL with SAND		OL.	SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND	
	GC-GM	SILTY, CLAYEY GRAVEL SILTY, CLAYEY GRAVEL WITH SAND	333		ORGANIC SILT ORGANIC SILT WITH SAND ORGANIC SILT WITH GRAVEL	
-	sw	Well-graded SAND Well-graded SAND with GRAVEL	$\langle i \rangle$	OL	SANDY ORGANIC SILT SANDY ORGANIC SILT WITH GRAVEL GRAVELLY ORGANIC SILT GRAVELLY ORGANIC SILT WITH SAND	
23.44.2	SP	Poorly graded SAND Poorly graded SAND with GRAVEL	СН		Fat CLAY Fat CLAY with SAND Fat CLAY with GRAVEL SANDY fat CLAY SANDY fat CLAY SANDY fat CLAY GRAVELLY fat CLAY GRAVELLY fat CLAY GRAVELLY fat CLAY	
1	SW-SM	Well-graded SAND with SILT Well-graded SAND with SILT and GRAVEL				
	sw-sc	Well-graded SAND with CLAY (or SILTY CLAY) Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)			Elastic Stl.T Elastic Stl.T with SAND Elastic Stl.T with GRAVEL SANDY elastic Stl.T	
N. P. S. S. S.	SP-SM	Poorly graded SAND with SILT Poorly graded SAND with SILT and GRAVEL		imfi	SANDY elastic SILT with GRAVEL GRAVELLY elastic SILT GRAVELLY elastic SILT with SAND	
N N	SP-SC	Poorly graded SAND with CLAY (or SILTY CLAY) Poorly graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)		он	ORGANIC tai CLAY ORGANIC tai CLAY with SAND ORGANIC tai CLAY with GRAVEL SANDY ORGANIC tai CLAY	
	SM	SILTY SAND SILTY SAND with GRAVEL		OH	SANDY ORGANIC ISI CLAY SANDY ORGANIC ISI CLAY with GRAVEL GRAVELLY ORGANIC ISI CLAY GRAVELLY ORGANIC ISI CLAY with SAND	
T. N. N.	sc	CLAYEY SAND CLAYEY SAND WID GRAVEL	333	0	ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL	
437.5	SC-SM	SILTY, CLAYEY SAND WITH GRAVEL		ОН	SANDY elastic ELASTIC SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SANI	
1 1 1	PT	PEAT		OI (OV	ORGANIC SOIL ORGANIC SOIL WITH SAND ORGANIC SOIL WITH GRAVEL	
N. S	H	COBBLES COBBLES and BOULDERS BOULDERS	OL/OH		OH SANDY ORGANIC SOIL WITH GRAVEL GRAVELLY ORGANIC SOIL WITH GRAVE GRAVELLY ORGANIC SOIL WITH SAND	

-7	FIELD AND LABORATORY TESTS
С	Consolidation (ASTM D 2435-04)
CL	Collapse Potential (ASTM D 5333-03)
CP	Compaction Curve (CTM 216 - 06)
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)
M	Moisture Content (ASTM D 2216-05)
ОС	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
R	R-Value (CTM 301 - 00)
SE	Sand Equivalent (CTM 217 - 99)
SG	Specific Gravity (AASHTO T 100-06)
SL	Shrinkage Limit (ASTM D 427-04)
sw	Swell Potential (ASTM D 4546-03)
TV	Pocket Torvane
UC	Unconfined Compression - Soil (ASTM D 2166-06) Unconfined Compression - Rock (ASTM D 2938-95
υu	Unconsolidated Undrained Triaxial (ASTM D 2850-03)

SAMPLER GRA	PHIC SYMBOLS
Standard Penetral	tion Test (SPT)
Standard Californi	a Sampler
Modified California	a Sampler
Shelby Tube	Piston Sampler
NX Rock Core	HQ Rock Core
Bulk Sample	Other (see remarks)

UW Unit Weight (ASTM D 4767-04) **VS** Vane Shear (AASHTO T 223-96 [2004])

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)



Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - North

REPOR	TTITLE	BORING RE	CORD LEG	END	
DIST.	COUNTY	ROUTE 710	POSTMILE D/D	EA 0	7-187900
	CT OR BRIDGE 710 Tunnel	NAME Technical St	udy		
BRIDGE	NUMBER	PREPARED BY		DATE	SHEET 1 of 3

CONSISTENCY OF COHESIVE SOILS					
Descriptor	Unconfined Compressive Strength (tsf)	Pocket Penetrometer (tsf)	Torvane (tsf)	Field Approximation	
Very Soft	< 0.25	< 0.25	< 0.12	Easily penetrated several inches by fist	
Soft	0.25 - 0.50	0.25 - 0.50	0.12 - 0.25	Easily penetrated several inches by thumb	
Medium Stiff	0.50 - 1.0	0.50 - 1.0	0.25 - 0.50	Can be penetrated several inches by thumb with moderate effort	
Stiff	1.0 - 2,0	1.0 - 2.0	0.50 - 1.0	Readily indented by thumb but penetrated only with great effort	
Very Stiff	2.0 - 4.0	2.0 - 4.0	1.0 - 2.0	Readily indented by thumbnail	
Hard	> 4.0	> 4.0	> 2.0	Indented by thumbnail with difficulty	

Descriptor	SPT N ₆₀ - Value (blows / foot)
Very Loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

MOISTURE			
Descriptor	Criteria		
Dry	Absence of moisture, dusty, dry to the touch		
Moist	Damp but no visible water		
Wet	Visible free water, usually soil is below water table		

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%

	SOIL PARTICLE SIZE				
Descriptor		Size			
Boulder		> 12 inches			
Cobble		3 to 12 inches			
Gravel	Coarse	3/4 inch to 3 inches			
	Fine	No. 4 Sieve to 3/4 inch			
Sand	Coarse	No. 10 Sieve to No. 4 Sieve			
	Medium	No. 40 Sieve to No. 10 Sieve			
	Fine	No. 200 Sieve to No. 40 Sieve			
Silt and Cla	ay	Passing No. 200 Sieve			

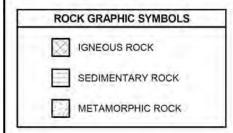
PLASTICITY OF FINE-GRAINED SOILS			
Descriptor	Criteria		
Nonplastic	A 1/8-inch thread cannot be rolled at any water content.		
Low	The thread can barely be rolled, and the lump cannot be formed when drier than the plastic limit.		
Medium	The thread is easy to roll, and not much time is required to reach the plastic limit; it cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.		
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.		

	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 (July 2007), Section 2, for tables of additional soil description components and discussion of soil description and identification.



Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - North



BEDDI	NG SPACING
Descriptor	Thickness or Spacing
Massive	> 10 ft
Very thickly bedded	3 to 10 ft
Thickly bedded	1 to 3 ft
Moderately bedded	3-5/8 inches to 1 ft
Thinly bedded	1-1/4 to 3-5/8 inches
Very thinly bedded	3/8 inch to 1-1/4 inches
Laminated	< 3/8 inch

		WEATHERING	DESCRIPTORS FOR	RINTACT RO	OCK	
		Diagr	ostic Features			
	Chemical Weathering-Disco	oration-Oxidation	Mechanical Weathering	Texture at	nd Solutioning	
Descriptor	Body of Rock	Fracture Surfaces	and Grain Boundary Conditions	Texture	Solutioning	General Characteristics
Fresh	No discoloration, not oxidized	No discoloration or oxidation	No separation, intact (tight)	No change	No solutioning	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 may be noted	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 (refer to grain boundary conditions)	All fracture surfaces are discolored or oxidized; surfaces are friable	Partial separation, rock is friable; in semi-arid conditions, granitics are disaggregated	Altered by chemical disintegration such as via hydration or 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 of 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 complete rem structure may leaching of so usually compl	nant rock be preserved; luble minerals	Can be granulated by hand, Resistant minerals such as quartz may be present as "stringers" or "dikes"

Note: Combination descriptors (such as "slightly weathered to fresh") are used where equal distribution of both weathering characteristics is present over significant intervals or where characteristics present are "in between" the diagnostic feature. However, combination descriptors should not be used where significant identifiable zones can be delineated. Only two adjacent descriptors shall be combined. "Very intensely weathered" is the combination descriptor for "decomposed to intensely weathered".

RELATIVE STR	RENGTH OF INTACT ROCK
Descriptor	Uniaxial Compressive Strength (psi)
Extremely Strong	> 30,000
Very Strong	14,500 - 30,000
Strong	7,000 - 14,500
Medium Strong	3,500 - 7,000
Weak	700 - 3,500
Very Weak	150 - 700

Very Weak 150 - 700 | Extremely Weak 150 - 700 | CORE RECOVERY CALCULATION (%)

 $\frac{\Sigma \text{ Length of the recovered core pieces (in.)}}{\text{Total length of core run (in.)}} \times 100$

RQD CALCULATION (%)

 $\frac{\Sigma \text{ Length of intact core pieces} > 4 \text{ in.}}{\text{Total length of core run (in.)}} \times 100$

	ROCK HARDNESS											
Descriptor	Criteria											
Extremely Hard	Specimen cannot be scratched with pocket knife or sharp pick; can only be chipped with repeated heavy hammer blows											
Very hard	Specimen cannot be scratched with pocket knife or sharp pick; breaks with repeated heavy hammer blows											
Hard	Specimen can be scratched with pocket knife or sharp pick with heavy pressure; heavy hammer blows required to break specimen											
Moderately Hard	Specimen can be scratched with pocket knife or sharp pick with light or moderate pressure: breaks with moderate hammer blows											
Moderately Soft	Specimen can be grooved 1/6 in, with pocket knife or sharp pick with moderate or heavy pressure; breaks with light hammer blow or heavy hand pressure											
Soft	Specimen can be grooved or gouged with pocket knife or sharp pick with light pressure, breaks with light to moderate hand pressure											
Very Soft	Specimen can be readily indented, grooved, or gouged with fingernail, or carved with pocket knife; breaks with light hand pressure											

	FRACTURE DENSITY
Descriptor	Criteria
Unfractured	No fractures
Very Slightly Fractured	Lengths greater 3 ft
Slightly Fractured	Lengths from 1 to 3 ft, few lengths outside that range
Moderately Fractured	Lengths mostly in range of 4 in. to 1 ft, with most lengths about 8 in.
Intensely Fractured	Lengths average from 1 in. to 4 in. with scattered fragmented intervals with lengths less than 4 in.
Very Intensely Fractured	Mostly chips and fragments with few scattered short core lengths



Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - North

REPOR		BORING RE	CORD LEG	END	
DIST:	COUNTY	ROUTE 710	POSTMILE D/D	EA 0	7-187900
	T OR BRIDGE 10 Tunnel 1	NAME Technical Stu	dy		
BRIDGE N/A	NUMBER	PREPARED BY		DATE	SHEET 3 of 3

LOGGE J. C a			3. Sc	BEGIN DATE COMPLETION DATE Chell 3-25-09 4-3-09	E LOC 0.000	ATIC	DN (Lat	/Lon	g or N	North	/East	and Da	tum)		DLE LOCATION (Lat/Long or North/East and Datum) 20.0004" / 118° 14' 25.9692" NAD83 DLE LOCATION (Offset, Station, Line) SURFACE ELEVATION												
DRILLII	NG C	CON	TRA		BOREHOL	E LOC	ATIC	ON (Off	set, S	Statio	n, Lir	ne)				SURFA	E ELE	/ATION									
DRILLI					Lt St		alu	m vva	ıy a	Ely	/siai	n Pa	rk Dri	ve				METER									
Rota				AND SIZE(S) (ID)	Ingerso			\400								6 in											
HQ c	ore	(2.	4")		SPT HAMM	atic H	amı			75%		CIENCY, E															
9				ILL AND COMPLETION Grout.	GROUNDV READINGS	VATER S	ATER DURING DRILLING AFTER DRILLING (DATE) T										DEPTH (OF BORII	٧G								
ELEVATION (ft)						ation nber	.⊆	ot	(%)			ight	gth	pc													
ATIO	(ff)	70	S	DESCRIPTION		e Loc e Nur	ner 6	per fo	ery (%	(%	e t (%)	it We	Strength	Method	Depth	F	Remark	s									
=LEV	DEPTH (Jateri	Graphics			Sample Location Sample Number	Blows ner 6 in	Blows per foot	Recovery (RQD (%)	Moisture Content (%)	Dry Un (pcf)	<u></u>	Drilling 1	asing												
	<u>-</u>			ASPHALT 6" thick.		တ တ	, ac	1 <u>6</u>	<u> </u>	<u> </u>	≥∪	ਹ ਲ	ω <u>ε</u>		This			as prepar									
	1			Road Base; 12" thick; silty angular gravel.										\Diamond	& R	ock Loggi	ng, Clas	e Caltrans sification	and 🔚								
497.16	2		•••	Poorly graded SAND (SP); yellow to brown; r trace coarse to fine GRAVEL; fine SAND.	noist; /				-					\Diamond	exce	ept as not	ed in Ap	(June, 200 pendix A1 I Summa	of E								
	3	= :												><	Rep	ort, SR-7 ly, Los Ar	10 Tunn	el Technic	al								
495.16	4		د.ه											\Diamond	Cali	ornia, da	ed April	, 2010.									
	5 =		:												Bori	ng is incl	ined at	60° from									
493.16	6			SEDIMENTARY ROCK (SANDTONE): fine-g thickly bedded to massive; yellow to brown; in weathered; very soft: (Poorly graded SAND-S about 5% coarse sand and fine angular GRA	rained; ntensely	C1			67					$\langle \rangle \langle$	mea	suremen	ts are re	nd struct lative to d lole dista	ore 🗄								
450.10		3	17.	maximum diameter of 1/2" triable) IPIJEN IE	VEL with										Elev	ation on	og are i	not valid.									
	7		-	FORMATION].										\searrow													
491.16	8		4	Subangular GRAVEL, max. 2" dia.; fine SANI decomposed siltstone fragment.	D;	C2			73					\Diamond													
	9	₹												\Diamond													
489.16	10	9	티											\Diamond													
	11																										
487.16	12	-												$\langle \rangle$													
	13			Soft, yellowish brown to gray, subangular GR	AVEL	C3			42					Š													
485.16				max. 1.5" dia.; coarse to fine SAND, decompositstone fragments.	osed									\sim													
														\Diamond													
	16	i												\Diamond													
			÷											\ \ \ \													
	17																										
481.16	18	0	③			C4			4					$\langle \rangle \langle \rangle$													
	19	5.												\Diamond													
479.16	20	•												\Diamond													
	21	_		_aminations of shale, gray, decomposed.		C5			40																		
477.16	22		•	gray, decomposed.		<u> </u>			- 1 U					\Diamond													
	22													◇ ×<													
	24													\Diamond													
	,	í	-											\Diamond													
	۷۵			(continued)					200.00					/_V_													
				Department of Transportation		R	BO	RT TI RING	LE RE	COF	RD_				10 (10 (10 (10 (10 (10 (10 (10 (10 (10 (HOLE R .	1D 09-Z1	B2								
			Division of Engineering Serv	rices	D	IST. 7	. (OUN			ROU 71 (ΤΕ)	POS D/	STMILI D	E	EA	7-18790										
		7	/	Geotechnical Services Office of Geotechnical Design	n - South	P		ECT O	R BF			ME															
				Single of Geolechinical Design								SHEET	42														
	W.E. S.								uccann.		Λ.					0-∡	Z=U9	(0)	14								

CALTRANS BORING RECORD MET+ENG FIXED SR710_BORINGLOG_3_28_2010.GPJ CALTRANS LIBRARY.GLB 3/28/10

proposatella manda de la companya de	operation with			/					20020072	2005								
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	Shear Strength (tsf)	Drilling Method Casing Depth		Ren	narks		
476.37	25 26	-	° ((continued). SEDIMENTARY ROCK (SANDSTONE): fine grained		C5 C6			40 70				> <					
			·	SEDIMENTARY ROCK (SANDSTONE): fine grained, laminated, gray, decomposed, very soft, trace of SILTSTONE laminations.					ľ									
474.37	28												\ \ \ \					
472.37	30												>><					
470.37		· ;	- 0	Mottled yellowish brown, strong brown, and gray, trace of shale fragments max. 1" dia.		C7			75				× < × <					
468.37	33												>>>>					
466.37	35			Very soft, highly oxidized.		C8			73				$\Diamond \times \Diamond \times$					
	37 38				O SERVICE AND SERV								\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\					
462.37	39 40		· /9600 .	Bedding inclination 66°.									X0X<					
460.37	41	:				C9			42				>>>>					
458.37	43		A STATE OF THE STA										$\Diamond \stackrel{\times}{\wedge} \Diamond$					
	45												$\stackrel{\wedge}{\sim}$					
	46					C10			72				$\Diamond \times \Diamond$					
	48	· 经	· F	Fine-grained SANDSTONE, varies from yellowish prown to strong brown.									\times					
	50												\Diamond					
	51 52		т 8	Frace of shale and sandstone fragments to 1.5" dia.	C	C11			82				$\stackrel{\wedge}{\circ}$					
	53 54	o .											\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\					
	55			(continued)		a decima de de de secono							\Diamond			and the supply and the supply of a country of		
			V 18 0 /	(continued)		RI	EPOR		LE	arvinalesia.					I	IOLE ID	a war gawa wang a karak (1970) a gala k	0111555194110
				Department of Transportation Division of Engineering Services			EPOR B ORI I IST.	NG	REC	COF		UTE	POS	TMUE		R-09	-Z1E	2
	L	7	J	Geotechnical Services		7	7		LΑ		7 ′ E NAME	0	D/I	TMILE)		<u></u> 07-18	B 790 0	
			I	Office of Geotechnical Design - South	n 1	5	SR-71	10 T	UNI	NEL	. TECH		STU	DY				
						BF	RIDGE	NUN	WIBIE	τ	PREPAI K.T	KED BY			DATE 6-22-	09 SH	of 1	2

ELEVATION (ft)	DEPTH (ft)	()	rial hics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	(%)	Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method Casing Depth	Remarks
ELE	DEP	į	Material Graphics		Samp Samp	Blows	Blow	Reco	RQD (%)	Moist Conte Dry U (pcf)	Shea (tsf)	Drillin Casin	
450.39	-55- 56		: :	(continued).	C11			82					
450.39				SANDSTONE with trace SILTSTONE, laminated, gray to light gray, decomposed, very soft, possible bedding inclination 90°.	C12			92				\Diamond	
			- ;	inclination 90°.	2001 002 002 002 002 002 002 002 002 002							\Diamond	
448.39	58		thil	Decomposed SHALE laminations, inclined 0°.								\Diamond	
	59											\Diamond	
446.39	60							:				\Diamond	
	61			SANDSTONE, fine-grained, yellowish brown to gray, decomposed, trace of SHALE fragments up to 1/4" dia.	C13			53					
444.39	62		0.	Thin hadding inclined 62°	RESTRUCTOR								
	63											\Diamond	
442.39	64		1							,		\Diamond	
	65							2				\Diamond	
440.39	66				C14			88				\Diamond	
	67				No.							\Diamond	
438.39	68		⊙`									\Diamond	
	69		• ; .									\Diamond	
436.39	70		.#///	SILTSTONE and SANDSTONE, laminated to thinly								>4	
	71		3.7.7 5.5.7	SILTSTONE and SANDSTONE, laminated to thinly bedded, fine-grained, dark gray, very soft, decomposed.	C15			65				\Diamond	
434.39	72				10.0							\Diamond	
434.39	73		///	Intensely weathered, moderately hard.								\Diamond	
432.39	74		. /									\Diamond	
	75											\Diamond	
430.39	76		·;.	Labelia Bartia Con anna i				07				\Diamond	
			/	Joint inclination 60°, organic material; grass, wood.	C16			97				\Diamond	
428.39	78		3.7									D (1)	
2			0000										
426.39	80											\Diamond	
	81											\Diamond	
424.39					C17			78				\Diamond	
1255			0									\Diamond	
422.39			·:									\Diamond	
422.39	84											\Diamond	
428.39	00			(continued)		OED:	RT TI			220000000000000000000000000000000000000			
				Department of Transportation		BO	RING	RE			ITE	DOS	HOLE ID R-09-Z1B2
7			7	Division of Engineering Services Geotechnical Services		DIST. 7		LA		ROU 71 SE NAME	0	D/I	ETMILE BA 07-187900
				Office of Geotechnical Design - Sout	h 1	SR-	710 3E NL	TUN	NEI	L TECHI		STU	
				nkeelijk		or (ID)	JE NC	NVISIE	ĸ	PREPAR K.T	TEDETY	V parting state in course of all	DATE SHEET 6-22-09 3 of 12

			1	1.										440 00 X 8 14 1 10 0 10 0 0 0 0 0 0 0 0 0 0 0 0 0		
EVATION (ft)				Sample Number	3 in.	oot	(%)			Dry Unit Weight (pcf)	ngth	por 4	5			
ATIC	э 9 10 БРТН (ft)	al	DESCRIPTION	e N	Blows per 6 in.	Blows per foot	ery ((%	e t (%)	iit W	Strength	Drilling Method	2	Re	marks	
ELEV	EPT	Material Graphics	DESCRIPTION	du	SMO	SMC	Recovery	RQD (%)	oistur onten	y Ur	Shear (tsf)	Illing				
Ш	85 85	<u>- ~ '.</u> ≥⊙		တ် C17		商	ਔ 78	Ж.	ĕö	٥٥	R St)	ام ال	3			
424.41	86	(
			Very dark gray to black, moist, medium plasticity.	C18			100					\Diamond	PA			
	87	9%	Wood fragment.	Wilderson								\bigcirc				
422.41	88			ASSERTATION ASSERT								\Diamond				
	89		Madison describes a language to the second of the second o						4.7	440		> 4				
420.41	90		Medium dense, yellowish brown, moist, about 81% coarse to fine SAND, about 19% nonplastic fines.	-Accounting					17	113		\Diamond				
420.41		. :	Joint inclined 80°.	100000								\Diamond				
	91		Moderately weathered, oxidized zone.	C19			92					D				
418.41	92											\Diamond				
	93			SON SECURIO								\bigcirc				
440.44		··.:	SILTSTONE laminations, bedding inclination 90°.	Y24603et bino								\Diamond				
416.41	94											>4				
	95	\$.:		errossivas.												
414.41	96		SILTSTONE laminations inclined 85°.	C20			100					\Diamond				
	97	15°					100					\Diamond				
412.41	98] /: 	Joint inclinations 30°, slight HCL reaction along joint	SMERGOVE								> 4				
412.41	90		plane.	2505000000								\Diamond				
	99			Miliporta								\Diamond				
410.41	100			92000000								D				
	101											\Diamond				
			Becomes reddish yellow.	C21			95					\Diamond				-
408.41				Merchan								\Diamond				
	103	<u>.</u>		SWSWING CO.								D				
406.41	104	<u>:</u> :.		ESYNETTON								\Diamond				
	105			- Constant								\Diamond				
404.41	106											$\times \Diamond \times$				
				C22			80									
	107	:		Military and a second												
402.41	108											\Diamond				
	109															
400.41	⊢	انتفاد										X0X0X0X				
	111	 		C23			85					$\langle \rangle \langle$				
398.41	112			CANAL PROPERTY.												
	113	.										\Diamond				
396.41	114	= .c.	SILTSTONE/SHALE laminations, light gray, inclination	Section 1								\Diamond				
		7.7	80°- 90°.	00000000000000000000000000000000000000								\Diamond				
404.41 402.41 400.41 398.41	·115 ^E	and or the amountain	(continued)										· ·			
18			Department of Transportation	F	REPOR BOR	RT TIT RING	LE RE	COF	3D_						HOLE ID R-09-Z	1R2
	r	12807	Division of Engineering Services	E	DIST.	C	AUO:			ROU 71 0	TE	POS	STMILE D		EA	
	_	7	Geotechnical Services	F	7 PROJE	ст о	L A R BF	RIDG	E NA	ME					07-187	900
			Office of Geotechnical Design - South	1	SR-7	710 T E NUI	UN	NEL	, TE	CHN	IICAL ED BY	STL	JDY	DATE	SHE	-T
		Ha CHANCE	10 m						ĸ.					DATE 6-2 2	2-09 4 c	T of 12

(ft)					tion	ber		Ħ				ght	‡	Т				
ELEVATION (ff)	H (ft)		cs	DESCRIPTION	Sample Loca	Sample Number	Blows per 6 in.	Blows per foot	ery (%)	(%	e t (%)	Dry Unit Weight (pcf)	Strength	Drilling Method	Casing Depth	R	emarks	
ELEV,	DEPTH (ft)		Material Graphics		Sampl	Sampl	Slows	Slows	Recovery	אסס (י	Moistur Conten	Ory Un pcf)	Shear (tsf)	Orilling	Casing			
	115					C23			85		<u> </u>		0, 0	\sim		See note at en RQD.	d of log rega	rding
398.43			9 00			C24			72	23				\Diamond		rigo.		
	117			SEDIMENTARY ROCK (SILTSTONE and	-0000000000000000000000000000000000000									\Diamond				
396.43			/:::/	SANDSTONE): fine-grained, laminated to thickly										\Diamond				
	119			slightly weathered, soft to very soft, bedding and bedding plane parting inclined 70° to 90° Joint inclined 15°, polished surface, 0.1" aperture,										\Diamond				
394.43				filled with clay.										\Diamond				
			1.1	Faults inclined 80°- 90°, partially healed, 1/3" displacements.		C25			100	52				>< \				
392.43					Street Control									> > >				
390.43	123		.:	SEDIMENTARY ROCK (SANDSTONE with SILTSTONE and CLAYSTONE); fine-grained to							15			>< \cdot		CS & EM, SD,	UC	
				medium-grained, thinly bedded to massive, dark gray, intensely weathered, soft to moderately soft, intensely to slightly fractured, bedding inclined 70° to 90°, 80%							16			♦		UC		
388.43	125	= .		sandstone.										$\Diamond \times \Diamond$				
	127		-27		Symmotor	C26			100	100				> <				
386.43															1			
	129		÷.			C27			98					\ \ \ \				
384.43			, t	5 0 11 12 12										>				
	131		1	Fe0 lined bedding joint.		000			00					\Diamond	1			
382.43 380.43	132		#	Minor faults inclined 75°, sand filling.		C28			92					\diamond				rding
	13 3				Negative and see									\\				
380.43														\Diamond				
	135		13											\Diamond				-
378.43	136					C29			100	23				×				
1	137				NEW CONTRACTOR									\ \ \ \				
376.43	138		. Y.											\Diamond				
	139			Zones of very soft and moderately hard sandstone.										\Diamond				
374.43				Zones of very soft and moderately hard sandstone, 1/2' to 2' thick between 135' -141' depth.										\Diamond				
	141					C30			90					>< \ \				
372.43	142				September 1									\$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\				
	143													Š				
370.43	144		11.											$\Diamond \times \Diamond$				
378.43 376.43 374.43 372.43	145	ار		(continued)										$ \nabla$				
	100 102			Department of Transportation			EPOR BORI	ING	RE		RD		,				HOLE ID R-09-	Z1B2
	L	- 11.58 - 11.58		Division of Engineering Services Geotechnical Services			IST. 7		LA			ROU 71 (TE O	P(os D/[STMILE D	EA 07-18	7900
(10.12)		1		Office of Geotechnical Design - South	า 1	1 3		10 T	ΓUΝ	NEL		ECHN	NICAL ED EX	ST	U			
						В	RIDGE	: NU	VIBE	ĸ	PR K	EPAR .T	ED BY			6-2	E SHE 22-09 5	ET of 12

-																And a finish secure don't the Annual Secure	
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	Re	marks	
	145	","	(continued).		30		74 740 000 7 744 000 0	90					\sim	S		of log regarding	
372.45	146	~ , 3	SEDIMENTARY ROCK (SANDSTONE with	\Box_{c}	231			100	48				\Diamond	F	RQD.		
	147	9.5	SILTSTONE): fine-grained to medium-grained thinly bedded to massive, yellowish brown to dark gray, moderately weathered to fresh, intensely to slightly	1,500,000					.0				> 4				
	_		moderately weathered to fresh, intensely to slightly fractured, sandstone 85%.	PRESSURE													
370.45	148		fractured, sandstone 65%.										\Diamond	c	CS & EM, UC		
	149												D				
368.45	150												\Diamond				
300.43	130												\Diamond				
	151				232			95	60				D				Ē
366.45	152			TVW0W.													
				*ADSCRIPTION									\Diamond				
	153			SAUGUS									> 4				Ē
364.45	154	· , · /,											\Diamond				E
	155												\Diamond	ŀ			E
													><				
362.45	156				233			77	10				\Diamond				
	157			MOSSMA									\Diamond				
260.45	150			Marchae									$\triangleright \triangleleft$				E
360.45			Light gray, hard, fresh zone 1.5' thick.										\Diamond		CAI, CS & EM,	UC	
	159	·/·	Brown to yellowish brown oxidation 1 .75" thick on										$\langle \rangle$		57 ti, 00 ti Livi,		100 40,000
358.45	-	⊣ / . · ∣	each side of joint, inclination 25°.										$\triangleright \triangleleft$				
			Becomes dark yellowish brown.										\Diamond				
356.45 354.45	161	>	Becomes moderately soft, slightly fractured, bedding		234			98					\Diamond				Ē
356.45	162	15.00	inclination 25°.	Offinger									\sim				
	163	7.		WEDTERSON									\Diamond				
			Bedding inclination 65°.										\Diamond				
354.45	164	· · ·											>4				
	165	7											\Diamond				
352.45		TI											\Diamond				
332,43	100			C	235			100	17				D < 1				
	167		SILTSTONE bed, gray to dark yellowish brown, slightly	Software,						15			\Diamond	c	CS & EM, SD, U	JC	
350.45	168		weathered, moderately soft, bedding inclination 80°-88°.	0000									\Diamond				
													D4				
	169												\Diamond				Ē
348.45	170												\Diamond				
	171	1,5											D				
		· -	Becomes medium to fine-grained, light gray, moderately hard, slightly fractured.	C	236			100	90				$[\lozenge]$				
346.45	172	.	, , , , , , , , , , , , , , , , , , , ,	9325000000													
352.45 350.45 348.45 346.45	173		Concretion, fine SANDSTONE, light gray to yellowish brown, slightly weathered, hard, strong reaction to										\Diamond	C	CAI, CS & EM		
344.45	-	::	HCL.										\Diamond				
344.43																	
	175	I - I - I	(continued)										$ \nabla $				
	2.2.377 = 0,000				ΙR	EPOR		(LE								HOLE ID	337
		1	Department of Transportation		1	BOR	NG	RE		RD	D 0		1			R-09-Z1B2	9
	F		Division of Engineering Services			IST. 7		COUN	41 Y		ROU 71 0	0	PO D	ST /D	MILE	EA 07-187900	
		6 7	Geotechnical Services		Р	ROJE(RIDG	E NA							ŕ

PROJECT OR BRIDGE NAME
SR-710 TUNNEL TECHNICAL STUDY
BRIDGE NUMBER PREPARED BY
K.T

SHEET 6 of 12

DATE **6-22-09**

Office of Geotechnical Design - South 1

		and the library						592025702									
ELEVATION (ft)	945 145 165 165 165 165 165 165 165 165 165 16	Material Graphics		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		R	emark	6	
346.47	176	2 5		C3			100 100	90				X \ \ \		te at en	d of log	regardin	9
344.47		18.1										$\Diamond \times \Diamond$	CAI, CS	S & EM,	UC		
342.47	179		Laminations inclined 75°.									× < × <					
340.47	181	7.	SILTSTONE laminations, gray, slightly weathered, soft, bedding and bedding plane parting inclined 75° to-80°, soft sediment deformation and worm burrows.	C3	8		100	47				$\sim \sim \sim$					
338.47	183		80°, soft sediment deformation and worm burrows. Becomes gray, slightly weathered to fresh to 203' depth.														
336.47				СЗ	9		73	38				$\Diamond \times \Diamond \times$					
334.47		د غور م	Siltstone/Sandstone lamination, 4" thick.									$\langle \Diamond \times \Diamond \rangle$					
332.47									14								
330.47				C4	0		125	63				X0X0					
330.47 328.47	193 194	Z Z	Bedding inclined 60°.									\ \ \ \ \					
326.47		1.00	Bedding inclination 90°, joint inclination 25°.	C4			100	53				>>					
324.47	197 198											$\langle \Diamond \times \Diamond \times \rangle$					
322.47		187	SEDIMENTARY ROCK (SANDSTONE): fine-grained to medium-grained, moderately bedded, gray, fresh, hard, strong reaction to HCL, concretion. Becomes soft.	C4.	2		97	77				<					
320.47	202	100	Bedding inclined 75°. Joint inclined 80°.									X0X0					
318.47			SEDIMENTARY ROCK (SILTSTONE/CLAYSTONE): fine-grained, laminated siltstone, thinly to thickly bedded, dark gray to very dark gray, fresh, soft, moderately fractured, bedding inclined 75°-90°, sandstone 50% interbedded with siltstone 50%.									\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\					
	205		(continued)	##2.										nanén kana baham	Standard all Kinds to	APPENDENT STANDARD STANDARD PROPERTY.	
					REPO	RT TI	TLE			Na Vision VIII and					HOLE	E ID	
			Department of Transportation Division of Engineering Services		BOR DIST.	ING	RE		RD	ROU	TE	POS	STNAU E		R-	09-Z1	B2
8 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -		7	Geotechnical Services		7		LA			710		D/	TMILE D		0	7-18790	0
15000		<i> </i>	Office of Geotechnical Design - South	า 1 📙		710 T	TUN	NEI	L TE	ECHN	IICAL	STU	DY				
		10000			BRIDG					EPAR	ED BY			DATE	<u>-</u> 2-09	SHEET 7 of	12
W									- 1					V-2	r VV		

						20170				200 B 201 K 200	1900 Inc. 600-0	,			water below to the time of the time				
ELEVATION (ft)	DEPTH (ft)	Matorial	Graphics	DESCRIPTION	Sample Location	odilipio ivalino	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method		R	emarks		
	205			(continued).	C4				87	67					CS & E		-1 -61		
320.49	206		1.1		Ctjerone									\Diamond	RQD.	te at en	d of log	regarding	
	207	:			92002520026									> 4					
	201	∃•,																	
318.49	208			Siltstone rip-up fragments.															
	209	7/ 1/4		1 1 3		İ								\sim					
														\Diamond					
316.49	210				C4	14			92	43				\Diamond					
	211				ONDOCOR									\sim					
			::		255 LOVE COMM									\Diamond					
314.49	2 2	⊒:		Joint inclined 20°.															
	213	= 3	==											\Diamond					
312.49	214	2												\Diamond					
		≓ ∙.	• • •																
	215				C4	5			100	55				\Diamond					
310.49	216			SEDIMENTARY BOOK (SANDSTONE	Milworkey									\Diamond					
	047	╡ ·		SEDIMENTARY ROCK (SANDSTONE with SILTSTONE): fine grained to medium-grained, laminated to thinly bedded, gray to light gray, fresh, soft to moderately hard, slightly to moderately fractured, 90% of Sandstone, trace of hard zone, bedding and bedding plane parting inclined 70°-90°.	92/27/2012									$\triangleright \triangleleft$					
	217	,	•	laminated to thinly bedded, gray to light gray, fresh, soft to moderately hard, slightly to moderately										\Diamond					
308.49	218	∄`		fractured, 90% of Sandstone, trace of hard zone, bedding and bedding plane parting inclined 70°-90°.										\Diamond					
	219] :		Coarse-grained zone, graded bedding, joints inclined 10° to 50°.										$\triangleright \Diamond$					
		⊒:	11,11	10 10 30 .										\Diamond					
306.49	220	=			C4	16			83	33				\Diamond					
	221	≣.												\mathcal{N}					
		_ ^*	///	Siltstone laminations inclined 60°.	C4	7			87	2				\Diamond					
304.49 302.49	222		//		011000000000000000000000000000000000000														
	223			Graded bedding, coarse to fine-grained zone.										\Diamond					
302.49	224			e.										\Diamond					
302.43	224	▋.																	
	225	Ξ.	•	Joints inclined 30° to 35°, rough surfaces.															
300.49	226	<u> </u>												\Diamond					
		= .		Soft zone.	C4	8			102	48				D4					
	227			Joints inclined 35°, weak HCL reaction, slightly rough	100000000									\Diamond					
298.49	228			to moderately rough surfaces.										\Diamond					
	229													\mathbb{N}^{4}					
		_ 5		Hard cemented zone, calcite cement.							13			$\langle \rangle$	UC				
296.49	230		K 3	Healed calcite, joints inclined 35°.															
ı	231	,												\Diamond	00.0 5				
004		=			C4	9			100	87				×0×0	CS & E	IVI, UC			
294.49	232	ऱ.		Siltstone laminations inclined 70°.	Security														
	233													\rangle					
292.40	234													\bigcirc					
292.49	_0-1	≣ .	, , ,	Coarse to medium-grained zone.															
300.49 298.49 296.49 294.49	235			(continued)											L				
						R	EPOR	الزان	ÎLE	ALVOCEDI		/:-:::::::::::::::::::::::::::::::::::				100 Carlo o plano e major Carlo Santo	HOLE	ID	
			T	Department of Transportation		3	30RI	NG	RE		RD	DOL	IT.	De	STAR E			D 9-Z1I	32
	ſ			Division of Engineering Services		ום 7	IST. 7	C	OUI LA	41 Y		ROL 71	0 0	POS D/	STMILE D		EA 07	r-187900)
		7		Geotechnical Services		PF	ROJE(CT O	R B	RIDG	E N	AME		,,.,.,.,					
				Office of Geotechnical Design - South			RIDGE						IICAL ED BY	SIL	ייטע	DAT	E	SHEET	
											K	T				6-2	E 2 2-09	8 of '	2

ELEVATION (ff)	.н (ft)	a l ics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	ery (%)	(%)	re it (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Method	i Re	emarks
ELEV	235 235	Material Graphics				Blows	Recovery	RQD (Moistur Conten	Dry Ur (pcf)	Shear (tsf)	Drilling Method Casing Depth		
294.51	236		(continued).	C49			100					> > >	See note at en RQD.	d of log regarding
	237		Joint inclined 20°.	C50			73	48	13			\sim		
292.51	238	in it	Becomes coarse-grained, trace fine gravel.						13			\times		
	239		2000 nee ceange gramos, adoc into grave.									× ×		
290.51	240	12										\sim		
	241		SEDIMENTARY ROCK (SILTSTONE, SANDSTONE,	C51			100	58				\sim		
288.51	242		CLAYS I ONE): 65% siltstone, 5% claystone, 30% sandstone, fine grained to medium-grained, laminated to very thin bedded Siltstone with Claystone, thin to	The suppose of the su								\sim		
	243		SEDIMENTARY ROCK (SILTSTONE, SANDSTONE, CLAYSTONE): 65% siltstone, 5% claystone, 30% sandstone, fine grained to medium-grained, laminated to very thin bedded Siltstone with Claystone, thin to moderately bedded sandstone; gray to very dark gray and dark brown, fresh, moderately soft to hard, slightly to intensely fractured, bedding and bedding plane parting inclined 60°-80°. Puente Formation.						14				CS & EM, SD,	UC
286.51			parting inclined 60°- 80°. Puente Formation.											
	245	137	Joint inclination 25°.	C52			40	0				$\stackrel{\wedge}{\searrow}$		
284.51	246	/:///		- and another state of the stat										
282.51												$\stackrel{\circ}{\sim}$		
	249											$\stackrel{\circ}{\sim}$		
280.51	250	. : . //	Joint inclination 25°.	C53			100	25				$\stackrel{\wedge}{\sim}$		
	251		Bedding plane parting.				100	23						
278.51 278.51 276.51	252		Soft sediment deformation.	C54			56	40						
מיוער איי	253	11:11:5	Bedding inclined 70° to 90°.	Withardson										
276.51	254	/	Deduing mainted 70 to 30.											
4	255													
274.51				C55			80	13						
2 272.51	257	////										\		
212.31	259	://	Joint inclination 37°.	C56			100	0				\ \ \		
270.51		//										\\		
	261		Bedding inclined 75°.	C57			100	77				\\		
268.51	262			G5/			100	ű				\Diamond		
	263		Bedding inclined 65° to 75°.						13			\\	CS & EM, SD,	UC
266.51	264	***	Joint inclined 30°.									\\		
274.51	265	**	(continued)									$ \Diamond $		
		1	Department of Transportation	R	EPOR BOR				RD					HOLE ID R-09-Z1B 2
			Division of Engineering Services Geotechnical Services		IST. 7		LA			ROU 710	ΓE	POS D /	STMILE D	EA 07-187900
		1	Office of Geotechnical Design - Sout	h 1	ROJE SR-7 RIDGE	10 T	UN	NEL	JE	CHN		STU		CUEFT
					INIDGI	UN	MBE	K	K .	EPARE . T	D BY		6-2	SHEET 2-09 9 of 12

													harman de Artis	ngoyay,					100 to 1 manufact or 100 to 100
ELEVATION (ft)	265 265	(4)	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		R	emarks		
268.53	266			(continued). Incipient joints, rough, moderately fractured, HCL reaction.	C57			100 100	77				>X		See note RQD.	e at en	d of log	regarding	
266.53) :: ::	Bedding inclined 75° to 80°.									$\Diamond \times \Diamond \rangle$						
264.53										13			$\langle \Diamond \times \Diamond \rangle$,	EM, SD	, UC			
262.53			7	Fault inclination 30°, 0.1" displacement.	C59			73	28				× </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
260.53													× < ×						
258.53				Claystone rip-up fragments 1/4" to 1" size, , smooth, fault inclined 0-20° with slickensides, 0.1"	C60			97	22				♦						
256.53				displacement. Clay filling joint, inclination up to 18°.															
254.53													$\Diamond \times \Diamond$						
252.53			////	Siltstone laminations inclined 75°.	C61			92	53				$\times \times \times \diamond$, , ,					
250.53			000	Siltstone rip-up fragments, 1" size.						15			X < X <						
248.53	285 286 287				C62			95	57				\bigcirc \times \bigcirc \times \bigcirc						
246.53	288 289			Soft codiment deformation was hadding indicat 77°									\$\\ \\ \\ \\						
244.53	290 291			Soft sediment deformation, wavy bedding inclined 75°. Fractured zone; 6" thick in black to very dark gray	C63			57	72				$\langle \Diamond \times \Diamond \times \rangle$						
242.53	292 293	■.	夢	Siltstone and Claystone. Minor fault inclined 20°, slickensides parallel to core	C03			37	12				$\langle \Diamond \times \Diamond \times \rangle$,					
240.53				axis. Trace of coal and pyrite crystals.									$\langle \diamond \times \diamond \rangle$						
				(continued)							Acceptant Association			/23-V-		a police a proper Ad			
				Department of Transportation		REPOF BOR	ING	TLE RF	COL	SD.		manufacture and a	***************************************	estime?	And the second s		HOLE	ID 1 9-Z1	32
10.00	ſ			Division of Engineering Services	1	DIST. 7	C	1UOC		·	ROU 71	ΠE	PO	os D/C	TMILE		EA		
	_	7	7	Geotechnical Services	F	PROJE	CT C	LA R B	RIDG	ΕN	71 0						U/	-18790	U
				Office of Geotechnical Design - South	11	SR-7 BRIDG	10 1	TUN	NEL	. 115	CHN	IICAL ED BY	ST	U	DY	DAT	F	SHEET	
										K	ī 🖺		***************************************			6-2	E 22-09	10 of	12

CALTRANS BORING RECORD MET+ENG FIXED SR710_BORINGLOG_3_13_2010.GPJ CALTRANS L

ELEVATION (ft)	585 560 1 1 1 1 1 1 1 1 1 1	Material Graphics		7.00	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)			Remarks	3
242.55	296	11.1			C63 C64			57 100	72 54				> X <	See note RQD.	at end of log	regarding
240.55	297 298 299	<i>}]]][</i> ;								16			$X \Diamond X \Diamond X$	EM, SD,	110	
A 1	300	///::	Bedding inclined 70°, abundant bedding plane parting.										> X <	EIVI, SD,		
236.55	301			C	65			92	40				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			
234.55	303 304		Becomes gray, hard, calcite cement 6" thick, minor fault inclined 0° to 30°.										\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			
232.55	305 306):h////:	Trace of coal fragments. Bedding plane parting inclination 60° to 70°.		:66			62	0				\Diamond			
230.55	307 308	\//\.\/	Zestening practice partiting monitoration de 10 / 0 :					02	ŭ				$\times \times \times$			
228.55	309 310	450	No recovery.										>			
	311			C	67								>><>			
226.55 224.55													\times			
222.55	316			С	:68								\times \times \times			
	318												\ \ \ \			
218.55	319 320 321		Trace of pyrite crystals, black lamination of coal. No recovery.	C	69			30	0				$X \Diamond X \Diamond X$			
216.55				С	70											
214.55																
	J_0	.,	(continued)										2000			
			Department of Transportation Division of Engineering Services			POR B ORI ST.	С	LE RE		RD	ROU 710	TE	PO:	STMILE	EA)9- Z1B2 7-187900
	in laborati	7	Geotechnical Services Office of Geotechnical Design - South	1	5	ROJEC SR-71 RIDGE	T 0	R BF	NEL	. 115	AME CHN EPARI	ICAL ED BY		IDY		SHEET 11 of 12

ELEVATION (ff)	325	5	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	R	emarks	
216.57	326			No recovery.														
	327	7		Bottom of borehole at 326.0 ft bgs (Inclined at 60° from horizontal)														
214.57	328	3		Backfilled with Grout.														
214.57 214.57 212.57 210.57 208.57 204.57 202.57 198.57	329 330 33°			RQD values provided in the boring logs are based on intact core pieces obtained between two natural discontinuities. The majority of cores obtained in this boring are typically very weak to weak and do not meet the "sound core" definition provided in standard test method for RQD ASTM (D 6032). These RQD values should not be used to evaluate the rock mass quality.														
210.57	332	2		should not be used to evaluate the rock mass quality.														
208.57	334	4																
	33	5																
206.57	33	7																
204.57	338	8																
	339																	
202.57	340																	
200.57 198.57	342	2																
	343	3																
198.57	344	4 5																
196.57	346	6																
194.57	343	7																
	349	9																
192.57	350	0																
190.57	35°	1 2																
	353	3																
194.57 192.57 190.57 188.57	354	4																
	35	5	***************************************			X.207.202.02799	H. Paragolis (n. 1947-1949)		Market Market Market				S=102,02,07,070,3070					
						R	EPOR'	TTIT	LE			0.0076100.011600			****		HOLE ID	

CALTRANS BORING F

Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1

REPORT BORIN	TITLE G RECORD			R-09-Z1B2
DIST. 7	COUNTY LA	ROUTE 710	POSTMILE D/D	EA 07-187900
	OR BRIDGE N		CTUDY	

SHEET 12 of 12

SR-710 TUNNEL TECHNICAL STUDY
BRIDGE NUMBER PREPARED BY
K.T

DATE **6-22-09**

LOGGED J.Cast		3. Sc	BEGIN DATE COMPLETION DATE hell 1-23-09 1-31-09	BOREHOL 34° 5' 2										um)	HOLE I	9-Z1B3		(110)
DRILLIN	G CO	NTRA		BOREHOL									ndo I	Soad	SURFA	CE ELEVATION 23 ft NAVD		
DRILLIN	G ME	THOD	_	DRILL RIG	;				ut 11	. 0	4111	GITIC	iiao i	COLC		OLE DIAMETI		
Rotar			AND SIZE(S) (ID)	Speed SPT HAMI											6 in	- D FFFIOLENC	, FD:	
SPT (1.4")	, Cal	(2.4"), PQ core (3.2")	Automa	atio	: На	ımme							10 /5	70%	DEPTH OF BO		
Piezo			talled on Completion	READING:	S	IEK	NM				2	9.9 f	t on 7				JRING	
ELEVATION (ft)	оертн (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		Remarks		
341.23	1 2 3		ASPHALT , 2.4" thick. SILTY SAND (SM); medium dense, yellowish moist, fine to medium-grained.	brown,	<i>Γ</i>									0000000000000000	in accordance Soil & Rock I and Presente 2007) except A1 of the Fin Summary Re Technical St County, Calif	Record was pre e with the Calt Logging, Class at an noted in A al Geotechnica port, SR-710 udy, Los Angel fornia, dated A	rans lification June, ppendix al Tunnel les	
337.23	4 - 5 - 6 - 7 - 7		Medium dense, yellowish brown, slightly mois fine SAND, slightly micaceous.	st, very	X	S1	1 4 5	9	100					0000000000	randomly an	rements were a d the readings al value for an	s were	
335.23	7 8 9													2000000000				
1 331.23 1 1	1 2		Lean CLAY (CL); medium stiff, grayish brown medium plasticity, very thin horizontal bed at SAND in shoe, nonmarine gastropod shells.	ı, moist, tip, SILTY		D2	2 3 5	8	100				PP = 1.5	<u>ananananananananananananananananananan</u>				
327.23 1 1	5 1 7 8		At EL. 328.2', becomes grayish brown, interbook with Poorly graded SAND, horizontal bedding GRAVEL to 0.5" dia, medium plasticity.	edded g, trace	X	S3	3 5 8	13	100					เ <u>กิดอิกิดอิกิดอิกิดอิกิดอิกิดอิกิดอิกิดอ</u>				
323.23 2 2 321.23 2	9 20 21		Poorly graded SAND with SILT (SP-SM); med dense, dark grayish brown, moist, about 95% to medium SAND, about 5% nonplastic fines, micaceous, locally oxidized, large wood chun	dium coarse) (D4	10 20 15	35	100		13	93		<u>odooodaaaaa</u>				
319.23 2	23 24 25			DOMESTIC STREET,										000000000				
	green of the total and a m		(continued)			-	EDOD		пг	¥500000	oderdoode					LHOLE ID		
			Department of Transportation Division of Engineering Serven				EPOR BOR IST.	NG			RD	ROL	TE	PO	STMILE	HOLE ID R-09-	Z1B	3
			Geotechnical Services	vices			7		LA			71		D /		^{-A} 07-18	7900	
			Office of Geotechnical Design	gn - Sout	h ′	1		10 T	TUN	NE	- 1	CHN	IICAL	STL	JDY			
						В	RIDGE	NU	MBE	R	PRI K .		ED BY		DA 6	TE SHI -22-09 1	EET of 1 1	

ELEVATION (ft)	овертн (ft)	. Material Graphics	DESCRIPTION	Sample Location		Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	7-4-11-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	Remarks		
	26		Poorly graded SAND with SILT (SP-SM) (continued). Dense, gray, about 98% medium to fine SAND, 2% fines, subangular granitic sources.	X	S5	9 15 \ 17	32	100	_				300000	See note a	at end of log r	egarding	
315.23	28 =												000000				
	30		Fat CLAY (CH); stiff, very dark gray, moist, medium to high plastic, micaceous.	X	D6)	5 6	14	.100,				PP = 2.75	00000				
311.23	32					8							00000				
309.23	33 34												000000				
307.23	35 36 37		Poorly graded SAND with SILT (SP-SM); very dense, dark gray, moist, about 1% fine GRAVEL, fine SAND, grading down to medium SAND, subrounded to subangular diorite and gabbroic gravel, max. 1" dia.	X	S7	22 24 26	50	100					$\overline{a}aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa$				
305.23	38												200000				
303.23			At EL. 303.2', becomes dense, fine GRAVEL, faintly bedded in horizontal laminations and beds, 3" thick.	X	D8	19 27	52	100		16	118		00000	CR			
						25							000000				
299.23	44 45												00000				
	46		Fat CLAY (CH); hard, gray to very dark gray, moist, , about 20% fine SAND, medium to high plasticity fines, about 20% specks of soft carbonate nodules, predominantly quartz and feldspar, trace mica, trace black organics.	X	S9	4 11 23	34	100				PP = 2.25		VOC=0.4	ppm		
297.23 295.23 293.23 291.23	48												<u> </u>				
293.23	50		Poorly graded SAND with SILT (SP-SM); very dense, gray, moist, about 11% rounded, coarse GRAVEL, max. 1.5" dia.; about 63% coarse to fine SAND, 6%	X	D10	30 40 47	87	100	-	14	121		000000	CR, PA, V	OC=0.2 ppm		
291.23	52 53		nonplastic fines, moderately graded, granitic source, faint horizontal bedding.										00000				
289.23	54												00000				
	***********	essent N.S. Clariforn	(continued)					er and trace operated in the			Note a ring and review of social sci					Committee on the particular of the Committee of the	
	residence L		Department of Transportation Division of Engineering Services		D	REPOR BORI DIST.	ING	RE COU			ROU	TE	PO:	STMILE	EA	19-Z1E	
	<u></u>	7	Geotechnical Services Office of Geotechnical Design - South	h.	Ρ.	7 PROJE	CT C	LA OR BI	RIDGI	E NA	71 0 .ME) IICAL	D/	D	07	-187900	
			Omeo of Geolechnical Design - Soul			RIDGE					PAR	ED BY			DATE 6-22-09	SHEET 2 of 1	1

ion (ft)	(ff)		oci ation	To an	Vumber	ır 6 in.	r foot	(%) /		(%	Weight	Strength	ethod				***************************************	
ELEVATION (ff)	р БЕРТН (#)	Material Graphics	DESCRIPTION Jejumes		Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit (pcf)	Shear St (tsf)	Drilling Method	A Building		Remarks		
287.23	56		Becomes coarse SAND, moderately graded bedding, channel deposits. Poorly graded SAND with SILT (SP-SM) (continued).	s	11	19 30 32	62	100						See i RQD	note at e	end of log	regarding	
285.23	57												00000					
283.23	59 60												20000		100 1			
	61		ORGANIC SILT (OL); hard, black to olive, moist, about 29% coarse to fine GRAVEL, about 64% coarse to fine SAND, about 7% nonplastic fines, H2S odor.	ט	12	16 45 48	93	100		10	126	PP = 3.5	<u> </u>	PA, V	VOC=1.4	i ppm		
281.23	62		SAND, about 7% nonplastic fines, H2S odor.										00000					
279.23	64 65		SILT (ML); hard, olive, H2S odor, slight micaceous.	//s	13	16	40	100				PP =	20000	voc	:=0.3 ppr	n		
277.23	66 67		SILTY SAND (SM); dense, gray, moist, coarse SAND, moderately angular, graded.			19 21	,0	100				PP = 2.5	20000					
275.23	68						-						20000					
273.23	69 70	e l	Poorly graded SAND with SILT and GRAVEL (SP-SM); about 20% coarse to fine GRAVEL, about 72% coarse	D	14	37		100		17	114		00000	PA				
271.23	71 72	- 114	about 20% coarse to fine GRAVEL, about 72% coarse to fine SAND, about 8% nonplastic fines.			50/5							00000					
271.23 269.23	73		SEDIMENTARY ROCK (SILTSTONE and SANDSTONE): fine-grained, laminated to thinly hadded dark growish brown to brownish grow, intensely										00000					
	75	72.00	bedded,dark grayish brown to brownish gray, intensely weathered, soft, friable, minor oxidation, slightly micaceous. Puente Formation.	(s	15	27 50/5		100				PP = 4.5		voc	≔0.1 ppi	m		
267.23	76 77	;;;; ///											× 4000000000000000000000000000000000000					
265.23	78 -	;;;;; //											00000					
263.23	80		X	s	16	11 42		100					00000	voc	≔0.2 ppı	m		
261.23	82	# 43.5	SEDIMENTARY ROCK (SANDSTONE): fined-grained, moderately bedded, medium gray, slightly weathered, soft, slightly fractured, few thin SILTSTONE (10%) beds, dipping 10° to 20°.			50/3		57	57				XOXW					
267.23 265.23 263.23 261.23 259.23	83		beas, dipping 10° to 20°.										$\sim \sim \sim$	UC				
	-85 ⁻		(continued)										$\langle \rangle$					
			Department of Transportation			EPOR			COL	a D						HOLE	09-Z1E	22
7			Division of Engineering Services		D	BORI IST.	С	100		עט	ROL		PO	STMIL	=	ΙEΑ		
		7	Geotechnical Services			ROJE	сто						D			U	7-187900	
			Office of Geotechnical Design - South	1		S R-7 ' RIDGE				PR	EPAR	NICAL ED BY	ડાા	Yעע	DA	TE - 22-09	SHEET	
and the second second second second						allower or got South				K	.Τ	garwigue and a state of the sta			6	-22-09	3 of 1	<u>fi</u>

	nonline Spinish					a mana 2000 katananan ng	La Donnado Sólden			_				7			
ELEVATION (ff)	ים 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		Rema	ırks	
257.23	85 86 87	11.	(continued). At EL. 257.2', cross bedding 0° to 20°.		C2			29	19				\ \ \ \ \ \	See not RQD.	te at end of	log regardin	ng E
255.23	88 89	://:://:	At EL. 254.2', siltstone beds dipping 20° to horizontal.										× < < <				
253.23	90	: //://:			00			400	00				×	indicates	s beds dipp	r (Appendix l ing northeas	F)
251.23	92	[; :][.:	At EL. 251.2', siltstone beds and laminations dipping 5° to 25°.		C3			100	63				\ \ \ \ \ \	No reac	tion to HCL		
249.23													$\langle \rangle \langle \Diamond \rangle$				
247.23	95		At EL. 248.2', hard cemented sandstone zone, reacts to HCL (1.2' thick).	Richardenthrous	C4			100	53	3			\ \ \ \	UC			
245.23	97																
243.23	99] [[[]]	At EL. 244.2', siltstone and claystone laminations, dipping 10° to 20°, rip-up fragments, flame structures. SEDIMENTARY ROCK (SANDSTONE): fined-grained,		C5			100	100				$\langle \rangle \langle$				
241.23	101 102	.)	thick bedded to massive, gray, slightly weathered to fresh, very soft to moderately hard; slightly fractured, tight joints, slightly rough to smooth surface, bedding dip 5° to 10°.	SOCIO (1) SOCIO									>				
	103 104]	At EL. 240.2', becomes altered lithic arkose sandstone; Quartz=26%, Plagioclase=26%, K-feldspar=25%, Plutonic volcanic fragments, dolomite cement 1%. Incipient joints dipping 40°.											PTS			FF)
237.23	106												\$ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\				
235.23			At EL. 236.2', mudstone laminations, dip 5° to 10°.		C6			71	39								
233.23) · (At EL. 233.2', light gray Calcite veins, dipping 80° to 90°.										\ \ \ \ \ \	UC			
231.23	-	.:	At EL. 231.6', calcite-cemented zone, 1' thick, light gray, very hard.										$\langle \diamond \rangle \langle \diamond \rangle$				
237.23			At EL. 229.8', incipient random joints, thin Calcite-cemented zone.										>< >>< >><				
	115		(continued)					r re selven somelen k		**/,****,*****			\vee	1			
			Department of Transportation			EPOR B OR I			വ	SD			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		H	DLE ID R-09-Z1	D2
	_		Division of Engineering Services		D	IST.	C	100		ער	ROUT		POS	STMILE	E/	1	
7	_	7	Geotechnical Services		Р	7 ROJEG	CT O	LA R B	RIDG	E N	710 AME		D/			07-18790	y U
			Office of Geotechnical Design - South	n i		SR-7 RIDGE					EPARE T		ราบ	IDY	DATE 6-22-0	SHEET 9 4 of	11
							- Charles		33272227170							-, VI	

225.23 116				on from the Armite Are								-00-us 1-00-kmm-1				- univida					
Af EL 2927, mudstone luminations displaced by fault Af EL 2928, mudstone luminations displaced by fault Af EL 2918, soft segiment of Transportation Division of Engineering Services Gestechnical Services Ges	ELEVATION (ft)	DEPTH (ft)		rateriai sraphics	i (ample Localion	ample Number	lows per 6 in.	lows per foot	ecovery (%)	QD (%)	loisture ontent (%)	ry Unit Weight ocf)	hear Strength sf)	rilling Method	asing Depth		Re	emarks	5	
tight and without filling, 50% fine-grained sandstone. 50% mudsotne and sandstone interbeds. At EL. 207.2', mudstone laminations dip 20'. At EL. 207.2', mudstone laminations, dip 20'. At EL. 203.2', minor faults displace laminations, dip 90' to 40'. At EL. 293.2', minor faults displace laminations, dip 90' to 40'. At EL. 199.5', soft sediment deformation, mudstone. Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COUNTY ROUTE POSTMILE A 710 D/D A 07-187900 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY		115		≥O	AT EL. 228.2', becomes light gray cross-bedding dipping 50°. (continued).			Ω	В		70	ΣO	08	S (t	\sim		See note RQD.		l of log	regarding	
tight and without filling, 50% fine-grained sandstone. 50% mudsotne and sandstone interbeds. At EL. 207.2', mudstone laminations dip 20'. At EL. 207.2', mudstone laminations, dip 20'. At EL. 203.2', minor faults displace laminations, dip 90' to 40'. At EL. 293.2', minor faults displace laminations, dip 90' to 40'. At EL. 199.5', soft sediment deformation, mudstone. Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COUNTY ROUTE POSTMILE A 710 D/D A 07-187900 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	225.23		Ħ.		At EL. 225', mudstone laminations offset by minor	Section of the sectio									× < × <						
tight and without filling, 50% fine-grained sandstone. 50% mudsotne and sandstone interbeds. At EL. 207.2', mudstone laminations dip 20'. At EL. 207.2', mudstone laminations, dip 20'. At EL. 203.2', minor faults displace laminations, dip 90' to 40'. At EL. 293.2', minor faults displace laminations, dip 90' to 40'. At EL. 199.5', soft sediment deformation, mudstone. Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COUNTY ROUTE POSTMILE A 710 D/D A 07-187900 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	223.23		Ξ.	///	vertical fault.		C8			100	45				> < < > <						
tight and without filling, 50% fine-grained sandstone. 50% mudsotne and sandstone interbeds. At EL. 207.2', mudstone laminations dip 20'. At EL. 207.2', mudstone laminations, dip 20'. At EL. 203.2', minor faults displace laminations, dip 90' to 40'. At EL. 293.2', minor faults displace laminations, dip 90' to 40'. At EL. 199.5', soft sediment deformation, mudstone. Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COUNTY ROUTE POSTMILE A 710 D/D A 07-187900 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	221.23		'	-: :-		The Section was a service of the section of the sec									\circ						
tight and without filling, 50% fine-grained sandstone. 50% mudsotne and sandstone interbeds. At EL. 207.2', mudstone laminations dip 20'. At EL. 207.2', mudstone laminations, dip 20'. At EL. 203.2', minor faults displace laminations, dip 90' to 40'. At EL. 293.2', minor faults displace laminations, dip 90' to 40'. At EL. 199.5', soft sediment deformation, mudstone. Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COUNTY ROUTE POSTMILE A 710 D/D A 07-187900 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	219.23					CONCRETE CONTRACTOR OF THE PARTY OF THE									> <		uc				
tight and without filling, 50% fine-grained sandstone. 50% mudsotne and sandstone interbeds. At EL. 207.2', mudstone laminations dip 20'. At EL. 207.2', mudstone laminations, dip 20'. At EL. 203.2', minor faults displace laminations, dip 90' to 40'. At EL. 293.2', minor faults displace laminations, dip 90' to 40'. At EL. 199.5', soft sediment deformation, mudstone. Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COUNTY ROUTE POSTMILE A 710 D/D A 07-187900 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	217.23		١.												$\langle \Diamond \times \Diamond \rangle$						
tight and without filling, 50% fine-grained sandstone. 50% mudsotne and sandstone interbeds. At EL. 207.2', mudstone laminations dip 20'. At EL. 207.2', mudstone laminations, dip 20'. At EL. 203.2', minor faults displace laminations, dip 90' to 40'. At EL. 293.2', minor faults displace laminations, dip 90' to 40'. At EL. 199.5', soft sediment deformation, mudstone. Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COUNTY ROUTE POSTMILE A 710 D/D A 07-187900 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	215.23			\	At EL. 216.6', joint dipping 45°.									PP = 3	× <> × <>						
tight and without filling, 50% fine-grained sandstone. 50% mudsotne and sandstone interbeds. At EL. 207.2', mudstone laminations dip 20'. At EL. 207.2', mudstone laminations, dip 20'. At EL. 203.2', minor faults displace laminations, dip 90' to 40'. At EL. 293.2', minor faults displace laminations, dip 90' to 40'. At EL. 199.5', soft sediment deformation, mudstone. Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COUNTY ROUTE POSTMILE A 710 D/D A 07-187900 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	213.23			5.			C9			87	38			PP = 3	× < × <						
tight and without filling, 50% fine-grained sandstone. 50% mudsotne and sandstone interbeds. At EL. 207.2', mudstone laminations dip 20'. At EL. 207.2', mudstone laminations, dip 20'. At EL. 203.2', minor faults displace laminations, dip 90' to 40'. At EL. 293.2', minor faults displace laminations, dip 90' to 40'. At EL. 199.5', soft sediment deformation, mudstone. Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COUNTY ROUTE POSTMILE A 710 D/D A 07-187900 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	211.23		Ħ٠	1	At EL. 211.2', mudstone laminations displaced by fault dipping 85°.	o Soldista Commenter									> < < < <						
tight and without filling, 50% fine-grained sandstone. 50% mudsotne and sandstone interbeds. At EL. 207.2', mudstone laminations dip 20'. At EL. 207.2', mudstone laminations, dip 20'. At EL. 203.2', minor faults displace laminations, dip 90' to 40'. At EL. 293.2', minor faults displace laminations, dip 90' to 40'. At EL. 199.5', soft sediment deformation, mudstone. Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COUNTY ROUTE POSTMILE A 710 D/D A 07-187900 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	209.23				SEDIMENTARY ROCK (MUDSTONE and SANDSTONE interbeds): fine-grained, laminated to thickly bedded, fresh, very soft to hard; slightly to moderately fractured with joints, minor faults, bedding										\circ						
Continued Continued Continued Continued Continued	207.23	135 136		<u>; ; </u>	50% mudsotne and sandstone interbeds.										\Diamond						10000
Continued Continued Continued Continued Continued	205.23		\exists	///											\Diamond	1					
Continued Continued Continued Continued Continued	203.23		≣.		At EL. 203.2', minor faults displace laminations, dip		C10			91	22				\rangle						
Continued Continued Continued Continued Continued	201.23			<i>!</i>		AND SERVICE PROPERTY OF THE PR									\diamond						
Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. TOUNTY	199.23				At EL. 199.5', soft sediment deformation, mudstone.										><						
Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. TOUNTY		145		Part of the By annual	(continued)									AND THE RESERVE AND ADDRESS OF AD	IV					CONTRACTOR OF THE STREET, STRE	
Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 DIST. The county are counted by the counter of the counter o		Hillonoon					R	EPOR	TTI	ĪΙΕ	20,7000,000		0.000.000.000						HOLE	ID	ww.e
Office of Geotechnical Design - South 1 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY				\overline{I}				BOR	NG	RE		RD	POL	ITE	D	00	TMILE)9-Z1I	33
Office of Geotechnical Design - South 1 SR-710 TUNNEL TECHNICAL STUDY								7		LA			71	0		ο) D/I	D		07	7 -187 9 0	0
BRIDGE NUMBER PREPARED BY DATE SHEET K.T 6-22-09 5 of 11			1	İ		1	[_{	SR-7	10 7	TUN	NE	_ TE	ECHI		S7	TU	DY				
							В	RIDGE	E NU	MBE	R	PR K	EPAR . T	ED BY				DATE 6-2 2	: 2 - 09	SHEET 5 of	11

CALTRANS BORING RECORD MET+ENG FI

ON (ff)	(ft)		rejie	umber	r 6 in.	r foot	(%)		(%)	Weight	Strength	epthod			
ELEVATION (ft)) HLGEQ 5	Material Graphics		Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (9	Dry Unit Weight (pcf)	Shear Str (tsf)	Drilling Method		Rema	
197.23	146		(continued).	C10			91	22					See note RQD.	at end of l	og regarding
	147		At EL. 197.2', becomes mudstone laminations dip 20° to 25°, bedding plane parting.									\Diamond			
195.23	148	7.5.7										\Diamond			
	149	. (//	At EL. 195.2', becomes deformed siltstone.									\Diamond			
193.23	150	11.1					00	F0				\Diamond	l oot ooro	attan	
	151	;;:///		C11			82	59					Lost core	ат юр	
191.23	152											\Diamond			
	153		SEDIMENTARY ROCK(SILTSTONE and CLAYSTONE interbeds): laminated, thinly bedded,									\Diamond			
189.23	154		CLAYSTONE interbeds): laminated, thinly bedded, light gray, slightly weathered, soft to moderately hard, laminations dip 5° to 10°, some beds deformed by soft-sediment deformation.									\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	PTS		
	155											\Diamond			
187.23	156		At EL. 189.2', becomes silty claystone; clay 50%, Organic 15%, Quartz 15%, K-feldspar 15%.												
	157	64/6	At EL. 186.5', becomes breccia zone, small pieces of hard rock in clayey sand matrix, no shears. Probably	C12	2		92	33							
185.23	158	000	ancient fracture zone.									\Diamond			
	159	10/0/01	At EL. 184.2', hard cemented zone, 6" thick interbedded mudstone and sandstone.									\Diamond			
183.23	160											\Diamond			
28/10	161		At EL. 181.2', hard cemented zone, 0.9' thick several joints horizontal to 20° dip, smooth to slightly rough surfaces, tight, no filling, laminations dip 15° to 20°.									$\langle \rangle$			
ANS LIBRARY.GLB 3/28/10 181.23 129.23		- 1										× <			
RARY.	163											>><			
179.23 SV	164		At EL. 179.2', becomes laminations dipping 15° to 20°.	C13	3		100	63				\times			
	165		At EL. 177.4', bedding plane parting.	And the second second								> <			
ਹ ਹਿ ਹਿ	E		ACLES 14 1.4, beading plane parting.	110240400000000000000000000000000000000								$\stackrel{\diamond}{\sim}$			
3_2010.	167		At. EL. 175.8', several joints dipping 45° to 60°.	SERVINESCOR					4.0			\Diamond	SD, UC		
ဥ္ 175.23 ဗု									10			\Diamond	3D, 0C		
0 INGIO 173.23	169		At EL. 173.4', becomes coarse sandstone, sandstone									\Diamond			
173.23 173.23	171	<i>"</i> //	33%, claystone 33%, siltstone 33%, bedding joint 10°, fine gravel, 2" thick. SEDIMENTARY ROCK (SANDSTONE): fined-grained,									\Diamond			
171.23	=	: :	thickly bedded, gray, fresh, slightly weathered, soft to moderately hard, slightly fractured, joint dipping 10°,									\Diamond			
FIXE	173	1.	primarily bedding plane parting dipping 15°.									$\langle \Diamond \rangle$			
169.23	Ė											\Diamond	DM		
CALTRANS BORING RECORD MET+ENG FIXED SR710_BORINGLOG_3_112_2010.GPJ CALTRA CALTRANS BORING RECORD MET+ENG FIXED SR710_BORINGLOG_3_112_2010.GPJ CALTRA CALTRANS BORING RECORD MET+ENG FIXED SR710_BORINGLOG_3_112_2010.GPJ CALTRA CALTRANS BORING RECORD MET+ENG FIXED SR710_BORINGLOG_3_112_2010.GPJ CALTRA CALTRANS BORING RECORD MET+ENG FIXED SR710_BORINGLOG_3_112_2010.GPJ CALTRA CALTRANS BORING RECORD MET+ENG FIXED SR710_BORINGLOG_3_112_2010.GPJ CALTRA CALTRANS BORING RECORD MET+ENG FIXED SR710_BORINGLOG_3_112_2010.GPJ CALTRA CALTRANS BORING RECORD MET+ENG FIXED SR710_BORINGLOG_3_112_2010.GPJ CALTRA CALTRANS BORING RECORD MET+ENG FIXED SR710_BORINGLOG_3_112_2010.GPJ CALTRA CALTRANS BORING RECORD MET+ENG FIXED SR710_BORINGLOG_3_112_2010.GPJ CALTRA CALTRANS BORING RECORD MET+ENG FIXED SR710_BORINGLOG_3_112_2010.GPJ CALTRA CALTRANS BORING RECORD MET+ENG FIXED SR710_BORINGLOG_3_112_2010.GPJ CALTRA CALTRANS BORING RECORD MET+ENG FIXED SR710_BORINGLOG_3_112_2010.GPJ CALTRA CALTRANS BORING RECORD MET-ENG FIXED SR710_BORING RECORD SR710_BORING	175	::.	Performed Pressure Meter Test.	C14	+							\Diamond	PM		
3 REC			(continued)		REPOR	रा गा	ΓLE		~=					HC	OLE ID R-09-Z1B
BORING	F		Department of Transportation Division of Engineering Services		BOR DIST.	C	1000		RD	ROL 71		PO:	STMILE	EA	(-09-Z1B 07-187900
RANS		7	Geotechnical Services Office of Geotechnical Design - South	1	PROJE SR-7	сто	LA OR BI	RIDG	SE N.	71 AME -CH	VICAL				07-167900
CALT			Office of Geotechnical Design - South		BRIDG				PR		ED BY		,,,,	DATE 6-22-0	SHEET 9 6 of 11

ELEVATION (ft)	DEPTH (ft)	rial hics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	(%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depin	Remarks
ELE	d∃O 175—	Material Graphics		Sam	Samp	Blow	Blow	Reco	RQD	Moist Conte	Dry (pcf)	Shea (tsf)	Orillin		
167.23			(continued). Pressure Meter Test.										$\stackrel{\times}{\diamond}$	See note at e RQD.	nd of log regarding
	177												>4		
165.23		<i>;</i>		Supplement	C15			89	89	3				UC	
	179												\Diamond		
	180	////	SEDIMENTARY ROCK (MUDSTONE and		C16			100	100				\Diamond		
	181	l:////:	SANDSTONE): fine-grained, laminated to moderately bedded, gray to black, fresh, soft to hard; slightly fractured, predominantly bedding plane parting, dipping 15°, 30% sandstone.		C 16			100	100				\Diamond		
161.23	182	 	alphing 15, 50% sanusione.	The second second									\Diamond		
	183			district de projection est									\Diamond		
159.23	184			Silver State of the last									\bigcirc		
	185									8			\Diamond	SD	
157.23	186	<i> </i>											\Diamond		
	187	<i>M</i>	At EL. 156', eroded bedding.										\Diamond		
155.23	188	//											\Diamond		
	189	::W::/	At EL. 154', soft sediment deformation and eroded laminations.										\Diamond		
153.23	190		At EL. 153.2', reworked siltstone fragments, max. 2" dia.		C17			100	100				\Diamond		
	191		Gra.										\Diamond)
151.23 149.23	192		At EL. 150.4', soft sediment deformation.										\Diamond		
	193		At EL. 190.4, 30tt Scalment deformation.	201011111111111111111111111111111111111											
149.23			At EL. 148.2', calcite-cemented sandstone 1' thick,							10			Š	CS & EM, SE)
447.00	195		sharp contact dipping 20°.										\sim		
147.23	196	;;;.// _{//}											\times		
145.23	197 198		At EL. 146.2', incipient cross cutting joints, minor oxidation on bedding plane surface.										\sim		
143.23	199		At EL. 144.5', calcite-cemented, fined-grained Sandstone 1" thick.										X	CS & EM	
143.23													\Diamond		
	201		Performed Pressure Meter test.		C18								\Diamond	PM	
141.23													\Diamond		
	203												\Diamond		
139.23	204		SEDIMENTARY ROCK (SANDSTONE): fined-grained										\Diamond		
147.23 145.23 143.23 141.23	205		to medium-grained, thickly bedded to massive, gray, (continued)	7	C20			83	79				\Diamond		
			Department of Transportation		R	EPOF	IT TI	TLE	CO	DD					HOLE ID
7	F		Division of Engineering Services		E	BOR IST. 7		COUI LA			ROL 71	ITE N	PC	STMILE I /D	R-09-Z1B3
	4	7	Geotechnical Services Office of Geotechnical Design - Sout	h	P	ROJE	CT C	OR B	RIDO NE	SE N	AME	NICAL			01-101300
			Office of Secretifical Design - South	; I		RIDG				PR		ED BY			TE SHEET -22-09 7 of 11

	÷				Ę	<u>ب</u>		na identificación de		a engoseoci		+							
1972 20	ELEVATION (f		ЭЕРТН (ft)	/aterial sraphics	DESCRIPTION DESCRIPTION	sample Numbe	slows per 6 in.	slows per foot	Recovery (%)	ROD (%)	Noisture	ory Unit Weigh acf)	shear Strength tsf)	brilling Method		F	lemark	s	
At EL. 133.8*, coldate values digraing SS*to 45*. 200 201 202 203 205 206 207 207 207 207 207 207 207		20)5 	.:	fresh, predominantly very soft, locally hard, friable,			മ		79	≥0		တဗ	\sim	See no	ote at e	nd of lo	g regardir	ıg
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY				. 1	(continued).									\Diamond	RQD.				
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY		20	07		At EL. 135.8', calcite veins dipping 35° to 45°.														
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	į l																		
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY		20	9																
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY				:										\Diamond					
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY														\Diamond					
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY														\Diamond					
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY				• •															
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY		21																	
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY																			
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY		21	15	27.4	At EL. 127.8', lineations on joint surface with clay	C21			79	79				\Diamond					
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	127.23	21	16	إستر	filling, smooth, aperture 1 mm.									\Diamond					
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY		21	17		At EL. 126.2' joints dipping 30° to 40°, smooth						7			\Diamond	CAI				
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY					surface, 1 mm aperture.														
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY		21	19																
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY														\Diamond					
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY														\Diamond					
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY				////·	At EL. 121.6', laminations dipping 20° to 25°.									\Diamond					
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	121.23													$\langle \rangle$					
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY				•															
117.23 226 117.23 228 118.23 228 119.23 230 At EL. 112', light gray zone, calcite-cemented beds, dipping 30'. At EL. 111.2', siltstone fragment, max. 3" dia. 109.23 234 At EL. 108.6', bedding dipping 20'. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COLINY 710 POSTMILE PROPED WITH TO THE DIST. COLINY 710 DIST. TO TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	119.23	22	24											D					
115.23 228 113.23 230 At EL. 112, light gray zone, calcite-cemented beds, dipping 30°. At EL. 112, siltstone fragment, max. 3" dia. At EL. 111.2', siltstone fragment, max. 3" dia. At EL. 1108.6', bedding dipping 20°. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. TA ROUTE DOSTMILE DATE PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE SHEET			25	7		C22	2		100	100					CS &	EM, UC			
115.23 228 113.23 230 At EL. 112, light gray zone, calcite-cemented beds, dipping 30°. At EL. 112, siltstone fragment, max. 3" dia. At EL. 111.2', siltstone fragment, max. 3" dia. At EL. 1108.6', bedding dipping 20°. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. TA ROUTE DOSTMILE DATE PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE SHEET	117.23	22	26											\Diamond					
At EL. 112, light gray zone, calcite-cemented beds, dipping 30°. At EL. 111.2', siltstone fragment, max. 3" dia. At EL. 111.2', siltstone fragment, max. 3" dia. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COUNTY ROUTE POSTMILE PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE SHEET		ı												\bigcirc					
At EL. 112, light gray zone, calcite-cemented beds, dipping 30°. At EL. 111.2', siltstone fragment, max. 3" dia. At EL. 111.2', siltstone fragment, max. 3" dia. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COUNTY ROUTE POSTMILE PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE SHEET	115.23	22	28																
At EL. 112, light gray zone, calcite-cemented beds, dipping 30°. At EL. 111.2', siltstone fragment, max. 3" dia. At EL. 111.2', siltstone fragment, max. 3" dia. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COUNTY ROUTE POSTMILE PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE SHEET		22	29								-								
At EL. 112, light gray zone, calcite-cemented beds, dipping 30°. At EL. 111.2', siltstone fragment, max. 3" dia. At EL. 111.2', siltstone fragment, max. 3" dia. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COUNTY ROUTE POSTMILE PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE SHEET	113.23	23	30											\sim					
At EL. 112, light gray zone, calcite-cemented beds, dipping 30°. At EL. 111.2', siltstone fragment, max. 3" dia. At EL. 111.2', siltstone fragment, max. 3" dia. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COUNTY ROUTE POSTMILE PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE SHEET				÷.*;		023	3		107	102									
At EL. 108.6', bedding dipping 20°. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD TOUNTY TOUN	444.00			-	At EL. 112', light gray zone, calcite-cemented beds, dipping 30°.									\Diamond	UC				
At EL. 108.6', bedding dipping 20°. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD TOUNTY TOUN	111,23				At EL. 111.2', siltstone fragment, max. 3" dia.									\Diamond					
At EL. 108.6', bedding dipping 20°. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD TOUNTY TOUN		23	33	: 0															
Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE SHEET	109.23	23	34		At EL. 108.6', bedding dipping 20°.														
Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 DIST. COUNTY ROUTE 710 POSTMILE DI/D PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE SHEET	117.23 115.23 113.23 111.23 109.23	23	35⊏		(continued)														
Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 DIST. COUNTY ROUTE 710 POSTMILE DI/D PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE SHEET	A				Department of Transportation		REPOR BOR	ING	TLE RE	CO	RD						HOL R.	E ID -09-7 1	IB3
Geotechnical Services Office of Geotechnical Design - South 1 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE SHEET	415.4		r		Division of Engineering Services	Ī	DIST.		COU			ROL 71	JTE 0	PO:	STMILE		EA		
BRIDGE NUMBER PREPARED BY DATE SHEET		L		7		Ī	PROJE	ст с	R B	RIDO	SE N	AME						101-0	
					Office of Geolechnical Design - South 1	E					PR	EPAR			וטי	DA	TE	SHEET	

ELEVATION (ft)	235 14)	' Material Graphics	DESCRIPTION		Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method		Remark	
107.23	236	::///::	At EL. 107.23', light gray zone, cross beds dipping 30°.		C23			107	102				× < ×	UC See not RQD.	te at end of log	regarding
105.23			At EL. 105.23', very faint white line-incipient joint dipping 90°.													
103.23	240	/ []	At EL. 103', cross bedding dipping 40°, light gray, hard Calcite-cemented zone, 6" thick.		C24			100	84				$\langle \rangle \times \langle \rangle$	uc		
101.23	242 -	h	At EL. 102', siltstone fragments, calcite-cemented bedding (?) dipping 15°.	CATAN POSTEROTE STREET									$\langle \Diamond \times \Diamond \rangle$			
99.23	244	//											$X \Diamond X \Diamond$			regarding
97.23		1.	At EL. 98.2', becomes siltstone/siltstone laminations. At EL. 97.2', rip-up fragments, graded bedding. At EL. 96.8', incipient joints dipping 40°.							12			$\langle \Diamond \rangle$	SD		
95.23	248		At EL. 95.2', faint light gray veins.										\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			
į.	249		At EL. 94', becomes mudstone lamination, dipping 30°. At EL. 93', faint sandstone beds dipping 30°.		C25			100	72				$\langle \Diamond \times \Diamond \rangle$			
91.23 89.23		****	SEDIMENTARY ROCK (SANDSTONE and MUDSTONE): fine-grained, laminated to thickly bedded, gray, fresh, soft, slightly to moderately fractured, bedding plane parting, dipping 15° to 20°, 70% sandstone.	SALE OF CHANGE SALES OF THE SAL							٠		$\times \times \times$	EM, UC	C	
													$\mathcal{S} \mathcal{S} \mathcal{S} \mathcal{S}$			
87.23	255 256	// 	At EL. 87.8', distorted laminations, worm burrows.										$\times \Diamond \times \langle$			
85.23	257 - 258 -	-	At EL. 85.8', light gray hard ridges, no reaction to HCL.										$\times \circ \times \circ \times$			
83.23	260			Ţ	C26			100	100				X0X0X0X0X0X			
81.23	261		At EL. 82.2', weak friable zone 3" thick.										$\langle \dot{\rangle} \dot{\rangle} \langle \dot{\rangle}$			
87.23 85.23 83.23 81.23 79.23	263 264	// //	At EL. 79', cemented zone dipping 25°.										× < × <			
	265		(continued)									and the probability of the				
A		1	Department of Transportation	******	F	EPOF BOR	NG NG	TLE	വ	SD		N. C. S.			HOL	E ID - 09-Z1B 3
	_		Division of Engineering Services		C	IST.		COU		ND.	ROL 71		PO	STMILE	EA	- 03- 2103 17-187900
	_	7	Geotechnical Services		P	7 ROJE	стс	LA R B	RIDO	E N	71 AME		D/			7-16/900
(E) i.			Office of Geotechnical Design - South	h 1		SR-7 RIDG				PR	EPAR	VICAL ED BY	. STU	ץטנ	DATE 6-22-09	SHEET 9 of 11
								2007_X		, N			elita nomenavi		0-22-09	9 01 11

(£		o Constitution of the same of the		5 5		**************************************					000000000000000000000000000000000000000				
ELEVATION (ft)	æ			Sample Location Sample Number	Blows per 6 in.	Blows per foot	(%)		Moisture Content (%)	Veigh	Strength	Drilling Method Casing Depth			
VATI	DЕРТН (ft)	rial hics	DESCRIPTION	ole L(s per	s per	very	(%)	ure ent (%	Jnit V	ır Stre	g Me	F	Remarks	
ELE	DEP	Material Graphics		Sam	Blow	Blow	Recovery (%)	RQD (%)	Moist Conte	(pcf)	Shear (tsf)	Drillin			
	265		(continued).	C26			100	100				\searrow		end of log regarding	
77.23	266	= 3		Agount House								\Diamond	NQD.		
	267											\Diamond			
75.23	268											\Diamond			
	269	/	At El 73.6' claystone lamination with SILT coating	C27			100	96				> 4			
73.23	270	11.1	At EL. 73.6', claystone lamination with SILT coating, bedding joint dipping 20° to 45°.	SZ.			.00					\Diamond			
	271			Array (Vision)								\Diamond			
5			At EL. 72', soft sandstone zone.									\Diamond			
	272		At EL. 71', mudstone laminations over claystone rip-up												
	273		fragments.									\ \ \			
69.23	274	:///										\Diamond			
	275	//////										\Diamond			
67.23	276											\bigcirc			
	277		At EL. 65.8', joints dipping 10° to 20°.	C28			100	88				\Diamond			
65.23	278						100					D			
	279		At EL. 64.6', soft sediment deformation.									\Diamond			
				C29			100	44				\Diamond			
	280											\bigcirc			
	281	1.7										$\Diamond \times \Diamond$	CAI		
į.		o.€//	At EL. 61.2', calcite-cemented sandstone, coarse-grained, 13" thick, few fine gravel of siltstone fragments.									\Diamond			
	283		ragineria.									D4			
59.23			At EL. 59.2', fault dipping 65°, clam shell fragment.									\Diamond			
	285	<i>;</i> : :										\Diamond			
57.23	286		At EL. 57.2' soft zone, 5" thick.									$\stackrel{\checkmark}{\sim}$			
	287	-:													
55.23	288	//:/	At EL. 56.2', siltstone laminations with rip-up fragments.									\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			
33.23		: (.) ::-:::										\sim			
	289		At EL. 54', hard calcite-cemented Sandstone, 10" thick, bedding dipping 5°.	C30			100	100					CS & EM, UC	;	
53.23	290											\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			
	291														
51.23	292		At EL. 51', becomes reworked siltstone fragments of									0%0%0	CS & EM, UC	;	
	293		1/4" size, joints parallel to bedding plane.									\searrow			
49.23	294	# *	At El 40' becomes rewarked eithtens fragments of									\Diamond			
57.23 55.23 53.23 51.23 49.23	295	<i>\\\\</i> .	At EL. 49', becomes reworked siltstone fragments of 1/4" size.								Company of the con-	\Diamond			
			(continued)		REPOR		TIE	20230		addi a coma localist co				HOLETO	
		1	Department of Transportation		BOR	ING	RE			DOL	TE	l pos	STALL E	R-09-Z1E	33
200			Division of Engineering Services	ا	DIST.		NOC	41 Y		ROU 71	1 =	POS	STMILE D	EA 07-187900	

CALTRANS BO

Geotechnical Services Office of Geotechnical Design - South 1

REPORT BORIN	TITLE G RECORD			HOLE ID R-09-Z1B3
DIST. 7	COUNTY LA	ROUTE 710	POSTMILE D/D	EA 07-187900
	OR BRIDGE N		CTUDY	

SR-710 TUNNEL TECHNICAL STUDY
BRIDGE NUMBER PREPARED BY
K.T

SHEET 10 of 11 DATE **6-22-09**

Semicon of boreholds at 300.0 Fig. 200.0 Schools (Semiconduct) and semiconduction of boreholds at 300.0 Fig. 200.0 Schools (Semiconduct) and semiconduction of boreholds at 300.0 Fig. 200.0 Schools (Semiconduct) and semiconduction of boreholds at 300.0 Fig. 200.0 Schools (Semiconduct) and semiconduction of boreholds at 300.0 Fig. 200.0 Schools (Semiconduct) and semiconduction of boreholds at 300.0 Fig. 200.0 Schools (Semiconduct) and semiconduction of boreholds at 300.0 Fig. 200.0 Schools (Semiconduct) and semiconduction of boreholds at 300.0 Fig. 200.0 Schools (Semiconduct) and semiconduction of boreholds at 300.0 Fig. 200.0 Schools (Semiconduct) and semiconduction of boreholds at 300.0 Fig. 200.0 Schools (Semiconduct) and semiconduction of boreholds at 300.0 Fig. 200.0 Schools (Semiconduct) and semiconduction of boreholds at 300.0 Fig. 200.0 Schools (Semiconduct) and semiconduction of boreholds at 300.0 Fig. 200.0 Schools (Semiconduct) and semiconduction of boreholds at 300.0 Fig. 200.0 Schools (Semiconduct) and semiconduction of boreholds at 300.0 Fig. 200.0 Schools (Semiconduct) and semiconduction of boreholds at 300.0 Fig. 200.0 Schools (Semiconduct) and semiconduction of boreholds at 300.0 Fig. 200.0 Schools (Semiconduct) and semiconduction of sem	ELEVATION (ft)	э Боертн (ft)	Material Graphics	DESCRIPTION Legition 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	Remark	(S	
SEDIMENTARY ROCK (SANDSTONE) fined-grained, org., firsth, moderately hard, unfractured. SEDIMENTARY ROCK (MUDSTONE) fined-grained, processes of the second	47.22	295		(continued).	C30			100	100				\sim	See not	e at end of lo	g regarding	
45.23 3500 SEDIMENTARY HOCK (MUDSTONE): terminated to solution of the company of	41.23																
48.23 300 SEDIMENTARY ROCK (MUDSTONE). Isminated to miniph backed, gray to very dark brown, feet, intensely and the protection of the pro	45.23				004			100	00								
27.23 316 25.23 318 25.23 318 21.23 322 21.23 322 21.23 322 21.23 322 21.23 322 22.23 324 22.23 324 22.23 322 23.23 324 24.23 322 25.25 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD To South 1 PROJECT OF BRIDGE NAME PROJECT OF BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY					C31			100	80	11			$\stackrel{\wedge}{\searrow}$	EM UC			
27.23 316 25.23 318 25.23 318 21.23 322 21.23 322 21.23 322 21.23 322 21.23 322 22.23 324 22.23 324 22.23 322 23.23 324 24.23 322 25.25 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD To South 1 PROJECT OF BRIDGE NAME PROJECT OF BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	43.23	300		SEDIMENTARY ROCK (MUDSTONE): laminated to													
27.23 316 25.23 318 25.23 318 21.23 322 21.23 322 21.23 322 21.23 322 21.23 322 22.23 324 22.23 324 22.23 322 23.23 324 24.23 322 25.25 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD To South 1 PROJECT OF BRIDGE NAME PROJECT OF BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY		301		thinly bedded, gray to very dark brown, fresh; intensely fractured, bedding plane parting, dipping 5° to 10°, sandstone 10% Puente Formation									\sim				
27.23 316 25.23 318 25.23 318 21.23 322 21.23 322 21.23 322 21.23 322 21.23 322 22.23 324 22.23 324 22.23 322 23.23 324 24.23 322 25.25 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD To South 1 PROJECT OF BRIDGE NAME PROJECT OF BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	41.23	302		canasione 10%. Facility of onlyagon									\sim				
27.23 316 25.23 318 25.23 318 21.23 322 21.23 322 21.23 322 21.23 322 21.23 322 22.23 324 22.23 324 22.23 322 23.23 324 24.23 322 25.25 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD To South 1 PROJECT OF BRIDGE NAME PROJECT OF BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY				Bottom of borehole at 303.0 ft bgs Bottom of borehole is at elevation 40.2 ft.													
27.23 316 25.23 318 25.23 318 21.23 322 21.23 322 21.23 322 21.23 322 21.23 322 22.23 324 22.23 324 22.23 322 23.23 324 24.23 322 25.25 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD To South 1 PROJECT OF BRIDGE NAME PROJECT OF BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	39.23																
27.23 316 25.23 318 25.23 318 21.23 322 21.23 322 21.23 322 21.23 322 21.23 322 22.23 324 22.23 324 22.23 322 23.23 324 24.23 322 25.25 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD To South 1 PROJECT OF BRIDGE NAME PROJECT OF BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	37 23			intact core pieces obtained between two natural discontinuities. The majority of cores obtained in this boring are													
27.23 316 25.23 318 25.23 318 21.23 322 21.23 322 21.23 322 21.23 322 21.23 322 22.23 324 22.23 324 22.23 322 23.23 324 24.23 322 25.25 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD To South 1 PROJECT OF BRIDGE NAME PROJECT OF BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	37.23			typically very weak to weak and do not meet the "sound core" definition provided in standard test													
27.23 316 25.23 318 25.23 318 21.23 322 21.23 322 21.23 322 21.23 322 21.23 322 22.23 324 22.23 324 22.23 322 23.23 324 24.23 322 25.25 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD To South 1 PROJECT OF BRIDGE NAME PROJECT OF BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	35.23			should not be used to evaluate the rock mass quality.													
27.23 316 25.23 318 25.23 318 21.23 322 21.23 322 21.23 322 21.23 322 21.23 322 22.23 324 22.23 324 22.23 322 23.23 324 24.23 322 25.25 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD To South 1 PROJECT OF BRIDGE NAME PROJECT OF BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY																	
27.23 316 25.23 318 25.23 318 21.23 322 21.23 322 21.23 322 21.23 322 21.23 322 22.23 324 22.23 324 22.23 322 23.23 324 24.23 322 25.25 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD To South 1 PROJECT OF BRIDGE NAME PROJECT OF BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	33.23	310															
27.23 316 25.23 318 25.23 318 21.23 322 21.23 322 21.23 322 21.23 322 21.23 322 22.23 324 22.23 324 22.23 322 23.23 324 24.23 322 25.25 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD To South 1 PROJECT OF BRIDGE NAME PROJECT OF BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY		311															
27.23 316 25.23 318 25.23 318 21.23 322 21.23 322 21.23 322 21.23 322 21.23 322 22.23 324 22.23 324 22.23 322 23.23 324 24.23 322 25.25 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD To South 1 PROJECT OF BRIDGE NAME PROJECT OF BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	31.23	312															
27.23 316 25.23 318 25.23 318 21.23 322 21.23 322 21.23 322 21.23 322 21.23 322 22.23 324 22.23 324 22.23 322 23.23 324 24.23 322 25.25 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD To South 1 PROJECT OF BRIDGE NAME PROJECT OF BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY		313															
27.23 316 25.23 318 25.23 318 21.23 322 21.23 322 21.23 322 21.23 322 21.23 322 22.23 324 22.23 324 22.23 322 23.23 324 24.23 322 25.25 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD To South 1 PROJECT OF BRIDGE NAME PROJECT OF BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	29.23																
25.23 318 25.23 318 25.23 318 21.23 322 21.23																	
25.23 318 21.23 322 21.23 322 21.23 322 21.24 323 22	21.23																
23.23 320 21.23 322 21.23 322 19.23 324 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COUNTY ROUTE POSTMILE FA 710 D/D FA 07-187900 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE SHEET	25.23																
23.23 320 21.23 322 19.23 324 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COUNTY 710 POSTMILE PART 07-187900 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE SHEET																	
Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD TO BORING RECORD DIST. TO BOUTE POSTMILE 710 D/D PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE SHEET	23.23	320															
Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE SHEET		321															
Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD R-09-Z1B3 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE SHEET	21.23	322															
Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD R-09-Z1B3 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE SHEET																	
Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD R-09-Z1B3 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE SHEET	19.23																
Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 DIST. TOUNTY ROUTE POSTMILE DIST. TOUNTY ROUTE POSTMILE DIST. TOUNTY ROUTE POSTMILE SAME OF -09-Z1B3 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE SHEET		825			l e	EDAP										EID	
Geotechnical Services Office of Geotechnical Design - South 1 Office of Geotechnical Design - South 1 Office of Geotechnical Design - South 1 Office of Geotechnical Design - South 1 Office of Geotechnical Design - South 1 Office of Geotechnical Design - South 1 Office of Geotechnical Design - South 1 Office of Geotechnical Design - South 1 Office of Geotechnical Design - South 1 Office of Geotechnical Design - South 1 Office of Geotechnical Design - South 1 Office of Geotechnical Design - South 1 Office of Geotechnical Design - South 1		6 5 5 5 S								RD	ROL	TF	PC	STMILE		-09-Z1E	3
Office of Geotechnical Design - South 1 SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE SHEET		L	7	Geotechnical Services	P	7 PROJE	CT O	LA R B	RIDG	ΕN	71 AME	0	D	/D		07-187900	
				Office of Geotechnical Design - South	1 📙	SR-7	10 T	TUN	NEL	PR	EPAR		ST	UDY	DATE	SHEET	4.4



BORIN	G RECORD			R-09-Z1B3
DIST. 7	COUNTY LA	ROUTE 710	POSTMILE D/D	EA 07-187900
PROJECT	OR BRIDGE N	AME		

	alis	bur	-	BEGIN DATE (. Ba&&2-09	COMPLETION DATE 2-27-09	34° 5' 20)" / 1 [·]	18° 1	4' 25	5.9"	N/	AD8	3	and Dat	um)			09-2	Z1B		
DRILLIN Caltr				CTOR ng Services		BOREHOLE ' Lt Sta								ıe 39			1		ELEVA NAVI		
DRILLIN Rota						DRILL RIG	(tru	ck)									BORE 4 ir		DIAM	ETER	
SAMPL	ER.	TYPI	E(S)	AND SIZE(S) (ID)		SPT HAMM	ER TY	PE	!- 4	40		20					НАМІ	MER E	FFICIE	NCY, E	Ri
	HOL	ЕВА	CKF	FILL AND COMPLETION		Diedrich GROUNDW			-					•		DATE	84%		TH OF	BORIN	IG
	om	eter	r In	stalled on Comp	oletion	READINGS	حا . ا	NM	l 			_		t on 7	7-1-0	9	325	5.0 ft			
ELEVATION (ft)	DEPTH (ft)	Material	Graphics	Ī	DESCRIPTION		Sample Location Sample Number	Blows per 6 in.		Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depin		Ren	narks		
386.60	1 2 3	φ.	0. 0.	medium dense; dry angular GRAVEL, m rounded SAND; wea 7"). SILTY SAND with G loose to medium de 20 to 40% COBBLE	mentation; (5"). EL with SAND (GW); loos to moist; mostly coarse to max. 3 in. dia.; some coarak cementation; (Aggregate CBRAVEL and COBBLES (nse; light gray; dry to mose; light gray; dry to mose; light gray; dry to mose. dia.; mostly coarse, rou	o fine, se, ate Base = (SM); ist; about	D00			81					\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	in a Soi and 200 A.1 Sur Teo	ccorda & Roc Prese 7), exc of the nmary hnical	nce wince wince winder the content of the content o	th the (jing, Cl Manua noted i Seotech , SR-7 Los Ar	10 Tunno	ion ndix
382.60	5 6 7	φ.	0.0	SAND; little fines; w	eak cementation; COBB ounded, flat; [ALLUVIUM	LES									\$\\\ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Cau SP ⁻ wer sigr	utious & Fand Me not conificant	Mod Ca ollecte numbe	II (2") s d due t er of co	bbles an	
380.60 378.60	8 9 10	•	0.												\$X\$X\$X	logg		amples	C1 thr	s cored a ough C1	
376.60 374.60	13		0.	Matrix is CLAYEY S mostly medium to fire	SAND (SC), trace fine GR ne SAND, some fines.	AVEL,	C01 C02 C02A			100 100 100		13			\$X\$X\$X\$	PA					
372.60	15 16 17		2000 H	rounded, flat), matrix	0 to 100% COBBLES (Gr x consists of loose to me gray, dry, weak cementa	dium	C03 C04 C05			100 100 100					X\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	VO	C=0.0 բ	opm			
370.60 368.60	19						C06			100					>		0.00				
	21 22		202020 202020	Matrix is Well-grade some coarse to fine SAND, trace fines.	ed SAND (SW) with GRA GRAVEL, mostly coarse	VEL, e to fine	C07			100		13				PA	C=0.0 p				
364.60	23 24 -25-						C08			100) () () ()						
	_				(continued)		l n	EPOR	יוד די	I E								Ι.	101 E 1	D	
			/	Divisio	tment of Transportation of Engineering Ser		D	BOR IST. 07	ING C	RE OUN LA	ITY		ROU 71 (PO: T/	SТМI Т	LE		EΑ	D 9-Z1 7-1879	
		7			chnical Services of Geotechnical Des	ign - South		ROJE SR-7	CT OI 10 T	R BF	RIDG NE I	E N/ L T E	ME E CHI	NICAI	_ ST	'UD'	·				
				550		J.: 2041		RIDGI				PRE	PARE	ED BY sbury				DATE		SHEET 1 of	12

ELEVATION (ft)	DEPTH (ft)	Material Graphics	NOITPIN Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight	(pcl) Shear Strength (tsf)	Drilling Method	Casing Depth	emarks
362.60	26		<u> </u>	C09			100 100				$\langle \rangle$		
	27		<u> </u>	C11			100	•					
360.60	28												=
358.60	30			C12			100					VOC=0.0 ppm	
3.GLB 3.V	31												
356.60	32										Š		
354.60				C13			100		13				
ALIKAN	35			C14			100						
352.60	36		Well graded CAND (CM), lease to gradient deposit	C15			100					VOC=0.0 ppm	
350.60	38		Well-graded SAND (SW); loose to medium dense; olive; dry to moist; mostly coarse to fine, rounded SAND; weak cementation.	515			100				Š	VOO=0.0 ррпп	
348.60	39											VOC=0.0 ppm	
27 77 27 27 27 27 27 27 27 27 27 27 27 2	41	ا . ر . ا	Well-graded SAND with GRAVEL (SW); loose to medium dense; olive; dry to moist; little coarse to fine, angular GRAVEL, max. 3 in. dia.; mostly coarse to fine, rounded SAND; weak cementation.	C16			100				\Diamond		
346.60	42	6 A	ille, founded SAND, weak cementation.									VOC=0.0 ppm	
358.60 358.789 7789 7789 358.60 358.6	43		SILTY SAND with GRAVEL (SM); loose to medium dense; olive; dry to moist; little coarse to fine, angular GRAVEL, max. 3 in. dia.; mostly coarse to fine, rounded SAND; little fines; weak cementation.								$X \Diamond X \Diamond$		
			SILTY SAND (SM); loose to medium dense; light brown; dry to moist; mostly medium to fine, rounded SAND; little fines; weak cementation.	C17			100				\ \ \ \ \	UW, PA	
342.60 340.60 338.60 336.60 334.60	47 48 49	000000000000000000000000000000000000000	Poorly graded GRAVEL with SAND (GP); loose to medium dense; light brown; moist; mostly coarse to fine, angular GRAVEL, max. 3 in. dia.; little medium, rounded SAND; weak cementation.						21 10	5	\bigcirc	VOC=0.0 ppm	
338.60		000	Well-graded SAND with GRAVEL (SW); loose to medium dense; reddish yellow to light brown; moist;	C18			100				Š		
336.60	51	0.0	little coarse to fine, angular GRAVEL, max. 3 in. dia.; mostly coarse to fine. rounded SAND: weak	C19			100						
330.60	53		SANDY SILTY CLAY (CL-ML); soft to medium stiff;										
334.60	54		light brown; moist; little fine, rounded SAND; little nonplastic fines; weak cementation; fine sand.						24		\Diamond	VOC=0.0 ppm	
	55		(continued)						'				
2			Department of Transportation		EPOR'			CO	RD				HOLE ID R-09-Z1B4
BOS BOS	_		Division of Engineering Services	D	IST.)7	C	OUN _ A		RC	UTE 10	PO T	STMILE /T	EA 07-07-187900
Y Y		7	Geotechnical Services Office of Geotechnical Design - South 1		ROJEC	T 01	R BF	RIDG NE I	E NAME	HNICA	L ST	ΓUDY	
5			James S. Sostosamasar Boorgin South 1		RIDGE				PREPA	RED BY		.Barker	SHEET 2 of 12

ELEVATION (ft)	DEPTH (#)	(11)	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	Re	marks
332.60				SEDIMENTARY ROCK, CONGLOMERATE, thickly to very thickly bedded, olive gray, slightly weathered to fresh, moderately hard to hard, unfractured, with clay, gravel to 1/2". [PUENTE FORMATION]	G20			100	0				XOX		end of the log
330.60	58			SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light brown, slightly weathered to fresh, moderately hard, unfractured, well graded, with some silt.									\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\		
328.60	59 60		· .		C21			100	0				\$X	VOC=0.0 ppm	
	61		1	SEDIMENTARY ROCK, (CLAYSTONE)/MUDSTONE, moderately bedded, light brown, slightly weathered to fresh, hard, unfractured, with some fine sand.									♦ × ♦		
326.60	62 63		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, moderately to thickly bedded, light olive, slightly weathered to fresh, hard, unfractured, clayey. No sample.									X \ \		
324.60	64		1:1	No sample.									\ \ \ \ \ \		
322.60	65 66		,	SEDIMENTARY ROCK, (SILTSTONE), thinly to moderately bedded, light brown, slightly weathered to fresh, hard, unfractured, with fine sand and clay.	C22			52	0	24	0.1		♦ × ♦	VOC=0.0 ppm UW, PI, PA	
320.60	67 68			With fine sand. Lens of clayey fine sand.						31	91		0×0		
	69		`.										××<		
318.60	70 71		```	SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, olive gray, slightly weathered to fresh, moderately soft, unfractured, fine sand.	C23			100	0				\ \ \ \	VOC=0.0 ppm	
316.60	72 73		1.	SEDIMENTARY ROCK, (SILTSTONE), moderately to thickly bedded, olive gray, slightly weathered to fresh, hard, unfractured.									♦ × ♦		
314.60	74		, ,										0×0		
312.60	75 76			Light brown.	C24			40	0				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	VOC=0.0 ppm	
310.60	77 78		1:/	No sample.									>X <		
,,,,,	79		111		1								×<		
308.60	80 81		1		C25			100	0				\ \ \ \	VOC=0.0 ppm	
306.60	82		11										♦ × ♦		
304.60	83		(///	SEDIMENTARY ROCK, (CLAYSTONE), very thinly bedded, dark gray, slightly weathered to fresh, soft, unfractured. SEDIMENTARY ROCK, (SANDSTONE), thickly bedded, light gray, slightly weathered to fresh,									X0X0		
	-00			(continued)				-, -							HOLES
			_/	Department of Transportation Division of Engineering Services	D	BOR IST.	ING			RD	ROU 710	TE 0	POS T/	STMILE T	R-09-Z1B4 EA 07-07-187900
	L	7	7	Geotechnical Services	P	ROJE	CTC	R BF	RIDG	E N/	AME	5.4.5		Control of	31-31-101-000
		1		Office of Geotechnical Design - South		RIDG						NICA ED BY	_ 31	DATE	SHEET

Division of Engineering Services Or LA ROUTE POSTMILE EA 07-0 Or LA 710 T/T 07-0	
Second Process Seco	f the log
Second Process Seco	
reah, moderately hard to fiard, unfractured, sandy, the sand. Continued) Signify to very slightly fractured, joint (CL, not healed), Slightly to very slightly fractured to fresh, moderately bedded, glint olive gray, slightly weathered to fresh, moderately hard, slightly to very slightly fractured. Secondary from the sand, some measure of the sand, slightly to very slightly fractured fine to medium sand. No sample. SEDIMENTARY ROCK, (SANDSTONE), thickly bedded, light olive gray, slightly weathered to fresh, and slightly fractured, slightly to very slightly fractured for fractured fine to medium sand. Joint (CL, not healed), dipping 60°. No sample. SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, light olive gray, slightly weathered to fresh, hard, slightly fractured, slightly fractured to fresh, hard, slightly fractured, slightly weathered to fresh, hard, slightly fractured gliping 51°. No sample. SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, light olive gray, slightly weathered to fresh, hard, slightly fractured gliping 61°. No sample. SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, light olive gray, slightly weathered to fresh, slightly fractured, slightly fractured gliping 54°. Inciplent fracture dipping 67°. No sample. SEDIMENTARY ROCK, (SANDSTONE), thickly bedded, light olive gray, slightly weathered to fresh, hard, slightly slightly weathered to fresh, hard, slightly weathered to fresh, hard, slightly weathered to fresh, hard, slightly weathered to fresh, hard, slightly weathered to fresh, hard, slightly weathered to fresh, hard, slightly weathered to fresh, hard, slightly weathered to fresh, hard, slightly weathered to fresh, hard, slightly weathered to fresh, hard, slightly weathered to fresh, hard, slightly weathered to fresh, hard, slightly weathered to fresh, hard, slightly weathered to fresh, hard, slightly weathered to fresh, hard, slightly weathered to fresh, hard, slightly weathered to fresh, hard, slightly weathered to fresh, hard, slightly weathered to fresh, hard, slightly wea	
Section Sect	
94.60 94 95 SEDIMENTARY ROCK (SANDSTONE), thickly bedded, light gray, slightly weathered to fresh, hard, slightly fractured dipping 67°. 96 SEDIMENTARY ROCK (SANDSTONE), moderately bedded, light olive gray, slightly weathered to fresh, hard, slightly fractured, slight, some gray, slightly weathered to fresh, hard, slightly fractured, slight, some gray, slightly weathered to fresh, lociplent fracture dipping 67°. 97 SEDIMENTARY ROCK (SANDSTONE), moderately bedded, light olive gray, slightly weathered to fresh, hard, slightly fractured, slight, some gray, slightly weathered to fresh, lociplent fracture dipping 67°. 98 SEDIMENTARY ROCK (SANDSTONE), moderately bedded, light clive gray, slightly weathered to fresh, lociplent fracture dipping 67°. 98 SEDIMENTARY ROCK (SANDSTONE), moderately bedded, light clive gray, slightly weathered to fresh, lociplent fracture dipping 67°. No sample. 98 SEDIMENTARY ROCK (SANDSTONE), moderately bedded, light clive gray, slightly weathered to fresh, lociplent fracture dipping 67°. No sample. 99 90 90 13 117 VOC=0.0 ppm	
SEDIMENTARY ROCK, (SANDSTONE), thickly bedded, light olive gray, slightly weathered to fresh, hard, slightly fractured, silp, fire to medium sand. No sample. SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, light olive gray, slightly weathered to fresh, hard, slightly fractured, silp, fire to medium sand. Dipping 55°. Soft, joint (CL, not healed), dipping 61°. No sample. SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, light olive gray, slightly weathered to fresh, soft, slightly fractured, sightly meathered to fresh, soft, slightly fractured, sightly fractured, sightly fractured, soft, slightly fractured, soft, slightly fractured dipping 60°. No sample. SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, light olive gray, slightly weathered to fresh, soft, slightly fractured, slightly weathered to fresh, hard, slightly fractured, slightly fractured, slightly fractured, slightly fractured, slightly weathered to fresh, hard, slightly fractured, slightly fractur	
sand Joint (CL, not healed), dipping 60°. Septimentary Rock, (SANDSTONE), moderately bedded, light olive gray, slightly weathered to fresh, hard, slightly fractured, sity, fine to medium sand. Septimentary Rock, (SANDSTONE), moderately bedded, light olive gray, slightly weathered to fresh, soft, slightly fractured gray, slightly weathered to fresh, soft, slightly fractured gray, slightly weathered to fresh, soft, slightly fractured gray, slightly weathered to fresh, soft, slightly fractured gray, slightly weathered to fresh, soft, slightly fractured. Septimentary Rock, (SANDSTONE), thickly bedded, light olive gray, slightly weathered to fresh, soft, slightly fractured. Septimentary Rock, (SANDSTONE), thickly bedded, light olive gray, slightly weathered to fresh, soft, slightly fractured. Septimentary Rock, (SANDSTONE), thickly bedded, light olive gray, slightly weathered to fresh, and, slightly weathered to fresh, lard, slightly weathe	
88.60 100 SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, light olive gray, slightly weathered to fresh, hard, slightly fractured, slity, fine to medium sand. Dipping 55°. Soft, joint (CL, not healed), dipping 61°. No sample. SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, light olive gray, slightly weathered to fresh, slott, slightly fractured. Joint (CL, not healed), dipping 54°. No sample. SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, light clive gray, slightly weathered to fresh, slott, slightly fractured. Joint (CL, not healed), dipping 54°. No sample. SEDIMENTARY ROCK, (SANDSTONE), thickly bedded, light clive gray, slightly weathered to fresh, slott, slightly fractured. SEDIMENTARY ROCK, (CLAYSTONE), thickly bedded, light clive gray, slightly weathered to fresh, slott, slightly fractured. SEDIMENTARY ROCK, (CLAYSTONE), moderately to thickly bedded, light crive gray, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (CLAYSTONE), moderately to thickly bedded, light crive, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (CLAYSTONE), moderately to thickly bedded, light crive, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (CLAYSTONE), moderately to thickly bedded, light crive, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (CLAYSTONE), moderately to thickly bedded, light crive, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (CLAYSTONE), moderately to thickly bedded, light crive, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (CLAYSTONE), moderately to thickly bedded, light crive, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (CLAYSTONE), moderately to thickly bedded, light crive, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (CLAYSTONE), moderately to thickly bedded, light crive, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (CLAYSTONE), moderately to th	
bedded, light olive gray, slightly weathered to fresh, hard, slightly fractured, slity, fine to medium sand. Dipping 55°, Soft, joint (CL, not healed), dipping 61°. No sample. SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, light olive gray, slightly weathered to fresh, soft, slightly fractured. Joint (CL, not healed), dipping 54°. Incipient fracture dipping 90°. No sample. SEDIMENTARY ROCK, (SANDSTONE), thickly bedded, light olive gray, slightly weathered to fresh, soft, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), thickly bedded, light olive gray, slightly weathered to fresh, soft, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), thinkly bedded, light olive gray, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), thinkly bedded, light gray, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (GANDSTONE), thinkly bedded, light gray, slightly weathered to fresh, hard, slightly fractured. Sity, line sand, Joint (CL, not healed), dipping 15°. Department of Transportation Division of Engineering Services Or LA 710 POSTMILE EA 700 FORTITLE BORING RECORD DIST. COUNTY ROUTE POSTMILE EA 710 TITT 07-04	
Dipping 55°. Soft, joint (CL, not healed), dipping 61°. No sample. SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, light olive gray, slightly weathered to fresh, soft, slightly fractured. No sample. Reference of the services of the services of the services of the services of the services. No sample. SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, light olive gray, slightly weathered to fresh, soft, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), thinkly bedded, light olive gray, slightly weathered to fresh, soft, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), thinkly bedded, light thrown, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light gray, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light gray, slightly weathered to fresh, hard, slightly fractured, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light gray, slightly weathered to fresh, hard, slightly fractured, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light gray, slightly weathered to fresh, hard, slightly fractured, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light gray, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light gray, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light gray, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light gray, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light gray, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light gray, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (SANDST	
No sample. SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, light olive gray, slightly weathered to fresh, soft, slightly fractured. Joint (CL, not healed), dipping 54°. Incipient fracture dipping 90°. No sample. SEDIMENTARY ROCK, (SANDSTONE), thickly bedded, light olive gray, slightly weathered to fresh, soft, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, light prown, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light gray, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light gray, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light gray, slightly weathered to fresh, hard, slightly fractured, slity, line sand. Joint (CL, not healed), dipping 15°. (continued) Department of Transportation Division of Engineering Services O7 LAY ROUTE POSTMILE EA- O7-Catachprical Services O7 LAY 710 T/TT O7-C	
bedded, light olive gray, slightly weathered to fresh, slightly fractured dipping 90°. 80.60 108 78.60 110 Incipient fracture dipping 67°. No sample. SEDIMENTARY ROCK, (SANDSTONE), thickly bedded, light olive gray, slightly weathered to fresh, soft, slightly fractured. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, light brown, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light provan, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light gray, slightly weathered to fresh, hard, slightly fractured, slity, fine sand. Joint (CL, not healed), dipping 42°. Joint (CL,	
No. Sample SEDIMENTARY ROCK, (SANDSTONE), thickly bedded, light olive gray, slightly weathered to fresh, soft, slightly fractured. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, light horow, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light brown, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light gray, slightly weathered to fresh, hard, slightly fractured, sith, time sand. Joint (CL, not healed), dipping 42°. Joint (CL, not healed), dipping 42°. Joint (CL, not healed), dipping 42°. Joint (CL, not healed), dipping 15°. Department of Transportation Division of Engineering Services DiST COUNTY ROUTE POSTMILE R-Contemplated Services T/IT ROUTE POSTMILE R-Contemplated Services R-Contemplated	
Incipient fracture dipping 67°. No sample. SEDIMENTARY ROCK, (SANDSTONE), thickly bedded, light olive gray, slightly weathered to fresh, soft, slightly fractured. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, light brown, slightly weathered to fresh, hard, slightly fractured, septiment of thickly bedded, light gray, slightly weathered to fresh, hard, slightly fractured, silty, fine sand. Joint (CL, not healed), dipping 42°. Joint (CL, not healed), dipping 45°. Joint (CL, not healed), dipping 15°. Continued) REPORT TITLE BORING RECORD District Country ROUTE POSTMILE RACTOR Contrological Services DIST COUNTY ROUTE POSTMILE EA T/T T/	
bedded, light olive gray, slightly weathered to fresh, soft, sightly fractured. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, light brown, slightly weathered to fresh, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light gray, slightly weathered to fresh, hard, slightly fractured, sitty, fine sand. Joint (CL, not healed), dipping 42°. Joint (CL, not healed), dipping 15°. Continued) Department of Transportation Division of Engineering Services DIST COUNTY ROUTE POSTMILE EA O7-0	
SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light gray, slightly weathered to fresh, hard, slightly fractured, silty, fine sand. Joint (CL, not healed), dipping 42°. Joint (CL, not healed), dipping 15°. (continued) Department of Transportation Division of Engineering Services Contrological Services DIST. COUNTY ROUTE POSTMILE RATED TITLE BORING RECORD DIST. COUNTY ROUTE POSTMILE FAMILY ROUTE POSTMILE TOTAL RATED TOTAL RATED POSTMILE POSTMILE POSTM	
Department of Transportation Division of Engineering Services Control brigger Services Dist County Route Postmile EA 710 T/T 07-0	
Department of Transportation Division of Engineering Services Coateshpired Services DIST COUNTY ROUTE POSTMILE EA 710 T/T 07-0	
Division of Engineering Services DIST COUNTY ROUTE POSTMILE EA 710 T/T 07-0	D 09-Z1B
Geolectifical Services PROJECT OR BRIDGE NAME	07-18790
Office of Geotechnical Design - South 1 SR-710 TUNNEL TECHNICAL STUDY BRIDGE NUMBER PREPARED BY DATE	SHEET

ELEVATION (ft)	SDEPTH (ft)	Material Graphics	the state of the s	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%) Dry Unit Weight	(pcf) Shear Strength (tsf)	Drilling Method	Accessed to the second
272.60	116		Joint (CL, not healed), dipping 15°. Joint (CL, not healed), dipping 15°. Soft. No sample.	C31			67	67			\$X	VOC=0.0 ppm See note at the end of the log regarding RQD.
270.60	117 118 119	.')	SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light olive gray, slightly weathered to fresh, soft, slightly fractured, silty, fine sand, with some medium sand. Joint (CL, not healed), dipping 64°. No sample.								XOXOX	
68.60	120 121	1,1	SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, light olive gray, slightly weathered to fresh, soft, slightly fractured, fine sand, some medium sand. Shear (CL, not healed), dipping 42°, moist, plastic.	C32			100	100			\$\$X\$X	VOC=0.0 ppm
66.60	122		SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, slightly weathered to fresh.								000	
64.60		11	moderately hard to hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), thinly to moderately bedded, light brown to light olive brown, slightly weathered to fresh, moderately hard to hard, slightly fractured, silty, fine sand. Shear (CL, not healed), dipping 65°.	C33			95	95	ŧ		XOXOX	VOC=0.0 ppm
62.60	126		Shear (CL, not healed). Shear (CL, not healed), dipping 62°. Soft to moderately soft, with some silt. Dark gray.					n)			>X	
60.60		1::/	SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, slightly weathered to fresh, soft to moderately soft, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, dark gray, slightly weathered to fresh, soft to moderately soft, slightly fractured.								>	
58.60		11	SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, slightly weathered to fresh, soft to moderately soft, slightly fractured.	C34			100	100			\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	VOC=0.0 ppm
56.60	131 132 133		SEDIMENTARY ROCK, (SANDSTONE), thinly to moderately bedded, light gray to dark gray, slightly weathered to fresh, soft to moderately soft, slightly fractured. Shear (CL, not healed), dipping 15°. Light olive gray, silty, fine sand with some medium						14 11	7	XOXOX	UW, PA
54.60	E		sand. Moderately hard to hard.						Ш		$\Diamond \times \Diamond$	
52.60	135		Light gray.	C35			93	93			XOX	VOC=0.0 ppm
50.60			Extremely hard.								XOX	
48.60	E		thickly bedded, light olive gray, slightly weathered to	C36			100	100			\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	
46.60	142	1	fresh, extremely hard, slightly fractured, silty, fine sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, slightly weathered to fresh								0×0	
44.60	143		moderately soft, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, light gray, slightly weathered to fresh, moderately soft, slightly fractured, silty, fine sand.								X0X0	
	145	1,*	(continued)								1.	4
1	L	_/ 7	Department of Transportation Division of Engineering Services Geotechnical Services	DI (EPOR BOR IST. D7 ROJE	CTO	RE OUN LA R BF	RIDG	E NAM	OUTE 10	T/	A CONTRACTOR OF THE CONTRACTOR
			Office of Geotechnical Design - South 1		RIDGE				PREP	HNICA ARED BY alisbu	1	DATE SHEET

ELEVATION (ft)	SDEPTH (#)		Material Graphics	DESCRIPTION	Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Re	marks
242.60	146			Medium sand with some fine sand. (continued).	C37			83	0				X0X	See note at the regarding RQD	
240.60				SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, slightly weathered to fresh, hard to very hard, slightly fractured.									×0×0		
238:60	150 151			No sample. SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, light olive gray, slightly weathered to fresh,	C38			83	83	G.			0×0	VOC=0.0 ppm	
236.60		E	111	hard to very hard, slightly fractured, silty, fine sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, slightly weathered to fresh, hard to very hard, slightly fractured, sandy, fine sand. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded light gray, slightly weathered to fresh											
234.60				thickly bedded, light gray, slightly weathered to fresh, hard to very hard, slightly fractured, silty, medium sand with some fine sand. No sample.									OXO		
232.60	155 156			SEDIMENTARY ROCK, (SANDSTONE), thinly to moderately bedded, light olive gray, slightly weathered to fresh, hard to very hard, slightly fractured. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, r	C39			80	80	9			× 6 × 6	VOC=0.0 ppm	
230.60		Ξ.	/	moderate brown, slightly weathered to fresh, soft to moderately soft, slightly fractured, shear (CL, not healed), dipping 60°. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light gray, slightly weathered to fresh,									X0X0		
228.60		፟.		moderately hard to hard, slightly fractured. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, slightly weathered to fresh, soft to moderately soft, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately to	C40			100	100	5			♦ × ♦	VOC=0.0 ppm	
226.60	161		1	thickly bedded, light gray, slightly weathered to fresh, moderately hard to hard, slightly fractured, silty, fine sand. No sample.									0 X Q		
224.60	163 164			SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, light gray, slightly weathered to fresh, weak, moderately hard to hard, slightly fractured, medium sand.						7.			>X \ \ \	UW, PI, UU, CR	
222.60	165 166			thickly bedded, moderate brown, slightly weathered to fresh, medium strong, moderately hard to hard, slightly fractured, sandy, fine sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, slightly weathered to fresh, medium strong, moderately	C-41			100	63	18	110		X0X	VOC=0.0 ppm	
220.60		B		hard to hard, slightly to very slightly fractured, fractured parallel to bedding. SEDIMENTARY ROCK, (CLAYSTONE)/MUDSTONE, laminated, olive gray to olive black, slightly weathered, weak, moderately soft to moderately hard, slightly									X0X0	VOC=0.0 ppm	
218.60				fractured, joint (not healed), dipping 45 to 50°, smooth, very thin, no filling, scattered 3" fine sandstone lenses. SEDIMENTARY ROCK, (SANDSTONE), slightly (weathered, strong, very hard, unfractured.	C-42			93	68				0X0X		
216.60	171 172			SEDIMENTARY ROCK, (CLAYSTONE)/MUDSTONE, laminated, olive gray to olive black, slightly weathered, weak, moderately hard, unfractured.						14	135		0 X Q	SD	
214.60	173 174		11/1	SEDIMENTARY ROCK, (SANDSTONE), slightly weathered, strong, very hard, unfractured. SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, laminated, olive gray to olive black, slightly weathered, weak, moderately hard, slightly fractured, shear dipping 50°, slightly rough, very thin, no filling, 6"									>	VOC=0.0 ppm	1 10
	17.0			fracture zone (continued)	1=	EDGE									HOLETS
	ſ		1	Department of Transportation Division of Engineering Services	D	EPOR BOR IST.	ING	RE	_	RD	ROU 71		POS T/	STMILE T	R-09-Z1B4 EA 07-07-187900
	-	7		Geotechnical Services Office of Geotechnical Design - South	P	ROJE	CTC	R B			AME	NICA			
			. "	Office of Geolechinical Design - South		RIDG	_		_	PR	EPAR	ED BY		Barker DATE	SHEET 6 of 12

ELEVATION (#)	175 175	Material Graphics	DESCRIPTION DESCRIPTION	Sample N	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Re Castled	emarks
212.60	176 177		at 172.8'. At EL. 213.6 ft, becomes intensely fractured, slightly rough, very thin, no filling. (continued). SEDIMENTARY ROCK, (SANDSTONE), slightly	C-43			100	50			× 0 ×	See note at the regarding RQD	e end of the log).
210.60			weathered, weak, moderately hard, unfractured. SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, laminated, olive gray to olive black, slightly weathered,								♦ ×♦	VOC=0.0 ppm	
	179	177	weak, moderately hard, intensely fractured, slightly rough, very thin, no filling. At EL 211.6 ft, becomes moderately fractured, dipping 50°, smooth, no filling.								×	VOC=0.0 ppm	
208.60	180		SEDIMENTARY ROCK, (SANDSTONE), slightly weathered, weak, moderately hard, unfractured. SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE,	C-44			80	70			\ \ \ \		
206.60	182		laminated, olive gray to olive black, slightly weathered, weak, moderately hard, slightly fractured, dipping 60°, smooth, no filling.								◇ ×	V00=0.0	
204.60	183 184		SEDIMENTARY ROCK, (SANDSTONE), fine-grained, massive, dark greenish gray, slightly weathered, weak to medium strong, moderately hard, unfractured. At EL. 205.3 ft, observed 2-3" siltstone lens.								\ \ \ \	VOC=0.0 ppm	
202.60	185 186	* : :	At EL. 203.3 ft, becomes extremely weak, soft.	C-45			98	75			0×0		
200.60	187 188	=									$\langle \Diamond \times \Diamond \rangle$	VOC=0.0 ppm	e end of the log
198.60	189 190		At EL. 199.9 ft, becomes weak, moderately hard.	C-46			97	97			\ \ \ \ \	VOC=0.0 ppm	
196.60	191 192	1.1.1	At EL. 197.6 ft, becomes weak to medium strong, very hard. At EL. 196.3 ft, becomes hard.								X0X0	V00 88	
194.60	193 194										×<	VOC=0.0 ppm	
	195			C-47			38	38			\ \ \ \	VOC=0.0 ppm	
192.60	196 197										♦ ×♦		
190.60	198	∓ ∴ I									× × × ×	VOC=0.0 ppm	
188.60		1: 4		C-48			100	95			♦ × ♦		
186.60	201	:::									× <		
184.60	203 204		At EL. 185.9 ft, observed shear, dipping 70°, slickensided, tight. At EL. 185.6 ft, becomes laminated. SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, laminated, olive gray, slightly weathered, weak,						14 118		0000	VOC=0.0 ppm EM	
	205	1: 4 * 4	(continued)								. •	.0	
	Г	_/	Department of Transportation Division of Engineering Services	DI	BPOR BOR IST.	ING C	RE OUN		RD ROU		PO T	STMILE	HOLE ID R-09-Z1B4 EA 07-07-187900
	-	7	Geotechnical Services Office of Geotechnical Design - South	1 PF	ROJE SR-7	CT 0 10 T	R BF	NE	E NAME L TECHI	NICAL		TUDY	
		-	Walter Control of the State of	B	RIDGI	NUI	MBE	R	M.Sali	=D BY sbury	, K.	Barker DATE	7 of 12

ELEVATION (ft)	SOEPTH (ft)	Material	Graphics		Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)	1 RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Casing Method	Remarks
182.60		∃∴		moderately hard. SEDIMENTARY ROCK, (SANDSTONE), fine-grained, laminated, dark greenish gray, slightly weathered, weak, moderately hard.	C-49			100	54				X 0 X	See note at the end of the log regarding RQD.
180.60	207 208	==	:: =	At EL. 181.9 ft, observed 4" fracture zone. SEDIMENTARY ROCK, (CLAYSTONE)/MUDSTONE, laminated, medium dark gray, slightly weathered, very									0×0	VOC=0.0 ppm
78.60	209 210			weak, moderately soft, intensely to moderately fractured. At EL. 180.1 ft, observed 6" fracture zone. At EL. 179.6 ft, becomes medium gray. At EL. 179.1 ft, observed joint, dipping 45°, polished, very thin, no filling.	C-50			100	50				X0X	
76.60	211 212			At ÉL. 178.6 ft, observed 1' fracture zone. At EL. 177.4 ft, observed shear, dipping 70°, slickensided, 1mm. At EL. 176.9 ft, observed shear, dipping 70°.									X0X	-0
174.60	213 214			slickensided, 1mm. At EL. 176.6 ft, observed 6" fracture zone. At EL. 175.9 ft, observed shear, dipping 45°, slickensided, 1mm. SEDIMENTARY ROCK, (SANDSTONE), fine-grained,						27	112		X0X0	UW, SD VOC=0.0 ppm
72.60	216	=		laminated, medium gray, slightly weathered, weak, moderately soft, unfractured. At EL. 173.9 ft, becomes olive black. At EL. 173.6 ft, becomes massive, olive gray, moderately hard, slightly fractured. At EL. 173.1 ft, observed shear, dipping 10°, slickensided.	C-51			98	78				\$X\$X\$	
170.60	218			At EL. 171.6 ft, becomes dark greenish gray.									X0X	VOC=0.0 ppm
68.60			۲.	SEDIMENTARY ROCK, (CLAYSTONE)/MUDSTONE, fine-grained, massive, olive gray, slightly weathered, weak, moderately soft. SEDIMENTARY ROCK, (SANDSTONE), fine-grained, massive, olive gray, slightly weathered, weak,	C-52		8-	100	56				\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	
66.60		∃1:		moderately hard, slightly fractured. At EL. 166.6 ft, observed joint, dipping 45°, rough, 1mm, no filling,.									0×0	
64.60	1	-		SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, massive, olive gray, slightly weathered, weak, moderately soft to moderately hard, slightly fractured, scattered 1-3" sandstone lenses.									> \ \ \ \	
62.60		Ξ	11 5	At EL. 163.8 ft, observed shear, dipping 50°, slickensided, 1mm.	C-53			86	42	8	136		×0×	VOC=0.0 ppm EM
60.60	227 228 229	=:		SEDIMENTARY ROCK, (SANDSTONE), fine-grained, massive, dark greenish gray, slightly weathered, weak, moderately hard to hard, unfractured.						1			X0X	VOC=0.0 ppm
58.60	230	⊒ ∶,			C-54			100	55				\$ \$ X \$	
23.37	231			SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, olive gray, slightly weathered, weak, moderately hard, unfractured. SEDIMENTARY ROCK, (SANDSTONE), fine-grained,									0×0	
54.60	233 234		1	massive, dark greenish gray, slightly weathered, weak, moderately soft, unfractured. SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, olive gray, slightly weathered, weak, moderately hard, intensely to moderately fractured, dipping 30 to 45°,									XOXO.	
	235	1	-1	(continued)						_		1	1	
			/	Department of Transportation Division of Engineering Services	D	EPOR BOR IST.	ING		_	RD	ROU 71		PO:	HOLE ID R-09-Z1B4 STMILE EA 07-07-187900
	-	7	1	Geotechnical Services Office of Geotechnical Design - South	P	ROJE	CTC	R BF	RIDG	E N	AME	NICA		The state of the s
				Since of Section finds Design - Court		RIDGI				PR	EPAR	ED BY		Barker DATE SHEET 8 of 12

ELEVATION (ft)	235 24 25 26 26 26 27 27 27 27 27 27 27 27 27 27 27 27 27	Material Graphics	·	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method		marks	
	237		smooth, 0-1 mm, no filling and clay. SEDIMENTARY ROCK, (SANDSTONE), fine-grained to silt, massive, dark greenish gray, slightly weathered, weak, moderately soft, unfractured. At EL. 153.6 ft, observed (continued).	C-55			86	20				0×0×0	VOC=0.0 ppm See note at the regarding RQD		
150.60	238	11	SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, olive gray, slightly weathered, weak, moderately hard, moderately to slightly fractured, shear (clay), dipping 50°, slickensided.									X0X0	VOC=0.0 ppm		
	241		SEDIMENTARY ROCK, (SANDSTONE), fine-grained, massive, dark greenish gray, slightly weathered, extremely to very weak, soft to moderately soft, unfractured.	C-56			90	40				X0X0			
146.60 144.60	243		At EL. 145.6 ft, becomes weak, moderately soft, very slightly fractured.						13	119		X0X0	UU		
	245		At EL. 144.1 ft, observed joint, dipping 40°, slightly rough, 1 mm, no filling. At EL. 143.6 ft, becomes moderately soft to moderately hard.	C-57			70	60				X0X0			
140.60	E											X0X0X			
138.60	249 250 251		At EL. 138.6 ft, becomes extremely weak, soft.	C-58		1.	96	30				\$X\$X\$			
	253		At EL. 135.6 ft, becomes weak, moderately hard.									>X	VOC=0.0 ppm		
134.60 132.60	255	(A).	At EL. 134.2 ft, observed joint, dipping 40°, slightly rough, very thin, no filling. At EL. 133.6 ft, becomes extremely weak, soft.	C-59		I	60	0				\$X\$X\$	VOC=0.0 ppm		
	257											X0X0X			
128.60	259 260 261		At EL. 128.6 ft, becomes soft to moderately soft.	C-60		18	80	16	211			XOXOX			
126.60		: 2:5	SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, massive, dark greenish gray, slightly weathered, weak, moderately soft.									X0X0	VOC=1.7 ppm		
124.60	264		SEDIMENTARY ROCK, (SANDSTONE), massive, dark greenish gray, slightly weathered, extremely weak, soft, scattered 3" claystone lenses.									0×0	VOC=0.0 ppm	11	The state of the s
			(continued)	l p	EPOF	יד דו	ri E	-	_					HOLE ID	_
	L	_/	Department of Transportation Division of Engineering Services Geotechnical Services	D	BOR IST 07	ING	RE OUN LA	VTY		71	TE O	PO:	STMILE T	R-09-Z1B EA 07-07-18790	
			Office of Geotechnical Design - South	11 3	ROJE SR-7 RIDG	10	TUN	NE	L T	ECH EPAR	NICAI		DATE	SHEET 9 of 12	-

ELEVATION (ft)	SDEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	emarks
122.60	266		(continued).	C-61			70	30			$\overset{\vee}{\diamond}$	VOC=0.0 ppm See note at the regarding RQI	e end of the log
120.60	267		At EL. 122.1 ft, becomes weak, moderately hard.								X0X0	VOC=3.5 ppm	
	269										$\stackrel{\times}{\diamond}$		
118.60	270		At EL. 119.1 ft, becomes laminated, with thin black bedding. At EL. 118.6 ft, becomes massive, soft to moderately soft.	C-62			40	20			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
116.60											>X	VOC=0.0 ppm	
	273										$\stackrel{\wedge}{\sim}$	VOC=0.0 ppm	
114.60	E										$\stackrel{\wedge}{\vee}$	VOC=13.4 ppii	
112.60		37.E 37.E	SEDIMENTARY ROCK, (SILTSTONE/ MUDSTONE, laminated, olive gray, slightly weathered, weak, moderately hard, unfractured, with scattered 2" lenses of fine sandstone.	C-63			85	62			$\Diamond X \Diamond X \Diamond$		
110.60	277 278 279		At EL. 110.6 ft, becomes slightly fractured, shear, dipping 45°, smooth, 1-2 mm.								$\times \Diamond \times \Diamond$	VOC=0.9 ppm	e end of the log
108.60	280	::	SEDIMENTARY ROCK, (CLAYSTONE)/MUDSTONE, thinly bedded, olive black, slightly weathered, very	C-64			100	50			$\langle \Diamond \times \Diamond \rangle$		
106.60	281	\equiv	weak, moderately soft, unfractured, interbedded with dark greenish gray, fine sandstone.								\Diamond		
	283		SEDIMENTARY ROCK, (SANDSTONE), dark greenish gray, slightly weathered, weak, moderately soft, unfractured.								>X ()	VOC=1.2 ppm	
104.60	284		At EL. 104.1 ft, observed 2" siltstone lens, moderately hard.	C-65		- 15	100	85			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	uw	
102.60	286		SEDIMENTARY ROCK, (SILTSTONE/MUDSTONE, laminated, olive gray, slightly weathered, weak, moderately hard, slightly fractured.								$\Diamond \times \Diamond$		
100.60		-::	slightly weathered, strong, very hard. SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, olive gray, slightly weathered, weak, moderately hard, moderately to slightly fractured, joint dipping 40 to 50°,								\ \ \ \ \	PTS VOC=1.2 ppm	
	289	5.51	smooth, véry thin, nó filling. SEDIMENTARY ROCK, (SANDSTONE), dark greenish gray, slightly weathered, weak, moderately soft, unfractured.	C-66			100	66	23 114		0 X Q	SD	
	291										×0×	VOC=0.0 ppm	
	293										\Diamond	VOC=0.0 ppm	
2 8 2 2 2	294	1, 1	SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, laminated, olive gray, slightly weathered, weak, moderately hard, unfractured.								$\Diamond \times \Diamond \rangle$	VOC=0,7 ppm	
	295		(continued)	-			-, -						Luavese
	_	_/	Department of Transportation Division of Engineering Services Geotechnical Services	D	BOR IST 07	ING	RE OUN LA	VTY	710			OSTMILE //T	R-09-Z1B4 EA 07-07-187900
			Office of Geotechnical Design - South	1 _	SR-7	10 1	run	NE	L TECH		LS		
	- 1	4		В	RIDG	= NU	MBE	R	PREPAR M.Sali	ED BY sbury	, K	.Barker	SHEET 10 of 12

ELEVATION (ft)	SDEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%)	(pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	emarks
4000	296	10.1	SEDIMENTARY ROCK, (SANDSTONE), dark greenish gray, slightly weathered, weak, moderately soft, slightly fractured. At EL. 92.6 ft, observed joint, dipping 50°, smooth, 1 mm, no filling.	C-67			100	90				$\times \Diamond \times \langle$	See note at the regarding RQI	e end of the log
90.60	-		SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, massive, olive gray, slightly weathered, weak, moderately soft to moderately hard, slightly fractured. At EL. 90.8 ft, observed fracture zone, smooth, very									$\Diamond \times \Diamond$	VOC=0.0 ppm	e end of the log
88.60	300		thin, no filling. At EL. 88.8 ft, becomes very hard, shear, dipping 50°,	C-68	4	ļ,	100	48	ķ			$\overset{\times}{\diamond}\overset{\times}{\diamond}$	VOC=0.7 ppm VOC=0.0 ppm	
1	301		slickensided. At EL. 88.6 ft, becomes moderately hard, dipping 40°, smooth, very thin.									$\Diamond \times \Diamond$		
	303		SEDIMENTARY ROCK, (SANDSTONE), massive, olive gray, slightly weathered, weak, moderately hard, unfractured.									$\times \times \times$	VOC=0.0 ppm	
84.60	304	.:.	SEDIMENTARY ROCK, (CLAYSTONE)/MUDSTONE, laminated, olive gray, slightly weathered, weak,	C-69			100	55	6			$\Diamond X \Diamond X$	VOC=0.2 ppm	
	306	///	moderately hard, slightly fractured, (clay), dipping 40°, smooth, very thin. At EL. 83.6 ft, observed shear, dipping 60°, smooth, 0.5mm.									$\Diamond \times \Diamond$	00.54	
80.60	308		At EL. 82.3 ft, observed shear, dipping 60°, smooth, 0.5mm. At EL. 81.6 ft, observed shear, dipping 10°, 2mm. SEDIMENTARY ROCK, (SANDSTONE), massive,						17 1	113		× </td <td>SD, EM VOC=0.0 ppm</td> <td></td>	SD, EM VOC=0.0 ppm	
78.60	310		dark greenish gray, slightly weathered, weak, soft to moderately soft, unfractured. At EL. 78.6 ft, becomes moderately soft to	C-70			100	42	ć			$\Diamond \times \Diamond$	VOC=0.0 ppm	
76.60	311		moderately hard. At EL. 78.0 ft, becomes soft, shear, slickensided.									× × ×		
	313		SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, laminated, olive gray, slightly weathered, weak, moderately hard to hard, moderately fractured, shear (clay), dipping 15 to 60°, smooth, 0-1 mm.									$\Diamond \times \Diamond$	VOC=0.0 ppm	
1	314		SEDIMENTARY ROCK, (SANDSTONE), massive, dark greenish gray, slightly weathered, weak, soft to	C-71	1		100	30				XOX	VOC=0.0 ppm	
	316 317		moderately soft, unfractured. At EL. 73.6 ft, becomes unfractured.									$\Diamond \times \Diamond$		
	318		At EL. 71.1 ft, becomes soft.						2 1	157		$\times \diamond \times$	VOC=0.0 ppm EM VOC=0.4 ppm	
68.60	320	1	At EL. 69.8 ft, becomes hard. SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, laminated, olive gray, slightly weathered, weak, hard, intensely fractured, shear (clay), dipping 45°, smooth,	C-72			100	50				$\Diamond X \Diamond X$		
	321	15	1 mm. At EL. 68.6 ft, becomes hard to very hard, moderately fractured, bedding plane separation, dipping 45°, smooth, very thin, no filling.									$\langle \Diamond \rangle \langle $		
64.60	323											$\times \Diamond \times \Diamond$	VOC=0.0 ppm	
	325E		(continued)									\Diamond		
115			Department of Transportation		REPOR			cc	PD.					HOLE ID
	L	_/	Division of Engineering Services Geotechnical Services	D	BOR OIST. 07	(LA	VTY	F	710	E	PC	STMILE TT	R-09-Z1B4 ^{EA} 07-07-187900
		/	Office of Geotechnical Design - South	11_	SR-7	10	TUN	NE	L TE	CHN		_ S	TUDY	
		-	The state of the s	В	RIDG	E NU	MRE	K		PAREI Salis		, K	.Barker	SHEET 11 of 12

ELEVATION (ft)	(#) 325 325	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
62.60	326		RQD values provided in the boring logs are based on intact core pieces obtained between two natural							
60.60	327 328 329		discontinuities. Majority of cores obtained in this boring are weak and does not meet the "sound core" definition provided in standard test method for RQD ASTM D 6032. These RQD values should not be used to evaluate the rock mass quality. Bottom of borehole at 325.0 ft bgs							
58.60	330		Borehole was converted to piezometer at the							
GLB 3/	331		completion of drilling.							
56.60	332									
CALTRANS BORING RECORD MET+ENG FIXED KRIS - SR-7/10 CALTRANS LIBRARY GA0808.GLB	333									
LTRAN	335									
52.60	336									
ONLY.	337									
50.60	338	1								
385 ANI 48.60										
Z2B4 Z	341	1								
46.60	342									
1B4 Z1B	343									
44.60	344									
SS WITH	345									
9015N 42.60	346									
80 40.60										
ALTRAN	349									
38.60	350									
RIS - SF	351									
36.60	352									E
ENG ENG ENG ENG ENG ENG ENG ENG ENG ENG	353									
34.60 Q	354 355									
RECOP	- 000			R	EPOR	T TITLE				HOLE ID
SORING	_	_/	Department of Transportation Division of Engineering Services	I	BOR IST.	COUNTY	/ ROU	TE	POSTMILE	R-09-Z1B4
RANS		7	Geotechnical Services Office of Geotechnical Design - Sout	PI	07 ROJE SR-7	LA CT OR BRID 10 TUNNE	710 GE NAME EL TECHI		│ T/T ∟ STUDY	07-07-187900
CAL			Sines of Geolegia Pesign - Godi			NUMBER	PREPARI	ED BY	, K.Barke	DATE SHEET

BORIN	IG RECOR	D		R-09-Z1B4
DIST. 07	COUNTY LA	710	POSTMILE T/T	EA 07-07-187900
	OR BRIDGE		L CTUDY	•

D. Ja	ankly	/	BEGIN DATE 2-16-09	COMPLETION DATE 2-24-09	34° 4'	38.283	8" / 11	8° 1	2' 13	3.330	B" N.		iuiII)		R-09-		
DRILLII			CTOR ng Inc.		BOREHO							ark A	ve.)			NAVD 88	
DRILLII Rota)		DRILL RI		0k								BOREHOLE 6 in	DIAMETER	
SAMPL	ER T	YPE(S)	AND SIZE(S) (ID)	0.011)	SPT HAM	MER T	/PE	4 .	40 !!					ı	HAMMER E	FFICIENCY, E	Ri
			(2.4"), PQ core (Auton GROUND							•	NG (E		70% TOTAL DEF	PTH OF BORI	1G
			stalled on Comp		READING	∋s ────	NM				22.7	t on7			502.0 ft		
ELEVATION (ft)	DEPTH (ft)	Material Graphics		DESCRIPTION		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%) Moisture	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casilig	Rer	marks	
			ASPHALT 4 inches tales has been also have a larger tales.	5 inches thick.		-{								lin acc	ordance wi	ord was prepar th the Caltrans	
440.20 438.20	1 2 3 4 5		SANDY SILT (ML); s homogeneous [OLDI	oft; brown; moist; fine	sand,	D01	I		100				-\} -\} -\}	and P 2007) A.1 of Sumn Techr Count 2010.	Presentation I, except as If the Final Conary Reportation Inical Study, Ity, Californ	ging, Classifica i Manual (June noted in Appe Geotechnical Seotechnical Los Angeles ia, dated April,	, ndix iel
436.20	6																
434.20													000000				
432.20			Medium stiff.			S02	2 2 2 3	5	100				0000				
430.20	12												MANNAN				
428.20	14	7	Vory stiff: brown to d	ark brown; 43% mediı	um to fino	/S03	3 7	20	100	17	109		0000	PA			
426.20			SAND, 57% fines. Irovoids to 1/16-inch dia	on staining, slightly po	rous, open		9 11	20	-	''	109		MANNA				
424.20													DODDODDO				
422.20	20	- 11111	Hard; dark brown to	dark gray; moist; hom	ogeneous.	VS04	8 22 34	56	100				MANNA				
420.20						<u> </u>							300000				
418.20	24												20000				
				(continued)			REPOR	т тіт	l F						Т	HOLE ID	
			Division	ment of Transporta n of Engineering S hnical Services		1	BOR DIST. 07	ING C(L	REC OUNT -A	ΓΥ	ROL 71	ITE 0	PO: D	STMILE /D		R-09-Z1 EA 07-187900	
				of Geotechnical De	esign - Sou	uth 1 📙		10 T	UNI	NEL 1	IAME ECH	NICA	LST	UDY			
					-		BRIDGI N/A	NUN	/BER	PF	REPAR). Ja r	ED BY			DATE 4-7- (SHEET 1 of	19

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location		Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Cashig Depui	Remarks
416.20	26		SILTY CLAY (CL-ML); hard; brown; moist; medium to fine SAND; homogeneous.	X	S05	10 21 34	55	100				DODDOD		
414.20												000000		
412.20	30		SANDY lean CLAY (CL); very stiff; brown; moist; some medium to fine SAND; homogeneous.	X	S06	4 9 11	20	100				sosoos		
410.20	32											SOSSO		
408.20	34		42% medium to fine SAND, 58% fines.		S07	11	39	100		18 111		000000	PA, PI	
406.20	36 37			X		18 21								
404.20	38											000000		
402.20	40		SANDY SILT (ML); very stiff; brown; moist to wet; medium to fine SAND; homogeneous.	X	S08	6 6 8	14	100				20000		
400.20	42	1111										000000		
398.20	44		SILTY SAND (SM); medium dense; brown; moist to	V	S09		32	100		22 104		00000	PA	
396.20	46		wet; 55% medium to fine SAND, 45% low plasticity fines.	À		14 18						000000		
394.20	48											000000		
392.20	50		SILTY CLAY with SAND (CL-ML); stiff; brown; moist to wet; fine SAND; homogeneous.	X	S10	3 3 5	8	100				Manna		
390.20	53											000000		
388.20	54 55											000		
<u> </u>			(continued)		l r	REPOR	יד דו	ri E						HOLEID
			Department of Transportation Division of Engineering Services			BOR DIST.	ING	RE		RD ROL	ITF	PO	STMILE	HOLE ID R-09-Z1B5
		7_	Geotechnical Services		F	07 PROJE	CT C	LA R B	RIDG	71 SE NAME	0	D/	/D	07-187900
			Office of Geotechnical Design - Sout	th	1 📙	SR-7	10 7	ΓUΝ	INE	L TECH PREPAR		L ST	UDY	DATE
					-	N/A	L NU	INIDE	л.	D. Jar	ובט פּץ. אועם טבו			DATE SHEET 4-7-09 2 of 18

ELEVATION (ft)	DEPTH (ft)	Material Graphics		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	Remarks	
386.20	56		SANDY SILTY CLAY (CL-ML), very stiff; light brown; moist; fine SAND; some iron staining, homogeneous.	S11	7 17 7	24	100		17	111		DOOD	See note at RQD.	end of log regarding	
384.20	57 58											MANN			
	59			W.,								DODD			
382.20	60		SILTY SAND (SM); very dense; brown; moist; medium to fine SAND; homogeneous.	XS12	50/5"		100					DOUG			
380.20												DODG			
378.20	63											000000000000000000000000000000000000000			
376.20	65 66		SEDIMENTARY ROCK, (SILTSTONE and SANDSTONE), yellowish brown and light olive brown, intensely to moderately weathered, fine sand. [PUENTE FORMATION]	S13	30 41 50/5"		100		31	88		MANN			
	67		[PUENTE FORMATION]		30/3							2000			
374.20	68											DODDODDDDDDDDD			
372.20	70	1	SEDIMENTARY ROCK, (SANDSTONE), light olive brown, fine grained, intensely to moderately	\\S14	28 50/6"		100								
370.20			weathered.				9					DODDODDDDDDDDDD			
368.20	73 74											MM			
	75			X S15	50/4"		100		18,	106		\otimes			
366.20	77											STATE			
364.20	78 79											DODDDDDDDDDDD			
362.20			SEDIMENTARY ROCK, Silty fine (SANDSTONE) with interbedded CLAYEY SILTSTONE, thinly bedded,	S16	9 31		100					X			
360.20	81		SEDIMENTARY ROCK, Silty fine (SANDSTONE) with interbedded CLAYEY SILTSTONE, thinly bedded, yellowish brown and light olive brown, intensely to moderately weathered, soft, moist, very slightly fractured, local iron oxide staining. At EL. 360.2 ft, observed bedding joint, dipping 70°, ½-inch thick, fine SANDSTONE bed.	C17	50/4"		90	60	19	107		$\Diamond \times \Diamond$			
358.20	83		At EL. 358.4 ft, observed bedding joint, dipping 50°, faint SANDSTONE lamination.									× 0 ×			
	85	Ν.	faint SANDSTONE lamination. (continued)									\Diamond	1		_
	ſ	_/	Department of Transportation Division of Engineering Services Geotechnical Services	71	BOR DIST. 07	ING	COUI	YTY		ROU 71	TE 0		STMILE /D	R-09-Z1E EA 07-187900	3:
	. 1	/	Office of Geotechnical Design - South	h 1 _	SR-7	10 1	TUN	INE	L TI	ECH	NICAI	_ \$1		TE SHEET 3 of 1	

ELEVATION (ft)	DEPTH (#)	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	Remarks	
356.20	86		At EL. 357.4 ft, observed bedding joint, dipping 50°, %-inch thick siltstone bed. (continued).	C17			90	60				\ \ \ \	See note at end of log regarding RQD. VOC = 9.8 ppm	
354.20	87 88		SEDIMENTARY ROCK, (SANDSTONE), massive with iron oxide staining.									000		
352.20	90		SEDIMENTARY ROCK, (SILTSTONE) with	C18			83	75				> × <		
350.20	91 92		interbedded fine SANDSTONE, olive gray to pale yellowish brown, laminated to thinly bedded, occasional diatomaceous laminations to 3/8-inch thick.									\$ \$ \$ \$	VOC = 9.7 ppm	
	93		At EL. 350.2 ft, observed bedding joint, dipping 35°.									0×0	VOC = 8.7 ppm	
48.20	94 95		At EL. 347.2 ft, observed bedding joint, dipping 40°.									× 6 ×		
46.20	96 97	X	SEDIMENTARY ROCK, (SANDSTONE), fine to medium grained, massive, pale yellowish brown,	C19			88	75				0×0		
44.20	98	1	intensely to moderately weathered. At EL. 344.7 ft, observed fault, dipping 70°, polished with paper thin clay lining, juxtaposes SANDSTONE above with thinly bedded SILTSTONE below.									X 0 X		
42.20	100		SEDIMENTARY ROCK, (SILTSTONE) with interbedded DIATOMACEOUS SILTSTONE, thinly bedded, olive gray. At EL. 342.7 ft, observed bedding joint, dipping 45°.									♦ <		
40.20	101											X		
38.20	103		SEDIMENTARY ROCK, (SANDSTONE), fine to medium grained, pale yellowish brown, bedding joint dipping 55°, Upper 1" to 2" of bed is black, pale yellowish brown below.									0×0	VOC = 3.2 ppm	
36.20	105	-	SEDIMENTARY ROCK, Interbedded (SILTSTONE), CLAYEY SILTSTONE and DIATOMACEOUS SILTSTONE, laminated to very thinly bedded, olive gray, intensely to moderately weathered, soft to Imoderately soft, very slightly fractured to unfractured.	C20			100	75				\ \ \ \ \ \ \		
	107		At EL. 337.2 ft, observed bedding joint, dipping 50°. SEDIMENTARY ROCK, (SANDSTONE), fine to medium grained, pale yellowish brown, moderately soft, oxidized.									X 0 X	VOC = 9.7 ppm	
34.20	108		SEDIMENTARY ROCK, Interbedded (SILTSTONE), CLAYEY SILTSTONE and DIATOMACEOUS SILTSTONE, laminated to very thinly bedded, olive gray, intensely to moderately weathered, soft to moderately soft, very slightly fractured to unfractured,						13	113		0 X Q		
32.20	110 111	1	bedding joint dipping 50°. SEDIMENTARY ROCK, (SANDSTONE), fine to medium grained, pale yellowish brown. SEDIMENTARY ROCK, Interbedded (SILTSTONE).	C21			90	80				>X <>		
30.20	112 113		CLAYEY SILTSTONE, Interbedded (SILTSTONE), CLAYEY SILTSTONE and DIATOMACEOUS SILTSTONE, laminated to very thinly bedded, olive gray, intensely to moderately weathered, soft to moderately soft, very slightly fractured to unfractured.									× 6×		
28.20			SEDIMENTARY ROCK, (SANDSTONE), fine grained, pale yellowish brown, in upper 6", black from 109.5 to 110. SEDIMENTARY ROCK, Interbedded (SILTSTONE,									0%0	_2	
	115	1	ine (continued)			-						1 7 1		_
	Г		Department of Transportation Division of Engineering Services	D	EPOF BOR IST.	ING	RE OUN	_	RD	ROU 71		POS D/	HOLE ID R-09-Z1E STMILE EA 07-187900	3
	_	7	Geotechnical Services Office of Geotechnical Design - South	P	ROJE	CTC	R BF			AME	NICA	1	10.00	_
			Sings of Section modification 2 South	В	RIDGI N/A	_			PR		ED BY		DATE SHEET 4-7-09 4 of 1	-

ELEVATION (ft)	Б Б Б Б Б Б Б Б Б Б Б Б Б Б Б Б Б Б Б	Material Graphics	DESCRIPTION Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	(tsf)	Drilling Method	Re	marks
326.20	116		thinly bedded, olive gray to pale yellowish brown, intensely to moderately weathered.	C21			90	80				\ \ \	See note at end RQD. VOC = 2.2 ppm	of log regarding
324.20	117	\ \ \ \	SEDIMENTARY ROCK, (SANDSTONE), fine to medium grained, massive, bedding joint dipping 30°, bedding shallows, 60 degree dip at 112', 30 degree at 112.5 at top of SANDSTONE bed. Beds pinch and swell.									× 0×		
	119	1.	SEDIMENTARY ROCK, Interbedded (SILTSTONE), CLAYEY SILTSTONE and DIATOMACEOUS SILTSTONE, laminated to very thinly bedded, olive gray, intensely to moderately weathered, soft to									000		
322.20	121	1	pedding joint dipping 50°. SEDIMENTARY ROCK (SANDSTONE), fine to medium grained, with irregular, undulatory laminations.	C22			95	80	21			\ \ \		
320.20			possible soft sediment deformation. Possible charcoal fleck, 1/8-inch diameter at EL. 325.8 ft. SEDIMENTARY ROCK, Interbedded (SILTSTONE), CLAYEY SILTSTONE and DIATOMACEOUS	1								◇ × ◇		
318.20	123	7	SILTSTONE, laminated to very thinly bedded, olive gray to black, intensely to moderately weathered, soft to moderately soft, very slightly fractured to unfractured, bedding joint dipping 55°, becoming uAbstitiza24.2 ft. observed bedding joint, dipping 60°.									0000		
316.20		j(); i(),	34-inch thick, black SANDSTONE bed. SEDIMENTARY ROCK, (SILTSTONE) with interbedded fine SANDSTONE, thinly bedded, black to grayish blue, moderately weathered, moderately soft, very slightly fractured.									>>		
314.20	128	1	At EL. 322.0 to 310.5 ft, observed highly disturbed and folded rock, 1.5-foot thick disturbed SILTSTONE and SANDSTONE. At EL. 321.2 ft, observed bedding joint, dipping 45°.									2000		
312.20			bedding joint dipping 70°, beds are continuous, folded.	C23			95	95				000	VOC = 11.5 ppn	1
310.20	131 132	1	At EL. 317.2 ft, observed bedding joint, dipping 70°, to vertical, folded. At EL. 315.7 ft, observed bedding joint, dipping 55°. SEDIMENTARY ROCK, (SANDSTONE), grayish blue, moderately weathered, bedding joint dipping 60° on									\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
308.20	134		3-inch thick SANDSTONE bed. At EL. 310.7 ft, becomes fine-grained, thickly bedded, light olive brown, very soft to soft, bedding joint, dipping 50°. At EL. 309.2 ft, observed bedding joint, dipping 45°, 1/2" thick SILTSTONE bed.									\$ \$ \$ \$ \$		
306.20			At EL. 308.2 ft, observed bedding joint, dipping 50°, olive brown above, black below.									× 0 ×		
304.20	137											000		
302.20	139 140		At EL. 302.2 ft, becomes fine to medium grained, some soft sediment deformation. At EL. 301.4 ft, observed bedding joint, dipping 60°,	C24			100	94	8	108		2020		
300.20		i ii	1/4" inch to 1 inch thick black SANDSTONE lamination. SEDIMENTARY ROCK, Interbedded (SILTSTONE and fine SANDSTONE), sandstone beds pinch and swell.									000	VOC = 8.5 ppm	
298.20	143		fine SANDSTONE), sandstone beds pinch and swell. At EL. 299.2 ft, observed bedding joint, dipping 60°. At EL. 298.9 ft, observed 4-inch thick SANDSTONE bed.									0000		
	145	1 X	(continued)									~		
1	_	_/	Department of Transportation Division of Engineering Services Geotechnical Services	Di O	BOR IST.	ING	RE OUN LA	VTY		ROUTE 710		POS D/	STMILE	HOLE ID R-09-Z1E EA 07-187900
	- 1		Office of Geotechnical Design - South 1		ROJE SR-7	CT 0	R BI	RIDG NEI	L TE	ECHNI		ST	UDY	
			A street A administration of the said and	BI	RIDGE N/A	NU	MBE	R	PRE	Jank!	BY V		DATE 4-7-	09 SHEET 5 of 1

ELEVATION (ft)	DEPTH (#)	Material Graphics	DESCRIPTION J ample 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	emarks
296.20	145	/	At EL. 297.5 ft, observed 6-inch thick SILTSTONE bed, intensely fractured. (continued).	C24			100	94			>×<	See note at end RQD. VOC = 23.9 pp	d of log regarding
294.20	147 148		At EL. 296.9 ft, observed bedding joint, dipping 60°, 1-inch thick SILTSTONE bed. At EL. 295.5 ft, observed bedding joint, dipping 55°, 6-inch thick, thinly bedded SILTSTONE sequence. At EL. 294.4 ft, observed 6-inch thick SILTSTONE bed, depositionally irregular contact at top.								$\langle \Diamond \times \Diamond \times \rangle$		
292.20	149 150		At EL. 293.6 ft, observed bedding joint, dipping 55°, faint black lamination. At EL. 293.2 ft, becomes very thinly bedded, dark greenish gray to dark bluish gray, fresh, moderately soft to moderately hard, slightly fractured. At EL. 292.2 ft, observed bedding joint, dipping 45°.	C25			100	100			X0X0X		
290.20		1	At EL. 290.2 ft, observed 6-inch thick SANDSTONE bed, depositionally irregular contact at base.								××	1	
288.20	153 154 155	100	At EL. 289.2 ft, observed bedding joint, dipping 50°. At EL. 288.9 ft, observed SANDSTONE bed, fine grained, with numerous siltstone rip-up clasts dipping parallel to bedding. Possible charcoal flecks at base of bed.								00000		
286.20	156	1	At EL. 286.2 ft, observed bedding joint, dipping 60°, Decreasing SILTSTONE.	C26			100	100			× 0 × 0	VOC = 3.8 ppm	
284.20	=	4	At EL. 284.7 ft, observed bedding joint, dipping 50°.								$\langle \Diamond \times \Diamond \rangle$		
282.20	160		At EL. 283.7 ft, observed bedding joint, dipping 50°. SEDIMENTARY ROCK, (SANDSTONE) with occasional SILTSTONE beds and rip-up clasts, sand is fine to medium grained. At EL. 282.4 ft, observed bedding joint, dipping 50°, 3/8-inch thick SILTSTONE bed.	C27			100	100			0×0		
280.20	161		At EL. 281.2 ft, observed bedding joint, dipping 45°, SILTSTONE with interbedded SANDSTONE.								× 0×		
278.20	163 164 165		At EL. 279.9 ft, becomes SANDSTONE with some SILTSTONE rip-up clasts at top. At EL. 278.7 ft, observed bedding joint, dipping 40°, 2" thick SILTSTONE bed. At EL. 277.7 ft, observed joint, dipping 40°, tight, paperthin clay lining.								X0X0X	VOC = 34.9 pp	
276.20	166 167	0	SEDIMENTARY ROCK, Interbedded (SILTSTONE and fine SANDSTONE), dark greenish gray to dark bluish								$\Diamond \times \Diamond$		
274.20	168	1.1	gray, fresh, moderately soft to moderately hard, slightly fractured.	C28			100	89			×0×	VOC = 0.4 ppm	
272.20	170		At EL. 273.2 ft, observed joint, dipping 70°. At EL. 272.7 ft, observed bedding joint, dipping 45°.								2000		
270.20	171		At EL. 270.8 ft, observed silty fine to medium grained SANDSTONE with siltstone rip-up clasts. Very weak. At EL. 269.9 ft, observed SILTSTONE bed, 0.7' thick.					1	10 117		$\Diamond X \Diamond \rangle$	UU	
268.20	173 174		At EL. 269.2 ft, observed shear, vertical juxtaposes SANDSTONE and SILTSTONE. Material highly disturbed at EL. 268.5 ft. SEDIMENTARY ROCK, (SANDSTONE), thickly								×0×<		
	175	2	(continued)								V		
	_		Department of Transportation Division of Engineering Services	D	EPOR BOR IST.	ING		-	RD ROU			STMILE	HOLE ID R-09-Z1B5 EA 07-187900
	_	7	Geotechnical Services Office of Geotechnical Design - South	PI	ROJE	сто	R BF		E NAME TECH	F 1 1			
			Office of Geolechinical Design - South	BI	RIDGE N/A				PREPAR D. Jar	ED BY		DATE 4-7	SHEET -09 6 of 18

ELEVATION (ft)	DEPTH (ft)	Material Graphics		Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method		Remarks
266.20	176		to moderately soft, slightly fractured, moist, bedding joint dipping 50°, on black SANDSTONE laminations. (continued).	228			100				X		e note at end of log regarding QD.
264.20	177 178		At EL. 266.7 ft, observed bedding joint, dipping 50°, at base of 6" thick massive CLAYEY SILTSTONE BACL. 265.2 ft, becomes Silty fine SANDSTONE, occasional cross beds. At EL. 264.2 ft, observed bedding joint, dipping 40°, massive SANDSTONE, faint joint, light gray lining.	29			70	60				VC	DC = 14.3 ppm
262.20	179 180 181		At EL. 262.2 ft, observed joint, dipping 30°, faint, tight, light gray lining. At EL. 262.2 ft, observed bedding joint, dipping 35°, SANDSTONE bed, 5-inches thick, very hard, fine to medium grained.								X \ \ \ \ \ \ \	VC	OC = 63.8 ppm
260.20			At EL. 260.2 ft, observed bedding joint, dipping 50°, on laminations within SANDSTONE.								$\langle \Diamond \times \Diamond \rangle$		
258.20	184 185	1:45	At EL. 258.7 ft, observed SANDSTONE bed, 5-inches thick, very hard, fine to medium grained, joint in center, tight, rough, dipping 60-70 degrees.										
256.20	186 187			230			86	71			$\langle \Diamond \times \Diamond \rangle$		
254.20	188 189	$=$ \vee	At EL. 254.7 ft, observed bedding joint, dipping 45°, on lamination within SANDSTONE.								× < × <		
252.20			SEDIMENTARY ROCK, (SILTSTONE), laminated, dipping 40 degrees. Bed offset (reverse) 2.5-inches by tight fault with fine sand lining. Fault dipping 60 degrees. At EL. 252.2 ft, observed Fault, undulatory, roughly 30° dip, tight, polished, striated along strike, unknown								\$X\$X\$	VC	OC = 39.5 ppm
250.20	192 193	=	offset. SEDIMENTARY ROCK, (SANDSTONE), thickly bedded to very thickly bedded, dark greenish gray, fresh, soft to moderately soft, slightly fractured, moist, bedding joint dipping 30 to 50°, cross bedded.								0X0X		
248.20	194 195	by	At EL. 248.2 ft, becomes Silty fine SANDSTONE. At EL. 247.7 ft, observed bedding joint, dipping 45°, locally fractured, joints dipping 70°, 30°, and 20°.	231			89	67			\$\\ \\ \\ \\ \\		
246.20	196 197	\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.	At EL. 246.2 ft, becomes very thickly bedded to massive, bedding joint, dipping 40°, on 1/8-inch thick SILTSTONE bed. At EL. 245.7 ft, observed bedding joint, dipping 20°,								0×0×		
	199	5.0	tight, faint, no lining.								0×0×		
242.20	201	300	At EL. 242.2 ft, becomes very thickly bedded, soft. At EL. 241.2 ft, observed bedding joint, dipping 45°, on 1/8-inch thick SILTSTONE lens. Very weak.	32			88	88	14 113		\\ \\ \\ \\	VC	DC = 2.8 ppm
238.20	203		At EL. 239.2 ft, observed bedding joint, dipping 50°, on 1/8-inch thick SILTSTONE lens. At EL. 238.2 ft, observed moderately soft to hard, 6"	233		,	100	80			\$X\$X\$		
	205	- <u>:. :</u>	thick section of silty fine SANDSTONE. (continued)								V		
1	_		Department of Transportation Division of Engineering Services	DI	POR BOR ST.	NG		-	RD ROU		PO	OSTM D/D	HOLE ID R-09-Z1E ILE EA 07-187900
	L	7	Geotechnical Services	PF	ROJE	CT O	R BF	RIDG	E NAME	5.25			
			Office of Geotechnical Design - South 1	BF	RIDGE N/A			_	PREPAR D. Jan	ED BY	_ 3	מטו	DATE SHEET 4-7-09 7 of 1

ELEVATION (ft)	э ЭDEРТН (ft)	Material Graphics		Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	200	marks
236.20	206		(continued). At EL. 236.9 ft, observed bedding joint, dipping 30°, very faint, cemented SANDSTONE lamination. At EL. 236.2 ft, becomes moderately soft.	233			100	80				\ \ \ \	See note at end RQD.	of log regarding
234.20	207	/	At EL. 235.2 ft, becomes soft, massive SANDSTONE. At EL. 234.5 ft, observed fault, dipping 30°, %-inch normal offset.									(\ \ \ \		
232.20	209	/	At EL. 233.9 ft, observed fault, dipping 30°, truncates 1/8-inch thick SILTSTONE lamination, fault has 1/8 inch thick brown, slightly clayey gouge, unknown offset.									×		
230.20	211	: : : `\;	At EL. 233.2 ft, observed fault, dipping 50°, 1/8 inch thick, brown, slightly clayey gouge, unknown offset. At EL. 231.2 ft, becomes moderately soft, bedding joint, dipping 40°, faint SANDSTONE lamination.						8	139		♦ × ♦	uc	
230.20	213	/	At EL. 230.2 ft, becomes moderately soft to moderately hard, massive SANDSTONE, medium strong. At EL. 220.7 ft, becomes soft to moderately soft, joint, dipping 60° tight, planar, no lining.									× 0 × 0		
228.20	214		dipping 66 , agni, pianar, no ining.	C34			100	100				\$ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\		
226.20	216		At EL. 227.0 ft, observed bedding joint, dipping 45°, SILTSTONE lamination with massive SANDSTONE.									0X0		
224.20	218		SEDIMENTARY ROCK, SANDY (SILTSTONE), laminated, bedding joint dipping 45°.									× 0 ×		
222.20	219	Į.	At EL. 223.2 ft, observed very faint randomly oriented fractures to 4-inches long.									$\Diamond \times \Diamond$	VOC = 3.5 ppm	
220.20	221		At EL. 220.2 ft, observed bedding joint, dipping 40°, 1/8-inch thick SILTSTONE lamination.									× 0 ×		
218.20	223	you.	At EL. 219.2 ft, observed 4-inch thick interbedded SILTSTONE and fine SANDSTONE, depositionally chaotic, folded, sandstone to 6" below has siltstone	C35			94	75				\ \ \ \		
216.20	225		At EL. 217.7 ft, observed bedding joint, dipping 45°, on 6" thick section of interbedded SILTSTONE, moderately fractured.					10				$\Diamond \times \Diamond$	VOC = 1.8 ppm	
	227	/	At EL. 216.2 ft, observed fault, dipping 70°, tight, no lining, silty fine SANDSTONE above and fine to medium SANDSTONE below. SEDIMENTARY ROCK, Interbedded (SILTSTONE and									×		
214.20	228	1	fine sandy SILTSTONE), thinly to moderately bedded, moderately soft to moderately hard, local beds with soft sediment deformation, pinch, swell and folded.									$\Diamond \times \Diamond$		
212.20	230	11	At EL. 212.3 ft, observed bedding joint, dipping 55°. Very weak.						15	106		× 0 ×	SD, UC	
210.20	232	11	SEDIMENTARY ROCK, Silty (SANDSTONE), bedding	036			100	88				2000		
208.20			At EL. 209.7 ft, observed bedding joint, dipping 60°. At EL. 209.2 ft, observed shear, dipping 30°, slightly polished, below is roughly 1.5 thick silty fine sandstone bed with soft sediment deformation (tightly									0×0		
	235	1 4 4 5 2 5	folded (continued)									~		
			Department of Transportation	R	EPOR BOR	TTIT	RE	CO	RD					R-09-Z1E
		_/ 7	Division of Engineering Services Geotechnical Services	DI C	ST. 7 ROJE	CTO	LA R BF	RIDG	E NA	710 ME		D		EA 07-187900
			Office of Geotechnical Design - South 1		SR-7	10 T	UN	NE	L TE	CHN	NICAL	ST		
					RIDGE N/A	NUI	MRE	K		Jan			DATE 4-7-	09 8 of 1

ELEVATION (ft)	235 230EPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing	marks
206.20	236	X	siltstone beds, rip-ups). At EL. 207.7 ft, observed bedding joint, dipping 60°. At EL. 207.2 ft, observed fault, dipping 70°, 1-inch to 2-inch thick gouge zone of intensely fractured SILTSTONE and soft SANDSTONE, material highly disturbed adjacent to fault.	C36			100	10.7			\$X\$X\$	See note at end RQD. VOC = 2.0 ppm	of log regarding
204.20	238	1.15	(continued). At EL. 205.7 ft, observed bedding joint, dipping 55°.								X \ \	W00 - 0.0	
202.20	240	9	At EL. 203.2 ft, observed bedding joint, dipping 55°. At EL. 202.2 ft, observed bedding joint, dipping 50°, material is locally slightly brittle.								$\Diamond \times \Diamond$	VOC = 3.2 ppm	
200.20	242		At EL. 201.9 ft, observed intensely fractured rock. At EL. 201.2 ft, observed joint, dipping 80°. At EL. 200.7 ft, observed bedding joint, dipping 60°, material highly broken, fragments are moderately hard.	C38			100	0			$\Diamond X \Diamond X$		
198.20		1	At EL. 198.7 ft, observed bedding joint, dipping 60°.								$\Diamond X \Diamond X$	VOC = 2.5 ppm	
196.20			SEDIMENTARY ROCK, Interbedded (SILTSTONE and fine SANDSTONE), laminated to thinly bedded. At EL. 195.7 ft, observed bedding joint, dipping 50°.	C39			96	96	K a II		X0X0		
194.20	248	χ.	At EL. 194.7 ft, observed joint, dipping 55°, conjugate to bedding.								× 0 ×		
192.20	1116	1.	SEDIMENTARY ROCK, Silty fine (SANDSTONE), beds are highly folded immediately above (soft sediment deformation). At EL. 192.2 ft, observed fault, dipping 70°, very tight, striated perpendicular to dip, unknown offset, 2" thick									VOC = 1.5 ppm	
190.20	E		SILTSTONE fragment observed adjacent to fault. At EL. 191.2 ft, observed bedding joint, dipping 55°, 2-inch thick SILTSTONE bed within fine SANDSTONE. At EL. 190.2 ft, observed bedding joint, dipping 55°.								$\Diamond \times \Diamond$		
188.20	=		on 2" thick SILTSTONE bed. At EL. 188.3 ft, observed bedding joint, dipping 55°, on 4" thick SILTSTONE bed.								$\Diamond X \Diamond X$		
186.20	255 256	11	At EL. 187.4 ft, observed 1.5' thick laminated SILTSTONE bed.	C40			100	89			×0×		14
184.20	257 258 259		At EL. 185.7 ft, observed bedding joint, dipping 60°. At EL. 185.2 ft, observed bedding joint, dipping 55°, faint SANDSTONE lamination. At EL. 184.2 ft, observed shear, dipping 40 to 0°, undulatory, 1/8-inch thick, soft clay lining.								×0×0		
182.20	260	1/200	SEDIMENTARY ROCK, (SILTSTONE), laminated, bedding joint dipping 50°, on contact to SILTSTONE.								$\Diamond \times \Diamond \rangle$	VOC = 3.4 ppm	
180.20	261		At EL. 181.2 ft, observed bedding joint, dipping 60°, Some interbedded fine SANDSTONE.								0X0		
178.20	263 264	7	SEDIMENTARY ROCK, (SANDSTONE), fine to medium grained, very thickly bedded, dark bluish gray, fresh, very weak, moderately soft to moderately hard, very slightly fractured, bedding joint dipping 55°, on contact to SANDSTONE.	C41			100	67	11 116		\$X\$X	υυ	
	265 -		(continued)								. *: [
	_	_/	Department of Transportation Division of Engineering Services Geotechnical Services	D	EPOR BOR IST. 07	ING	RE OUN LA	VTY	710		PO D	STMILE I/D	R-09-Z1B5 EA 07-187900
			Office of Geotechnical Design - South	11 _3	ROJE SR-7 RIDGI N/A	10 7	run	NE	E NAME L TECHI PREPAR D. Jan	ED BY	L ST	DATE 4-7-	09 SHEET 9 of 18

ELEVATION (ft)	SDEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing	emarks
176.20	266		At EL. 177.8 ft, observed bedding joint, dipping 55°, on 6" thick section of SILTSTONE with interbedded fine SANDSTONE, laminated to thinly bedded. At EL. 177.4 ft, observed SANDSTONE laminations with abundant black detritus.	C41			100	67			×0×4	See note at end RQD.	of log regarding
174.20		\	(continued). At EL. 174.4 ft, observed bedding joint, dipping 50°, SANDSTONE lamination.								$\Diamond \times \Diamond$		
172.20	269 270		SEDIMENTARY ROCK, (SILTSTONE), laminated, local soft sediment deformation, bedding joint dipping 55°.								X \ \		
	271	1.	SEDIMENTARY ROCK, (SANDSTONE), fine to medium grained, very thickly bedded, dark bluish gray. At EL. 171.2 ft, becomes soft, saturated, some black								$\Diamond \times \Diamond$	VOC = 1.3 ppm	
170.20	272		staining.								$\overset{\vee}{\diamond}$		
168.20		1.0	Pressuremeter testing at EL. 169.0 to 160.1 ft.								\$X		
166.20	275 276										$\Diamond \times \Diamond$		
	277										\times		
164.20	279	0.0									$\Diamond \times \Diamond$		
162.20	280										× 0 ×		
160.20		3	At EL. 160.2 ft, observed bedding joint, dipping 55°, 1-inch thick SILTSTONE lamination. Material is	C42			100	100			$\Diamond \times \Diamond$	VOC = 1.7 ppm	
158.20	283		locally cemented, hard. At EL. 158.9 ft, observed bedding joint, dipping 55°, 1/8-inch to 1/2-inch thick SANDSTONE lamination.	C43			93	93	111		× 0 ×		
156.20	285 286 287	X	At EL. 157.6 ft, observed joint, dipping 90 to 60°, numerous irregular, black lined joints, tight. At EL. 157.2 ft, becomes fine to coarse grained, with some interbedded SILTSTONE, thickly to very thickly bedded, sandstone is dark bluish gray, siltstone is dark greenish gray, fresh, moderately soft to								$\Diamond \times \Diamond \times \Diamond$		-
154.20	288		moderately hard, slightly fractured. At EL. 156.7 ft, observed bedding joint, dipping 60°. At EL. 155.4 ft, observed bedding joint, dipping 60°, on 5" thick CLAYEY SILTSTONE bed. Rock to 6-inches below is depositionally chaotic mix of								$\times \diamond \times \langle$		
152.20	289 290 291		SILTSTONE and SANDSTONÉ. At EL. 153.2 ft, observed 4" thick cemented SANDSTONE bed, hard.	C44			100	95			$\times \Diamond \times \Diamond$		
150.20	292		At EL. 150.8 ft, observed bedding joint, dipping 50°, 2" thick SILTSTONE bed. Some rip-up clasts below. At EL. 150.4 ft, observed bedding joint, dipping 55°, 1/8-inch thick SILTSTONE lamination.								$\Diamond \times \Diamond$		
148.20	293		At EL. 149.2 ft, observed bedding joint, dipping 65°, 2" thick SILTSTONE bed, thinly bedded. At EL. 148.4 ft, observed bedding joint, dipping 60°, 8" thick brown SILTSTONE sequence with some internal light gray fine SANDSTONE laminations.								$\Diamond X \Diamond X \Diamond$		
	200-		(continued)										
	_		Department of Transportation Division of Engineering Services	D	EPOR BOR IST. 07	ING		_	RD ROU 710		PC	DSTMILE D/D	R-09-Z1B5 EA 07-187900
			Geotechnical Services Office of Geotechnical Design - South	1	ROJE SR-7 RIDGI N/A	10 7	TUN	NE	E NAME L TECHI PREPARI D. Jan	ED BY			SHEET -09 10 of 18

ELEVATION (ft)	SDEPTH (ft)	Material Graphics	DESCRIPTION Jegun Percention		Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method		narks
146.20	F	1 17	At EL. 146.7 ft, observed 1/8-inch thick SILTSTONE rip-up clast, roughly 3" long.	C44			100	95				X0X	See note at end RQD.	
144.20	297 298	: : :										♦ ×♦	VOC = 3.8 ppm	
142.20	299 300			C45			90	89				\ \ \ \ \ \		
140.20	301 302		At EL. 140.7 ft, observed bedding joint, dipping 60°, %-inch thick laminated SILTSTONE bed.									X0X	VOC = 4.0 ppm	
138.20	303 304 305	X	\$EDIMENTARY ROCK, Interbedded (SILTSTONE and fine SANDSTONE), laminated to thinly bedded, some soft sediment deformation, local rip-ups and beds that pinch and swell, bedding joint dipping 60°. At EL, 139.0 ft, observed shear, dipping 40 to 20°,									00000		
136.20			½-inch normal offset, tight. SEDIMENTARY ROCK, (SANDSTONE), fine to coarse drained, with some interbedded SILTSTONE, thickly to very thickly bedded, sandstone is dark bluish gray, siltstone is dark greenish gray, fresh, moderately soft to moderately hard, slightly fractured, bedding joint									X 0 X 0		
134.20	E	<i>i.'</i>	dipping 60°. At EL. 136.2 ft, observed bedding joint, dipping 60°. At EL. 135.0 ft, observed bedding joint, dipping 60°, Two parallel siltstone beds.									X 0 X <		
132.20	E	\ 	At EL. 133.2 ft, becomes fine to medium grained SANDSTONE.	C46			100	100				♦ × ♦	VOC = 3.7 ppm	
130.20	311 312 313	\ \ \	At EL. 131.2 ft, observed bedding joint, dipping 55°, 3-inch thick SILTSTONE sequence, beds are locally polished along bedding planes. At EL. 130.7 ft, observed bedding joint, dipping 55°, faint tight shear with 3/8-inch reverse offset. Very weak.						11	118		X0X0X	υυ	
128.20	314 315	200										XOXO		
126.20	316 317	1	At EL. 126.7 ft, observed 3/4-inch to 1-inch thick SILTSTONE bed, SANDSTONE immediately above is coarse grained. At EL. 126.2 ft, observed bedding joint, dipping 55°, 2-inch thick laminated SILTSTONE bed. Material is soft to moderately soft.									X0X0		
124.20	318	=:::		C47			63	63				♦ × ♦		
122.20	320 321	/	At EL. 121.2 ft, observed light brown, joint, dipping	1								\ \ \ \ \ \	VOC = 3.7 ppm	
120.20	322		50°, faint, 1/8-inch thick, moist, silty clay lining. Weak. At EL. 119.4 ft, observed bedding joint, dipping 55°,						5	142		XOX	uc	
118.20	324	``\	%-inch thick silty lamination.									$\Diamond \times \Diamond$		
			(continued)											
	_	_/	Department of Transportation Division of Engineering Services Geotechnical Services	DI	BOR IST.	ING	RE OUN LA	ITY		ROU 710		PO:	STMILE	HOLE ID R-09-Z1B5 EA 07-187900
		/	Office of Geotechnical Design - South		ROJE SR-7	CT O	UN	NE	E N/	ECHI	NICA	LST	UDY	
				BI	RIDGE N/A			_	PRI		ED BY		DATE 4-7-0	SHEET 11 of 1

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION Jejdmble Procession	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Re	emarks
116.20	326	/		C47			63	63				\ \ \	See note at end RQD.	d of log regarding
114.20	327 328	1/1	At EL. 115.2 ft, observed shear, dipping 65°, 1/16-inch thick, silt lined, unknown offset. At EL. 114.2 ft, observed shear, dipping 40°,	C48			100	58	t			\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	VOC = 4.2 ppm	i
	329		1/16-inch thick silt lined unknown offset									×<		
112.20	E	W	At EL. 113.5 ft, observed shear/fault zone, dipping 80 to 25°, 1/16-inch thick, silt lined, unknown offset. At EL. 113.0 ft, observed bedding joint, dipping 60 to 50°, 3-inches thick, laminated, faulted SILTSTONE bed, 1/2-inch reverse offset by shear dipping 50 to 30									×		
110.20	331	X	bed, 1/2-inch reverse offset by shear dipping 50 to 30 degrees, 1/16-inch thick, silt lined. At EL. 112.4 ft, observed shear, dipping 70 to 60°, 1/16-inch thick, silt lined, unknown offset. At EL. 111.9 ft, observed shear, dipping 90 to 50°,											
	333		some shears with silty lining, unknown offset, very tight, faint.									0		
108.20	334		1/16-inch thick, silt lined, unknown offset.	C49			100	100				\ \ \	VOC = 5.2 ppm	1.
106.20	335	V	0°, folded and overturned laminations. At EL. 108.7 ft, observed shear, dipping 30°, 1/16-inch thick, silt lined, unknown offset.									0×0		
	337		At EL. 108.7 ft, observed shear, dipping 30°, 1/16-inch thick, silt lined, unknown offset. At EL. 107.7 ft, observed shear, dipping 30 to 20°, 1/16-inch thick, silt lined, unknown offset. At EL. 106.7 ft, observed scour mark with siltstone									××		
104.20	338		rip-ups below. At EL. 106.5 ft, observed bedding joint, dipping 60°, 6" thick CLAYEY SILTSTONE bed, brown, very faintly laminated.									0		
102.20	339	"//	At EL. 105.2 ft, observed bedding joint, dipping 60°, SILTSTONE bed, 5" thick, brown.									0		
02.20	341	- XM	Pressuremeter testing at EL. 101.5 to 95.0 ft.				-					\$<		
100.20	342											0×0		
98.20	343											××		
50.20	345	: :::										\Diamond		
96.20	346			0.50					2			000		
94.20	347		At EL. 95.7 ft, becomes soft to moderately soft.	C50			20	20				\$<		
34.20	349			C51			94	94				0×0		
92.20	350	7	SEDIMENTARY ROCK, Interbedded (SILTSTONE and fine SANDSTONE).	331			.,	×.7	10			×× ×		
90.20	351		At EL. 91.2 ft, observed bedding joint, dipping 50°, fault dipping 78°, very tight with paper thin clay lining, unknown offset.											
30.20	353	0001	At EL. 90.2 ft, observed bedding joint, dipping 60°, local siltstone rip-ups.									\ \ \		
88.20	354	1.2	At EL. 88.7 ft, becomes bedding joint, dipping 55°.									>×<	SD	
	355	1)	(continued)							1_		IV	ı	
			Department of Transportation	R	EPOR BOR	TTIT	RF	co	RD					R-09-Z1B
	L	_/	Division of Engineering Services Geotechnical Services	D	IST.)7	C	LA	1TY		710		POS D/	STMILE D	EA 07-187900
			Office of Geotechnical Design - South		ROJE SR-7	10 T	R BF	NE	E NA	ME ECHN	NICA	LST		
			The state of the last containing to asked	В	RIDGE N/A	NUI	MBE	R		Jan			DATE 4-7	-09 SHEET

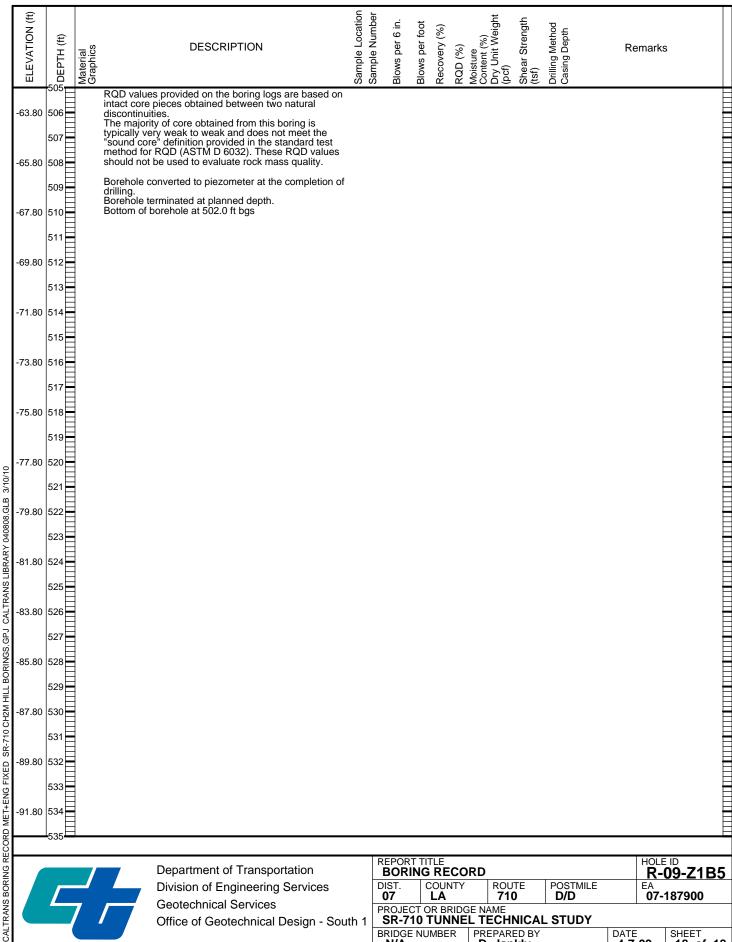
ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION		Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Cassing Deptid	emarks
86.20	355 356	24	SEDIMENTARY ROCK, (SANDSTONE), thickly to very thickly bedded, gray, fresh, soft to moderately soft, slightly fractured, fine to medium grained.	C51			94	94				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	-	nd of log regarding
	357 358	100		C52			80	80				0×0	VOC = 4.9 pp	m
	359 360											\ \ \ \ \ \		
80.20	361 362	/.	At EL. 81.7 ft, becomes well cemented, irregular, undulatory contact below. At EL. 81.1 ft, observed joint, dipping 60°, black lining, rough. SEDIMENTARY ROCK, Interbedded (SILTSTONE and	C53			92	77				× 0 ×		
78.20	363 364	Ž	fine SANDSTONE), highly sheared, bedding joint dipping 60°. At EL. 79.2 ft, observed bedding joint, dipping 70°, material is folded and faulted, unknown offset, tight, tight massive, moderately fractured									20%		
76.20	365 366	-/-:	SEDIMENTARY ROCK, (SANDSTONE), thickly to very thickly bedded, gray, fresh, soft to moderately soft, slightly fractured, fine to medium grained, shear dipping 30 to 40°, faint shears, tight silty lining. At EL. 76.7 ft, observed shear, dipping 70°, faint									\ \ \ \ \		n
	367 368		shear 1/8-inch thick brown silty clay lining, within soft, very moist sandstone. At EL. 75.6 ft, observed shear, dipping 70 to 30°.										VOC = 2.0 pp	m
	369 370	1:1	SEDIMENTARY ROCK, SANDY (SILTSTONE) sequence, soft, moist, massive. At EL. 72.5 ft, observed bedding joint, dipping 60°, on 3/4-inch thick SILTSTONE bed.	C54			94	88	9	101		0×0	UU	
	371 372		SEDIMENTARY ROCK, Silty fine (SANDSTONE), gray, very weak, moderately soft. At EL. 70.7 ft, grades to fine to medium grained SANDSTONE, moderately soft to moderately hard.									\ \ \ \ \ \		
68.20	373 374 375		At EL. 68.0 ft, observed shear, dipping 45 to 20°, 1/8" thick silty lining.									XOXOX		
66.20	376 377	*	At EL. 66.0 ft, observed 3-inch thick cemented SANDSTONE bed, hard.	C55			100	100				0%0		
	378 379	(At EL. 65.2 ft, observed bedding joint, dipping 55°, 0.3' thick SILTSTONE bed, 1.5" thick, 4" long rip-up clast below. At EL. 64.9 ft, grades to fine grained SANDSTONE, moist, moderately soft to moderately hard.	C55			100	100				X 0 X		
	380	1	At EL. 62.8 ft, observed shear, dipping 50 to 20°, tight silty lining.									$\wedge \times \Diamond \times \Diamond$	VOC = 3.9 pp	
60.20	382		At EL. 60.8 ft, observed bedding joint, dipping 60°, on 1-inch thick SILTSTONE bed, fractured, consistent sandstone above and below. At EL. 60.2 ft, observed bedding joint, dipping 60°, 1.5-inch thick laminated SILTSTONE bed, undulatory.									X0X0		
58.20	384	1.0		C56			53	47				0×0		
	385	and Kil	(continued)											
	L	_/	Department of Transportation Division of Engineering Services Geotechnical Services	Di O	EPOR BOR IST. D7 ROJE	ING	RE OUN LA	ITY		710			STMILE /D	R-09-Z1B
		/	Office of Geotechnical Design - South	1 5	SR-7	10 1	UN	NE	L TE	CHN		L ST	TUDY	e lane-
		-		В	RIDGE N/A	= NUI	MRF	K	D.	Jan	kly kly		DAT 4-7	F SHEET 7-09 13 of 1

ELEVATION (ft)	PDEPTH (ft)	Material Graphics	DESCRIPTION To all possible pocation and possible pocation and possible pocation and possible pocation and possible pocation and possible pocation and possible pocation and possible pocation and possible possib	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	emarks
56.20	386	1	total reverse offset, paper thin black clay lining, adjacent bedding dipping 60°. At EL. 56.7 ft, observed bedding joint, dipping 50°, SANDSTONE bed truncated by fault above, beds are	C56			53	47			<0×<	See note at end RQD.	d of log regarding
54.20	387	X	locally folded to EL. 56.0 ft. At EL. 55.2 ft, observed bedding joint, dipping 50°, 1/8" thick SILTSTONE bed truncated by fault dipping 50 degrees. Fault is tight with paper thin clay lining. Locally intensely fractured.								0%0		
52.20	390										$\Diamond \times \Diamond \times$		
50.20	391 392	'.	Pressuremeter Testing at EL. 50.0 to 43.0 ft.								XOX		
48.20	393 394										×0×0		
46.20	395 396										$\times 0 \times 0$		
14.20	397								31		<0×0×		
12.20	400	1	SEDIMENTARY ROCK, (SANDSTONE), fine to coarse grained, thickly to very thickly bedded, gray, fresh, soft to moderately soft, slightly fractured, shear dipping 55 to 60°, tight, light gray silty lining. At EL. 42.2 ft, observed bedding joint, dipping 65 to 55°, on dark gray SANDSTONE lamination.	C57			100	90			X0X0X		
40.20	402		At EL. 40.3 ft, observed shear, dipping 20°, tight, light gray silty lining.								$\langle \Diamond \times \Diamond \rangle$		
	404 405	7									$\langle \Diamond \times \Diamond \rangle$	VOC = 0.8 ppm	
86.20	406 407	4	At EL. 36.7 ft, becomes moderately soft to moderately hard, shear, dipping 60 to 20°, tight, light gray silty lining. At EL. 35.2 ft, becomes soft.					ı			$\Diamond \times \Diamond \rangle$, , , , , , , , , , , , , , , , , , , ,	
	408 409	1	At EL. 34.2 ft, becomes weak, moderately hard. At EL. 34.0 ft, observed bedding joint, dipping 55°, 3" thick sequence of interbedded SII TSTONE and	C58			100	100	5 144		$\Diamond X \Diamond X$	UC	
	410 411	/	SANDSTONE, faulted, intensely fractured. At EL. 33.0 ft, observed some Siltstone rip-ups. At EL. 32.2 ft, observed shear, dipping 30°, faint, light gray 1/16-inch to 1/8-inch thick silty lining. At EL. 31.2 ft, observed shear, dipping 30°, faint, light				- 5 %		1		>X >X >X >X		
	412 413	. 5	gray 1/16-inch to 1/8-inch thick silty lining. At EL. 30.2 ft, observed shear, dipping 70 to 20°, numerous shears, faint, light gray 1/16-inch to 1/8-inch thick silty lining.								$\times 0 \times 0$		
	414 415	k	At EL. 28.2 ft, observed shear, dipping 70 to 40°, unknown offset, numerous SILTSTONE fragments,								$\Diamond \times \Diamond$	7	-4
			(continued)	l p	EPOR	יוד די	TE						HOLEID
	L	_/	Department of Transportation Division of Engineering Services Geotechnical Services	D	BOR IST. 07	ING	RE OUN LA	ITY	710			STMILE	R-09-Z1B EA 07-187900
			Office of Geotechnical Design - South						E NAME L TECH I	NICA	LS	TUDY	
			The state of the s		RIDGE N/A	NU	MBE	R	PREPAR D. Jan	ED BY		DATE 4-7	-09 SHEET

ELEVATION (ft)	SDEPTH (ft)	Material Graphics		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight	Shear Strength (tsf)	Drilling Method	Casing	emarks
26.20	416	\mathcal{I}	juxtaposed to massive SANDSTONE. At EL. 26.9 ft, observed shear, dipping 20°, 1/8-inch to 1/4-inch thick silty lining. SANDSTONE is dark bluish gray, fine grained, moist. At EL. 26.4 ft, observed shear, dipping 20°, 1/8-inch to 1/4-inch thick silty lining.	C58			100	100			>X </td <td>See note at end RQD.</td> <td>d of log regarding</td>	See note at end RQD.	d of log regarding
24.20	418		At EL. 25.6 ft, observed shear, dipping 20°, 1/8-inch to 1/4-inch thick silty lining. At EL. 25.2 ft, observed shear, dipping 60 to 45°, 1/8-inch to 1/4-inch thick silty lining.				10				×0×		
22.20	420	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	to 1/4-inch thick silty lining. SANDSTONE is dark bluish gray, fine grained, moist. At EL. 26.4 ft, observed shear, dipping 20°, 1/8-inch to 1/4-inch thick silty lining. At EL. 25.6 ft, observed shear, dipping 20°, 1/8-inch to 1/4-inch thick silty lining. At EL. 25.2 ft, observed shear, dipping 60 to 45°, 1/8-inch to 1/4-inch thick silty lining. At EL. 24.7 ft, observed shear, dipping 25°, 1/8-inch to 1/4-inch thick silty lining. At EL. 24.5 ft, observed shear, dipping 30°, 1/8-inch to 1/4-inch thick silty lining. At EL. 23.8 ft, observed shear, dipping 20°, 1/8-inch to 1/4-inch thick silty lining.	C59			94	80			0×0	VOC = 8.7 ppm	
20.20	421		At EL. 23.6 ft, observed shear, dipping 20°, 1/8-inch to 1/4-inch thick silty lining. At EL. 23.6 ft, observed shear, dipping 20°, 1/8-inch to 1/4-inch thick silty lining. At EL. 22.2 ft, becomes SANDSTONE, fine to medium grained, with some interbedded								XOX		
18.20	423		SILTSTONE, massive to thickly bedded, dark bluish gray, fresh, moderately soft, moist to saturated.								0×0>		
16.20	425										(0X0		
	427										×0×		
14.20	428		At EL. 12.9 ft, observed shear, dipping 20°, very faint.	C60			100	100			0×0	VOC = 10 4 pp	n
12.20	430		At EL. 12.2 ft, observed fresh, moderately soft.								×0×<		
10.20	432		At EL. 10.2 ft, observed bedding joint, dipping 65°, on 2-inch thick SILTSTONE bed, SANDSTONE to 1.2' below is soft, tightly folded, soft sediment deformation.								X0X		
8.20	434	-(0)	delomation.								$\Diamond \times \Diamond$	VOC = 8.8 ppm	
6.20	436		At EL. 6.7 ft, observed shear, dipping 20°, faint, tight gray silty lining.								\ \ \ \ \ \ \	VOO = 0.0 pp.	
4.20	438			C61	(97	90			XOX	PA	
2.20	440		At EL. 2.7 ft, observed bedding joint, dipping 75 to 70°, on SANDSTONE lamination with abundant black grains.								\$\$X\$X		
0.20	442	1	At EL =0.3 ft observed hedding joint dipping 70° on								0×0		
-1.80	444	1	At EL0.3 ft, observed bedding joint, dipping 70°, on ¼-inch thick SILTSTONE bed, offset 1/2" normally by 15 degree dipping shear. At EL1.6 ft, observed bedding joint, dipping 65°, Siltstone rip-up clasts to 1-inch thick, some fine SANDSTONE laminations below are depositionally								X0X0		
	445	X X	(continued)								1~		
1	_	_/	Department of Transportation Division of Engineering Services Geotechnical Services	0	BOR BOR DIST. 07	ING	RE OUN LA	YTY	RO 71	UTE 10	PC	OSTMILE D/D	HOLE ID R-09-Z1E EA 07-187900
			Office of Geotechnical Design - South	1 1 L	SR-7	10 7	run	INE	L TECH		LS		1
			A Section of Sections of Section 2		RIDG N/A				PREPAR D. Ja	RED BY		DATE 4-7	-09 SHEE

ELEVATION (ft)	94 90 90 90 90 90	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing	emarks
-3.80	446	\	At EL2.8 ft, becomes massive, dark bluish gray, fresh, moderately soft, moist to saturated, scarce SILTSTONE beds	C61			97	90			$\times \diamond \times \checkmark$	See note at end RQD.	l of log regarding
-5.80	448	\	randomly oriented. At EL4.3 ft, observed bedding joint, dipping 70°, 2-inch thick SILTSTONE bed. At EL5.8 ft, grades to SILTY fine SANDSTONE, as above.	C62			100	100			$\times 0 \times 0$		
-7.80	450	X									$\Diamond \times \Diamond$		
-9.80	452		At EL8.6 ft, observed bedding joint, dipping 50°, ½-inch to 1-inch thick SILTSTONE bed, offset ¾-inch by two shears which are very faint, no lining, dipping 40 and 50 degrees								$\Diamond X \Diamond X \Diamond$	VOC = 3.2 ppm	
-11.80	E		PTS: Coarse-grained granitic arkosic SANDSTONE with crystal and rock fragments up to 3mm in size, in a								X0X		
-13.80	E		with crystal and rock fragments up to 3mm in size, in a predominantly calcite matrix (50%). At EL12.8 ft, observed 7" thick SANDSTONE bed, moderately hard. At EL13.5 ft, observed bedding joint, dipping 60°, on siltstone bed at base of cemented SANDSTONE								\ \ \ \	PTS	
-15.80	457 458		above. At EL14.4 ft, observed shear, dipping 25°, silty lining, very faint, massive SANDSTONE above and below.	C63			100	100			\$\$\$\$		
-17.80	459 460		At EL16.8 ft, observed shear, dipping 25°, silty lining, very faint, tight, 1/16-inch to 1/8-inch thick. At EL17.8 ft, observed possible bedding plane (dipping 60 degrees) on contact from fine to medium								$\Diamond X \Diamond$		
-19.80	E		(dipping 60 degrees) on contact from fine to medium grained SANDSTONE above to fine SANDSTONE below, faint. At EL18.8 ft, observed shear, dipping 25°, silty lining, very faint, tight, 1/16-inch to 1/8-inch thick. At EL20.2 ft, observed shear, dipping 15°, silty					15			$\Diamond X \Diamond X$	VOC = 1.3 ppm	
-21.80	E		lining, very faint, tight, 1/16-inch to 1/8-inch thick.	C64			50	10			X0X0		
-23.80	466	/	At EL23.8 ft, observed shear, dipping 55°, silty lining, very faint, tight, 1/8-inch thick, continuing massive SANDSTONE above and below.								XOX		
-25.80			massive SANDSTONE above and below.								\ \ \ \		
-27.80	E										0X0X		
-29.80	E										$\Diamond X \Diamond$		
-31.80	473 474			C65			100	90			$\Diamond X \Diamond X$	VOC = 7.8 ppm	
	475	174 ((continued)								1		
	_		Department of Transportation Division of Engineering Services	D	EPOR BOR IST.	ING	RE COUN		RD ROU 710	TE 0		DSTMILE D/D	HOLE ID R-09-Z1E EA 07-187900
	-	7	Geotechnical Services Office of Geotechnical Design - Sout	P	ROJE	CTC	R B	RIDG	E NAME L TECH	5.45			
			Office of Geolechnical Design - South		RIDGI N/A				PREPAR D. Jan	ED BY		DATE 4-7-	SHEET 16 of

ELEVATION (ft)	SDEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	-	Casing	narks
-33.80	476			C65			100	90			$\langle \Diamond \times \langle$	See note at end of RQD.	of log regarding
-35.80	477 478								12 119		$\Diamond \times \Diamond$	PA	
-37.80	479										× 4×		
	481										$\times \Diamond \times \Diamond$		
-41.80	483	1	At EL40.8 ft, observed shear, dipping 70 to 25°, faint, up to 1/8" thick clay lining. At EL41.1 ft, observed shear, dipping 40°, faint, up to 1/8" thick clay lining.	C66			97	97			X0X0	VOC = 2.3 ppm	
-43.80	485 486	1	At EL41.5 ft, observed shear, dipping 10°, faint, up to 1/8" thick clay lining. At EL41.7 ft, observed shear, dipping 35°, faint, up to 1/8" thick clay lining. At EL42.3 ft, observed possible bedding (dipping 65 degrees) on black sand bed which pinches out.								X0X0		
-45.80	E	\sim	At EL42.6 ft, observed shear, dipping 30°, faint, up to 1/8" thick clay lining. At EL42.9 ft, observed shear, dipping 20°, faint, up to 1/8" thick clay lining. At EL43.2 ft observed shear dipping 25° faint up								\ \ \ \ \		
-47.80	489 490 491		to 1/8" thick clay lining. At EL43.7 ft, observed shear, dipping 20 to 0°, faint, up to 1/8" thick clay lining. At EL43.9 ft, observed shear, dipping 30°, faint, up to 1/8" thick clay lining. At EL44.3 ft, observed shear, dipping 30°, faint, up							ij	<0X0X		
-49.80			to 1/8" thick clay lining. Unit grades to Silty fine SANDSTONE, gray, massive, soft, moist. At EL45.3 ft, observed shear, dipping 50°, faint, up to 1/8" thick clay lining. At EL46.1 ft, observed shear, dipping 40°, faint, up								$\Diamond \times \Diamond$		
-51.80			to 1/8" thick clay lining. At EL46.3 ft, observed fault, dipping 55°, clay lined to 1/16" thick, 1" reverse offset of 1" thick SILTSTONE bed dipping 50°. At EL48.8 ft, observed bedding joint, dipping 55°.	C67			56	50			$\Diamond X \Diamond X \Diamond$	VOC = 1.5 ppm	
-53.80		2000	on %-inch thick laminated SILTSTONE and fine SANDSTONE bed. At EL49.1 ft, observed shear, dipping 50°, 1/4" to 1/8" thick silty clay lining. At EL50.8 ft, becomes very soft.								×0×<		
-55.80	E	1	At EL54.8 ft, observed 3.5" thick SANDSTONE bed, hard. Below SANDSTONE is greenish gray to gray, very soft to soft, moist to very moist. At EL55.8 ft, observed numerous 1/8" to 1/4" thick shears with silty lining, dipping from 30 to 70								>X >X >X >X		
-57.80		4	At EL58.4 ft, observed numerous 1/8" to 1/4" thick shears with silty lining, dipping from 30 to 65 degrees. At EL58.4 ft, observed shear, dipping 60°, 3/8" thick							. 17	X0X		
-59.80		3.75	silty lining.								\Diamond	VOC = 0.9 ppm	
-61.80	503 504												
	505		(continued)										
	_		Department of Transportation Division of Engineering Services	10	EPOR BOR	ING	RE		RD ROL	ITE	PO	STMILE E	OLE ID R-09-Z1B5
	L	7	Geotechnical Services	P	07 ROJE	СТО	R BF	RIDG	71 E NAME	0	D	/D	07-187900
			Office of Geotechnical Design - South	11 3		10 1	UN	NE	L TECH PREPAR		L ST	TUDY DATE	SHEET
					N/A	.,,,		, 3"	D. Jar	ikly		4-7-0	9 17 of



BRIDGE NUMBER

N/A

PREPARED BY

D. Jankly

DATE **4-7-09**

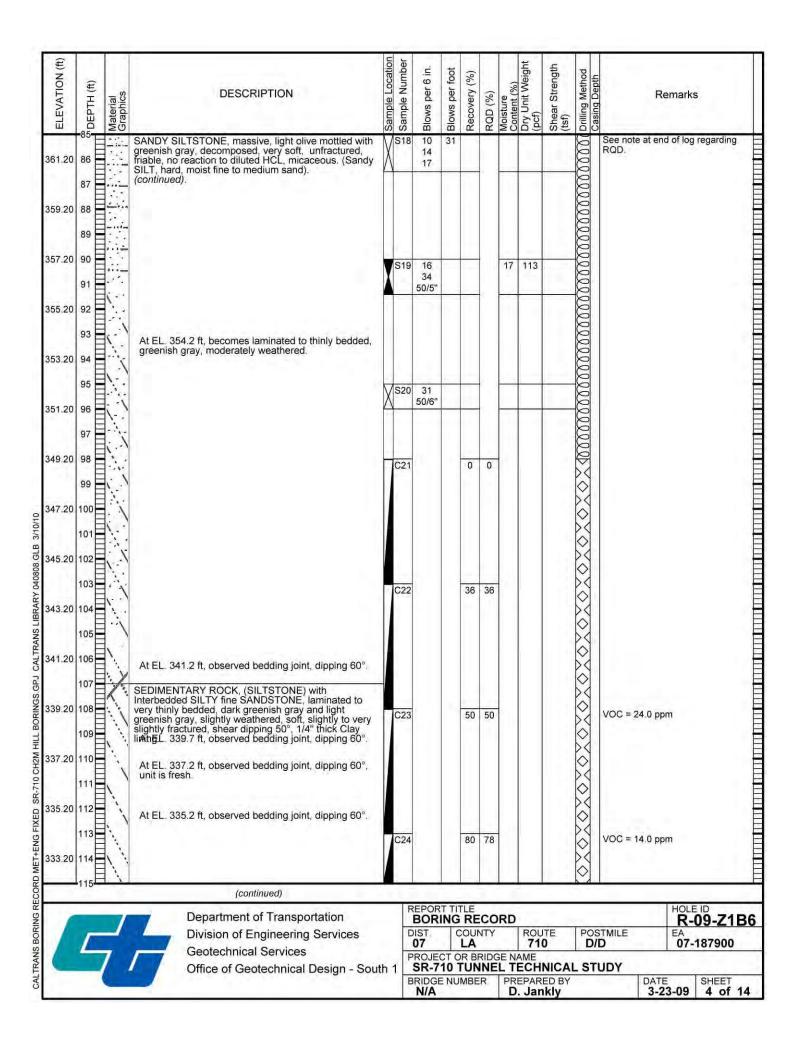
SHEET

18 of 18

R.Ch	avez	z/D.Ja	BEGIN ankly1-30- ACTOR			0.722	4" / 1	18° 1	11' 2	25.9	506	" N					9- Z1 1		_
Casc	ade	Drilli	ing Inc.		' Lt :	Sta (N							opaz	St.))	447.2	ft NA	VD 88	
	ry W	Ash YPE(S)) AND SIZE(S	S) (ID) Q core (3.2")	SPT HA	RIG SOII RE MMER T matic I	YPE		40	lb. 3	80 ir	nch d	drop			6 in		AMETER CIENCY, E	Ri
BOREH	IOLE I	BACKF	FILL AND CC			IDWATE		RING			AF	TER				TOTAL 400. 5		OF BORIN	IG
ELEVATION (ft)	DEPTH (ft)	Material Graphics	otuniou oi	DESCRIPTION		Sample Location	_	Blows per foot	Recovery (%)	RQD (%)	_	Dry Unit Weight (pcf)		Drilling Method	Т		Remark	ss	
445.20 443.20	1 2 3 4		SANDY SIL	material, 6" thick. T (ML); medium stiff; dark b AVEL; low to medium plast	rown; moist; icity fines	DO	1								This in ac Soil and 200 A.1 Sum	ccordance & Rock Presenta 7), excep of the Fin mary Re hnical St nty, Cal	e with the Logging, ation Mar of as note that Geote port, SR	as prepare e Caltrans Classificat nual (June, d in Apper echnical -710 Tunn Angeles ated April,	ion , ndi
441.20	5 6 7		Medium stif	f.		S0	2 3 3 3 3	6							Han	d Auger	to 7'		
	8 9 10		CLAYEY S. moist; fine	AND (SC); medium dense; c SAND; medium plasticity fine	olive yellow;	So	10	24						<u> </u>					
435.20	12						14							DODDODDO					
431.20	15 16		No Recove	ry.		V SO	4 4 6 6	12						000000000					
	18 19		SANDV SII	T (MI): yery stiff: brown mo	ttled with olive	e \\S0	5 5	21			21	109		DANDONDO					
425.20	21 22 23		gray; moist	.T (ML); very stiff; brown mo fine SAND; low plasticity fir	nes.		9 12					109		DODDDDDDD					
423.20				(continued)										00000					
		_/		Department of Transpo Division of Engineering Geotechnical Services			REPO BOF DIST. 07	RING	RE COUI LA	VTY		ROU 71 (PO D	STMIL D /D	.E	EA	E ID • 09-Z1 •187900	
				Office of Geotechnical	Design - Sc	outh 1	SR-	710	TUN	INE	L TI	ECH	NICA ED BY	L Sī	ΓUDΥ	/ DA	TE	SHEET	_

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 Deput	Remarks
421.20	26 27		П	Dark brown; trace mica. SANDY SILT (ML) (continued).	X	S06	5 7 9	16						000000		
419.20														<u>danonanandanonananananananananananananan</u>		
417.20	30			Lean CLAY (CL); very stiff; dark brown mottled with olive gray; moist; trace mica.	Y	S07	8 14 14	28			21	109		monto	PI	
415.20	32													mm		
413.20	34 35			Hard.		S08	6	26						STREET		
411.20	36 37				X		10 16							SOSSOS		
409.20	38													200000		
407.20	40 41			SANDY; 30% fine SAND, 70% fines.	X	S09	9 19 23	42			19	112		mm	PA	
405.20	42															
403.20	44 45				M	S10	8 12	30								
401.20	46				Λ		18							MANA		
399.20	49															
397.20	51				X	S11	14 23 25	48			23	106		Manne		
395.20 393.20	53													<u>sasasasasasasasasasasasasasasasasasasa</u>		
030.20	55			(continued)										<u> </u>		
	L	7		Department of Transportation Division of Engineering Services Geotechnical Services			REPOR BOR DIST. 07	С	OUN LA	NTY		ROU 71 0	0	D,	STMILE /D	HOLE ID R-09-Z1B6 EA 07-187900
				Office of Geotechnical Design - Sout	h 1	1 E	SR-7 RIDGI N/A	10 T	MBE	NE R	PRE	PAR	NICA ED BY I kly	L ST	UDY	DATE SHEET 3-23-09 2 of 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
391.20	56		SILTY SAND (SM); dense; olive yellow; moist; fine SAND; low plasticity fines; trace mica.	\s\s\	2 9 14 17	31		4				000000		
389.20	58											<u> </u>		
387.20	60		SILTY CLAY with SAND (CL-ML); hard; olive yellow; moist; 23% fine SAND, 77% low plasticity fines, trace mica.	S1:	3 14 22 22	44			26	100	ī	MONTH	PA	
385.20	62 63										ī	000000		
383.20	64		SANDY SILT (ML); hard; olive yellow; moist; fine SAND; low plasticity fines; friable, no reaction to HCL	\/S14	1000	30					Ė	000000		
381.20	66		SAND; low plasticity fines; friable, no reaction to HCL solution.	X_	15 15			6 ()				000000		
379.20	68	111 	SEDIMENTARY ROCK: SANDY (SILTSTONE), massive, light olive mottled with greenish gray, decomposed, very soft, unfractured, friable, no reaction to HCL solution, micaceous, decreasingly									000000		
377.20	70 71		reaction to HCL solution, micaceous, decreasingly weathered with depth., (Sandy SILT, very stiff, moist fine to medium sand) [PUENTE FORMATION]	S1	5 9 19 22	41			23	106		Socood		
375.20	72											500000		
F - F W - 1 - F - 1	74 75	÷ ;		VS10	3 9 11	25			iii H					
	76 77			Λ_	14			9				100000		
	78						i i					1000000		
	81			S1*	7 12 22 31	53			23	103	Ţ	MONOR	PA	
	82 83 84											000000000000000000000000000000000000000		
	85		(continued)									00		
	_	_/	Department of Transportation Division of Engineering Services Geotechnical Services	7	BOF DIST. 07	C	LA	YTV		ROU 710	TE)	D	OSTMILE D/D	HOLE ID R-09-Z1B EA 07-187900
			Office of Geotechnical Design - Sou	uth 1	PROJE SR-7 BRIDG N/A	10 TENU	R BE FUN MBE	RIDG INE	L TE	ME CHI	NICAI	_ 57	TUDY	ATE SHEET 3-23-09 3 of 14



ELEVATION (ft)	р Б Б Б Б Б Б Б Б Б Б Б Б Б Б Б Б Б Б Б	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 Base September Septemb	marks
331.20		1.	At EL. 332.2 ft, observed bedding plane separation, dipping 45°, locally bedding becomes thinly bedded to laminated. Interbedded SILTSTONE, parting along bedding, strong reaction to diluted HCL.	C24			80	78			$\times \Diamond \times \Diamond$	See note at end RQD.	of log regarding
329.20	117	11	At EL. 330.2 ft, observed bedding joint, dipping 45°.	C25			65	65			♦ × ♦	VOC = 38.8 ppr	n
327.20	119		At EL. 327.4 ft, observed bedding joint, dipping 45°.								×0×<		
325.20	121	7	At EL. 326.7 ft, observed bedding joint, dipping 70°. SEDIMENTARY ROCK, (Siliceous SILTSTONE), moderately bedded, light greenish gray, fresh, hard, healed short and discontinuous fractures, no reaction								X0X	4 7 3 3 4 7	
323.20	123	1	to diluted HCL, bedding plane separation dipping 45°. SEDIMENTARY ROCK, (SILTSTONE) with Interbedded SILTY SANDSTONE, laminated to very thinly bedded, dark greenish gray and light greenish gray, fresh, soft to moderately soft, very slightly	C26			87	63			0×0>	VOC = 32.2 ppr	n
321.20	125	1,	fractured to unfractured. As 122.2' with very thin interbeds of black SHALE;, joint dipping 90°, slightly open, smooth, silt infill.								$\Diamond \times \Diamond$		
319.20	127	1	At EL. 319.7 ft, observed bedding joint, dipping 55°.	C27			83	83			X0X0	VOC = 2.5 ppm	m
317.20	129	X	At EL. 317.0 ft. observed joint, dipping 35°								$\Diamond \times \Diamond \times$		
315.20	131	11	At EL. 317.0 ft, observed joint, dipping 35°. At EL. 316.7 ft, observed bedding joint, dipping 50°.								\times	PA	
313.20	133	7	At EL. 314.7 ft, observed bedding joint, dipping 55°. At EL. 313.7 ft, observed joint, dipping 20°.	C28			100	100			$\times \Diamond \times \Diamond$		
311.20		1	At EL. 312.2 ft, observed joint, dipping 30°. At EL. 311.7 ft, observed bedding joint, dipping 60°. At EL. 311.5 ft, observed joint, dipping 20°.								X0X0		
309.20		1	At EL. 308.9 ft, observed bedding joint, dipping 60°,	C29			100	100			$\times \Diamond \times \Diamond$		
307.20		A. C.	strong brown phosphatic nodule. At EL. 308.1 ft, observed bedding joint, dipping 60°, 5" thick, SILTY SANDSTONE interbed. At EL. 306.7 ft, observed bedding joint, dipping 60°, 1" thick SILTY SANDSTONE interbed.								\$\\ \\ \\ \\ \\ \		
305.20	E										$\Diamond \times \Diamond$		
303.20	143		At EL. 304.7 ft, observed bedding joint, dipping 60°, 10" thick SILTY SANDSTONE BED.	C30			100	93			>< < <		-40
	145	1	(continued)								1/1	1	
1	_		Department of Transportation Division of Engineering Services	D	EPOR BOR IST. 07	ING	RE OUN		RD ROU			OSTMILE D /D	HOLE ID R-09-Z1B6 EA 07-187900
			Geotechnical Services Office of Geotechnical Design - South	h 1	ROJE SR-7 RIDGI N/A	10 1	UN	NEI	E NAME TECHI PREPARI D. Jan	ED BY	LST	DATE	3-09 SHEET

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	Remarks
301.20	146 147		At EL. 302.3 ft, observed bedding joint, dipping 60°, 1" thick SILTY SANDSTONE bed, light greenish gray. SILTSTONE with Interbedded SILTY SANDSTONE, laminated to very thinly bedded, dark greenish gray and light greenish gray, fresh, soft to moderately soft, very slightly fractured to unfractured. Occasional thin	C30			100	93				>X	See note at end of log regarding RQD.
299.20	148	X	black SHALE beds. At EL. 301.0 ft, observed joint, dipping 30°, through 4" thick SILTY SANDSTONE bed. At EL. 300.1 ft, observed bedding joint, dipping 60°, 3" thick SILTY SANDSTONE bed.									XOX	
297.20	E	, ·	At EL. 299.7 ft, observed joint, dipping 35°. At EL. 298.2 ft, observed joint, dipping 30°, bedding dipping 60 degrees on 1" thick SILTY SANDSTONE bed.									OXO	
295.20	151 152 153		At EL. 296.6 ft, observed 1.5" thick SILTY SANDSTONE bed. At EL. 295.7 ft, observed bedding joint, dipping 60°, 3" thick SILTY SANDSTONE bed. At EL. 295.2 ft, observed bedding joint, dipping 60°, 1.5" thick SILTY SANDSTONE bed.	C31			86	80				X0X0X	VOC = 39.1 ppm
293.20	154	1, 1	At EL. 293.2 ft, observed bedding joint, dipping 50°.									♦ × ♦	
291.20	156 157	- \										\ \ \ \ \ \	
289.20	E	∃ ′ ∣	At EL. 289.9 ft, observed bedding joint, dipping 50°.									XOX	VOC = 33.9 ppm
287.20	159 160 161	(1)	At EL. 288.4 ft, observed 1/2" thick SILTY SANDSTONE bed. At EL. 287.9 ft, observed 1" thick SILTY SANDSTONE bed. At EL. 286.8 ft, observed joint, dipping 80 to 45°, two joints.									X0X	
285.20	162 163	:	At EL. 286.2 ft, observed bedding joint, dipping 50°.									♦ × ♦	
283.20	10		At EL. 283.8 ft, observed 1.5" thick SILTY SANDSTONE bed. At EL. 283.0 ft, observed 1.5" thick SILTY SANDSTONE bed.	C32			100	100				\$ \ \ \ \	VOC = 29.4 ppm
281.20	E		At EL. 282.2 ft, observed bedding joint, dipping 60°, 3" thick SILTY SANDSTONE bed. At EL. 281.4 ft, observed 1" thick SILTY SANDSTONE bed.									X0X0	
279.20	168		At EL. 278.8 ft, observed 1" thick SILTY									XOX	
277.20	169 170	1	SANDSTONE bed. At EL. 278,2 ft, observed bedding joint, dipping 60°. At EL. 277.2 ft, observed 1" thick SILTY SANDSTONE bed.									OXOX.	
275.20	E	/ /		C33			100	100				♦X♦	VOC =5.3 ppm
273.20	173 174	1										0X0	
	175	3.	(continued)										
1	_	_/	Department of Transportation Division of Engineering Services	D	EPOR BOR IST.	ING	RE OUN	_	RD	ROU 71		POS	HOLE ID R-09-Z1B6 STMILE EA 07-187900
	-	7	Geotechnical Services Office of Geotechnical Design - Sout	P	ROJE	стс	R BF	NF	EN	AME	NICA		
			Office of Geolechinical Design - Sout	В	RIDGI N/A				PR		ED BY	_ 01	DATE SHEET 3-23-09 6 of 14

ELEVATION (ft)	2,DEPTH (ft)	Material Graphics		Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing	marks	
271.20		11	SILTSTONE with Interbedded SILTY SANDSTONE, laminated to very thinly bedded, dark greenish gray and light greenish gray, fresh, soft to moderately soft, very slightly fractured to unfractured. Occasional thin black SHALE beds.	33			100					>X	See note at end RQD.	of log regarding	
269.20	178 179		At EL. 269.2 ft, observed bedding joint, dipping 50°.	34			100	100	10			>X >X >X >X			
267.20	180	, ,	At EL. 266.9 ft, observed bedding joint, dipping 50°.									XOX			
265.20	182		At EL. 264.7 ft, observed 4" thick SILTY SANDSTONE bed.									$\Diamond X \Diamond$			
263.20	184	1	At EL. 263.7 ft, observed 1" thick SILTY SANDSTONE bed.									X 0 X 0			
261.20)	At EL. 262.3 ft, observed bedding joint, dipping 50°. At EL. 260.8 ft, observed joint, dipping 45°.									X \ \			
259.20	188		At EL. 259.2 ft, observed bedding joint, dipping 50°.	35			100	100				$\times \Diamond \times \Diamond$			
257.20	194	1.										$\Diamond \times \Diamond$			
255.20		1.										$\Diamond X \Diamond$			
253.20												X			
251.20	195	1	At EL. 251.8 ft, observed bedding joint, dipping 50°.									X0X	VOC = 32.4 ppr	n	
249.20		1	At EL. 249.7 ft, observed bedding joint, dipping 50°. Pressuremeter testing at 198' to 203.5'.									\$\\ \\ \\ \\ \			
247.20												♦ × ♦ >			
245.20		11										$\Diamond X \Diamond$			
243.20	203	1	At EL. 243.7 ft, observed bedding joint, dipping 50°. Very weak.	36			90	75	12	113		0X0X	uc		
	205		(continued)									1 1	t .		•
	_	_/	Department of Transportation Division of Engineering Services Geotechnical Services	DI	BOR IST.	ING	RE OUN LA	YTY		ROU ⁻ 710		D	STMILE /D	HOLE ID R-09-Z1E EA 07-187900	
		/	Office of Geotechnical Design - South 1	PF	ROJE	10 T	R BF	NE	E NA	CH	NICAI	LST	TUDY		
		4	A NEW ALKSON, AND AND A STATE OF THE STATE O	BI	RIDGE N/A				PRE	Jan	D BY		3-2:	3-09 SHEET 7 of 1	,

ELEVATION (ft)	SOEPTH (ft)	Material Graphics		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%) Dry Unit Weight (ocf)	Shear Strength (tsf)	Drilling Method	Rema		
241.20			SILTSTONE with Interbedded SILTY SANDSTONE, laminated to very thinly bedded, dark greenish gray and light greenish gray, fresh, soft to moderately soft, very slightly fractured to unfractured. Occasional thin black SHALE beds.	C36			90	75			0×0×<	See note at end of RQD.	og regarding	
239.20		',									XQX			The state of the s
237.20	210	1	At EL. 237.7 ft, observed bedding joint, dipping 50°.								>×			
235.20	211		At EL. 236.7 ft, observed joint, dipping 70°.								XOX			
233.20	213			C37			100	95			0×0			
231.20	215	X									X0X0			
229.20	217	P.,	At EL. 231.2 ft, observed shear, dipping 90 to 75°, 1-inch wide sheared zone, 1/8-inch thick clay lining in center, faintly polished 1/16-inch to 1/4-inch offset. Consistent bedding dipping 50 degrees.								\$X\$X\$			
227.20	219	/	At EL. 227.2 ft, observed joint, dipping 70°.								X0X0X			
225.20			At EL. 225.2 ft, observed bedding joint, dipping 45°.	C38			95	90			XOXO			
223.20	225		At EL. 221.7 ft, observed bedding joint, dipping 40°.								0X0X0			
ij	227	19%	At EL. 220.2 ft, observed 2" thick bed with abundant soft sediment deformation.								\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\			
217.20		11 11									XOXOX			
215.20	231			C39			93	93	90		$\langle \phi \times \phi \rangle$			
213.20		1	At EL. 214.2 ft, observed bedding joint, dipping 40°. At EL. 213.7 ft, with local interbedded DIATOMACEOUS SILTSTONE beds less than 1/8-inch thick.							0-	$\Diamond X \Diamond$			A STATE OF THE PERSON
	200		(continued)							ī				
1	_	_/	Department of Transportation Division of Engineering Services Geotechnical Services	D	BOR IST.	ING	RE OUN LA	YTY	71	JTE 0	PC	STMILE EA	R-09-Z1B 7-187900	6
		/	Office of Geotechnical Design - South	1 1 P	ROJE SR-7	CT O	R BF	NE	E NAME L TECH	INICA	LS	rudy		
			January States and Sta		RIDG N/A				PREPAR D. Ja	RED BY		DATE 3-23-0	9 8 of 1	_

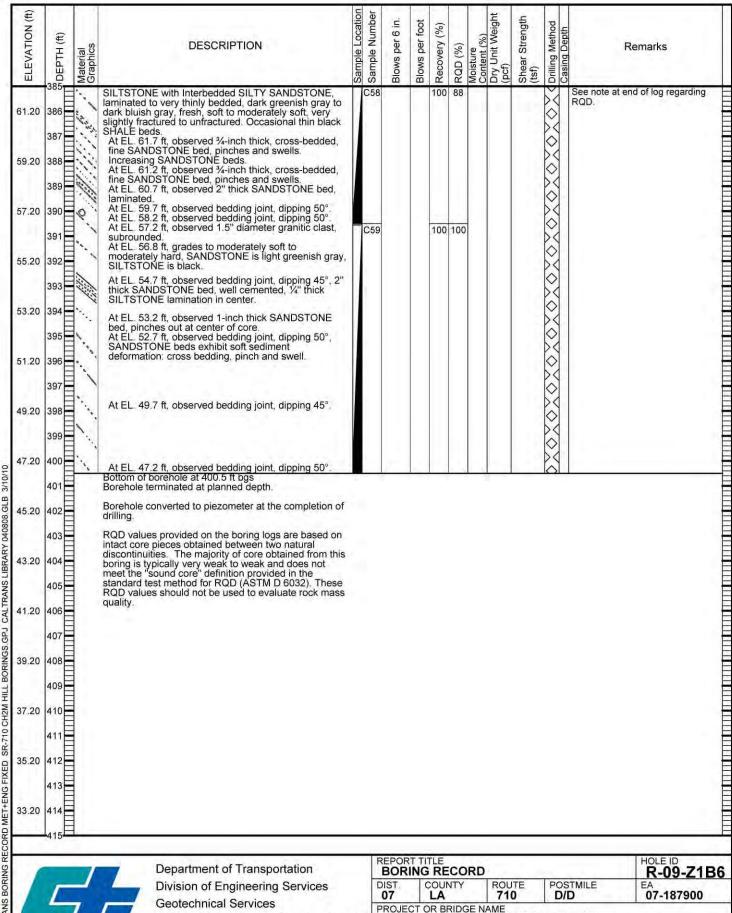
ELEVATION (ft)	SDEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	200	Moisture Content (%)	(pcf)	(tsf)	Drilling Method		Remarks	
211.20	236	1	At EL. 213.0 ft, observed bedding joint, dipping 45°. SILTSTONE with Interbedded SILTY SANDSTONE, laminated to very thinly bedded, dark greenish gray and light greenish gray, fresh, soft to moderately soft, very slightly fractured to unfractured. Occasional thin black SHALE beds.	C39			93	93				× 0 × 0	RQD.	end of log regarding	
209.20	in		black SHALE beds. Very weak. Very weak.							111		♦ × ♦	UC, SD		
207.20	I E	1.	At EL. 208.0 ft, observed possible charcoal fleck, 1/8" dia. At EL. 207.2 ft, observed bedding joint, dipping 50°.									×			
205.20	242		Pressuremeter testing at 242' to 247'.									× 0 × 0			
203.20												×			
201.20												× 0 × 0			
199.20	248	,	At EL. 199.7 ft, observed phosphate nodule, occasional DIATOMACEOUS SILTSTONE beds up to 1/4-inch thick.	C40			100	92				× < ×			
197.20			At EL. 197.7 ft, observed bedding joint, dipping 45°.									0×0×			
195.20	- 1		At EL. 195.2 ft, observed bedding joint, dipping 45°.			l.		0.5				♦×♦×			
193.20	254	1	At EL. 193.2 ft, observed bedding joint, dipping 45°. At EL. 192.5 ft, observed 3-inch thick, weak, fine to	C41			100	95				0×0			
191.20	256	1	medium grained SANDSTONE sequence.									× 0 × 0			
189.20	258	1	At EL. 189.2 ft, observed bedding joint, dipping 40°.	l								0×0×			
187.20	260		At EL. 187.2 ft, observed bedding joint, dipping 45°.	ı								×			
185.20	262	. '	At EL. 184.7 ft, observed bedding joint, dipping 45°	C42			100	100	. 24			◇	SD		
183.20	264	1	At EL. 183.0 ft, observed bedding joint, dipping 45°.	C42			100	100				♦ ♦ ♦	30		
			(continued)	1.5	DEDA	OT T	TIF							LHOLETD	_
	L	_/	Department of Transportation Division of Engineering Services Geotechnical Services	C	BOF DIST. 07	RING	RECOU	YTV		ROUTE 710		PO:	STMILE /D	R-09-Z1E EA 07-187900	3
			Office of Geotechnical Design - Sout	h 1 _	SR-	710	TUN	INE	L TE	CHNI		ST		Te 150	
					N/A	E NU	MINE	-02		PAREC Jank l			3	TE SHEET 9 of 1	

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)			Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
181.20	266		SILTSTONE with Interbedded SILTY SANDSTONE, laminated to very thinly bedded, dark greenish gray to light greenish gray, fresh, soft to moderately soft, very slightly fractured to unfractured. Occasional thin black SHALE beds.	C42			100	100		122		$\Diamond X \Diamond X \Diamond$	See note a	at end of log regarding
179.20	268		Very weak. At EL. 179.2 ft, observed bedding joint, dipping 40°.	C43			100	100	12	122		\$X\$X		
177.20	270 271	٠.	At EL. 176.7 ft, observed bedding joint, dipping 45°.									0×0×<		
175.20	272	. '	As 125', SILTSTONE beds are dark greenish gray, SANDSTONE beds are dark bluish gray.	C44			98	96				X0X		
	275	.]	At EL. 172.2 ft, observed bedding joint, dipping 40°.					A				\$X\$X		
171.20	277	1										X0X		
169.20 167.20	279	,	At EL. 168.2 ft, observed bedding joint, dipping 40°. Very weak.						12	114		$\times \Diamond \times \Diamond$	υυ	
165.20	281		At EL. 165.2 ft, observed bedding joint, dipping 40°.									$\times 0 \times 0$		
163.20	283	i i	At EL. 163.5 ft, observed moderately fractured zone with 1/16" thick clay film along bedding. At EL. 163.2 ft, observed bedding joint, dipping 40°.	C45			98	98				$\Diamond X \Diamond X \Diamond$		
161.20	285											0×0×<		
159.20			At EL. 159.2 ft, observed bedding joint, dipping 40°.									$\Diamond \times \Diamond \times \Diamond$		
157.20	290	1	At EL. 156.7 ft, observed bedding joint, dipping 45°.									>X >X >X <		
155.20	292	<i>></i> .	At EL. 155.4 ft, observed shear, dipping 20°, 1/8-inch thick clay lining, tight, slightly polished, less than 1" offset.	C46			100	80				>X	SD	
153.20	294	`\	(continued)									$\Diamond \times \Diamond$		
				R	EPOF	RT TIT	TLE							HOLE ID
	L	_/ 7	Department of Transportation Division of Engineering Services Geotechnical Services	D	BOR IST 07 ROJE	CTO	LA OR BE	RIDG	SE NA	ROU' 710 ME		D	OSTMILE D/D	R-09-Z1B0
			Office of Geotechnical Design - Sout	th 1	SR-7	10 1	run	NE	L TE	CH		LS	TUDY	1 200
				В	RIDGI N/A	LINU	IVIDE	43	D.	Jan	D BY			3-23-09 SHEET 10 of 1

ELEVATION (ft)	SDEPTH (ft)	Material			Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method		Remarks
151.20	E	~	SILTSTONE with Interbedded SILTY SANDSTONE, laminated to very thinly bedded, dark greenish gray to dark bluish gray, fresh, soft to moderately soft, very slightly fractured to unfractured. Occasional thin black SHALE beds, shear dipping 10 to 20°, ½-inch offset along two bisecting shear planes, very tight.	C46			100	80				0×0×¢	See note at e RQD.	nd of log regarding
149.20	298 299											X 0 X		
147.20		<i> </i>	At EL. 148.2 ft, observed shear, dipping 90 to 70°, tight, 1/16-inch to 1/4-inch clay lining. Weak.						17	111		♦ × ♦	UC	
5.2 42	301		At EL. 146.2 ft, observed bedding joint, dipping 50°.									×		
145.20	302		At EL. 145.2 ft, observed bedding joint, dipping 50°, on ½-inch thick, very soft, plastic, CLAY seam.	C47			92	80	e			X 0 X		
143.20	304		At EL. 143.5 ft, observed shear, 20, tight, less than 1/16-inch clay lining, less than 1-inch offset.									\$		
141.20	305 306		At EL. 142.2 ft, observed bedding joint, dipping 45°.									♦ × ♦		
П	307	`.										×		
139.20	308 309	- 1	At EL. 139.2 ft, observed bedding joint, dipping 40°, Shear also observed, tight, less than 1/16-inch clay lining, less than 1-inch offset. Very weak.						15	111		× 6×	UU, CR	
137.20	1111		At EL. 137.7 ft, observed bedding joint, dipping 40°. At EL. 137.2 ft, observed 2-inch thick SHALE bed.									>>		
135.20		= '	At EL. 135.5 ft, observed bedding joint, dipping 40°, 2-inch thick, moderately hard, DIATOMACEOUS SHALE bed.									0×0		
133.20			ALE! 400.00 all and 10 in all 40 in	C48			78	70				× 6 ×		
131.20			At EL. 132.2 ft, observed bedding joint, dipping 45°.									0×0		
	317	`	L. Proposition (C. P.)									× 0 ×		
129.20	318 319	∃.	At EL. 129.2 ft, observed bedding joint, dipping 45°.									\ \ \		
127.20	320		At EL. 128.2 ft, observed bedding joint, dipping 45°.									0%0		
125.20	-	٠.,										X		
	323	1		C49			100	100				× × ◊		
123.20	324	٠,	PTS - Finely bedded SILTSTONE, bedded at millimeter scale, alternating iron oxide rich and poor bands.									200	PTS	
	520		(continued)	Гр	EPOR	TITLE	ri e							THOLEID
	_	_/	Department of Transportation Division of Engineering Services Geotechnical Services	D	BOR IST. 07	ING	COUI	YTV		ROL 71	TE 0	POS D/	STMILE	R-09-Z1 EA 07-187900
			Office of Geotechnical Design - South	1 _ 3		10 7	TUN	INE	L TE	ECH	NICAI	ST		
		(-	The second distriction of the second second was	В	RIDGE N/A	E NU	MBE	R	PRE	Jar	ED BY		DAT	23-09 SHEET 11 of

ELEVATION (ft)	ў БЕРТН (ft)	Material Graphics		Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%) Dry Unit Weight	(pct) Shear Strength	Drilling Method		Remarks
121.20	326		At EL. 122.3 ft, observed bedding joint, dipping 45°. SILTSTONE with Interbedded SILTY SANDSTONE, laminated to very thinly bedded, dark greenish gray to dark bluish gray, fresh, soft to moderately soft, very slightly fractured to unfractured. Occasional thin black	C49			100	100			× 0 ×	See RQI	note at end of log regarding D.
119.20	328	1	SHALE beds. Pressuremeter testing at 326' to 333'.								0×0		
117.20	329	1.									× 0 × 0	M. 198	
115.20	331										× 0 × 0		
113.20	E		Very weak. At EL. 112.7 ft, observed bedding joint, dipping 45°.	C50			100	100	17 11	5	0×0×0	UC SD	D. Title at end on log regarding
111.20		1	At E.E. 112.7 It, abserved bedding joint, dipping 45								0×0×		
109.20	E	`·.	At EL. 109.7 ft, observed bedding joint, dipping 45°.								0×0×		
107.20	1 +1		At EL. 108.2 ft, observed bedding joint, dipping 45°, 2-inch thick, moderately cemented sequence of medium to coarse grained SANDSTONE, 1/8-inch thick laminations.								(0×0)		
105.20	342	1	At EL. 105.7 ft, observed bedding joint, dipping 45°.	C51			100				$\langle \phi \times \phi \rangle$		
103.20			At EL. 103.2 ft, observed bedding joint, dipping 50°.	052			100	100			(
101.20	346	1	At EL. 100.2 ft, observed bedding joint, dipping 45°.								0 × 0		
	348		At EL. 99.2 ft, observed steepened bedding between 348' and shear below at 349.9', beds dipping 60°.								×0×0		
11	350 351	. /	At EL. 97.3 ft, observed shear, dipping 70°, tight, paper thin clay lining, 1/2-inch normal offset. At EL. 97.2 ft, observed bedding joint, dipping 45°. At EL. 96.2 ft, observed bedding joint, dipping 45°.	253			94	81			×0×0		
	352 353	1	,								× < ×		1
93.20	354	K	At EL. 93.7 ft, observed shear/fault zone, dipping 90 to 70°, ¼-inch to ½-inch thick clay lining, irregular, undulatory shear, bedrock within shear zone is								◇ ×◇		
			(continued)	P	EDOD	T TIT	16						LIOLEID
	Г		Department of Transportation Division of Engineering Services Geotechnical Services	DI	EPOR BOR IST. D7	ING	RE OUN LA	ITY	R0 7	0UTE 10	P	OSTMIL D/D	HOLE ID R-09-Z1B6 EA 07-187900
			Office of Geotechnical Design - South 1	PF	ROJE	10 T	R BF	NEI	E NAME	HNIC	AL S	TUDY	
			J. South	BF	RIDGE N/A			_	PREPA	RED B			3-23-09 SHEET 12 of 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		demarks	
91.20	356 357	5	moderately contorted, beds are folded and irregular, beds dip up to 60° SILTSTONE with Interbedded SILTY SANDSTONE, laminated to very thinly bedded, dark greenish gray to dark bluish gray, fresh, soft to moderately soft, very slightly fractured to unfractured. Occasional thin black	C53			94	81			0.0000	* () * ()	See note at er RQD.	nd of log regarding	
89.20	358	K	SHALE beds. At EL. 91.2 ft, observed bedding joint, dipping 45°. At EL. 89.2 ft, observed shear, dipping 65°, tight, paper-thin clay lining.								No.		1		
87.20	360	∃. `` ,	At EL. 88.2 ft, observed bedding joint, dipping 50°, interbedded fine SANDSTONE and SHALE, gradually increasing cemented, moderately hard to 365.5'.	C54			100	63			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	1			
85.20	361 362 363	- 1	At EL. 86.2 ft, observed bedding joint, dipping 55°, well cemented, moderately fractured. At EL. 85.2 ft, observed local bedding planes with chrome colored minerals.	C55			100	0			0,0000				
83.20	364		At EL. 83.2 ft, observed roughly 1.5' thick, moderately hard, laminated, SILTSTONE bed, moderately fractured.				100	0			0.00	2 / / 2			
81.20	366		At EL. 81.7 ft, observed bedding joint, dipping 45°, soft to moderately soft.	C56			92	85	b		0	0.0			
79.20	367										0,00	1 4 () 4	1		
77.20	369 370 371	1	At EL. 77.7 ft, observed bedding joint, dipping 45°.								0.000	12000			
75.20	372 373	1	At EL. 75.2 ft, observed bedding joint, dipping 45°.	C57			95	90			0 % 0 %				
73.20		\.,	At EL. 73.2 ft, observed bedding joint, dipping 45°.								0 % 0				
71.20	376 377	1	At EL. 70.7 ft, observed bedding joint, dipping 45°, . Very weak.						15 1	11	000	200	UC, SD		
69.20	378 379	No.	At EL. 68.7 ft, observed 3-inches thick moderately cemented zone, moderately hard.								× 0 × <				
67.20	380		At EL. 68.2 ft, observed bedding joint, dipping 45°.								0×0×				
65.20	382	:	At EL. 65.2 ft, observed bedding joint, dipping 45°.	C58			100	88			0 % 0 %	2020			
63.20	384		At EL. 63.2 ft, observed bedding joint, dipping 45°, occasional SHALE beds up to 1/2-inch thick.								0 % 0				
			(continued)											Topiese	
1	_		Department of Transportation Division of Engineering Services	D	EPOR BOR IST.	ING	RE		F	710	P	os D/I	STMILE D	R-09-Z1E	3
	_	7	Geotechnical Services	P	ROJE	CTC	R B	RIDG	ENAN	1E				012101000	-
_		1	Office of Geotechnical Design - Sout		RIDG					ARED		, , ,		E SHEET 23-09 13 of	_



Office of Geotechnical Design - South 1

SR-710 TUNNEL TECHNICAL STUDY

PREPARED BY

3-23-09

14 of 14

BRIDGE NUMBER

CALTRANS BORING RECORD MET+ENG FIXED

R. Ch	havez		1-19	DATE 1-09	1-23-0	TION DATE 9	BOREHO 34° 4' 3 BOREHO	32.123	34" <i> 1</i>	18°	10'	59.6	814	4" N					-Z1B7	_
DRILLIN			ig Inc.				Lt S								.)				E ELEVATION ft NAVD 88	
DRILLIN Rota							DRILL RIC		nd Δ	400								BOREHO	DLE DIAMETER	
SAMPL	ER TY	PE(S)	AND SIZE(SPT HAM	MER T	/PE									HAMMER	R EFFICIENCY, EF	₹i
-				Q core (-		Autom								•	NG (F	ATF)	75%	EPTH OF BORING	_ G
Piezo	omete	er Ins	talled o	n Comp	letion		READING		NN					0.0 ft				300.0		_
ELEVATION (ft)	оертн (ft)	Material Graphics		[DESCRIPT	ION		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	מפונים מפונים	R	emarks	
478.50 476.50	1 2 3 4		SANDY lea	material,	CL): stiff: o	live yellow; m OLDER ALLU	noist; fine UVIUM].										in ac Soil a and I 2007 A.1 c Sum Tech	cordance & Rock Lo Presentat (), except of the Final mary Reprinced Studies, California, C	ecord was prepared with the Caltrans ogging, Classification on Manual (June, as noted in Appen- il Geotechnical ort, SR-710 Tunne by, Los Angeles ornia, dated April,	on di:
474.50	5 6 7																	uum extra tility clear	cted from 1' to 7.5' ance.	
472.50 470.50	8 9 10							VS0°	5 5 4	9							voc	= 2.9 ppi	n	
468.50	11 12 13															000000000000000000000000000000000000000				
	15 16	// L	 _ean CLA` ine SAND	Y with SAI ; medium	ND (CL); ha plasticity fir	ard; dark brownes.	vn; moist;	S02	2 8 14 24	38						000000000000000000000000000000000000000	voc	= 3.8 ppi	n	
	18															00000000				
	21	//\	ery stiff; ı	micaceous	S.			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	8 5 8 14	22						000000	voc	= 6.4 ppi	m	
	22 23 24 24															0000000000				
	25	/··/.l			(continue	d)										, V				_
				Divisio		ransportation			REPOR BOR DIST. 07	ING	RE OUN LA	NTY		ROUT 710	E	PO:	STMIL 'D	E	HOLE ID R-09-Z1I EA 07-187900	В
						hnical Desi	ign - Sou	th 1		'10 T	ΓUΝ	NEL	. TE	ECHN		_ST	UDY			
									BRIDG N/A	E NU	MBE	R	PRE	PARE Jank	D BY			DAT	E 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	Reide Reide	marks
454.50	26		Lean CLAY with SAND (CL) (continued). 24% medium to fine SAND, 76% fines.	S04	9 14 17	31			20	108		SOCIOL	See note at end RQD. PI, PA VOC = 11.0 ppm	
452.50												000000		
450.50	30		Lean CLAY (CL); hard, brown to dark brown; moist; little medium to fine SAND; medium plasticity fines.	VS05	8 17 50/6"			5				00000	VOC = 1.0 ppm	
448.50				/ \	50/6			8				mono		
446.50												00000	VOC = 8.1 ppm	
444.50	36		19% medium to fine SAND, 81% fines. Olive gray, friable.	S06	50/4"		100	100	24	102		40000	PI, PA	
442.50	37			007			100	100				XOX		
440.50	39 40		SEDIMENTARY ROCK: DIATOMACEOUS (SILTSTONE), massive, olive to white, decomposed, very soft, oxidized, (Clayey SILT, hard, moist) [PUENTE FORMATION, (Diatomaceous Member)] At EL. 440.3 ft, contains SHALE interbeds, laminated to very thinly bedded, pale olive to, pale yellow,									>X		
438.50			intensely weathered, very soft, carbonate nodules. At EL. 439.5 ft, observed bedding joint, dipping 5°.	C08		H	100	100				X0X	VOC = 5.2 ppm	
436.50	44 45	, ; ; ;	At EL. 437.5 ft, observed bedding joint, dipping 15°.									X0X		
434.50	46	; ; ! ;	At EL. 434.8 ft, observed bedding joint, dipping 15°. At EL. 434.5 ft, becomes very pale brown to brownish yellow, moderately weathered, soft, with carbonate veins and nodules.	C09			93	93				\ \ \ \	VOC = 4.0 ppm	
432.50	48	1 3										$\Diamond \times \Diamond \rangle$		
430.50		1 1	At EL. 432.0 ft, observed light gray to light olive brown, 2" thick SANDSTONE bed, fine grained, dipping 20 degrees, friable, no reaction to HCL.									$\Diamond \times \Diamond$		
428.50 426.50	52 53		At EL. 429.2 ft, observed SANDSTONE bed, 3" thick, fine grained, dipping 20 degrees, friable. At EL. 428.8 ft, observed light greenish gray, SANDSTONE bed, 1" thick, fine grained, dipping 20 degrees, friable. At EL. 427.4 ft, observed SANDSTONE bed, 2" thick, fine grained, dipping 20 degrees, friable.	G10			100	80	19	83		X0X0X0	VOC = 21.5 ppm	
	55	,	(continued)									1		
	L	Department of Transportation Division of Engineering Services Geotechnical Services	C	BOR BOR DIST 07 PROJE	CTO	RECOUNT	RIDG	SE N	ROU 710	0	D	STMILE /D	HOLE ID R-09-Z1B EA 07-187900	
			Office of Geotechnical Design - South	h 1 _	SR-7	10 1	run	INE	L TI	ECH	NICAI	_ 51	TUDY DATE	SHEET

ELEVATION (ft)	DEPTH (ft)	Material Graphics		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
424.50	56	1	At EL. 425.8 ft, observed bedding joint, dipping 20°, 0.6' thick SANDY SILTSTONE bed. (continued).	C10			100 73	33				OX<	See note at RQD. VOC = 3.0 p	end of log regarding
422.50	57 58	1 11 11	At EL. 423.5 ft, observed SANDSTONE bed, 3" thick, fine grained, dipping 20 degrees, friable.									X0X0X		
420.50	7	1 3	At EL. 420.5 ft, observed SANDSTONE bed, 3" thick,									0×0		
418.50	61	/ //	fine grained, dipping 20 degrees, friable. At EL. 419.8 ft, observed SANDSTONE bed, 4" thick, fine grained, dipping 20 degrees, friable. At EL. 419.5 ft, becomes DIATOMACEOUS SILTSTONE with fine SANDSTONE laminations, light greenish gray, locally contested and high whated.	C12			100	100				×0×,	VOC = 7.5 p	pm
416.50	63	<i>[]</i>	greenish gray, locally contorted and bioturbated. Bedding dipping 20 degrees. At EL. 417.5 ft, grades to DIATOMACEOUS SILTSTONE, lacks sandstone.									X0X		
414.50	65	1 1	At EL. 414.5 ft, observed bedding joint, dipping 20°.	C13			100	100				0×0>	VOC = 2.5 p	pm
412.50	68	7										$\Diamond \times \Diamond$		
410.50	69 70	/	At EL. 411.5 ft, observed joint, dipping 70°, tight, calcite lining.									>< < <		
408.50	71 72 73	1 1 1	SEDIMENTARY ROCK: (SILTSTONE), laminated to very thinly bedded, very dark gray, slightly weathered, soft, slightly fractured. Abrupt contact between oxidized and unoxidized at 70.3' [PUENTE FORMATION, (Siltstone Member)] At EL. 410.0 ft, observed bedding joint, dipping 10°. At EL. 408.0 ft, becomes SANDY (fine grained), massive, unfractured, unoxidized, no reaction to HCL	C14			100	100				X0X0X	VOC = 7.7 p	pm
406.50	74 75	W. W.	solution.						3	97		$\langle \Diamond \times \Diamond \rangle$	PA	
404.50	76 77		At EL. 404.5 ft, becomes intensely to moderately weathered, soft to moderately soft.	C15			92	92				$\Diamond X \Diamond X$	VOC = 29.0	ppm
402.50	78 79											$\Diamond X \Diamond X$		
400.50	80	· · · ·	At EL. 399.5 ft, becomes thinly bedded to laminated.	C16		- 5	87	87	e e			X0X	VOC ≈ 2.6 p	pm
398.50	83		At EL. 398.0 ft, observed bedding joint, dipping 40°. At EL. 397.5 ft, observed bedding joint, dipping 40°. At EL. 397.0 ft, becomes massive.	0,0			O,	5				$\Diamond X \Diamond X \Diamond$		
396.50	84	*			No.							\Diamond		4.1
			(continued)	TE	EDOS)T 717	TIF							LHOLEID
		_/	Department of Transportation Division of Engineering Services	D	BOR IST. 07	ING	RE		RD	ROU 710			OSTMILE D/D	R-09-Z1E
		7	Geotechnical Services Office of Geotechnical Design - South	P	ROJE	CTO	R B	RIDG	E N/	AME	500		TUDY	
				В	RIDG N/A				PRI		ED BY		I DA	TE SHEET 3 of 1

ELEVATION (ft)	оертн (ft)	Material Graphics		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Remarks
394.50	86 87		At EL. 395.5 ft, becomes SILTSTONE with thin interbeds of SILTY SANDSTONE, laminated, slightly weathered, soft, very slightly fractured, weak reaction to HCL solution. (continued).	C17			100	100				0×0×0	See note at end of log regarding RQD. VOC = 3.2 ppm
392.50	88	1										X \ \ \	
390.50	90	, ,	Pressuremeter testing at 90.5' to 96.5'.						SIL			$\Diamond \times \Diamond$	
388.50												$\Diamond \times \Diamond \times$	
386.50		11										\times	
384.50	95 96			C18			80	80				\ \ \ \ \	
82.50			At EL. 383.1 ft, observed bedding joint, dipping 10°.									\$\$X\$	
380.50	100		At EL. 380.7 ft, observed bedding joint, dipping 10°.	C19			82	67				0×0	
78.50			At EL. 379.3 ft, observed fault, dipping 90°. At EL. 378.5 ft, observed bedding joint, dipping 20°.	Ç 19			02	67	12	101		$\Diamond X \Diamond X$	Pl, PA
76.50		1	At EL. 376.5 ft, observed joint, dipping 45°.									X0X0	
74.50			At EL. 374.9 ft, observed bedding joint, dipping 20°. At EL. 374.6 ft, observed bedding joint, dipping 20°. Pressuremeter testing at 106' to 111.5'.						5			X 0 X	
372.50		, . ,										×0×0	
370.50		,										$\langle \Diamond \times \Diamond \rangle$	
368:50		V		C20		00	98	98				$\Diamond X \Diamond$	
366.50	113	11	At EL. 367.7 ft, observed joint, dipping 60°, tight, no lining.									X0X0	
	115	1	(continued)									IVI	
1	_	_/	Department of Transportation Division of Engineering Services	D	EPOR BOR IST	ING	RE	YTV		ROU 710	TE)	PO	HOLE ID R-09-Z1E OSTMILE EA 07-187900
		1	Geotechnical Services Office of Geotechnical Design - South	n 1	ROJE SR-7	CT 0	R BI	INE	L TE	ME CHI	NICAI		TUDY
		4	A transfer of a continuous series of the series	В	RIDGI N/A	E NU	MBE	R	PRE	PARI Jan	ED BY		3-13-09 SHEET 4 of 1

ELEVATION (ft)	SDEPTH (ft)	Material Graphics		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	marks
364.50	116	1	At EL. 365.7 ft, observed bedding joint, dipping 80°. SILTSTONE with thin interbeds of SILTY SANDSTONE, laminated, slightly weathered, soft, very slightly fractured, weak reaction to HCL solution.	C20			98	98			>×<>×<	See note at end RQD.	of log regarding
362.50			At EL. 362.5 ft, observed bedding joint, dipping 80°.								00000		
360.50	120	1					-		6		× 0 ×		
358.50		i	SEDIMENTARY ROCK, SILTY (SANDSTONE), very thickly bedded to massive, very dark grayish brown, slightly weathered, soft. Scattered very thin SILTSTONE interbeds. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, very dark grayish brown, weak reaction to HCL	C22			87	87			$\langle \Diamond \times \Diamond \rangle$		
356.50	124	1	solution. SEDIMENTARY ROCK, SILTY (SANDSTONE), with scarce very thin SILTSTONE beds, very thickly bedded to massive, very dark grayish brown, slightly weathered, soft.								$\langle \Diamond \times \Diamond \rangle$		
354.50	126		noamorou, oon	C23		-	82	32	5-11		$\Diamond \times \Diamond$	VOC = 4.7 ppm	
352.50	128		SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, very dark grayish brown, bedding joint dipping 15°, weak reaction to HCL solution.								$\Diamond \times \Diamond \times \langle$		
350.50	130		SEDIMENTARY ROCK, SILTY (SANDSTONE), fine grained, with scattered very thin SILTSTONE interbeds, very thickly bedded to massive, very dark grayish brown, slightly weathered, soft. Pressuremeter testing at 131' to 136'.						-		X0X	VOC = 6.8 ppm	
348.50	132	1									$\times \Diamond \times \Diamond$		
346.50	134										<0×0>		
344.50	136			C24			77	68			0×0		
342.50	138										$\Diamond X \Diamond X$		
340.50	140		At EL. 341.0 ft, observed bedding joint, dipping 80°, local CLAY beds.	C25		2	100	100			X 0 X	VOC = 2.9 ppm	
338.50		11:	At EL. 338.0 ft, observed bedding joint, dipping 80°, ½-inch thick SILTSTONE interbed.	525			100	100			$\times \Diamond \times \Diamond$	100 - 2.9 ppill	
336.50			At EL. 337.2 ft, observed bedding joint, dipping 80°, 1½-inch thick SILTSTONE interbed.								$\Diamond \times \Diamond$	PA	11
	. 10		(continued)										
	_	_/	Department of Transportation Division of Engineering Services Geotechnical Services	D	BOR IST.	ING	RE OUI LA	YTV	71	TE 0	PC	DSTMILE D/D	R-09-Z1E EA 07-187900
			Office of Geotechnical Design - South		ROJE SR-7	CT 0	R BI	RIDG INE	E NAME L TECH	NICAI	LS	TUDY	
			And the state of the state of the state of the state of	В	RIDGE N/A	E NU	MBE	R	PREPAR D. Jan	ED BY		DATE 3-1:	3-09 SHEET 5 of 1

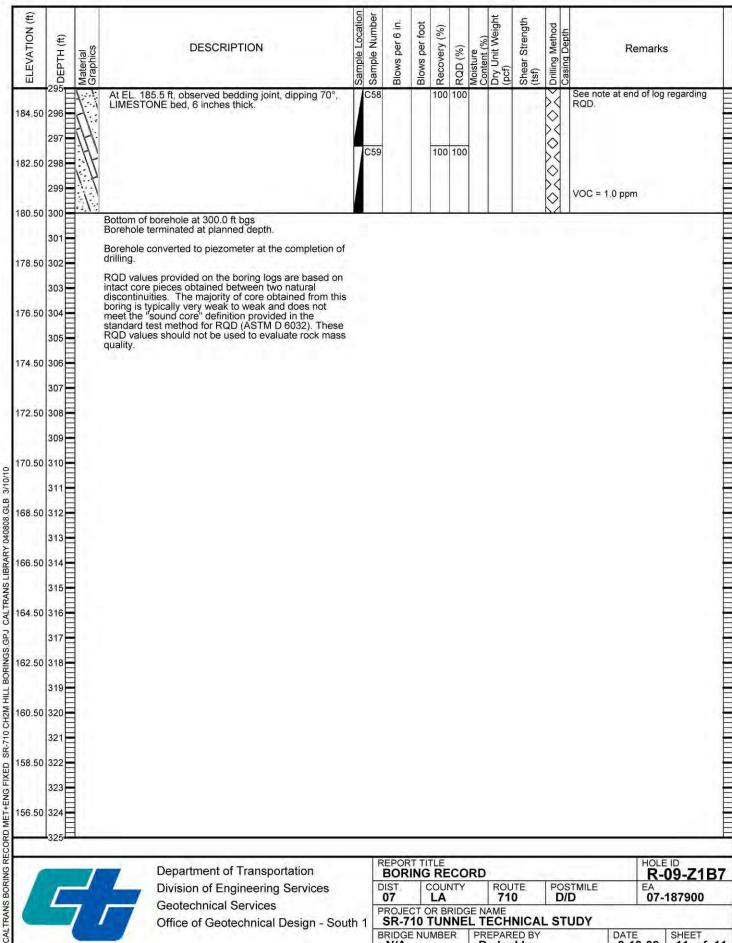
ELEVATION (ft)	SDEPTH (#)		Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	
	140	\vdash	1	(continued).	C25			100	100				×	See note at end of log regarding RQD.
334.50 332.50	147			SEDIMENTARY ROCK, (SILTSTONE) with scattered very thin interbeds of SANDY SILTSTONE, laminated to very thinly bedded, very dark gray, fresh, soft. Unoxidized, moderate reaction to HCL.	C26			100	100				0×0×0	VOC = 3.7 ppm
330.50	149 150		. \	SEDIMENTARY ROCK, SILTY (SANDSTONE), with scarce very thin SILTSTONE beds, every thickly bedded to massive, very dark grayish brown, fresh,									XOX	
328.50			and and	sett.EL. 331.0 ft, observed bedding joint, dipping 45°. SEDIMENTARY ROCK, (SILTSTONE), with scattered very thin SANDY SILTSTONE beds, laminated to very thinly bedded, very dark gray, fresh, soft, unoxidized, moderate reaction to HCL. At EL. 330.0 ft, observed bedding joint, dipping 45°. At EL. 328.0 ft, observed bedding joint, dipping 70°.	C27			100	100	19			0000	VOC = 2.0 ppm PA
326.50	153 154		; , 	At EL. 328.0 ft, observed bedding joint, dipping 70°.									X 0 X	
324.50		Ξ		At EL. 324.5 ft, becomes locally intensely weathered and moderately soft, bedding joint, dipping 80°.	C28			100	100				00000	VOC = 2.2 ppm
322.50	158 159			At EL. 323.2 ft, observed 6" thick calcareous concretion, fresh, hard, moderate reaction to HCL solution.									X0X0	
320.50	160 161	\exists	1	At EL. 319.9 ft, observed bedding joint, dipping 80°.	C29			100	100	201			X0X0	VOC =2.8 ppm
318.50	162 163	Ε.											× 0 × 0	
316.50	164 165			SEDIMENTARY ROCK, (LIMESTONE), very thinly to thinly bedded, dark olive gray, fresh, medium strong, hard, unfractured, unoxidized, moderate reaction to HCL solution. Bedding dipping 80 degrees.	C30			100	100				XOX	PL
314.50	167			At EL. 314.9 ft, observed bedding joint, dipping 80°. SEDIMENTARY ROCK, (SILTSTONE), with scattered very thin interbeds of SANDY SILTSTONE, laminated to very thinly bedded, very dark gray, fresh, moderately soft, unoxidized, moderate reaction to HCL.	C31		1	100	100				X0X	VOC = 1.8 ppm
312.50	169			SEDIMENTARY ROCK, (LIMESTONE), light greenish									XOX	
308.50	171			gray, fresh, hard, unfractured, unoxidized, strong reaction to HCL solution. SEDIMENTARY ROCK, SILTY (SANDSTONE), with light bluish gray fine SANDSTONE beds, laminated, very dark gray, fresh, moderately soft, unfractured.	C32		S	100	100	e e			XOXO	
306.50	173 174		1	Micaceous, unoxidized. SEDIMENTARY ROCK, (SILTSTONE), laminated to very thinly bedded, very dark gray, fresh, weak, soft, with scattered very thin interbeds of SANDY SILTSTONE, unoxidized, mostly non-plastic, moderate reaction to HCL.						.14	104		0%0%0	PL
	1/5			(continued)										
1	L			Department of Transportation Division of Engineering Services Geotechnical Services	D (BOR IST. D7 ROJE	CTC	RE OUN LA OR BE	RIDG	E N.		0	D/	
		1		Office of Geotechnical Design - South	1 1 S		10	TUN	NE	PR	ECH	NICA ED BY Ikly	L ST	DATE SHEET 3-13-09 6 of 11

ELEVATION (ft)	175 175	Material Graphics	DESCRIPTION		Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	
304.50		, :	At EL. 307.0 ft, observed bedding joint, dipping 80°, unit is weak. At EL. 305.5 ft, observed bedding joint, dipping 80°, 1	C32				100				×<	See note at end of log regarding RQD.
302.50	177	1 :	At EL. 305.5 ft, observed bedding joint, dipping 80°, 1 inch thick, calcareous interbed, white. (continued). SEDIMENTARY ROCK, SANDY (SILTSTONE) to SILTY (SANDSTONE), fine sand, moderately to thickly bedded, very dark gray brown, fresh, soft, unfractured,	C33			98	67				0×0×<	VOC = 1.2 ppm
300.50	=	11	unoxidized, micaceous, no reaction to HCL solution. SEDIMENTARY ROCK, (SILTSTONE/SHALE) with fine SANDSTONE laminations, laminated to very thinly bedded, very dark gray, (light bluish gray sandstone beds), fresh, unfractured, tar impregnated bedding. At EL. 300.9 ft, observed bedding joint, dipping 80°.									\$X\$X\$	
298.50	181			C34			83	0	3			× 6×	VOC = 0.7 ppm
296.50	183		At EL. 298.0 ft, observed bedding joint, dipping 80°.									\ \ \ \	
294.50	185	1 1		C35			125	0				0 X Q	
292.50	187		At EL. 293.3 ft, observed bedding joint, dipping 70°.									× 0 × 0	
290.50	189	1		C36			100	80				× 6×	
288.50	E	1 4.	At EL. 288.5 ft, observed bedding joint, dipping 80°, 2 inch thick, medium strong, hard, calcareous bed,						2	147		0X0X0	VOC = 0.9 ppm PL
286.50	-	:/	strong reaction to diluted HCL.									× 6 × 6	
284.50	195 196	\ <u>`</u> ;	At EL. 284.3 ft, observed bedding joint, dipping 70°, interval with abundant very thin interbeds of light	C37			80	72				0×0×	VOC = 1.1 ppm
282.50		(; \	bluish gray, friable, fine-grained SANDSTONE beds between 196' and 208'.									X 0 X	
280.50		; \		C38			100	100				X0X0	VOC = 0.5 ppm
278.50	E	i /E	At EL. 279.5 ft, observed bedding joint, dipping 70°, 1½-inch thick fine grained sandstone bed, light bluish gray. At EL. 278.0 ft, observed tar impregnated bedding						14	111		0×0	SD, UC
276.50			plane. Very weak.	C39			100	100				\ \ \ \ \ \ \	VOC = 0.4 ppm
	205	1	(continued)										
1	L	_/	Department of Transportation Division of Engineering Services Geotechnical Services	D	EPOR BOR IST. D7 ROJE	ING	RE OUN LA	ITY		ROU 71 (TE)	POS D/	HOLE ID R-09-Z1B7 STMILE D EA 07-187900
			Office of Geotechnical Design - South	1 3		10 1	UN	NE	L TI		VICAL	ST	DATE SHEET
					N/A	- 1401	AIDE	134		. Jan			3-13-09 7 of 11

ELEVATION (ft)	SDEPTH (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	
074.50	203	\ ;	(continued).	C39			100	100				×	See note at end of log regarding RQD.
274.50 272.50	207	/ /	At EL. 273.5 ft, observed bedding joint, dipping 70°.									>	
270.50	209	1	SEDIMENTARY ROCK, (SHALE), very thinly bedded to laminated, very dark gray, fresh, moderately soft, unfractured, moderate reaction to HCL solution, unoxidized.	C40			100	100	9			0000	VOC = 0.5 ppm
268.50	211 212 213	/	At EL. 268.5 ft, observed bedding joint, dipping 70°, unit is weak.									XOXOX	
266.50		į.	SEDIMENTARY ROCK, SILTY (SANDSTONE), fine grained, massive, very dark gray, fresh, soft, very slightly unfractured, friable, weak reaction to HCI, unoxidized.	C41			100	100				X0X0X	VOC = 0.1 ppm
264.50	216	17:	SEDIMENTARY ROCK, (LIMESTONE), light greenish gray, fresh, hard, unfractured, unoxidized, strong reaction to HCL solution.									♦ × ♦	
262.50	218 219	1	At EL. 263.5 ft, observed bedding joint, dipping 70°. SEDIMENTARY ROCK, (SILTSTONE/SHALE) with fine silty SANDSTONE laminations, laminated to very thinly bedded, very dark gray, (light bluish gray sandstone beds), fresh, moderately soft, unfractured. At EL. 261.5 ft, observed bedding joint, dipping 70°.									\ \ \ \ \ \ \	VOC = 0.9 ppm
260.50 258.50	221	(\)	At EL. 261.5 ft, observed bedding joint, dipping 70°. At EL. 260.5 ft, observed bedding joint, dipping 70°.	C42			100	100				XOXOX	
256.50	223 224 225	1:	At EL. 256.0 ft, observed bedding joint, dipping 70°.	C43			100	16				0000	V00 - 1 5
254.50	-	<i>i</i> /	At EL. 255.5 ft, observed bedding joint, dipping 70°.									X0X0X	VOC = 1,5 ppm
252.50	229	()	At EL. 252.2 ft, observed bedding joint, dipping 70°.	C44			80	0				X0X0	
250.50	231	11										0×0	VOC = 0.2 ppm
248.50	232	//										\ \ \ \	
246.50	234	//		C45			100	100				0×0	
	235		(continued)										
1	L	7	Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - Sout	D	EPOR BOR IST. 07 ROJE SR-7	CTC	RE OUN LA R BF	RIDG	E NA	ROU 710 ME CHI	TE)	D/	
		<u></u>	A manage of admiration position of the	В	RIDGI N/A				PRE		ED BY		3-13-09 SHEET 8 of 11

ELEVATION (ft)	SDEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing	emarks
244.50	236	\	(continued).	C45			100	100				\ \ \ \	See note at end RQD. VOC = 0.9 ppm	d of log regarding
242.50	237 238 239		SEDIMENTARY ROCK, SILTY (SANDSTONE), laminated, very dark gray, fresh, extremely weak, moderately soft, unfractured. Laminations of light bluish gray, fine grained SANDSTONE, locally impregnated with tar. Micaceous, unoxidized. At EL. 243.5 ft, observed bedding joint, dipping 70°.						5	112		XOXOX	UC	or log regarding
240.50		100		C46			100	100				$\langle \Diamond \times \Diamond \rangle$	VOC = 1.3 ppm	
238.50	E	1										$\Diamond \times \Diamond$		
236.50	E	, .		C47		r	100	100				$\Diamond X \Diamond X$	V00 = 4.8	
234.50		<i>\</i>	At EL. 235.5 ft, observed bedding joint, dipping 70°, 2" thick SILTSTONE bed.									$\Diamond X \Diamond X \Diamond$	VOC = 1.8 ppm	
232.50	E	. \	Very weak.						13	113		\ \ \ \	PL, UC, EM	
230 50		()	PTS - Arkosic SANDSTONE, biotite rich.	C48		*	60	50	e			$\langle \Diamond \rangle \langle \Diamond \rangle$	PTS VOC = 0.6 ppm	
228.50	251 252 253	/ /	At EL. 228.8 ft, observed 0.9' thick SILTSTONE/SHALE bed, dipping 70 degrees. Extremely weak.						13	107		$\langle \Diamond \times \Diamond \rangle$	UU VOC = 1.3 ppm	
226.50	E	//	At EL. 227.4 ft, observed 1' thick SILTSTONE/SHALE bed, dipping 70 degrees. Unit is extremely weak.	C49		1	100	100				$\langle \Diamond \times \Diamond \rangle$		
224.50	256 257	//		C50			100	100				$\Diamond X \Diamond X$	VOC = 6.4 ppm	
222.50	258 259	: \										$\Diamond X \Diamond X$		
220.50	260 261	- 1	At EL. 220.5 ft, with with gravel-sized SILTSTONE/SHALE fragments.									X0X	VOC = 5.9 ppm	
218.50	E	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	At EL. 219.2 ft, observed 0.9' thick SILTSTONE/SHALE bed, dipping 70 degrees.	C51			100	100	b			\ \ \ \	VOC 2 0.9 ррп	
216.50		/./										$\Diamond X \Diamond$		
			(continued)	TE	EDOS	T 71	ri e							HOLEID
	L	_/	Department of Transportation Division of Engineering Services Geotechnical Services	С	BOR BOR IST. 07 ROJE	ING	RE OUN LA	VTY		ROU 71 0	TE.	PC	DSTMILE D/D	R-09-Z1B7 EA 07-187900
			Office of Geotechnical Design - South	1 1 L	SR-7 RIDG N/A	10	TUN	NE	PRE	CHI	ED BY	L S	TUDY DATE 3-1	SHEET 3-09 9 of 11

ELEVATION (ft)	99 99 90 10 10 10 10 10 10 10 10 10 10 10 10 10	Material Graphics		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%) Dry Unit Weight	(pcf) Shear Strength	-		emarks
214.50		<i>!</i> :	SILTY SANDSTONE, laminated, very dark gray, fresh, moderately soft, unfractured; with laminations of light bluish gray, fine grained SANDSTONE impregnated with tar. Micaceous, unoxidized. (continued).	C52			80	80			>X >X >X >X	See note at en- RQD. VOC = 1.8 ppn	d of log regarding
212.50	268	. /		C53			100	100			× 0 × 0	VOC = 1.1 ppn	1
	271	'.'									× 0 × 0		
208.50	273	<u> </u>	SEDIMENTARY ROCK, (SILTSTONE/SHALE) with fine SANDSTONE laminations, laminated to very thinly bedded, very dark gray, (light bluish gray sandstone beds), fresh, moderately soft, unfractured. Locally	C54			100	100	, in		× 0 × 0 ×	VOC = 0.5 ppn	,
204.50	275 276	11	impregnated with tar At EL. 206.2 ft, observed bedding joint, dipping 80°. At EL. 205.3 ft, observed bedding joint, dipping 70°.								\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\		
202.50	278	\ :		C55	H		100	100			0X0X0X		
198.50	281	//	At EL. 199.5 ft, observed bedding joint, dipping 80°.	C56	(°		100	100			(0X0X0X	VOC = 1.1 ppn	1
196.50 194.50	285	1:	Weak.						13 1	08	(0×0×0	PL, SD, UC, EI	м
192.50	287 288 289		At EL. 193.2 ft, observed bedding joint, dipping 80°, LIMESTONE bed, 2 inches thick. SEDIMENTARY ROCK, SILTY (SANDSTONE), laminated, very dark gray, fresh, moderately soft, unfractured, with laminations of light bluish gray, fine grained SANDSTONE, micaceous, unoxidized.	C57			100	100			X0X0X0	VOC = 1.2 ppn	1
190.50 188.50	291		grained SANDSTONE, micaceous, unoxidized. Locally impregnated with tar At EL. 192.0 ft, becomes locally bioturbated.					No.			×0×0×	W00 = 5.5	
186.50	293	1		C58			100	100			\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	VOC = 0.6 ppn	1
	295		(continued)										
1	L	_/ 7	Department of Transportation Division of Engineering Services Geotechnical Services	C F	BOR BOR DIST. 07	CTC	RE COUN LA	RIDG	E NAM	710		OSTMILE D/D	HOLE ID R-09-Z1B EA 07-187900
			Office of Geotechnical Design - Sout		RIDG N/A				PREF	ARED lankly	BY	TUDY DATE 3-1	3-09 SHEET 10 of



BRIDGE NUMBER

PREPARED BY D. Jankly

DATE 3-13-09

11 of 11

Office of Geotechnical Design - South 1

K. B	D BY arker	,	BEGIN DATE . COMPLETION DATE 1-6-09 1-12-09	BOREHOL 34° 4' 3							East a	and Dat	um)	HOLE ID
DRILLI			CTOR ng Services	BOREHOL										SURFACE ELEVATION 419.6 ft NAVD88
DRILLI		THO		DRILL RIG										BOREHOLE DIAMETER 4 in
SAMPL	ER TY	PE(S)	AND SIZE(S) (ID) ch Core(2.5"),Shelby(2.87"),HQ Co	SPT HAMN	IER T		140	lb.,	30 i	nch	dro	р		HAMMER EFFICIENCY, ERI 87%
BORE	OLE E	BACKE	FILL AND COMPLETION stalled on Completion	GROUNDV READINGS	VATER		ING I			AF	TER I			ATE TOTAL DEPTH OF BORING
ELEVATION (#)	рертн (#)	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	Remarks
417.63 415.63	1 2 3 4		SILTY, CLAYEY SAND (SC-SM); medium dolive brown; dry; fine SAND; little low to med plasticity fines [RECENT ALLUVIUM].	ense; light dium	D01			100					7	This Boring Record was prepared in accordance with the Caltrans Soil & Rock Logging, Classification and Presentation Manual (June, 2007), except as noted in Appendix A.1 of the Final Geotechnical Summary Report, SR-710 Tunnel Technical Study, Los Angeles County, California, dated April, 2010.
13.63	5		At EL. 414.6 ft, contains trace fine GRAVE		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	5 5 17	22	100					Showing S	Hand Auger 0'-5'
11.63	7 8 9		At EL. 412.6 ft, with olive yellow mottled wit gray.	th light									0000000000000	
09.63	10				003	3		33					0	
	13												000000000	
03.63	15 16		At EL. 404.6 ft, becomes black. SANDY SILT (ML); stiff; dark grayish brown; GRAVEL; little coarse to fine SAND; mostly	dry; few	VS04	3 4 5	9	100		23			000000	PA
01.63	17 18 19		plasticity fines.	iow.									00000000	
99.63	20		SILTY SAND (SM); loose; dark yellowish bromedium SAND.	own;	005	i		33					asasasasa	
97.63 95.63	23												000000000	
	25		August State										00	
			(continued)		11	REPO	RT TI	TLE	/English				_	HOLE ID
A	L]	Department of Transportati Division of Engineering Ser Geotechnical Services		ī	BOF DIST. 07 PROJE	CTC	COUN LA OR BE	RIDG	E NA	ROU 710)	_ T/	R-09-Z1B EA 07-07-18790
			Office of Geotechnical Des	ign - Sout	h 1	SR-	110	TUN	INE	PRE	CHI	VICAI ED BY Cer	ST	DATE SHEET 1 of 7

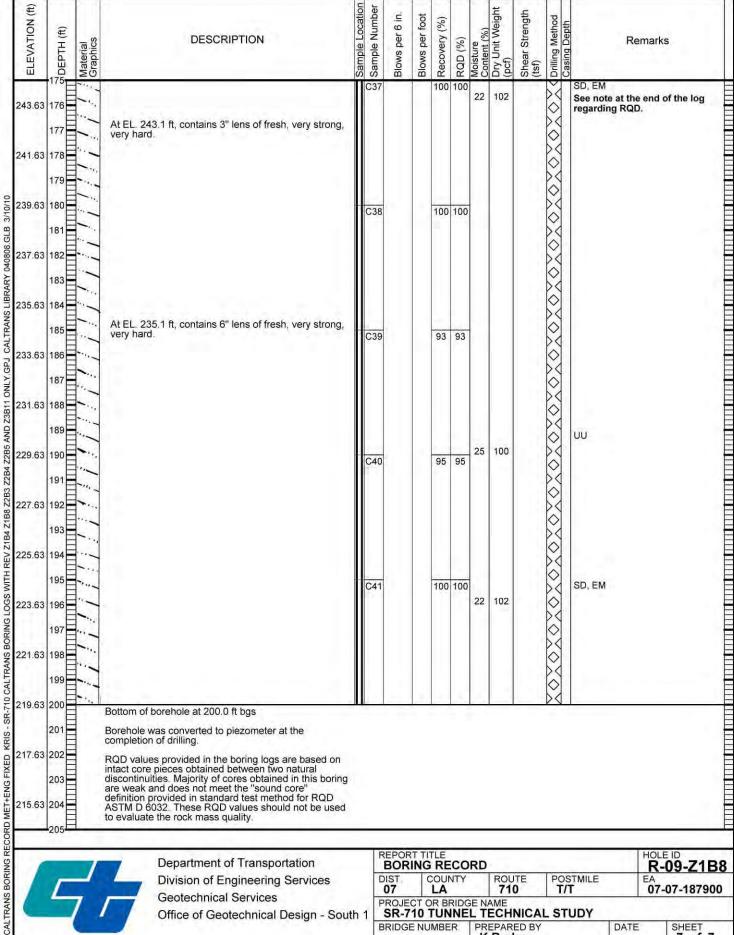
ELEVATION (ft)	DEPTH (#)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	F	demarks
393.63	26		Lean CLAY (CL); soft, very dark grayish brown slightly mottled with rust staining; medium plasticity fines.	X	S06	р р 2		100		32			0000	PI	
391.63	27 28											I	<u> </u>		
389.63	29 30		SILTY SAND (SM); very dark grayish brown; fine		007			33					STATE		
	31		SAND.	1	Our			33					10000		
87.63	32			ř									รององ		
85.63	34 35		Poorly graded SAND (SP): medium dense: gravish	- 17	S08	5	20	100					างของก		
83.63	36 37		Poorly graded SAND (SP); medium dense; grayish brown; coarse to medium SAND; weak cementation.	X		7 13		. 22					solon		
81.63	38												20000		
79.63	39 40		SILTY, CLAYEY SAND (SC-SM); medium dense; grayish brown; trace fine GRAVEL; mostly medium to	1	O09			17					<u> </u>	PA, DS	
77.63	41 42		tine SAND; some low plasticity tines.	1									00000		
75.63	43		olive gray, intensely weathered, weak, soft, unfractured, with thin (1") clay lenses. [PUENTE FORMATION]							21	110	Ŧ	00000		
73.63	45			V	S10	8	33	100					doordag		
73.03	46			Δ		20			¥				MANNE		
71.63	48								, a			li	DOODO		
69.63	50 51				011	i	8	100				TV = 8		uw	
67.63	52 53									22	109		MANNE		
65.63	54	-:::													
	55		(continued)										1-1-		
		_/	Department of Transportation Division of Engineering Services		D	EPOR BOR IST. D7	C	LA	VTY		ROL 71	ITE O	POS T/	STMILE T	HOLE ID R-09-Z1B
		1	Geotechnical Services Office of Geotechnical Design - Sou	th	1 P	ROJE SR-7	CT 0	R BE	RIDG	E N.	AME	NICA			
			Washington and delegation in the second of the			RIDGI				PR K	EPAR .Bar	ED BY ker		DAT	E SHEET 2 of 7

ELEVATION (ft)	э DEРТН (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	Remarks
63.63	56		At EL. 364.6 ft, contains pebble to cobble. (continued).	X	S12	24 23 20	43	100	4 3				00000	
61.63	57												00000	
59.63	59 60				013			0					MANA	uw
57.63	61												100000	
55.63	63												MANNA	
53.63	65			X	S14	6 14 18	32	100					MANA	
51.63	67		SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, massive, medium dark gray to dark gray, moderately weathered, weak, soft, unfractured.	-									<u> </u>	
19.63	69 70)15A			0					MANAGE	UW
47.63	71				, , , ,			5					200000	
45.63	73 74	;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;											MANNE	
43.63	75 76			Ī	J15B			0					000	1
41.63	77 78			X	C16	12 29 50/5.5'		0	0				Annual	
39.63	79 80				C17			97	47				$\Diamond \times \Diamond \times$	See note at the end of the log regarding RQD.
37.63	81									26	97		V V V V	
35.63	83												5X0X(
	85 E		(continued)	Ш									 	4
	_		Department of Transportation Division of Engineering Services	Ī	D	EPOR BOR IST.	ING	RE OUN		RD	ROU 71	TE 0	POS T/	HOLE ID R-09-Z1B STMILE EA 07-07-187900
		7	Geotechnical Services Office of Geotechnical Design - Sou	ith 1	P	ROJE	CTO	R BF	NE	LT	AME	NICA		

ELEVATION (ft)	э DEРТН (ft)	Material Graphics		Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth		emarks	
333.63	86	:	(continued).	S18	10 18 23	41	100					×		See note at th	e end of the log D.	
1	87			C19	20		0	0				×		regarding iva	J.	
331.63	88											><				
	89		At EL. 330.6 ft, grades to greenish black.									\\ \\				
329.63	90			C20			100	100				××				
-4	91		At EL. 329.6 ft, becomes slightly fractured, not healed, dipping 60 to 50°.									×				
327.63	92											>				
	93											$\stackrel{\diamond}{\times}$				
325.63	94											*				
	95			C21			100	100	e .			0				
323.63	96											0				
	97											0				
321.63	98											0				
	99	_										0				
319.63				C22			50	50				0				
- 1	101		At EL. 318.6 ft, becomes unfractured.									0				
317.63	E											0				
315.63	103	- n	40													
-	105															
313.63			At EL. 314.6 ft, becomes slightly fractured, not healed, dipping 50°.	C23			100	100				×		PI, PA, UU		
7.11	107											×				
311.63	108											×				
714	109											×				
309.63	110		At EL. 309.6 ft, becomes unfractured.	C24			83	83	23	103		××				
	111		and an account of the same same same same same same same sam	1000								××				
307.63	112											×				
	113		(T									×				
305.63	114		4.1									××				
	115	1	(continued)	1								V	LL			
		1	Department of Transportation		EPOF BOR				RD						R-09-Z1	В
			Division of Engineering Services Geotechnical Services		IST. 07	- 1	LA			710	0	17	Г/Т	TMILE	67-07-1879	
			Office of Geotechnical Design - South						LT	ECHI	NICA	LS	TL		e lovee	
		-		B	RIDG	E NU	MBE	K	K	.Barl	ED BY Ker			DAT	E SHEET 4 of	7

ELEVATION (ft)	15 15 15 16 17	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	Remarks
303.63	116			C25								XOX	See note at the end of the log regarding RQD.
301.63												♦ × ♦	
299.63	=		At EL. 299.6 ft, becomes moderately soft.	C26		2	100	100	21 16	104		OXO.	See note at the end of the log regarding RQD. PI, PA, UU, CR SD, EM
297.63	E											\	
295.63	123 124	, ,										XOXO	
293.63	F			C27			83	83				0000	
291.63												X 0 X	
289.63	130		At EL. 289.6 ft, becomes laminated.	C28		ř.	100	100				XOX	SD, EM
287.63	132	111						li s				\$ \$ \$ \$ \$	
285.63	134	111		C29			100	100	23	100		0×0	
283.63	136						182	() P P				(0X0)	
281.63	138	111	At EL. 281.6 ft, contains 6" lens of fresh, very strong, very hard.									\$\\ \	
279.63	140 141	111	At EL. 279.1 ft, becomes medium strong, very slightly fractured, bedding plane separation.	C30			100	0				X0X0	
277.63	142											X 0 X	
275.63	144	1	(continued)									♦	
			(continued)	IP	EPOF	TTI	TLF						HOLE ID
	L	_/	Department of Transportation Division of Engineering Services Geotechnical Services	D	BOR IST. 07	ING	RE OUN LA	YTI		ROU 71	TE O	PO:	R-09-Z1B
			Office of Geotechnical Design - South	1 1 🗀	ROJE SR-7 RIDG	10	TUN	NEI	_ TI	ECH	NICA ED BY Ker	LST	DATE SHEET 5 of 7

ELEVATION (ft)	45 145 145 145	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	Re	marks
273.63	146	1 / /		C31			100	100				X0X	See note at the regarding RQD	end of the log
271.63		, , ,							22	105		♦ × ♦	PTS, SD, EM	
269.63	150	1 / 3		C32			100	100				0%0		
267.63	151	, j j ;										X0X0		
265.63	153	1 1										X 0 X	<u>.</u>	
263.63	155	7 7 7		C33			100	100				X0X	UW, PI, CR	
261.63	E	, , ,										\$\$\$\$		
259.63		///	At EL. 259.6 ft, becomes soft.	C34			98	98	22	106		(0X0)		end of the log
257.63	E	111										× 6× 6		
255.63		1, 1										X0X0		
253.63		, , ,		C35			95	95				X0X		
251.63		1,1										X0X		
249.63			At EL. 249.6 ft, with few coarse sand.	C36			100	100				\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\		
247.63		, , ,										(0X0)		
245.63	173	1 ; ;										X0X0		
	1/5		(continued)											
	_		Department of Transportation Division of Engineering Services	D	EPOF BOR IST. 07	C	LA	ITY		ROU 71	TE O	POS T/	STMILE I	HOLE ID R-09-Z1B8 EA 07-07-187900
			Geotechnical Services Office of Geotechnical Design - Sou	ıth 1	ROJE SR-7 RIDG	10 1	UN	NEI	L TE	CH	NICA ED BY Ker	_ ST	DATE	



BRIDGE NUMBER

PREPARED BY

K.Barker

SHEET 7 of 7

DATE

	stle,	B. S	BEGIN DATE COMPLETION DATE chell 1-13-09 1-21-09	34° 7' 1	3.7	752 6	5" / 1	18°	13'	10.7	496	" N/		um)			-Z2B1	
DRILLIN			ACTOR ng Inc.	BOREHOL													E ELEVATION REPORTED IN 1981	
DRILLIN			-	DRILL RIG		Lay	ie i	JCK	DIV	aL	Avc	40					LE DIAMETER	
Rota	уW	ash		Speed S		ar 30	0K									6 in		
SPT (1.4"), Cal	I (2.4"), PQ core (3.2")	SPT HAMN Autom a	tic	: Ha	amme									70%	R EFFICIENCY,	
				GROUNDV READINGS		TER		NG [2 ft	DRILI		1	3.9 f	DRILLII t on 7			150.0	EPTH OF BORI	NG
ELEVATION (ft)	рертн (#)	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 Depui		emarks	
449.02	1 2 3		GRASS-LANDSCAPE (Fill). SANDY lean CLAY (CL); very stiff, strong bro gray, moist, about 1% coarse GRAVEL, 90% to fine-grained SAND, 9% fines, slightly plasti gravel.	wn and medium c, granitic		B0								$\delta \delta $	This in ac Soil and I 2007 A1 or Sum Tech	Boring Recordance & Rock Lo Presentat) except a f the Fina mary Republic Califo	ecord was prepa with the Caltran ogging, Classific ion Manual (Jun is noted in Appe Geotechnical ort, SR-710 Tun dy, Los Angeles rnia, dated April ments were tak the readings w value for ambie	red s ation e, endix nel
447.02	4 5											0000	2010 VOC	measure	ments were tak	en		
445.02	6		At EL. 446', becomes brownish yellow. D1 7 26 100 11 15							PP = 1.5	3000000	withi air. VOC VOC	in normal =0.1 ppm =0 ppm	value for ambie	ent			
443.02	8 9													000000				
	10		SEDIMENTARY ROCK (SANDSTONE/MUDS fine-grained, laminated to thinly bedded, gray decomposed, soft, unfractured, bedding dips hard, plastic clay interbedded with fine sand, in	STONE), 60°; moist.	X	S2	7 14 16	30	100		29	96	PP = 4	doodda	CR,	PI, VOC=	0.2 ppm	
	12 13		Topanga Formation.								; ;			0000000				
	15 16				X	D3	9 16 18	34	100				PP = 4	\sim	VOC CR	=0.2 ppm		
433.02	17 18	<i>\</i>																
431.02	20 =	<i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>			X	S4	5 10 14	24	100				PP = 4.5	<u> </u>				
	22		At EL. 429.2', bedding 60°.			C1			100					$\times \circ \times \emptyset$	VOC	=0.2 ppm		
427.02	23 24 2													$\times \times \times$				
	4 0	- 17867 H	(continued)		and STA					-0.0.0.5	CC-PROVING.	San Charles Control			TO SERVE PROPERTY.			
	Winds		Department of Transportation Division of Engineering Serv				EPOR BOR IST.		100		RD	ROU	TE	PO:	STMIL	E	HOLE ID R-09-Z	
		7	Geotechnical Services Office of Geotechnical Design		h 1	P	7 ROJE SR-7	CT C 10 1	LA PR BF UN	RIDG NEL	. TE	710 ME CHN) ICAL	D	D .		07-1879	
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					В	RIDGI	ENU	МВЕ	R	PRE K .	PARI T	ED BY			DAT 6-2	E SHEE 22-09 1 o f	6

ELEVATION (ft)	DEPTH (ft)	Material	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	Cashiy Depil	Remarks
425.02	26		/	Same as above. (continued). At EL. 425', bedding 45°.	Opposition and a second	C2			92					X \ \ \		
	27 28			At EL. 423, bedding 43.										\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
	29 30		/			C3			97					\Diamond		
	31		· :	At EL. 420', becomes bedding 30°- 45°.		33			5					$\langle \Diamond \times \Diamond \rangle$		
	33		/ ;								30			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	SD, UC	
	35		منعم	At EL. 416', horizontal bedding, 1/4" thick gypsum veins, steeply dipping, random orientation.		C4			98					\Diamond		
	36 37		X											$\Diamond X \Diamond X$		
	38 39		The very live											$\langle \Diamond \times \Diamond \times \rangle$		
	40 41		1	At EL. 411', thin laminated Gypsum veins, 1/4" thick. At EL. 410', bedding 45°.		C5			32					\Diamond		
	42 43			No recovery at EL. 409'.										$\Diamond X \Diamond X$	Lost Core	
407.02	44													$\langle \Diamond \rangle \langle \Diamond \rangle$		
R .	45 46		()	At EL. 406', wavy bedding dipping 85° to 90°.		C6			83					k /		
403.02	47 48 49			At EL. 403', gypsum vein, 1/8" thick on some bedding planes.										X0X0X0X0		
401.02	50 51			SEDIMENTARY ROCK (MUDSTONE and SANDSTONE), fine-grained, laminated to thinly bedded, very dark gray to dark yellowish brown, intensely weathered to moderately weathered, very soft to soft, unfractured; wavy bedding dipping near		C7			48		24			X0X0X0X	SD, UC	
399.02	52 53		A STATE OF THE PARTY OF THE PAR	Intensely weathered to moderately weathered, very soft to soft, unfractured; wavy bedding dipping near vertical (85° to 90°). Parting along some mudstone bedding planes.										$\rangle \rangle \langle \rangle \rangle$		
397.02	54 -55-			At EL. 396.5', gypsum veins, 1/4" thick.			MT 100 (00.000.000.000							$\Diamond \Diamond \Diamond$		
				(continued)	m. s/2/2		- DAE		T) -F			00040000000		ydamywyga.	2011/79.0000shw.0020e270.00000	LUOLE ID
			1	Department of Transportation			EPOF B OR									HOLE ID R-09-Z2B1
	I			Division of Engineering Services Geotechnical Services			IST. 7		COUN LA			ROU 71 0	TE)	PO: D /	STMILE /D	EA 07-187900
		7		Office of Geotechnical Design - Sout	h	1 📑		10 T	UN	NEL	TE	CHN	ICAL	STL		
	7771171171					В	RIDGI	= NU	WBE	ĸ	PRE K.	PARI T	ED BY			DATE SHEET 6-22-09 2 of 6

ELEVATION (ft)	оертн (ft)	Material Graphics	. DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight	Shear Strength (tsf)	Drilling Method	Remarks
395.02	56	The second secon	(continued). At EL. 395.5', parting along bedding planes, smooth and polished bedding surfaces.		C8			90				 	
393.02	57 58												
391.02	59 60 61	, - -	At EL. 391', becomes very dark gray and brown to black, slightly to moderately weathered, very soft, micaceous.		C9			42					
389.02	62	The state of the s	micaceous.										
387.02	64		At El. 2001 initiations antiched conferen		210							$\langle \langle \rangle \langle \rangle \rangle$	
385.02	66		At EL. 386', joint 60°, polished surface.		C10			65				$\langle \langle \langle \rangle \rangle$	
383.02	68 69	: {										X0X0	
	70 71	//	At EL. 381', becomes slightly fractured, minor faults, dipping 65°, displaces bedding 1/4".	C	C11			43				>	
379.02 377.02	72											\times	
	75		At EL. 375.5', becomes slightly weathered to moderately weathered, minor faults, horizontal to 60°		C12			76				$\Diamond X \Diamond X \Diamond$	
375.02	77		moderately weathered, minor faults, horizontal to 60° dip, 1/4" displacements, folded bedding 50°- 90° dip. At EL. 373.5', 1/8" to 1/4" fault offsets, fault with	7	C13			64				\Diamond	
373.02	79	1/, 1	polished surface.		310			5 +				\times \circ \times \circ \times	
371.02	81				C14			44				×0×0	
	83												
	85											\Diamond	
			(continued)		R	EPOR	ПТО	ΙE			ERASSI (SALE EE ALESSE (SA	*************	HOLEID
			Department of Transportation Division of Engineering Services			EPOR B OR IST.	NG	REG	COF		UTE	PO	HOLE ID R-09-Z2B1
7	L	7	Geotechnical Services			7		LA		7	10	D/	STMILE
		,	Office of Geotechnical Design - Sour	th 1	{	ROJE(SR-7 ' RIDGE	10 T	UN	NEL	E NAME TECH	NICAL RED BY	STU	
								=1=		K.T			DATE SHEET 6-22-09 3 of 6

ELEVATION (ft)	э Э	Material Graphics	DESCRIPTION		Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Molsture Content (%) Dry Unit Weight (ncf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
365.02	86		Same as above.	C	15			43				\Diamond		at end of log regarding
363.02	87 = 88 = 89 =		At EL. 364', bedding 80° dip, easy parting on bedding planes. Weak calcite cementation.									$\times \circ \times \circ \times$		at end of log regarding
361.02	90		At EL. 360.8', becomes diagonal shear, moderately fractured, smooth, CLAY filling faults dipping 60°-45°.	C	16			98				\\\ \\\\		
359.02	92	/	At El 250 El minor foult dinning AE°							20		$\times \circ \times \diamond$	SC & EM,	SD, UC
357.02	94		At EL. 358.5', minor fault dipping 45°.									\Diamond		
355.02	95 9 96 9 7		SEDIMENTARY ROCK (MUDSTONE and SANDSTONE), fine-grained, laminated to thinly bedded, gray to very dark gray, slightly weathered, very soft to soft, friable, slightly to moderately fractured, wavy bedding dipping near vertical (85°-90°).	Ċ	17			70				$\Diamond X \Diamond X \Diamond$		
353.02	98		Parting along some bedding planes.									\times		
351.02				∏C'	18			100				$\Diamond \times \Diamond$		
349.02	101 102											$\times \circ \times$		
347.02				7c	19			100				$\times \Diamond \times \Diamond \times$		
				Cź	20			17				$\times \circ \times \circ \times$		<u></u>
343.02												$\times \times \times $		
341.02			At EL. 342', minor reaction to HCL.	C	21			92				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
339.02			At EL. 339', becomes bedding 70°- 90°.									$\Diamond \times \Diamond \times \Diamond$		
337.02			Same as above (appear more rock-like).	7 C2	22			63	13	22		\Diamond	SD, UC	
	115		(continued)											
68		1	Department of Transportation		RE F	POR B ORI	r tit NG	LE RE	COF	RD.				HOLE ID R-09-Z2B1
7		au.	Division of Engineering Services			ST.	С	0UN L A			JTE O	PC	STMILE D/D	EA 07-187900
		7	Geotechnical Services Office of Geotechnical Design - Sout	h 1	S	SR-71	T 0	R BR	VEL	NAME TECH	NICAL	-	UDY	
		7.26				RIDGE				PREPAF K.T		100.0 Gr 10000 (Gr) 1		OATE SHEET 6-22-09 4 of 6

ELEVATION (ft)	DEPTH (ft)	Material	Graphics	DESCRIPTION	Sample Location	Dalling Did like	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit weignt (pcf)	Shear Strength (tsf)	Drilling Method		Rema	rks	
335.02				At EL. 342', minor HCL reaction. (continued).	C2	22			63	13				> < <	See not RQD.	e at end of I	og regarding	
333.02	117 118 119			At EL. 332', several minor hairline faults with 1/8" to 1/2" displacement.	☐C2	23			112	0				X0X0X				
331.02	120													\ \ \ \	CS & E	M, UC		
329.02	121 - 122 - 123 -			At 328.8', performed Pressure Meter test.	C2	24								>><	PM			
327.02	124													\Diamond				
325.02	125 126 127		3 5 4 5 4 6 6 4											0X0X0				
323.02	128 129	11	• 4															
321.02		-		At EL. 322', altered sandstone; feldsparthic litharenite, calcite cement, carbonaceous matter, collophane.	C2	25			20	20				$\Diamond \times \Diamond$	PTS			
319.02	131 132 133													X0X0X				
				At EL. 317', performed Pressure Meter Test.	C2	26								<0×0×	РМ			
315.02 313.02 311.02 309.02 307.02	136 137	- 1												<u> </u>				
313.02	138 139	11												X \ \ \				
311.02	140 141	4		At EL. 310.8', healed fault, minor HCL reaction.	C2	27			45	35				X0X0	0.11			
309.02			4 5 5 4 6 4 6 4 6 4 6 4 6 4 6 4 6 4 6 4	At EL. 308.8', seperates upon drying-slaking.										X0X0X0X	CAI			
307.02		- Contract												$\langle \rangle \langle \rangle \langle \rangle$				
	145 ^上			(continued)														
			Ī	Department of Transportation		RE B	POR ORI	I TII NG	ILE RE	COI	RD					НС	LE ID R-09-Z2	B1
7 Je			J	Division of Engineering Services Geotechnical Services		DIS 7	ST.	C	OUN LA	ITY		ROUT 710	Ξ	PO: D /	STMILE 'D	EA	07-18790	0
			7	Office of Geotechnical Design - South	th 1	S	OJEC R-7 IDGE	10 1	UN	NEL	E NAI TE(PRE	CHN	ICAL D BY	STU	JDY	DATE 6-22-0 9	SHEET 5 of	6

ELEVATION (ft)	DEPTH (ft)	ial nics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	(%)	Moisture Content (%)	nit vveignt	Shear Strength (tsf)	Drilling Method	R	emarks
ELEV		Material Graphics		Sampl Sampl	Blows	Blows	Recov	RQD (%)	Moistu Conter	(pcf)	Shear (tsf)	Drilling	Casilly	
305.02	146		At EL. 306', minor fault displacements, 0.1", dipping 45° .	C28				79	21			>>>>	See note at en RQD. CS & EM, SD,	d of log regarding UC
303.02	148			C29			61	39				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
301.02		. 4	Bottom of borehole at 150.0 ft bgs Bottom of borehole is at elevation 301 ft.									\Diamond		
299.02	151		RQD values provided in the boring logs are based on intact core pieces obtained between two natural discontinuities.											
297.02	154		The majority of cores obtained in this boring are typically very weak to weak and do not meet the "sound core" definition provided in standard test method for RQD ASTM (D 6032). These RQD values should not be used to evaluate the rock mass quality.											
295.02	155 156		Borehole converted to piezometer at the completion of drilling.											
293.02	158													
291.02	159 160													
293.02 291.02 289.02 287.02	161 = 162 = 1													d of log regarding UC
289.02 287.02	163 164													
285.02	165													
283.02	167 168													
281.02	169 170													
279.02	171 172													
285.02 : 283.02 : 281.02 : 279.02 : 277.02 :	173 - 174 -													
	175 [⊟]													
		7	Department of Transportation		EPOR B ORI	NG	REC							HOLE ID R-09-Z2B1
		property.	Division of Engineering Services	D	IST. 7	C	OUN'	ΤΥ	F	710	ΙΞ	PO: D /	STMILE D	EA 07-187900

Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - South 1

BORIN	G RECO	RD			R-09-Z2B1
DIST. 7	COUNTY LA	ROUTE 710	POSTMILE D/D	Ε	07-187900
	OR BRIDG TUNNEL	E NAME TECHNICAL	STUDY		
BRIDGE N	IUMBER	PREPARED BY		DATE	SHEET

LOGGED BY M. Salisbu		ATE BOREHOL 34° 7' 0							and Da	tum)	R-09-Z2B2		
DRILLING CON Caltrans In		BOREHOL									SURFACE ELEVATION 601.1 ft NAVD88		
DRILLING MET		DRILL RIG		ck)							BOREHOLE DIAMETER 4 in		
	PE(S) AND SIZE(S) (ID)	SPT HAMM Diedric	VER TY	PE	ic 14	o Ib	30	inch	dron		HAMMER EFFICIENCY, ERI 84%		
BOREHOLE BA	ACKFILL AND COMPLETION Slurry and capped with "Quickcret	GROUND	NATER	7	NG DR		G A		I				
	Sidiry and capped with Quickcret	le	-				_				203.0 10		
ELEVATION (ft)	Oraceraal Oracer		Sample Location Sample Number	Blows per 6 in.	Blows per foot	RQD (%)	Moisture	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method Casing Depth	Remarks		
599.07 2 2 599.07 4 5 595.07 6	CONCRETE (Concrete Slab = 5"). Poorly graded GRAVEL with SAND (GI yellowish brown; dry; mostly coarse to GRAVEL, max. 3 in. dia.; little medium trace fines; weak cementation; (Aggrege CLAYEY SAND with GRAVEL (SC); de brown; dry to moist; few coarse to fine, GRAVEL, max. 3 in. dia.; mostly coarse SAND; few fines; weak cementation; A SEDIMENTARY ROCK, (SANDSTON) moderately bedded, pale yellowish brown moderately to slightly weathered, mode very slightly fractured, coarse sand, poor cemented. [FERNANDO FORMATION]	fine, rounded to fine SAND; jate Base = 7"). Jense; yellowish rounded e to medium rtificial fill. E), thinly to wn, erately hard, orly	II C01		400	0 1000				×	This Boring Record was prepared in accordance with the Caltrans Soil & Rock Logging, Classification and Presentation Manual (June, 2007), except as noted in Appendix A.1 of the Final Geotechnical Summary Report, SR-710 Tunnel Technical Study, Los Angeles County, California, dated April, 2010. Hand Auger 2'-10'		
589,07 12 13 587,07 14 15										X0X0X0X0X	regarding RQD.		
585.07 16 17 17 18 19 19 19 19 19 19 19 19 19 19 19 19 19	SEDIMENTARY ROCK, (MUDSTONE moderately bedded, dusky red, modera weathered, moderately hard, very sligh	i), thinly to ately to slightly itly fractured.	C02		10	0 100	12	120		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	UW, PA		
581.07 20 21	SEDIMENTARY ROCK, (SANDSTON moderately bedded, light brown, moder weathered, moderately hard, very sligh coarse sand.	rately to slightly	C03		10	0 100)			×0×0×			
579.07 22 23 23 577.07 24 5										0.0000			
25	(continued)		1.0	CD2	·						Tuere		
5	Department of Transport Division of Engineering Geotechnical Services	g Services	- E	BOR IST. 07 ROJE	CT OR	ECC JNTY N BRIDG	GE N	ROL 71	0	_ T/1			
	Office of Geotechnical	Design - Sout			ENUME		PF	EPAR	ED BY sbury		DATE SHEET 1 of 10		

ELEVATION (ft)	P DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Casing Method	Remarks
575.07			(continued).	C04			100	100				X 0 X	See note at the end of the log regarding RQD.
573.07	28											♦ × ♦	
571.07	30	Ÿ.	SEDIMENTARY ROCK, (MUDSTONE), thinly to	C05			100	100				X 0 X	
20.07	31		moderately bedded, light brown, moderately to slightly weathered, moderately hard, very slightly fractured, sandy, fine sand, moderately graded.	000			100	100				0×0	
69.07												X 0 X	
67.07	34						100		E			0×0	
65.07			SEDIMENTARY ROCK, (SANDSTONE), thinly to moderately bedded, light brown, moderately to slightly weathered, moderately soft to moderately hard, very slightly fractured, coarse.	C06			100	100				X 0 X	
63.07									10	123		000	UW
61.07			Silty, fine sand, poorly graded.	C07			95	100				0×0	
59.07	41	j.										× 6 × 4	
57.07	43 44	`.	Dipping 33°, coarse sand, with gravel. SEDIMENTARY ROCK, (SILTSTONE), thinly to moderately bedded, light brown, moderately to slightly weathered, moderately soft to moderately hard, unfractured, dipping 27°, sandy, fine sand.									XOXO	
55.07	45 46		SEDIMENTARY ROCK, (SANDSTONE), thinly to moderately bedded, light brown, moderately to slightly weathered, moderately soft to moderately hard, unfractured, silty, fine sand.	C08			100	100				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
53.07	47 48	 	Dipping 8°, fine sand, with silt.									0×0	
- 1 0-7	49	•	Dipping 8°, coarse sand.									XOX	
51.07	50		Medium sand, with silt.	C09			100	100				000	
49.07	52 53											× 6 ×	
47.07			To light brown, fine sand, with clay. (continued)									(0X0	
	L	_/	Department of Transportation Division of Engineering Services Geotechnical Services	D	EPOF BOR IST. 07	ING	RE OUN LA	VTY		ROU 71	ITE 0	POS T/	HOLE ID R-09-Z2B STMILE EA 07-07-187900
			Office of Geotechnical Design - South	11 3	SR-7	10	TUN	NE	L T	ECH EPAR	NICA ED BY sbury		DATE SHEET 2 of 10

ELEVATION (ft)	PDEPTH (ft)	Motoriol	Graphics	DESCRIPTION	Sample	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
545.07	56			(continued). Grayish orange, dipping 22°, silty, fine sand.	C10			100	100	11	125		$\overset{\vee}{\diamond}$	regarding RO	he end of the log
543.07	57 58 59		1:1:	Light brown, dipping 18°, sandy, fine sand. SEDIMENTARY ROCK, (SILTSTONE), thinly to moderately bedded, light brown, slightly weathered to fresh, moderately soft to moderately hard, unfractured, dipping 19°, sandy, medium sand.									×0×0×	UW, PA	
541.07	60 61		11:11	SEDIMENTARY ROCK, (CLAYSTONE), thinly to moderately bedded, moderate brown mottled with light olive, slightly weathered to fresh, moderately soft to moderately hard, unfractured, dipping 22°, sandy,	C11			100	100				X0X		19
539.07	62	Ē.		SEDIMENTARY ROCK, (SANDSTONE), thinly to moderately bedded, moderate brown, slightly weathered to fresh, moderately hard, unfractured, clayey, medium sand.									\$X	14 14 15 16	
537.07	63 64			SEDIMENTARY ROCK, (CLAYSTONE), thinly to moderately bedded, light brown, slightly weathered to fresh, moderately hard, unfractured, dipping 19°. SEDIMENTARY ROCK, (SANDSTONE), thinly to									×0×		
535.07	65 66		//	moderately bedded, light brown mottled with light olive, slightly weathered to fresh, moderately hard, very slightly fractured, bedding joint (clay, not healed), dipping 12°.	C12			100	100	5			$\Diamond \times \Diamond \rangle$		15
533.07	67 68			SEDIMENTARY ROCK, (SILTSTONE), thinly to moderately bedded, light brown, slightly weathered to fresh, moderately hard, unfractured, dipping 28°, clayey, with sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly to									$\Diamond \times \Diamond$		
531.07	69 70		1/1	moderately bedded, light brown, slightly weathered to fresh, moderately hard, unfractured, sandy, fine sand. SEDIMENTARY ROCK, (SANDSTONE), thinly to moderately bedded, light brown, slightly weathered to	040			100	100				X0X		
529.07	71			fresh, moderately hard, very slightly fractured, dipping 12°, silty, fine sand. Dipping 14°, silty, clayey. Joint (clay, not healed), dipping 25°. Grayish orange, coarse sand.	C13			100	100				$\Diamond \times \Diamond$		
529.07	72 73		111	SEDIMENTARY ROCK, (SILTSTONE), thinly to moderately bedded, grayish orange, slightly weathered to fresh, moderately hard, unfractured, dipping 22°, sandy, fine sand.									\$ X Q X		
527.07	74 75			SEDIMENTARY ROCK, (SANDSTONE), thinly to moderately bedded, light brown to grayish orange, slightly weathered to fresh, moderately hard, slightly to very slightly fractured, dipping 15°, medium sand. Dipping 10°, coarse.	C14			100	100				×0×		
525.07	76 77		1	Joint (člay, not healed), dipping 10°, clayey. SEDIMENTARY ROCK, (CLAYSTONE), thinly to moderately bedded, light brown, slightly weathered to fresh, moderately hard, unfractured, sandy, medium to						13	122		$\Diamond \times \Diamond$	PA, PI	
523.07	78 79		1:	coarse sand. SEDIMENTARY ROCK, (SILTSTONE), thinly to moderately bedded, light brown, slightly weathered to fresh, moderately hard, unfractured, dipping 11°,									XOX		
521.07	80 81		1	MENTARY ROCK, (CLAYSTONE), thinly to moderately bedded, light brown, slightly weathered to fresh, moderately hard, unfractured, sandy. SEDIMENTARY ROCK, (SILTSTONE), thinly to moderately bedded, light brown, slightly weathered to	C15			100	100				$\Diamond X \Diamond X$		
519.07	82		111	fresh, moderately hard, slightly fractured, dipping 12°, sandy. Light olive to light brown, dipping 11°, sandy, fine to medium sand.									$\Diamond \times \Diamond$		
517.07	83 84			Concretion ~ 1" diameter. Concretion ~ 0.5" diameter. Concretion ~ 1" diameter. Joint (clay, not healed), dipping 30°. Concretion ~3" diameter.									XOX		
	-85-	Η,		(continued)									V		
	_		/	Department of Transportation Division of Engineering Services Geotechnical Services	D	EPOR BOR IST. 07	ING	RE OUN LA	VTY		ROU 71 (TE)	PC	DSTMILE	HOLE ID R-09-Z2B2 EA 07-07-187900
		1	1	Office of Geotechnical Design - South	1 3	ROJE SR-7 RIDGI	10 1	TUN	NE	PRE	CHI PARE	NICA ED BY sbury		TUDY	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	
515.07	86		moderately bedded, light olive, slightly weathered to fresh, moderately hard, slightly to very slightly fractured, sandy, fine sand. Joint dipping 38°.	C16			100		10	122		XOX	See note at t regarding RO UW	he end of the log QD.	
513.07	88	×.	Joint (clay, not healed), dipping 8°, 1/4" thick clay. Concretion ~ 3" diameter. SEDIMENTARY ROCK, (SILTSTONE), thinly to									$\Diamond \times \Diamond$			
511.07	89 90	///	moderately bedded, light olive, slightly weathered to fresh, moderately hard, unfractured, with coarse sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly to moderately bedded, light olive, slightly weathered to fresh, moderately hard, unfractured, sandy, medium to coarse sand, some gravel to 3/4".	C17			100	100)X0X0			
509.07	91 92	. //	SEDIMENTARY ROCK, (SANDSTONE), thinly to moderately bedded, light olive mottled with light brown, slightly weathered to fresh, moderately hard, unfractured, silty, medium to coarse sand. Concretion ~ 1" diameter.									0.000			
507.07	93		Grayish orange, dipping 12°, coarse sand. SEDIMENTARY ROCK, (SILTSTONE), moderately to thickly bedded, light brown, slightly weathered to fresh, moderately hard, unfractured, with fine sand,. Sandy, coarse sand.									XOX			
507.07 505.07 503.07 501.07 499.07	95 96 97		SEDIMENTARY ROCK, (SANDSTONE), thinly to moderately bedded, grayish orange, slightly weathered to fresh, moderately hard, unfractured, medium to coarse sand.	C18			100	100				>X			
503.07	98		SEDIMENTARY ROCK, (SILTSTONE), thinly to moderately bedded, light brown, slightly weathered to fresh, moderately hard, unfractured, dipping 24°, sandy, fine sand.									2000			
501.07	99		SEDIMENTARY ROCK, (SANDSTONE), thickly bedded, light brown, slightly weathered to fresh, moderately hard, unfractured, dipping 20°, clayey, medium to coarse sand. Concretion ~ 1" diameter. Dipping 11°.	C19			98	98	H			$\Diamond \times \Diamond \rangle$			
499.07	101		Dipping 11°. Concretion ~1/2" diameter. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, light brown, slightly weathered to fresh, moderately hard, unfractured, sandy, coarse sand.									×0×<			
497.07	103 104	∃ .	SEDIMENTARY ROCK, (SANDSTONE), very thinly bedded, grayish orange, slightly weathered to fresh, moderately hard, unfractured, medium sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly to									\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\			
	105 106		fractured, dipping 32°, sandy, coarse sand, gravel to J@nt (not healed), dipping 15°. Concretion ~ 3" diameter.	C20			100	100				×0×0			
493.07	107		Concretion ~ 2" diameter. SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, light olive, slightly weathered to fresh, moderately hard, unfractured, coarse sand with some silt.									<0×0×			
495.07 493.07 491.07 489.07		<i>!:/::</i>	SEDIMENTARY ROCK, (CLAYSTONE), thinly to moderately bedded, light brown and light olive, slightly weathered to fresh, hard, unfractured, dipping 22°, sandy, coarse sand. SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, grayish orange, slightly weathered to	C21			100	100				X0X0			
489.07		//	fresh, moderately hard, unfractured, dipping 28°, silty, coarse sand. Light brown, clayey, fine sand. Grayish orange, dipping 27°, some silt, trace gravel to									$\langle \Diamond \times \Diamond \rangle$			
487.07	113	<i>\</i>	SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, light brown mottled with light olive, slightly weathered to fresh, hard, unfractured, sandy, fine sand. SEDIMENTARY ROCK, (CLAYSTONE), thickly						13	118		$\langle \Diamond \times \Diamond \rangle$			THE PERSON
	115		(continued)												
		-	Department of Transportation		POR			co	RD					R-09-Z2B	2
	_		Division of Engineering Services	DI	ST.	C	OUN			ROU			STMILE	EA	T
	L	7	Geotechnical Services	PF	7 ROJE	CT O					E to to a		/T	07-07-18790	,
			Office of Geotechnical Design - South 1	5		10 T	UN	NE	L TE	CH	NICAI	LS	TUDY DA	TE SHEET	
				Por	NOGE	NO	VIOC.	34			sbury	,	DA	4 of 10)

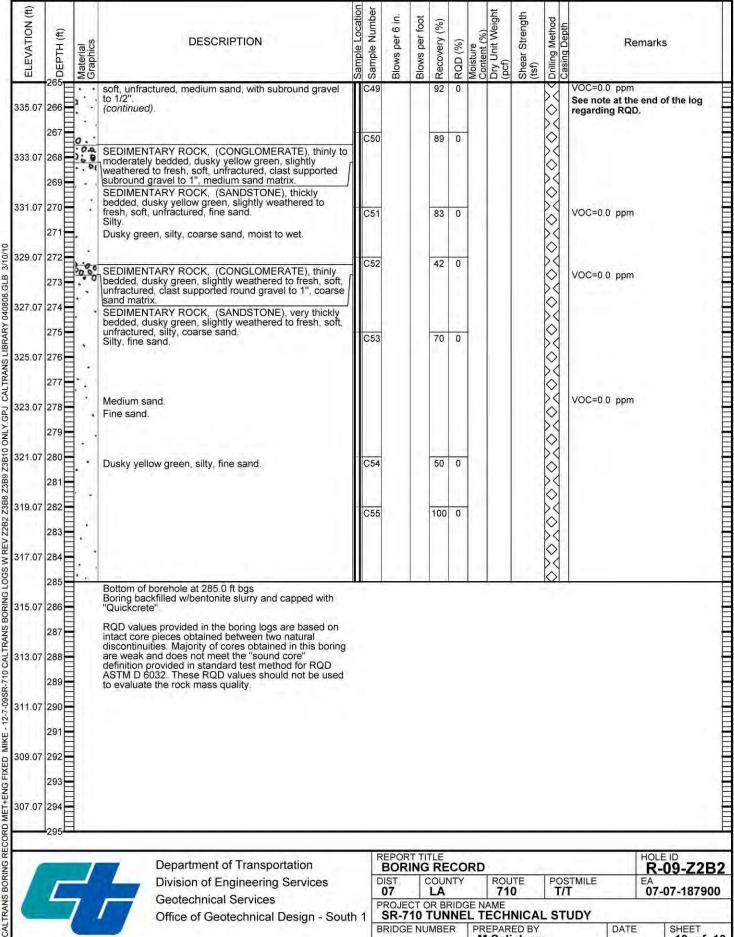
ELEVATION (ft)	TOEDTH /#/	לום ביו ויו	Material Graphics	DESCRIPTION -	Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Remarks
485.07	116		1:1	bedded, light brown, slightly weathered to fresh, moderately soft to moderately hard, unfractured, sandy, medium sand.	C22			100					\ \ \ \	See note at the end of the log regarding RQD.
	117	7	4	SEDIMENTARY ROCK, (SILTSTONE), moderately to thickly bedded, light brown, slightly weathered to fresh, hard, unfractured, sandy, fine sand.									Š	regarding requi
483.07	118	E		SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, grayish orange, slightly weathered to fresh, moderately soft to moderately hard, unfractured, coarse sand.									× 0 ×	
481.07		E	0.0	SEDIMENTARY ROCK, (SILTSTONE), moderately to thickly bedded, light brown mottled with light olive, slightly weathered to fresh, hard, unfractured, dipping	C22			100	100	13	115		000	UW
479.07	121	E		35°, sandy. SEDIMENTARY ROCK, (CLAYSTONE), moderately bedded, light brown, slightly weathered to fresh, moderately soft to moderately hard, unfractured, dipping 28°, sandy, coarse sand.									× 0 ×	
477.07	123	E		SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, grayish orange, slightly weathered to fresh, hard, unfractured, dipping 30°, coarse sand.									♦ × ♦	
477.07	124	E	,	SEDIMENTARY ROCK, (CLAYSTONE), thinly to moderately bedded, light brown, slightly weathered to fresh, hard, unfractured, sandy, coarse sand. SEDIMENTARY ROCK, (SANDSTONE), thickly	C23			100	100				× < > <	
175.07	126	E	111	bedded, dark yellowish brown to pale olive, slightly weathered to fresh, hard, unfractured, dipping 22°, coarse. Laminated to very thinly bedded.									\$X	
173.07		E		SEDIMENTARY ROCK, (SILTSTONE), moderately bedded, dark yellowish brown, slightly weathered to fresh, hard, unfractured.									\$X\$	
71.07	129			SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, dusky yellow, slightly weathered to fresh, moderately soft to moderately hard, unfractured, dipping 39°, medium to coarse sand.									X 0 X	
				SEDIMENTARY ROCK, (CONGLOMERATE), moderately bedded, grayish orange, slightly weathered to fresh, moderately soft to moderately hard, unfractured, clast supported, sand matrix, gravel to 3",				0					♦ × ♦	130.0 - 136.0; 3" dia. pressuremeter pocket was drilled for the field test.
69.07	132	E		cobbles to 4". SEDIMENTARY ROCK, (CLAYSTONE), thickly bedded, light brown to light olive, slightly weathered to fresh, hard, unfractured, sandy, coarse sand.									× 0 ×	
67.07		E		SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, light brown, slightly weathered to fresh, moderately soft to moderately hard, unfractured, silty, clayey, coarse sand.									0×0	
	136	E		SEDIMENTARY ROCK, (SILTSTONE), moderately bedded, light brown, slightly weathered to fresh, hard, unfractured, sandy, fine sand. SEDIMENTARY ROCK, (SANDSTONE), thickly									X 0 X	Exterior plates of the pressuremeter apparatus lost inside the hole. Remains of the pressuremeter plates slowed down
63.07	137	E		bedded, light brown, slightly weathered to fresh, moderately soft to moderately hard, unfractured, clayey, coarse sand. Dusky yellow, dipping 32°, coarse sand.									0×0	the drilling and disturbed sample recovery.
	139			Light brown to light olive, hard, coarse sand, with silt. No sample.									Ž	
61.07	140	E	٠,										X V	
459.07	142												>× <	
457.07	143 144	E	6////	SEDIMENTARY ROCK, (CONGLOMERATE), thinly to moderately bedded, grayish orange, slightly weathered to fresh, hard, unfractured, clast supported, coarse sand matrix, gravel to 1/2". SEDIMENTARY ROCK, (SILTSTONE), thinly to moderately bedded, light olive, slightly weathered to	C24			100	100				0000	PA, UU
	145			(continued)	In	EDOF	T T							LIOUEID
	1		_/	Department of Transportation Division of Engineering Services Geotechnical Services	D	BOR IST.	ING	RE OUN LA	YTY		ROU 71		PO:	R-09-Z2B STMILE EA 07-07-187900
				Office of Geotechnical Design - South	1 _		10	TUN	NE	L TI	ECH	NICAI	ST	UDY
				A service of the serv	В	RIDG	E NU	MBE	R			ED BY sbur	,	DATE SHEET 5 of 10

ELEVATION (ft)	145 145 145	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	Remarks
455.07	146	"	fresh, hard, unfractured, sandy, fine sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly to moderately bedded, light brown, slightly weathered to fresh, moderately hard, unfractured, sandy, coarse	C25			78	0				× 0 × 0	See note at the end of the log regarding RQD.
453.07	147 148	//	sand. SEDIMENTARY ROCK, (SANDSTONE), thinly to moderately bedded, dusky yellow green, slightly weathered to fresh, very weak, moderately hard,									0 X Q	
451.07	149		Linfractured, coarse sand. SEDIMENTARY ROCK, (CLAYSTONE), thickly bedded, light brown, slightly weathered to fresh, moderately hard, very slightly fractured, sandy, coarse									X 0 X	1
401.07	151		sand. Light brown mottled with light olive, joint (CL, not healed), dipping 38°.	C26			100	0				>X	_ 0
149.07	152 153	///	SEDIMENTARY ROCK, (SILTSTONE), thinly to moderately bedded, light olive, slightly weathered to fresh, moderately hard, unfractured, sandy, fine sand.									0 X Q	
47.07			SEDIMENTARY ROCK, (CLAYSTONE), very thinly to thinly bedded, light brown, slightly weathered to fresh, moderately hard, unfractured.									× ×	
45.07	155 156	. 0	SEDIMENTARY ROCK, (SANDSTONE), thickly bedded, grayish orange to dusky yellow green, slightly weathered to fresh, moderately hard, unfractured, with silt and clay, coarse sand with subround gravel to 1". SEDIMENTARY ROCK, (CONGLOMERATE),	C27			100	167				X0X0	
43.07	157 158		moderately to thickly bedded, dusky yellow green, slightly weathered to fresh, moderately hard, unfractured, clast supported, coarse sand matrix, gravel to 1/2". SEDIMENTARY ROCK, (SANDSTONE), thickly									0×0	
41.07	159 160		bedded, pale yellowish brown to grayish orange, slightly weathered to fresh, moderately soft, unfractured, dipping 32°. Coarse sand with subround gravel to 1/2".	C28			79	75				× 0 ×	
	161	0,80	Fine sand. Grayish orange, coarse sand with subround gravel to 1/2".	020			75	73				000	
39.07	162 163	0.	SEDIMENTARY ROCK, (CONGLOMERATE), moderately to thickly bedded, grayish orange, slightly weathered to fresh, moderately soft, unfractured, round gravel to 2", clast supported, coarse sand	C29			86	67				X 0 X	
37.07	-	200	bedmentary ROCK, (SANDSTONE), thickly bedded, grayish orange, slightly weathered to fresh, moderately soft, unfractured, coarse sand. SEDIMENTARY ROCK, (CONGLOMERATE),							7.4		$\Diamond \times \Diamond$	
35.07		,	weathered to fresh, moderately soft, unfractured, matrix supported subround gravel to 1", medium to coarse sand matrix.	C29			100	0	16	114		X 0 X	UU
33.07	167 168	//	SEDIMENTARY ROCK, (SILTSTONE), thickly bedded, light brown, slightly weathered to fresh, very weak, soft, very slightly fractured to unfractured, with some fine sand.	C29			100	58				♦ × ♦	
31.07	169		SEDIMENTARY ROCK, (SANDSTONE), thickly bedded, light brown, slightly weathered to fresh, very to extremely hard, unfractured, strongly cemented, fine sand.									XOX	
	171 172	111	Light gray, soft, moderately to slightly fractured, clayey, fine to medium sand. SEDIMENTARY ROCK, (SILTSTONE), thickly bedded, light brown, slightly weathered to fresh, moderately soft to moderately hard, slightly fractured, clayey with some fine sand.	C30			100	100				XOXO	
07.55	173	111					politica (0×0	
27.07	175		SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, light brown, slightly weathered to fresh,	C30			100	67				\Diamond	
			(continued)	TR	EPOF	RT TI	TLE		1/2				HOLE ID
	Г	_/	Department of Transportation Division of Engineering Services	D	BOR IST. 07	ING	RE	_	RD	ROU 71		POS T/	R-09-Z2B2
	-	7	Geotechnical Services	P	ROJE	CTC	R BF			AME	NICA	1	
			Office of Geotechnical Design - South		RIDG	_		_			ED BY	_ 31	DATE SHEET

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	Remarks
425.07	176 176		moderately soft to moderately hard, slightly fractured, fine to medium sand, with gravel. SEDIMENTARY ROCK, (SILTSTONE), thickly bedded, olive gray, slightly weathered to fresh, moderately soft to moderately hard, slightly fractured,	C31			100					>X0X0	See note at the end of the log regarding RQD.
423.07	178 179	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	with fine to medium gravel. Light olive, clayey, with coarse round gravel.	C31			100	100				>X	
421.07	180	000	SEDIMENTARY ROCK, (CONGLOMERATE), moderately bedded, light gray, slightly weathered to fresh, very hard, intensely to moderately fractured,	C32			100					X0X0	
419.07	182		clast supported subround gravel to 3", granite clasts. SEDIMENTARY ROCK, (SANDSTONE), very thickly bedded, light brown, slightly weathered to fresh, soft, slightly to very slightly fractured, medium to coarse sand.	032			100	100				0×0	
417.07	184						5					0 X 0 X	
115.07	186		Fine sand. Coarse sand. Light olive gray, fine sand.	C33			100	100	18	112		×0×	uw
413.07	188			C33			100	100				X0X	
411.07			With clay and gravel to 1/2". Dusky yellow, silty, coarse sand.	C34			92	0				0×0	
409.07	191 192		SEDIMENTARY ROCK, (CLAYSTONE), thickly bedded, light brown mottled with light olive, slightly weathered to fresh, extremely weak, moderately hard, slightly to very slightly fractured.						500	2.5		X0X0	SD, EM
407.07			Light brown.						12	127		000	
405.07	195 196		Light brown mottled with light olive, with well graded sand. SEDIMENTARY ROCK, (CONGLOMERATE), thinly	C35			100	0				XOX	
403.07	197 198		bedded, light brown, slightly weathered to fresh, moderately hard, slightly to very slightly fractured, dipping 50°, subround clast supported gravel to 1", coarse sand matrix.									20%	
401.07		////:	SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, grayish orange, slightly weathered to fresh, moderately hard, slightly to very slightly fractured, coarse sand, well graded. SEDIMENTARY ROCK, (SILTSTONE), thinly to	C36			100	0	d			0X0	
399.07	201	////	moderately bedded, light brown, slightly weathered to fresh, moderately hard, slightly to very slightly fractured, sandy, fine sand. With coarse sand. SEDIMENTARY ROCK, (SANDSTONE), thinly to									0×0	
397.07	203 204	1, ()	moderately bedded, light brown to light olive, slightly weathered to fresh, moderately soft, slightly to very slightly fractured, silty, fine sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly to moderately bedded, light brown, slightly weathered to									XOXC	
	205	1.	(continued)									IVI	A.
1	Г	_/	Department of Transportation Division of Engineering Services	D	EPOR BOR IST.	ING			RD	ROL 71	ITE 0	POS T/	HOLE ID R-09-Z2B2 STMILE EA 07-07-187900
	_	7	Geotechnical Services Office of Geotechnical Design - South	h 1	ROJE	CT 0	R BF	NE	PR	AME ECH EPAR	NICA ED BY	LST	1, 20, 20, 30, 20,

ELEVATION (ft)	PDEPTH (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	Remarks
395.07	206		11	fresh, moderately soft, slightly to very slightly fractured, dipping 33°, sandy, coarse sand. Concretion ~ 2" diameter.	C37			90	0	4.2			♦ × ♦	See note at the end of the log regarding RQD.
393.07	207 208		1111	SEDIMENTARY ROCK, (SILTSTONE), moderately to thickly bedded, light brown, slightly weathered to fresh, moderately soft, unfractured, sandy, fine sand. Light brown mottled with light olive, very weak. (continued). Medium sand.						11	129		X0X0X	SD, EM
391.07				SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light brown, slightly weathered to fresh, moderately soft, unfractured, clayey, coarse sandish orange to light olive, silty, coarse sand.	C38		r	90	90				0 X Q	
389.07		Ξ,	4	SEDIMENTARY ROCK, (CONGLOMERATE), moderately bedded, grayish orange, slightly weathered to fresh, moderately soft, unfractured, clast supported sub round gravel to 3/4", clayey fine sand matrix.									X0X0	
387.07				SEDIMENTARY ROCK, (SANDSTONE), moderately to thickly bedded, light brown, slightly weathered to fresh, very weak, moderately soft, unfractured, clayey, coarse sand.						11	121		× 0×	UU
385.07	215	\equiv	0	Light brown to light olive, lithic fragments (angular volcanic clasts).	C39			100	0				20%	
383.07			1././	Grayish olive, silty, coarse to medium sand, with some gravel to 3/8". SEDIMENTARY ROCK, (SILTSTONE), moderately bedded, light brown mottled with light olive, slightly									\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
381.07	1		000	weathered to fresh, moderately soft, unfractured, sandy, coarse sand. SEDIMENTARY ROCK, (CONGLOMERATE), thinly bedded, light brown, slightly weathered to fresh, moderately soft, unfractured, clast supported gravel to	C40		r	100	0				(0×0)	
379.07				1/2". SEDIMENTARY ROCK, (SANDSTONE), thickly bedded, light brown, slightly weathered to fresh, moderately soft, unfractured, silty, fine sand. Grayish orange, silty, coarse sand.									0×0	
377.07				Dipping 42°. Light brown, silty, fine to medium sand. To grayish orange, silty, coarse sand, with some rounded gravel to 1".									000	
375.07			1111	SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, light brown, slightly weathered to fresh, moderately soft, unfractured, sandy, medium sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly to	C41			100	0				× 6×	
373.07	227		111	moderately bedded, light brown, slightly weathered to fresh, soft, unfractured, dipping 37° plastic, moist. To grayish orange, moderately hard, sandy, coarse sand.									×0×0	
371.07			///.	SEDIMENTARY ROCK, (SANDSTONE), very thinly bedded, light brown to pale yellowish brown, slightly	C42			100	95				000	
369.07	231			weathered to fresh, moderafely hard, unfractured, dipping 35°, clayey, coarse sand. SEDIMENTARY ROCK, (SILTSTONE), very thinly bedded, light brown to light olive gray, slightly									>X (UC, PTS
367.07	233 234		11	bedded, light brown to light olive gray, slightly weathered to fresh, moderately hard, unfractured, coarse sand. SEDIMENTARY ROCK, (CLAYSTONE), very thinly bedded, light brown, slightly weathered to fresh.					1	11	128		X 0 X	CR
	235	-	1	moderately hard, unfractured.									\Diamond	
				35.436.377.45.27	R	EPOF	T TI	TLE						HOLE ID
	L		_/	Department of Transportation Division of Engineering Services Geotechnical Services	D	BOR IST 07	(LA	YTY		ROL 71		POS T/	R-09-Z2B2 STMILE EA 07-07-187900
		/		Office of Geotechnical Design - South		ROJE SR-7	10	R BF	NE	LT	AME ECH	NICA	ST	UDY
						RIDG			_	PR	EPAR	ED BY		DATE SHEET 8 of 10

ELEVATION (ft)	SDEPTH (ft)	Material Graphics		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Remarks
365.07	236		SEDIMENTARY ROCK, (SILTSTONE), very thinly to thinly bedded, light brown, slightly weathered to fresh, very weak, moderately hard, unfractured.	C43			100					♦ ×	See note at the end of the log regarding RQD.
363.07	237 238		SEDIMENTARY ROCK, (CLAYSTONE), very thinly to thinly bedded, light brown, slightly weathered to fresh, moderately hard, unfractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, light brown mottled with light olive, slightly weathered to fresh, moderately hard, unfractured, sandy, well									\ \ \ \ \ \ \	
361.07	239 240	, . . ,	graded sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, light brown, slightly weathered to fresh, soft,	244				•				X 0 X	
1	241		lunfractured, plastic, moist. SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, light olive, slightly weathered to fresh, soft, unfractured, silty, fine to medium sand.	C44			63	0	12	119		♦ × ♦	UW
59.07	111	į,	Medium sand. Fine sand. Dusky yellow green, moderately hard, coarse sand, with subround gravel to 3/4".									× < > ×	
57.07	244	ļ.,	with subfound graver to 3/4 .				0					\$X	
55.07	245 246		No sample.				0					0X0	245.0 - 250.0: 3" dia. pressuremeter pocket was drilled for the field test.
53.07	247											X 0 X	
4	249	• •										0×0	
51.07	250 251			C45			73	0				X 0 X	
49.07			Silty, medium to coarse sand, with some subround gravel to 1/2".									♦ ×♦	VOC=0.0 ppm
47.07	253 254			C46			100	0				× 6×	У-50-5.0 ррш
4	255	፟. •		C47			65	0				0	1
45.07	256 257											>×	
43.07			SEDIMENTARY ROCK, (CLAYSTONE), moderately									\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
41.07	259 260		to thickly bedded, light brown, slightly weathered to fresh, very weak, moderately hard, unfractured, sandy, coarse sand.									XOX	
	261			C48			48	0	11	125		$\stackrel{\diamond}{\sim}$	VOC=0.0 ppm PA, UU
39.07		ου,	SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, dusky yellow green, slightly weathered to fresh, soft, unfractured, dipping 44°, silty, medium SEDIMENTARY ROCK, (CONGLOMERATE), thinly									♦ × ♦	
37.07	263 264		bedded, dusky yellow green, slightly weathered to fresh, soft, unfractured, clast supported subround gravel to 1", medium sand matrix. SEDIMENTARY ROCK, (SANDSTONE), thickly									XOX	
	265	Ħ•;; •	bedded, dusky yellow green, slightly weathered to freeh, (continued)									\Diamond	
			Department of Transportation Division of Engineering Services	D	EPOR BOR IST.	ING		_	RD	ROU 71	TE 0	POS T/	HOLE ID R-09-Z2B STMILE EA 07-07-187900
	_	7	Geotechnical Services Office of Geotechnical Design - South	P	ROJE	CTC	R BF	RIDG	E N.	AME	NICA		10,000000000000000000000000000000000000
			Office of Geolechinical Design - South		RIDG						ED BY		DATE SHEET



Office of Geotechnical Design - South 1

SR-710 TUNNEL TECHNICAL STUDY

PREPARED BY

M.Salisbury

DATE

10 of 10

BRIDGE NUMBER

	ai,T.∣		a, K. Bl-an-109m 3-12-09	BOREHOL 34° 6' 3	6" / 1	18° 1	Ì' 27	7" N	IAD8	3	and Dat	um)			9-Z2E		
DRILLI Caltı			CTOR ng Services	BOREHOL							a St.				CE ELEV		
DRILLI Rota	NG ME	THO		DRILL RIG		ck)								BOREH 4 in	OLE DIA	METER	
SAMPL	ER T	PE(S	AND SIZE(S) (ID) nch Core (2.5"), HQ Core	SPT HAMN Diedric	MER TY	PE	ic 1	140	lh 2	0 inch	dron				R EFFIC	IENCY, EF	₹i
BORE	HOLE I	BACKI	FILL AND COMPLETION stalled on Completion	GROUNDV READINGS	VATER		NG D			AFTER	_					OF BORING	3
(E)	Ome		Stance on completion		on					-		П		000.0			\top
ELEVATION	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	Cassing Cassin Cassing Cassing Cassing Cassing Cassing Cassing Cassing Cassing	ļ	Remark	5	
5	1		ASPHALT (8"- 9"). SANDY SILT (ML); light gray; dry; contains fe	NW								X	in ac	cordanc	e with the	as prepared Caltrans	
544.93 542.93 540.93 538.93 534.93	1 2 3		cobbles and little coarse gravel [FILL].	5VV									and 2007 A.1 o Sum	Presenta	ation Man t as note nal Geote	710 Tunne	dix
542.93	4				D01									nty, Cali		ted April,	
	5								-				Hand	d Auger (0.9' - 10'		
540.93	6 7				₩D02												
538.93	8				D02	•											
536.93	9																
550.95	11		SILTY SAND (SM); very dense; yellowish bromoist; little coarse to fine GRAVEL; mostly cofine SAND; [ALLUVIUM].	own; parse to	O03	8						M					
534.93	12											000000000000000000000000000000000000000					
532.93	13											3000					
	15		Little coarse to fine GRAVEL; mostly coarse to	to fine	\/S04		82		9)		MM	PA				
530.93	16		SAND; little low plasticity fines.		O05	37 45						0000					
528.93	17											0000					Ē
	19											0000					
526.93	20				S06	35 64 50/6"						0000					
524.93	22				007	30/0						0000					
530.93 528.93 526.93 524.93	23											MMM	hard	drilling			
522.93	24		At EL. 522.9 ft, observed boulders and cobb	oles.													
<u> </u>			(continued)		F	REPOR	т тіт	ΓLE							HOLE	ID	
			Department of Transportation Division of Engineering Services			BOR DIST.	ING			D ROL	JTE	PO	STMIL	.E	R-	09-Z2I	
		7	Geotechnical Services	V1003	F	07 PROJE	CT O	LA R BR	IDGE	71 NAME	0	_ T/	<u> </u>		07-	07-1879	00
			Office of Geotechnical Design	gn - Sout	:h 1 📙	SR-7 BRIDGE	10 T	TUN	NEL R	TECH REPAR	ED BY			DA	TE	SHEET	
										T.Halo	la, K.I	3ark	er	,		1 of '	12

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	Remarks
520.93				At EL. 521.9 ft, becomes dark gray to yellowish brown; little coarse to fine GRAVEL; mostly coarse to fine SAND; little low plasticity fines. SILTY SAND (SM) (continued).	S08	45 17	62			10		0000	PA
518.93							ř					00000000	lost mud thru cobble and coarse sand VOC=11.2 ppm 28'- 29.5' drilling thru granite rock
516.93				At EL. 517.4 ft, observed cobbles (29.5'- 30'), At EL. 516.9 ft, becomes brown.	XS10	58 50/6"			á			100	
514.93	31				011							monno	piece of cobble blocked the shoe
512.93	33			SILTY CLAY (CL-ML); stiff to very stiff, dark yellowish brown; moist.								0000000	
10.93	35 36				S12	8 11	19					anno	
08.93	37 38		1 : 1	SEDIMENTARY ROCK, (SILTSTONE), laminated to very thinly bedded, grayish orange to moderate yellowish brown, moderately weathered, weak, very soft, very intensely to intensely fractured, bedding joint (partially healed), beds dip 20°, partly FeO lined, strong very closely spaced fractures. [TOPANGA]	C13			100	0			0000	lost mud again. stopped drilling to place cement into the hole to seal the leaks, then resumed drilling/rock coring the next day. See note at the end of the log
06.93	39 40		/ / /	FORMATION]	C14			100	0	6		20%	regarding RQD. VOC=22.7 ppm
04.93	41		1									\$ \$ \$ \$	
02.93	43											$\Diamond \times \Diamond$	
00.93	45 46		/: - - - -	SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, very thinly bedded, dark yellowish brown and moderate yellowish brown, moderately weathered, extremely weak, moderately hard, very intensely fractured, fracture zone (FE), dipping 0 to 90°, slightly rough,	C16		15	100	0	18 1	19	\$ \$ X \$ X	UW, PA
98.93	47	V	; ; ; /	fracture zone (FE), dipping 0 to 90°, slightly rough, thin.								>× 0×	
96.93	49 50		11		C17			100	0			× 0 × 0	VOC=5.1 ppm
94.93	51 52		;									X0X0	
92.93	53 54		//:									\$\$X\$X	
	55	=1.		(continued)	4.1							ry	
1	L	7		Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - Sout	C	BOR BOR DIST 07 PROJE SR-7	CTC	RECOUNT	RIDG	E NAM	OUTE 710 E CHNICA	. 7	HOLE ID R-09-Z2B STMILE EA 07-07-18790
			_	Office of Geolechnical Design - Sout		RIDG				PREP	ARED BY		DATE SHEET

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	Remarks	
	56	/ / / /	At EL. 491.9 ft, becomes weak, hard, intensely fractured, bedding joint, dipping 15°, slightly rough, thin, zones of very intensely fractured. (continued).	C18			100	50	17	107		XOX	See note at the end of the log regarding RQD.	
	58	/										0%0		
486.93	59 60	,		C19			100	40				× 6×	VOC=10.5 ppm	
	F	, , ,		NGS 3 W				O.P.						
	63	, ,										0×0		
	65	, j	At EL. 481.9 ft, becomes very intensely fractured, dipping 80 to 15°.	C20			100	7	e			XOX		
	66											X0X		
	68	, <u>,</u> ,										(0×0	VOC=3.0 ppm	
476.93	70 71	//		C21			100	0				0×0		
474.93	E	, , ,										× 0×		
		, ,	At EL. 471.9 ft, becomes very intensely to intensely firactured, bedding joint, dipping 15°.	C22			100	0				X0X		
	76 77	, , ,	firactured, bedding joint, dipping 15°.									0×0		
	78 79	11	At EL. 468.9 ft, observed no fracture filling.	C23		3.5	100	17	8			0×0×	VOC=10.2 ppm	
166.93	80	, , ,	At EL. 466.9 ft, becomes intensely to moderately firactured.	C24			100	35	15	115		X0X	uw	
164.93	E											(0×0		
162.93	84	1 1										000		
	-00		(continued)											
	_		Department of Transportation Division of Engineering Services	D	BPOR BOR IST. D7	ING	RE OUN LA	ITY		ROU'	TE)	POS T/	HOLE ID R-09-Z2 STMILE EA 07-07-1879	
	7	1	Geotechnical Services Office of Geotechnical Design - Sout	h 1 📑	ROJE SR-7 RIDGI	10 1	TUN	NE	L TE	ME CHI	VICAI	LST		

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	Re	emarks	
460.93	86	, j	At EL. 461.9 ft, becomes dark yellowish brown and dusky yellowish brown, hard to very hard, intensely fractured.	C25			100	40				\ \ \ \	See note at the regarding RQD	e end of the log	
	87											0	VOC=8.6 ppm		E
458.93	88	, ·										\Diamond			
	89														
456.93	90	.	At EL. 456.9 ft, becomes olive gray, moderately hard	C26			100	42							E
	91		to hard.									×			
54.93	92		At EL. 455.4 ft, becomes moderately soft, intensely fractured, joint, dipping 45 to 15°.									×			
Ш	93	<u> </u>										×			
52.93	94														
Ш	95		At EL. 451.9 ft, becomes slightly fractured, dipping 45°.	C27			100	80				\Diamond	VOC=21.5 ppn	1	
450.93	96	-,:	45.									0			
	97]"~	At EL. 449.9 ft, becomes dusky yellowish brown.									\Diamond			
48.93	98	1										0			
Н	99	-										0			
146.93	100	<u>```</u>	At EL. 446.9 ft, becomes moderately soft to moderately hard, slightly fractured, bedding joint,	C28			100	90							
	101	(dipping 30°.												
144.93	102											×			
	103	\. .										×			
142.93	104	7.,										\diamond			
	105			C29		1.6	100	80	22	94		\Diamond	VOC=39.3 ppn UW, PI	1	
140.93	106											\			
	107	\ .										\Diamond			
38.93	108											\Diamond			
	109		At EL. 437.9 ft, becomes intensely fractured, fracture zone, dipping 45 to 30°, rough, slightly open.									\Diamond			
136.93	110		zone, dipping 45 to 30°, rough, slightly open.	C30			100	25				0			
J Ī,6	111	\`													
134.93	112		SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE,	C31			100	50				X			
şt]l	113	`	laminated, moderate yellowish brown, moderately weathered, weak, hard, intensely fractured, bedding joint (FE, MN), dipping 20°, slightly rough, thin.					1				×			
132.93	114	'	3									X	VOC=9.3 ppm		
	115		(continued)										2000-200-7100		
			Department of Transportation	R	EPOF BOR	ING	RE	co	RD					R-09-Z2	33
	1		Division of Engineering Services	D	IST. 07	C	LA	_		71	TE 0	POS T/	TMILE	EA 07-07-1879	
		7	Geotechnical Services Office of Geotechnical Design - Soutl	P	ROJE	CT 0	R BE	RIDG	E N.	AME	NICA				
			A street of adoption and a straight of the said.		RIDG	E NU	MBE	R	PR T	EPAR . Hal c	ED BY	Bark	er DATE	SHEET 4 of	12

ELEVATION (ft)	15 15 15	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	
430.93	E	, , ,		C32			100	22				×××	PTS See note at the end of the log regarding RQD.
428.93	117											\$X	
	119											X	
426.93	120	7::		C33			100	55				X	
	121			000			100	55				$\stackrel{\diamond}{\sim}$	0
424.93	122	`.											1.
	123	,										\Diamond	VOC=3.9 ppm
122.93	124	`										$\stackrel{\diamond}{\sim}$	
	125	7.07	At EL. 421.9 ft, becomes fracture zone, dipping 80 to 20°, locally moderately soft, bedding joints at 20	C34			100	39				$\stackrel{\wedge}{\sim}$	
420.93	126	\	degrees.	C35			100	17				\Diamond	
	127		At EL. 420.4 ft, becomes dusky yellowish brown and dark yellowish brown.	033			100	W				0	
118.93	E	- 1										\$	
446.02	129	- 1						55-44				0	
416.93	131			C36			100	0				\Diamond	
414.93		, ,		C37			100	0				0	VOC=16.3 ppm
,,,,,,,,,,	133											0	
412.93	134	·										0	
	135		At El. 411 9 ft. becomes dusky vellowish brown	C38			100	30				0	
410.93	136	1	At EL. 411.9 ft, becomes dusky yellowish brown, hard, intensely fractured, joint, dipping 50 to 20°, slightly rough, slightly open.				100	50				0	
	137	, ; ;										0	
408.93	138	,,										0	
7	139	<i>'</i>						A Mari				\Diamond	
406.93	140	. ~	At EL. 406.9 ft, becomes locally moderately soft.	C39			100	7				0	VOC=12.1 ppm
	141	, ,										\Diamond	
404.93	E											\Diamond	
402.02	143											0	
402.93	144	<i>j: 1</i>	At EL. 402.4 ft, becomes hard, very intensely								14	0	
			(continued)	I B	EDOF	T T	rie						Tuoiein
	_		Department of Transportation Division of Engineering Services	D	EPOR BOR IST.	ING	RE		RD	ROU	TE	POS	HOLE ID R-09-Z2B3
	_	7	Geotechnical Services	P	ROJE	CTC	R BF	RIDG	EN	AME ECH	Santa	T/	Market States
			Office of Geotechnical Design - Sout		RIDGI				PR		NICA ED BY	17.07	DATE SHEET

ELEVATION (ft)	145 145 140 140	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	Remarks	
400.93		,	fractured, fracture zone, slightly rough, thin, also bedding joints, some calcite cementation.	C40			100	0				×<	See note at the end of the regarding RQD.	log
	147											0		
398.93	148 149	<i>;</i> ;										\Diamond		
396.93	E		At EL 306 0 ft hecomes very intensely to intensely	C41			100	18	14	114		\Diamond	VOC=3.1 ppm UW, PL	
	151		At EL. 396.9 ft, becomes very intensely to intensely fractured, dipping 80 to 20°, slightly rough, slightly open, clean.				100	,,,	13	3.5		♦ ×	10.00	
94.93		= "~										0×0		
392.93	153	,										×		
02.00	155			C42			100	15	e e			\Diamond		
390.93	156			0,12			100	10				\(\)		
	157	, ; ;										X		
88.93	158	. .1										\$		
86.93		··~		C43			100	0	4			××		
	161	,		045			100	Ü				0×0		
384.93		/										××	VOC=16.3 ppm	
82.93	163	//										>		
	E		At EL. 381.9 ft, becomes locally moderately soft.	C44		15	100	8				× ×	SD	
380.93	166	1	A LEE SO NO II, SOSSINEE ISSUITY MEASURE OF SOIL				185					\$		
	167	,										\$	VOC=17.7 ppm	
378.93	168 169	\\										××		
376.93		,		C45			100	23	d			2		
	171	,						Na.				Š		
374.93	-											\Diamond	VOC=22.9 ppm	
372.93	173 174	, , ,										×		
	175		(continued)								Ш	\Diamond		
		1	Department of Transportation		EPOF BOR				RD			l ==	R-09-	Z2B3
	L	7	Division of Engineering Services Geotechnical Services	P	IST.)7 ROJE	CTO	LA R BF	RIDG	E NA	710 AME	S. V.	1/		87900
			Office of Geotechnical Design - Sout	h 1 📑	SR-7	10 1	TUN	NE	PRI	ECHI EPAR	NICAI ED BY Ia, K.I			ET of 12

ELEVATION (ft)	SDEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Re	marks
370.93		; ;		C46			100	7				× < > <	See note at the regarding RQD	end of the log
868.93	177	, , ,										0×0	VOC=23.1 ppm	
66.93	179			C47		9	100	18	4	140		X0X0X	UW, PL	
64.93	181	, ,										\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
62.93	183	<i>j. j.</i>										0 X Q	VOC=22.3 ppm	
	185	; ; ; ; ; ;		C48		•	100	13				\ \ \ \ \ \ \		
	187											\$X \$X \$X \$X	VOC=21.7 ppm	
56.93	189		At El. 356.9 ft, heromes intensely fractured, hedding	C49			100	28				X \ \		
54.93	191	; ; ; ;	At EL. 356.9 ft, becomes intensely fractured, bedding joint, dipping 10°.	040			100	20				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
52.93	193	, ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;										×0×0	VOC=17.8 ppm	
50.93	195	, ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;		C50			100	25				X0X0		
48.93									10	124		× 0 × 0	SD, EM VOC=14.9 ppm	
46.93		. j . j	At EL. 346.9 ft, becomes very intensely to intensely fractured, fracture zone, with bedding joints.	C51			100	22						
44.93												XOXOX	VOC=15.5 ppm	
42.93		, i i										× 0 × 0	, , s.o ppm	
	205		(continued)									-		
	_		Department of Transportation Division of Engineering Services Geotechnical Services	D	EPOR BOR IST. 07	ING	COUN	1TY		ROU 710	TE D	POS T/		HOLE ID R-09-Z2B EA 07-07-18790
			Office of Geotechnical Design - South	11 📑		10 1	TUN	NE	L TE	CH	NICAL	ST		
			A STATE STATE OF STATE OF STATE OF STATE	В	RIDG	E NU	MBE	R	PRE	PAR	ED BY	Bark	DATE	SHEET 7 of 1

ELEVATION (ft)	SDEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	(pcf) Shear Strength	(tsf) Drilling Method	Casing Depth	emarks
340.93	206	<u> </u>		C52			100	19			×<	See note at the regarding RQI	e end of the log).
	207	1	·								0	VOC=13.6 ppm	b.
338.93	208										×		
	209			C53			100	0			×		
36.93	210		At EL. 336.9 ft, becomes intensely fractured, bedding joint, dipping 10°.	C54			100	32			×		
	211	7	joint, dipping 10°.								×		
34.93	212										\$X		
	213		-								>	VOC=15.9 ppr	n
32.93	214										> <		
	215		At EL. 331.9 ft, becomes locally moderately soft.	C55			100	52	11 1	27	\Diamond	SD, EM	
30.93	216										\(\)		
	217										\ \ \	V00-04 0 mm	. · · · · · · · · · · · · · · · · · · ·
28.93	218	-									\Diamond	VOC=24.9 ppr	n
	219										\Diamond		
326.93	220		At EL. 326.9 ft, becomes bedding joints dip 5 degrees.	C56			100	0			\(\(\)		
	221		degrees.								\Diamond		
324.93	222		(=								×<	V00-05 0	
	223										×<	VOC=25.9 ppr	
322.93	224										D		
	225		At EL. 321.9 ft, becomes very intensely to intensely fractured, fracture zone, bedding joints dip 5 degrees.	C57			100	17			\$		
320.93	226		mactured, macture zone, bedding joints dip 5 degrees.								\\		
	227										\$	VOC=024.3 pp	
318.93	228										\Diamond	VOC-024.3 pp	
	229										\Diamond		
316.93	230		At EL. 316.9 ft, becomes intensely fractured.	C58			100	32			0		
	231	·									\Diamond		
314.93	232		At EL. 314.9 ft, becomes moderately fractured, bedding joint, dipping 5°, slightly rough, slightly open.								0	VOC=10.4 ppr	
	233		second found albeing o , sugney rough, sugney oben.								×	VOC-10.4 ppr	,
312.93	234										×		
	235E		(continued)									1	
1	_		Department of Transportation Division of Engineering Services	D	EPOR BOR IST	ING	RE OUN	_	F	ROUTE 710	PC	OSTMILE	HOLE ID R-09-Z2B EA 07-07-187900
	_	7	Geotechnical Services Office of Geotechnical Design - South	P	ROJE	CTO	R BF	RIDG	ENAN	ΛE		TUDY	0. 51 10100
	- 1		Office of Geolechinical Design - South		RIDG			_	PREF	PARED lalda,	BY	DATE	SHEET 8 of 12

ELEVATION (ft)	(#) 235 24 25 25 25	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	Remarks
310.93	236			C59			100	62				×	See note at the end of the log regarding RQD.
308.93	237 238											X0X0X	VOC=20.3 ppm
306.93			At EL. 306.9 ft, becomes intensely fractured.	C60			100	22				$\Diamond \land \Diamond$	
304.93	242	(c) —										OXO)	VOC=17.1 ppm
302.93		-:-										XOXO	
300.93				C61			100	52				X 0 X	
298.93	247 248 249	-:-										$\times \circ \times \circ$	VOC=18.3 ppm
296.93	=	 	At EL. 296.9 ft, becomes olive gray, increased sand content.	C62			100	33				X0X0	
294.93	E] ; ; ;							3	155		(0 X Q)	VOC=16.5 ppm
292.93												0×0×	
290.93				C63			100	33				X0X0	
288.93		-:-										X 0 X	VOC=22.9 ppm
286.93			At EL. 286.9 ft, becomes dusky yellowish brown.	C64			100	35				XOXO	
284.93	=		At EL. 285.4 ft, becomes moderately fractured.									\$X\$X	VOC=18.9 ppm
282.93		į į į										$\langle \Diamond \times \Diamond \rangle$	
	200-		(continued)										1,02,212
	L	_/	Department of Transportation Division of Engineering Services Geotechnical Services	D	EPOF BOR IST. 07	C	LA	VTY		71	TE O	T/	
			Office of Geotechnical Design - Sout		ROJE SR-7 RIDG				PR	EPAR	NICA ED BY Ia, K.		UDY DATE SHEET 9 of 12

ELEVATION (ft)	26DEPTH (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)	Casing Method	Remarks	
280.93	266			C65			100	58				× ♦	See note at the end of the log regarding RQD.	
111	267											\Diamond	CR	
278.93	268		-									\Diamond	VOC=10.7 ppm	
11/	269													
276.93	270		At EL. 276.9 ft, becomes intensely fractured.	C66			100	28				X		
	271											×		
274.93	272											×		
	273											\diamond	VOC=12.3 ppm	
272.93	274											\Diamond	1	
111	275			C67			100	42				0		
270.93	276											\Diamond		
	277											\Diamond		
268.93	278											\Diamond	VOC=15.9 ppm	
ĸ.	279													
266.93	280	,	At EL. 266.9 ft, becomes slightly fractured, dipping 10	C68			100	87	12	119		×		
1	281		to 5°.									>4	SD, EM	
264.93	282	1										\$		
	283	···	. Al									\Diamond	VOC=11.2 ppm	
262.93	284	7										\Diamond		
	285			C69			100	70				0		
260.93	286	,,,	- 1									\Diamond		
Э	287	-										\Diamond		
258.93	288											0		
	289											\Diamond		
256.93	290	,,	At EL. 256.9 ft, becomes intensely fractured, fracture	C70			100	30				\lambda	PL	
	291	;	zone.									Š		
254.93	292											X	C & A	
	293	;;										×	VOC=15.3 ppm	
252.93	294		7.1									\Diamond		
	295	Ţ	(continued)									\Diamond		
			Department of Transportation	R	EPOR BOR	TTI	TLE	co	pn				HOLE ID R-09-Z2E	22
	_	_/	Division of Engineering Services	D	IST.	C	COUN		עט	710	TE	POS T/	STMILE EA	
	_	7	Geotechnical Services Office of Geotechnical Design - South	P	ROJE	сто	R BF	RIDG	E N/	AME	NICA			
			Office of Geolechnical Design - South		RIDGI				PRI	EPAR	ED BY		DATE SHEET	

ELEVATION (ft)	50 50 50 50 50 50	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)	Casing Method	Remarks	
250.93	296			C71			100	60				Š<	See note at the end of t regarding RQD.	he log
	297	_,,	At EL. 250.4 ft, becomes moderately fractured, bedding joint, dipping 10°, slightly rough, thin.											
248.93	298	~~											VOC=15.6 ppm	
	299											Š		
246.93	300			C72			100	73				×		
4	301											X		
244.93	302											$\stackrel{\diamond}{\sim}$		
- 34	303	la C										\Diamond	VOC=21.1 ppm	
42.93	304											\Diamond		
	305	- 1		C73		0.	100	100	8	137		\Diamond		
40.93	306							10.50.41				\Diamond	SD, EM	
	307											\Diamond		
238.93	308													
	309	,,,										×		
36.93	310	-"		C74			100	55				×		
	311	į					100					X		
234.93	312											\Diamond		
11	313											\langle	VOC=15.7 ppm	
232.93	314	-	At EL. 232.9 ft, becomes intensely fractured.									\Diamond		
	315		At EL. 252.9 It, becomes mensely fractured.	C75		1	100	40				\Diamond		
230.93	316			C/5			100	42				\Diamond		
	317											\Diamond		
228.93	318		ALEL 200 0 B have read and the first and									×	VOC=15.4 ppm	
	319		At EL. 228.9 ft, becomes moderately fractured.									X		
226.93	320	7.		070			400		ļ			×		
	321			C76			100	55				><		
224.93		<i>`</i>										\Diamond		
L' S	323											\Diamond	VOC=17.8 ppm	
222.93												0	PL	
	325				10							\Diamond		- 11
			(continued)	l R	EPOF	ET TI	TLE						HOLF II	
1	-		Department of Transportation Division of Engineering Services	[13]	BOR IST.	ING	RE		RD	ROL	TE	POS	STMILE LEA	9-Z2B
	L	7	Geotechnical Services	P	07 ROJE	CTC	LA R BF	RIDG	SE N	71 AME	CALL	T/	T 07-07	-187900
-			Office of Geotechnical Design - Sou	ith 1	SR-7	10	TUN	INE	LT	ECH	NICA ED BY	LST		HEET 11 of 1

ELEVATION (ft)	SOEPTH (ft)	/ Material Graphics	DESCRIPTION	Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Casing Method	Remarks
220.93	326			C77			100	65				Š Š	See note at the end of the log regarding RQD.
	327											\Diamond	
218.93	328	<u> </u>										\Diamond	VOC=13.7 ppm
dli	329	<u>_</u>										\Diamond	
216.93	330			C77B		1	100	57					
	331											X	
214.93	332	<u> </u>										×	VOC=19.0 ppm
	333											×<	VOC-19.0 ppm
212.93	334											×	
	335	į	At EL. 211.9 ft, becomes locally moderately hard.	C78			100	47	e .			\Diamond	
210.93	336	"~										\Diamond	
	337											\Diamond	VOC18.8 ppm
208.93	338		11-11-00-10-1									\Diamond	VOC 18.8 ppm
	339		At EL. 208.4 ft, becomes olive gray, very intensely to intensely fractured.									\Diamond	
206.93	340	,	At EL. 206.9 ft, becomes dusky yellowish brown, moderately fractured, joint, dipping 65°, bedding joints dip 5-10 degrees.	C79			100	60	7	137		\Diamond	
Ш	341		joints dip 5-10 degrees.										
204.93	342											×	V00 40 7
	343		At EL. 203.9 ft, observed increased calcite									×	VOC=19.7 ppm EM
202.93	344		cementation.									X	
	345	,	At EL 201.9 ft, becomes joint, dipping 60°, bedding	C80		1.6	100	62				X	
200.93	346	-:-	joints dip 5-10 degrees, locally moderately soft.									0	
	347											0	100 100
198.93	348	_`										\Diamond	VOC=18.9 ppm
	349	—										\Diamond	
196.93	350		Bottom of borehole at 350.0 ft bgs						-				
	351		Borehole was converted to piezometer at the completion of drilling.										
94.93	352		RQD values provided in the boring logs are based on intact core pieces obtained between two natural										
t il	353		are weak and does not meet the "sound core"										
192.93	354 355		definition provided in standard test method for RQD ASTM D 6032. These RQD values should not be used to evaluate the rock mass quality.										

5

Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - South 1

	BOR	NG RECC	ORD		- F	R-09-Z2B3
	DIST.	COUNTY	710	POSTMILE T/T		7-07-187900
1		T OR BRIDG	SE NAME L TECHNICA	AL STUDY		
	BRIDGE	NUMBER	PREPARED BY T.Halda, K		DATE	12 of 12

LOGG K. B	arke	r	BEGIN DATE 3-19-09	COMPLETION DATE 4-3-09	BOREHOL 34° 5' 5	2" / 1	18° 1	0' 46	6" N	IAD	83	and Dat	tum)		DLE ID R-09-Z	Z 2B4	
		ONTRA Drilli	CTOR ng Services		BOREHOL						, Line) Ilis Av	е.				NAVD88	
		ETHOD Vire-L			DRILL RIG		ıck)								REHOLE	DIAMETER	
SAMP	LER T	YPE(S)	AND SIZE(S) (ID)	Q Core	SPT HAMM Diedric	MER T	/PE	ic. 1	140	lb ;	30 incl	n drop		HA		FFICIENCY, ER	₹i
BORE	HOLE	BACKF	FILL AND COMPLETION stalled on Comp	N	GROUND\ READING	NATER		NG D			AFTER	-	NG (D	ATE) TO		TH OF BORING	3
ELEVATION (ft)	DEPTH (ft)	Material Graphics]	DESCRIPTION		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Content (%) Dry Unit Weight	Shear Strength (tsf)	Drilling Method		Ren	narks	
556.11 554.11 552.11 546.11	1 2 3 4		(Aggregate Base = 1 SANDY fat CLAY (C	with SILT and GRAVEL 12"). CH); stiff; very dark gray; D; high plasticity fines;	·	7 D01			100				X	in accor Soil & R and Pre 2007), e A.1 of th Summa Technic	dance with cock Logg sentation except as the Final Gry Report al Study,	rd was prepared h the Caltrans ing, Classificatic Manual (June, noted in Appendentechnical , SR-710 Tunne Los Angeles a, dated April,	on dix
552.11	5 6 7					D02	2		100					Hand Ai VOC=3.	uger 1.3' - 3 ppm	- 10'	
550.11 548.11	9		Fat CLAY (CH); stiff to fine SAND; high p	; olive brown; moist; son plasticity fines.	ne medium												
546.11	11		At EL. 548.1 ft, bed	comes about 10 to 15%	fine SAND.	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	3 4	7	100		30	PP = 1.25	<u> </u>	PI VOC=3.	2 ppm		
	13 - 14 - 15 -		At EL. 543.1 ft, bec	comes about 10 to 15% s	fine,	004	1		67				0000000000				
542.11 540.11 538.11 536.11	16 17		Subangulai GNAVI	-L .									00000000				
538.11	19 20 21					VS05	3	7	100	_		PP = 3.75	0000000				
536.11	22					/\	4						STREET				
534.11	24												0000000				
<u> </u>				(continued)		1.	RED∩□	ד דוד	TI E						1 1	HOLE ID	
				ment of Transportat			BOR	ING	RE			ITE	BOS	2TM/II F		HOLE ID R-09-Z2E	34
		7		n of Engineering Se chnical Services	IVICES		DIST. 07 PROJE		OUN LA R BR		RO 7 1 E NAME	0	T/	TMILE T		A 07-07-1879	00
			Office	of Geotechnical Des	sign - Sout	th 1 📙	SR-7	10 T	TUN	NEL	TECH PREPAR		L ST	UDY	DATE	SHEET	
							ال	01	ا∟ت،،	•	K. Ba	rker			DATE	1 of 1	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	Repuil Re	emarks
532.11	26	//	SANDY fat CLAY (CH); stiff; olive brown; moist; about 40 to 50% fine SAND; high plasticity fines.	X	S06	2 2 3	5	100		34		PP = 0.75	0000	VOC=3.6 ppm	
530.11	27												222222		
528.11	29 30			V	S07	2	6	100				PP =	00000	VOC=1.8ppm	
526.11	31 32		Elastic SILT (MH); stiff; very dark gray and dark olive gray; moist; medium plasticity fines; 1" interbeds of fine sand.	-X		3						.25-1.7	mannana		
524.11	33 34												DODDOD		
522.11	35 36		At EL. 523.1 ft, grades to black.	X	S08	2 2 4	6	100			1	PP = .25-1.7	00000	VOC=3.2 ppm	
520.11	37 38		At EL. 520.1 ft, observed trace fine, angular GRAVEL.										DOLLDON		
518.11	40		Fat CLAY with SAND (CH); hard; dark greenish gray; moist; few coarse to fine GRAVEL; little coarse to fine SAND, mostly high plasticity fines.	X	S09	3 5 7	12	100		32		PP = 2.5	MANAGE	PI, PA	
516.11	42		At EL. 515.1 ft, becomes mottled with olive brown;										MANAGEMENT		
514.11	44 45		silty.	V	S10	3	11	100				PP = 2.5	0	VOC=2.5ppm	
512.11	46 47			Å		5			4.			2.5	222222		
510.11	48 49												222222		
508.11	50 51		SILT (ML); hard; dark yellowish brown; moist; low plasticity fines; few 1/2" white lenses.	X	S11	5 7 11	18	100				PP = 2-2.5	00000	VOC=3.6 ppm	
506.11	52 53		Poorly graded SAND with SILT (SP-SM); medium dense; dark yellowish brown mottled with dark										MANAGEMENT		
504.11	54 55		greenish gray; moist; fine SAND; weak to moderate cementation.										DOD		
					R	EPOF	TTI	TLE		1.7				14	HOLE ID
	Γ	_/	Department of Transportation Division of Engineering Services Geotechnical Services		D	BOR IST. 07	ING	RE OUN LA	1TY		ROU 71 (PO:	STMILE T	R-09-Z2B4 07-07-187900
		1	Office of Geotechnical Design - Sou	th '	P	ROJE	CTC	R BF	NF	E NA	ME	VICA	ST	UDY	
			Office of Geolechinical Design - Sou	LII		RIDG						ED BY		DATE	SHEET 2 of 14

ELEVATION (ft)	DEPTH (ft)	Material Graphics		Sample Location		_	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Remarks
502.11	56		Poorly graded SAND with SILT (SP-SM) (continued).	S1:	2 9 1:	2	100					4000	VOC=0.1 ppm
500.11			SEDIMENTARY ROCK, (SANDSTONE), fine-grained, thinly bedded, dark greenish gray and moderate yellowish brown, slightly weathered, weak, moderately soft, unfractured, [PUENTE FORMATION]	C1	3		100	100				\$X0X0X	See note at the end of log regarding RQD.
498.11				/S1-			100		31			\Diamond	VOC=0.0 ppm
1	61			Λ	1						I a l	\Diamond	
196.11	-		At EL. 496.6 ft, becomes laminated, moderate olive brown and olive gray, soft to moderately soft.	C1	5		100	100				0×0	VOC=2.7 ppm
94.11												>>	
	65		SEDIMENTARY ROCK, (CLAYSTONE)/MUDSTONE, massive, olive black, slightly weathered, weak, soft to	/S10	5 1	1 51	100					X	
192.11	66		moderately soft, unfractured, lenses of fine sandstone.	X	3)						X	
190.11	67 68		SEDIMENTARY ROCK, (SANDSTONE), fine-grained, moderate olive brown mottled with olive gray, slightly weathered, weak, moderately soft, unfractured.	C1	7		100	100				X 0 X	VOC=2.8 ppm
	69	7.5	SEDIMENTARY ROCK, (CLAYSTONE)/MUDSTONE, massive, olive black, slightly weathered, weak, moderately soft, unfractured.									0	
88.11	70		SEDIMENTARY ROCK, (SANDSTONE), fine-grained, massive, grayish olive green, slightly weathered, weak, moderately soft, unfractured.	S1	8 8	0.750.7	100					0×0	1
186.11	71		At EL. 488.6 ft, grades to olive black. SEDIMENTARY ROCK, (CLAYSTONE)/MUDSTONE, massive, olive black, slightly weathered, weak, moderately soft to moderately hard, unfractured, little thin fine sandstone lenses.	C1	9	1	100	100				× 0 ×	
84.11	73 74		SEDIMENTARY ROCK, (SANDSTONE), fine-grained, massive, grayish olive green, slightly weathered, weak, soft to moderately soft, unfractured.									0×0	VOC=5.3 ppm
			SEDIMENTARY ROCK, (CLAYSTONE)/MUDSTONE,	/S2	0 1	7 64	100						1 1 1 1
82.11	76		massive, olive black, slightly weathered, weak, moderately hard, slightly fractured, joint dipping 30°, slightly rough, very thin, clean.	λ	3								
80.11	77 78			C2	1		100	100				XOX	
	79	 (3):	SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, massive, olive gray, slightly weathered, weak, moderately soft to moderately hard, slightly fractured,									0×0	VOC=2.5 ppm
78.11	80		lioint dipping 30°, slightly rough, very thin, clean. SEDIMENTARY ROCK, (SANDSTONE), fine-grained, massive, olive gray, slightly weathered, weak, moderately soft, unfractured.	C2:	2		60	15				××	
76.11	82		SEDIMENTARY ROCK, (CLAYSTONE)/MUDSTONE, massive, olive black, slightly weathered, weak, hard, very intensely fractured, fracture zone (clean), thin,									>X (
74.11	83		locally moderately soft.									>X<	
	85		(continued)	Ш									
1	7		Department of Transportation Division of Engineering Services	L	DIST	RING	RE		RD	ROU			HOLE ID R-09-Z2B4
	L	7	Geotechnical Services		PRO	JECT C	LA OR B	RIDG	E N	AME FOU	S.V.S.	T/	1.31.22
			Office of Geotechnical Design - South			-/10 GE NU			PR		NICA ED BY	LSI	DATE SHEET 3 of 14

ELEVATION (ft)	SDEPTH (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	Re	marks
472.11	86		At EL. 473.1 ft, becomes moderately soft to moderately hard, slightly fractured, random fracture, dipping 30°, rough, thin. (continued).	C23			105	100				× <	See note at the regarding RQD	end of log
	87		A. C.									0		
470.11	88								23	100		\Diamond	UW, PI, PA	
468.11	90		At EL. 468.1 ft. becomes moderately soft, moderately	C24		,	105	100				\$ X		
	91		At EL. 468.1 ft, becomes moderately soft, moderately to slightly fractured, dipping 45°, rough, open.									000		
466.11	E											×<	VOC=4.6 ppm	
464.11	93											0		
	95		SEDIMENTARY ROCK, (SANDSTONE), fine-grained, massive, dark greenish gray, slightly weathered, weak,	C25			100	62				0		
462.11			moderately hard. At EL. 462.1 ft, observed fracture zone, 1.5', rough,									0		
460.11	97 98	100	moderately open.									\$	VOC=2.3 ppm	
400.11	F		At EL. 459.5 ft, observed fracture zone, 4", rough, moderately open.									000	11.1	
458.11	100	1 5	At EL. 458.1 ft, becomes hard, intensely to moderately fractured, random fracture, dipping 90 to	C26			100	0				×<		
11211	101	= .	0°, moderately rough, moderately open. At EL. 457.1 ft, observed 10" moderately soft zone.									\Diamond		
456.11	102	-										\Diamond	VOC=2.3 ppm	
454.11	F	1. 1										0		
	105	- :		C27			80	0				\\		
452.11	106											000		
450.11	F		At EL. 451.1 ft, becomes moderately soft, very intensely to intensely fractured, fracture zone, moderately thin.									×<	VOC=2.3 ppm	
	109		At EL. 449.1 ft, becomes moderately soft to									× <		
448.11			moderately hard, unfractured. At EL. 448.3 ft, observed 3" mudstone lens. At EL. 448.1 ft, becomes moderately hard, slightly	C28			105	100				0		
446.11	111	154	fractured, shear, dipping 60°, smooth, very thin.									0		
7,9,11	113								17	109		0	UW, PI, PA	
444.11	114											\$X		
	115E	1	(continued)	Ш								IVI_		
		1	Department of Transportation	10	EPOF BOR	ING	RE	_	RD					R-09-Z2B4
	L	=	Division of Engineering Services Geotechnical Services		1ST. 07	- 1	LA		\E.\:	71	TE 0	POS T/	T T	07-07-187900
			Office of Geotechnical Design - South	11 _		10	TUN	NE	LT	ECH	NICA	LST		Louver
		-	The second control of the second control of	В	RIDG	ENU	MBE	R	PR K	EPAR . Ba ı	ED BY ker		DATE	4 of 14

ELEVATION (ft)	PDEPTH (ft)	Material Graphics		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight	(pcf) Shear Strength (fsf)	Drilling Method	Re	emarks
442.11			SEDIMENTARY ROCK, (CLAYSTONE)/MUDSTONE, massive, olive black, slightly weathered, weak, hard, very intensely fractured, fracture zone (trace calcite), slightly rough, slightly open.	C29			100	8			× <	See note at the regarding RQD	end of log
	117		signly rough, signly open.								0	VOC=2.8 ppm	
440.11	118	_									\ \ \	2.0 pp.m	
438.11		_	SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE,	C30			100	90			\$X		
	121	\	SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, thickly bedded, olive black and dark greenish gray, slightly weathered, weak, moderately hard, slightly fractured, random fracture (clay), dipping 60 to 80°,								000		
436.11		1 1	slightly rough to smooth, very thin, few sandstone lenses.								×× ×	VOC=3.9 ppm	
434.11	123										0		
	125	\	At EL. 433.1 ft, becomes thinly bedded, rock expands upon excavation (continues to bottom of hole).	C31			140	100			\ \ \		
432.11	-	1	apon expanding continues to bottom or note).								\$ X	VOC=8.8 ppm	
430.11	127	1 1	37	C32			100	100			000	1 = 1	
	129	1 1 1									\ \ \ \	VOC=3.7 ppm	
428.11	-	1 1		C33			110	100			0		
426.11	131	- 1 T	J-								0		
	133	i									\Diamond		
424.11		- :									× ×		
422.11	135	: 1	At EL. 423.1 ft, becomes unfractured, 30-40% sandstone.	C34			110	100			0×0		
	137	1 1									> <		
420.11	138	1							15 11	3	0	VOC=6.2ppm SD, EM	
410 11	139	1:1		C35		П	125	100			0	1	
418.11	140	3.6									×	VOC=7.3 ppm	
416.11	142			C36			83	83			0 X Q		
	143	, !						1			××	VOC=13.6 ppm	
414.11	144												
			(continued) Department of Transportation	R	EPOR BOR	T TIT	TLE DE		PD		÷		HOLE ID R-09-Z2B4
	L		Division of Engineering Services Geotechnical Services	D	IST.)7	C	LA	YTV	R0	OUTE '10	PO:	STMILE T	EA 07-07-187900
	777	/	Office of Geotechnical Design - South		ROJE	10 T	R BF	NE	E NAMI	HNICA	I ST	IIDA	

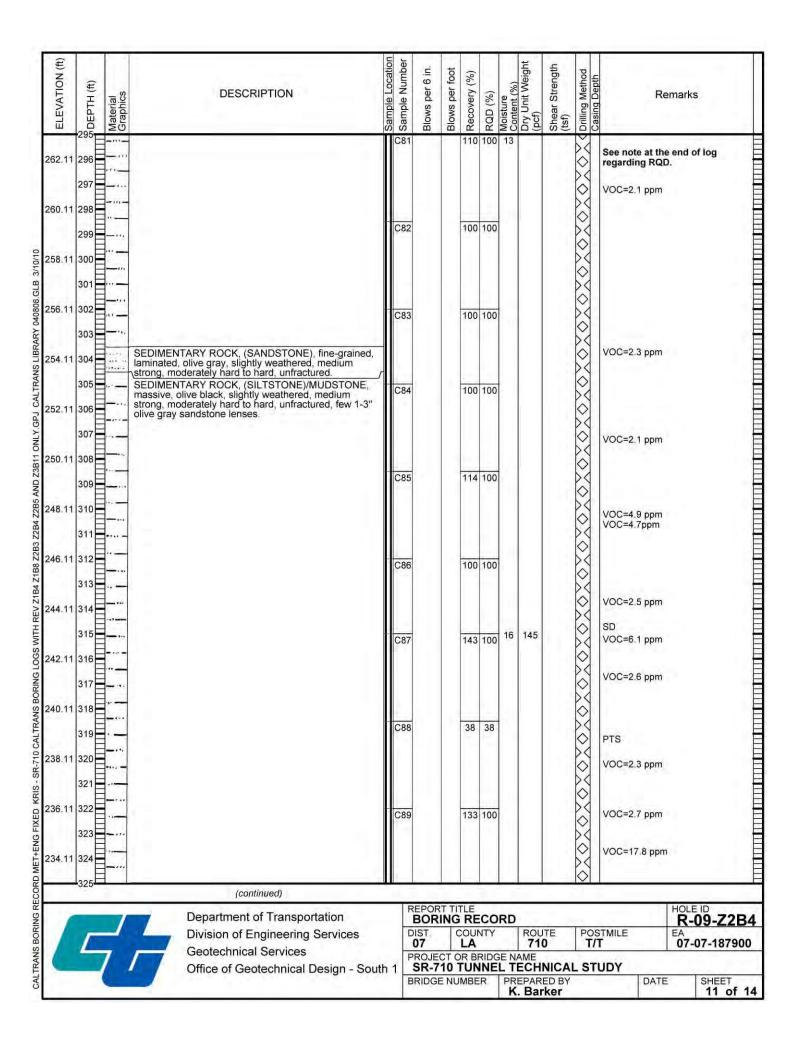
ELEVATION (ft)	SDEPTH (ft)	Material Graphics		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	(pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	emarks
412.11		1 . 1	(continued).	C37			125	100				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	See note at th regarding RQI	e end of log D.
410.11	=	\ \ \						li li				$\langle \phi \times \phi \rangle$	VOC=6.6 ppm	
408.11	149 150	/ /	At EL. 408.1 ft, becomes laminated to very thinly bedded, trace sandstone lenses.	C38			108	100				XOXOX	VOC=2.4 ppm	
406.11		, \ \		C39		4.5	111	100				X0X0X	10.00	
404.11	154	<i>i</i>	At EL. 403.1 ft, becomes thinly to moderately bedded,	C40		9-5	119	100	F			(0X0)	VOC=2.9 ppm	
408.11 406.11 404.11 402.11 400.11 398.11 396.11 392.11 388.11 388.11	157	\	At EL. 403.1 ft, becomes thinly to moderately bedded, olive gray and dark greenish gray, slightly fractured, joint, dipping 80°, slightly rough, thin.						11	121		0×0×0	PA, UU	
398.11	159	\ \		C41			100	100				XOXOX	VOC=2.9 ppm	e end of log
396.11	161 162 163		At EL. 396.1 ft, becomes very thinly bedded.	C42			117	90				XOXO	VOC=2.9 ppm	
394.11 392.11	165	\ \	At EL. 393.1 ft, becomes unfractured.	C43			121	100				X0X0X	VOC=2.9 ppm VOC=2.7 ppm	
390.11	167 168	, \		C44			133	81	el el			$\Diamond X \Diamond X \Diamond$	VOC=19.3 ppn	
388.11	170 171	1	At EL. 388.1 ft, becomes laminated, slightly fractured, joint, dipping 80°, slightly rough, thin, no sandstone lenses.				100	0,				\$X\$X\$		
386.11 384.11	173	:	At EL. 384.9 ft, observed 3" fracture zone.	C45			117	95				X0X0X0	VOC=2.9 ppm	
	175		(continued)							- 4		1∨1		
	_	_/	Department of Transportation Division of Engineering Services Geotechnical Services	D	EPOF BOR IST.	ING	RE OUN LA	1TY		710	TE.	PC	OSTMILE	HOLE ID R-09-Z2B4 EA 07-07-187900
			Office of Geotechnical Design - South	11 _	ROJE SR-7 RIDG	10 7	TUN	NE	PRE	CH	D BY	L S	TUDY DATE	SHEET 6 of 14

ELEVATION (ft)	SDEPTH (ft)	Material Graphics		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight	Shear Strength (tsf)	Drilling Method	Re	emarks
382.11			At EL. 383.1 ft, becomes unfractured, few sandstone lenses.	C46			125	100			\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	See note at the regarding RQD	end of log
380.11	177										000	VOC=13.8 ppm	r I
378.11	179	1		C47		S	117	100			2000		
376.11	181			C48		į,	92	92			\$X\$X\$	VOC=11.8 ppm	
374.11	183	1							21 106		X0X0	UU VOC=3.5ppm	
372.11	185	ļ		C49			125	100			000		
370.11	187	1									000	VOC=3.4 ppm	
368.11	189	\ \ \		C50			125	100		H	\$\$X\$		
366.11	191	\	At EL. 366.1 ft, observed trace hard sandstone	C51			119	100			X	VOC=3.5 ppm	end of log
364.11	193	Ì	lenses.								XOXO	VOC=1.8 ppm	
362.11	195	. \	At EL. 363.1 ft, becomes hard.	C52			121	100	h		\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\		
360.11	197	/									♦ X ♦	VOC=3.8 ppm VOC=2.5 ppm	
358.11	199	<i>\</i>		C53			111	100	lan Lan		0×0×	VOC=3.1 ppm	
356.11	201		SEDIMENTARY ROCK, (SANDSTONE), fine-grained, massive, dark greenish gray, slightly weathered, weak, hard. SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, laminated, olive black and dark greenish gray, slightly weathered, weak, hard, unfractured, trace 1-3"	C54			125	100			XOX		
354.11	203	Ì	weathered, weak, hard, unfractured, trace 1-3" sandstone lenses.								XOX	VOC=2.0 ppm	
	205	- 3	(continued)								$ \Diamond $		
	L	_/	Department of Transportation Division of Engineering Services Geotechnical Services	D P	EPOF BOR IST. 07 ROJE	CTC	RECOUNTED	RIDG	71 E NAME	5.45	T/		HOLE ID R-09-Z2B4 EA 07-07-187900
			Office of Geotechnical Design - South		SR-7 RIDG				PREPAR K. Ba	RED BY	L ST	UDY DATE	SHEET 7 of 14

ELEVATION (ft)	а В В В В В В В В В В В В В В В В В В В	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	Regulation Re	emarks
352.11	205		SEDIMENTARY ROCK, (SANDSTONE), fine-grained, massive, olive gray, slightly weathered, medium strong, hard, unfractured.	C55			100	100				>×< ♦	See note at the regarding RQI	e end of log).
	207											0	VOC=1.6 ppm	
350.11									4	124		\Diamond	ЕМ	
348.11	209		SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, laminated, olive black and dark greenish gray, slightly weathered, medium strong, hard, unfractured.	C56			111	100	8	127		0		
	211	1	Trouble of the state of the sta									\Diamond	VOC=2.2ppm	
346.11	212	\ \		C57			100	100				×		
	213	1:						P				♦ × ♦	VOC=2.4 ppm	
344.11	214	N						i.	e			×		
342.11	E	1		C58			115	100				0		
	217											0	VOC=1.7ppm	
340.11	218		SEDIMENTARY ROCK, (SANDSTONE), fine-grained, laminated, olive gray, slightly weathered, medium strong, hard, unfractured.									\Diamond	1	
338.11	219	Ì	SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, massive, olive black, slightly weathered, weak to medium strong, moderately hard, unfractured.	C59			119	100	15	112		0	PI, UC	
330.11	221	\ \	medium strong, moderately flard, unifiactured.									\Diamond	VOC=1.5 ppm	
336.11	222	1.		C60								×		
	223		Barrer and the second									$\Diamond \times \Diamond$	VOC=2.3 ppm	
334.11	224		At EL. 334,3 ft, observed sandstone lens.									××<	VOG-2.3 ррш	
332.11		1		C61			114	50				\\		
	227		At EL. 331.6 ft, becomes medium strong, hard to very hard, very intensely to intensely fractured, fracture									\Diamond	VOC=1.6 ppm	
330.11	228		zone, slightly rough, 1 mm.	000			114	50	b I			0		
200 44	229			C62			114	50				0		
328.11	231	j.										\\	VOC=2.1 ppm	
326.11	F	∃ \	At EL. 326.1 ft, observed dipping 50°, veins crosscut	C63			100	31	8			× ×		
	233	\\	bedding.					900				$\Diamond \times \Diamond$	V00-4.5	
324.11	234	\ \	At EL. 324.6 ft, becomes intensely to moderately fractured, dipping 20°.									\ \ \ \	VOC=1.8 ppm	
	235		(continued)											Lucies
1	_		Department of Transportation Division of Engineering Services	D	EPOF BOR IST 07	ING	RE OUN LA	VTY		ROU 71	TE 0	PO:	STMILE T	R-09-Z2B4 EA 07-07-187900
	11	7	Geotechnical Services Office of Geotechnical Design - South	1 1 P	ROJE SR-7	CT 0	R BF	NE	LT	AME ECH	NICA	LST	UDY	
			A Market A Market Charles of the Ship		RIDG	E NUI	MBE	R	PR K	EPAR . Bar	ED BY		DATE	SHEET 8 of 14

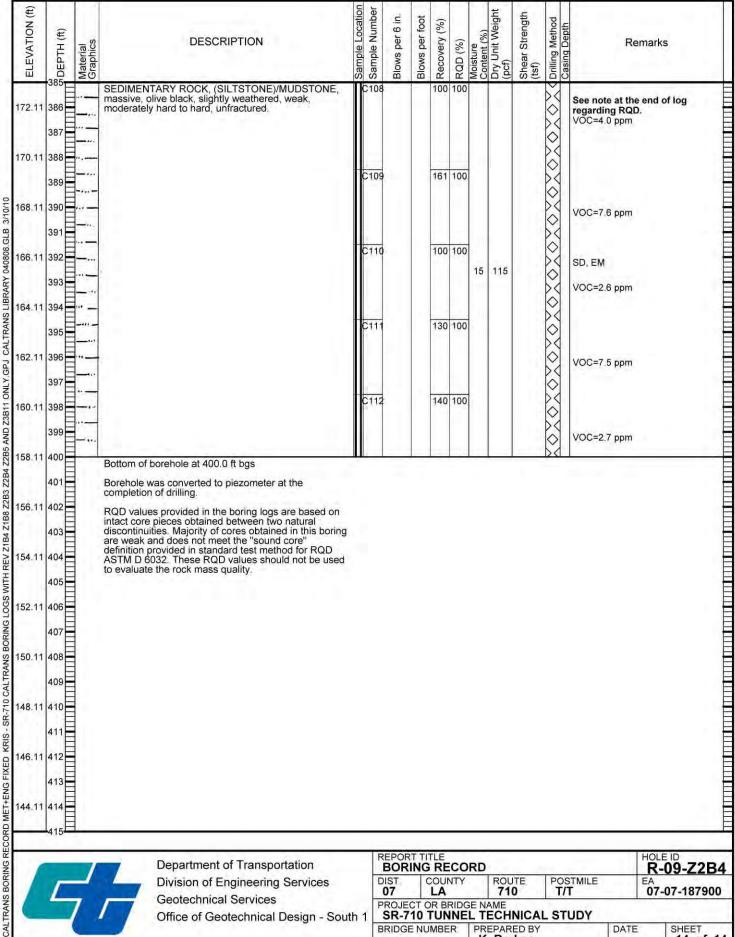
ELEVATION (ft)	DESCRIPTION - John Sample Coation		Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	emarks
322.11 236	(continued).	C64			114	55			$\langle \phi \times \langle$	See note at the regarding RQI	e end of log D.
320.11 238									$\times \Diamond \times$	VOC=2.2 ppm	
239	At EL. 319.6 ft, becomes weak to medium strong, moderately hard, unfractured.	C65			100	100			0\\0\\0\\0	VOC=2.0 ppm	
241 241 242 243 245 245 245 245 245 245 246 246 246 246 246 246 246 246 246 246	At EL. 316.1 ft, becomes medium strong, moderately hard to hard.	C66		•	117	100			X0X0X	VOC=1.7 ppm	
245 312.11 246 247 247 310.11 248		C67		_	120	100			>×<>×<>	VOC=1.8 ppm	
247 248 249 308.11 250 251 306.11 252 253 304.11 254 255 257 259 259 261		C68		_	100	100			>X0X0X0X0	VOC=3.9 ppm	e end of log D.
253 304.11 254 255 255 255 255 255 255 255 255 255	At EL. 302.9 ft, observed 6" fracture zone.	C69		_	114	100			>X<>X<>X<	VOC=5.8ppm	
302.11 256 257 300.11 258 259		C70			117	90	15 147		>X<>X<>X<	VOC=3.6 ppm	
298.11 260	At EL. 298.1 ft, observed few sandstone lenses.	C71		_	133	100			$\langle \Diamond X \Diamond X \Diamond \rangle$	VOC=2.2 ppm	
296.11 262 263 294.11 264		C72			100	100			$\Diamond X \Diamond X \Diamond X$		
265	(continued)									·	
296.11 262 263 294.11 264 265	Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South	1 PI	EPOR BORI IST. D7 ROJEC BR-7	NG C I CT OI 10 T	RE OUN LA R BF UN	ITY RIDG NEI	RD ROU 71 E NAME TECH PREPAF K. Ba	0 NICA		DSTMILE I/T TUDY	HOLE ID R-09-Z2B4 EA 07-07-187900 SHEET 9 of 14

ELEVATION (ft)	S GDEPTH (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		marks
292.11		1	At EL. 293.1 ft, observed 25% sandstone lenses.	C72			100	100				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	VOC=1.3 ppm See note at the regarding RQD	end of log
290.11	267 268	<i>\</i>		C73			100	100				0×0	1	
288.11	269		SEDIMENTARY ROCK, (SANDSTONE), fine-grained, massive, olive gray, slightly weathered, medium strong, moderately hard to hard, unfractured.									XOX		
006 14	271		SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, massive, olive black, slightly weathered, medium strong, moderately hard to hard, unfractured.	C74			100	100				0×0		
286.11	273		SEDIMENTARY ROCK, (SANDSTONE), fine-grained, massive, olive gray, slightly weathered, medium strong, moderately hard to hard, unfractured.									× 0 ×		
284.11	274			C75			100	100	¢			\$ X \$ X	VOC=2.1 ppm	
282.11	276 277								11	115		0×0	EM VOC=1.5 ppm	
280.11	278			C76			44	44				×0×	VOC=5.1 ppm	
278.11	280											\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	VOC=2.9 ppm	
276.11		' 	SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, massive, olive black, slightly weathered, medium strong, moderately hard to hard, unfractured.	C77			120	100				(0×0)		
274.11												0×0	VOC=2.7 ppm	
272.11	286			C78			119	100				XOX		
270.11	287			C79			136	100				X0X0	VOC=2.6 ppm SD, EM	
268.11	289	;	At EL. 268.1 ft, observed few 1-3" olive gray sandstone lenses.	0,0			100	100	16	110		0×0	VOC=3.2 ppm	
266.11	291			C80			110	100				0X0		
264.11	293	,										>X \ \ \	VOC=2.2 ppm	
	₂₉₅ E	1	(continued)		H							V		
1	_		Department of Transportation Division of Engineering Services	D	EPOR BOR IST.	ING	RE OUN LA	1TY		ROL 71	ITE 0	POS T/	STMILE	HOLE ID R-09-Z2B EA 07-07-187900
			Geotechnical Services Office of Geotechnical Design - South	h 1 📑	ROJE SR-7 RIDGI	10 1	TUN	NE	L T	ECH	NICA ED BY	LST	UDY DATE	SHEET 10 of 1



ELEVATION (ft)	SOEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Re	marks
232.11	326			C90			71	71				× ×	See note at the regarding RQD	end of log
	327	—										\Diamond	VOC=2.5 ppm	
230.11	328	<u>.</u>	At EL. 230.1 ft, observed joint, dipping 80°, smooth,									\Diamond		
	329		thin.	C91			114	100	13	120		\Diamond	EM	
228.11												\Diamond		
	331											\Diamond		
226.11	332			C92			156	100						
224.11												\Diamond	VOC=2.6 ppm	
	335	± —		000			444	100				\Diamond		
222.11	336			C93			114	100				0	1	
	337											0	VOC=2.9 ppm	
220.11	338	"-												
	339			C94			130	100						
218.11	340											0	VOC=2.0 ppm	
	341		SEDIMENTARY ROCK, (SANDSTONE), fine-grained, laminated, olive gray, slightly weathered, medium strong to strong, hard, unfractured.									\\		
216.11	342	<u></u>	SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, massive, olive black, slightly weathered, weak to medium strong, moderately hard to hard, unfractured, few 1-3" olive gray sandstone lenses.	C95			125	100						
	343		few 1-3" olive gray sandstone lenses.										VOC=3.9 ppm	
214.11												×		
212.11	345			C96			130	100				×		
. 12. 1 1	347											×		
210.11	348	<i></i>										×	VOC=3.3 ppm	
	349			C97			120	100				× ×	11.00	
208.11	350											××	VOC=10.0 ppm	
1 he	351											×<		
206.11	352			C98			127	100				×<	CR	
111	353	-/11										×<	VOC=20.4 ====	
204.11	354											X	VOC=20.4 ppm	
	355		(continued)	411					l .			IVI	d.	
		1	Department of Transportation	11,	EPOF BOR	ING	RE		RD	POL	TE	l no:	CTANLE	R-09-Z2B
		7	Division of Engineering Services Geotechnical Services	P	IST. 07 ROJE	CTC	LA R BF	RIDG	E N	71 AME	0	T/		07-07-187900
			Office of Geotechnical Design - Sout	h 1	SR-7	10	TUN	NE	LT	ECH	NICA ED BY	LST	UDY DATE	SHEET 12 of 1

ELEVATION (ft)	25 25 25 25 25 25 25	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Republican Re	marks
202.11		_,,,		C99			120	100				×× ×	See note at the regarding RQD	end of log
200.11	357								14	115	• 11	\ \ \ \	UU VOC=2.8 ppm	
200.11	359	-,		C100			114	100	a .			× ×		
198.11	360											♦ × ♦	VOC=12.3 ppm	
196.11	361 362											×		
130.11	363			C101			122	100	11			0		
194.11	364	-,,, -										\$	VOC=3.8 ppm	
192.11	365 366			C102			120	100	14			0×0		
102.73	367											×<	VOC=9.1 ppm	
190.11	E			C103			114	100						
188.11	369	,,		0103			lua.	100				\ \ \		
	371											♦ ×	VOC=3.0 ppm	
186.11				C104			130	100				♦ × ♦		
184.11	373											8	VOC=3.2 ppm	
	375			C105			130	100				\ \ \ \		
182.11	E	119										♦		
180.11	377											♦ × ♦	VOC=2.3 ppm	
	379	- "" (), (),	SEDIMENTARY ROCK, (SANDSTONE), fine-grained, massive, olive gray, slightly weathered, weak,	C106			140	100						
178.11	380		moderately hard, unfractured. SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, massive, olive black, slightly weathered, weak, moderately hard to hard, unfractured.									\ \ \	VOC=2.6 ppm	
176.11			moderately hard to hard, unfractured.	C107		- 3	100	100				♦ ×		
174.11	383 384	7 ()	SEDIMENTARY ROCK, (SANDSTONE), fine-grained, massive, olive gray, slightly weathered, weak, moderately hard, unfractured.						14	117		0000	VOC=2.6 ppm	
	385		(continued)									171		
	_	_/	Department of Transportation Division of Engineering Services Geotechnical Services	D	EPOR BOR IST.	ING	RE OUN LA	VTY		ROL 71	ITE O	PO:	STMILE	HOLE ID R-09-Z2B4 EA 07-07-187900
		/	Office of Geotechnical Design - South	11 P	ROJE SR-7	CT 0	R BF	NE	LT	ECH	NICA	LST	UDY	
			A STATE OF STREET OF STREET STREET		RIDG	ENU	MBE	R	PR K	EPAR . Ba i	ED BY		DATE	13 of 1



Geotechnical Services Office of Geotechnical Design - South 1

DIST	COUNTY	ROUTE	POSTMILE	R-09-Z2B4
07	LA	710	T/T	07-07-187900

BRIDGE NUMBER PREPARED BY

DATE SHEET K. Barker 14 of 14

ans l		ACTOR					NA								9-Z2B5	
	Drilli	ng Services	BOREHOL								ve.				E ELEVATION ft NAVD88	
	THOI		DRILL RIG		ck)									BOREHO	OLE DIAMETER	?
ER TY	PE(S)) AND SIZE(S) (ID)	SPT HAMN	ΛΕΚ Τ	/PE				20	· •	-1			HAMME	R EFFICIENCY	, ERi
-		rich Core(2.5"),HQ Core FILL AND COMPLETION	Diedric GROUNDV	VATER								1G (DATE)	84% TOTAL I	DEPTH OF BOF	RING
met	er In	stalled on Completion	READINGS	_		<u> </u>			_		on 7	-1-	09	300.0	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	g	F	Remarks	
1 2 3 4		SILTY CLAY (CL-ML); soft to medium stiff; da	ark Vi j										in a Soil and 200 A.1 Sun Tec Cou	ccordance & Rock L Presenta 7), except of the Fin- nmary Rep hnical Stu unty, Calif	with the Caltra ogging, Classifi- tion Manual (Ju- as noted in App al Geotechnical port, SR-710 Tu dy, Los Angeles	ns catior ne, cendi nnel
5 6 7	Ш[/	SANDY SILT (ML); medium stiff; dark brown; fine SAND; nonplastic fines.	moist;	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	4 6 8	14					PP = 0.3			•		
8 9 1 0		Lean CLAY with SAND (CL); stiff; dark brown	n; moist.			7			10			STREET	DI			
11 12				502	3 4				19			MANTANA		C=28.1 pp	m	
Ħ		SILTY SAND (SM); dense; yellowish brown; SAND.	moist; fine	VS03		32			17			MANNA				
16 1 7 1 8				Λ	16							MMMM	VO	C=37.2 pp	m	
19 = 20 = 21 =		A.F. 404.46		VS04	14	33						00000000	VO	C=6.3 ppn	1	
22 = 23 = 24 =		At EL. 431.4 π, contains coarse to fine SAN	υ.	/ \	19							00000000000				
₂₅ <u> </u>		(continued)										0				
	_/ 7	Department of Transportation Division of Engineering Services	vices	1	BOR DIST. 07 PROJE	CTC	RECOUNT	RIDG	E N/	710 AME		Т	/T		EA	
		Office of Geotechnical Desi	gn - Sout	:h 1 📙	SR-7	10 7	ΓUN	INE	L TE	ECHN		_ S	TUDY		E SHFF	T
	(#) FLGGO 1 1 2 3 4 4 5 6 6 7 8 8 9 1 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(#) H_Ld=0 0 1 2 3 4 5 6 6 7 8 9 10 11 12 13 14 11 15 16 16 17 18 19 19 10 11 12 22 23 23 23 23 23 23 23 23 23 23 23 23	ASPHALT (4"). SILTY CLAY (CL-ML); soft to medium stiff; dark brown; moist; low plasticity fines; [ALLUVIUM] SANDY SILT (ML); medium stiff; dark brown; fine SAND; nonplastic fines. Lean CLAY with SAND (CL); stiff, dark brown; SAND. SILTY SAND (SM); dense; yellowish brown; SAND. At EL. 431.4 ft, contains coarse to fine SAND; popartment of Transportation Division of Engineering Ser Geotechnical Services	DESCRIPTION ASPHALT (4*). SILTY CLAY (CL-ML); soft to medium stiff; dark brown; moist; fine SAND; nonplastic fines. Lean CLAY with SAND (CL); stiff; dark brown; moist, fine SAND. SILTY SAND (SM); dense; yellowish brown; moist; fine SAND. At EL. 431.4 ft, contains coarse to fine SAND. Department of Transportation Division of Engineering Services Geotechnical Services Geotechnical Services	DESCRIPTION ASPHALT (4'). SILTY CLAY (CL-ML): soft to medium stiff, dark brown; moist; fine SAND; nonplastic fines. SANDY SILT (ML): medium stiff, dark brown; moist. Lean CLAY with SAND (CL): stiff; dark brown; moist. SILTY SAND (SM): dense; yellowish brown; moist; fine SAND. At EL. 431.4 ft, contains coarse to fine SAND. Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1	DESCRIPTION Secondary Sec	DESCRIPTION ASPHALT (4'). SILTY CLAY (CL-ML); soft to medium stiff; dark brown; moist; fine SAND; nonplastic fines. SANDY SILT (ML); medium stiff; dark brown; moist; fine SAND; nonplastic fines. SILTY SAND (SM); dense; yellowish brown; moist; fine SAND. SILTY SAND (SM); dense; yellowish brown; moist; fine SAND. Department of Transportation Division of Engineering Services Office of Geotechnical Design - South 1 Department of Transportation Division of Engineering Services Office of Geotechnical Design - South 1 REPORT IT BORING DIST. CONTINUED.	DESCRIPTION ASPHALT (4'). SILTY CLAY (CL-ML); soft to medium stiff; dark brown; moist; fine SAND; nonplastic fines. ASPHALT (4'). SILTY CLAY with SAND (CL); stiff; dark brown; moist; fine SAND; nonplastic fines. But a subject of Sand Sand Sand Sand Sand Sand Sand Sand	DESCRIPTION DESCR	DESCRIPTION DESCR	DESCRIPTION DESCR	DESCRIPTION DESCRIPTION	DESCRIPTION DESCR	DESCRIPTION Section DESCRIPTION DESC	DESCRIPTION DESCR	DESCRIPTION DESCR

Action A		ELEVATION (ft)	DEPTH (ft)	Material Graphics		Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Re	emarks
	42	6.38			SANDY SILT (ML); hard; light brown; moist; some fine SAND; mostly nonplastic to low plasticity fines; interbedded with silty sand (SM).	\s\s\s\s\s	11	22		_			000000	VOC=8.8 ppm	
Size Size	42	4.38											000000		
20	42i 42i 42i	2.38				S0	11	19			27		20		
## 14.3.8 3 44	ARY 040808.0	0.38			SILTY SAND (SM); medium dense; yellowish brown; moist; medium to fine SAND; nonplastic fines.					-			mm		
416.38 36 44 41.38 38 40 41 41.38 38 40 41 41.38 40 41 41.38 40 41 41.38 40 41 41.38 40 41 41.38 40 41	TRANS LIBRA	8.38				1/80	17 3	14		_			MMM		
## 41-38 38 ## 41-38 40 ## 41	ILY.GPJ CAL	6.38					6			-				VOC=2.3 ppm	
412.38 40 411.38 42 410.38 42 410.38 42 410.38 42 410.38 42 410.38 42 410.38 42 410.38 42 410.38 42 410.38 42 410.38 42 410.38 48 410.38 48 410.38 48 410.38 48 410.38 48 410.38 48 410.38 48 410.38 48 410.38 48 410.38 48 410.38 48 410.38 48 410.38 48 410.38 50 51 51 51 51 51 60.00000000000000000000000000000000000	ND Z3B11 ON	4.38													
408.38 44 44 44 44 44 45 45 45 45 45 45 45 45	Z2B4 Z2B5 A	2.38				VS0	7	13		-			\triangleright	VOC=33.1 ppm	
408.38 44 4	4 Z1B8 Z2B3	0.38			CANDY CILT (MI) v atiff to your atiffu alive grow maint					-			MMM		
404.38 48 48 49 404.38 48 49 404.38 50 404.38 50 400.38 50 51 400.38 52 400.38 50 51 51 51 51 51 51 51 51 51 51 51 51 51	1TH REV 218	8.38			plasticity fines.	\(\lambda_0 \)		10		-			MANNA		
404.38 48 402.38 50 402.38 50 402.38 50 400.38 52 400.38	M SDOT DNI	6.38	46				8	18		_			STATE	VOC=21.1 ppm	- -
402.38 50 400.38	LTRANS BOR	4.38	48		SILTY SAND (SM); medium dense; light brown; moist; little fine GRAVEL; fine SAND.										
At Et. 401.4 ft, with trace fine GRAVEL; mostly fine SAND; some low plasticity fines. 400.38 52 400.38 52 53 53 54 55 55 56 56 56 56 57	3 - SR-710 CA	2.38	50			V/S1	8	18		-	21		20		=
398.38 54	FIXED KRIS	0.38	52		At EL. 401.4 ft, with trace fine GRAVEL; mostly fine SAND; some low plasticity fines.		10			_			MANA		
Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 REPORT TITLE BORING RECORD DIST. COUNTY ROUTE POSTMILE TO 17/T OT 17/T OT 17/T OT 18790 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	RD MET+ENG	8.38											100000		
Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 Dist. COUNTY ROUTE POSTMILE T/T 07 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	SECO_				(continued)	-	DESC) T T'							1101 5 15
Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1 DIST. COUNTY ROUTE 710 T/T 07-07-18790 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	ING F						BOF	RING	RE						R-09-Z2B5
Geotechnical Services Office of Geotechnical Design - South 1 PROJECT OR BRIDGE NAME SR-710 TUNNEL TECHNICAL STUDY	S BOR						DIST. 07			ΙΤΥ	ROL 71	TE 0	POS T/	STMILE T	
Since of Cooleening Design County Control Cont	IRANS			7		1	PROJE	CT 0	R BI	RIDG NE I	E NAME				
BRIDGE NUMBER PREPARED BY BRIDGE NUMBER K. Barker, M. Islam DATE SHEET 2 of 1'	CAL				Since of Coolesianida Bodign Count	•					PREPAR	ED BY		DATE	SHEET 2 of 11

ELEVATION (ft)	25 25 26 27 27 27	Material Graphics	DESCRIPTION	Sample Location		Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	R. Cassing Cassing	emarks
396.38	56		At EL. 397.4 ft, grades to medium to fine SAND. SILTY SAND (SM) (continued).	X	S11	20 20 14	34					0000	VOC=9.0 ppm	
394.38	59		SILTY CLAY (CL-ML); stiff to very stiff; olive brown to olive gray; moist; low plasticity fines.									00000		
392.38 393.38	60			X	S12	6 8 11	19					0000	VOC=17.4 ppn	, [
390.38	62											0000		
388.38 388.38	63 6 4 6 5 6 5											200000		
386.38				X	S13	5 6 8	14					3000	VOC=4.2 ppm	
392.38 390.38 390.38 390.38 386.38 386.38 386.38 386.38 387.38 386.38 386.38 386.38 386.38 386.38 386.38	68											<u> </u>		
382.38 382.38	70 -			X	S14	7 9 15	24					000000	VOC=9.5 ppm	
380.38												0000		
378.38	73 - 74 - 75 -		Fat CLAY (CH); very stiff; olive gray; moist; medium to high plasticity fines.											
376.38	76			X	S15	5 9 11	20			21		20000	VOC=7.6 ppm	
374.38	77 78 79		SILTY CLAY (CL-ML); stiff to very stiff; light brown; moist; low plasticity fines.									00000000		
372.38				X	S16	4 5 7	12					000000	VOC=9.2 ppm	
370.38	82											$ \infty $		
368.38	83 84 85											000000000		
			(continued)		Ιn	EPOR	ד דוד	1 =						HOLEID
BOKING			Department of Transportation Division of Engineering Services			BORI BORI DIST. 07	NG C	RE OUN		RD ROU 71	JTE O	PO: T/	STMILE T	R-09-Z2B5 EA 07-07-187900
CALIKANS			Geotechnical Services Office of Geotechnical Design - Sout	th	1	ROJE	T 0	r bf 'Un	NE	E NAME L TECH PREPAR K. Bai	NICAL ED BY	_ ST	T UDY	

2 SNI dod SINV dt IV

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location		Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	$\overline{}$	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Re	emarks
366.38	86		SILTY CLAY (CL-ML) (continued).	X	S17	6 9 11	20			21			0000	VOC=10.8 ppm	n =
	87												2000		
364.38			Very stiff; olive gray; low to medium plasticity fines.										3000		
362.38	90												000		
3/10 3/10	91			X	S18	5 8 9	17						0000	VOC=8.8 ppm	
360.38	92												000		
SKARY C	93												2000		
358.38	94												000		
356.38	95 96			X	S19	5 7 9	16						000000000000000000000000000000000000000	VOC=11.4 ppm	1
NLY.GP	97												3000		
354.38	98												000		
35 AND	99												3000		
352.38	100			X	S20	6 9	22						000	VOC=12.4 ppm	, [
350.38						13							3000		
184 218	103												000		
348.38													000		
346.38	105	IIII/	At EL. 347.4 ft, with few fine SAND.	1	O21					27	101	PP = 3.75	000	PI, PA, UU, C	
7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	107														
344.38	108		CLAYEY SAND (SC); medium dense; light brown;										000	VOC=6.4 ppm	
CALIK	109		moist; fine SAND; nonplastic to low plasticity fines.										00000		
342.38				V	S22	4	14						00000	V00 40	
340.38	111			Ι.		8							\bowtie	VOC=4.6 ppm	
N N N N N N N N N N N N N N N N N N N	113												00000000		
362.38 362.38 362.38 362.38 362.38 363.38 363.38 363.38 363.38 363.38 363.38 363.38 363.38 363.38 363.38 363.38 363.38 363.38 363.38 363.38 363.38 363.38 363.38 363.38	114		SANDY lean CLAY (CL); stiff; light brown to light gray;	+									<u> </u>		
ב ככ בר	115	///	moist to wet; fine SAND; low plasticity fines. (continued)										\triangleright	1	
NG KE			Department of Transportation		R	EPOR BOR	T TIT	LE RE	СО	RD					HOLE ID R-09-Z2B5
NO POR			Division of Engineering Services			IST. 07	С	OUN LA			ROU 71 0	TE)	PO:	STMILE T	EA 07-07-187900
KAN THE			Geotechnical Services Office of Geotechnical Design - Sou	th	1 🖳		10 T	UN	INE	L TE	ME E CH	NICAL	_ ST	UDY	
3			3			RIDGE	NUI	MBE	R	PRE K.	PAR Bar	ED BY ker, N	/l. Is	lam DATE	SHEET 4 of 11

ELEVATION (ft)	SDEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	_	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Remarks
336.38	116		SANDY lean CLAY (CL) (continued).	X	S23	5 6	11					PP = 1.5	0000	VOC=11.5 ppm
334.38	117 118												DISTILLIBRICA	
32.38			At EL. 332.4 ft, grades to very stiff.	V	S24	5 6	14		. 5	- 2		PP = 3.0	Minne	
30.38	E			Λ		8							<u> </u>	VOC=9.5 ppm
28.38	E		Fat CLAY (CH); very stiff, light brown to light gray; moist to wet.										DODDO	
26.38	125 126				O25					28	95	PP = 2.0	DOODOO	PI, UU
24.38													DISTILLA	VOC=9.3 ppm
22.38			SANDY lean CLAY (CL); very stiff; light brown to light gray; moist to wet.		S26	10 12 15	27					PP = 4.0	222222	VOC=10.7 ppm
20.38	132			/		10							mannana	
18.38	134		Very stiff to hard.	7	S27	12	43							
16.38	136		SEDIMENTADY BOOK	X	C26	18 25		100	100				Ann	VOC=8.2 ppm See note at the end of log
14.38	E	//	(CLAYSTONE)/MUDSTONE, thinly bedded, moderate olive brown and olive gray, slightly weathered, extremely weak, very soft, unfractured, [PUENTE FORMATION]										(0X0)	regarding RQD.
12.38			At EL. 312.4 ft, becomes laminated, soft.		C27			100	100				\ \ \ \ \ \	VOC=1.6 ppm
10.38	F	1 1											\$\delta\x	
08.38	144	1											X 0 X	1 -4
	1-10-		(continued)		R	EPOR	TTI	TLE						HOLEID
1	L	_/ 7	Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - So	uth :	D (BOR IST. D7 ROJE	CTC	RECOUNT	RIDG	SE NA	ROU 710	TE D	7.0	R-09-Z2B STMILE EA 07-07-18790
	- 1		Office of Geolechinical Design - 30	uul		RIDGI				PRE	PAR	ED BY		DATE SHEET

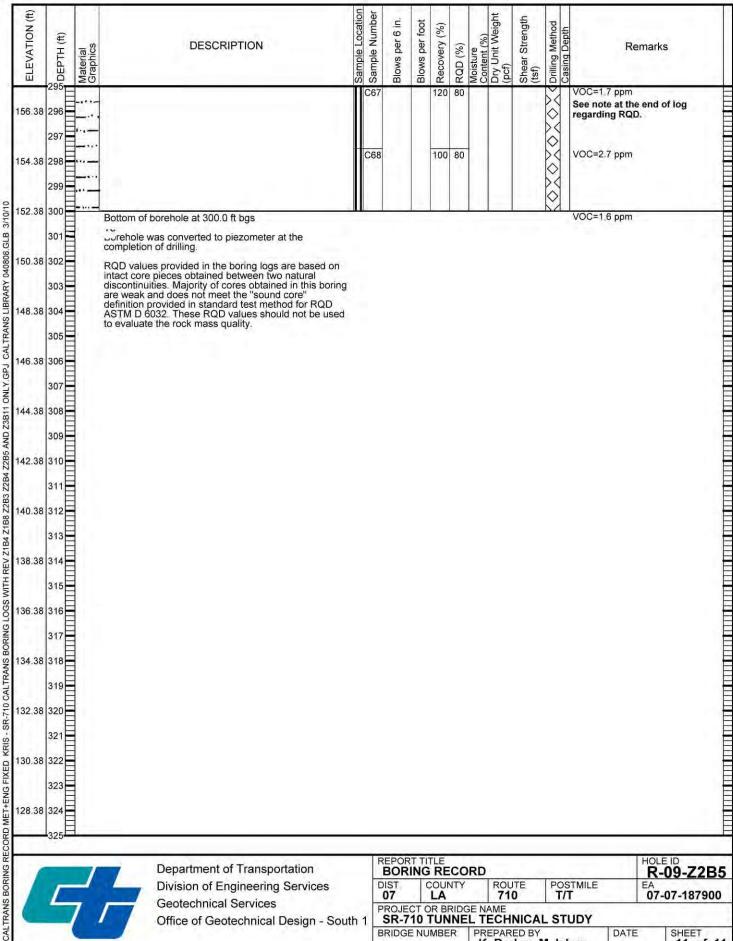
ELEVATION (ft)	э Боертн (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	
306.38	146		At EL. 307.4 ft, becomes slightly fractured, joint, not healed, dipping 30°. (continued).	C28			90	90			ы	♦ ×	VOC=2.8 ppm See note at the end of log regarding RQD.
	147	1											VOC=1.1 ppm
304.38	148		l)=						40	80			PI, PA, UU
	149											\Diamond	
302.38	150		At EL. 302.4 ft, becomes unfractured.	C29			100	100				×	
	151	1											
300.38	1												
000.00	153											×<	
298.38			At EL. 297.9 ft, becomes soft to moderately soft.									×	
296.38	155		SEDIMENTARY ROCK, (CLAYSTONE)/MUDSTONE, massive, black, slightly weathered, weak, soft to moderately soft, unfractured.	C30			100	84				××	VOC=1.1 ppm
230.50	157		moderately soit, uninactured.									><	
294.38												× ×	W00-0.7
	159											♦ ×	VOC=2.7 ppm
292.38	160			C31			100	88				>	
	161						100	00				×	
290.38	162											X	
	163											> <	VOC=1.9 ppm
288.38	164											\Diamond	
	165		At EL. 287.4 ft, becomes very slightly fractured, shear, dipping 45°.	C32		- 45	100	100				\Diamond	V/00-0.5
286.38	166		snear, dipping 45°.									\	VOC=2.6 ppm
	167			C33			120	80				\Diamond	
284.38				033			120	00				\Diamond	
	169											\lambda	VOC=1.7 ppm
282.38			At EL. 282.4 ft, becomes moderately soft, unfractured.	C34			100	100				0	
280.38	171											\Diamond	
200.30	173	5/_! /}		Ç35			108	80				\Diamond	VOC=1.8 ppm
278.38		9_ [0	
	175	(T 1			10							0	4.11
	11 7 7		(continued)	R	EPOF	T TIT	LE						HOLE ID
	_	_/	Department of Transportation Division of Engineering Services	D	BOR IST. 07	C	OUN	_	KD	ROL 71	TE	POS T/	R-09-Z2B
	_	7	Geotechnical Services	P			R BF	RIDG	SE N		NICA		
			Office of Geotechnical Design - South		RIDGI				PR	EPAR	ED BY		DATE SHEET

ELEVATION (ft)	SDEPTH (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		marks
276.38			At EL. 277.4 ft, becomes very slightly fractured, joint, dipping 70°, few subhorizontal silty laminations. (continued).	C36			100	20				V V V	VOC=1,7 ppm See note at the regarding RQD	end of log
274.38	177								23	101		\ \ \ \	PI, PA, UC	
272.38 270.38 268.38 266.38 264.38 269.38 259.38 259.38 259.38 248.38	179											\ \ \ \ \	VOC=1.6 ppm	end of log
272.30	181			C37			100	33				\$X		
270.38	182								e			♦ × ♦	VOC=3.4 ppm	
268.38	E			C38			100	100				× 0 × 0		
266.38	185											$\Diamond \times \Diamond$	VOC=2.9 ppm	
264.38	187			C39			100	83				× 0 ×	VOC=3.7 ppm	
204.50	189								21	107		$\Diamond \times \Diamond$		
262.38	190			C40			104	100				× 0 ×	VOC=4.1 ppm	
260.38	192							Į.				$\Diamond \times \Diamond$		
258.38		//	At EL. 258.4 ft, contains about 50% siltstone, weakly subvertically laminated.	C41			100	75				× 0 ×	VOC=20.0 ppm	
256.38	195		subvertically laminated.									$\Diamond \times \Diamond$		
254.38	197											× <		
254.50	199		At EL. 253.4 ft, becomes unfractured.	C42			106	100				$\Diamond \times \Diamond$	VOC=25.4 ppm	4
252.38	200	11										× × ×	1	
250.38	=	1							34			0 X Q		
248.38	203			C43			100	100	22	105		× 0 × 0	VOC=28.1 ppm SD, EM	
	205	1 1	(continued)							4		V	de la companya de la	
	_	_/	Department of Transportation Division of Engineering Services Geotechnical Services	D	EPOR BOR IST.	ING	RE	ITY		ROU 710	0	T/		HOLE ID R-09-Z2B 5 EA 07-07-187900
			Office of Geotechnical Design - Sout		ROJE SR-7 RIDGI				PRE	PAR	NICA ED BY ker, i		DATE	SHEET 7 of 11

ELEVATION (#)	GDEPTH (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	Ren	narks	
246.38	206			C43			100	100				× <	See note at the regarding RQD.	end of log	
244.38			SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, laminated, black, slightly weathered, weak, moderately soft, unfractured, subvertical laminations.	C44			100	100				X0X0X	VOC=2.7 ppm		
242.38	210	į		C45			100	100				0 X Q			
240.38	211	! \										X 0 X	VOC=17.3 ppm		
	213			C46			100	100				0×0	VOC=17.3 ppm VOC=25.0 ppm		
238.38	214	1										× () ×			
236.38	216	; ;										0×0			1
234.38	218	ί/		C47			100	82	23	102	۲	\ \ \ \	UU, CR VOC=3.2 ppm		
232.38	219	<i>[</i>]										0×0			
230.38	221											× 6 ×			
	223	<i>\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ </i>	At EL. 229.4 ft, observed fine grained sand lenses.	C48			104	73				X0X0	VOC=16.5 ppm		
226.38	225	<i>i</i> /										X0X0			
224.38	-		At EL. 224.4 ft, becomes dark greenish gray.	C49		1	100	75				×0×0	VOC=4.6 ppm		
222.38		\\		C50			92	92	P			♦ × ♦			
220.38	231	/										\ \ \ \ \ \	PTS		
218.38	233	1	At EL. 218.4 ft, becomes slightly fractured, shear, dipping 80°.	C51			94	40				0.000	VOC=29.0 ppm		
	235		(continued)			Π									
	_	_/	Department of Transportation Division of Engineering Services Geotechnical Services	D	EPOR BOR IST 07	ING	RE OUN LA	YTY		ROL 71	ITE O	PO: T/	STMILE I	HOLE ID R-09-Z2E EA 07-07-18790	
		1	Geotechnical Services Office of Geotechnical Design - Soutl	11 P	ROJE SR-7	CT C	R BF	NE	LT	AME ECH	NICA	LST			
			4		RIDG				PR	EPAR	ED BY		DATE	SHEET 8 of 1	1

ELEVATION (ft)	ў Брертн (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	(pcf)		Drilling Method	Re	emarks	
216.38	236	\	(continued).	C51			94	40				\$ \ \$ \ \$ \	See note at the regarding RQD	end of log	
	237	$ \cdot $	At EL. 215.8 ft, observed 2-3" gravel lens, fine, rounded and sub-angular.	C52			100	100	¢			0	VOC=2.5 ppm		
214.38	238	1										\ \ \			
	239											0			
212.38	240	j		C53			100	92	21	109		0	VOC=3.2 ppm SD, EM		
210.38		1									Š		VOC=1.5 ppm		
	243	1													
208.38	244	1		C54			88	79	Q			>>			
	245	\ ! !										>>			
206.38	246											>>			
204.38		\	At EL. 204.4 ft, becomes extremely weak, very soft.	C55			42	10				\$ X \$	VOC=4.1 ppm		
	249	1	At LL. 204.4 II, becomes extremely weak, very soit.	055			42	,,				×<	700 4.7 ppm		
202.38	250	1													
	251	Ì	At EL. 200.9 ft, observed breccia lens, fine gravel,									0	-		
200.38	252	::	sub-rounded, black siltstone matrix. SEDIMENTARY ROCK (SANDSTONE) fine-grained	C56			89	0					VOC=1.0 ppm		
198.38			massive, dark greenish gray, slightly weathered, extremely weak, very soft, unfractured.									0			
	255	. 7		C57			30	0					VOC=5.1 ppm		ı
196.38	256														
	257														
194.38	258											>			
192.38				C58			67	16				>>	VOC=17.0 ppm		
	261			030			07	10				000	VOO-17.0 pp		
190.38	262											×<			
	263											× ×	VOC=6.2 ppm		
188.38	264	4	SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, laminated, dark gray, slightly weathered, weak,								,	0			
	200		(continued)	IR	EPOF	TTI	TLE		Ú				11	HOLE ID	
	_		Department of Transportation Division of Engineering Services	D	BOR	ING	RE			ROUT		POS	STMILE	R-09-Z2E	
	_	7	Geotechnical Services Office of Geotechnical Design - Sout	P	07 ROJE SR-7	CTC	R BE	RIDG	E NAI	710 ME CHN	ICAL	T/		07-07-18790	U
			Office of Geolechnical Design - Sout		RIDG				PRE	PARE			DATE	SHEET 9 of 1	1

183 38 286 184 38 280 287 287 184 38 280 288 288 288 288 288 288 288	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	Remarks	
184.38 286 2	186.38		 	and trace fine gravel.	C59			111	83	24			XOX	See note at the end of log	
September Sept	184.38		<u>-</u>	SEDIMENTARY ROCK, (CONGLOMERATE), coarse	C60			111	33				><	VOC=0.7 ppm	
180.38 272 273 274 275 2			0	sand to cobble, dark gray, slightly weathered, extremely weak, very soft, unfractured, sand and clay matrix, clasts are very hard, sub-rounded and sub-angular, metamorphosed granitics, trace shell									><		
178.38 274 275 276 277 277 277 277 277 277		271	80		C61			42	0				X0X	VOC=2.7 ppm	
SEDIMENTARY ROCK, (CLAYSTONE) MUDSTONE, massive, dark gray, slightly weathered, weak, moderately soft, with lenses of siltstone. C62		273	• 0		Coi			42	U				0×0	VOG-2.7 ррп	
172.38 278 SEDIMENTARY ROCK, (SANDSTONE), fine-grained, dark gray, slightly weathered, weak, hard, slightly fractured, joint dipping 45° At EL 172.4 ft, observed little coarse and fine gravels, sub-rounded, granitic. SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, laminated to very thinly bedded, dark gray, slightly weathered, weak, moderately soft, slightly fractured, locally very soft, with sandstone laminations. SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, laminated to very thinly bedded, dark gray, slightly weathered, weak, moderately soft, slightly fractured, locally very soft, with sandstone laminations. C64		275	.O.	SEDIMENTARY ROCK, (CLAYSTONE)/MUDSTONE, massive, dark gray, slightly weathered, weak,	C62			100	40					VOC=1.0 ppm	
SEDIMENTARY ROCK, (SANDSTONE), fine-grained, dark gray, slightly weathered, weak, hard, slightly ractured, joint diploring 45° Af EL. 172 4t, observed little coarse and fine gravels, sub-rounded, granitic. VOC=4.9 ppm SEDIMENTARY ROCK, (SILTSTONE/MUDSTONE, aminated to very thinly bedded, dark gray, slightly weathered, weak, modarely wost, slightly reactured, locally very soft, with sandstone laminations. SEDIMENTARY ROCK, (SILTSTONE/MUDSTONE, aminated to very thinly bedded, dark gray, slightly weathered, weak, modarely wost, slightly reactured, locally very soft, with sandstone laminations. SEDIMENTARY ROCK, (SILTSTONE/MUDSTONE, aminated to very thinly bedded, dark gray, slightly reactured, locally very soft, with sandstone laminations. C64 135 40 VOC=4.9 ppm VOC=4.5 ppm VOC=3.0 ppm VOC=3.0 ppm Department of Transportation Division of Engineering Services Geotechnical Services Geotechnical Services REPORT TITLE BORING RECORD DIST. COUNTY ROUTE 710 POSTMILE EAPO9-; 171 COUNTY 710 TITLE EAPOP-; 171 COUN		277		moderately sort, with lenses of sitistone.									>X \ \ \		
At EL 172.4 ft, observed little coarse and fine gravels, sub-rounded, granitic. 170.38 288		279		dark gray, slightly weathered, weak, hard, slightly fractured, joint dipping 45°.	CGS			00	0				><	VOC=14.5 ppm	
SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, laminated to very thinly bedded, dark gray, slightly weathered, weak, moderately soft, slightly fractured, locally very soft, with sandstone laminations. CG4 135 40 VOC=4.5 ppm VOC=3.0 ppm At EL 159.9 ft, observed 1' bed of little fine to coarse gravels, sub-angular. C66 Department of Transportation Division of Engineering Services Geotechnical Services Geotechnical Services REPORT TITLE BORING RECORD DIST COUNTY ROUTE POSTMILE FA-07-01-11 PROJECT OF BRIDGE NAME	170.38		=: : : :	At EL. 172.4 ft, observed little coarse and fine	003			90	U						
164.38 288	168.38	284		laminated to very thinly bedded, dark gray, slightly weathered, weak, moderately soft, slightly fractured,									X 0 X		
162.38 290 At EL. 159.9 ft, observed 1' bed of little fine to coarse gravels, sub-angular. At EL. 159.9 ft, observed 1' bed of little fine to coarse gravels, sub-angular. C66 C67 C68 C68 C68 C68 C68 C68		286	=:-		C64			135	40				X 0 X		
162.38 290 At EL. 159.9 ft, observed 1' bed of little fine to coarse gravels, sub-angular. At EL. 159.9 ft, observed 1' bed of little fine to coarse gravels, sub-angular. C66	164.38	288												VOC=4.5 ppm	
At EL. 159.9 ft, observed 1' bed of little fine to coarse gravels, sub-angular. At EL. 159.9 ft, observed 1' bed of little fine to coarse gravels, sub-angular. (continued) Department of Transportation Division of Engineering Services Geotechnical Services Geotechnical Services Division of Engineering Services Geotechnical Services Division of Engineering Services Geotechnical Services Division of Engineering Services Geotechnical Services	162.38	290	-,		C65			107	50				><	VOC=3.0 ppm	
(continued) Separate Continued Cont	160.38		_,,,	At El 150 0 ft observed 1' had of little fine to access	Cee			100	92	31	88		><	SD, EM	
Department of Transportation Division of Engineering Services Geotechnical Services Department of Transportation Division of Engineering Services Geotechnical Services DIST COUNTY ROUTE POSTMILE T/T 07 LA 710 T/T 07-07-18	158.38		 		Ç66			100	92				>>		
Department of Transportation Division of Engineering Services Geotechnical Services BORING RECORD DIST. COUNTY ROUTE POSTMILE T/T 07-07-11 PROJECT OR BRIDGE NAME BORING RECORD DIST. COUNTY T/T 07-07-11		295		(continued)							l d			l-	1
PROJECT OR BRIDGE NAME				Department of Transportation Division of Engineering Services	D	BOR IST. 07	ING	RE OUN LA	VTY		71	0	T/	R-09-Z2 STMILE EA T 07-07-187	
			7	Geotechnical Services Office of Geotechnical Design - South			CT 0	R BF			AME ECH	NICA	LST	UDY	



Geotechnical Services Office of Geotechnical Design - South 1

	T TITLE	D		R-09-Z2B5
DIST. 07	COUNTY	710	POSTMILE T/T	EA 07-07-187900
	CT OR BRIDGE		VI STUDY	

SR-710 TUNNE **BRIDGE NUMBER** PREPARED BY

K. Barker, M. Islam 11 of 11

DATE

SHEET

	rsiello G CONTF	3-12	1 DATE 2-09	COMPLETION DA 3-24-09		26.199	" / 11	8° 1	0' 4	7.6	106	" NA		tum)			-Z3B1 E ELEVATION
Casca	ade Dri	lling Inc.			' Lt \$	Sta (Av							Blvc	l.)			ft NAVD 88
Rotary SAMPLE SPT(1	I.4"), C	n (S) AND SIZE(al (2.4"), P	Q core (-	SPT HAI	soll Ra MMER TY natic H	^{/PE}	er 1								6 in HAMMER 75%	LE DIAMETER
		KFILL AND CO			GROUNI READIN	DWATER GS	DUR NN		DRIL	LING			DRILLII t on0			300.0 f	EPTH OF BORING ft
ELEVATION (ft)	DEPTH (ft) Material	Glaphics	С	ESCRIPTION		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	R	emarks
883.10 : 881.10 : 8879.10 : 5	1 1 2 1 3 3 4 4 1 5 5 6 6 1 7 8 8 1 5 8 1 5 1 6 1 6 1 6 1 6 1 6 1 6 1 6 1 6 1 6	SILTY SAI	ΓΕ 6" thick ND (SM); r fine SANI	nedium dense; brov D; low plasticity fine	vn; moist; s [OLDER	<u> </u>									in ac Soil and 2007 A.1 c Sum Tech Cou 18, 2	& Rock Lo Presentati 7), except a	ecord was prepared with the Caltrans gging, Classificatio on Manual (June, as noted in Append t Final Geotechnica ort, SR-710 Tunnel ty, Los Angeles rrnia, dated March
875.10 1 1 873.10 1	9	Medium de SAND, 31'	ense; 1% f % low plas	ine GRAVEL, 68% l ticity fines, iron oxic	medium to finde staining.	e S01	7 14 22	36	100		14	122		<u>ooooooooooooooooooooooooooooooooooooo</u>	PA VOC	C = 0.0 ppn	n
871.10 1 1 869.10 1	14	At EL. 87	0.1 ft, bec	omes dense; dark b	rown.	VS02	2 6 14 21	35	100	-				sassassassassassassassassassassassassas	VOC	C = 0.0 ppn	n
865.10 2	20 21 21		, 56% coa	omes medium dens rse to fine SAND, 4:		S03	8 6 12 18	30	100	-	16	117		<u> </u>	PA, VOC	PI C = 0.0 ppn	n
	23													DODDODDO			
				(continued)			REPOF	T TIT	TLF								HOLE ID
	/		Division	ment of Transpor n of Engineering hnical Services		1	BOR DIST. 07	ING	RE COUN LA	NTY		ROU 71 0		PO D	STMIL /D	E	R-09-Z3E
				of Geotechnical [Design - So	uth 1 📙	PROJE SR-7 BRIDG N/A	<u> 10 T</u>	ΓUΝ	INEL	PRE	ECHI	NICA ED BY	L S1	ΓUDΥ	DATI	E SHEET

ELEVATION (ft)	SDEPTH (ft)	Material	Graphics		Sample Location Sample Number	1000	Blows per foot	Recovery (%)		Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing	emarks
859.10				Poorly graded SAND with SILTY CLAY (SP-SC); very dense; brownish yellow; moist; coarse to fine SAND; medium plasticity fines.	X SO	14 50/5		100				MARKET	See note at end RQD. VOC = 0.0 ppm	of log regarding
857.10	27 28											0000		
855.10	29 30			At EL. 855.1 ft, becomes very pale brown.	× s0:	50/4		100				Monor		
853.10	31 32			SEDIMENTARY ROCK: (SANDSTONE), fine sand to coarse sand, pale brown, moderately weathered, moderately soft to moderately hard, slightly fractured, slight iron oxide staining. [TOPANGA FORMATION] At EL. 853.1 ft, grades to light yellowish brown with	C06	5		100	60			XOX	VOC = 0.0 ppm	
851.10	33 34		1	At EL. 852.6 ft, observed fault, dipping 75°, Bedding joint dipping 15 degrees. At EL. 851.8 ft, observed fault, dipping 80°, dark gray clay lining.	C07	7		100	45			$\Diamond \times \Diamond \rangle$		
849.10	35 36	1		At ÉL. 851.3 ft, observed 15 mm thick clay seam, dipping 15 degrees, yellowish red. At EL. 851.1 ft, becomes medium sand to coarse sand, dusky brown, intensely to moderately weathered moderately hard				,00	, 40			0×0		
847.10	37 38		1	At EL. 849.7 ft, becomes very thinly to thinly bedded, bedding joint, dipping 15 to 0°, clay lined, 1 to 2 mm aperture. At EL. 849.1 ft, contains bedding joint, dipping 15°, 1"								>>	VOC = 0.0 ppm	
845.10	39			thick, gray silty clay seam. At EL. 848.6 ft, contains fault, dipping 65°, clay lined. At EL. 847.9 ft, contains fault, dipping 55°, calcite lined. At EL. 847.6 ft, contains bedding joint, dipping 15°. At EL. 846.6 ft, contains 2" thick silty sand lens, light	CO	3		3	0			X0X	VOC = 0.0 ppm	
843.10	41			gray, very moist.								00000		
841.10	43 44			SEDIMENTARY ROCK, (CONGLOMERATE), granule to cobble, massive, light gray, moderately weathered,	Cos	9		38	0			X \ \		
839.10			0.0	recovered as pebble-sized clasts of intrusive rock, clasts are very hard. At EL. 840.1 ft, observed moderately hard, sandstone, as 30.5'. Numerous joints. At EL. 839.4 ft, observed extremely hard.								\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	VOC = 0.0 ppm	
837.10	7	0,		cobble-sized intrusive clast.								\ \ \ \		
835.10			. 0	At EL. 836.1 ft, becomes pebble to granule, intensely to moderately weathered, moderately hard, intensely to moderately fractured, bedding joint, dipping 5°, Matrix is fine to coarse sand, clasts are angular to subangular, diorite derived.	G10	ō		33	0			X0X0	VOC = 0.0 ppm	
833.10	51	8										(0X0)		
831.10	53 54	0			C1	1		30	0			$\Diamond X \Diamond X \Diamond$		
	55			(continued)										
			/	Department of Transportation Division of Engineering Services		BOF DIST 07	RING	RE	CO	RD ROL 71	JTE O	PO D	STMILE /D	HOLE ID R-09-Z3E EA 07-187900
	_	7	1	Geotechnical Services Office of Geotechnical Design - South	11	PROJ	710 E NU	R B	INE	E NAME L TECH PREPAR D. Jar	NICA ED BY		TUDY	SHEET 2-09 2 of 1

ELEVATION (#)	ОЕРТН (#)	Material Graphics	DESCRIPTION	Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight	Shear Strength (tsf)	Drilling Method	Casing Depth	emarks
829.10	56	ò · .	At EL. 830.3 ft, becomes dark reddish brown, moderately weathered, Local highly fractured siltstone lens, soft, gray. (continued). At EL. 829.9 ft, observed coarse sandstone lens,	C11			30	0			XOX	See note at ene RQD. VOC = 0.0 ppn	d of log regarding
827.10	57	o .	abundant iron oxide staining, intensely weathered (SAND, dense, moist).								0×0		
825.10	60		ANEL 2040 A shooted heading faint display for	C12			37	0			\ \ \ \ \ \	VOC = 0.0 ppm	
823.10	4	0 .	At EL. 824.6 ft, observed bedding joint, dipping 5 to 2°.								X0X0	VOC - 0.0 ppn	
821.10		0, 0	At EL. 821.1 ft, becomes soft to moderately soft.	C13			50	13			>X		
819.10	65 66 67	·	At EL. 819.2 ft, observed bedding joint, dipping 5°, very thinly bedded siltstone, intensely fractured.								>×<>×<	VOC = 0.2 ppn	i
817.10	68	,									X0X0		
815.10		, ^D .	At EL. 816.1 ft, becomes intensely to moderately weathered. At EL. 814.8 ft, contains gray sandstone bed, non-indurated, 0.3' thick.	C14			57	13			X0X0	VOC = 0.4 ppm	
813.10											X0X0		
811.10	74 75		No recovery at El. 811 to 806 due to drilling error.	C15			0	0	34		$\langle \Diamond \times \Diamond \rangle$		
809.10	76 77										000	VOC = 0.0 ppm	t.)
807.10	78 79		At EL. 806.1 ft, becomes light bluish gray mottled with	C16			77	18			0×0×		
805.10	80	<i>0</i> .	At EL. 806.1 ft, becomes light bluish gray mottled with pale brown, moderately to slightly weathered, soft, iron oxide staining. At EL. 805.0 ft, becomes light olive brown, moderately weathered.							1	× 0 ×	VOC = 1.2 ppm	
803.10	82		At EL. 803.5 ft, becomes dusky blue, slightly weathered, moderately hard, calcite cement.	C17			98	25			X0X0		
801.10		,									$\Diamond \times \Diamond$	VOC = 0.0 ppm	
			(continued)	P	EPOR	TTIT	TE	+					HOLE ID
	_		Department of Transportation Division of Engineering Services Geotechnical Services	D	BOR IST. 07	ING	RE OUN LA	1TY	RO 7	JTE I 0		STMILE	R-09-Z3B
			Office of Geotechnical Design - South	1 P	ROJE SR-7	CT 0	R BF	RIDG NE I	E NAME L TEC F	INICA	LST	TUDY	
	-		Sinds of Goodson Hodi Bedign - Oddin	В	RIDGI N/A				PREPAI D. Ja	RED BY		DATE 5-1	2-09 SHEET

ELEVATION (ft)	^а рертн (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	emarks
799.10	86	0 -	At EL. 800.3 ft, becomes slightly weathered to fresh, dark yellowish brown becoming dark bluish gray below.	C17			98	25			♦ ×	See note at end RQD.	d of log regarding
11	87	0 -		C18			39	0			× <	VOC = 0.2 ppm	
797.10	88										×		
	89										×		
795.10	90			C19	61		0	0			0		
	91	. 9		1									
793.10		o'									0	M 20 10	
791.10	93												
791.10	95												
789.10			At EL. 789,7 ft, observed granule to pebble-sized crasts in fine to coarse sand matrix, soft to	C20 C21			100 85	33					
	97	0	moderately soft. Clasts are subrounded to angular.								\Diamond	VOC = 3.0 ppm	P.
787.10	98	/	At EL. 788.1 ft, observed shear, dipping 60°, 5 mm aperture, clay lined, slickensided. At EL. 787.2 ft, contains joint, dipping 0°.								0		
	99									14	\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\		
785.10	100		Fine to very coarse grained sand matrix, clasts are	C22			27	0					
.16	101	0 .	subangular.	CZZ			21	U			\Diamond		
783.10				1							\Diamond		
781.10	103) e	1							\Diamond	VOC = 3.4 ppm	
100	105	0						=		14	0		
779.10		1 1	At EL. 779.7 ft, observed granule to cobble, very thickly bedded to massive, intensely to moderately	C23			97	74			\Diamond		
	107	2/	fractured. At EL. 778.4 ft, contains joint, dipping 80°, 2" aperture.	1							\Diamond	VOC = 1.9 ppm	
777.10	108		aperture.	1							\Diamond		
	109	+	At EL. 776.3 ft, contains shear, dipping 20°, 1" to 1.5" aperture, slickensided.							11	\Diamond		
775.10	110		At EL. 775.7 ft, observed four joints dipping 0, 20, 45, and 80 degrees.	C24			80	47	2	11	\Diamond		
	111		At EL. 774.6 ft, becomes moderately soft to moderately hard, numerous horizontal joints, likely due to drilling.	102,			0.0				\Diamond		
773.10											\Diamond	VOC = 1.3 ppm	
771.10	113	. 0	At EL. 772.2 ft, observed possible 2" sheared zone - infilled sand is decomposed to silt. Local zones with calcite cement.								\Diamond		
	115		1.000.00								\Diamond	MI .	
			(continued)	F	REPO	RT TI	TLE					1	HOLE ID
	_	_/	Department of Transportation Division of Engineering Services	0	BOF IST	10	NOC		ROL	JTE.	PO	STMILE	R-09-Z3B
	_	7	Geotechnical Services	F	ROJE	CTC	LA OR BE	RIDG	71 E NAME L TECH	8.45		/D	07-187900
			Office of Geotechnical Design - South		RIDG N/A	E NU			PREPAR D. Jar	ED BY			SHEET 2-09 4 of 1

ELEVATION (ft)	GDEPTH (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	marks
769.10)	At EL. 768.7 ft, contains possible fracture zone, 5" thick. At EL. 768.1 ft, becomes very intensely fractured,	C25			80	38				See note at end RQD. VOC = 1.7 ppm	of log regarding
767.10	118		bint, dipping 40°. At EL. 767.2 ft, observed joint, dipping 20°, slickensided with chlorite alteration.								♦	4	
765.10	120	, D		C26			96	23			$\Diamond X \Diamond X$	VOC = 3.8 ppm	
763.10	122	. · ·	At EL. 762.1 ft, becomes dark gray mottled with white, slightly weathered to fresh, intersected igneous								\times		
761.10	124	<u>o</u> (·	content signify weathered to fresh, intersected igheous clasts. Numerous joints dipping 0 to 70 degrees, appertures up to 3 mm.	C27			100	0	s= 41		X0X	VOC = 2.0 ppm	
759.10	126	·/	At EL. 758.6 ft, becomes intensely fractured, Numerous joints dipping 0 to 15 degrees. Shear dipping 50 degrees, slight clay lining.	C28			100	40			\$\$X\$X		
	129	- 1	At EL. 755.8 ft, observed random fracture, dipping ADEL. 755.5 ft, observed random fracture, dipping 60								\$\$\$\$	VOC = 0.0 ppm	
755.10 753.10	131	1.00	to 20°. At EL. 754.4 ft, observed medium to very coarse sandstone lens, 2.5" thick. At EL. 754.0 ft, becomes fresh, soft, numerous joints dipping 0 to 50 degrees.	C29			77	20			(0X0X		
751.10	133	X	At EL. 752.1 ft, observed numerous joints dipping 50 to 80 degrees, 1 to 2mm aperture, calcite infill.					D				VOC = 0.0 ppm	
749.10	135	0		C30			0	0			$\langle \Diamond \times \Diamond \rangle$		
747.10	137	0.		C30			Ü	Ü			\ \ \ \ \		
745.10	139	· ·									0		
743.10	141	0 0	At EL. 744.0 ft, observed local slickensided surfaces on diorite clasts.	C31			39	0	4-		\$X\$X	VOC = 0.3 ppm	
741.10	143	٠٠٠ مار	At EL. 741.1 ft, observed numerous joints dipping 0 to 90 degrees.	C32			100	42			0×0×		
	145		(continued)								101		
1	_		Department of Transportation Division of Engineering Services	D	EPOR BOR IST.	ING	RE OUN		RD ROL 71	ITE O	PO	STMILE	HOLE ID R-09-Z3B EA 07-187900
	_	7	Geotechnical Services	P	ROJE	CTO	R BF	RIDG	E NAME L TECH	0.575			01-101900
-			Office of Geotechnical Design - South	В	RIDGI N/A				PREPAR D. Jar	ED BY	_ 3	DATE 5-1 2	2-09 SHEET 5 of 11

ELEVATION (ft)	5 5 0 6 0 6 0 7 0 7 0 7 0 7 0 7 0 1 0 1 0 1 0 1 0 1	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%) Dry Unit Weight	Shear Strength (tsf)	Drilling Method	Casing	marks
739.10	146		At EL. 739.0 ft, observed fine to very coarse sand matrix, clasts up to 3" observed, local slickensided joint faces dipping 70 to 80 degrees.	C32			93				XOX	See note at end RQD. VOC = 8.5 ppm	l of log regarding
737.10	147	ζ.	joint faces dipping 70 to 80 degrees.								0×0	VOC = 3.3 ppm	
735.10	149	•	At EL. 736.0 ft, observed 4" thick section of possible gouge. At EL. 735.0 ft, with coarse grained sand matrix, joint,								>>		
733.10	151		dipping 75°. At EL. 733.0 ft, observed 1' thick section of	C34			40	0	S-No.		XOX		
731.10	153	. 0	sandstone with granule to pebble sized clasts, dark gray, clasts are angular to subrounded.								$\Diamond \times \Diamond$	VOC = 1.5 ppm	
729.10	155										X0X0		
	157		At EL. 729.0 ft, becomes fresh, moderately soft, very slightly fractured, clasts are easily friable.	C35			90	57			XOX	VOC = 7.0 ppm	
727.10 725.10	159	•	At EL. 726.0 ft, observed zone with light greenish gray sand and fragments of hardened clay, possibly gouge.								\$X\$X\$		
723.10	161 162		At EL. 724.0 ft, becomes granule to cobble sized clasts with fine to coarse grained sand matrix, clasts are subangular, very thickly bedded to massive, soft, very intensely fractured.	C36			55	7	S#1		00000	VOC = 5.5 ppm	
721.10											X0X0X		
719.10	166 167	, , , , , , , , , , , , , , , , , , ,	At EL. 719.0 ft, becomes soft to moderately soft.	C37			25	0			(0%0)	VOC = 6.3 ppm	
717.10	168 169	. 0									0×0		
715.10	170 171			C38			75	42	4	Hi	X		
713.10 711.10	173	٠٠٠٠٠٠٠٠	At EL. 713.1 ft, becomes intensely to moderately fractured, contains numerous joints dipping 0 to 20 degrees. Very weak. At EL. 712.4 ft, observed joint, dipping 10°. At EL. 711.5 ft, observed joint, dipping 10°, Strong. PTS - Coarse grained arkosic Sandstone with crystal and rock fragments to 2mm, fragments composed of				, 5				0X 0 X 0 X 0	PL VOC = 0.0 ppm PL PTS	
	175		(continued)							1	1.		
	_		Department of Transportation Division of Engineering Services	C	BOF DIST.	RING	RE	YTV	RO 7			OSTMILE D/D	HOLE ID R-09-Z3B EA 07-187900
			Geotechnical Services Office of Geotechnical Design - Sout		SR-7	CT C	R BE	RIDG	E NAME	INICA	LST	TUDY	
			Sinds of Section filed Design 2 odd		RIDG N/A	E NU			PREPAI D. Ja	RED BY		DATE	2-09 SHEET

ELEVATION (ft)	SDEPTH (ft)	Material Graphics		Sample Location	_	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing	emarks
709.10	176	.,	digrite and sandstone. Fine to medium grained calcite matrix.	C3	8			75	42				X	See note at en RQD.	d of log regarding
703.10	E	•	At EL. 711.0 ft, observed joint, dipping 20°. At EL. 709.0 ft, becomes very intensely fractured, intersected clasts up to 7", abundant joints dipping 0	C3	9			100	55				$\stackrel{\diamond}{\sim}$		
707.40			to 65 degrees.										0	V00 04	
707.10		1	At EL. 707.4 ft, observed joint, dipping 45°. PTS - Quartz Diorite clast: Plutonic rock with										0	VOC = 0.4 ppn	1
	179	1	allotriomorphic-granular texture. At EL. 706.0 ft, observed joint, dipping 45°. At EL. 705.4 ft, observed joint, dipping 65°.	1									\Diamond		
705.10	=	•	At EL 705.4 ft, observed joint, dipping 65°.										0		
	181			C4	0			63	13				\Diamond		
703.10	182	. ,	At EL. 702.8 ft, observed joint, dipping 60°.		1									VOC = 0.0 ppn	ì
	183	%	At EL. 702.8 ft, observed joint, dipping 60°, slickensided. Unit exhibits numerous joints dipping from 0 to 60 degrees, joints are typically rough, aperture uncertain due to intensely fractured nature										><		
701.10	184		of the unit. Weak.										>	PL	
	185	0											\Diamond		
699.10	186		At EL. 699.0 ft, becomes slightly weathered to fresh,	C4	1			38	0	a I			\Diamond		
	187	. 9	At EL. 699.0 ft, becomes slightly weathered to fresh, very intensely to intensely fractured, Numerous clay lined, slickensided joints at 186' to 187' dipping 70 to 85 degrees.										0	VOC = 0.0 ppn	1
697.10	188	" .	oo degrees.	1									\Diamond		
	189	1:		1											
695.10	190	1.											X		
	191	1,0	At El. 604.0 ft, becomes granula to boulder sized. At	C4	2			79	30				X		
693.10	192	Ţ.	At EL. 694.0 ft, becomes granule to boulder sized. At 192.1', intersected 1.7' long diorite boulder. Boulder is intensely fractured, medium strong.	0.4	-			13	50	0	164		$\stackrel{\wedge}{\sim}$	UC	
	193	+								3	3.70		\Diamond	VOC = 0.0 ppn	
691.10	194	+	Very strong										0	PL	
	194		very suorig.	C4	3			94	25				0	VOC = 0.2 ppn	
689.10	196			1						i i			\Diamond	VOO - 0.2 ppi	
	197		At EL. 688.5 ft, observed joint, dipping 30°, unit	C4	4			90	43				\Diamond		
687.10			At EL. 688.5 ft, observed joint, dipping 30°, unit becomes granule to pebble sized. At EL. 688.0 ft, observed joint, dipping 35°.	Ш									\Diamond		
	199	, ,											><	VOC = 0.1 ppm	î.
685 10			Medium strong. At EL. 685.9 ft, observed joint, dipping 20°.										\$	-	
685.10	201	1											\Diamond		
692 10	202	٠,	At EL. 684.0 ft, becomes moderately soft to moderately hard, moderately hard zones due to	C4	5			100	22				\Diamond		
683.10	-	4	calcite cementation. At EL. 683,6 ft, observed joint, dipping 30 to 10°. Weak.										\Diamond	PL	
604.45	203												\Diamond	VOC ≈ 0.0 ppn	
681.10	204	50	At EL. 681.1 ft, observed joint, dipping $80^{\circ},$ roughly 2 foot long.										\Diamond		
	205		(continued)		P.	DOE	1								LIOLEIE
		1	Department of Transportation		В	POR	ING	RE	_	RD	l nov		T-	0.T.L.	R-09-Z3B
		_	Division of Engineering Services Geotechnical Services		0	7		LA		EN	710)		OSTMILE D/D	07-187900
	- 7	/	Office of Geotechnical Design - South	th 1	S		10 1	UN	INE	LT	ECHI		LS	TUDY	12
		<u></u>				IDGE V/A	NU	MRE	K		EPARI . Jan	ED BY kly		5-1	2-09 7 of 1

ELEVATION (ft)	э ЭОЕРТН (ft)	Material	2	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	_	Casing	emarks
679.10	206	/°			C45			100				♦ ×<	See note at end RQD.	d of log regarding
677.10	207	,	At EL	- 678.0 ft, observed joint, dipping 45°.	C46			28	12			X0X0X	VOC = 0.1 ppm	
675.10	1		a		C47			40	-7			X0X		
673.10	212 213	,		672,0 ft, observed joint, dipping 45°,	047			40				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	VOC = 0.7 ppm	v.
	215	. "												
	217	1	✓ At EL	669.0 ft, observed numerous slickensided s dipping from 0 to 60 degrees.	C48			70	28	8		$\times 0 \times 0$	PA VOC = 6.3 ppm	
	219	- "	o C									XOXO		
663.10	221 222		At EL clasts	664.1 ft, becomes granule to cobble sized s 663.0 ft, observed joint, dipping 50°.	C49			60	27	46		>X \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		
661.10	223 224 225			661.5 ft, observed joint, dipping 85°.								$\Diamond \times \Diamond \times \Diamond$	VOC = 21.7 pp	m
659.10	226	o .		658.8 ft, observed joint, dipping 45°.	C50		9	17	7			X0X0	VOC = 3.7 ppm	
657.10												$\Diamond X \Diamond X$		
	231	· ·	At EL	654.0 ft, observed numerous joints dipping 0	C51			40	7	50.		$\Diamond X \Diamond X$		
653.10 651.10	233		angu 3" dia mode	654.0 ft, observed numerous joints dipping 0 degrees, 1mm aperture. Unit consists of alar to subrounded clasts of diorite and gneiss to a with fine to very coarse sand matrix. Soft to erately soft, intensely fractured.								X0X0X	VOC = 0.9 ppm	
	235	6		(portinged)								\Diamond		
	_		7	(continued) Department of Transportation Division of Engineering Services	0	EPOR BOR	ING	RE		ROU	TE	PC	DSTMILE	HOLE ID R-09-Z3E
	L	7		Geotechnical Services	P	07 ROJE	CTC	LA R BI	RIDG	710 E NAME	0	C)/D	07-187900
				Office of Geotechnical Design - Sout	th 1	SR-7 RIDG N/A	10	LUN	INE	PREPAR D. Jan	ED BY	LS		2-09 SHEET

ELEVATION (ft)	23 25 26 27 27 27 27 27	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	emarks
649.10	236	. 0	At EL. 649.0 ft, observed predominantly diorite clasts.	C51			88	33			\Diamond		
	237		Weak.	C52			00	33				PL	
647.10	238	6.	At EL. 647.8 ft, observed bedding joint, dipping 10°, 4" thick zone, thinly bedded.									10.7	
645.10	239	1900	Weak. PTS - Highly fractured and altered clast of brecciated Quartz Monzonite. Very weak.								×0×<	PL PTS VOC = 0.3 ppm PL	
	241	ث	At EL. 644.0 ft, observed numerous joints dipping 0 to 20 degrees, 1mm aperture.	C53			53	21			X		
643.10	242		to 20 degrees, 1mm aperture Weak.								\Diamond	PL	
	243	. 0									$\stackrel{\wedge}{\vee}$	VOC = 5.3 ppn	
641.10	244		KT 11								\$	-	
	245	.0									\		
639.10		. ,	At EL. 639.0 ft, observed clasts up to 5.5". At EL. 638.6 ft, observed numerous joints dipping 0	C54			60	21					
	247	1.	to 45 degrees.								\Diamond		
637.10	E	0									\Diamond	VOC = 0.4 ppm	L.
635.10	249										\		
033.10	251		(\Diamond		
633.10		4.	10	C55			58	22			\Diamond		
	253										0		
631.10	254		Weak.								0	VOC = 15.5 pp PL	m
	255										\Diamond		
629.10	256	,		C56			60	8	s		\Diamond		
	257	. 0	Weak.	000							\Diamond	PL	
627.10	258	0									\Diamond	1.50	
	259										\Diamond	VOC = 0.0 ppm	i e
625.10	260	10									\Diamond		
	261		At EL 624.0 ft, observed 1.7' thick sandstone bed	C57			68	18			0		
623.10	262	٥	with some clasts, medium to coarse grained, increasingly coarse with depth.										
	263		At EL. 622.3 ft, observed joint, dipping $45^{\circ},$ at base of sandstone.										
621.10	264	0	At EL. 621.0 ft, observed joint, dipping 65°.									VOC = 0.0 ppm CAI	16
	265	. w/	(continued)										
		1	Department of Transportation		BOR	ING	RE	_				OTA 411 -	R-09-Z3B
		7	Division of Engineering Services Geotechnical Services		07		LA		ROU 710 SE NAME	0	D	STMILE /D	07-187900
		1	Office of Geotechnical Design - South	1 1 L	SR-7	10 7	TUN	INE	L TECH		LST		loueer
		-		-	RIDG N/A	E NU	MRF	17	PREPAR D. Jan	kly		5-1	2-09 SHEET 2-09 9 of 1

ELEVATION (#)	26 29 29 20 20 20 20 20 20 20 20 20 20 20 20 20	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)	Casing Method	
619.10		0.	At EL. 619.0 ft, becomes intensely to moderately fractured. Intersected clasts up to 8", medium strong.	C57 C58			73	53	0	168		00000	See note at end of log regarding RQD. UC
617.10	269											>>>>>	VOC = 0.1 ppm
313.10	271 272 273	۰.	Very weak. At EL. 613.9 ft, becomes very intensely fractured, with numerous slickensided surfaces.	C59			42	10				0,000	PL.
611.10												20202	VOC = 0,0 ppm
607.10	277	. /	At EL. 608.0 ft, observed shear, dipping 70°. At EL. 607.0 ft, observed joint, dipping 65°.	C60			53	15	8			202020	VOC = 0.0 ppm PA
605.10 603.10	280 281 282 283	• • • • • • • • • • • • • • • • • • • •	At EL. 603.6 ft, observed bedding joint, dipping 10°, clasts up to 2" observed.	C61			25	15				020202020	VOC = 0.0 ppm
599.10 597.10	285 286 287 288	».		C62			35	Ō				×0×0×0×0×0×	VOC = 0.0 ppm
95.10 93.10	289 290 291 292 293 294			C63			28	7	3			020202020	VOC = 0.0 ppm
	295	0'	(continued)								(\Diamond	
1	L	<i>]</i>	Department of Transportation Division of Engineering Services Geotechnical Services	P	EPOF BOR IST. 07 ROJE	C	LA	VTY		710 ME	NICAL	D/	
			Office of Geotechnical Design - Sout	th 1	SR-7 RIDG N/A	10 T E NU	MBE	R	PRE	PARE Jani	D BY	ST	DATE SHEET 5-12-09 10 of

ELEVATION (ft)	(f) 295 199	Material	DESCRIPTION	Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)	4 RQD (%)	Moisture Content (%) Dry Unit Weight	Shear Strength (tsf)	C Drilling Method	Casing Depth		marks of log regarding
589.10	297	ef.	At EL. 589.0 ft, observed pebble to cobble sized ନ୍ୟୁଟ୍ଲୋଟ. 588.5 ft, observed numerous joints dipping 0 td 80 degrees.	C64			88	26			XOXOX		RQD.	
87.10	298	,									0×0			
35.10	E	0 -			-						×		VOC = 0.0 ppm	
33.10	301		Bottom of borehole at El. 585.1'. Bottom of borehole at 300.0 ft bgs Borehole terminated at planned depth.											
	303		Borehole converted to piezometer at the completion of drilling.											
1.10	304 305		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											
9.10	306		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.											
7 10	307		455.17											
7.10	309	1												
5.10	310													
3.10	311													
5.10	313													
1.10	314													
0.10	315													
9.10	317													
7.10	318													
E 40	319													
5.10	321													
3.10	E													
	323													
1.10	324 325													
		7	Department of Transportation	10	EPOR BOR	ING	RE							HOLE ID R-09-Z31
	Г		Department of Transportation Division of Engineering Services Geotechnical Services	0	BOR IST 07	ING	RE		RC	UTE 10	P	os D/I	TMILE D	R-09 67-187

Office of Geotechnical Design - South 1

DOM	ING INLUC	ND .		N-	03-Z3D1
DIST.	COUNTY	710	POSTMILE D/D	67-	187900
	T OR BRIDG	GE NAME L TECHNICA	L STUDY		
BRIDGE N/A	NUMBER	PREPARED BY		DATE 5-12-09	SHEET 11 of 11

	ratt/	T. Ha	BEGIN DATE Ilda 1-13-09	COMPLETION DATE 1-22-09	1872415.7	ft /	6514	1868	3.4 ft	t NA	D83	and Dat	um)			-Z3B2	
DRILLII Caltr					BOREHOLE L							3lvd				ELEVATION t NAVD88	
DRILLII Rota	_				DRILL RIG CS 2000 (ruc	· L \								BOREHOI 3.7 in	E DIAMETER	
SAMPL	ER T	/PE(S)) AND SIZE(S) (ID) nch Core(2.5") & I	HQ Rock Coring	SPT HAMMER Diedrich	TYI	PE	ic. 1	40 I	b 3) inch	drop				EFFICIENCY,	ERi
BORE	HOLE I	BACKE	FILL AND COMPLETION	N	GROUNDWAT READINGS			NG D			AFTER	_				PTH OF BOR	ING
ELEVATION (ft)	DEPTH (ft)	Material Graphics		ESCRIPTION		Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%) Moisture	Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depin		emarks	
779.40 777.40	1 2 3 4 5		Woody debris, pine no SILTY SAND (SM); Ic SAND; nonplastic fine Alluvial deposit). SANDY SILT (ML); ver fine SAND; nonplastic	ose; strong brown; moss; (probable Recent p	oist; fine conded	D01							2222	in ac Soil and 2007 A.10 Sum Tech	ccordance was Rock Log Presentation, except a confirmation of the Final amary Repondential Studynty, Califor	cord was prepaying the Caltrai gging, Classific on Manual (Jur is noted in App Geotechnical ort, SR-710 Tur /, Los Angeles nia, dated Apr	ns cation ne, pendix nnel
775.40 773.40	6 7 8	11111			X	S02 C03	2 7 11	18					000000000000000000000000000000000000000	VOC	E=0.2 PPM		il,
771.40	9		Well graded CAND w	ith CILT and CDAVEL		D04							000000000				
769.40 767.40	13		Well-graded SAND w very dense; yellowish fine to coarse GRAVE few fines; dominantly (intensely weathered) Quaternary Alluvium,	hard (slightly weather granitic rock fragmen	ed) to soft					10	129			UW, VOC	PI C=1.5 PPM		
765.40	15 1 6 1 7				V.	S05	32 20 28	48		g			000000000	PA VOC	C=0.5 PPM		
763.40 761.40	18 19 20												000000000				
	21 =	0 a d			X	S06	19 27 25	52					00000000	VOC	C=0.6 PPM		
757.40	23		COBBLES gravel, ar	nd sand, hard drilling.									200000				
				(continued)		F	EDOD	T T1-	1.5							HOLEID	
	\mathcal{L}		Division	nent of Transporta of Engineering Se nnical Services		D	EPOR BORI IST. D7	NG C	REC OUN LA	TY	ROL 71	JTE 0	РО Т /	STMIL /T	E	R-09-Z EA 07-07-18	
				f Geotechnical Des	sign - South 1	:	ROJE(SR-7 RIDGE	10 T	INU	NEL	Γ ECH REPAR	NICAL ED BY tt, M. I			DATE	SHEE 6-09 1 0	T f 10

	ELEVATION (ft)	DEPTH (#)	סבר ווו (וו)	Material	9	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		Re	marks
	755.40	26				SANDY SILT (ML); hard; yellowish brown; moist; nonplastic to low plasticity fines; FeO stained.	Λ	S07 C08	12 11 17	28						STATE	VOC=0.	0.5 PPN	
	753.40	27 28 29		a	9	Well-graded SAND with SILT and GRAVEL (SW-SM); very dense; yellowish brown; moist; some fine to coarse GRAVEL; mostly fine to coarse SAND; subangular to subrounded hard (slightly weathered) to minor soft (intensely weathered) granitic and schist		000								000000			
Z3B7 ONLY SR-710TUNLS CT BORING LOGS11_23_09JPCOPY.GPJ CALTRANS LIBRARY 040808.GLB 3/10/10	751.40			. Q		rock fragments.		O09								200000	VOC=2.	3 PPM	
BRARY 0408	749.40	32		0 4									9	132		00000	UW, PA		
SALTRANS LI	747.40	34 35		· 0	0			S10	07	86						MMM			
PCOPY.GPJ (745.40	36 37		. 0			X	310	27 45 41	00						00000	VOC=2.	1 PPM	
GS11_23_09J	743.40	38 39		0												000000			
T BORING LO	741.40	40 41		0 4		SILT (ML); hard; yellowish brown; moist; nonplastic fines.		S11	13 13 30	43			15			000000	VOC=1.	7 PPM	
-710TUNLS C	739.40	42 43		ا م		SILTY SAND (SM); very dense; yellowish brown; moist; nonplastic fines. Well-graded SAND with SILT, GRAVEL, and		C12								000000	VOC=3	PPM	
3B7 ONLY SR	737.40	44 45		.0.		Well-graded SAND with SILT, GRAVEL, and COBBLES (SW-SM); very dense; yellowish brown; moist; about 1 to 5% COBBLES; little fine to coarse GRAVEL; mostly coarse to fine SAND; few fines; COBBLES consist of; up to 6 in. diameter subangular to subrounded hard to moderately hard (slightly weathered) granitic rock fragments.		S13	21	91						00000			
Z3B2 Z3B5 Z3	735.40	46 47		.0.	0.4	weathered) granitic rock fragments.	X	C14	42 49							000000	VOC=0.		
IS WITH REV	733.40	48 49		* 0 4 												20000	100-11	0 1 1 W	
DE - CALTRAN	731.40	50 51		.0.	3		X	S15 C16	60 88/0.2		81					X	VOC=2.	4 PPM	
CALTRANS BORING RECORD MET+ENG FIXED JOE - CALTRANS WITH REV Z3B2 Z3B5	729.40	52 53	Е	0												♦	VOC=1.	1 PPM	
RD MET+	727.40	54 -55		• 0 • 0												\Diamond			
RECC						(continued)		l R	FPOR	T TI7	TIF							1	HOLE ID
BORING						Department of Transportation Division of Engineering Services		D	EPOR BOR IST. 07	ING			RD	ROU 71 0	TE O	PO: T/	STMILE T		R-09-Z3B2 EA 07-07-187900
RANS				7		Geotechnical Services	Lle ·	Р	ROJE	сто	R B	RIDG	E N	AME					
CALT						Office of Geotechnical Design - Sout	ın ′		RIDGE				PR	EPAR	NICAL ED BY			DATE 1-2 6	SHEET
													J.	rra	t, M.	isial	11	1-20	6-09 2 of 10

ELEVATION (ft)	DEPTH (ft)	Material Graphics		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	למטון המטון המטון	-	marks
725.40	56	. O	Well-graded SAND with SILT, GRAVEL, and COBBLES (SW-SM) (continued).	S17	31 50/0.5				11		X	VOC=7 PA	.1 PPM	
	57	• 0 • 0 • • •					0				X			
723.40	58	0 0									X			
01/10	59										X			
721.40	60	0 0		\/S18		92					X	VOC=4	.2 PPM	
0808.G	61				48 44		7.1				X			
748 719.40	62	٥		C19			74				Š	VOC=2	.9 PPM	
AS LIBR	63	ه ا ^ه د									Š			
AT 717.40	64		SILTY SAND (SM); hard; yellowish brown; moist; trace coarse to fine GRAVEL; mostly medium to fine SAND; some nonplastic fines; gradationally interbedded with						18			PA		
715.40			silty sand.	S20	9 31 38	69						VOC=1	35 PPM	
CT BORING LOGS/1_23_09JPCOPY.GPJ CALTRANS LIBRARY 040808.GLB 3/10/10 2	67	ا ا ا	Well-graded SAND with GRAVEL and COBBLES	C21	30		63							
713.40	68	.0.0	Well-graded SAND with GRAVEL and COBBLES (SW); very dense; yellowish brown; moist; about 10% COBBLES; about 15 to 25% fine to coarse GRAVEL; COBBLES consist of; up to 4 in. diameter subrounded									VOC=0	.8 PPM	
JGS11_	69	6 A	hard (slightly weathered) granitic rock fragments.											
711.40	70		SILTY SAND (SM); very dense; yellowish brown; moist; trace fine GRAVEL.	S22		100						VOC=2	. PPM	
CT BO	71			\ ∏ C23	50 50		97		15					
709.40							31		13			VOC=1	4 DDM	
709.40 707.40 707.40	73		CLAYEY SAND (SC); dense to very dense; strong brown; moist; nonplastic fines; gradationally interbedded with silty sand, possible hardpan									VOC=1	.4 PPIVI	
7 ONLY	75		(paleosol).											
7382 2385 Z386 705.40	76	6	Well-graded SAND with GRAVEL (SW); very dense;	S24	16 45 50	95					\Diamond	VOC=1	.9 PPM	
Z3B2 Z:	77	. 0	yellowish brown to light yellowish brown; moist; about 0 to 10% fine to coarse GRAVEL; fine to coarse SAND; interbedded with up to 10% silty sand,	C25			97							
703.40	78	ъ. 	subangular hard sheared granitic rock fragments.									VOC=2	.3 PPM	
INS WI	79	0.0												
701.40	80	• <i>0</i> •	Poorly graded SAND with GRAVEL (SP); very dense; yellowish brown to light yellowish brown; moist; little	S26	24 48	89						VOC=6	.1 PPM	<u> </u>
JOE - (81	0.0	yellowish brown to light yellowish brown; moist; little coarse to fine GRAVEL; mostly coarse to fine SAND; trace fines.	\ C27	41		91		15			PA		Ē
699.40	82	. O										VOC=0	.8 PPM	<u>=</u>
697.40														
CALTRANS BORING RECORD MET+ENG FIXED JOE - CALTRANS WITH REV 701 - 40 - 40 - 40 - 40 - 40 - 40 - 40 -	85	0 0	/ / B								\Diamond			
G REC			(continued) Department of Transportation	F	REPOR	T TIT	LLE							HOLE ID
BORIN			Division of Engineering Services	Ī	BOR DIST. 07	С	OUN LA		ROL 71		PO:	STMILE		R-09-Z3B2 EA 07-07-187900
RANS		7	Geotechnical Services Office of Geotechnical Design - Soutl		PROJE	сто	R BF	RIDGE I NE L	NAME TECH					3. 31 101300
CAL			Zimes S. Cookesiimiedi Zoolgii Coddi		BRIDGI				PREPAR J. Pra	ED BY			DATE 1-26	SHEET 3 of 10

ELEVATION (ft)	DEPTH (ft)	-	Material Graphics		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	1	Remarks
695.40	86		0.0	Poorly graded SAND with GRAVEL (SP) (continued).	_	50 70 50/0.4						$ \stackrel{\searrow}{\Diamond} $		VOC=4.9 PP	М
693.40 01/01/6 691.40	87 88 89			SILTY SAND (SM); very dense; strong brown to light yellowish brown; moist; trace fine GRAVEL; mostly coarse to fine SAND; interbedded with well graded sand and sandy silt, about 75% silty sand, about 20% well graded sand, crosslaminated.	C29			92				$\times \Diamond \times \Diamond \times \Diamond$		VOC=1.0PPN	Л
691.40 691.40	90				\$30	27 35 22	57			15		\ \ \ \ \		PA VOC=2.3 PP	м
CALTRANS LIBRARY 040808.GLB 04.789 05.089 06.088	93				C31			74				$\Diamond X \Diamond X \Diamond$		VOC=0.4 PP	М
687.40 685.40 685.40	95	Ħ	A A	Well-graded SAND (SW); very dense; light yellowish brown; moist; trace fine to coarse GRAVEL; (up to 1	S32	42 26 75/0.4'						$\langle \langle \langle \langle \langle \rangle \rangle \rangle \rangle \langle \langle \langle \langle \langle \rangle \rangle \rangle \rangle$		VOC=0.1 PP	М
685.40 685.40 683.40	97 98 99			in. dia.) hard granitic rock fragments. Well-graded SAND with GRAVEL (SW); very dense; light yellowish brown to yellowish brown; moist; about 5% COBBLES; coarse GRAVEL; up to 4 in. diameter subangular hard (slightly weathered) sheared quartz I diorite rock fragments, little silt interbeds.	C33	70/0.4		100				×		VOC0.0 PPM	M
B7 ONLY SR-710TUNLS CT BORING LOGS11_23 99 040 90 04	100			SILTY SAND (SM); dense to very dense; strong brown to reddish brown; moist; trace GRAVEL; mostly coarse to fine SAND; little nonplastic to low plasticity fines; interbedded with about 20% well graded sand and 25% silt, intensely weathered soil and quartz diorite and schist rock fragments.	S34	24 25 35	60			17		$\Diamond X \Diamond X \Diamond$		PA VOC=1.9 PP	м
SR-710TUNLS 679.40	103			and contact resix riaginisme.	C35			91				×		VOC=0.8 PP	м
677.40 677.40 675.40	105				S36	11 15 20	35	100		18		$\times \Diamond \times \Diamond \times$		VOC=1.8 PP	м 🗆
23 Z3	107 108 109				C37			100		10		$\Diamond \times \Diamond \times \Diamond$		VOC=0.4 PP	М
JOE - CALTRANS WITH REV Z3B2 Z3B5 Z3B5 Z3B5 Z3B5 Z3B5 Z3B5 Z3B5 Z3B5				SILTY SAND (SM); very dense; yellowish brown to reddish brown; moist; few fine GRAVEL; mostly coarse to fine SAND; some nonplastic to low plasticity fines; gradationally interbedded with clayey sand, subangular	S38	16 15 31	46					$\langle \langle $		VOC=0.48 PI	M PM
	112			gradationally interbedded with clayey sand, subangular (hard (slightly weathered) to soft (intensely weathered) quartz diorite and schist rock fragments, intensely weathered zone (paleosol).	C39			100		12		\bigcirc		PA VOC=0.1 PP	м
CALTRANS BORING RECORD MET+ENG FIXED												$\Diamond \times \Diamond$			
ECO.	-115			(continued)											
DRING RI			7	Department of Transportation Division of Engineering Services		EPOR BOR IST.	NG				JTE	PC).S.	TMILE	HOLE ID R-09-Z3B2
ANS BC	L			Geotechnical Services	F	07 ROJE	T O	L A R BF	RIDGI	71 NAME	0	T	/Τ	_	07-07-187900
LTR.				Office of Geotechnical Design - South	ı 1 📙	SR-7	<u> 10 T</u>	UN	NEL	TECH PREPAR		L S	ΤL	J DY	TE QUEET
ò						NIDGE	. INUľ	VIDE	r\$	J. Pra	itt, M.	Isla	ım	1 1-	TE SHEET 26-09 4 of 10

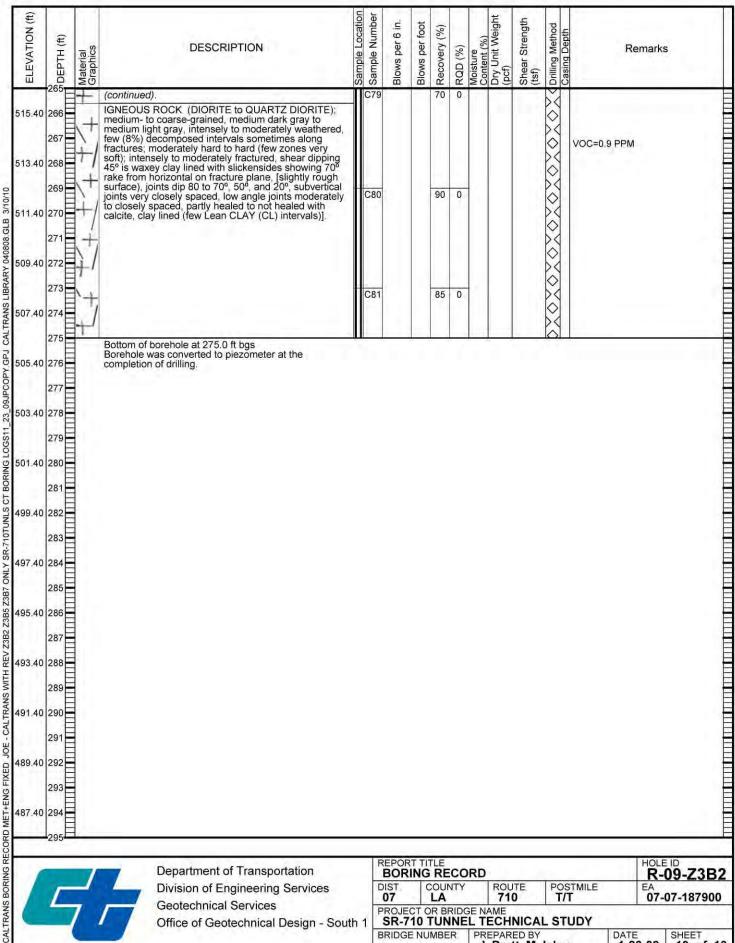
ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Cassilla	marks
665.40	116		CLAYEY SAND (SC); dense to very dense; very stiff to hard; yellowish brown to reddish brown mottled; moist; nonplastic to low plasticity fines; to sandy lean clay, intensely weathered (paleosol or regolith).	S40	10 15 21	36	69		14			XOX	VOC=0.2 PPM	
663.40	117 118		CLAYEY SAND (SC); very dense; very stiff; light yellowish brown to yellowish red mottled; moist to wet; nonplastic to low plasticity fines; wet between EL 663.1 to 662.6 ft, minor weakly calcite cemented sand, intensely weathered soft (paleosol/regolith).	041			33		1.3			XOXO	VOC=0,2 PPM	
661.40			,	X S42	Access to the second						PP = 3.0 to	0×0	VOC=0.1 PPM	
659.40		シュ	METAMORPHIC ROCK, (GNEISS); medium-grained to aphanitic; thinly to moderately foliated (0.2 to 1.0 ft), foliations dip 20°, dark yellowish orange to light brown, decomposed to intensely weathered; very soft to soft; intensely fractured; joints dip from 60 to 80°,	C43	50/.2'		100	0			4.0	0000	V00-0 0 PPM	
657.40	123 124 125	Ž	very thin slightly open fractures partly filled with clay and FeO (forms rubble), moderately thin totally silica healed fractures below EL +654.4 ft [fractures moderately rough; friable (Well graded SAND with CLAY (SW-SC), very dense). [Wilson Quartz Dioritě.									\$X\$X\$	VOC=0.0 PPM	
655.40		57		S44 C45	60/.33	,—————————————————————————————————————	51	0				X 0 X		
653.40	127 128 129	个个										XOXO	VOC=0.0 PPM	
651.40		8		C46		4.5	0					\$X\$X\$		
649.40	132 133	で	METAMORPHIC ROCK, (GNEISS); coarse-grained to									>X		
647.40	134 135	2	METAMORPHIC ROCK, (GNEISS); coarse-grained to very coarse-grained; generally foliated, pale yellowish brown to yellowish gray, intensely weathered, moderately soft to moderately hard, very intensely fractured, joints dip 55°, thin moderately open fractures partly healed with clay and FeO, some thin fractures (3 to 5 mm thick) moderately healed with silica or feldspared by the silicated upper the part of the 25° to 20° and 56° febble, retained upper the part of the 20° to 20° or 56° febble.	C47			38	0				>X<>		
645.40	136 137	メンジ	to 5 mm thick) moderately healed with silica or feldspar and dip 25 to 30°, and 55°; friable; estimated upper contact.					3				000		
643.40	138 139											\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	VOC=0.0 PPM	
641.40	140 141	Ž		C48			42	0				×0×0		
639.40	142	3										× 4×	V00-0 6 DDI	
637.40		12										$\Diamond \times \Diamond$	VOC=0.6 PPM	
			(continued)	- 12	EDOE	T T17	ri e	Ц						HOLEID
	Г	_/	Department of Transportation Division of Engineering Services	-	BOR BOR DIST. 07	ING	RE		RD	ROL 71	TE 0	PO	STMILE	R-09-Z3B2 EA 07-07-187900
	-	7	Geotechnical Services	F	ROJE	сто	R BF	RIDG	EN	AME	5 + 5		UDY	
			Office of Geotechnical Design - South		RIDGI						ED BY	_ 31	DATE	SHEET

ELEVATION (ft)	PDEPTH (ft)	Material Graphics		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	-	marks
635.40	146	7/2	\(\text{(continued)}\). METAMORPHIC ROCK, (GNEISS); medium-grained; generally foliated, pale yellowish brown to dark gray, intensely weathered, decomposed below EL 635.1 ft; moderately hard to hard; intensely fractured, below	C49			70	10		100		× 0 × 0	UW, PL	
633.40	E	SUN SUN	EL 635.1 ft, very soft (decomposed gneiss altered to clay with slickensides); rubble. METAMORPHIC ROCK, (GNEISS); generally foliated, light brownish gray to white, intensely weathered, moderately hard to hard, very intensely to intensely						0	160		20%	VOC=0.4 PPM	
631.40		グジ	fractured, joints dip 60°, 75°, and 40 to 25°, very closely spaced fractures (7 mm spacing) below EL 1633.4 ft; seams infilled with FeO and intensely weathered to decomposed mica (weathered to clay); fractures not healed.	C50			58	0				000		
629.40	152	37	METAMORPHIC ROCK, (GNEISS),, light brownish gray to white, intensely weathered, moderately hard to hard, intensely to moderately fractured, joints dip 65 to 75°, closely to moderately spaced (0.4 to 0.1 ft), FeO and clay lined, not healed.									\ \ \ \ \ \ \ \	VOC=0.3 PPM	
627.40	153 154 155	NO.	Below EL 629.2 ft., aphanitic to medium-grained, very intensely to intensely fractured, joints dip 25-30° and 65-75° (jointsets), very close to closely spaced (0.05 to 0.3 ft), subvertical joints not healed (FeO and clay infill); low angle joints moderately to totally healed with FeO and silica (0.5 to 10 mm thick).	C51			56	16				XOXO		
625.40	156 157		METAMORPHIC ROCK, (GNEISS); generally foliated, light gray to brownish gray, hard, intensely fractured, (decomposed seams), joints dip 80°, 50-55°, 65-25°,	001			50	10				×0×0		
623.40	158	1	FeO and silica lined fractures are moderately healed to not healed; wet clay lined fractures (1 to 10 mm thick) not healed, slightly rough, slickensides on low angle shears, 5 to 30 mm fracture [spacing, lots rubble].									× 0 × 0	VOC=1.1 PPM	
621.40	160	1		C52			68	8				20%		
619.40	162	Ý										\$ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	VOC=0.5 PPM	
617.40		1/2 N										000		
615.40		4	METAMORPHIC ROCK, (GNEISS); intensely weathered, hard, very intensely to intensely fractured, fracture zone, forms rubble.	C53			38	0				X0X0		
613.40		3	METAMORPHIC ROCK, (GNEISS); decomposed to intensely weathered, very soft to soft, possible veins/dike, seams weathered to clay (Well graded SAND with CLAY (SW-SC)).									X 0 X	VOC=0.9 PPM	
611.40		2	METAMORPHIC ROCK, (GNEISS); possibly thinly foliated (0.1 to 0.3 ft), yellowish gray, intensely weathered hard intensely fronting to provide the provided to t	C54			48	0				\ \ \ \	UW, PL	
609.40		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	weathered, hard, intensely fractured, continuous joints dip 60 to 70° and 25 to 40°, partly healed with silica and infilled with clay, slightly rough surfaces,						0	155		000	VOC=0.4 PPM	
607.40	E	N. A.										0×0×		
	1/5		(continued)											
	_	_/	Department of Transportation Division of Engineering Services	D	EPOF BOR IST. 07	ING		_	RD	ROU 71	TE O	POS T/	STMILE T	R-09-Z3B2 EA 07-07-187900
	-	7	Geotechnical Services Office of Geotechnical Design - South	P	ROJE	CTO	R BF	RIDG	EN	AME	NICAL		A Company of the Comp	
			Office of Geolechinical Design - South		RIDG			_	PR	EPAR	ED BY		DATE	SHEET 6-09 6 of 10

ELEVATION (ft)	SDEPTH (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	Re Cassing	emarks
605.40	0000	1	7	(continued). METAMORPHIC ROCK, (SCHIST); fine- to	C55			88	7				×		
603.40	177	1/1/1	ングン	medium-grained; intensely foliated (<3mm); intensely weathered to decomposed (possible altered mafic dike), dark gray, intensely weathered to decomposed (possible altered mafic dike); moderately hard; intensely to moderately fractured; fractures very closely spaced (10 to 15 mm), partly silica healed, remainder infilled with soft clay (not healed), [slightly to moderately open fractures (0.5 to 3 mm)].									XOXOX	VOC=0.3 PPM	
601.40	180	5	5	METAMORPHIC ROCK, (SCHIST); Chloritic, dark greenish gray, decomposed, very soft to soft, (decomposed to Lean CLAY (CL), medium plasticity, moist)).	C56			88	0				0×0		
599.40	181 182 183	-	1	METAMORPHIC ROCK, (GNEISS); very thinly foliated, light gray to pale yellowish brown, intensely weathered to decomposed; mostly hard to some soft; very intensely to intensely fractured; soft clay lined fractures not healed (slightly open to moderately open, 0.5 to 2 mm), forms rubble (some Poorly graded									(OXOX	VOC=0.9 PPM	9
597.40	184	1	X	GRAVEL with CLAY and SAND (GP-GĆ)). METAMORPHIC ROCK, (GNEISS);, medium light gray, intensely weathered, hard, intensely fractured, joint sets dip 80 to 70°, 60°, and 30°, fractures partly									() X		
595.40	185 186	7	X	healed with silica and remainder infilled with soft clay (not healed, moderately open, 1 to 2 mm), slightly rough to smooth surfaces; rubble.	C57			85	10				000		
	187	1	X	METAMORPHIC ROCK, (GNEISS);, fine-grained to medium-grained, medium light gray, intensely weathered to decomposed; hard to some very soft;									X 0 X		
593.40	188 189	2	V	very intensely to intensely fractured; joints dip 70° to 20°, very closely spaced (10 to 20 mm fracture spacing), siliceous & clay lined (1 to 2 mm), slightly rough to smooth surfaces [breaks down to rubble and	0.50								\$X		
591.40	190	<i>b y</i>	1	Coarse sand (some Poorly graded GRAVEL with SAND (GP))]. METAMORPHIC ROCK, (GNEISS);, white to dark	C58			71	0				0×0		
589.40	191 192 193	5	ソスノ	greenish gray, decomposed to intensely weathered; very soft to moderately soft; very intensely fractured; very closely spaced fractures (10 mm spacing) dip 70°, altered clay material is moist to wet (mostly Poorly graded GRAVEL with CLAY and SAND (GP-GC), moist to wet).									XOXOX		
587.40	194	1	1	METAMORPHIC ROCK, (GNEISS); fine-grained to aphanitic; thinly to moderately foliated (0.2 to 0.4 ft), greenish gray to medium bluish gray, intensely to	C59			80	0				SXOX		
585.40	195 196		7	moderately weathered, hard, intensely fractured, fractures dip 20 to 30°, and 50°, closely spaced (0.2 to 0.3 ft), chlorite and slickensides on shear and fracture surfaces, fractures/shears partly calcite healed.	C60			17	0				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
583.40	197 198 199	7/7	7	METAMORPHIC ROCK, (GNEISS);, medium gray to white, mostly decomposed (80%) to intensely weathered; mostly very soft to little hard; intensely fractured; chloritic alteration, (mostly Poorly graded GRAVEL with CLAY and SAND (GP-GC); Pressure meter test (195-201 ft depth).									XOXOX		
581.40		1	7										0×0		
579.40	201 202 203	1	5	METAMORPHIC ROCK, (GNEISS);, medium-grained to fine-grained, medium gray to medium light gray, mostly moderately to intensely weathered (75%) with little thin (0.1 to 0.3 ft) decomposed intervals (25%); mostly hard to little very soft; intensely fractured, joints dip 75-70°, 50° & 25°, [closely spaced (0.1 to 0.3 ft), continuous, partly healed with silica, clay lined (not	C61			93	0				X0X0X	VOC=0.9 PPM	
577.40		1	イス	continuous, partly healed with silica, clay lined (not healed), slightly rough surfaces (little Poorly graded SAND with CLAY (SP-SC))].									SXO.	VOC=0.9 PPM	
	205		,	(continued)						_			1		
			1	Department of Transportation	10	EPOF BOR	ING	RE		RD			1-		R-09-Z3B2
	L	7		Division of Engineering Services Geotechnical Services		IST. 07 ROJE	- 1	LA R BF		SE N	71 AME		T	STMILE / T	07-07-187900
		1	1	Office of Geotechnical Design - South	11	SR-7		TUN	NE			NICA	LST	YDDY	

ELEVATION (ft)	20EPTH (ft)	Material Graphics		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Rep	marks
575.40 573.40	207	THE THE THE	METAMORPHIC ROCK, (GNEISS); medium-grained, medium gray to medium light gray, mostly intensely weathered (70%) to some decomposed (30%); mostly moderately hard to some very soft; very intensely to intensely fractured; joints dip 70-80°, 50°, & 25 to 35°, very thin subvertical fractures very closely spaced (7 mm) [and totally silica healed, remaining lower angle joints are partly healed with silica and calcite and not healed with clay infill, slickensides plunge 20° on subvertical shears (some Lean CLAY with SAND (CL))].	C62			100	0				\$X\$X\$X\$X\$	VOC=1.0 PPM	
571.40 569.40 567.40	211 212 213	シガンマグン	METAMORPHIC ROCK, (GNEISS);, medium gray to medium dark gray, decomposed, very soft to soft, (Lean CLAY (CL), soft). METAMORPHIC ROCK, (GNEISS); medium-grained to fine-grained; very thinly to thinly foliated (dip 20°), medium gray to medium light gray, intensely to moderately weathered, moderately hard to hard, very intensely to intensely fractured, irregular discontinuous fractures dip 60 to 70° and 20°, fractures partly healed	C63			86	0				X0X0X0X0X	VOC=0.8 PPM	
565.40 563.40	217	ルケスタ	with chlorite and silica, slightly rough surfaces, 35% rubble. METAMORPHIC ROCK, (GNEISS), medium-grained, medium light gray to medium gray, mostly intensely to moderately weathered (80%) to little decomposed (20%): mostly moderately hard to little very soft:	C64			96	0	t			>×<>×<>×<	VOC=0.5 PPM	
561.40	219 220 221	心外交方	intensely fractured; joints dip 75°, 50°, and 25°, subvertical joints are very closely spaced (30 mm), low angle joints [are closely spaced (60 to 70 mm), continuous not healed fractures are lined with minor chlorite and rare calcite, moderately to slightly rough surfaces (little Lean CLAY (CL))]. METAMORPHIC ROCK, (GNEISS); medium-grained; foliated, medium gray, mostly moderately to intensely	C65			100	0				0%0%0%		
559.40 557.40	223	XXXX	weathered (5% decomposed); mostly moderately hard to few soft; very intensely to intensely fractured; joints dip 70° and 20°, closely to very closely spaced (<0.1 to 0.2 ft) [subvertical very thin (0.5 mm thick) fractures moderately healed with silica, moderately rough surfaces]. Below EL 559.2 ft becomes, dark gray, (Pressuremeter test from 221.0 to 227.0 ft depth).									X0X0X0X		
555.40	226	THE PARTY OF THE P	METAMORPHIC ROCK, (GNEISS); medium-grained,	C67			100	0				000		
553.40	228	シング	foliated, medium light gray to medium gray, moderately to intensely weathered; moderately hard; very intensely to intensely fractured; joints dip 70 to 80° & 20-25°, continuous subvertical joints partly healed with silica and not healed with clay infill [slightly rough surfaces, 80% soft decomposed below EL 551.4 ft].	C68			77	20	3	156		X0X0X	VOC=0.8 PPM	
551.40 549.40	231	及外次		C69			88	0				X0X0		
547.40	233	77+11	IGNEOUS ROCK (QUARTZ DIORITE; medium-grained, medium light gray, moderately to slightly weathered, hard to very hard, intensely fractured, low angle moderately open joints lined with waxey chlorite, slickensides show 65° rake from horizontal in 50° dip shear planes; continuous joints dip 75°, 50°, and 20°, closely (40 mm) to very closely									0%0%0	VOC=0.8 PPM	
	230		(10 (continued)											
	L	_/	Department of Transportation Division of Engineering Services Geotechnical Services	D	EPOR BOR IST. 07	ING	RE OUN LA	ITY		ROU 710	TE)	POS T/	STMILE T	HOLE ID R-09-Z3B2 EA 07-07-187900
			Office of Geotechnical Design - South	11	ROJE SR-7 RIDGI	10 T	UN	NE	PRE	EPARE	NICA ED BY t, M.		DATE	-09 8 of 10

ELEVATION (ft)	SOEPTH (ft)	Material Graphics		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Re	emarks
545.40	236	17	mm) spaced, [moderate and low angle joints closely spaced, subvertical joints very closely spaced and moderately healed with very thin silica (0.5 to 1 mm	C70			94	22			×<		
	237	X	thick)]. (continued). METAMORPHIC ROCK, (MARBLE) (partly replaced										
543.40	238	X	with QUARTZ DIORITE in patches); medium- to coarse-grained, light gray to medium light gray, moderately to intensely weathered; moderately hard;								\\	VOC=0.8 PPM	
	239	*	intensely fractured, low angle moderately open joints lined with waxey chlorite, high and low angle fractures moderately healed with calcite [fractures very closely								0		
541.40		7	spaced (20 to 25 mm), possible crinoidal debris in recrystalized mass]. At EL. 542.4 ft, becomes dark greenish gray,	C71			83	15			\Diamond		
F20.40	241	X	intensely fractured, joints dip 70°, 50 to 45°, and 20°, joints partly healed with calcite and chlorite infill to								0	VOC=0.9 PPM	
539.40	242	X	totally healed with calcite, 10% very soft decomposed interval altered to clay (few Lean CLAY (CL)). METAMORPHIC ROCK, (MARBLE)(partly replaced								0	-	
537.40		1	METAMORPHIC ROCK, (MARBLE)(partly replaced with QUARTZ DIORITE in patches); medium-grained, dark greenish gray to light brownish gray, moderately to intensely weathered; moderately soft; intensely	C72			92	0			\Diamond		
	245	XX	fractured, joints dip 80°, 50°, and 20°, partly to totally healed with calcite, moderately thin (1 to 2 mm) subvertical calcite veins very closely spaced (15 mm).	a.a.a.a.a.a.a.a.a.a.a.a.a.a.a.a.a.a.a.							0		
535.40	246	× ×	METAMORPHIC ROCK, (MARBLE) (partly replaced with QUARTZ DIORITE in mixed patches and layers); medium- to coarse-grained, medium light gray to	**********							0		
	247	X	greenish gray, intensely to moderately weathered, moderately soft to moderately hard, intensely fractured, joints dip 75 to 60°, 50°, and 20°, joints	C73			50	0	28		\Diamond		
533.40	248	X	partly to totally calcite healed (1 to 2 mm calcite veins), all continuous, some clay lined not healed open joints.	www.							0		
	249	*	METAMORPHIC ROCK, (MARBLE);, medium-grained, greenish gray, intensely to moderately weathered,	C74			80	0			0		
531.40		4/	moderately hard, very intensely to intensely fractured, joints dip 20 to 30° and 60°, subvertical joints very closely spaced, partly	C75			80	0			\Diamond		
529.40	251	+/	to totally calcite healed. IGNEOUS ROCK (DIORITE to QUARTZ DIORITE); medium- to coarse-grained, medium gray, intensely to	C76			88	8			\Diamond		
	253	4	moderately weathered, hard to very hard, intensely fractured, continuous joints dip 85 to 70° and 30°, very closely spaced subvertical joints partly healed with								0	VOC=1.0 PPM	
527.40	254	+,	calcite and some infilled with clay and slightly open, low angle joints partly healed to totally healed with calcite (1 to 2 mm thick).								0	V00=1.011 W	
	255	1+	Calcite (1 to 2 min thick).	C77			80	7			0		
525.40	256	+/									0		
	257	+									0	VOC=0.9 PPM	
523.40		+/	IGNEOUS ROCK (DIORITE to QUARTZ DIORITE); medium- to coarse-grained, medium gray, moderately								\Diamond	100 0.01111	
521.40	259	+	to intensely weathered; hard; moderately to intensely fractured; continuous subvertical joints dip approximately 70°.								\Diamond		
021.40	261	+		C78		100	74	9			\		
519.40	262	+	IGNEOUS ROCK (DIORITE to QUARTZ DIORITE); medium- to coarse-grained, light olive gray to greenish								\$ X		
	263	+	gray, decomposed, very soft, (Lean CLAY (CL), stiff to hard clay (PP=1.0 to >4.5 tsf).								>>	VOC=1.0 PPM	
517.40	264	+									>>		
	265E		(continued)								IVI.		
		/	Department of Transportation		EPOF BOR	ING	RE						R-09-Z3B2
	L	_/ 7	Division of Engineering Services Geotechnical Services		1ST. 07	- 1	LA		710		PO:	STMILE T	EA 07-07-187900
	""	/	Office of Geotechnical Design - South	11 3	SR-7		run	NE	E NAME L TECH	NICA	LST	UDY	



BRIDGE NUMBER

PREPARED BY J. Pratt, M. Islam DATE 1-26-09

10 of 10

LOGGE J. Ca			BEGIN DATE COMPLETION DATE chell 2-4-09 2-13-09	BOREHOLI 34° 7' 52	E LOC 2.614	ATION 6" / 1	(Lat/l 1 8° 9	Long 9' 1 7	or No 7.82	orth/E 3''N	ast an IAD8	nd Dat 3	um)		HOLE ID	-Z3B3		
DRILLIN			CTOR ng Inc.	BOREHOLI								Ave				E ELEVAT		
DRILLIN	NG ME	THO		DRILL RIG								· · · · · · · · · · · · · · · · · · ·				LE DIAME		
	ER TY	PE(S	AND SIZE(S) (ID) (2.4"), PQ core (3.2")	Speed S SPT HAMM Automa	IER T	/PE	ar 1/	10 IF	30	incl	h dro					REFFICIE	NCY, ER	i
BOREH	OLE	BACKI	FILL AND COMPLETION Stalled on Completion	GROUNDV READINGS	VATER		NG E			AFT		RILLIN				EPTH OF	BORING	;
£	Jinet		samou on component		e jo													_
ELEVATION	рертн (ft)	Material Graphics	DESCRIPTION		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	(pcf)	Shear Strength (tsf)	Drilling Method	מפטים המיסים	R	emarks		
799.90	1 2 3		GRASS and LANDSCAPE (Fill). SILTY SAND (SM); Loose, yellowish brown, fine SAND [ALLUVIUM].	medium to									100000000000000000000000000000000000000	in ac Soil and 2007 A1 o Sum Tech Coul	cordance & Rock Lo Presentat ') except of the Fina mary Rep Inical Stud nty, Califo	ecord was with the Cogging, Claion Manuals noted in Geotechrort, SR-71 dy, Los Anrnia, dated	altrans assificatio I (June, Appendi nical 0 Tunnel	in ix
797.90	4 5												300000	2010).			
795.90	6												00000000					
793.90	8			,									\sim					
791.90	10		Dense, yellowish brown mottled with brown, SAND, micaceous, oxidized.	moist, fine	S1	9 12 15	27	100					000000000000000000000000000000000000000					
789,90	12												00000					
787.90	14	9	Poorly graded SAND with GRAVEL (SP): de	nse.	▼ D2	28		100					00000					
785.90	16 17	0.0	Poorly graded SAND with GRAVEL (SP); de yellowish brown, moist, subangular GRAVEL 3/4" dia.; coarse SAND, micaceous, granitic	., max. source.	A	50/5							mana					
783.90	<u> </u>	6 /											000000					
781.90	20	a .			X S3	16 29 36	65	100					doord					
779.90	22	0.0											000000					
777.90	24	0											20000			. 240700240-20		
4· •	** **		(continued)			REPOR	RT TI	TLE					*************			H <u>O</u> LE	D	_
		/ 7	Department of Transportation Division of Engineering Services Geotechnical Services			BOR DIST. 07	ING	RE COUI LA	YTV		ROUT 710 ME	1	D	STMIL /D	E	EA	D 9-Z3E 37900	3
			Office of Geotechnical Des	ign - Sout		PROJE SR-7 BRIDG N/A					PARE		. STU	JDY	DA ⁻ 6 -	E 22-09	SHEET 1 of '	_

ELEVATION (ft)	DEPTH (ft)		Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RCD (%) Moisture Content (%) Dry Unit Weight	(pct) Shear Strength (tsf)	Drilling Method Casing Depth	Re	emarks	
ш	DEF		Grap		Sam	Sam	Blow	Blow	Rec	RQE Mois Cont Dry	(pct) Shea (tsf)	Drilling I			
	25 26		0	Poorly graded SAND with GRAVEL (SP) <i>(continued)</i> . Same as above. At EL. 775.99', becomes GRAVEL max. 2 1/4" dia.		D4)	20 50/5		100,			Company Com			
773.99	272829		σ. Θ									0000000			
771.99	30		0 <u>0</u>		X	S5	12 22	55	100			00000			
	31		o .c				33					00000			
767.99	33 34		0			-						00000			
	35 36		0 0 2		×	\D6	50/6		(100,			<u>รฝึงธอชาชาชาชาชาชาชาชาชาชาชาชาชาชาชาชาชาชาชา</u>			
763.99	37 38 39		0.0									0000000			
761.99	40		0	SILTY SAND (SM); very dense, yellowish brown and strong brown, moist, fine to very fine SAND, micaceous, oxidized.	X	S7	18 24	62	100			00000			
759.99	42			micaceous, oxidized.			38					00000			
759.99 757.99	43 44 45											000000			
				Assume Silty SAND as above.		\D8 _.	50/6		<u> </u>				Note: Sampler that fell into ho	Jammed with rock le	
753.99												000000			
755.99 753.99 751.99 747.99	49 50			No recovery.		D9,	24 50/3		0			00000			
749.99							30/3					00000			
747.99	53 54											<u>SOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO</u>			
8	-55-			(continued)								0		pp	
				(continued) Department of Transportation Division of Engineering Services			REPOR BOR DIST.	ING	TLE RE	CORD	OUTE	PO	STMILE	HOLE ID R-09-Z3B	3
	L	J	7	Geotechnical Services Office of Geotechnical Design - Sou	uth	1 F	7 PROJE SR-7	CT C 10 7	LA OR BI TUN	RIDGE NAM NEL TEC	710 E HNICAI	_ STL		07-187900	
		I				:	BRIDGI	E NU	MBE	R PREP	ARED BY	<i>'</i>	DAT 6-2	SHEET 2-09 2 of 10)

ELEVATION (ft)	л ло с РТН (ft)	Material Graphics	DESCRIPTION	Sample Location		Blows per foot	Recovery (%)	RQD (%)	Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method Casing Depth	Re	marks	
	56		SILT (ML); yellowish brown, moist, nonplastic fines, finely micaceous. GRAVELLY SILT (ML); medium stiff, dark yellowish brown, moist, about 50%, GRAVEL, max. 1" dia.; nonplastic fines, GRAVEL consists of diorite,	∑S1	10 17 50/1		100				000000			
743.99	58		subrounded to subangular, oxidized.								000000			
	60	000	SILT (ML); yellowish brown, moist, finely micaceous.	/D1	11/50/0.5		(100/				λόδο			
739.99	61 62	0 0 0 0	Poorly graded SAND with GRAVEL (SP); very dense, dark yellowish brown, moist, about 10% GRAVEL, max.1" dia.; coarse to fine SAND, GRAVEL consist of diorite, subangular, uncemented, unbedded.								000000000000000000000000000000000000			
737.99	63 64 65	0 0 0									300000			
735.99	66		SILTY SAND (SM); very dense, yellowish brown to brown, moist, trace fine GRAVEL, coarse to medium SAND.	VS1	12 29 39 50/4		100				000000			
733.99	68 69										000000			
	70 -		SILTY CLAY (CL-ML); hard, brown to dark yellowish brown, moist, medium plasticity; 0.2" to 0.4" thick beds, horizontal bedding, oxidized, trace of organic	D1	13 19 50/5		100				ŎŎŎŎŎ			
729.99 727.99	72 73		material. SILTY SAND (SM); dense, brown mottled with yellowish brown, moist, fine GRAVEL, coarse to fine SAND, about 20% nonplastic fines, dendritic manganese.								000000			
727.99	74 -										0000			
	76 77	9222		<u>×</u> S1	14, 50/6		(100)							
723.99	78 -										00000			
721.99		ф <i>О</i>	SILTY SAND with GRAVEL (SM); very stiff, dark brown mottled with dark vellowish brown, about 10% fine	D1	15 9 18	45	100				00000			
719.99	81 8 2 8 3	Ø 0	SILTY SAND with GRAVEL (SM); very stiff, dark brown mottled with dark yellowish brown, about 10% fine GRAVEL, max. 1/2" dia; coarse to fine SAND, GRAVEL consist of diorite, subrounded to subangular, increase in fine towards bottom, unbedded, one 0.08"-thick vein.		27						<u> </u>			
717.99	84	0.0									00000			
	,		(continued)			_continetory					200 - 200 -			
- C. 1			Department of Transportation Division of Engineering Services		REPOR BOR DIST.		TLE REC COUN		ROU	TE	POS	TMILE	HOLE ID R-09-Z3B: EA	3
		7	Geotechnical Services Office of Geotechnical Design - Sou	th 1	7 PROJE SR-7	_ СТО 10 Т	LA OR BR TUNI	RIDGE 1	710 NAME ECHN	0 NICAL	D/I	DY	07-187900	
					BRIDGE	E NU	MBEI	R PI	REPAR K.T			DATE 6-2 2	SHEET 2-09 3 of 10)

(ft)					uo	er	_ ,_				ŧ		Ļ						
ELEVATION (ft)	(ft)		S	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	ry (%)	·	Moisture Content (%) Dry Unit Weight		Strength	Drilling Method		Po	marks		
EVA.	DEРТН (ft)	Circh	Material Graphics	BESCHI HON	mple	mple	d swa	d swa	Recovery	RQD (%)	isture ntent / Unit	Ç	Shear S (tsf)	lling N	2	Ne	illains		I
団	급 -85-		S. •	Well-graded SAND with GRAVEL (SW); very dense		1816/		Bic	운 \100/	S _C	80°C) bc	Sh (tsi	<u> </u>					L
715.99	86	⊒ .	. 0	Well-graded SAND with GRAVEL (SW); very dense, yellowish brown, moist, about 30% subangular to subrounded GRAVEL, max. 1.5" dia.; coarse to fine		219	30/0		(100)					200					
	87		0 . 0	SAND, gravel consist of diorite.										200					L
	88	∃ :												000					
	89													200					l
			ò											200					
	90			SILTY SAND (SM); very dense, brown to yellowish		D17	32 39	80	100				PP = 2.75	00					
	91			brown, moist, about 20% fine GRAVEL, medium to fine SAND, sharp contact 20° dip; gravel consist of igneous and metamorphic rocks, more oxidized, more			41							000					
709.99	92			rounded, grading down to bottom.										000					
	93													<u> </u>					H
707.99	94													300					
	95] - -		Poorly graded SAND with SILT and CRAVEL (SR SM)		S18	23	84	100					<u> 3000000000000000000000000000000000000</u>					
705.99	96	ij.	σ.	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense, brown to yellowish brown, moist, fine GRAVEL, max. 1/4" dia.; coarse to fine SAND, 2" to 4" thick horizontal bedding.	X	010	34 50	0-1	100					000					
	97			thick horizontal bedding.	Ī									200					L
	98		0											<u> </u>					H
) E											000					
	99		. e. 											00					
701.99	100			SILTY SAND (SM); very dense, yellowish brown mottled with brown, moist, coarse to fine SAND,	X	D19	10 50/5		100					000					l
	101			micaceous, oxidized.			50/5							000					l
699.99	102													200					
	103													200					
699.99 697.99	104													000					L
	105					000	00							000					l
695.99	106				\mathbb{X}	S20	20 50/6		100					000					
330.33	107													200					
1	-													000					
693.99														00					
· ·	109													000					
691.99	1	21		At EL. 691', trace GRAVEL, max. 1/4" dia.	V	D21	20		100					200					
	111						50/6							<u> </u>					
689.99	112													000					
	113													<u> </u>					
687.99	114													000					l
	115													00					
695.99 693.99 691.99 689.99	***********	https://doi.org/		(continued)		IR	EPOR			-,						Colore (Cilliano de Colore)	HOLE ID	Way, some and a second	
				Department of Transportation Division of Engineering Services			BORI	NG	RE:			ROUT	E	POS	STMILE		R-09	-Z3B	3
	L		7	Geotechnical Services			7		LA		E NAM	710		D/	D		7-07-18	37900	
		1	4	Office of Geotechnical Design - Sout	h ´	1	SR-7	10 T	UN	NEL	_ TEC	HNI		STU	IDY	CATE			
						E	RIDGE	NU	VISE	ĸ	PREF K. T	ARE	DRA			DATE 6-22	2-09 SH	of 10	

EVATION (ft)	115 5DEPTH (ft)	()	Material Graphics	DESCRIPTION	Sample Location		Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Drv Unit Weight	31.65.A 311.0	ar Strength	Drilling Method	F	Remarks	
	115		Mat Gra				A-A-100-11-0-10-0-10-0-10-0-1	Blov	Rec	RQI	Mois Con	(pc)	Shear (tsf)	Drilli	O C C C C C C C C C C C C C C C C C C C		
685.99	116			No recovery.	X	S22	20 50/6		0					00000			
683.99	117 118	-												00000			
681.99	119 120													0000			
	121		ο΄	Poorly graded SAND with GRAVEL (SP); very dense, yellowish brown, moist, coarse to fine subangular GRAVEL, max. 1.5" dia.; coarse to fine SAND, gravels consist of feldspar rich granitic rock.	X	S23	50/6		100					OOOO			
679.99	122 123		ο											0000			
677.99			o. . O.											2000			
675.99	125 126 127			Well-graded GRAVEL (GW); very dense, gray to dark gray, moist, coarse to fine GRVEL; gravel consist of diorite and granite, slightly weathered, hard, slightly fractured, 10% dark minerals, oxidized.	X	D24 C1	50/5		100 55					$\langle \Phi \sigma \sigma \sigma \sigma \sigma \sigma \sigma \sigma \sigma \sigma \sigma \sigma \sigma \sigma \sigma \sigma \sigma \sigma $			
673.99	128			SILT (ML); very stiff, nonplastic, slightly micaceous.									PP = 3	$\langle \rangle \langle \rangle$			
671.99	129 130			SILTY SAND (SM); medium dense, brown to dark yellowish brown, moist, fine SAND, about 5% low plasticity fines, very stiff, sharp contact.		C2			100				PP = 3	$\langle \Diamond \times \langle \rangle \rangle$			
669.99	131 132			Well-graded GRAVEL with SAND (GW); dense, brown to dark yellowish brown, moist, trace COBBLE; coarse					.00					$\Diamond X \Diamond$			
669.99	133			to dark yellowish brown, moist, trace COBBLE; coarse GRAVEL; max. 2.5" dia.; coarse to fine SAND; about 5% low plasticity fines; gravel consist of diorite, gabbro and gneiss, hard to decomposed. SILTY SAND (SM); dense to medium dense, dark yellow to brown, medium to fine SAND; about 20%		C3			55					>			
	135 136			nonplastic fines. Well-graded GRAVEL with SAND (GW); dense, multi colored, moist, trace BOULDER; about 20%										X	-		
003.99	137			COBBLES; coarse to fine SAND; nonplastic fines; cobbles consist of diorite, quartz diorite, gabbro, granite, gneiss rocks, hard to decomposed, rounded to subrounded.										X0X0	Lost core at E	EL. 666.5' to 662'	
663.99	138 139													\Diamond			
661.99	140 141				7	C4			58					$\times \times \times $	Lost core		
659.99	141					C5			67					\Diamond			
	143 144					C6			22					$\Diamond \times \Diamond$	Lost core		
	145		r										***************************************	$\triangleright \langle$			
		nilas//i-		(continued)		Ī	EPOR		Œ							HOLE ID	
			\int	Department of Transportation Division of Engineering Services			BORI IST.	NG	RE			ROU	TE	PO	STMILE	R-09-Z3B	3
	L		7	Geotechnical Services			7		LA		E NAM	710)	Ď	/D	07-187900	
				Office of Geotechnical Design - Sou	th '	1 📙	SR-7	10 T	UN	NEL	PREP	HN PARE	ICAL ED BY	STU	DAT	TE SHEET	
			2540745959444						-2000		K.T	SECTION ASSESSMENT		***************************************	6-	22-09 5 of 10	

CAL TRANS BOBING BECO

ELEVATION (ff)	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	Re	marks	
655.99	145 146		Well-graded GRAVEL with SAND (GW) (continued).	C7	omakicianyo myo	42				>><	Difficult to drill		
653.99 <i>°</i>	147 148 149			C8		27				X0X0X0			
	150 151									\sim			
	-	.0	Poorly graded SAND with GRAVEL (SP); dense, reddish brown, moist, about 35% coarse to fine	C9		75				♦ ×			
647.99	154	σ . ο . ο .	Poorly graded SAND with GRAVEL (SP); dense, reddish brown, moist, about 35% coarse to fine GRAVEL, max. 2.75" dia.; coarse SAND; gravel consist of igneous and metamorphic rocks, hard to decomposed, subrounded to rounded, horizontal bedding. At EL. 648', becomes yellowish brown, moist, wide variety of igneous and metamorphic rocks, hard to	C10		100				X0X0	most likely Pleis horizon based of density		
645.99			decomposed.							\sim			
643.99	157 158		COBBLES with some well graded SAND with GRAVEL; medium desne to dense, brown and yellowish brown, moist, about 60% COBBLES, medium to coarse SAND; cobbles consist of igneous and metamorphic rocks, well rounded to subrounded, hard to decomposed.							\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			
641.99	159 160			C11		0				$\Diamond \times \Diamond$			
639.99	161 162							·		X0X0			
639.99 ¹	163 164			C12		50				$\stackrel{>}{\sim}$			
	165 166									X0X			
633.99	167 168		Poorly graded SAND (SP); dense, yellowish brown, \moist, coarse SAND.										
631.99	F	-	SILT (ML); stiff, yellowish brown, moist, nonplastic, micaceous. no bedding. Well-graded SAND with GRAVEL (SW); dense, yellowish brown, moist, little GRAVEL, max. 4" dia.; coarse SAND, gravel consist of igneous and	C13		60					Lost core at top		
629.99	172	70 1	metamorphic rocks.							\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			
627.99	173 174			C14		60				X			
	17/0	7000000	(continued)										
	1		Department of Transportation Division of Engineering Services	DI	BORI IST.	T TITLE ING RE		ROL	ĮΤΕ	POS	STMILE	R-09-Z3B	3
	<u></u>	7	Geotechnical Services Office of Geotechnical Design - South	า 1 🏻 รี	ROJE(10 TUN	ΝE	71 SE NAME L TECHI	VICAL	D/ STU	IDY	07-187900	
		19.93		BF	RIDGE	ENUMBE	R	PREPAR K.T	ED BY		DATE 6-2 2	SHEET 2-09 6 of 10)

605. 603. 601. 599.
.99
199
4+ 4+ 7/ 4+ 1+ 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1-
C19
Ð
87
0
F
PP = 4.5
\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\

£)	***********			LG .	i I					+							A Company of the Company
ELEVATION (ft)	S SDEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Ory Omit weigh (pcf)	Shear Strength (tsf)	Drilling Method Casing Depth		Rema	arks	
595.99	Ī	+ /			20			79	0				>	See not RQD.	e at end of	log regarding	
593.99	207 208	ا د ^{ار} ا ار +											\Diamond				
591.99		2											\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Lastas			
	211	+	At EL. 593', sheared, altered igneous and metamorphic rocks in SANDY CLAY matrix, dark gray to bluish green, about 50% dark minerals, joints and	C	21			75	0			PP = 4.5	♦ × ♦	Lost coi	re		
589.99	212 213	+ {}	to bluish green, about 50% dark minerals, joints and shears dipping 35° to 45°, clay filling small scale fault, dipping 40°.	Verziewien									X \ \ \				
587.99	214	+											\Diamond				
585.99	215 216	- C											$\Diamond \times \Diamond$	Lost coi	ге		
583.99	217	+											X0X0				
	219	ا / ا		C	22			83	0				X0X0X				
581.99	220 221	*) }}											$\times \circ \times$				
579.99		// ₊		C	23			40	0								
579.99 577.99	223 224	ر کر کر											×	Lost co	re		
	225	7+											\Diamond	200(00)			
575.99	226	+ + + }		C	24			73	0				>><				
573.99	228	<i>y</i> +											× < × <				
575.99 573.99 571.99 569.99		+											<u> </u>				
569.99	231	, , , , , , , , , , , , , , , , , , ,	At El. 569 5' hard zones: highly fractured and	C:	25			58	0				>< >>				
		+	At EL. 569.5', hard zones; highly fractured and sheared igneous and metamorphic rocks, decomposed.										$\Diamond \times \Diamond$				
567.99	234	+	(continued)										><				
		1	(continued) Department of Transportation		RE	EPOR B OR I	T TIT	LE RE	COF	RD_					HO	DLE ID R-09-Z3	R3
	\mathcal{L}		Division of Engineering Services Geotechnical Services		DI 7	ST.	С	OUN LA	I TY	F	ROUT 710	Ē	POS D/	TMILE D	E/	07-18790	
		/ /	Office of Geotechnical Design - Sout	h 1	S	SR-7'	10 T	UN	NEL	E NAM	CHN	ICAL	STU	DY			
		THE REAL PROPERTY.			BF	RIDGE	NUI	MBE	R	PREI K.T	PARE [D BY			DATE 6-22-0	SHEET 9 8 of	10

ELEVATION (ft)	SDEPTH (ft)	Material Graphics	NOITPIN Sample Location		Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method			emarks		
565.99	236	+ / /		C26			10	0				>	See note RQD. Very poo			regarding	
563.99	238	ارلد										\ \ \ \ \					
561.99	240	17	At EL. 562', sheared DIORITE, soft, decomposed, oxidized, altered.	C27			0	0				\Diamond					
559.99	241 = 242 = 243 = 243 = 243	+//+++										X0X0X					
557.99	244 245	/	At EL. 556.6', hard fragment of sheared diorite, max. 2.25" dia.	C28			50	58			PP = 4.5	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\					
	247	+ + As	At EL. 555', fault gouge zone with CLAYEY SAND; about 2% GRAVEL, about 64% coarse to fine SAND,						13	125	PP = >4.5	\ \ \ \ \	PI				
	249	/ + +	about 34% nonplactic fines; gravel consists of ignorus	C29			100	100					Difficult	to drill a	at EL. 5	54'	
551.99 549.99	251	*\ *\ *\	IGNEOUS and METAMORPHIC ROCKS (DIORITE): fine grained to coarse grained, gray, moderately weathered, hard, intensely fractured, abundant soft zones of sheared and altered rocks.									X0X0X					
	253	+/	At EL. 549.8', slickensides on fault surface, reddish brown, oxidation, clay filling, dipping 35°. At EL. 548', minor scale fault dipping 30°.									$\langle \Diamond X \Diamond X \rangle$					
	255	\ \ \	At EL. 546', altered DIORITE, soft to moderately soft, fractured.	C30			98	45	4			\Diamond	CS & EI	M, UC			
545.99	257	*/ */	At EL. 545', wavy fracture with oxidized clay filling, smooth polished surface, dipping 30°.									>>>>					
543.99	259	*\ +\	At EL. 543', becomes healed fault, dipping 40°, abundant slickenside. At EL. 542.5', FAULT GOUGE, light gray, very soft,									XOXOXOXOXOXOX	UC				
541.99	261		At EL. 542.5', FAULT GOUGE, light gray, very soft, altered to sandy clay. At EL. 540.5', recemented igneous rock, moderately hard, altered.														
	263	+ 1 + 2 + 1										$\times \Diamond \times \Diamond \times$					
537.99	264	+		C31			100	0				\Diamond					
			(continued)		REPOR		ΓLE				.,				HOLE	ID	
			Department of Transportation Division of Engineering Services		BORI	NG	RE		RD	ROL	ITE	PΩ	STMILE		R- (09-Z3E	3
7		7	Geotechnical Services		7		LA			71	0	D	/D		0.	7-187900	
as the	THE ST	/ .	Office of Geotechnical Design - South	1		10 T	ΓUΝ	NEL	<u> </u>	ECHN	NICAL	STL	JDY				
				В	RIDGE	: NU	MBE	R	PRI K .		ED BY			6-2	2-09	SHEET 9 of 1	0

(f)				tion	٦.	ot .				jht	4			
ELEVATION (ft)	оертн (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weig (pcf)	Shear Strength (tsf)	Drilling Method Casing Depth	Re	emarks
	265	+ ,	(continued).	C31			100							d of log regarding
535.99	266 - 267 -		At EL. 535.5', shattered zone, moderately hard, 1.25" wide.									$\Diamond \times \Diamond$		
533.99	268	-t]	At EL. 533', calcite crystals, max. 1/4" dia.									,		
531.99		//+ //-		C32			98	0			PP =	$\Diamond \times \Diamond$	CS & EM, PTS	
529.99	271	+	IGNEOUS ROCK (altered DIORITE), coarse-grained, light gray, predominantly very soft, locally hard.	-							PP = 4.5	$\times \circ \times$		
527.99	273 274	4	light gray, predominantly very soft, locally hard, intensely fractured, small scale faults, dipping 50° to 70°, recrystallization along fault plane, abundant FeO on joint and fault surfaces, hydrothermally altered, Plagioclase 40%, Hornblende 29%, Chlorite 8%, Quartz 8%, biotite 5%, K-feldspar 1%, Calcite 3%, weak directional fabric.									<		
525.99	275 276	Ϋ́	weak directional fabric. At EL. 528', becomes intensely fractured. Bottom of borehole at 275.5 ft bgs Bottom of borehole is at elevation 526.5 ft.									\Diamond		
	277		Borehole converted to piezometer at the completion of drilling.											
523.99														
	279													
521.99														
519.99	281 -													
	283													
519.99 517.99	284 285													
513 99	287													
010.00	289													•
511.99	290													
515.99 : 513.99 : 511.99 : 509.99 : 507.99 :	291													
	293													
507.99														
	295						,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,							
		1	Department of Transportation	R	REPOR BORI	T TIT	LE RE(COR	RD					HOLE ID R-09-Z3B3
			Division of Engineering Services Geotechnical Services	D	IST. 7	С	OUN L A			ROUT 710	ΤΕ	POS D/I	TMILE D	EA 07-187900
	0.000			-	ROJE(T O	D DD	IDGE	= NIAB	ME				

Office of Geotechnical Design - South 1

PROJECT OR BRIDGE NAME
SR-710 TUNNEL TECHNICAL STUDY
BRIDGE NUMBER PREPARED BY
K.T

SHEET 10 of 10 DATE **6-22-09**

D. Ja	nkly	,	3-2-0		3-6-09	TON DATE	34° 7'	58.77 1	2" / 1	18°	8' 5	4.53	16"	NA		um)			9-Z3B4	
DRILLIN			CTOR ng Inc.				BOREHC								nd Av	e.)			tt NAVD 88	
Rota SAMPL SPT(NG ME Iry W ER TY	ETHOD /ash /PE(S)), Cal	AND SIZE((2.4"), P	Q core (-		SPT HAN	G Istar 3 IMER T' natic H	0k /PE lamm	er 14	40 II	b. 30	0 inc	ch d	rop			6 in HAMMEI 70%	OLE DIAMETER	
			TILL AND CO				GROUNE READING		DURI NM		RILL	.ING	AFT N/		RILLII	NG (E	OATE)	276.0	DEPTH OF BORIN	G
ELEVATION (ft)	² DEРТН (ft)	Material Graphics		D	ESCRIPTIO	ON		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Content (%)	Diy Omit weignit (pcf)	Shear Strength (tsf)	Drilling Method	Casilly Deptil	F	Remarks	
766.00 764.00	1 2 3 4	6/0/	ASPHALT Road base CLAYEY S moist [FILL	material, AND with	4" thick. GRAVEL (S	SC); yellowis	sh brown;									~~~~	This in ac Soil and 2007 A.1 C	ecordance & Rock Lope Presentator), except of the Final Imary Repanical Stu- nty, Califor	ecord was prepare with the Caltrans ogging, Classificat tion Manual (June as noted in Apper al Geotechnical oort, SR-710 Tunn dy, Los Angeles ornia, dated April,	ior
762.00	5 6 7	/6/9 //	SILTY SAN	ND (SM); o	lense; light r low plastici	reddish brov	vn; moist;									0000000	Han	d Auger to	o 5'	
760.00 758.00	8 9 10		coarse to fi	ille SAND	iow piastici	ıy imes [OL	DEK	V S02	2 10 19 21	40	100					00000000000	VOC	C = 2.5 pp	m	
756.00	12							<u>/ \</u>	21							<u> </u>				
752.00	15 16		Medium de SAND, 389	ense; 2% f % fines.	ine GRAVEL	L, 60% coar	se to fine	S03	9 16 19	35	67		17	107		MANNAN	PI, F	PA		
750.00	18															000000000				
	21	0.	Poorly grad light reddis fine SAND	ded SAND h brown; r ; weak cer	with GRAV moist; fine G nentation.	EL (SP); ve RAVEL; coa	ry dense; arse to	S04	30 40 50/5"		71					sossos	VOC	C = 2.6 pp	m	
746.00 744.00	23	0 0 0 0 0														000000000				
	25				(continued)														_
		_/ 7		Division	ment of Tra n of Engine hnical Ser	eering Ser			REPOR BOR DIST. 07 PROJE	ING C I CT OF	OUN LA R BR	TY	I IAN E	ROUT 710 ME)	D.			R-09-Z3 EA 07-187900	В
				Office o	of Geotech	nical Des	ign - Sοι	ıth 1 📙	SR-7 BRIDGI N/A	<u> 10 T</u>	UN	NEL	. TE PREI	<u>CHN</u>	D BY	_ ST	UDY	DAT	TE SHEET 7-09 1 of	_

ELEVATION (ft)	^ភ DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location		Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Cashiy Depti	Remarks
742.00	26	0.0	Poorly graded SAND with GRAVEL (SP) (continued).	×	S05	50/4"		_0_				0000		-
740.00		θ . ο										000000		
738.00				X	S06	50/6"		0				<u> </u>		om
736.00		[·										000000		
734.00	33 3 34 3 35 3	0.										DODDODO		
732.00			SILT with SAND (ML); hard; brown; moist; little medium to fine SAND; mostly low plasticity fines.	X	S07	26 37 46	83	89				<u> </u>	VOC = 2.0 pp	om _
730.00														
728.00			At EL. 728.0 ft, becomes grayish brown with orange (FeO2) stained zones; 22% medium to fine SAND, 78% fines.	X	S08	18 43 50/3"		100		24 104			PI, PA	
726.00						30/3						22222		
724.00					800	11	50	100				DOODO	VOC = 1.7 p	om
722.00	46			X	309	19 31	30					MANDE	VOO = 1.7 p	5111
720.00	48	1111										000000		
718.00	50		SILTY SAND (SM); very dense; grayish brown with orange (FeO2) stained zones; moist; 8% coarse to fine GRAVEL, 50% coarse to fine SAND, 42% fines,	X	S10	28 50/4"		100		16 118		000000	PI, PA	
716.00	52		micaceous.									000000		
714.00 Me Heng	54											2000		
Ŭ 			(continued)		1 -) EDAS	T T'-							LIOLETS
			Department of Transportation			BOR	NG	RE			ITE	D0:	OTMU F	HOLE ID R-09-Z3B4
		7	Division of Engineering Services Geotechnical Services			DIST. 07 PROJE		LA R BI		ROU 71 SE NAME	0	D /	STMILE /D	07-187900
			Office of Geotechnical Design - Sour	th	1 📙	SR-7	10 T	ΓUΝ	INE	L TECH		L ST		
	'				_ E	Bridge N/A	NU	MBE	R	PREPAR D. Jar	ED BY I kly		DA 5 -	TE SHEET 2 of 10

ELEVATION (ft)	n DEPTH (ft)	Material		DESCRIPTION	Sample Location			Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight	Shear Strength (tsf)	Drilling Method	Rivers Rivers	emarks
712.00	56	; ° ,	Poo mois	orly graded SAND with GRAVEL (SP); brown; st; fine GRAVEL; coarse to fine SAND.	XS1	1 50/	5"	100				000	VOC = 2.2 ppn	
	57].°.	· 6									200		
710.00	58	0.	Ø									000		
	59	*	,									2000		
708.00	60		.4		X S1	2,50/	4"	0				000		
	61		`									200		
706.00			,									2000		
704.00			.4									2000		
704.00	65	0.	() 	TV CAND (CM), you doon ground arrange hypothesis	101	2 2		5 100		24		000	PA	
702.00	66		mois SAN	TY SAND (SM); very dense; gray to orange brown; st; 1% fine GRAVEL, 51% predominantly fine ND, 48% low plasticity fines.	MS1	3 39 42 43	2	5 100		24		000	VOC = 2.2 ppn	
	67											2000		
700.00	68											000		
	69											000		
3/10/10					X S1	4,50/	4"	0	1			000		
	1 1											2000		
NS LIBRARY 040808.GLB 00.969	73											000		
694.00												000		
ANS LIB	75				\/S1	5 19	,	75		21		000	VOC = 1.7 ppn	
692.00	76				<u> </u>	50)							
SS.GPJ	77											000		
690.00												000		
MH H W 688.00	79											2000		
SR-710 CH2M HILL BORINGS.GPJ CALTRA 00.0689 00.069 00.0769	80				X S1	6 20		0				000		
00.989 686.00												000		
NG FIXE	83											<u> </u>		
CALTRANS BORING RECORD MET+ENG FIXED 00°989	84) (1)		
CORD	⊥ ₈₅ _	<u> </u>	<u> </u>	(continued)										
ZING RE				Department of Transportation		BC	RIN	G RE		RD				HOLE ID R-09-Z3B4
NS BO				Division of Engineering Services Geotechnical Services		DIST 07	IFCT	COU LA		RO 7 ROME	UTE 0	D/	STMILE D	07-187900
CALTRA				Office of Geotechnical Design - Sou	ıth 1	SR	-710 GE N	TUN	NNE R	E NAME L TECH PREPAI D. Ja	INICAI	L ST	DATE 5-7	SHEET 3 of 10
ٽ ــــ						N/	Δ			D. Ja	nkly		5-7	-09 3 of 10

ELEVATION (ft)	DEPTH (#)	(11)	Material Graphics	DESCRIPTION Jampie Cocation	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	R	emarks	S	
682.00	85 86 87			Poorly graded GRAVEL (GP); very dense; light brown and dark gray; moist; cobbles to 3" dia. derived from granite and gneiss (slightly weathered, subangular to subrounded).	617 C18	50/5"		0_	0				$\Diamond X \Diamond X \Diamond$					
680.00	88		0000										× × ×					
678.00	90		200000	C	19		-	38	0				$\langle \rangle \langle \rangle \langle \rangle \langle \rangle$					
676.00	92												\Diamond					
674.00	94 95			SILTY SAND (SM); brown; moist; 2% fine GRAVEL, 65% predominantly medium to fine SAND, 33% low plasticity fines. At EL. 673.0 ft, observed 2" thick, very dark brown	20		-	50	33	12			$\Diamond \times \Diamond$	PA				
672.00	96 97		0 0	Poorly graded SAND with GRAVEL (SP); brown; moist; few fine GRAVEL; medium to fine SAND; low plasticity fines.									$\Diamond \times \Diamond$					
670.00	98 99		0. 0.: ₀										$\langle \Diamond \rangle \langle \Diamond \rangle$					
668.00	101			SANDY SILT (ML); soft to medium stiff; brown; moist to wet; fine SAND; homogeneous, micaceous.	21		-	20	0				$\langle \langle \rangle \rangle \langle \langle \rangle \rangle$					
666.00	103												\times					
664.00 662.00	105		000	Poorly graded GRAVEL (GP); light brown and dark gray; moist.	22		_	80	60				×					
	107			SILTY SAND (SM); brown; moist to wet; 1% fine GRAVEL, 55% predominantly fine SAND, 44% low plasticity fines, homogenous.						13			×	PA				
660.00 658.00	109				200		_	<u></u>	20				\ \ \ \ \	VOC =	= 51.3 pp	om		
658.00 656.00	112		900	Poorly graded GRAVEL with SAND (GP); light brown and dark gray; moist; coarse, subangular to subrounded GRAVEL; moderately to slightly weathered, moderately hard to hard, subangular to substantial data of the company of the substantial control of the company of the substantial control of th	23			54	30				$\Diamond X \Diamond X \Diamond$					
654.00	113			all and the contract of the co									$\langle \Diamond \rangle \langle \Diamond \rangle$					
	-115	,		(continued)														
			/	Department of Transportation Division of Engineering Services		EPOR BORI IST. 07	NG C	RE OUN		RD	ROL 71			STMILE		EA	10 09-Z3 187900	B 4
	L	7		Geotechnical Services Office of Geotechnical Design - South 1	P	ROJE	ст о 10 Т	R BI	INE	L T	AME ECH			TUDY	DATI	E I	SHEET	
						N/A				D	. Jar	ıkly			5-7	'-09	4 of	10

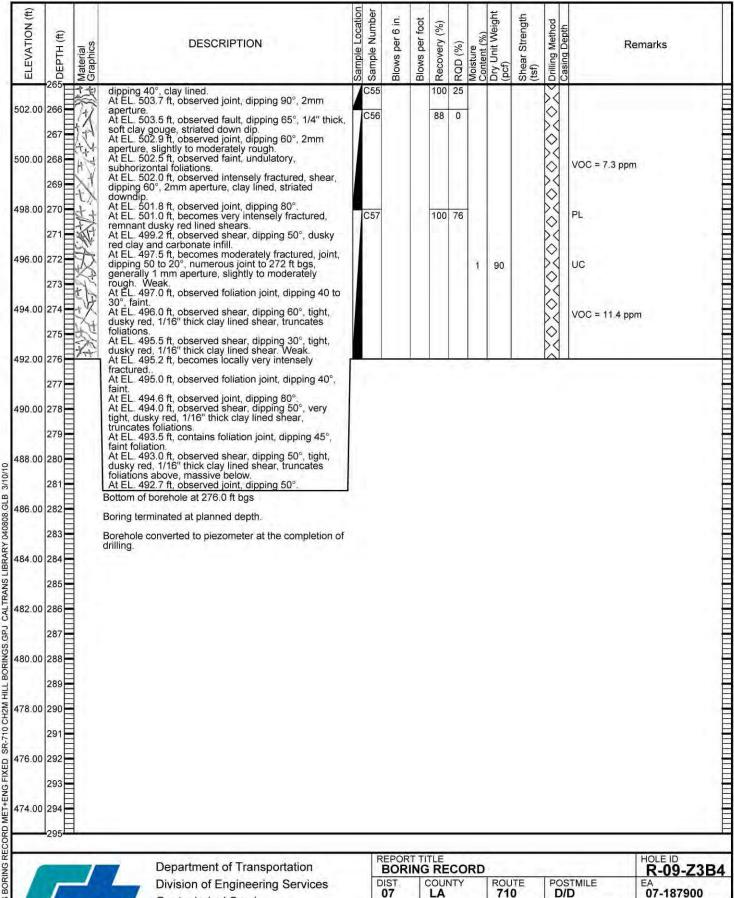
ELEVATION (ft)	DEPTH (ft)		Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight	Shear Strength (tsf)	Drilling Method Casing Depth	Remarks
652.00	115	\equiv		Poorly graded GRAVEL with SAND (GP) (continued).	C24			30	0			×	
	117		200										
650.00	118		000										
	119		000									\Diamond	
648.00	120				C25			16	0			\Diamond	
646.00	121		200 200 200									\Diamond	
	123		600									\Diamond	
644.00	124		000										
	125		000	At EL. 643.0 ft, observed 5-inch intersected granitic	C26			40	0			\Diamond	
642.00	126		000	clast.									
640.00	127		000	At EL. 641.4 ft, observed 5-inch intersected granitic clast.								\Diamond	
	129												
638.00	130				C27		-	40	0				
	131												
00.989 00.989	132		000	At EL. 636.3 ft, observed 3-inch intersected granitic clast.								Š	
634.00	133		000										
	135		200		000		_	50				\Diamond	
632.00	136		200		C28			50	0			\Diamond	
200	137		000	At EL. 631.5 ft, observed 5-inch intersected granitic clast. At EL. 630.7 ft, observed 3-inch intersected granitic								\Diamond	
630.00		Ħ	90	clast.								\Diamond	
628.00	139											\Diamond	
	141		0000		C29			0	0				
	142												
624.00 MET HENG TANKS BOX 10 MET HENG TANKS	143												
624.00	144		000									\rangle	
	145			(continued)						. '			1001515
A SING				Department of Transportation		EPOR BOR IST.		RE OUN			UTE	POS	HOLE ID R-09-Z3B4
Da ONE	L			Division of Engineering Services Geotechnical Services	P	07 ROJE	L CT O	L A R BF	RIDG	7 SE NAME	10	D/	D 07-187900
14 14 14 14 14 14 14 14 14 14 14 14 14 1				Office of Geotechnical Design - South	h 1 3	SR-7 RIDGE	10 T	UN	NE	L TECI PREPA	HNICA RED BY	L ST	
<u> </u>						N/A				D. Ja	nkly		DATE SHEET 5-7-09 5 of 10

	ELEVATION (ft)	DEPTH (ft)	Motorial	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	Casility	Re	emark	S	
	622.00	145 146 147		0000000		4	230			0 25	0				$\times \Diamond X \Diamond$					
	620.00		0000000	000000		l									$\Diamond X \Diamond X$					
	618.00			0000		C	231			20	0				$\Diamond \Diamond \Diamond \Diamond \Diamond$					
	616.00		0000	000000	At EL. 616.8 ft, observed 3-inch intersected granitic clast.	l									\Diamond					
	614.00			000000000000000000000000000000000000000											X \ \ \					
	612.00			#	Poorly graded SAND with SILT (SP-SM); moist to wet; 9% fine GRAVEL, 84% coarse to fine SAND, 7% low plasticity fines. SILTY SAND (SM); moist to wet; trace fine GRAVEL;	C	32			50	20	14			×	PA VOC =	10.0 pp	m		
	610.00				medium to fine SAND; homogeneous. At EL. 610.4 ft, observed SAND with faint subhorizontal laminations.										\bigcirc					
10/10	608.00			900	Poorly graded GRAVEL with SAND (GP); and COBBLES, to poorly graded SAND with GRAVEL and COBBLES, dark olive brown, moist to wet. Recovered predominately as gravel and cobble fragments with limited sandy matrix.	C	33			6	0				\Diamond					
10808.GLB 3/	606.00	162	000000	000000000000000000000000000000000000000	,										$\Diamond \Diamond \Diamond \Diamond$					
S LIBRARY 04	604.00			0000000											\ \ \ \ \ \ \					
J CALTRAN	602.00			000000		C	234		•	20	0				× < × <					
BORINGS.GF	600.00		ے ا	000000000000000000000000000000000000000											\ \ \ \					
0 CH2M HILL	598.00		0,000,00	0000000		C	235			40	0				$\Diamond \times \Diamond \times$					
FIXED SR-71	596.00			000000																
CALTRANS BORING RECORD MET+ENG FIXED SR-710 CH2M HILL BORINGS.GPJ. CALTRANS LIBRARY 040808.GLB. 3/10/10	594.00	173 174		0000000																
FCOR		1/5			(continued)															
NG RE					Department of Transportation		R	EPOR 30R I	T TIT	LE RF	CO	RD						HOLE R -	⊡ 09-Z3B	4
BORII		Γ			Division of Engineering Services		D	IST.)7	С	OUN			ROU 71 0	ITE O	PO	STMILE /D		EA	<u>09-230</u> 187900	<u> </u>
RANS			7		Geotechnical Services		PI	ROJE	T O	R BI	RIDG	E N/	AME					1 01-	.0.000	
SALTI					Office of Geotechnical Design - South	11	В	RIDGE N/A	NUI	MBE	R	PRI	EPAR	NICA ED BY	LOI	זעט	DATE 5-7		SHEET	_
۲								N/A				D.	. Jan	kly			5-7	-09	6 of 10)

ELEVATION (ft)	ФЕРТН (#)	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	R	demarks	
592.00	175	200		236			0	0			× <	See note at er RQD.	nd of log re	garding
	177	80°									×			
590.00	178	000									×			
	179	000									×			
588.00	180	500		37			0	0			X			
	181	0000									X			
586.00	182	000								15	\Diamond			
	183	0.00	1 4								0			
584.00	184	000									0			
	185	000	Gravel, cobbles and rock fragments in coarse-grained	238			40	0			\Diamond			
582.00	186	000	Gravel, cobbles and rock fragments in coarse-grained sandy matrix. Clasts are subrounded to well rounded, granitic and metamorphic derived.					3			\Diamond			
	187	0000									0			
580.00	188	000									0			
	189	50°								13	0			
578.00	190	0000		39			40	0			S			
	191	000	At EL. 577.2 ft, observed 2 to 4-inch thick intersected diorite and granite clasts.								×			
576.00	192	000	dionte and grante diasts.								×			
. 0	193	0000								116	X			
574.00	194	000	0.17								X			
	195	000		240			37	0	d m		\Diamond			
572.00	196	000									0			
	197	200									\Diamond			
570.00	198	000	5 m								\Diamond			
	199	000									0			
568.00	200	280		241			94	40			\Diamond	VOC = 17.0 p	pm	
	201	1+	consisting of Silty Clay. IGNEOUS ROCK (DIORITE), fine-grained, massive, dark greenish gray mottled with white, intensely to								\Diamond			
566.00	202	41	moderately weathered, moderately hard, moderately fractured, some fractures with up to 1/8" thick, soft,								×	h		
n'i	203	+	IGNEOUS ROCK (DIORITE), fine-grained, massive, dark greenish gray mottled with white, intensely to moberately weathered, moderately hard, moderately fractured, some fractures with up to 1/8" thick, soft, most sitly lining. Fractures are undulatory and irregular, tight to slightly open, smooth to moderately rough, no reaction to HCL sol. Becomes locally foliated at depth. [WILSON QUARTZ DIORITE] Af EL. 567.0 ft, observed joint, dipping 90 to 70°, 0 to 1 hm aperture, smooth to moderately rough.								X	VOC = 1.2 pp	m	
564.00	204	14	foliăted at depth. [WILSON QUARTZ DIORITÉ] Af EL. 567.0 ft, observed joint, dipping 90 to 70°, 0 to								×			
	205	- T-	(continued)											
		7	Department of Transportation	RI	EPOR BOR	TTIT	RE	со	RD				R-0	9-Z3B4
			Division of Engineering Services	(IST.)7		LA		71		POS D/	TMILE D	EA 07-18	V.T.
		/	Geotechnical Services Office of Geotechnical Design - South 1	5	SR-7	10 T	UN	NE	E NAME L TECH		LST			
				BI	RIDGI N/A	NUI	MBE	R	PREPAR D. Jar	ED BY		DAT 5 -7	7-09	7 of 10

ELEVATION (ft)	а В ОЕРТН (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	Remar	ks
562.00	206	が大	aperture, smooth to moderately rough. At EL. 563.5 ft, observed intensely fractured zone, 3" thick.	C42			66	20				>X >X >X >X			
560.00	208	27	At EL. 562.9 ft, becomes moderately weathered. Locally intensely fractured zone, 1.6' thick. At EL. 561.2 ft, observed joint, dipping 40°, 1 to 3 mm aperture, smooth to moderately rough. At EL. 561.1 ft, observed joint, dipping 70°, 1 to 3 mm aperture, smooth to moderately rough. At EL. 561.0 ft, becomes fine-grained to medium-grained moderately soft									× < ×			
558.00	210	沙沙	At EL. 561.0 ft, becomes fine-grained to medium-grained, moderately soft. At EL. 560.5 ft, observed joint, dipping 50°, 1 to 3 mm aperture, smooth to moderately rough.	C43			60	20				♦ × ♦		/OC = 76.6 ppm	
556.00	E	大大	At EL. 560.5 ft, observed joint, dipping 50°, 1 to 3 mm aperture, smooth to moderately rough. At EL. 560.2 ft, observed joint, dipping 20°, 1 to 3 mm aperture, smooth to moderately rough. At EL. 557.5 ft, observed shear, dipping 50 to 5°, undulatory, irregular shear, dusky red, paperthin clay lining, striated along strike, parallels faint foliations 4" above and 4" below.									X \ \ \ \			
554.00		1	above and 4" below. At EL. 557.3 ft, observed joint, dipping 30 to 0°, 2 mm aperture, rough, no infill. At EL. 556.9 ft, observed shear, dipping 40°, tight, moderately rough, 1/8" thick clay lining. At EL. 556.3 ft, observed shear, dipping 45°, tight, moderately rough, 1/8" thick clay lining, intensely fractured below shear. At El. 556.3 ft becomes intensely to moderately.									× 0 × 0			
552.00		+++	weathered, soft, intensely fractured.	C44			86	52				>X			
550.00	217	1	At EL. 552.8 ft, observed John, dipping 35 , 1 to 2 mm aperture, moderately rough. At EL. 552.2 ft, observed shear/fault zone, dipping 30°, 3" thick, highly sheared zone with dusky red clay lining (medium plasticity), along sub parallel shears, polished and striated. At EL. 551.9 ft, becomes coarse-grained, moderately weathered, mediately soft interestly fractured.						1	162		0×0×	1	/OC = 1.7 ppm	
548.00		サナナ	At EL. 551.0 ft, becomes intensely to moderately fractured, joint, dipping 60 to 50°, 3 mm aperture, moderately rough	C45			100	60				$\langle \Diamond \times \Diamond \rangle$	P	PL, UC	
546.00		1	At EL. 549.5 ft, observed faint clay lined discontinuity, possible shear, irregular and undulatory, dipping 70 degrees to vertical. Clay is greenish gray, soft, wet, low to medium plasticity. Very weak									× 0 × 0			
544.00		14	At EL. 547.0 ft, observed intensely fractured, joint, dipping 60° smooth. Very weak. At EL. 546.0 ft, observed shear, dipping 60°, polished and striated. At EL. 545.5 ft, observed shear, dipping 90 to 45°, tight, 1/16" to 1/8" thick dusky red clay lining, undulatory.									X \ \ \			
542.00		及梦	At EL. 545.2 ft, observed joint, dipping 70 to 60°, 1-2mm aperture, moderately rough. At EL. 545.0 ft, becomes intensely to moderately weathered, soft	C46			73	27				× 0 × 0		/OC = 2.3 ppm	
540.00	227	X	At EL. 544.0 ft, observed shear, dipping 90 to 60°, 1/8" thick dusky red clay lining, undulatory. At EL. 543.5 ft, observed joint, dipping 65°. At EL. 541.5 ft, becomes moderately weathered, moderately hard.									0×0×	ļ	/OC = 4.7 ppm	
538.00		松拉	At EL. 541.0 ft, observed joint, dipping 80 to 40°, 2-4mm aperture, moderately rough. At EL. 540.5 ft, observed joint, dipping 70°, 2mm aperture, moderately rough. At EL. 540.2 ft, observed joint, dipping 60°, 2mm aperture, moderately rough. At EL. 539.6 ft, observed joint, dipping 60°, 2mm	C47			100	20	Š.			♦X♦			
536.00	231	ななな	At EL. 539.6 ft, observed joint, dipping 60°, 2mm aperture, moderately rough. At EL. 537.5 ft, observed joint, dipping 70°, numerous subparallel joints within 2" thick fractured zone. 2-3mm aperture, slightly rough.	04/			100	30				X			
534.00	233		At EL. 539.6 ft, observed joint, dipping 60°, 2mm aperture, moderately rough. At EL. 537.5 ft, observed joint, dipping 70°, numerous subparallel joints within 2° thick fractured zone. 2-3mm aperture, slightly rough. At EL. 536.4 ft, observed joint, dipping 60 to 0°, 1-2mm aperture, moderately rough. At EL. 535.7 ft, observed fault, dipping 50°, paperthin clay lining, 1-2mm thick, smooth. Becomes fine grained, very dark gray, slightly weathered, hard, and									X0X<	V	/OC = 10.5 ppm	
	235	2	(continued)									IV	1_1_		
	_		Department of Transportation Division of Engineering Services	DI	POR BOR ST.	NG	RE OUN		RD	ROU 710			OSTI	MILE EA	LE ID - 09-Z3B 7-187900
		1	Geotechnical Services Office of Geotechnical Design - South 1	PF	ROJE	сто	R B	RIDG	E N/	AME	NICAI				
			onice of Geolechinical Design - Gould I	BI	RIDGE N/A			_	PRE		ED BY			DATE 5-7-09	SHEET 8 of 10

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	emarks
532.00	236	楼	moderately to intensely fractured below fault. At EL. 534.5 ft, observed shear, dipping 70°, tight, paperthin clay lining. At EL. 534.0 ft, observed shear, dipping 40°, paperthin dusky red clay lining, striated roughly downdip. Vein dipping 70 degrees with 1/8" thick	C48			100	33			×0×0	PTS PL	
530.00		1	Adiabonate idth, observed shear, dipping 25°, paperthin dusky red clay lining, striated roughly	C49			100	0			$\times \Diamond \times \Diamond$	VOC = 0.8 ppm	1
528.00		Legion X	allotriomorphic-granular texture. At EL. 532.7 ft, becomes moderately to slightly weathered, hard, intensely to moderately fractured. At EL. 532.4 ft, observed fault, dipping 70°, 3/8" reverse offset, tight, striated roughly downdip, offsets 1/16" thick carbonate lined vein. At EL. 532.1 ft, observed 1/4" thick vein with								$\wedge \times \Diamond \times \Diamond$		
526.00		.'/	carbonate infill. At EL. 531.6 ft, observed shear, dipping 50 to 45°, two shears with paperthin dusky red clay lining. Unit is medium strong.	C50			100	0	<i>.</i>		$\Diamond \times \Diamond$	VOC = 5.7 ppm	1
524.00	243	4	At EL. 530.9 ft, observed shear, dipping 70 to 25°, undulatory, dusky red clay lining, striated roughly parallel to strike. At EL. 530.5 ft, observed shear, dipping 65 to 25°, three shears with paperthin, dusky red clay lining. At EL. 529.6 ft, observed joint, dipping 90 to 80°, very								$\times 0 \times$		
522.00	245	No.	At EL. 529.6 ft, observed joint, dipping 90 to 80°, very intensely fractured, numerous joints with olive yellow staining. At EL. 529.2 ft, becomes very intensely fractured. At EL. 528.3 ft, observed shear, dipping 75 to 65°,	C51			100	0			$\Diamond \times \Diamond \times$		
520.00	247	11	3-4mm aperture with dusky red clay film, slightly to moderately rough. At FL 527.3 ft observed shear dipping 70° 2-3mm	C52			83	33			$\Diamond \times \Diamond$	VOC = 0.2 ppm	1
518.00	249	1/1/1	aperture, striated with paperthin dusky red clay lining. At EL. 526.7 ft, observed shear, dipping 60°, 2-3mm aperture, paperthin dusky red clay lining. At EL. 526.0 ft, observed shear, dipping 90 to 70°, 2-3mm aperture, paperthin dusky red clay lining. At EL. 525.2 ft, observed shear, dipping 90 to 80°, 4mm aperture, 1/8" thick dusky red clay lining.								$\Diamond \times \Diamond \times \Diamond$	PL CAI	
516.00	251	TH	4mm aperture, 1/8" thick dusky red clay lining. At EL. 523.5 ft, observed shear, dipping 40 to 20°, three shears and numerous fractures from 244.2 to 245 ft bgs, with yellowish red and dark red lining. At EL. 522.9 ft, contains joint, dipping 30°, moderately rough.								$\times \diamond \times$		
514.00	253 254	114	moderately rough. At EL. 522.0 ft, observed shear, dipping 50 to 40°, three shears from 245.8 to 246.5 ft bgs, clay lined. At EL. 521.5 ft, becomes soft to moderately soft from 246.5 to 247.5. At EL. 520.5 ft, observed shear, dipping 65°, 2mm								<>×	VOC = 7.9 ppm	1
512.00	255 256	*	intensely to moderately fractured. At EL. 519.5 ft, observed joint, dipping 30°, unit is	C53			75	0			$\Diamond \times \Diamond$		
510.00	257	ŽĮ.	weak. At EL. 518.8 ft, observed joint, dipping 30 to 20°. At EL. 518.1 ft, observed shear, dipping 60 to 40°, 2mm aperture, dusky red clay lining. At EL. 516.8 ft, observed shear, dipping 30°, 2mm								$\times \Diamond \times \Diamond$	VOC = 6.9 ppm	1
508.00	259	教な	At EL. 516.8 ft, observed shear, dipping 30°, 2mm aperture, clay lined, moderately rough. At EL. 515.0 ft, observed joint, dipping 90°, numerous carbonate lined joints up to 1/16" thick. At EL. 511.0 ft, observed joint, dipping 60°, carbonate lined joint or shear, dusky red lining, tight 1/16" thick.	C54			83	20			XOX		
	261	公社	faint. At EL. 508.4 ft, observed joint, dipping 60°, paperthin carbonate lining, tight								<>×		
	263	Z	Shears505.7 ft, observed shear/fault zone, dipping 45°, roughly 1' thick gouge zone with highly polished fault plane at 263', striated down dip. Gouge consists	C55			100	25			$\Diamond \times \Diamond$	VOC = 6.8 ppm	1
504.00	265	郅	of light greenish gray bentonitic clay with abundant diorite gravel to 1/4" dia. Gouge is moist, stiff, highly AlaStic.503.9 ft, becomes moderately fractured, shear, (continued)								\Diamond		11
					EPOR			القراعا	365	_			HOLE ID
			Department of Transportation	_	BOR	_				TE	Do	OCTMII E	R-09-Z3B
		1	Division of Engineering Services Geotechnical Services	()7		LA		710			OSTMILE D/D	07-187900
	7		Office of Geotechnical Design - South		ROJE	CT 0	R BI	NE	E NAME L TECH	NICAI	s	TUDY	
			Since of Cooleon moal Design - South	BI	RIDGI N/A			_	PREPAR D. Jan	ED BY		DATE 5-7	-09 SHEET



PROJECT OR BRIDGE NAME

BRIDGE NUMBER

SR-710 TUNNEL TECHNICAL STUDY

PREPARED BY

5-7-09

10 of 10

CALTRANS BORING RECORD MET+ENG FIXED

Geotechnical Services

Office of Geotechnical Design - South 1

LOGG K. L	ED BY ai/J.		BEGIN DATE 4-15-09	COMPLETION DATE 5-1-09	BOREHOL 186765							ind Dat	um)		LE ID		
	ING CO rans		ACTOR D use		BOREHOL ' Lt Sta											LEVATION NAVD88	
DRILL	ING ME				DRILL RIG										REHOLE in	DIAMETER	
SAMP	LER T	PE(S)	AND SIZE(S) (ID)	HQ Rock Coring	SPT HAMN	IER TY		40 I	h 30	0 incl	dro	n		HAI		FFICIENCY, E	ERi
BORE	HOLE	BACKE	FILL AND COMPLETIC	ON	GROUNDV READINGS	VATER				NG AF	TER	•		ATE) TO		TH OF BORII	NG
ELEVATION (ft)	Эрертн (#)	Material Graphics]	DESCRIPTION		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method Casing Depth		Rem	arks	
696.18 694.18 692.18 690.18 688.18 686.18 684.18 6878.18 676.18	1 2 3 4 5		CONCRETE PAVEN CLAYEY SAND (SC moist; low plasticity (FILL).	MENT.); medium dense; yellow fines; interstratified with	vish brown; minor silt	D01								in accord Soil & Ro and Pres 2007), e. A.1 of th Summar Technica County, 2010.	dance with ock Loggi sentation scept as re e Final G y Report, al Study, l California	rd was prepar in the Caltrans ng, Classifica Manual (June noted in Appe eotechnical SR-710 Tunr os Angeles a, dated April,	tion tion
692.18	6 7					S01	3 7 8	15						VOC=0 ¡	opm		
688.18	9			brown; moist; nonplastic Il downfeed with push sa		S02							000000000000000000000000000000000000000				
686.18 684.18	13		SANDY lean CLAY low plasticity fines.	(CL); stiff; yellowish brow	vn; moist;	/S03	3	15		18			000000000000000000000000000000000000000	PI			
682.18 680.18	17						6 9						000000000000	VOC=30	.3 ppm		
678.18 676.18	21		SILTY SAND (SM); brown; moist; trace ((Alluvium).	dense; yellowish brown GRAVEL; nonplastic fine	to light es;	S04							000000				
674.18	23 24 25			(agntinus d									00000000				
			Danc	(continued)	ion		EPOR								F	IOLE ID R-09-Z 3	
	_		Divisio	ment of Transportation of Engineering Sei		D	BORI IST. 07	С	REC DUNT .A		ROU 71 (TE)	POS T/	STMILE T	E	R-09-Z3 ^{:A} 07-07-187	
		7		chnical Services of Geotechnical Des	ign - Sout	P h 1	ROJEC SR-7	T 01	R BRII UNN		AME E CHI	NICAL					-
						В	RIDGE	NUN	/IBER	PR J .	Prat	ED BY t, M. I	slan	n	DATE 5-7-0	SHEET 9 1 of	15

ELEVATION (ft)	^й DE РТН (ft)	Material Graphics	DESCRIPTION aloues		Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method		emarks
672.18	26		SILTY SAND (SM) (continued).	S05	6 12 14	26					000	VOC=32.4 ppm	
	27				14			ŀ					
670.18	28										000		
0/10	29												
668.18	30		V	S06				+			000		
40808.G	31		<u> </u>								000		
84RY 0 666.18	32 =												
8 664.18													
CALTR	35		Trace GRAVEL; mostly medium to fine SAND; some	S07	7	26			14		000	PA	
662.18	36		fines.	007	12 14	20			-			VOC=55.6 ppm	
эльсов	37												
660.18	38		SILTY SAND (SM); dense; light brown; moist; fine SAND; nonplastic fines; interstratified with minor								200		
LOGS1	39		clayey sand and trace very stiff lean clay.								200		
9NN 0 658.18			V	S08				Ī		PP = 3.0			=
656.18	41 42							ŀ					
JOTOT OS.	43										200		
654.18	44		SANDY lean CLAY (CL); very stiff; light brown; moist.								200		
187 ONI	45			S09	7	24		-	14			PI	
652.18	46		X		10 14							VOC=75.2 ppm	
/ Z3B2 ;	47										000		
문 650.18 王	48		SILTY SAND (SM); dense; light brown; moist; fine SAND; nonplastic fines; interstratified with minor clayey sand and trace very stiff lean clay.								200		
W SANS W	49		clayey sand and trace very stiff lean clay.										
648.18	51		V	S10	8 11	23						VOC=19.5 ppm	
9 646.18			CHT (MI) book make to CAND a section to		12		\dashv						E E
IG FIXE	53		SILT (ML); hard; moist; fine SAND; nonplastic to low plasticity fines.								1000		
CALTRANS BORING RECORD MET+ENG FIXED JOE - CALTRANS WITH REV Z382 Z385 Z385 Z385 ONLY SR-710TUNLS CT BORING LOGS11_23_09JPCOPY.GPJ CALTRANS LIBRARY 040808.GLB 3/10/10 18 18 18 18 18 18 18 18 18 18 18 18 18	54												
CORD	L ₅₅ 🗏		(continued)								\triangleright		<u></u>
ING RE			Department of Transportation		EPOR' BORI								HOLE ID R-09-Z3B5
NS BOF		=/ 7	Division of Engineering Services Geotechnical Services	(IST.)7	L	OUN _ A		ROU 71 0	0	T/		EA 07-07-187900
ALTRAI			Office of Geotechnical Design - South		ROJEC SR-7' RIDGE				NAME TECH PREPAR	ED BY		UDY	SHEET
ر ا							-		J. Pra	tt, M. I	slar	n DATE 5-7-	-09 2 of 15

ELEVATION (ft)	5	DEPTH (II)	Material Graphics			Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)		Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	
642.18	56			SILTY SAND with GRAVEL (SM); very dense; light	S11	7 29 50/3"				13		Ш	DODO	PA VOC=36.1 ppm
	57	,	ø	gray; moist; some coarse GRAVEL; coarse to fine SAND; hard (slightly weathered) quartz diorite rock fragments.									000	
40.18	58	E		SILTY SAND (SM); very dense; dark yellowish brown; moist; coarse to fine SAND; some fines.				100	0				OX4	
38.18	60	,			S12	10	41						\Diamond	VOC=30.9 ppm
N	61			<u> X</u>		19 22							\Diamond	
36.18		E			H			100	0				X	
34.18	63	E		SANDY SILT (ML); very stiff; yellowish brown; moist; trace coarse to fine GRAVEL; some medium to fine									\	
	65	E	0	SAND; mostly nonplastic to low plasticity fines;	S13	7	29			16		PP =	$\stackrel{\wedge}{\sim}$	PA
32.18	66	5	0	weathered paleosol/regolith).		13 16						4.0	♦ ×	VOC=19.3 ppm
	67	E			C14			100	0				X	
30.18			a .										×	
28.18	70		1	SEDIMENTARY ROCK, (SANDSTONE); fine sand; thin to moderately bedded (0.1 to 0.8 ft), beds dip 50°, dark yellowish orange to moderate yellowish										See note at end of log regarding RQD
	71	E		brown, intensely weathered, very soft, unfractured, contains minor claystone laminations (<1%, 2 to 10	C15			100	0				\Diamond	VOC=20.7 ppm
26.18	72		1	mm thick) and trace coarse sand; also contains minor gypsum filaments and iron oxide patches (weathered); below EL 626.1 ft. contains thin (0.3 ft) claystone interbed, trace gravel at EL 625.7 ft:									\Diamond	
	73	E	1	claystone interbed, trace gravel at EL 625.7 ft; weakly [feldspar cemented (Poorly graded SAND with SILT (SP-SM), SILTY SAND (SM), and SANDY Lean CLAY (CL) interbed; very stiff clay (PP=4.0 tsf); fine sand, few to little silt, trace clay) [TOPANGA]									\Diamond	
24.18	74	E		fine sand, few to little silt, trace clay) [TOPANGA FORMATION].									\Diamond	
22.18		E	4		C16			100	0	13	123		\Diamond	UW, PA VOC=17.1 ppm
	77												X	
20.18	78												XX	
	79	E	1										\ \ \ \	
18.18	80	E			C17			100	0				$\overset{\vee}{\diamond}$	VOC=22.6 ppm
16.18		E	1	SEDIMENTARY ROCK, (SANDSTONE) (60%), fine sand, gradationally thinly interbedded with SANDY CLAYSTONE (40%), moderate yellowish brown to grayish brown, intensely weathered, very soft, (sandstone contains trace gravel); (Poorly graded SAND with SILT (SP-SM), SILTY SAND (SM), and SANDY Lean CLAY (CL) interbed; very stiff clay (PP=3.0 tsf); fine sand, few to little silt, few clay).									$\langle \rangle$	
	83	3		(sandstone contains trace gravel); (Poorly graded SAND with SILT (SP-SM), SILTY SAND (SM), and SANDY Lean CLAY (CL) interbed; very stiff clay									0	
14.18	84			(PP=3.0 tsf); fine sand, few to little silt, few clay). SEDIMENTARY ROCK, (SANDSTONE); fine sand, thinly to moderately bedded, dark yellowish orange.									\Diamond	12 -2
	-85	; <u> </u>	A.	(continued)									rN	
			1	Department of Transportation	10	EPOR BOR	NG	RE	_	RD	ROU	TE	DO	HOLE ID R-09-Z3E
	L		7	Division of Engineering Services Geotechnical Services	P)7 ROJE	CT O	R BF	RIDG	ΕN	710 AME	0	T	T 07-07-18790
				Office of Geotechnical Design - South 1	1 📑	SR-7 RIDGE	10 1	run	NE	L TI	ECH EPAR	NICAI ED BY It, M.		DATE SHEET

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		marks
612.18	86 87	\	soft clay on bedo organic graded	ly weathered, very soft, unfractured, trace very ystone seams (2 to 5 mm thick), FeO coating ding surfaces, at EL 613.6 ft is trace black debris(peat/coal) and very thin seams; (Poorly SAND with SILT (SP-SM) interbedded with SAND (SM); SANDY Lean CLAY (CL) [seams				100	0				0000	VOC=21.0 ppm See note at end RQD	of log regarding
610.18	88 89		fine san (continu SEDIME soft, org	id, few to little silt, trace clay)]. led). ENTARY ROCK, (PEAT/COAL), black, very Janic (PEAT (PT), highly organic soil, hard									X \ \ \		
608.18	90		medium	o tsty). ENTARY ROCK, (SANDSTONE); fine to a sand, thinly to moderately bedded, dark is orange to light brownish gray, intensely red, very soft, unfractured, contains trace to	C19			100	0				$\Diamond X \Diamond X$	VOC=18.6 ppm	
506.18			modera quartz o grains ir	oradic fine to coarse gravel; very soft to tely soft (intensely to moderately weathered) diorite rock fragments; feldspar grains and FeC ntensely weathered; uncemented to weakly r cemented (SILTY SAND [(SM); few to little									0×0		
604.18	94	\	scattere thinly to intensel claystor	ENTARY ROCK, (SANDSTONE) with 25% and cobbles (6" diameter), fine to medium sand by moderately bedded, medium gray to light gray by weathered, very soft, unfractured, trace thin be seams (1 to 3 mm thick); subrounded,	y.				100				>>>>		
602.18	96 97		modera slightly weakly SILT (S	tely soft to moderately hard, (moderately to weathered) quartz diorite rock fragments; calcite cemented (Poorly graded SAND with P-SM); Lean CLAY with SAND (CL) seams). ENTARY ROCK, (SANDSTONE), contains few	C20			92	0				× 0 × 0	VOC=9.1 ppm	
600.18		,	scattered moderal gray to soft to s thick bla	ed fine gravel; fine to medium sand; thinly to tely bedded (0.2 to 0.5 ft), beds dip ~50°, light medium light gray, intensely weathered, very soft, slightly fractured, at EL 597.2 ft is 3 mm ack peat/coal lamination and incipient clay line									×0×0		
598.18		· ·	70° from (bedding modera	g plane fracture (dip 55°) with slickensides (rak n horizontal), incipient fractures dip from 50 g plane) to 15° below EL 600.7 ft; weakly to tely [calcite cemented (Poorly graded SAND .T SP-SM))].	C21			100	6	9	131		XOXO	UW VOC=25.1 ppm	
596.18		V	sporadi	ENTARY ROCK, (SANDSTONE), contains few c subrounded gravel, fine to medium sand, p light gray, intensely to moderately weathered									X0X0		
594.18	104 105		sporadio subpara linear ric	ft to soft, moderately fractured, when cally cemented, incipient fractures dip 65° allel to bedding planes; at EL 595.7 ft raised dges show a rake angle of 40° on a clay lined plane (mostly Poorly graded SAND with SILT I	C22			84	0				\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	VOC=17.7 ppm	
592.18	106 107		SEDIME grayish dips 35° SEDIME	ENTARY ROCK, (CLAYSTONE), black to olive green, soft, incipient clay lined fracture of slightly rough surface. ENTARY ROCK, (SANDSTONE); contains little				5"	9				0×0		
590.18	108 109		diamete intensel contains (slightly	vel, few coarse gravel, 10% cobbles (up to 5 ir rr); fine to medium sand, medium light gray, ly weathered, very soft to soft, unfractured, s trace claystone seams (laminations); hard weathered) quartz diorite rock fragments,	n.				P				X 0 X 0		
588.18	110 111		SEDIME sand, th MUDST	below EL 589.8 ft; weakly cemented (SILTY with GRAVEL (SM); contains 10% cobbles). ENTARY ROCK, (SANDSTONE) (85%), fine hinly to moderately interbedded with CONE/CLAYSTONE (15%); beds dip 50°.	C23			100	0				× 0 ×	VOC=30.2 ppm	
586.18	112 113		soft, inte continue seams of faint slice	n light gray, intensely weathered, very soft to ensely to moderately fractured, almost all ous incipient bedding plane fractures with clay dipping from 50 to 75°, smooth surfaces with ckensides with 30° rake angle at EL 580.7 ft; to moderately calcite cemented (Poorly graded									>X0X<		
584.18	114		SAND v (PP=4.0	to moderately calcite cemented (Poorly graded with SILT (SP-SM) [; very stiff to hard clay 0 to >4.5 tsf)].									><		8
				(continued)		DEDO	OT T	TIE	4						HOLEID
	_	_/	Z	Department of Transportation Division of Engineering Services		BOF DIST.	RING	RE	_	RD	ROL 71		PO:	STMILE T	R-09-Z3B
		7		Geotechnical Services		ROJE	CT C	R BF	RIDG	EN	AME	NICA	I QT	IIDA	
				Office of Geotechnical Design - So		BRIDG				PR		ED BY		DATE	SHEET

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	
582.18	116		(continued).	C24			100	0				X 0 X 4	VOC=13.9 ppm See note at end of log regarding RQD
580.18	117	X										0×0	
578.18	119		SEDIMENTARY ROCK, (SANDSTONE), trace fine to coarse gravel (5%); fine to medium sand, thinly to moderately bedded, medium light gray to light gray, intensely weathered, very soft to soft, slightly fractured,	C25			92	0				XOX	VOC=19.1 ppm
576.18	121		incipient fractures are generally claystone lined and dip from 40 to 80°, at EL 568.5 ft slickensides show 20° rake angle on fracture dipping 80°, angular hard (slightly weathered) quartz diorite rock fragments, below EL 568.2 ft is black peat/coal debris [; weakly to moderate to the peat of t									XOXC	
574.18	123		moderately calcite cemented; (Poorly graded SAND with SILT (SP-SM) grading to SILTY SAND (SM); Lean CLAY with SAND (CL) lining, hard clay (PP>4.5 tsf)].									0 X Q	
572.18	125			C26			100	8				0×0×	VOC=21.7 ppm
570.18	127											>>	
568.18	129			007			100	0				XOX	VOC=11.6 ppm
566.18	131	<u>.</u>	SEDIMENTARY ROCK, (SANDSTONE) (94%), fine sand, interbedded with MUDSTONE/SILTSTONE (6%); beds dip 40 to 50°, continuous clay lined incipient fractures dip 65 to 70° between EL 564.7 and	C27			100	0				X0X0	
564.18	133	•	incipient fractures dip 65 to 70° between EL 564.7 and 563.9 ft, thinly to moderately bedded, medium gray to light gray, intensely weathered, very soft to soft, moderately to slightly fractured, unfractured below EL 558, incipient clay lined fractures dip 20 to 25° at EL 566.5 and 559 ft (slickensides show 25° rake), black									$\Diamond X \Diamond X$	VOC=3.0 ppm
562.18	135	\ •	566,5 and 559 ft (slickensides show 25° rake), black peat/coal laminations (3 to 4 mm thick) and debris occur sporadically above EL 561 ft; clay seams cross each other (different [orientations); weakly to minor strongly calcite cemented (Poorly graded SAND with SILT (SP-SM) interbedded with SILTY SAND (SM) and SILT (ML) to Lean CLAY with SAND (CL); hard silt to	C28		4	100	8	8	137		0×0	UW, PA
560.18	137		SILT (SP-SM) Interbedged with SILTY SAND (SM) and SILT (ML) to Lean CLAY with SAND (CL); hard silt to clay (PP>4.5 tsf)].									>> <	
558.18	139	/										XOX	
556.18	141			C29			100	8				\ \ \ \ \	VOC=28.8 ppm
	143											OXO.	
554.18	144	\ · ·	SEDIMENTARY ROCK, (SANDSTONE); fine to									\Diamond	0
	140-		(continued)										Togress
	_		Department of Transportation Division of Engineering Services	D	BOR IST.	ING	RE OUN LA	1TY		ROU 71	TE)	POS T/	HOLE ID R-09-Z3B 5 STMILE EA 07-07-187900
		7	Geotechnical Services Office of Geotechnical Design - South		ROJE SR-7						NICA	LST	1000
					RIDGI				PR	EPAR	ED BY		DATE SHEET

ELEVATION (ft)	DEPTH (ft)	Material Graphics		Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Re	emarks
552.18	146		medium sand; moderately soft to very soft, intensely to moderately fractured, fractures dip 60 to 70° with chlorite on fracture surfaces, strongly to weakly calcite cemented.	C30			100	40				XOX	VOC=33.5 ppm See note at end RQD	d of log regarding
550.18	147	\	SEDIMENTARY ROCK, Clayey (SANDSTONE); fine sand, brownish gray, intensely weathered, very soft to soft, weakly to strongly calcite cemented (mostly CLAYEY SAND (SC), little clay). SEDIMENTARY ROCK, (SANDSTONE); fine sand;									0×0		
548.18	149 150	*.	beds dip ~40°, medium light gray to brownish gray, intensely to moderately weathered, very soft to soft, moderately fractured, incipient fractures dip from 40 (parallel to bedding) to 70°, crosslaminated;	C31			100	36				XOX	VOC=4.0 ppm	
546.18	151	`,	predominantly weakly to minor strongly calcite cemented (mostly Poorly graded SAND with SILT ((SP-SM)). SEDIMENTARY ROCK, (SANDSTONE); fine sand;											
	153	\	moderately bedded, beds dip 35 to 40°, brownish gray, very soft, moderately fractured, at EL 545.8 ft fracture dips 55°, slickensides show 30° rake angle on bedding planes and fractures; contains thin organic black peat/coal seams and debris; weakly calcite cemented									000		
544.18	155		(SILTY SAND (SM); little to some silt). SEDIMENTARY ROCK, (SANDSTONE); fine to medium sand; thinly to moderately bedded (0.1 to 0.8 ft), beds dip 45 to 55°, penecontemporaneous faulting (soft sediment deformation) at EL 541.1 ft, medium	C32			100	72	6	142		XOX	UC VOC=1.2 ppm	
542.18	157	ÿ	light gray, intensely weathered, very soft to moderately soft; moderately to slightly fractured; continuous incipient clay lined bedding plane fractures dip 45 to 55°; at EL 541.1 ft fracture dips 45° and contains raised ridges with 40° rake angle, crosscuts bedding;									\$ \$ \$ \$		
540.18	158		[unfractured below EL 538.2 ft with few to little fine gravel; weakly to moderately calcite cemented (minor strongly cemented); (partly Poorly graded SAND with SILT (SP-SM) interbedded with minor SILTY SAND (SM))].									0×0		
538.18	160 161		(GWI))].	C33			100	44				X 0 X	VOC=3.0 ppm	
536.18	162 163											X 0 X C		
534.18	164 165	ó':	SEDIMENTARY ROCK, Cobble/Boulder (CONGLOMERATE) with silty sandstone matrix, fine									0×0		
532.18	166	0.0	sand; 70% cobbles/boulders with 30% sandstone matrix, boulder (12.5 in diameter) and cobbles (9 to 10 in. diameter), brownish gray, unfractured, subrounded moderately hard to moderately soft (slightly to intensely weathered) quartz diorite rock	C34			100	0				×0×	VOC=1.4 ppm	
530.18		0	fragments; fine sandstone matrix is intensely weathered, very soft, weakly cemented (COBBLES) and BOULDERS in SILTY SAND (SM) matrix; mostly 上野的小性有知的 ROCK, (SANDSTONE); contains trace fine gravel; fine to medium sand; dominantly									XOX		
528.18	170		moderately bedded (minor thinly to thickly bedded), beds dip ~30°, medium light gray, intensely to moderately weathered, very soft to moderately soft; very slightly fractured to unfractured; incipient fractures on bedding planes dip 30°; some fractures moderately	C35			100	86				♦ × ♦	PA VOC=9.8 ppm	
526.18	171 172	/	to totally healed with silica (0.5 mm thick) and minor clay infill, slightly rough; [thin claystone seams; arkosic; predominantly strongly and minor weakly to moderately calcite cemented (minor Poorly graded SAND with SILT interbedded with SILTY SAND (SM);									0 X Q X		
524.18	173 174		few to little silt)].									XOX	VOC=29.0 ppm	
	1 ₇₅ E	111	(continued)									$ \Diamond $		
					EPOR				14					HOLE ID
	-	_/	Department of Transportation Division of Engineering Services	D	BOR	10	NO	_	KD	ROU	TE	POS	STMILE	R-09-Z3B5
		7	Geotechnical Services	P	07 ROJE	CTC	LA R BF	RIDG	E NA	710 AME	5	T/		07-07-187900
			Office of Geotechnical Design - South	1	SR-7	10 7	run	NE	L TI	ECHI EPARI	NICA	L ST	UDY DATE	SHEET

ELEVATION (ft)	DEPTH (#)	Material Graphics	DESCRIPTION	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
522.18	176	`	(continued).	C36			100	70				♦ ×	See note at end of log regarding RQD
520.18		0	SEDIMENTARY ROCK, isolated cobble (11 in. diameter) within (SANDSTONE) matrix, fine sand, subrounded moderately hard (moderately weathered) [quartz diorite rock fragment.									X0X0X	
518.18	179 180 181	\	SEDIMENTARY ROCK, (SANDSTONE), fine to medium sand, dominantly moderately bedded (minor thin to thick bedded), beds dip ~30°, medium light gray, intensely to moderately weathered, very soft to soft, very slightly fractured to unfractured, between EL 518.4 and 513.2 ft fractures dip 75 to 70°; unfractured above and below; scattered few coarse gravel (1 to 3	C37			104	20				X0X	VOC=3.2 ppm
516.18	182 183		in. diameter); thin irregular claystone seams (1 to 2 mm thick); chlorite in matrix; weakly to strongly calcite cemented [(predominantly Poorly graded SAND with SILT (SP-SM))].									>X	
14.18	185			C38			100	0				0X0X0	VOC=27.2 ppm
10.18	187											\$X\$X\$	
08.18			SEDIMENTARY ROCK, (SANDSTONE); fine to coarse; moderately to thickly bedded (0.3 to 1.4 ft),	C39			98	0				X0X0X	VOC=8.2 ppm
06.18	191 192 193	:/:	coarse; moderately to thickly bedded (0.3 to 1.4 ft), beds dip ~30 to 40°, very soft to soft, slightly fractured, incipient bedding plane fractures dip 30 to 60° and are lined with chlorite; chlorite in matrix; contains few fine gravel; weakly cemented (SILTY SAND (SM) grading to Poorly graded SAND with SILT (SP-SM)).									XOXOX	
04.18	194		SEDIMENTARY ROCK, (MUDSTONE/ CLAYEY									♦ × ♦	
02.18			SILTSTONE); organic, brownish gray to brownish black, very soft, (SILT (ML) to Lean CLAY with SAND (CL), hard (PP>4.5 tsf)). SEDIMENTARY ROCK, (SANDSTONE); fine to medium sand; moderately to thinly bedded, beds dip ~40°, soft, very slightly fractured, chlorite in matrix;	C40			100	80				X0X0	VOC=29.6 ppm
00.18	198 199		lithic arkose composition; predominantly moderately to strongly calcite cemented (minor weakly cemented). SEDIMENTARY ROCK, (SANDSTONE); fine sand, very soft, unfractured, chlorite in matrix; weakly calcite cemented (SILTY SAND (SM)). SEDIMENTARY ROCK, (SANDSTONE); fine to									X0X0X	
98.18	201	///i.	medium sand; beds dip ~25 to 30°, very slightly fractured to unfractured, predominantly moderately to little strongly calcite cemented (some weakly cemented) (partly Poorly graded SAND with SILT _(SP-SM) interbedded with SILTY SAND (SM)).	C41			100	46	6	142		X0X0X	EM VOC=40.8 ppm
96.18 94.18	203		SEDIMENTARY ROCK, (SANDSTONE) (60%), fine to medium sand, interbedded with MUDSTONE/SILTSTONE, brownish gray, very soft, unfractured, mudstone interbeds are organic rich; weakly cemented (SILTY SAND (SM) interbedded with SANDY SILT (ML) and Lean CLAY (CL), very stiff to hard clay (PP=4.0 to >4.5 tsf)).									>X \ \ \ \	4
	205 <u>L</u>	100	SEDIMENTARY ROCK (SANDSTONE): fine to (continued)										
1	L	_/ 7	Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South	Di (EPOR BOR IST. D7 ROJE	ING CT O	RE OUN LA R BF	RIDG	E N			T/	1
			Since of Geoleconnical Design - South		RIDGE	_		_	PR	EPAR	ED BY		DATE SHEET

ELEVATION (ft)	SDEPTH (ft)	Material Graphics		Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method		emarks
492.18	206		medium sand; beds dominantly moderately bedded but range from thinly to thickly bedded (0.2 to 1.1 ft thick), beds dip ~30°, medium light gray, very soft to soft, dominantly slightly fractured (minor intensely fractured), mostly incipient fractures on bedding planes, at EL 490.6 ft fractures dip 75°; predominantly	C42			100	30				0%0%0	VOC=22.0 ppm See note at end RQD	d of log regarding
490.18	208	١.,	weakly to minor moderately calcite cemented (predominantly Poorly graded SAND with SILT (SP-SM) [grading to SILTY SAND (SM))]. (continued).									>>>>		
488.18	210		SEDIMENTARY ROCK, (SANDSTONE) (95%), fine sand, with thin MUDSTONE/CLAYSTONE (5%) interbeds and laminae (0.3 to 1 mm), dominantly thickly bedded (1.9 ft thick), beds dip ~30°, medium	C43			100	100				×0×.	VOC=18.1 ppm	
486.18	212		light gray to moderate brown, soft to moderately soft, very slightly fractured to unfractured, at EL 484.6 ft beds dip 30° and incipient bedding plane fracture has slickensides with 30° rake angle; moderately to strongly cemented.									X0X0		
484.18	214	//:	Strongly comenica.	C44			100	32				(0×0)	VOC=19.6 ppm	je li
482.18	216	5	SEDIMENTARY ROCK, (MUDSTONE/CLAYSTONE), thin bed, moderate brown, very soft, (Lean CLAY with SAND (CL), hard clay (PP>4.5 tsf)). SEDIMENTARY ROCK, isolated boulder (16 in.					****				000		
480.18	218	\	diameter) within (SANDSTONE) matrix, subrounded hard quartz diorite rock fragment, igneous boulder contains numerous calcite veins; FeO stained. SEDIMENTARY ROCK, (SANDSTONE); fine to medium sand; moderately bedded; intensely to									0×0×		
478.18	220	(· · · ·)	moderately weathered; moderately soft to very soft, slightly fractured, incipient fractures dip 60°; contains thin irregular claystone seams; predominantly strongly cemented to some weakly cemented (partly Poorly graded SAND with SILT (SP-SM) grading to SILTY SAND (SM)).	C45			100	0				>>	VOC=16.98 pp	m
476.18	222		SEDIMENTARY ROCK, (MUDSTONE/SANDY CLAYSTONE), moderate brown, soft. SEDIMENTARY ROCK, (SANDSTONE); fine sand; dominantly moderately bedded (0.3 to 0.4 ft thick) and									X0X		
474.18	224		minor thickly bedded, beds dip ~30°, medium light gray, intensely weathered, very soft to soft, slightly fractured, incipient bedding plane fractures; predominantly weakly to minor moderately calcite cemented (Poorly graded SAND with SILT (SP-SM)	C46		- 6	106	44				\ \ \ \ \	VOC=26.6 ppm	
472.18	226		grading to SILTY SAND (SM)). SEDIMENTARY ROCK, (MUDSTONE/SANDY CLAYSTONE); contains few charcoal or coal debris, thinly bedded, (SANDY lean CLAY (CL), hard (PP>4.5 tsf)).				1					000		
470.18	228	0.0	SEDIMENTARY ROCK, (SANDSTONE), fine to medium sand; contains a cobble (7%, 4 in. diameter) below EL 471 ft, medium light gray, soft to moderately soft, very slightly fractured to unfractured, trace coarse gravel; moderately hard quartz diorite rock									000		
468.18	230	· · · · ·	fragments; strongly to weakly calcite cemented (some Poorly graded SAND with SILT (SP-SM)). SEDIMENTARY ROCK, (CONGLOMERATE) with fine to medium sandstone matrix, cobbles (up to 12 in. diameter), beds dip ~25°, medium light gray,	C47			100	0				>>>>	VOC=6.6 ppm VOC=17.8 ppm	
466.18 464.18	233	0.000	moderately weathered, unfractured, some very soft to moderately soft sandstone matrix; subrounded to angular, moderately hard, (moderately weathered) quartz diorite and minor soft mudstone rock fragments; weakly to moderately calcite cemented matrix (GRAVEL and COBBLES with SILTY SAND [(SM) matrix)].									X0X0X	VOC=32.8 ppm	
	235	0.	(continued)									\Diamond		
					EPOR									HOLE ID
	_	_/	Department of Transportation Division of Engineering Services	D	BOR IST.	C	OUN	_		ROUT	E	POS	STMILE	R-09-Z3B
	_	7	Geotechnical Services	P	7 ROJE	сто	LA R BF	RIDG	E NA	710 ME		T/	100	07-07-187900
_			Office of Geotechnical Design - South		SR-7	-				PARE		LSI	DATE	SHEET

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	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	
462.18	236	0.0	(continued).	C48			100	66				>>>	UC See note at end of log regarding RQD	
	237	0,0										X		
460.18	238	ó∵										×		E
	239	,,,	SEDIMENTARY ROCK, (SANDSTONE); fine sand;									×		
458.18	240		thinly interbedded (0.1 ft) with SANDY MUDSTONE/CLAYSTONE, medium light gray to brownish gray, intensely to moderately weathered, moderately soft to very soft, unfractured; predominantly moderately to minor weakly cemented	C49			102	60				× 0 ×		
456.18		, ' ' '	(partly Poorly graded SAND with SILT (SP-SM) interbedded with SANDY fat CLAY (CH); hard clay BEDMENTAR W来物CK, (SANDSTONE) (60%), fine to medium sand; moderately interbedded with						5	142		000		
454.18		, , ,	Gravel/Cobble CONGLOMERATES (40%), cobbles (up to 6 in, diameter), beds dip ~40 to 50°, medium light gray, unfractured, contains thin irregular mudstone beds and seams (0.2 ft to 1 mm thick);									X 0 X		
452.18	245 246	14	subrounded moderately soft to moderately hard quartz diorite rock fragments; intensely weathered feldspar grains; predominantly strongly to some weakly calcite (cemented (partly [Poorly graded SAND with SILT (SP-SM))].	C50			104	58				♦ × ♦		
450.18	247 248		SEDIMENTARY ROCK, (SANDSTONE) (80%); contains 11% cobbles (up to 5 in. diameter) and few gravel; fine to medium sand; moderately to thinly interbedded with MUDSTONE/SILTSTONE, medium light gray to brownish gray, intensely weathered, soft									\ \ \ \	VOC=22.5 ppm	
448.18	249 250	0.0	to moderately soft, unfractured, subrounded quartz diorite rock fragments; predominantly moderately to strongly calcite cemented (some weakly cemented); (partly Poorly graded SAND with SILT (SP-SM) and SILT (ML) interbeds, hard silt (PP>4.5 tsf)).	C51			102	36				× 0 × 0	VOC=6.7 ppm	
446.18	251 252		SEDIMENTARY ROCK, Coarse Gravel/Cobble (CONGLOMERATE) with fine SANDSTONE matrix, cobbles (up to 10 in. diameter), moderately bedded, unfractured, soft to very soft matrix; contains claystone seams; subrounded to subangular moderately hard									X0X		
444.18	253 254		quartz diorite rock fragments; predominantly moderately to minor weakly cemented matrix (partly Poorly graded SAND with SILT (SP-SM). SEDIMENTARY ROCK, (SANDSTONE) (85%); fine to									\\ \\ \\ \\ \\		
	255		medium sand; thinly to moderately interbedded with MUDSTONE/CLAYSTONE (15%), beds dip ~40°, medium light gray to brownish gray, intensely weathered, very soft to moderately soft; very slightly fractured to unfractured; at EL 439.6 ft moderately	C52			104	64					UC VOC=19.3 ppm	
442.18	256	X	spaced incipient fractures dip 60 to 65° and lined with clay (3 to 5 mm thick); pervasive irregular mudstone seams; mudstone very soft to soft; bioturbated; [weakly to strongly calcite cemented (partly SILTY									× 6 ×		
440.18	258 259	Ÿ.	SAND (SM) interbedded with Poorly graded SAND with SILT (SP-SM) and SANDY lean CLAY (CL); hard clay (PP.4.5 tsf)].						5	136		0 X Q		
438.18	260 261		OFFINENTARY POOK (SAMPOTONE) &	C53			102	38				XOX	VOC=7.3 ppm	
436.18			SEDIMENTARY ROCK, (SANDSTONE); fine sand; moderately to thinly bedded (0.5 to 0.2 ft thick), beds dip ~40°, medium gray, very soft to soft, very slightly fractured, at EL 435 ft incipient fracture dips 60° and is clay lined and smooth; thin (2 to 3 mm) clay seams are									\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\		
434.18			truncated by opposite dipping clay seams; weakly to moderately cemented (partly Poorly graded SAND with SILT (SP-SM)). SEDIMENTARY ROCK, (SANDY MUDSTONE/SANDY ICLAYSTONE) with minor thin SANDSTONE interbed									\		
	200		(continued)	а	EPOR	T-T-17	1 =						LHOLEID	
1	_	_/	Department of Transportation Division of Engineering Services	D	BOR IST. 07	ING	RE OUN LA	VTY		ROU 71	TE 0	POS T/	R-09-Z3 STMILE EA 07-07-1879	
		1	Geotechnical Services Office of Geotechnical Design - South		ROJE SR-7	CT O	R BF	NE.	LT	AME ECH	NICAI	ST		
			A service of results and a service of the service of		RIDGE	E NU	МВЕ	R			ED BY	Islan	DATE SHEET 5-7-09 9 of	15

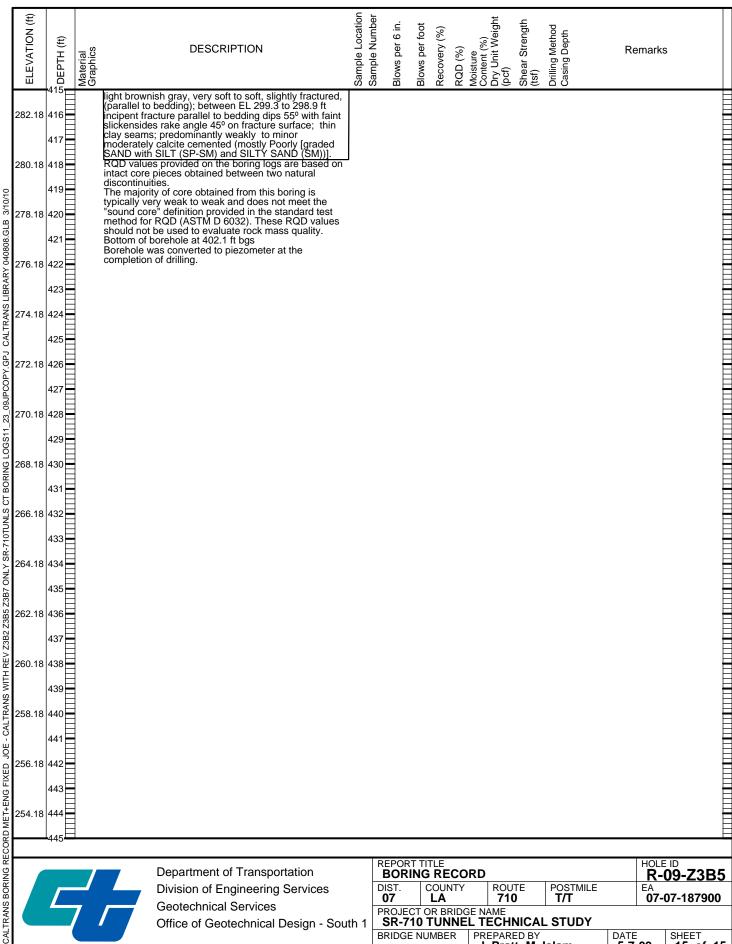
ELEVATION (ft)	DEPTH (#)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Re	emarks
432.18	265 266 267		thinly bedded, soft, contains minor sporadic very thin (1 to 2 mm thick) tar or organic seams. SEDIMENTARY ROCK, (SANDSTONE) (60%); fine to medium sand; thinly to moderately interbedded with MUDSTONE/SILTSTONE grading to CLAYSTONE	C54			102	34				>×0×	VOC=10.7 ppm See note at end RQD	of log regarding
430.18	E		with SAND, medium gray to brownish gray, very soft to soft, unfractured, contains irregular claystone seams; bioturbated; predominantly weakly to some moderately calcite cemented (mostly Poorly graded									×<		
428.18	269 270	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	SAND with SILT (SP-SM) grading to SILTY SAND (SM) interbedded with SILT (ML) and lean CLAY with SAND (CL); hard clay and silt [(PP>4.5 tsf)); vuggy zone between EL +432.2 to 431.2 ft]. SEDIMENTARY ROCK, (SANDSTONE) (80%); fine	C55			125	50				>X <	VOC=28.7 ppm	a.
426.18	271 272		sand; thinly interbedded with MUDSTONE/CLAYSTONE/SILTSTONE (20%), beds dip ~45°, medium light gray to brownish gray, very soft to soft moderately fractured, inclinent bedding plane.						10	139		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
ST 8-24	273		fractures dip 60 to 65°; strongly to weakly calcite cemented (partly SILTY SAND (SM) grading to Poorly graded SAND with SILT (SP-SM) interbedded with Lean CLAY with SAND (CL) to SILT (ML); very stiff to									0 X Q		
424.18 422.18	275	\ .	hard clay and silt [(PP=4.0 to >4.5 tsf))]. SEDIMENTARY ROCK, (MUDSTONE/CLAYSTONE) (60%) thinly interbedded (0.1 to 0.2 ft thick) with SANDSTONE (40%), fine sand; beds dip ~60°, medium light gray to brownish gray, very soft to moderately soft, unfractured; irregular thin beds,	C56			125	50				>X	VOC=31.6 ppm	
	277		laminations, and mudstone seams (seams are roughly parallel to and also crosscut bedding), contains laminated mudstone rip-up clasts and also bioturbated beds between EL 422.3 to 421.2 ft; [predominantly weakly to minor moderately calcite cemented (partly SILTY SAND (SM) grading to Poorly graded SAND	C57			107	83				\$X\$X		
418.18	279 280	1	SED MENGARY CCK, (SANDSTONE) (60%), fine sand, thinly interbedded with MUDSTONE/SILTSTONE/CLAYSTONE with SAND (40%), beds dip ~50 to 60°, medium light gray to brownish gray, intensely weathered, predominantly									X0X0		
416.18	E	\ \ \	moderately soft to minor very soft; unfractured; contains sporadic black coal and possibly trace organic tar seams (laminae) between Et 419.9 to 417.9 ft, predominantly strongly to minor weakly calcite cemented (partly SILTY SAND (SM) [grading to Poorly graded SAND with SILT (SP-SM))].	C58			100	52				X0X0	VOC=37.5 ppm	
414.18	285	Jak !	SEDIMENTARY ROCK, (SANDSTONE) (65%), fine sand, thinly interbedded with MUDSTONE/CLAYSTONE (35%), beds dip ~60°, mudstone also laminated, medium light gray to brownish gray, soft to moderately soft, predominantly moderately soft to minor very soft, between EL 414.5 to 413.5 ft laminations and thin beds are offset along small fault dipping 75° (possible penecontemporaneous faulting/soft sediment	C59			95	88				XOXOXOX		
110.18	287 288 289		deformation); thin coal seam at EL 414 ft; bioturbated [below EL 412.2 ft; predominantly strongly to minor [weakly calcite cemented (partly SILTY SAND (SM) [SMM] FOR THE STAND (SM) [SMM] FOR THE SAND (SM) [SMM] FOR THE STAND (SM) [SMM] FOR THE SAND (SM) [SM] [SM] [SM] [SM] [SM] [SM] [SM] [SM]									\$X\$X\$		
08.18		ί.)	unfractured, strongly calcite cemented. SEDIMENTARY ROCK, (MUDSTONE/CLAYSTONE) (90%) thinly interbedded with SANDSTONE (10%), fine sand; also laminated, beds dip up to ~70%, brownish gray, moderately soft to moderately hard, slightly fractured, mudstone lined fracture at EL 408.4	C60			120	68	9			>X	VOC=11.5 ppm	
106.18	292 293	j,	ft dips 70° in opposite direction of bedding dip (crosscuts bedding). SEDIMENTARY ROCK, (SANDSTONE) (85%), fine to medium sand, moderately to thinly interhedded with					Ш				XOX	VOC=9.7 ppm	
104.18	294	//:	MUDSTONE (15%), beds dip ~70°, medium dark gray to medium light gray, predominantly moderately hard to minor very soft; sporadic trace black organic/coal patches and debris between EL 407.2 to 405 ft; thin	C61			100	93				0×0	EM VOC=22.9 ppm). a fo
			(continued)	- 10										naie:-
1	7		Department of Transportation Division of Engineering Services	D	BOR IST.	ING	RE		RD	ROU			STMILE	R-09-Z3B
	_	7	Geotechnical Services	P)7 ROJE	сто					S. C.	T/		07-07-187900
		1	Office of Geotechnical Design - South		SR-7	-				PAR	NICA	LST	UDY DATE	SHEET

ELEVATION (ft)	а ОЕРТН (ft)	Material Graphics	DECODIDATION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Remarks
402.18	295	\:	mudstone seams; predominantly strongly to moderately calcite cemented (minor weakly cemented) (minor SILTY SAND (SM) [interbeds)].	C61			100	93	1	162		>×<	VOC=17.3 ppm See note at end of log regarding RQD
400.18	299	\	SEDIMENTARY ROCK, (SANDSTONE), fine to medium sand; thinly to moderately bedded, beds dip ~65°, light brownish gray to brownish gray, moderately hard to hard, intensely fractured, very closely spaced to closely spaced (20 to 60 mm spaced) fractures dip 25, 40 ,and 60°, moderately thin (1 to 1.5 mm) fractures are totally healed with calcite; strongly calcite cemented; organic brown film appeared in drilling mud tub at EL 404.2 ft.	C62			100	60				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	VOC=10.4 PPM
398.18 396.18	301	•/	SEDIMENTARY ROCK, (SANDSTONE) (55%), fine sand; thinly interbedded with MUDSTONE/CLAYSTONE (45%), mudstone is dominantly laminated, soft to moderately soft, unfractured, irregular claystone seams, strongly calcite cemented below EL 400.2 ft, predominantly moderately to minor weakly cemented above (minor	C63			108	50				XOXOX	
394.18	303 304 305		SILTY SAND (SM)). SEDIMENTARY ROCK, (MUDSTONE/CLAYSTONE) (75%) interbedded with SANDSTONE (25%); contains few sporadic fine to coarse gravel (1 in. length); beds dip ~70°, brownish gray to medium light gray, soft to very soft; unfractured; black organic patches at EL 397.2 ft, bioturbated, irregular laminations, moderately to weakly calcite cemented (partly SILTY SAND (SM)									X0X0X	
392.18 390.18	307	1	interbeds). SEDIMENTARY ROCK, (SANDSTONE) (65%), fine to medium sand, interbedded with MUDSTONE/CLAYSTONE (35%), thinly bedded to laminated, some moderately bedded, beds dip ~50 to 70°, dominantly soft to moderately soft (minor very soft), medium light gray to brownish gray, intensely weathered, unfractured, organic coal seam at EL 392.7 ft; sporadically bioturbated; strongly to weakly	C64			113	50	9	133		\$\\\$\\\$\\\$	SD, EM VOC=30.8 ppm
388.18 386.18	311		calcite cemented (some SILTY SAND (SM)). SEDIMENTARY ROCK, (SANDSTONE (80%), fine interbedded with MUDSTONE/CLAYSTONE (20%), sandstone is moderately to thinly bedded (0.5 to 0.1 ft thick) and mudstone is thinly bedded to laminated (0.1 ft to 5 mm thick), beds dip 60 to 70°, medium light gray to brownish gray, very soft to moderately soft; unfractured; moderately to weakly calcite cemented (partly SILTY SAND (SM) interbedded with Lean CLAY with SAND (CL), hard clay (PP>4.5 tsf).	C65			95	50				X0X0X0X	VOC=3.9 ppm
384.18 382.18	315	\ \ \ \	SEDIMENTARY ROCK, (SANDSTONE), fine sand; contains few gravel (rounded fine sandstone rock fragments), medium light gray, very soft to soft, unfractured, black coal patches and thin lavers (0.2 to	C66			100	48				X0X0X	VOC=13.0 ppm
380.18 378.18	319 320		0.3 ft thick); moderately to weakly calcite cemented (partly SILTY SAND (SM) interbeds). SEDIMENTARY ROCK, (SANDSTONE) (80%), fine sand, interbedded with SILTSTONE/CLAYSTONE (20%), thinly to moderately bedded, beds dip ~70°, medium light gray to brownish gray, very soft to soft, unfractured, moderately to weakly calcite cemented (some Poorly graded SAND with SILT (SP-SM) and SILTY SAND (SM)).	C67			105	53				<	
376.18 374.18	323	\	SEDIMENTARY ROCK, (SANDSTONE) (70%), fine sand, interbedded with MUDSTONE/SHALE (30%), beds generally thinly bedded to laminated, some moderately bedded sandstone, beds dip ~50 to 70°, medium light gray to brownish gray, intensely weathered, very soft to soft, very slightly fractured to unfractured, below EL. 368.5 ft. is incipient bedding	C68			100	48				0X0X0X0	PTS
	325		(continued)										4
1	L	_/ 7	Department of Transportation Division of Engineering Services Geotechnical Services	D	EPOF BOR IST 07 ROJE	CTO	RE OUN LA	RIDG	E N/	ROU 710	0	T/	
			Office of Geotechnical Design - South		SR-7 RIDG				PRI	EPAR	NICAI ED BY It, M.		DATE SHEET

ELEVATION (ft)	орертн (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 Deput	Remarks	
372.18	326 327	1	plane fracture dipping 50° (slightly rough surface); truncated bedding at EL 371.8 ft. (possibly erosional); bioturbated; weakly to moderately calcite cemented (partly SILTY SAND (SM) interbeds).	C68			78	0				>X	See note at RQD	end of log regarding	
370.18	E											×<			
368.18	330	\		C70			113	75				0 X Ø	UU		
366.18	331 332 333		SEDIMENTARY ROCK, (SANDSTONE, fine sand, moderately bedded, medium light gray to brownish gray, moderately hard, unfractured, predominantly moderately hard to minor very soft; predominantly strongly to minor weakly calcite cemented (minor									\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			
364.18		ババ	SILTY SAND (SM) interbeds). SEDIMENTARY ROCK, (CLAYSTONE/SILTSTONE) (65%) interlaminated with SANDSTONE (35%), fine sand; laminaed ip 70°, medium light gray to brownish gray, soft to very soft; slightly fractured; at EL 364.5 ft fracture dips 30° (smooth surface); at EL 363.8 ft	C71			119	60				XOXOX			
362.18	336 337	, \	Irracture dips 30° (smooth surface); at EL 363.8 ft inicipient bedding plane fracture dips 60°; some penecontemporaneous faulting with minor offsets (soft sediment deformation); [moderately to weakly calcite cemented (partly SILTY SAND (SM) to Poorly graded SAND with SILT (SP-SM))].					ļ.							
360.18	339	/	SEDIMENTARY ROCK, (SANDSTONE) (94%), fine sand, interbedded with CLAYSTONE/SHALE (6%); moderately bedded to laminated; moderately hard to moderately soft, minor very soft weakly cemented sandstone between EL 363.2 to 362.5 ft, medium light gray to brownish gray, unfractured, strongly to weakly	C72		P	37	0				(OXOX			
358.18	341		cemented (partly SILTY SAND (SM)). SEDIMENTARY ROCK, (MUDSTONE/CLAYSTONE) (75%) interbedded with SANDSTONE (25%), fine sand; laminated to very thinly bedded, beds dip ~70°,					in i				0×0			
356.18	342 343	$\cdot \setminus$	dark gray to brownish gray, very soft to soft, very slightly fractured to unfractured, at EL 359.5 ft incipient fracture dips 50°; weakly calcite cemented (predominantly Lean CLAY with SAND (CL) interbedded with little SILTY SAND (SM); very stiff to	C73		J	86	0				×0×0			
354.18	345	1	BEDINENTARY ROCK, 전화NDSTONE) (80%), fine to medium sand, interbedded with MUDSTONE/CLAYSTONE (20%), dominantly moderately to thinly bedded, minor laminated, moderately hard to very soft;, medium light gray to	C74			56	42	çi l			>X			
352.18	347	\ <u>``</u>	brownish gray, moderately fractured, below EL 353.3 ft fracture sets dip 20 and 70° and are totally healed with calcite; between EL 353.3 to 352.8 ft small scale faulting/slippage at truncated mudstone and sandstone beds; weakly to strongly calcite cemented (SILTY SAND (SM)).									XOX			
350.18 348.18	349		SEDIMENTARY ROCK, (MUDSTONE/CLAYSTONE/SILTSTONE) (85%) very thinly interbedded with SANDSTONE (15%), fine sand; also laminated mudstone (5 to 10 mm thick), beds dip -75°, very soft, at EL 350.1 ft calcite cemented	C75		1.	123	0	3	143		XOX	UW, EM		
346.18	351		laminations in siltstone (Lean CLAY with SAND (CL) interbedded with SILT (ML) and minor SILTY SAND (SM); very stiff to hard clay and silt (PP=3.0 to>4.5 SEDIMENTARY ROCK, (SANDSTONE) (50%), fine sand, thinly interbedded with laminated (MUDSTONE/CLAYSTONE) (50%), medium light gray									XOXO			
344.18	353 354	1	(MDDS) ONE/CLAYSTONE) (50%), medium light gray to brownish gray, very soft, unfractured, between EL 348 to 347.4 ft black coal seams and patches; uncemented to weakly cemented (SILTY SAND (SM) interbedded with Poorly graded SAND with SILT (SP-SM) and Lean CLAY with SAND (CL); very stiff to hard clay (PP=3.0 to>4.5 tsf)).	C76			120	33				>X	CR		
	355	4	(continued)							l d		IVI	1		
	_	_/	Department of Transportation Division of Engineering Services	D	EPOR BOR IST 07	ING		-	RD	ROU 710	TE 0	PO T/	STMILE T	R-09-Z3 EA 07-07-1879	
		1	Geotechnical Services Office of Geotechnical Design - South	11 3	ROJE SR-7 RIDG	10 7	run	NE	L T	ECHI EPAR	NICA ED BY It, M.		D.	ATE SHEET 5-7-09 12 of	1

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	Casilly Dept.	Remarks	
342.18	356		SEDIMENTARY ROCK, (SANDSTONE), fine sand, hard, intensely to moderately fractured, intensely weathered feldspar grains; strongly calcite cemented.	C76			120	33				X	See note at RQD	end of log regarding	
	357	∃. ÷′	SEDIMENTARY ROCK, (SANDSTONE) (80%), fine to medium sand, interbedded with									×			
340.18	358		MUDSTONE/SILTSTONE/CLAYSTONE (20%), moderately bedded to laminated, beds dip ~70°, medium light gray to brownish gray, very soft to soft,	C77			108	12				X			
	359	: .	unfractured, predominantly weakly to minor moderately calcite cemented (mostly Poorly graded SAND with												
338.18	360		SILT (SP-SM) interbedded with minor SILTY SAND (SM)).												
	361											\Diamond			
336.18	362	::					0.0					\Diamond			
	363	[]	SEDIMENTARY ROCK, (SANDSTONE) (85%), fine sand, interbedded with MUDSTONE/CLAYSTONE (15%), moderately bedded to very thinly bedded and	C78			98	84				\Diamond			
334.18	364	1//	laminated, beds dip ~65°, moderately soft to soft (soft to very soft below EL 331.1 ft), light brownish gray to brownish gray, intensely to moderately weathered,									\Diamond			
	365	()	Intensely to moderately fractured, unfractured above EL 335 ft, below EL 335 ft very thin (0.5 to 1 mm)									0			
332.18	366	· ·	totally calcite healed fractures dip 60°,40° & 25°; one continuous fracture dips 75° below EL 331.1 ft with moderately rough surface; predominantly strongly to									0			
	367		minor weakly călcite [cemented (little Poorly graded SAND with SILT (SP-SM))].	C79			100	48				\Diamond			
330.18	368	(:		0/9			100	40							
	369	?:	CEDIMENTA DV DOCK (MUDOTONE (OLAVOTONE)												
328.18	370	\·.	SEDIMENTARY ROCK, (MUDSTONE/CLAYSTONE) (50%) interbedded with SANDSTONE (50%), fine sand; moderately bedded to laminated, dominantly						6	119		×	EM		
	371	:\	moderately hard to moderately soft (minor soft above EL328.2 ft), light brownish gray to brownish gray, slightly fractured, incipient bedding plane fractures are						7	1,00		×			
326.18	372	1.5	clay lined, predominantly weakly to minor strongly calcite cemented (predominantly SILTY SAND (SM)).	C80			96	26				X			
	373		SEDIMENTARY ROCK, (SANDSTONE) (85%), fine sand, interbedded with MUDSTONE/CLAYSTONE (15%) moderately to think bedded (minor laminated)				93								
324.18	374	1	(15%), moderately to thinly bedded (minor laminated), irregular beds dip ~60 to 45°, light brownish gray to medium light gray, intensely to moderately weathered,									\Diamond			
	375	1	very soft to soft, very slightly fractured to unfractured, below EL 324 ft irregular black coal laminations are offset and show minor slippage (small scale faulting):									0			
322.18	376		offset and show minor slippage (small scale faulting); sporadic black coal/tar patches; predominantly weakly to minor moderately cemented (mostly Poorly graded SAND with SILT (SP-SM) grading to [SILTY SAND									\Diamond			
	377	1	(SM)). SEDIMENTARY ROCK, (CLAYSTONE) interbedded	C81			100	42				\Diamond			
320.18	378	1	with SANDSTONE, fine sand, laminated (8 mm thick), irregular beds dip ~40 to 60°, brownish gray to medium light gray, very soft, moderately fractured, incipient									0			
	379	1	bedding plane fracture dips 40° with slickensides rake angle 75° on fracture plane (small scale 5 to 10 mm									\Diamond			
318.18	380	/.	offsets of laminations and 1 to 2 mm thick coal seams, mostly dip-slip); slightly rough to smooth surfaces; weakly cemented (SILTY SAND [(SM))].												
	381	(3)	SEDIMENTARY ROCK, (SANDSTONE), fine sand, moderately bedded, light brownish gray to medium												
316.18	382	1.	light gray, intensely to moderately weathered, very soft to soft, unfractured, contains irregular mudstone seams (1 to 2 mm thick); predominantly weakly to	C82			100	6				0			
	383	1.	minor moderately calcite cemented (SILTY SAND (SM) grading to Poorly graded SAND with SILT (SP-SM)).									X			
314.18	384	4	SEDIMENTARY ROCK, (SANDSTONE) (65%), fine sand, interbedded with MUDSTONE/CLAYSTONE (35%), thinly bedded to laminated (20 to 5 mm thick),									X			
	385	1049	(continued)									M			
			Department of Transportation		EPOF BOR			СО	RD	Ы				R-09-Z3E	3
	L		Division of Engineering Services Geotechnical Services		IST. 07		LA	33		710		PO:	STMILE T	EA 07-07-18790	
			Office of Geotechnical Design - Sout						_	CH	NICA	LST	UDY		
			A server of the state of the state of		RIDG	E NUI	MBE	R			ED BY	Islar	n D	ATE SHEET 13 of	1

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION Jamble Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit weight (pcf)	Shear Strength (tsf)	Drilling Method	F F	Remarks	
312.18	385 386 387		beds dip ~70°, light brownish gray to medium light gray, intensely to moderately weathered, very soft to soft, irregular beds show ripple crosslaminations and possible bioturbation, above EL 319.6 ft mudstone laminations are truncated (possibly by soft sediment deformation, erosion, or slippage of soft beds); weakly	C82			100 98	6				0×0×0	See note at e RQD	nd of log regardi	ng
310.18	388	\``.	to moderately calcite cemented (Poorly graded [SAND with SILT (SP-SM))]. SEDIMENTARY ROCK, (MUDSTONE/SHALE) (50%) interbedded with SEDIMENTARY BRECCIA (35%) and SANDSTONE (15%), fine sand; breccia layers	003			90	20				× 0 × 0			
308.18	390	V.	with mudstone clasts and sand and mudstone matrix; laminated to thinly bedded, beds dip ~60 to 70°, brownish gray to light brownish gray, very soft to soft, moderately to slightly fractured, between EL 316.9 to 1316.1 ft laminations are truncated and offset 10-20 mm									X0X			
306.18	392		on small shears (healed with silica) which dip from 50 to 60° and show reverse movement; probable debris	C84			100	24				♦ × ♦	uc		
304.18	394	,	SEDIMENTARY ROCK, (MUDSTONE/SILTSTONE/CLAYSTONE) (65%) interbedded with SANDSTONE (35%), fine sand; laminated to moderately bedded, laminations dip ~55°, brownish gray to brownish black, moderately						5	136		(0 X 0)			
302.18	396		weathered, very soft to soft, moderately fractured, above EL 315.3 ft fractures dip 75 to 80° in sandstone and are partly healed with calcite and infilled with clay; below are incipient fractures on clay lined smooth bedding plane surfaces; bioturbated and ripple	C85			98	34				\ \ \ \ \ \ \			
300.18	398	\ . \ .	moderately calcite cemented (mostly Lean CLAY with SAND (CL) interbedded with SILT (ML) and Poorly graded SAND with SILT (SP-SM), hard clay and silt SEDIME TARY ROCK, (SANDSTONE) (90%), fine	000			90	34				$\Diamond X \Diamond X$			
298.18	400		sand, interbedded with MUDSTONE/CLÁYSTÓNE (10%), thinly bedded to laminated, beds dip ~50 to 70°, medium light gray to light brownish gray, very soft to soft, moderately fractured, fractures dip 40° with slickensides rake angle 40° on fracture surface, calcite									X 0 X			
296.18	402	5.1	and chlorite lined fractures - partly healed, sporadic trace black organic material below EL 311.9 ft, predominantly weakly to minor moderately calcite cemented (mostly Poorly [graded SAND with SILT (SP-SM) grading to SILTY SAND (SM))].					4				\Diamond			
294.18	404		SEDIMENTARY ROCK, (SANDSTONE) (60%), fine sand, interbedded with MUDSTONE (40%), beds dip ~60°, medium light gray to light brownish gray, very soft to soft, unfractured, between EL 308.1 to 307.7 ft is sporadic coal; flame structures in mudstone												
292.18	406		(depositional shear); weakly to minor moderately calcite cemented (mostly Poorly graded SAND with SILT (SP-SM)). SEDIMENTARY ROCK, (SANDSTONE) (90%), fine sand, interbedded with MUDSTONE/SILTSTONE.												
290.18	408		SEDIMENTARY ROCK, (SANDSTONE) (90%), fine sand, interbedded with MUDSTONE/SILTSTONE (10%), moderately bedded to laminated, beds dip ~70°, very soft to soft, unfractured, predominantly weakly to minor moderately calcite cemented (Poorly graded SAND with SILT (SP-SM) interbedded with minor silt (ML), hard silt (PP>4.5 tsf)).												
288.18	410		(MUDSTONE/CLAYSTONE/SILTSTONE) (60%) interbedded with SANDSTONE (40%), fine sand; thinly												
286.18	412		bedded (U.2 ft) to laminated (5 to 10 mm thick), beds dip ~65°, brownish gray to light brownish gray, moderately weathered, very soft to soft, slightly fractured, incipient fractures on bedding planes dip 65°, weakly cemented (mostly Lean CLAY with SAND (CL) interbedded with SILT (ML) and Poorly graded SAND with SILT (SP-SM); hard clay and slit (PP>4.5												
284.18		3	SEDIMENTARY ROCK, (SANDSTONE) (97%), fine sand, with trace MUDSTONE/CLAYSTONE laminations (3%); dominantly moderately bedded (0.5 fit thick) and minor laminations (1 to 2 mm), beds dip ~ 70 to 55°.												
			(continued)	ומ	EPOR	יוד ד	TE							THOLEID	
	Г	_/	Department of Transportation Division of Engineering Services Geotechnical Services	DI	SOR IST. D7	ING	RE OUN LA	ITY		ROU 71 (PO.	STMILE T	R-09-Z EA 07-07-18	
			Office of Geotechnical Design - South 1	1 5	ROJE SR-7 RIDGE	10 1	UN	NEI	PRE	CHI PARI	NICA ED BY It, M.		UDY DAT	E SHEE 7-09 14	



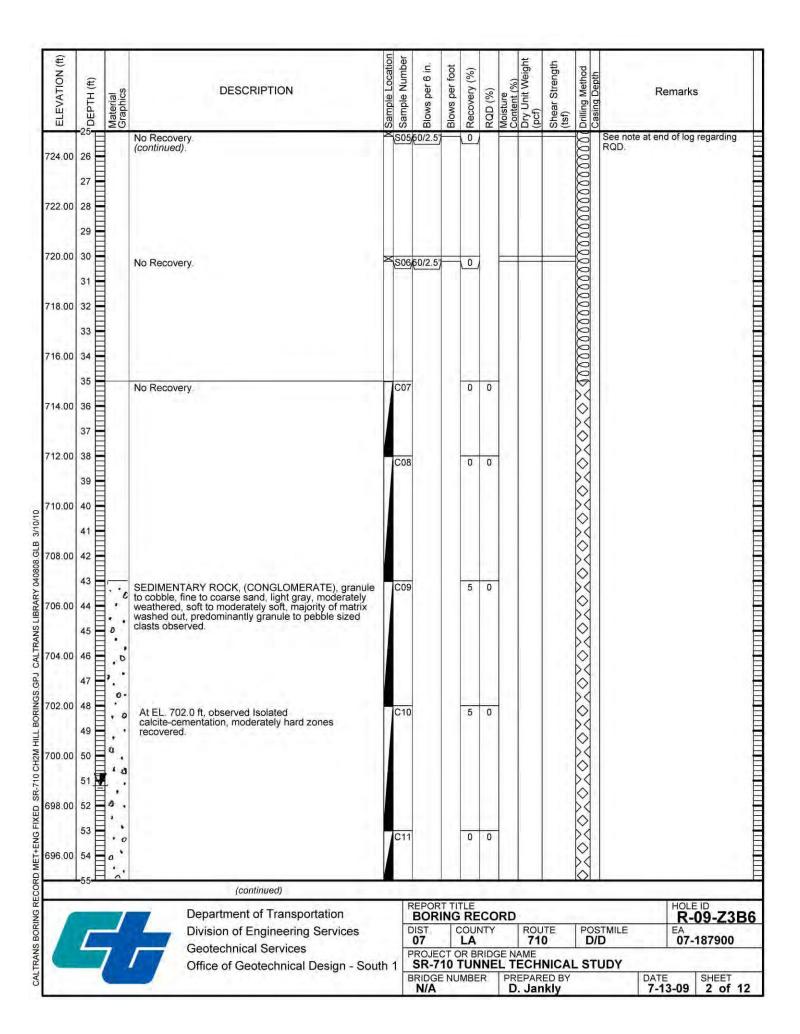
Geotechnical Services Office of Geotechnical Design - South 1

BORIN	G RECORD			R-09-Z3B5
DIST. 07	COUNTY LA	710	POSTMILE T/T	EA 07-07-187900
PROJECT	OR BRIDGE N	AME		

SR-710 TUNNEL TECHNICAL STUDY

• · · · · · · · · · · · · · · · · · · ·			
BRIDGE NUMBER	PREPARED BY	DATE	SHEET
	J. Pratt, M. Islam	5-7-09	15 of 15

M. To	orsi	ello	BEGIN 2-17-		3-11-09	ION DATE	BOREHO 34° 7' 3	31.558	8" / 1	18°	8' 5	4.6°	144	" N		tum)			-Z3B6 E ELEVATION
Casc	ade	Drilli	ng Inc.				'Lt S	ta (St							w/o S	R-11	10)	750.0 f	t NAVD 88
	ry V ER T	Vash YPE(S)	AND SIZE(S		3.2")		DRILL RIC Ingers SPT HAM Autom	OII Ra	/PE		40	lb. 3	0 ir	nch d	drop			6 in	LE DIAMETER EFFICIENCY, ER
			FILL AND CO				GROUND READING		DURI NM		RIL	LING			DRILLII ft on0	,	- 1	TOTAL DI 326.0 f	PTH OF BORING t
ELEVATION (ft)	рертн (#)	Material Graphics		D	ESCRIPTIC	ON		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 Deptn	Re	emarks
748.00 746.00	1 2 3 4	P 4 4	ASPHALT (CONCRET Poorly grad dry to moist [OLDER AL	E 6" thick ed SAND :; coarse t	(SP); very d	lark grayish AND; trace	ı brown; fines									\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	This in ac Soil and 2007 A.1 C Sum Tech Cou	ccordance value Rock Log Presentation (Presentation), except a coff the Final Rock Rock Rock Rock Rock Rock Rock Rock	cord was prepared with the Caltrans gging, Classification Manual (June, is noted in Append Geotechnical ort, SR-710 Tunnel y, Los Angeles rnia, dated April, 5'
744.00	5 6 7		SILTY SAN dry to moist SAND, 35%	:: 4% fine	nedium dens GRAVEL, 6 ² ticity fines.	se; very dar 1% predom	k brown; inantly fine	S01	4 5 6	11	100	_	6				PA VOC	C = 0.0 ppm	1
742.00	8 9															DODDODDOD			
	11		dark brown to fine SAN SEDIMENT decompose light gray, n	; 28% coa D, 16% lo ARY RO d (well-gr noist, trac	RAVEL (SM) arse to fine G by plasticity f CK, (SANDS aded SAND e fine gravel	FRAVEL, 56 fines. TONE), (SW); very , fine to coa	6% coarse dense.	S02	17 38 50/1"		92		8	128		MINTERIOR	PA VOC	C = 0.0 ppm	1
736.00	13 1 4 1 5		sand) [TO	PANGA F	ORMATION	1		Xeor	50/3"		. 17					DANDONDO	VOC	C = 0.0 ppm	
	16 17							303	<u>50/3</u>		(17)					0000000	Voc	7 = 0.0 ррп	'
	18 1 9 2 0 2 0		0					Xca	F0/2"		4=					0000000	Voc	> = 0.0 == :	
	21 =		Gray.					504	50/3"		<u> 17</u>					000000000000000000000000000000000000000	1000	C = 0.0 ppm	ı
726.00	23															000000			
	ZU				(continued))				T T'-									LIOLE ID
	_			Division	ment of Tra of Engine hnical Serv	ering Ser		I	REPOR BOR DIST. 07	ING	RE OUN LA	NTY		ROU 71		PO D	STMIL /D	E	HOLE ID R-09-Z3E EA 07-187900
					of Geotech		ign - Sou	th 1 📙	PROJE SR-7 BRIDGE N/A	<u> 10 T</u>	TUN	INE	L T I PRI	ECH	NICA ED BY	L ST	TUDY	DATE	SHEET 3-09 1 of 1



ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION		Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Remarks
694.00	56	0 . 0		C11			0	0			>X	See note at end of log regarding RQD.
692.00	58	0	At EL. 692.0 ft, becomes moderately to slightly weathered, soft to moderately hard. Matrix is fine to coarse grained sand. No visible structure. Granule to cobble sized clasts composed of hard to very hard intrusive rock (generally dioritic in nature), subangular	C12			30	0			XOX	V00 - 0.0 - 60-
690.00	60	. 0	to cobble sized clasts composed of hard to very hard intrusive rock (generally dioritic in nature), subangular to rounded.								\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	VOC = 0.0 ppm
688.00											0X0	
686.00		, ,		C13			7	0			X 0 X 0	
684.00											$\Diamond X \Diamond X$	
682.00	68	0.	At EL. 682.0 ft, becomes slightly weathered.	C14			18	13			XOX	
680.00	70 71	0.									X0X	
678.00	72 73										\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	
676.00	74 75	0.0									0X0	
674.00	76 77	, ,									\ \ \ \ \ \ \	
672.00	78 79	0.	At EL. 672.0 ft, becomes slightly weathered to fresh, clasts are hard.	C15			15	5			$\Diamond X \Diamond X$	VOC = 0.0 ppm
670.00	80	.0.									X 0 X	
668.00	82	0.									\ \ \ \	
666.00	84		(-246-200								$\Diamond \times \Diamond$	
			(continued)	D	EPOE	TTIT	TE	-				HOLEID
	_		Department of Transportation Division of Engineering Services Geotechnical Services	D	EPOR BOR IST. 07	C	LA	VTY	710)	PO D	HOLE ID R-09-Z3B STMILE EA 07-187900
			Office of Geotechnical Design - South	1 P	ROJE	CT 0	R BF	NF	E NAME L TECHI	NICA	LST	TUDY
			Since si Secretarina Designi South	В	RIDGI N/A	NUI	MBE	R	PREPARI D. Jan	ED BY		7-13-09 SHEET 3 of 1:

ELEVATION (ft)	^я DЕРТН (ft)	Material Graphics		Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%) Dry Unit Weight	(pct) Shear Strength (tsf)	Drilling Method	Casing Depth		marks	
664.00	86	9.		15			15	5			>×0×0		See note at end RQD.	of log regarding	
662.00			At EL. 662.0 ft, becomes medium gray.	16			8	3			×0×		VOC = 0.0 ppm		
660.00		0									0×0				
658.00	91 92	.0									× 0 × 0				
656.00		.0									0X0X				
654.00											0X0X				
652.00	97 98 99	0	C	:17			7	0			×0×0				
650.00		0.									\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\				
648.00		0.									0×0				
646.00	104										×0×0				
644.00		٥.									XOX				
642.00		. ,	At EL. 642.0 ft, with coarse grained sand matrix.	18			13	0			XOX		VOC = 0.0 ppm		
640.00	109 110										\$ X \$ X				
638.00	112	b .									(0×0)				
636.00	113	a	At EL. 636.0 ft, observed intersected clasts up to 3".	19			18	0			\0X0				
	110		(continued)							T					
	_	Department of Transportation Division of Engineering Services	DI	POR BOR ST.	C	RE OUN		R	OUTE 10	PC	OST D/D	IMILE	HOLE ID R-09-Z3E EA 07-187900	3	
	_	1	Geotechnical Services	PF	ROJE	CT O	R BF	RIDG	E NAME	1000				01-101000	_
			Office of Geotechnical Design - South 1	BF	RIDGE N/A				PREPA	RED BY		10	DATE 7-13	SHEET 4 of 1	-

ELEVATION (ft)	PDEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight	(pct) Shear Strength	(tsf) Drilling Method				
634.00		10.		C19			18	0			× 0 × 0		See note at end of RQD.	log regarding	
632.00	118	. 0	At EL. 632' to 627' Pressuremeter test.						e.		0 X Ø				
630.00	119										(
628.00	121	0.									× < × <				
326.00	123	.9		C20			0	0			0 X 0 X				
24.00	125	- 1		C21			0	0			\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\				
22.00	E	0	At EL. 622' to 617' Pressuremeter test.			94	_				\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\				
20.00	E	0.									\$X\$				
618.00	F	100									× < × <				
16.00	E	, ,	At EL. 617.0 ft, becomes greenish gray. At EL. 616.4 ft, observed incipient joint, dipping 0°.	C22			20	8			× 0 × 0		VOC = 0.0 ppm		
14.00	135										× 6×		100 с. о ррш		
12.00	E	0									\$ X \$ X				
10.00		Ū- ,									\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\				
08.00	141										\\ \\ \\ \\ \\				
606.00	143		At EL. 607.0 ft, observed slightly weathered, soft, incipient joint, dipping 70°, very hard clasts up to 8" intersected.	C23			47	13			× 0 × <				
	145	- /*	(continued)		Ħ					1		L			
	_		Department of Transportation Division of Engineering Services	D	BOR IST.	ING	RE OUN LA	ITY	R(OUTE 10		D/E	TMILE E	OLE ID R-09-Z3E 07-187900	16
		7	Geotechnical Services Office of Geotechnical Design - South	1 P	ROJE SR-7	CT 0	R BF	NEI	E NAMI	HNIC			YOL		
			- State Stat	BI	RIDGI N/A				PREPA	RED	BY		DATE 7-13-0	9 SHEET 5 of 1	2

ELEVATION (ft)	5 Ф Б Б Б Б Б Б Б Б Б Б Б Б Б Б Б Б Б Б	Material Graphics	DESCRIPTION	122	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight	Shear Strength (tsf)	Drilling Method	Casing	emarks
604.00		. 0		C23			47	13			OX	See note at ene RQD. VOC = 0.0 ppm	d of log regarding
602.00	147 148	0.	At EL. 602.0 ft, becomes medium gray, slightly weathered to fresh, very soft to soft.	C24			27	0	4		0X0X0X	VOC = 0.0 ppm	1
600.00	150										X0X		
598.00	152	01 .									0×0		
596.00	153 154 155		At EL. 597.0 ft, observed very soft matrix, clasts are very hard. Intact sand matrix up to 7" thick observed.	C25			45	12			0×0×		
594.00		, 0 									>×0×<	VOC = 0.0 ppm	
592.00				C26			45	17			>×0×<		
590.00	160	, , o	At EL. 590.0 ft, observed intact coarse grained sand matrix up to 5.5" thick, moderately soft. Very hard diorite clasts up to 5" observed.								×0×0	VOC = 0.0 ppm	i.
588.00	162	0											
586.00		0,0	At EL. 587.0 ft, becomes fresh, very soft, granule and pebble sized clasts within fine to medium grained sand matrix. At EL. 587' to 580' Pressuremeter test.								0×0×	VOC = 0.0 ppm	i.
584.00		0									X0X0		
582.00	Ε	0.									XOX		
580.00		0 . 0		C27			44	0			×0×0	VOC = 0.0 ppm	ı.
578.00	172		At EL. 579.0 ft, observed roughly 6 inches of reddish brown aphanitic igneous rocks.								0×0		
576.00	173	9.	At EL. 577.0 ft, observed greenish gray, slightly weathered to fresh, hard granule, pebble and cobble sized clasts within fine to coarse grained very soft sand matrix.	C28			67	7	11		>×0×0	PA VOC = 0.0 ppm	
	175		(continued)							Ü-	IV	4	
1	L		Department of Transportation Division of Engineering Services Geotechnical Services	Di (EPOR BOR IST. D7 ROJE	CTO	RE OUN LA	RIDG	RO 7'	0.45	<u>C</u>	DSTMILE D/D	HOLE ID R-09-Z3B EA 07-187900
			Office of Geotechnical Design - South	1 S	RIDGI N/A	10 1	UN	NE	PREPAR D. Ja	RED BY			3-09 SHEET 6 of 1

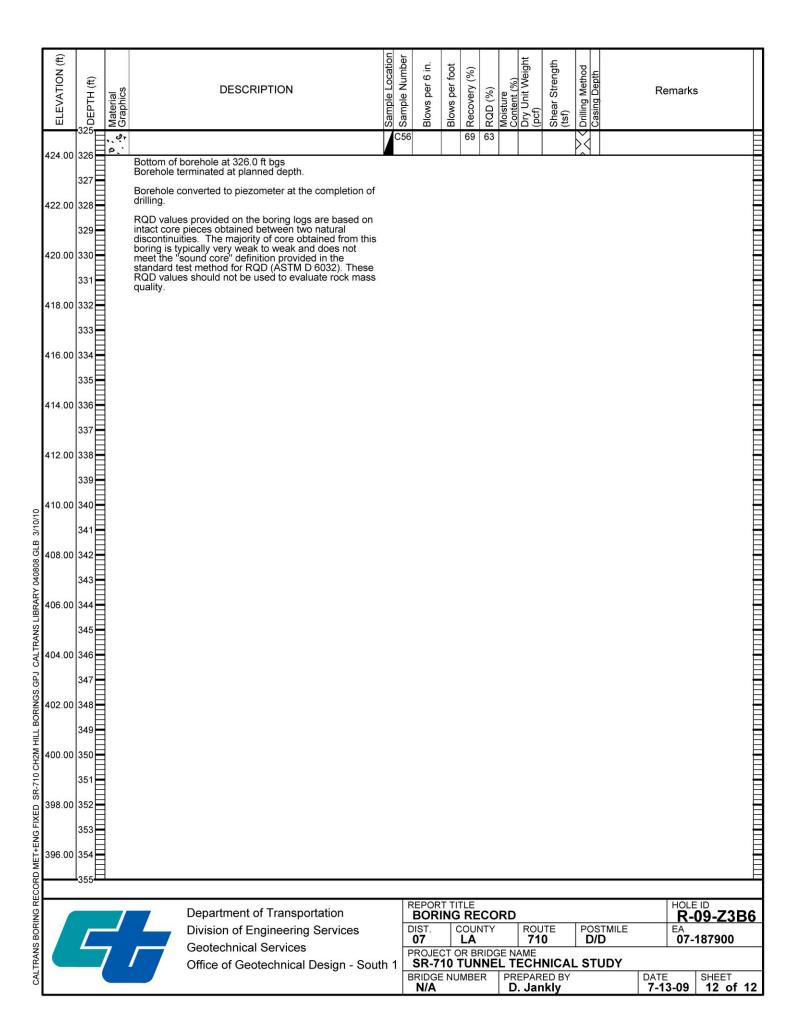
ELEVATION (ft)	SDEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing	marks
574.00	176		Very weak.	C28			67	7			××	See note at end RQD. PL	of log regarding
572.00	177 178 179	٠.	At EL. 572.0 ft, becomes light bluish gray to greenish gray, slightly weathered.	C29			30	12			X0X0X0	VOC = 0.0 ppm	or rog regarding
570.00 568.00	181										$\times \wedge \times \wedge \times$		
	183	, ,	At EL. 566.8 ft, observed joint, dipping 20°. At EL. 566.0 ft, becomes slightly weathered to fresh, intensely fractured, with pebble sized clasts, white,	C30			100	0			X \ \ \ \ \ \ \	VOC = 0.0 ppm	
564.00	E	0	intensely fractured, with pebble sized clasts, white, very hard, subangular. At EL. 565.5' to 557' Pressuremeter test.								$\times \Diamond \times \Diamond$		
562.00	187 188 189	1									\$X\$X\$		
560.00	E		At EL. 560.0 ft, observed abundant pebbles between EL. 560' to 559'. At EL. 559.0 ft, observed roughly 4" thick medium to								X0X		
558.00	192		coarse grained sandstone lens, greenish gray. At EL. 558.0 ft, observed some polished surfaces, possible gouge zone.								$\Diamond \times \Diamond \rangle$		
556.00	-		At EL. 557.0 ft, observed SANDSTONE bed, roughly 1' thick, medium-grained to granule, medium gray, slightly weathered, moderately fractured, bedding plane separation, dipping 30°, seven joints observed between EL. 557' to 555', dips range from 10 to 20 degrees.	C31			98	30			X0X0X		
554.00	196 197	<i>b</i> ,	At EL. 556.0 ft, becomes intensely fractured. At EL. 554.5 ft, observed joint, dipping 60 to 20°, three joints observed between EL. 554.5' to 554'. PTS - Quartz Diorite clast: Plutonic rock with allotriomorphic-granular texture. At EL. 554.0 ft, becomes poorly indurated								×0×0×	PTS CAI VOC = 0.0 ppm	
200	199	0.	conglomerate. At EL. 552.5 ft, observed incipient joint, dipping 60°, 1' thick coarse grained sandstone bed, easily friable. At EL. 552.0 ft, becomes massive, greenish gray, clasts up to 7" intersected. Very weak. At EL. 551.0 ft observed three rough to moderately	C32			100	29			$\times \Diamond \times \Diamond$	PL VOC = 0.0 ppm	
550.00 548.00	201		At EL. 551.0 ft, observed three rough to moderately rough joints observed between EL. 551.3' to 550.7'. At EL. 550.0 ft, observed numerous joints observed between EL. 550' to 548', dipping 0 degrees. At EL. 548.2 ft, observed random fracture, dipping	C33			78	0			×0×0		
-	203	0.	At EL. 547.0 ft, observed shear, dipping 75°, clay lined, slickensided. At EL. 546.9 ft, observed shear, dipping 75°.	C34		1	90	72			XOXOX	VOC = 0.0 ppm	
	205E	1/2	At EL. 545.5 ft, observed shear, dipping 50°. (continued)								\Diamond		
1	L	_/ 7	Department of Transportation Division of Engineering Services Geotechnical Services	D	EPOF BOR IST. 07 ROJE	CTO	RE OUN LA	RIDG	ROU 710 E NAME)	D	STMILE /D	HOLE ID R-09-Z3B6 EA 07-187900
			Office of Geotechnical Design - Sout	h 1	SR-7 RIDG N/A	10 1	TUN	NE	PREPARI D. Jan	ED BY	L ST		SHEET 7 of 12

	DEPTH (ft)	Material	DESCRIPTION	Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	(pcf)	Shear Strength (tsf)	Drilling Method	Re	emarks
544.00	205	∃ ; ;	At EL. 545.0 ft, becomes very thickly bedded,	C34	T		90	72				×	See note at end RQD. VOC = 0.0 ppm	d of log regarding
542.00	207	a '	At EL 543.7 ft, observed random fracture, dinning									0×0×0	VOC = 0.0 рргп	or log regarding
540.00	209 210 211	. .	Weak. At EL. 540.0 ft, observed joint, dipping 0°. At EL. 539.5 ft, observed incipient joint, dipping 0°.						4	146		X0X0X	UC, PL	
538.00	212		- At EL. 538.8 ft, observed joint, dipping 0°.									\ \ \		
536.00	213 214 215		At EL 535.6 ft becomes very thinly hedded bedding	C35			98	87				0000	V00 - 0.0	
534.00	E	0	joint, dipping 45°. At EL. 535.5 ft, observed joint, dipping 0°. At EL. 535.0 ft, becomes very thickly bedded, slightly weathered, light gray, coarse angular sand matrix. At EL. 534.5 ft, observed joint, dipping 0°. Very									\ \ \ \ \ \	VOC = 0.0 ppm	
532.00	218 219		At EL. 533.8 ft, observed joint, dipping 0°. At EL. 533.5 ft, observed joint, dipping 0°. At EL. 532.5 ft, observed joint, dipping 0°. At EL. 532.5 ft, observed joint, dipping 0°. At EL. 531.8 ft, observed joint, dipping 0°. At EL. 531.0 ft, observed joint, dipping 0°. Weak. At EL. 531.0 ft, observed 6" thick lens with medium						2	149		×0×0	UC	
530.00	220		grained sand matrix. At EL. 530.5 ft, observed joint, dipping 0°.									×		
528.00	221	÷.	At EL. 529.0 ft, becomes very weak, moderately soft, bedding joint, dipping 40°. At EL. 528.1 ft, observed joint, dipping 0°, At EL. 527.7 ft, observed joint, dipping 0°, . Very						3	142		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	UC, PL PL	
526.00			Week. 527.2 ft, observed joint, dipping 0°. At EL. 527.0 ft, observed granule to cobble sized clasts.	C36			57	13				X 0 X 0 X	VOC = 0.0 ppm	
524.00	E	→ .		C37			67	32				\ \ \ \	VOC = 0.0 ppm	
522.00		, , ,	At EL. 523.0 ft, observed bedding joint, dipping 35°, . Very weak to weak. At EL. 522.0 ft, observed Sandstone lens, light gray, fine to coarse grained, friable.					i	2	152	7.0	0×0×0	UC, PL	
520.00	230	0.	At EL. 519.5 ft, observed pebble to gravel sized clasts, subangular to angular, local slickensided	C38 C39			83 63	83				X 0 X	VOC = 0.0 ppm VOC = 0.1 ppm	
518.00	232		surfaces.	C4Ø			\19/	0 /				0×0		
516.00	233		SEDIMENTARY ROCK, (SANDSTONE), medium to coarse grained, angular, friable, possibly sheared.									\ \ \ \ \ \ \	VOC = 0.0 ppm	
	-235		(continued)	T F		T T								HOLETE
	Department of Transportation Division of Engineering Services Geotechnical Services		Division of Engineering Services	D	EPOR BOR IST. D7	ING	RE OUN LA	VTY		710 710	E	PO:	STMILE /D	R-09-Z3B6 EA 07-187900
			Office of Geotechnical Design - South	11 3		10 1	TUN	NE	L TE		D BY	ST	UDY DATE	SHEET 3-09 8 of 12

ELEVATION (ft)	SDEPTH (ft)	Material Graphics		Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	D Case	marks
514.00	236		(continued).	C40			19	0				× 6×	See note at end RQD.	l of log regarding
512.00												\$ \$ X \$		
10.00	240											♦ × ♦		
508.00		0 .	weathered to fresh, moderately hard, peoble sized	C41			100	0	şil.			\ \ \ \ \	VOC = 0.0 ppm	
606.00	244		At EL. 506.0 ft, observed random fracture, dipping 70°, dark gray slickensided surfaces.	C42			13	0				X0X0	VOC = 0.0 ppm	
504.00		1:										X0X0		
502.00	248	0	M A									X 0 X		
500.00	250											X0X		
198.00	252	./	At EL. 497.5 ft, observed joint, dipping 65°, slickensided.	C43			59	19	\$1			X0X		
196.00	254	1	At EL. 495.7 ft, observed calcite veins. At EL. 495.7 ft, observed joint, dipping 70°, slickensided. Weak.									\ \ \ \	PL VOC = 0.0 ppm	
194.00	256 257) ·	AATI 403.7 ff absorted inint display 0°	C44			\50/	32				$\Diamond \times \Diamond$	SD, PL	
192.00	258	. 0	Weak to medium strong.						2	154		$\Diamond \times \Diamond$	PTS UC VOC = 0.0 ppm	
190.00	260 261		7.4 EE. 43 1.2 It, observed joint, dipping o									X0X0		
188.00	262	, o,		C45		3	0	0				>X		
486.00	264		(continued)									\ \ \ \		-4
	7-		Department of Transportation Division of Engineering Services	DI	EPOR BOR	ING	RE			ROU	TE	PO	STMILE	HOLE ID R-09-Z3E
		7	Geotechnical Services Office of Geotechnical Design - South 1	PI	07 ROJE SR-7	CT 0 10 T	R BF	RIDG	E NA L TE	710 ME CHI	NICAL	D	D UDY	07-187900
			In some of depotent or had to be a market.	BI	RIDGE N/A	NUI	MBE	R	PRE D.	PARI Jan	ED BY		7-1:	3-09 SHEET 9 of 1

ELEVATION (ft)	% 05 05 05 05 05 05 05 05 05 05 05 05 05	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	
484.00	266	۰, ۴	(continued).	C45			0	0				Š	See note at end of log regarding RQD.
482.00	267	,/	At EL. 483.0 ft, becomes slightly weathered, Clasts are 1/2" to 1" dia., diorite pebbles, very hard, some slickensided surfaces. At EL. 482.0 ft, observed joint, dipping 70°, slickensided. At EL. 481.9 ft, observed Intersected 6" clast.	C46			32	10				000000	VOC = 0.0 ppm
480.00	270	2 .										\Diamond	
478.00	271	0.		C47			27	0				X0X0	
476.00	273	0	SEDIMENTARY ROCK, (SANDSTONE), dark bluish gray, moderately soft, fine to medium grained, subangular to angular, poorly cemented.									OXOX<	VOC = 0,0 ppm
474.00	276											\Diamond	
472.00	277	. o	At EL. 473.0 ft, observed Sandstone as above with few diorite derived pebbles. SEDIMENTARY ROCK, (CONGLOMERATE), pebble sized clasts within sand matrix.	C48			38	0				XOXOX	VOC = 0.2 ppm
470.00	279 280 281	٥	At EL. 471.4 ft, observed bedding joint, dipping 35°.									X0X0	
468.00 466.00	282	1	At EL. 468.0 ft, observed joint, dipping 35°. At EL. 467.8 ft, observed joint, dipping 70°, Well cemented, fine grained matrix. At EL. 467.0 ft, observed decreased cementation, moderately soft. At EL. 466.0 ft, observed Intersected 4" clast. Very	C49			45	19				×0×0×0	VOC = 0.0 ppm PL
464.00		0	weak.									\$X\$X\$	
462.00	288	9 .	SEDIMENTARY ROCK, (SANDSTONE), soft, fine to medium grained, poorly cemented. At EL. 462.3 ft, observed some angular to subangular pebbles.	C50			20	0				0X0X	VOC = 0.0 ppm
460.00	290											X 0 X	
458.00	292		At EL. 458.0 ft, becomes moderately soft, joint, dipping 75°, slickensided.	C51			15	0				XOXO	VOC = 0.0 ppm
456.00	294	o/.										× ×	
	295E	1, 0	(continued)										
	L	_/ 7	Department of Transportation Division of Engineering Services Geotechnical Services	D P	EPOR BOR IST. 07 ROJE	CTO	RE OUN LA	RIDG	E NA	ROU 710	TE)	D/	
	- 1		Office of Geotechnical Design - South	В	RIDGI N/A				PRI		ED BY	_ 31	DATE SHEET 7-13-09 10 of 12

ELEVATION (ft)	05 05 05 05 05 05 05 05 05 05 05 05 05 0	Material Graphics	DESCRIPTION	Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%) Dry Unit Weight	(pcf) Shear Strength	(tsf)	Casing Denth		marks
454.00		0 .		C51			15	0			><	>	RQD.	of log regarding
452.00	297 298 299	. 0	SHEAR ZONE AT El. 453' to El. 424' At EL. 452.8 ft, becomes massive, bluish gray, moderately to slightly weathered, extremely weak, very soft to soft, mostly fine to medium sand. Little fine to coarse, angular gravel. Little fines.	C52			46	24	6			10000	PL PA	
450.00	300		At EL. 450.0 ft, observed sheared and friable bedrock.						o .		\ \ \	2000	VOC = 0.0 ppm	
448.00		, o										222		
446.00	303 304 305	,	At EL. 446.3 ft, observed bedding joint, dipping 20°, Sandstone, white with black minerals, appears decomposed due to shearing.	C53			100	87	12		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	\ \ \	VOC = 0.4 ppm	
444.00	306 307		At EL. 444.0 ft, observed joint, dipping 77°, slickensided.									2222		
	309	:	At EL. 442.0 ft, observed joint, dipping 80°, Unit is friable, highly sheared, black gouge within joints. At EL. 441.0 ft, observed bedding joint, dipping 25°.	C54			100	48	SII .			NVV		
438.00	311	1:0	At EL. 439.0 ft, observed bedding joint, dipping 25°, Unit is sheared, continuing from El. 453'. At EL. 438.0 ft, becomes very soft and friable, pebbles within sandstone are decomposed and easily								2	20000	VOC = 0.2 ppm	
436.00	313 314 315	1	friable, numerous slickensided surfaces. At EL. 437.0 ft, becomes moderately to slightly weathered, soft, sandstone to siltstone, numerous near vertical slickensided surfaces 80 to 90 degree AFEL. 435.5 ft, observed bedding joint, dipping 25°, Local 3/8" thick beds of sandstone and siltstone.	C55			100	72			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	2222		
434.00		1.	At EL. 434.8 ft, observed Possibly decomposed diorite, very dark gray. Numerous gray, clay lined slickensided surfaces which are friable.								<	<	VOC = 0.6 ppm	s i
432.00	317 318 319	. 0	At EL. 433.0 ft, observed joint, dipping 40°, Likely continuation of shear zone from El. 453'. At EL. 432.8 ft, observed joint, dipping 10°. At EL. 432.5 ft, observed joint. At EL. 432.0 ft, observed Sandstone with some pebbles, gray to dark gray, friable, numerous	C56			69	63			2	2222		
430.00	=		slickensided surfaces. At EL. 431.0 ft, becomes moderately soft.								><>	2		
428.00		o	At EL. 429.0 ft, observed bedding joint, dipping 30°, Likely continuation of shear zone from El. 453'. At EL. 428.5 ft, becomes soft.								P	200	VOC = 0.9 ppm	
426.00	323	 o .									V V V	222		
	325		(continued)											
1	L	_/ 7	Department of Transportation Division of Engineering Services Geotechnical Services	D	EPOR BOR IST. D7 ROJE	ING CT O	RE OUN LA	RIDG	R E NAM	ОUТЕ 710		D/		HOLE ID R-09-Z3B6 EA 07-187900
			Office of Geotechnical Design - South	В	RIDGI N/A			_	PREP D. J	ARED ankly	BY	51	DATE 7-1:	SHEET 11 of 12



A. Ts	_	/J. P	ratt 1-29-09 2-20-09	186618	80.3 f	t /	651	034	1.9	ft N	IAC	83	and Dat	um)	R-09-Z3B7
	NG CC rans			BOREHOI												SURFACE ELEVATION 596.7 ft NAVD88
DRILLI	NG ME)	DRILL RIC												BOREHOLE DIAMETER 3.7 in
SAMPL	ER TY	PE(S		SPT HAM	MER			40	ll.	20 ·		انم				HAMMER EFFICIENCY, ERI
BORE	HOLE E	BACK			WATE						AF	TER	DRILLIN			87% TE) TOTAL DEPTH OF BORING
	omet	er In	stalled on Completion	READING	-		NM	I					t on 7	'-9 ⊤	- 09	326.0 ft
ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION		Sample Location		Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
594.69 592.69	1 2 3 4		SILTY SAND with GRAVEL (SM); brown; moi GRAVEL; (Alluvium).	ist; few	DO	01			100						ii 8	This Boring Record was prepared n accordance with the Caltrans Soil & Rock Logging, Classification deresentation Manual (June, 2007), except as noted in Appendi A.1 of the Final Geotechnical Summary Report, SR-710 Tunnel Fechnical Study, Los Angeles County, California, dated April, 2010.
590.69	5 6 7		COBBLES AND BOULDERS. Well-graded SAND with GRAVEL (SW); very light gray; coarse gravel (up to 2 in. diameter) hard granitic rock fragments.	dense;), fresh	\/sc	02	12 21	56			7			XXXXXXXXX		
588.69	8 9	. 9 99 99 00	COBBLES AND BOULDERS cobbles intersellengths up to 9 in. diameter.	cted core	Co	03	35		0					MANANA		
586.69 584.69	11				Co	04			20					<u> </u>		
582.69	13 14 15													ANNA		
580.69	16 17		Poorly graded SAND (SP); dense; light gray; \rounded coarse sand. SANDY SILT (ML); light brown; contains 10% hard granitic rock fragments.	•	/ Sc		14 11 11	22						MANNAN		
578.69	19		nais grando rook nagments.		C	06								MANANA		
576.69 574.69	21		SILTY, CLAYEY SAND (SC-SM); very dense brown to yellowish brown; moist; mostly fine \$; light SAND.	00	07			48		13	123		MANANAM		JW, PA
572.69	23													MANAMANA		
	20		(continued)			Dr	DOD	T T'								LIOLEID
		_/ 7	Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design	vices	th 1	DI: 0	POR BORI ST. 7 ROJEG	ING	RECOUNT	RIDG	E N	ROU 71 AME ECH	TE D NICAI	Ľ	T/T	HOLE ID R-09-Z3E MILE EA 07-07-18790
			Chice of Geolechnical Design	gii - 300	ur I		RIDGE				PR	EPAR	ED BY			DATE SHEET

ELEVATION (ft)	DEPTH (ft)	Material	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	Cashig Deput	Remarks
570.69	26		SILTY, CLAYEY SAND (SC-SM) (continued).	S08	24	46						M		
568.69	27		SANDY SILT (ML); light brown to yellowish brown; low plasticity fines.	Cos	9									
	29													
564.69	31		SANDY lean CLAY (CL); yellowish orange; low plasticity fines; estimated hard to very stiff.	O10	0		48		14	120		000000000000	UW	
562.69	33 34			C1 ⁻	1							000		
CALIKANS BOKING RECORD METERS ASSESSED AND SECOND METERS ASSESSED ASSESSED AND ASSESSED ASSES	35 36			\/\S12		31						000000000	PI, PA	
558.69	1 8		Lean CLAY (CL); yellowish brown; moist; low plasticity fines; contains 10% cobbles (up to 4 in. diameter).	C1:	13 18		100							
556.69	39													
554.69	42		SILTY SAND (SM); very dense; yellowish brown to light brown; fine SAND; nonplastic fines.	O14	1		68		16	117		000000	UW	
552.69	44 45			C18	5							000000		
550.69 550.69				S16	6 9 16 40	56						000000		
첫 548.69 표	48		CLAYEY SAND (SC); medium plasticity fines; interbedded with Sandy Clay, contains few gravel.	C17								<u> </u>		
546.69	50 51		SANDY SILT (ML); some medium to fine SAND;	O18	3		48		14	121		00000000	UW, PA	
544.69 544.69	52 53		mostly fines.				70			121		0000000		
542.69	54 55		/= = - tim - = - 1	C19	9							0000		
X N			(continued)		REPO	RT TI	TLE							HOLE ID
SBORING	L		Department of Transportation Division of Engineering Services Geotechnical Services		BOI DIST. 07	RING	RECOUNT	VTY		ROU 71 (PO: T/	STMILE T	R-09-Z3B7 EA 07-07-187900
CALIKAN			Office of Geotechnical Design - Sout	h 1 📙	SR-	710 EE NU	TUN	INE	L TE	ECH EPAR	NICAI ED BY It, A. I			TE SHEET 8-09 2 of 12

ELEVATION (ft)	DEPTH (#)		Material Graphics	DESCRIPTION	Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Remarks
540.69	56		000	Poorly graded GRAVEL with SAND (GP); very dense; light gray; contains cobbles (decomposed), angular gravel (up to 3 in. length).	C19 /S20							MAN	See note at end of log regarding RQD. PA PI, PA
538.69	57 58			CLAYEY SAND (SC); very dense; yellowish brown. SILTY SAND (SM); yellowish brown; moist; trace Gravel and Cobbles (elongated).	C21	50/4"	7-					000000	
536.69	59 60			SEDIMENTARY ROCK, (SANDSTONE (65%), fine sand, interbedded with MUDSTONE/SILTSTONE (33%) and SHALE/SANDY CLAYSTONE (2%); thinly to moderately bedded (0.1 to 0.5 ft), beds dip ~40 to 35°, moderate yellowish brown to dark yellowish orange, moderately weathered, unfractured, very soft	C22			100	0			designation of	See note at end of log regarding RQD.
534.69				to soft (minor moderately soft interbeds); FeO stain on bedding planes; weakly calcite and possible feldspar cemented to uncemented (few moderately	S23	18 50/3"		100	0	15		0×4000	PA
532.69	63 64 65			interbeds); (mostly Poorly graded SAND (SP) and [SILTY SAND (SM) interbedded with some SILT (ML) and SANDY Lean CLAY (CL); mostly very dense sand and some very stiff to hard silt and clay (PP=4.0 tsf) [TOPANGA FORMATION]								XOX	
530.69	66 67				S25	21 50/5"		78	0			\$X\$X\$	
528.69	68 69		<u>/</u>		020			, ,				\$X\$X\$	
526.69	70 71				/S27	17	65			15		X0X0	
524.69	72 73				C28	27 38		91	0	14		X0X	PI, PA
522.69	74 75											×0×0	
520.69	76 77			SEDIMENTARY ROCK, (MUDSTONE/CLAYSTONE) (75%) interbedded with SANDSTONE (25%), fine to coarse sand; thinly to moderately bedded (0.2 to 0.5 ft thick), medium dark gray to light gray, intensely weathered, predominantly very soft to soft (minor	S29 C30	50/4"		84	0			\$X\$X	
518.69	78 79		1	weathered, pledofiniantly very soft to soft (finition moderately hard); unfractured; weakly cemented (minor moderately to strongly calcite cemented); below EL 516 ft pale brown (mostly Lean CLAY with SAND (CL) interbedded with little Poorly graded SAND (SP) grading to [SILTY SAND (SM); very stiff to hard clay								(0×0)	
516.69	81		1	(PP=4.0 to >4.5 tsf) interbedded with very dense sand)].	C31	10	10	90	14			0X0	
514.69	82 83 84			SEDIMENTARY ROCK, (MUDSTONE/CLAYSTONE/SILTSTONE), contains few to little gravel (composed of calcite cemented sandstone rock fragments), medium gray, very soft to soft, burrow mottled; (SANDY Lean CLAY (CL) to SILT								>>>>>	
	00			(continued)									
			_/	Department of Transportation Division of Engineering Services	-	BOR BOR IST. 07	NG	RE OUN	_	RD ROU		POS T/	HOLE ID R-09-Z3B STMILE EA 07-07-187900
	_	7	7	Geotechnical Services	F	ROJE	сто	R BF		ENAME	Sec.		
-		1	1	Office of Geotechnical Design - South		SR-7				PREPAR		- 21	DATE SHEET

ELEVATION (ft)	SDEPTH (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		Remarks	
510.69	86		(ML); very stiff to hard clay and silt (PP=4.0 to >4.5 SEDIMENTARY ROCK, (SANDSTONE), fine to medium sand, pale brown, moderately hard, intensely fractured, very thin (0.5 to 1 mm thick) totally calcite lealed fractures dip 65°; strongly calcite cemented.	C31			100	24				× 0 ×	See note a RQD. UW	at end of log regardi	ng
508.69	88	1	SEDIMENTARY ROCK, (MUDSTONE/CLAYSTONE/SILTSTONE) (80%) interbedded with SANDSTONE (20%), fine sand; thinly bedded, dark yellowish brown to brownish gray, very soft to soft unfractured. (mostly SANDY Lean CLAY									X0X			
506.69			(CL) interbedded with little SILTY SAND (SM) grading to Poorly graded SAND (SP); hard clay (PP>4.5 tsf). (continued). SEDIMENTARY ROCK, (SANDSTONE), fine to						9	134		0%0			
504.69	91 92 93		medium sand, thinly to moderately bedded, dark yellowish brown, mostly very soft to little hard (below EL 509 ft); intensely fractured; below EL 508.4 ft closely spaced totally calcite healed fractures dip 65°; mostly weakly to little strongly calcite cemented (mostly Poorly graded SAND (SP)).	C33			100	36				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			
502.69			SEDIMENTARY ROCK, (MUDSTONE/CLAYSTONE/SILTSTONE), thinly bedded, brownish gray, very soft to soft, unfractured, (mostly Lean CLAY with SAND (CL) interbedded with SANDY SILT (ML); very stiff clay and silt (PP=4.0 tsf)).									000			
500.69			SEDIMENTARY ROCK, (SANDSTONE) (70%), fine sand, interbedded with CLAYSTONE/SILTSTONE (30%), thinly to moderately interbedded (0.2 to 0.5 ft thick), beds dip 40°, medium light gray to brownish gray, slightly weathered, moderately fractured,	C34			100	54	7	134		>X \ \ \	UW, PA		
498.69		\ .	dominantly very soft to soft (minor moderately soft sandstone intervals); moderately fractured; moderately spaced (0.3 to 0.6 ft) incipient bedding plane fractures are clay lined and dip ~40°; at EL 504.2 ft are lenticular beds; some moderately to some [weakly cemented sandstone (some Poorly graded SAND with									0%0%			
496.69	100		SILT (SP-SM) interbedded with some SANDY Fat CLAY (CH) and SANDY SILT (ML); very stiff to hard clay and silt (PP=3.0 to >4.5 tsf))]. SEDIMENTARY ROCK, (SANDSTONE), fine sand;	-								X 0 X			
494.69	102 103		mostly moderately to little thickly bedded (0.3 to 1.5 ft lthick), beds dip ~50°, light gray to medium light gray, moderately soft and very soft; mostly unfractured, lintensely fractured between EL 498.5 ft to 498.2 - fractures dip 80° and slickensides 50° rake; below EL 495.6 ft fractures dip 65° totally calcite healed [mostly]	C35			100	38				X0X0			
492.69	104 105		strongly to moderately calcite cemented, some weakly cemented between EL 498.2 to 495.5 ft (some Poorly graded SAND with SILT (SP-SM))]. SEDIMENTARY ROCK, (SANDSTONE) (80%), fine sand, moderately interbedded with									X0X			
490.69	106 107		MUDSTONE/CLAYSTONE/SILTSTONE (20%), beds dip 40 to 50°, medium light gray to brownish gray, mostly very soft (some hard); unfractured; smooth waxy clay lined bedding plane surfaces; mostly weakly to some strongly cemented sandstone (mostly Poorly graded SAND with SILT (SP-SM) interbedded with	C36		*	100	50				000			
488.69	108	1.	SANDY Fat CLAY (CH) and SANDY SILT (ML); hard clay [and silt (PP>4.5 tsf))]. SEDIMENTARY ROCK, (PEAT/COAL); black; organic,					9				>>			
486.69	110 111		very soft. SEDIMENTARY ROCK, (MUDSTONE/CLAYEY SILTSTONE) (65%) interbedded with SANDSTONE (35%), fine sand; moderately bedded (1.0 to 0.3 ft) to laminated (5 mm), brownish gray to medium light gray, very soft to soft, some moderately hard and	C37			100	44	, a			>X			
484.69	112 113		moderately soft; unfractured; below EL 487.7 ft penecontemporaneous faulting (soft sediment deformation) in laminated section (high sedimentation rates); (some SILT (ML) interbedded with little Poorly graded SAND with SILT (SP-SM) [; some hard silt				16.0					× 6×<			
482.69	114		(PP>4.5 tsf))]. SEDIMENTARY ROCK, (SANDSTONE), fine sand, moderately bedded, medium light gray, moderately hard.									200			
	.,,,,,		(continued)												
	_		Department of Transportation Division of Engineering Services	D	EPOF BOR IST. 07	ING	RE		RD	ROU 71	TE.	POS T/	STMILE	R-09-Z	E 1.40
	_	7	Geotechnical Services Office of Geotechnical Design - South	P	ROJE	CTC	R BE TUN	RIDG NE	E N/	AME	NICA			07-07-18	7 900
		V	The state of the state of a state of	В	RIDG	E NU	MBE	R			ED BY tt, A .	Meh		DATE SHEE 5-8-09 4 o	T f 12

ELEVATION (ft)	DEPTH (ft)	1-2-4-00	Material Graphics	DESCRIPTION -	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Barbara Barbara	Remarks	
		Ĭ,		to hard, unfractured, strongly calcite cemented. SEDIMENTARY ROCK, (SANDSTONE) (80%),	C37			100	44				X	See note a	at end of log regarding	
480.69	116	= (medium to fine sand, interbedded with MUDSTONE/CLAYSTONE/SILTSTONE (20%),	C38			100	52				\Diamond	UW, PA		E
	117	= '	/	moderately to thinly interbedded (0.5 to 0.1 ft thick).									X			E
470.00	440	-	1	beds dip ~40 to 50°, medium light gray to brownish gray, very soft to soft, some moderately soft; very									X			F
478.69	110	Ξ,	1	slightly fractured to unfractured; between EL 483.8 to 481.5 ft rare bedding plane fractures calcite lined;									\Diamond			E
	119	=,		above EL 484.2 ft bioturbated, some weakly to some strongly calcite cemented sandstone (some Poorly graded SAND with [SILT (SP-SM) interbedded with									~			E
476.69	120	=		ISILTY SAND (SM) and little SANDY Fat CLAY (CH)									X			E
		Ξ.	1	and SANDY SILT (ML); very stiff clay and silt (PP=4.0						6	136		\Diamond			E
	121	7		SEDIMENTARY ROCK, (MUDSTONE/SANDY CLAYSTONE/SILTSTONE) (70%) thinly to moderately I	C39			100	54				8			E
74.69	122	į,	1 '	(0.2 to 0.6ft) interbedded with SANDSTONE (30%), fine to medium sand, brownish gray to medium light									Š			E
	123	=,		gray, mostly soft to some very soft; unfractured to slightly fractured; dominantly weakly to moderately									\Diamond			Ė
70.00		Ξ.	4	cemented sand (some SANDY Lean CLAY (CL)									8			E
72.69	124			interbedded with SILT (ML) and little Poorly graded									Š			Ē
	125	= .	1	SEDIMENTARY ROCK, (SANDSTONE) (85%), medium to fine sand, interbedded with									\Diamond			E
70.69	126			MUDSTONE/CLAYEY SILTSTONE (15%), dominantly moderately to thinly bedded (1.0 to 0.1 ft thick), minor	0.70			100					0			Ė
77.07.4		=1		laminated, beds dip ~40 to 50°, medium light gray to brownish gray, mostly soft to moderately soft	C40			100	22				><			E
	127	='	.;.	sandstone; mudstone very soft to soft; very slightly fractured to unfractured; possible incipient clay lined												Ē
68.69	128	÷	1	fractures dip 80° with faint slickensides; above EL									0			-
	129	= :	;;	473.6 ft lenticular bedding; weakly to moderately calcite [cemented (some SILTY SAND (SM) and Poorly graded SAND with SILT (SP-SM) interbedded									><			
40.34		Ξ,	1	with few SILT (ML); very stiff to hard silt (PP=3.5 to												E
66.69	130	₽,	10	SEDIMENTARY ROCK, (SANDSTONE) (80%), fine to medium sand, interbedded with									0			Ē
	131	3		MUDSTONE/CLAYSTONE/CLAYEY SILTSTONE (20%), thinly bedded (0.1 to 0.3 ft), beds dip ~40°,	C41			98	28							E
164.69	132	= ;	•	medium light gray to brownish gray, mostly very soft (little moderately hard); unfractured; bioturbated and				30								E
04.00	102	٥.		possible ball and pillow structures; mostly weakly to									0			E
	133	=>	(7)	little strongly cemented (mostly SILTY SAND (SM) and Poorly graded SAND with SILT (SP-SM) interbedded with few SANDY Lean CLAY [(CL) and SILT (ML);									><			Ē
62.69	134	Ŧ		hard clay and silt (PP>4.5 tsf)). SEDIMENTARY ROCK, (SANDSTONE) (95%), fine to												E
	135	Ξ,		coarse, interbedded with MUDSTONE/CLAYSTONE									0			E
		= '	1:	(5%), thinly to moderately bedded (0.2 to 0.8 ft), few laminations and irregular seams (3 to 8 mm thick),												Ē
60.69	136	₹.		medium light gray to brownish gray, mostly very soft to some moderately soft to moderately hard; moderately	C42			100	54				\Diamond			Ē
	137	=,	١.	to slightly fractured; moderately fractured between EL 463.5 to 462.5 ft with totally calcite healed continuous					7				\Diamond			E
58.69	138	≣`	··	fractures dip 60°; below EL 460.7 ft fractures dip 60° and 20 to 30° [and generally moderately fractured;												Ē
00.00	100	≣`:	V	mostly weakly to some strongly calcite cemented (mostly Poorly graded SAND with SILT (SP-SM)									X			Ē
	139	Ξζ,	1	grading to SILTY SAND (SM) interbedded with few Lean CLAY with SAND (CL); hard clay (PP>4.5 tsf))].									\Diamond			Ē
56.69	140	-		SEDIMENTARY ROCK (MUDSTONE/CLAYEY												E
	141	₫,		SILTSTONE/CLAYSTONE) thinly interbedded with SANDSTONE, very soft, uncemented sandstone				,					X			Ē
5.578		∃,	1	(mostly SILT (ML) interbedded with Fat CLAY (CH) and some SILTY SAND (SM); hard silt and clay	C43			100	50				\Diamond	UU		E
54.69	142	=(1.	(PP>4.5 tsf)).									2			
	143		1	SEDIMENTARY ROCK, (SANDSTONE) (92%), fine to medium sand, interbedded with									Š			-
52.69	144		61	MUDSTONE/CLAYSTONE; dominantly moderately bedded, beds dip ~40°, medium light gray to brownish									0			
52.55		=;		gray, moderately hard to very soft; intensely to moderately fractured; between EL 455.3 to 454.2 ft 60					4	4	144		0			
	145		- 1	(continued)									1 1			
				Department of Transportation		EPOF BOR			co	BD					R-09-Z3	D7
	-			Division of Engineering Services	D	IST.		NUO		יעט	ROU			STMILE	EA	
	L	7		Geotechnical Services		07 ROJE		LA R BE	SIDO	E N	710	0	T/	T	07-07-1879	00
		/	1	Office of Geotechnical Design - South	1 3	SR-7	10	ΓUN	NE	LT	ECH	NICA	LST			
		1			В	RIDG	E NU	MBE	R			ED BY	Meh		5-8-09 SHEET 5-8-09	

ELEVATION (ft)	SDEPTH (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		Remarks	
450.69		X	to 70° dip clay lined fractures and between EL 453.9 to 453.3 ft 60 to 70° clay lined and 20 to 30° unlined fractures, (minor unfractured above EL 455.3 ft [and between EL 454.2 to 453.9 ft); some strongly to some weakly calcite cemented (some Poorly graded SAND	C43			90	50				XOX	See note RQD.	at end of log regarding)
448.69	147		(SP) and SILTY SAND (SM) interbedded with few SANDY Lean CLAY (CL); hard clay (PP>4.5 tsf))]. SEDIMENTARY ROCK, (SANDSTONE) (85%), fine to medium sand, interbedded with									0×0			
446.69	149 150	j	MUDSTONE/CLAYSTONE (15%); dominantly moderately bedded to minor thickly bedded (0.4 to 1.5 ft), medium light gray to brownish gray, very weak, mostly moderately hard to moderately soft (little very soft mudstone); slightly fractured above EL 451.8 ft									>>			
444.69	151 152		with incipient clay lined fractures; unfractured below; bioturbated below EL 450 ft; mostly moderately to some weakly calcite cemented (some [Poorly graded SAND with SILT (SP-SM)) and SILTY SAND (SM) interbedded with little Lean CLAY with SAND (CL);	C45			98	76				XOX			
442.69	153 154		hard clay (PP>4.5 tsf))]. (continued). SEDIMENTARY ROCK, (SANDSTONE), fine to medium sand, moderately bedded (0.3 to 0.9 ft), medium light gray, mostly moderately soft (very soft									\$ X \$ X	EM, UC		
440.69	155 156	• /.	below EL 446.7 ft); moderately fractured; above EL 447.9 ft fractures dip 85° and are moderately thin (2 mm thick) and not healed (clay lined); unfractured below; mostly moderately to little weakly cemented (little Poorly [graded SAND (SP)]).	C46			100	80	5	142		000			
438.69	157 158		SEDIMENTARY ROCK, (SANDSTONE) (95%), fine to medium sand, interbedded with MUDSTONE/SILTSTONE (5%), thickly to moderately bedded (2.5 to 0.3 ft), minor thin wavey bedding below	540			,00	30				2000			
36.69	159	2.1	EL 443 ft, medium light gray to brownish gray, slightly weathered, mostly moderately hard to hard, little very soft; moderately fractured above EL 443 ft, unfractured below; mostly strongly to little weakly calcite cemented (little Poorly graded SAND (SP)).									XOX			
434.69	161 162		SEDIMENTARY ROCK, (SANDSTONE) (95%), fine to medium sand, interbedded with MUDSTONE/CLAYSTONE (5%), moderately bedded to minor laminated, medium light gray to brownish gray, very weak, moderately hard above EL 438.5 ft,	C47			100	10				\$ \$ \$ \$ \$			
432.69	163 164	· . '	soft below; moderately fractured above EL 439.5 ft; between EL 441.5 to 441 ft discontinuous fracture dips 70° with 15° rake angle for slickensides; incipient fractures dip 60 to 55° between EL 441 to 439.5 ft; [unfractured below; moderately to strongly calcite cemented above EL 438 ft, little weakly cemented									X0X0			
430.69	165 166	\ \	sand interbeds (little Poorly graded SAND (SP))]. SEDIMENTARY ROCK, (SANDSTONE) (98%), fine to medium sand, interbedded with MUDSTONE/CLAYSTONE (2%), thinly to moderately bedded (minor laminated), beds dip ~40 to 50°,	C48			100	36				000			
428.69	167 168		medium light gray to medium gray, intensely weathered, mostly soft to very soft (few to little moderately hard); unfractured; mostly weakly to few to little strongly calcite cemented (mostly Poorly graded SAND with SILT (SP-SM) grading to SILTY SAND					3				0×0×			
426.69	169 170		MENTARY ROCK, (SANDSTONE) (92%), fine to medium sand, interbedded with MUDSTONE/SILTSTONE (8%), moderately to thinly bedded, minor laminated (1 mm), beds dip ~40 to 50°, medium light gray to brownish gray, intensely to									2000			
424.69	171 172	/	moderately weathered, mostly moderately soft to very soft (little moderately hard); moderately to slightly fractured; incipient very thin clay lined fractures above EL 429.6 ft; continuous fracture with rough surface dips 60° between 427.1 to 426.8 ft; @ EL 425.6 ft	C49		9	100	54				>X \ \ \			
422.69	173 174		rough [fracture dips 40° with raised ridges rake 10°; incipient clay lined fractures dip 70° (EL 425 to 423 ft); mostly moderately to weakly cemented (little strongly cemented); (some Poorly graded SAND with SILT (SP-SM))].						6	138		X0X	EM, UC		
	175	Sie	(continued)						(E)			$ \lozenge $			
		-	Department of Transportation		EPOF BOR			CO	RD					HOLE ID R-09-Z3	B7
	Γ		Division of Engineering Services	D	IST. 07	C	LA	ITY		71	TE 0	POS T/	TMILE	EA 07-07-1879	C. Carrie
		7	Geotechnical Services Office of Geotechnical Design - South		ROJE SR-7	CT 0	R BF	NEI	EN	AME ECH	NICA	LST	UDY		
					RIDG	-			PR	EPAR	ED BY			5-8-09 SHEET 6 of	12

ELEVATION (ft)	SDEPTH (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	Rema	arks	
420.69	176		(continued).	C49			100	54				X	See note at end of RQD.	log regarding	
		X	OFFINENTARY ROOK (PRECOM) - W	C50			100	44							
418.69	177 178 179	1/2	SEDIMENTARY ROCK, (BRECCIA) with mudstone matrix interbedded with SANDSTONE, fine sand, thinly bedded to laminated, contains soft sandstone clasts, brownish gray to light gray, extremely weak, mostly very soft breccia and some hard sandstone interbeds; intensely fractured; sandstone between EL 419.3 to									X0X0	1		
416.69			418.9 ft with continuous fractures dip 80° closely spaced and slickensides 40° rake; breccia may possibly represent debris flow; mostly strongly [to weakly cemented (some SILTY SAND (SM) to Poorly graded SAND (SP))].									0×0			
414.69	182		SEDIMENTARY ROCK, (SANDSTONE) (98%), fine to medium sand, interbedded with CLAYSTONE (2%), moderately to thinly bedded, minor irregular laminations, medium light gray to brownish gray, mostly moderately hard to little very soft; moderately	C51			96	58				0×0			
412.69			fractured; incipient clay lined fractures dip 75 to 80°; mostly moderately to little weakly cemented (little SILTY SAND (SM) interbedded with trace Fat CLAY (CH); hard clay (PP>4.5 tsf)).									×0×			
410.69	-	V	SEDIMENTARY ROCK, (SANDSTONE) (95%), fine to medium sand, interbedded with MUDSTONE/CLAYSTONE (5%) with soft sandstone clasts, thinly to thickly (0.1 to 2.0 ft) bedded, medium light gray to brownish gray, mostly moderately hard to some very soft; very slightly fractured to unfractured; irregular subvertical claystone seams are closely to	C52			100	0	7	135		0000	UU		
408.69	188 189		moderately spaced; mostly moderately to some weakly cemented (some Poorly graded SAND with SILT (SP-SM) interbedded with [few Lean CLAY with SAND (CL), hard clay (PP>4.5 tsf))].									×0×			
406.69	-		SEDIMENTARY ROCK, (SANDSTONE) (95%), fine to medium sand, interbedded with MUDSTONE (5%), thinly to moderately bedded, medium gray to medium light gray, very weak, soft to moderately soft, little very soft; moderately thin to thin claystone seams (1 to	C54			100	0				X0X0			
404.69			4 mm) dip 60 to 70°, and 20°, mostly moderately to little weakly calcite cemented (little Poorly graded SAND with SILT (SP-SM). SEDIMENTARY ROCK, (SANDSTONE), fine to medium sand, light gray, intensely weathered, very									0×0			
402.69	194		soft, no claystone seams; uncemented (Poorly graded SAND with SILT (SP-SM) grading to SILTY SAND ***DMENTARY ROCK, (SANDSTONE) (95%), fine to medium sand, interbedded with MUDSTONE/CLAYSTONE (5%), thinly to moderately				0					\$X\$X			
400.69		: · · ·	bedded (minor laminations), light gray to brownish gray, very soft, contains thin claystone seams; mostly weakly cemented to uncemented, few moderately cemented; *between EL 407 to 402.5 ft rotten seaweed or rotten egg odor (mostly SILTY SAND (SM)	C55			6	0				×0×			F
398.69			interbedded with Poorly graded SAND with SILT (SP-SM) and few Lean CLAY [with SAND (CL); very stiff to hard clay (PP=2.75 to >4.5 tsf))].									XOX			
396.69															
394.69	201 202		SEDIMENTARY ROCK, (SANDSTONE) (95%), fine to medium sand, interbedded with MUDSTONE/SILTSTONE (5%), thinly to moderately bedded, minor very thinly bedded (15 to 20 mm, beds dip add? medium light cray to greenish black models.	C56			90	40				0×0			
392.69	203 204		dip ~40°, medium light gray to greenish black, mostly very soft to little moderately hard; unfractured above EL 393.2 ft, slightly fractured below; @ EL 393.1 ft discontinuous fracture dips 85°; @ EL 391.5 ft fractures dip 50° with slickensides 40° rake angle; mostly weakly to moderately calcite [cemented, little	C57			100	20				X0X0			
	205	14.	strongly cemented (continued))-		1~1	4		
	Γ	_/	Department of Transportation Division of Engineering Services Geotechnical Services	D	EPOR BOR IST.	ING	RE OUN LA	1TY		ROU 71		PO:	STMILE E	OLE ID R-09-Z3E 07-07-18790	
			Office of Geotechnical Design - South	11 3	ROJE SR-7 RIDGI	10 1	TUN	NE	L TI	ECH EPAR	NICA ED BY It, A.		DATE	SHEET 7 of 1	12

ELEVATION (ft)	SDEPTH (ft)	Material Graphics	DESCRIPTION	-	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method		Remarks	
390.69	206		(mostly Poorly graded SAND with SILT (SP-SM) interbedded with SILTY SAND (SM) and few SILT (ML); PP>4.5 tsf))].	C57			100					×<	See note at e RQD. EM, UC	nd of log regarding	
388.69	207	``	(continued). SEDIMENTARY ROCK, (SANDSTONE) (95%), fine to coarse sand, interbedded with MUDSTONE/CLAYSTONE (5%), thinly to moderately bedded, medium light gray to brownish gray, extremely weak, mostly moderately soft to little very soft;	C59			100	15	6	138		\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\			
386.69	209		unfractured; little sandstone above EL 390.7 ft is uncemented, mostly strongly calcite cemented below (little Poorly graded SAND with SILT (SP-SM) and few SANDY Lean CLAY (CL); hard clay (PP>4.5 tsf)). SEDIMENTARY ROCK, (SANDSTONE), fine to coarse	C60			89	9				>>>>			
384.69	211		sand, light gray, intensely weathered, very soft, unfractured, weakly calcite cemented to uncemented; *between EL 388 to 387.5 ft smells like rotten eggs (SILTY SAND (SM) grading to Poorly graded SAND with SILT (SP-SM)).									X0X			
382.69	213		SEDIMENTARY ROCK, (SANDSTONE), fine to medium sand, light gray, soft to moderately soft, unfractured, mostly moderately to few strongly calcite cemented.									♦ × ♦			
380.69	215		SEDIMENTARY ROCK, (SANDSTONE), fine to medium sand; moderately to thickly bedded, beds dip ~35 to 40°, light gray to medium light gray, very soft to soft, unfractured above EL 380.9 ft, intensely fractured below, mostly uncemented to weakly calcite cemented above EL 380.9 ft, some moderately to weakly	C61			100	0				X0X0X			
378.69	217		cemented between EL 383.9 to 383.5 ft and below EL 380.9 ft (mostly Poorly graded SAND with SILT (SP-SM) [interbedded with SILTY SAND (SM))]. SEDIMENTARY ROCK, (SANDSTONE) (95%), fine to				1101								
376.69	219	×	medium sand, interbedded with MUDSTONE/CLAYSTONE (5%), moderately to thinly bedded, minor clay lamination and seams (3 to 5 mm), beds dip 40°, medium light gray to brownish gray, mostly moderately soft to moderately hard (some very	C62			100	60					UW, PL		
374.69	221	_	soft); moderately to slightly fractured, incipient bedding fractures and claystone seams dip 75 to 90° above EL 378.1 ft and between EL 376.1 to 375.8 ft; @ EL 376.6 ft [slickensides on clay lined bedding planes with rake langle 80 to 90°; mostly strongly to moderately calcite cemented (some weakly cemented)].	C63			100	47	1	148		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			
372.69		Σ.	SEDIMENTARY ROCK, (SANDSTONE) (55%), fine sand, interbedded with MUDSTONE/SILTSTONE/CLAYSTONE (45%), thinly bedded to laminated, beds dip 40°, convoluted bedding below EL 374.6 ft, medium light gray to	C64			100	60	111			\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\			
370.69			brownish gray, very soft to soft, very slightly fractured to unfractured, irregular claystone seams/incipient fractures (1 to 5 mm thick) dip 50 to 60°; sporadically bioturbated; few soft sandstone clasts at base of unit; moderately to weakly calcite cemented (little Poorly graded SAND with SILT (SP-SM) interbedded with little									0 X 0 X			
368.69			ISANDY Lean CLAY (CL) and SILT (ML); hard clay ●型分析性内下条件 特別CK, (SANDSTONE) (80%), fine sand, interbedded with MUDSTONE/SILTSTONE (20%), thinly bedded to laminated (0.1 to 0.3 ft, 5 to 1	C65			86	71				× 0 × 0			
366.69			mm), medium light gray to brownish gray, very soft to soft, moderately to slightly fractured, incipient fractures clay lined and subparallel to bedding planes; sandstone mostly moderately to weakly cemented; uncemented below EL 369.5 ft (SILTY SAND (SM)).									X0XC	- No.		
364.69		//	SEDIMENTARY ROCK, (SANDSTONE) (90%), fine to coarse sand, interbedded with MUDSTONE/SILTSTONE/CLAYSTONE (10%), thinly to moderately bedded, minor laminations, beds dip ~40°, medium light gray to brownish gray, intensely	C66			98	62	6	143		0×0	EM, UC		
362.69		\	weathered, extremely weak, soft to very soft above EL 365.7 ft, moderately hard to moderately soft below; moderately to slightly fractured, incipient fractures (claystone seams) dip 40 to 80° and increase below EL 363.5 ft; mostly moderately to little weakly									♦			
	200-	11 Ti	cemented (continued)												
1	7		Department of Transportation Division of Engineering Services	D	EPOR BOR IST.	ING	RE			ROU			STMILE	R-09-Z3	
	L	7	Geotechnical Services	PI)7 ROJE	СТО	R BF	RIDG	E NA	710 ME		T/	Τ	07-07-1879	00
			Office of Geotechnical Design - South		RIDGI	_			PRE	PARE	ED BY		DA	TE SHEET 8-09 8 of	40

ELEVATION (ft)	SDEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	-	emarks	
360.69	236		above [EL 365.7 ft, moderately to strongly calcite cemented below (little SILTY SAND (SM) interbedded with few SILT (ML) and Lean CLAY with SAND (CL); hard silt and clay (PP>4.5 tsf))].	C66			98	62				× < ×	See note at en	d of log regardi	ng
358.69		0.	SEDIMENTARY ROCK, (SANDSTONE) (95%), fine to coarse sand, interbedded with MUDSTONE/CLAYSTONE (5%), moderately to thinly bedded (1 to 0.1 ft), minor laminated, beds dip ~40°, medium light gray to brownish gray, intensely weathered, mostly moderately hard, few claystone									(0X0)			
356.69		i.	laminations very soft; very slightly fractured to unfractured, incipient fractures (claystone seams) dip 60°; contains a cobble (6 in. diameter) below EL 361.7 ft (subrounded hard granitic rock fragment); [mostly moderately to strongly calcite cemented, some weakly									0×0			
354.69	242		cemented (some Poorly graded SAND with SILT (SP-SM) interbedded with few Lean CLAY with SAND (CL), hard clay)]. (continued).	C68			94	60	4	147		>> <	EM, UC		
352.69	243 244 245	/	SEDIMENTARY ROCK, (SANDSTONE) (90%), fine to coarse sand, interbedded with MUDSTONE/CLAYSTONE (10%), thinly bedded (50 to 60 mm), beds dip ~40°, contains a cobble (10 in diameter) and coarse gravel below EL 354.3 ft, light gray to brownish gray, very weak, moderately soft to moderately bard slightly fractured to unfractured.									0000			
350.69		1	moderately hard, slightly fractured to unfractured; @ EL 356.9 ft incipient bedding plane fracture dips 40°, slickenside rake 30°; @ EL 357.2 ft penecontemporaneous faulting (soft sediment deformation) with minor offset [subrounded hard quartz diorite rock fragments; mostly moderately to	C69			100 97	47				>> \			
348.69	248		some strongly calcite cemented]. SEDIMENTARY ROCK, (SANDSTONE) (90%), fine to medium, interbedded with MUDSTONE/CLAYSTONE (10%), thinly to moderately bedded, minor laminated, beds dip ~50°, light gray to brownish gray, intensely					11				× 0 × 0			
346.69	250	```	weathered, mostly moderately soft to little moderately hard above EL 350.1 ft, very soft to moderately soft below; very slightly fractured to unfractured; incipient fractures dip 60 to 70°; penecontemporaneous faulting (soft sediment deformation) between EL 350.7 to	C71			100	40				\$ \$ \$ \$ \$	UU, CR		
344.69	E	(j)	[350.1 ft, moderately to strongly calcite cemented above EL 350.1 ft, moderately to weakly cemented below (below EL 350.1 ft, some SILTY SAND (SM) interbedded with Lean CLAY with SAND (CL); hard	C72			97	50	5	145		♦ × ♦			
342.69	253 254 255		SEDIMENTA 時限OCK, (SANDSTONE) (90%), fine to medium sand, interbedded with MUDSTONE/SILTSTONE (10%), contains a boulder (35%, 14 in. diameter) below EL 345.7 ft, thinly to moderately bedded, light gray to brownish gray, very weak, mostly very soft to some moderately hard;					E				X0X0X			
340.69	256 257		unfractured; subrounded very soft decomposed quartz diorite rock fragment (weathered to clays, medium ldark gray); mostly weakly to some strongly calcite icemented (mostly Poorly graded SAND with SILT (SP-SM) [interbedded with SILT (ML))].	C73			98	36				0×0			
338.69	258 259		SEDIMENTARY ROCK. (SANDSTONE) (90%), fine to medium sand, interbedded with MUDSTONE/SILTSTONE (10%), thinly to moderately bedded, medium gray to brownish gray, mostly very soft above EL 342.2 ft, moderately hard below; unfractured; mignactured of EL 341.1 ft; mostly weakly.									X 0 X 0			
336.69	260 261		unfractured; minor oil/tar @ EL 341.1 ft; mostly weakly calcite cemented above EL 342.2 ft, strongly to moderately calcite cemented below (above EL 342.2 ft mostly Poorly graded SAND with SILT ((SP-SM) grading to SILTY SAND (SM) interbedded with few SILT (ML); hard silt (PP>4.5 tsf))].	C74		2	100	74	4	144		X 0 X			
334.69	262		SEDIMENTARY ROCK, (SANDSTONE) (92%), fine to coarse sand, interbedded with MUDSTONE/SILTSTONE (8%); moderately to thinly bedded 0.2 to 1.0 ft), minor laminated; beds dip ~50°, light brownish gray to medium light gray, mostly very				2.5					X0X	PTS, EM, PL, U	JC	
332.69	264		soft to some moderately hard; unfractured; weakly to moderately calcite cemented (little strongly cemented); (mostly Well graded SAND with SILT (SW-SM) interbedded with few SILT (ML); hard silt (PP>4.5 tsf)).									♦ × ♦			
			(continued)	TE	EDOS	7 71	rir							LHOLETS	
1	_	_/	Department of Transportation Division of Engineering Services	D	EPOR BOR IST.	ING			RD	ROU 71	ITE O	POS T/	STMILE T	R-09-Z EA 07-07-18	
	_	7	Geotechnical Services Office of Geotechnical Design - South	1 P	ROJE SR-7	10 T	R BE	NE	L TI	AME ECH	NICA		UDY		
				B	RIDG	E NU	MBE	K			ED BY	Meh	razar 5-8	-09 SHEE	f 12

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	R	emarks
330.69	265		SEDIMENTARY ROCK, (SANDSTONE) (92%), fine to coarse sand, interbedded with MUDSTONE/SILTSTONE (8%), moderately to thinly	C74			100	74				×<	See note at en RQD.	d of log regarding
328:69	267 268		bedded, minor laminated (2 mm), beds dip ~40°, light brownish gray to medium light gray, very weak, mostly moderately hard to hard, little very soft; very slightly fractured to unfractured; @ 331.3 ft bioturbated beds, mostly strongly to moderately calcite cemented, little weakly cemented (little Well graded SAND with SILT (SW-SM) interbedded with few [SILT (ML); hard silt	C75		11	90	23				>		
	269	46	(PP>4.5 tsf))]. -{(continued)	C77			93	0			16	\Diamond		
326.69	271		SEDIMENTARY ROCK, (SANDSTONE) (92%), fine to medium sand, interbedded with MUDSTONE/SILTSTONE (8%), moderately to thinly bedded (0.7 to 0.1 ft), beds dip ~40°, light gray to				30	O.				× × ×		
324.69	272	74	brownish gray, very soft to moderately soft interbeds; unfractured; weakly to moderately cemented (mostly SILTY SAND (SM) grading to Poorly graded SAND				pose.				15	× ×		
322.69	E	<u>\</u>	with SILT (SP-SM) interbedded with few SILT (ML)). SEDIMENTARY ROCK, (SANDSTONE) (92%), medium to coarse sand, interbedded with MUDSTONE/SILTSTONE (8%), thinly to moderately bedded, light gray to brownish gray, very soft, unfractured, bioturbated below EL 324.7 ft; mostly	C78			100	59				>X		
	275	(A)	weakly to little moderately cemented (mostly Poorly graded SAND with SILT (SP-SM) interbedded with few SILT (ML); hard silt (PP>4.5 tsf)).									×<		
320.69	276	Õ.	SEDIMENTARY ROCK, (SANDSTONE) (96%), fine to medium sand, interbedded with MUDSTONE/SILTSTONE (4%); moderately bedded	C79			100	74				\$X\$		
318.69	278 279	0:0	(0.3 to 0.5 ft), minor laminations and irregular seams, beds dip 30 to 40°, medium light gray to brownish gray, moderately soft to very soft; very slightly fractured to unfractured; between EL 324.1 to 323.8 ft									× 0 ×		
316.69			incipient clay lined fractures (irregular seams) dip 70 to 80°; mostly moderately to weakly calcite cemented (some Poorly graded SAND with SILT (SP-SM) (interbedded with SILT (ML); hard silt (PP>4.5 tsf))].									0×0		
314.69	281 282 283	9.0	SEDIMENTARY ROCK, Boulder/Cobble (CONGLOMERATE); contains 14 to 10 in. diameter boulders and cobbles, medium gray, unfractured, subrounded moderately soft to moderately hard (intensely to moderately weathered) quartz diorite rock fragments; no matrix apparent.	C80			98	44	7	147		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	EM, PL, UC	
312.69			SEDIMENTARY ROCK, (SANDSTONE) (95%), medium sand, interbedded with MUDSTONE/SILTSTONE (5%), thin siltstone seams, medium gray to brownish gray, soft, unfractured, mostly moderately to little strongly cemented.									×0×0		
310.69			SEDIMENTARY ROCK, Gravel (CONGLOMERATE) with mudstone matrix, medium gray to brownish gray, soft, unfractured, rounded soft intensely weathered medium sandstone clasts in a soft mudstone/siltstone	C81			100	38				× 6 ×		
308.69	287	(T)	matrix, probable depositional conglomerate. SEDIMENTARY ROCK, (SANDSTONE) (95%), medium to fine sand, interbedded with MUDSTONE/SILTSTONE (5%), contains a thin (0.2 ft thick) Gravel CONGLOMERATE layer below EL 315.9									0×0		
306.69	289	!	ft, thinly to moderately bedded, beds dip ~35 to 50°, medium gray to brownish gray, intensely weathered, extremely weak, mostly moderately soft to moderately hard, little very soft; unfractured; gravel conglomerate									XOX		
	291	火火	has a medium sandstone matrix; contains few laminations; mostly moderately to little strongly calcite cemented, little uncemented to weakly cemented (little [Poorly graded SAND with SILT (SP-SM) interbedded with few SILT (ML); hard silt (PP>4.5 tsf))].	C82			100	50	5	142		0×0	υυ	
304.69 302.69	293	^	SEDIMENTARY ROCK, Cobble (CONGLOMERATE), contains 7 in. diameter cobbles, no matrix apparent, very light gray, contains subangular to subrounded hard (slightly weathered) to moderately hard (intensely weathered) quartz diorite rock fragments; unfractured;									$\langle \diamond \times \diamond \rangle$		
002.09	295	1	upper cobble is slightly foliated; uncernented SECONTENTARY ROCK, (SANDSTONE) (96%), fine to									\ \ \		
			(continued)	R	EPOF	T TI	TLE		1/2-					HOLE ID
	1		Department of Transportation Division of Engineering Services	E	BOR	ING			-	ROUTE	E	POS	STMILE	R-09-Z3B
	L	7	Geotechnical Services	(7 ROJE		LA	33		710		Ť		07-07-187900
			Office of Geotechnical Design - South	1 3		10	run	NE	L TE	PARE		. ST	UDY DATE	E SHEET

ELEVATION (#)	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	Barbara Barbara	Remarks	
300.69	295	≣	medium sand, interbedded with MUDSTONE/CLAYSTONE (4%), dominantly thinly to moderately bedded (30 to 110 mm), minor laminated	C82			100	50				X	See note a RQD.	at end of log reg	arding
300.69 298.69	297	0,0	(1 to 7 mm), beds dip ~30 to 50°, very light gray to brownish gray, moderately soft, intensely to moderately fractured, closely to moderately spaced incipient fractures (claystone seams) cross each other, moderately to weakly calcite cemented (some Poorly graded SAND with SILT (SP-SM) interbedded with trace Lean CLAY with SAND (CL); hard clay (PP>4.5	C83			98	32				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			
296.69	300	30.0.	SHDIMENTARY ROCK, Boulder (CONGLOMERATE), boulder 22 in. diameter, (may be just singular boulder isolated in sandstone above and below), subrounded soft (intensely weathered) quartz diorite rock fragment.									OXO)			
294.69			SEDIMENTARY ROCK, (SANDSTONE) (96%), fine to coarse sand, interbedded with MUDSTONE/CLAYSTONE (4%), moderately to thinly bedded, beds dip ~40 to 55°, medium light gray to brownish gray, very weak, mostly moderately soft to some very soft, little moderately hard; intensely to	C84			100	32				×0×0			
292.69			moderately fractured; incipient clay lined fractures (mudstone seams) dip from 40 to 75° and cross each other; mostly moderately to some weakly calcite cemented, little [strongly cemented (some Well graded SAND with SILT (SW-SM) interbedded with trace Lean									>XOX			
290.69	305 306		CLAY with SAND (CL); hard clay (PP>4.5 tsf))]. SEDIMENTARY ROCK, Coarse Gravel and Cobble (CONGLOMERATE) (50%) thinly to moderately interbedded with (SANDSTONE) (50%), cobbles (4 in. diameter) and gravel (2 in. diameter), fine sand,	C85			98	32	S.			XOX			
288.69	307 308		medium light gray, very soft to moderately soft sandstone; cobbles and gravel are composed of subrounded moderately hard (intensely weathered) quartz diorite rock fragments; weakly to moderately cemented (some cobbles and gravel interbedded with									X0X0			
286.69		<i>7.</i>	few Poorly graded SAND with [SILT (SP-SM))]. SEDIMENTARY ROCK, (SANDSTONE) (85%), fine to coarse sand, interbedded with MUDSTONE/CLAYSTONE (7%) and Coarse Gravel CONGLOMERATE (8%, below EL 296.3 ft), thinly to												
284.69		Υ. <u>(</u>	moderately bedded, medium light gray to brownish gray, intensely weathered, soft to very soft; unfractured; coarse gravel composed of moderately hard quartz diorite rock fragments; trace thin shelled pelecypod (clam) debris (composed of high Mg calcite	C86			94	36				0×0			
282.69	1	4.0	or aragonite-fizzes vigorously with HCL) is scattered between EL 298.9 to [296.3 ft; mostly moderately to weakly cemented, little strongly cemented (Well graded SAND with SILT (SW-SM) interbedded with few Poorly graded Gravel (GP) and few Lean CLAY									>X \ \			
280.69			with SAND (CL); hard clay (PP>4.5 tsf))]. SEDIMENTARY ROCK, (SANDSTONE) (92%), fine sand, interbedded with MUDSTONE/SILTSTONE (8%); thinly bedded to laminated, medium light gray to brownish gray, very soft to soft, unfractured, contains	C87			98	38	777			XOX			
278.69			irregular thin siltstone laminations; mostly weakly to some moderately cemented (mostly Poorly graded SAND with SILT (SP-SM) interbedded with few SILT (ML), very stiff to hard silt (PP=3.75 to >4.5 tsf)). SEDIMENTARY ROCK, (SANDSTONE), medium									XOXO			
276.69			sand, thinly to moderately bedded, medium light gray, vuggy, mostly moderately hard to little very soft; unfractured; mostly strongly to little weakly calcite cemented, pelecypod shell debris below EL 292.7 ft (little Poorly graded SAND with SILT (SP-SM)).									0×0			
274.69		\	SEDIMENTARY ROCK, (SANDSTONE) (96%), fine to medium sand, interbedded with MUDSTONE/CLAYSTONE (4%), moderately to thinly bedded, beds dip 45 to 55°, medium light gray to brownish gray, vuggy, very soft to soft, unfractured;	C88		5	100	78	3	150		0×0	EM, UC		
272.69	323 324		pelecypod debris @ EL 288.8 ft; weakly to moderately calcite cemented (mostly Poorly graded SAND with SILT (SP-SM) interbedded with trace Lean CLAY with SAND (CL); hard clay (PP>4.5 tsf)). SEDIMENTARY ROCK, (SANDSTONE) (96%),									000			
	325	1 42	(continued)									LVI			
		1	Department of Transportation	- 10	BOR	ING	RE	_	RD						-Z3B7
	L	=	Division of Engineering Services Geotechnical Services		07		LA	31		71	0	POS T/	T T	07-07-	187900
			Office of Geotechnical Design - South		ROJE SR-7				LT	ECH	NICA	201	UDY		
		-	A service of the serv	В	RIDG	E NU	MBE	R			ED BY			5-8-09 1	EET 1 of 12

ELEVATION (ft)	я Р В В В В В В В В В В В В В В В В В В	Material Graphics	DESCRIPTION	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Re	marks	
270.69	325	X		88	1		100	78				×	See note at end RQD.	of log regarding	
	327		brownish gray, mostly moderately soft to little very soft; mostly moderately to little strongly calcite cemented,												
268 69	328		little weakly cemented; calcite nodules just above basal contact (little Poorly graded SAND with SILT (SP-SM) interbedded with trace SILT (ML)).												
200.00	329		SEDIMENTARY ROCK, Gravel (BRECCIA) with sandstone and mudstone matrix; contains coarse												
266 69	330		gravel and trace cobbles (5 in length), thinly to moderately bedded, brownish gray to medium light gray, vuggy, very soft to soft intensely weathered												
200.00	331		matrix; unfractured; angular hard sandstone rock fragments (dominantly coarse gravel to trace cobble size); may represent cataclastic breccia with gouge;												
264 60	332		size); may represent cataclastic breccia with gouge; weakly to moderately cemented (Poorly graded GRAVEL with SILT (and SAND and COBBLES												
204.03	333		(GP-GM) grading to Poorly graded gravel with CLAY ■□5700EWTARY **OCK, (SANDSTONE) (64%), fine to medium sand, interbedded with Cobble-Gravel												
262 60			medium sand, interbedded with Cobble-Gravel CONGLOMERATE (33%) and MUDSTONE/SILTSTONE (3%); cobbles (30%, up to 6												
202.09	334		in. diameter) and trace coarse gravel, thinly to moderately bedded, medium light gray to brownish												
260.00	335		gray, slightly weathered, some moderately hard to some very soft; very soft below EL 279.9 ft; unfractured; contains sporadic subrounded hard												
260.69	336		(slightly weathered) quartz diorite rock fragments; mostly moderately to weakly calcite cemented, some												
050.00	337		uncemented conglomerate, very hard [drilling (mostly Poorly graded SAND with SILT (SP-SM) interbedded with some cobbles and gravel and trace SILT (ML))].												
258.69	338		SEDIMENTARY ROCK, (SANDSTONE), medium sand; moderately to thinly bedded (0.3 to 0.6 ft), light												
	339		gray to medium light gray, moderately hard to hard, very intensely to intensely fractured, very closely spaced (10 to 30 mm) moderately thin (2 to 3 mm)												
256.69	340		discontinuous totally calcite healed fractures dip 70 to 75°; strongly calcite cemented.												
5.547.2.2	341		SEDIMENTARY ROCK, (SANDSTONE) (96%), fine to medium sand, interbedded with												
254.69	342		MUDSTONE/SILTSTONE (4%), thinly to moderately bedded, minor laminated (2 mm), light gray to brownish gray, mostly very soft to some moderately												
	343		hard interbeds; contains a thin calcite layer @ EL 277.7 ft; mostly weakly to some strongly calcite cemented (mostly Poorly graded SAND with SILT												
252.69	344		(SP-SM) interbedded with trace SILT (ML); very stiff silt (PP=3.75 tsf)).												
	345	1	SEDIMENTARY ROCK, (SANDSTONE) (96%), medium sand, interbedded with												
250.69	346		bedded, beds dip ~40 to 55°, medium gray to light gray, weak, mostly hard to little very soft; moderately to												
	347		medium sand, interbedded with MUDSTONE/CLAYSTONE (4%), thinly to thickly bedded, beds dip ~40 to 55°, medium gray to light gray, weak, mostly hard to little very soft; moderately to slightly fractured (0.7 to 1.9 ft), clay lined fractures dip 60 to 75°; crosslaminated between EL 274.5 to 273.3 ft; minor fossil debris; clean; clay seams cross												
248.69	348		eachother; mostly strongly to little weakly (calcite cemented (little Poorly graded SAND with SILT (SP-SM) interbedded with trace Lean CLAY with												
	349		(SP-SM) interbedded with trace Lean CLAY with SAND (CL); hard clay (PP>4.5 tsf))]. RQD values provided on the boring logs are based on												
246.69	350		intact core pieces obtained between two natural discontinuities.												
	351		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												
244.69	352		"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. Bottom of borehole at 326.0 ft bgs Borehole was converted to piezometer at the completion of difficulties.												
	353		Borehole was converted to piezometer at the completion of drilling.												
242.69	354		Printed of the State of the Sta												
	355			T E-	-5-									uale le	_
		1	Department of Transportation	В	POR	NG	RE	_	RD	_	TC	I nor	STAU F	R-09-Z3	В
		,	Division of Engineering Services Geotechnical Services	0	ST.		LA		E 11	710)	T/	T T	07-07-1879	00
			Office of Geotechnical Design - South 1	S		10 T	UN	NE	L T	ECHI		LST		Louise	
				BK	RIDGE	IVUI	NIRF	7		. Prat		Mehi	razar 5-8		1



	ING RECOR		_	R-09-Z3B7
07	LA	710	T/T	07-07-187900
	CT OR BRIDGE 10 TUNNEL		AL STUDY	

	alis k NG C	ONTR	3-1 1	N DATE N- 09	COMPLETION 3-25-09	N DATE	34° 6' 2	21.5 LE LO	9" /	/ 118 TION	9' (Offs	24. et, S	5" I tation	NA[n, Lir	D83	and Da	tum)		SURFA	9- Z 3	EVATION	
DRILLII Rota	NG M	ETHC		(S) (ID)			Lt SO DRILL RICE CME 8	∋ 5			ı Av	e. n	100	Jak	St.				BOREI	HOLE C	AVD88 DIAMETER	
Bulk	,SP	Γ (1.4		Core(2	.5"),HQ Core		CME A					-				•	NO (5	- A TEX	87%			
			nstalled o				GROUND READING		EK	NM		KILI	LING			unac			275.		1 OF BOR	ING
ELEVATION (ft)	DEPTH (ft)	Material Graphics	5	ı	DESCRIPTION	l		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 Depin		Rema	rks	
592.27 590.27	1 2 3 4		ASPHALT SANDY SI light brown fines; wea	ILTY CLA	Y (CL-ML); soft some SAND; mo ation; [ALLUVIU	to mediui stly nonp I M]	m stiff; olastic		B1				_					in ac Soil and 2007 A.1 Sum Tecl	ccordan & Rock Present 7), exce of the Fi nmary R nnical S nty, Ca	ce with Logging tation M pt as no inal Geo eport, S tudy, Lo	was preparthe Caltraing, Classificanual (Jurated in Apportechnical SR-710 Turated Aproperties Angeles dated Aproperties Caltrains (Apporter)	ns cation ne, cend nnel
588.27 586.27	5 6 7 8		strong bro	wn; moist	Y (CL-ML); soft; ; some SAND; n weak to moderat	nostly noi	nplastic to		S2	3 4 4	8	100							d Auger C=16.8 p		.5' - 5'	
584.27	8 9 10		SANDY SI moist to w plasticity fi	ILTY CLA et; some s nes; weal	Y (CL-ML); soft; SAND; mostly no k cementation.	strong b	rown; to low	M	C3			78		25			doodddadad	UW	C=15.1 բ	opm		
582.27 580.27																						
578.27	15 1 6 1 7		SANDY S SAND; mo cementation	stly nonp	soft; light brown; lastic to low plas	; moist; s sticity fine	ome fine es; weak	X	S4	3 2 3	5	100	_				<u> </u>	VOC	C=17.3 բ	ppm		
576.27 574.27	18 1 9 2 0	-111			t; light brown; mo				C5			78		23	104		000000000000000000000000000000000000000	UW,	PI			
572.27	21 - 22 - 23 -		SANDY S moist; few	on.´ ILT (ML); fine SAN	medium stiff to s D; mostly nonplak cementation.	stiff: liaht	brown:	/ <u>\</u>					_				SOSSOSSOS					
570.27	24																					
				_	(continued)				R	EPOR	T TIT	LE								НС	LE ID	
	L	_/		Divisio	tment of Trans In of Engineer chnical Servic	ing Ser			D	BOR IST. 07	ING	RE OUN LA	ITY		ROU 71 0		PO T /	STMIL /T	.E	F EA	<u>R-09-Z</u>	
					of Geotechnic		ign - Sou	th 1	;		10 T	TUN	NEI	_ TI	ECH	NICA	L ST	TUDY				
									B	RIDGI	NU	MBE	R			ED BY sbur y	,		D/	ATE	SHEE	

ELEVATION (ft)	DEPTH (#)	(11)	Material Graphics	DESCRIPTION		Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method		marks
568.27	26			SANDY SILT (ML); medium stiff to stiff; light brown; moist; few fine SAND; mostly nonplastic to low plasticity fines; weak cementation; Siltstone; moderately hard [BEDROCK].	S6	12 14 14	28	100					00000	VOC=11.4 ppm	
566.27	27 28		11111	SEDIMENTARY ROCK, (MUDSTONE), thinly to moderately bedded, moderate olive brown, moderately weathered, soft, moderately fractured, [TOPANGA FORMATION]	C07			100	43				22020	See note at the regarding RQD	end of log
564.27	30		11.	Intensely to moderately fractured, random fracture	C08			100	70	25	96		2000	UW, PI VOC=21.4 ppm	
562.27	31		1111	(CL), with some fine sand. Bedding plane separation dipping 35°. Bedding joint dipping 25°. Bedding joint dipping 15°. Bedding joint dipping 52°.								\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	2000		
560.27	33			Bedding joint dipping 62°.									000		
558.27	35		11:11	Very thickly bedded, light brown to grayish orange, moderately soft to moderately hard, intensely fractured, with sand and clay, fine sand. Bedding joint (CL), dipping 45°.	C09			100	20				1000	VOC=15.2 ppm	
556.27	37 38 39		1111	Very thickly bedded, light brown mottled with greenish gray, moderately soft to moderately hard, intensely fractured.									2020		
554.27	40 41			SEDIMENTARY ROCK, (CLAYSTONE), thickly bedded, pale yellowish orange, moderately hard, intensely to moderately fractured, sandy, with silt, poorly graded, fine sand.	C10			100	40	6			2020	VOC=16.3 ppm	
552.27 550.27	42 43 44		11/11	SEDIMENTARY ROCK, (SILTSTONE), very thickly bedded to massive, pale yellowish orange, moderately hard, intensely to moderately fractured, with fine sand, poorly graded. Very thickly bedded to massive, bedding plane								\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	>>>>>		end of log
548.27	45 46		111	separation dipping 42°. Bedding plane separation dipping 39°. Olive gray, intensely to moderately fractured, with fine sand. Bedding plane separation dipping 35°.	C11			100	32				2000	VOC=17.4 ppm	
546.27	48		11/11	Bedding plane separation dipping 32°. Bedding joint dipping 67°. Bedding plane separation dipping 18°.									0000		
544.27	49 50		111	Bedding plane separation dipping 29°. Bedding joint (ML), dipping 45°. SEDIMENTARY ROCK, (SANDSTONE), thickly	C12			100	40				000	VOC=15.6 ppm	
542.27	51		111	bedded, moderate yellowish brown, moderately hard, intensely to moderately fractured, silty, fine sand. Bedding plane separation dipping 32°. SEDIMENTARY ROCK, (SILTSTONE), thickly bedded,						25	100		200	LINA DI	
540.27	53 54			light brown, moderately hard, slightly fractured, with some fine sand. Random fracture (ML), dipping 90°. SEDIMENTARY ROCK, (CLAYSTONE), moderately to thickly bedded, moderate brown, moderately soft, slightly fractured, shear (CL), dipping 32°						22	102	\ \ \ \ \ \	2020	UW, PI	
	55			(continued)											
	1		1	Department of Transportation Division of Engineering Services	D	EPOR BOR IST.	ING			-	ROUT	E	PO T/	STMILE	HOLE ID R-09-Z3B8 EA 07-07-187900
	_	1		Geotechnical Services Office of Geotechnical Design - South	1 P	ROJE	CT 0	R BF	NE	PRE	ME				

ELEVATION (ft)	DEPTH (#)		Material Graphics	DESCRIPTION	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Re	emarks
500.07	-55		11	SEDIMENTARY ROCK, (SILTSTONE), moderately bedded, moderate brown, moderately soft, slightly	C13			100	50			×	VOC=16.4 ppm See note at the	end of log
538.27	56		111	fractured, bedding plane separation dipping 31°. SEDIMENTARY ROCK, (CLAYSTONE), thinly to moderately bedded, moderate brown, moderately soft, F.								\Diamond	regarding RQE).
	57		///	Bedding plane separation dipping 31°.								\lambda		
536.27	58		"	(continued). SEDIMENTARY ROCK, (SILTSTONE), thinly to								\Diamond		
	59			moderately bedded, moderate brown, very to extremely hard, slightly fractured.					М			0		
534.27	60		$^{\prime\prime}$	SEDIMENTARY ROCK, (CLAYSTONE), thinly to moderately bedded, moderate brown, soft, slightly fractured, shear (CL), dipping 25°.	C14			100	43			\Diamond	VOC=18.3 ppm	k!
	61	E	//	SEDIMENTARY ROCK, (SILTSTONE), thinly to moderately bedded, moderate brown, very to								Š		
532.27	62		//	extremely hard, slightly fractured. SEDIMENTARY ROCK, (CLAYSTONE), thinly to								×		
	63	Ē		moderately bedded, moderate brown, soft, slightly fractured, shear (CL), dipping 40°.								\Diamond		
530.27	64		//	SEDIMENTARY ROCK, (SILTSTONE), thinly to moderately bedded, moderate brown, very to								\Diamond		
	65		1	extremely hard, slightly fractured, bedding plane separation dipping 15°, laminated silty fine sand lens.	045			400	40			0	VOC=18.7 ppm	
528.27	66			SEDIMENTARY ROCK, (CLAYSTONE), thinly to moderately bedded, moderate brown, soft, slightly fractured, shear (CL), dipping 25°.	C15			100	40			\Diamond	VOC=18.7 ppin	
	67];	SEDIMENTARY ROCK, (SANDSTONE), thinly to moderately bedded, moderate yellowish brown, soft,								Š		
F00 07			1	slightly fractured, bedding plane separation dipping 22°, silty, medium sand.								×		
526.27	68		1	SEDIMENTARY ROCK, (CLAYSTONE), thinly to moderately bedded, moderate brown, soft, slightly								\Diamond		
	69			fractured, shear (CL), dipping 25°. Thinly to moderately bedded, moderate brown, soft, very slightly fractured to unfractured, shear (CL),								\Diamond		
524.27	70		1	dipping 25'. SEDIMENTARY ROCK, (SANDSTONE), thinly to	C16			90	20			\Diamond	VOC=24.6 ppm	k.
	71		1	moderately bedded, olive gray, moderately soft to moderately hard, very slightly fractured to unfractured,										
522.27	72		11	bedding plane separation dipping 22°, silty fine sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly to								×		
	73		/	moderately bedded, moderate brown, soft, very slightly fractured to unfractured.								X		
520.27	74	Ħ	1:	Bedding joint (CL), dipping 39°. Bedding joint (CL), dipping 39°. Thinly to moderately bedded, moderate brown, soft,								\Diamond		
1	75		1:1	very slightly fractured to unfractured, shear dipping	C17			100	10			\Diamond	VOC=22.4 ppm	. 1
518.27	76			moderately bedded, moderate brown, soft, very slightly fractured to unfractured.				100				\Diamond	133 22.1 (6)	
	77		://	Shear dipping 30°. SEDIMENTARY ROCK, (CLAYSTONE), thinly to										
516.27	78		11	moderately bedded, moderate brown, soft, very slightly - fractured to unfractured. Shear dipping 15°.								Š		
010.27	79		//	SEDIMENTARY ROCK, (SILTSTONE), thinly to moderately bedded, moderate brown, hard to very								×		
-1107			1.1	hard, very slightly fractured to unfractured. Moderately hard, shear (clay), dipping 19°.								\Diamond	200	
514.27	80		1.1	Thinly to moderately bedded, moderate brown, very hard, very slightly fractured to unfractured. SEDIMENTARY ROCK, (SANDSTONE), thinly	C18			100	42			\Diamond	VOC=14.1 ppm	
	81			SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, olive gray, very hard, very slightly fractured to unfractured, dipping 28°, silty, fine sand.								\Diamond		
512.27	82		1	Moderate brown, shear (clay), dipping 25°. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded,								0		
	83			moderate brown, very hard, very slightly fractured to unfractured.	C19			71	25					
510.27	84		1:/	SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, very slightly								×		
	-85-	E	\.,	fractured to unfractured, shear (clay), dipping 22°. (continued)								$ \Diamond $		
				Department of Transportation	R	EPOR BOR	TTI	LE	CO	RD.				HOLE ID R-09-Z3B
	I			Division of Engineering Services	D	IST.	C	OUN		ROU 710		POS T/	STMILE T	EA 07-07-187900
	L	y	7	Geotechnical Services	PI	ROJE	сто	R BF		ENAME	S. V.	1		01-01-101-000
-		1		Office of Geotechnical Design - South		RIDGE	-		_	PREPAR M.Sali	ED BY		DATE	SHEET 3 of 11

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	Ren	narks
508.27	85	Z	SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, very hard, very slightly fractured to unfractured.	C20			93	67				×<	VOC=17.0 ppm See note at the e regarding RQD.	end of log
	87	1	SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, very hard, very slightly fractured to unfractured.											
506.27	88		SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, intensely to moderately fractured, sandy, fine sand.						13	117		Š Š	uw	
504.07	89		Olive gray, dipping 35°. Moderate brown. (continued).									\Diamond	4.0	
504.27	90	11	Very intensely to intensely fractured, dipping 15°. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, very intensely to intensely fractured, shear.	C21			92	0				>×<	VOC=16.4 ppm	
502.27	92	//	SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, very intensely to intensely									X		
	93	1	fractured. Intensely to moderately fractured, trace fine sand. Dipping 15°.									X		
500.27	94	///	Moderate brown to light gray, sandy, find sand. Moderate brown, slightly fractured. Thinly bedded, light gray, dipping 10°. Moderate brown.	- 1 0								0×0	August 200 mg mg	
498.27	96	/ <u>!</u> /	SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, soft to moderately soft, slightly fractured, dipping 25°.	C22			100	0				× 0 ×	VOC=24.1 ppm	
	97	\.	SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, soft to moderately soft, slightly fractured.									\Diamond		
496.27	98 99	, , ,	Laminated to very thinly bedded, hard, dipping 25°. Moderately hard, shear (clay), dipping 25°. SEDIMENTARY ROCK, (SILTSTONE), laminated to									X		
494.27		//W	very thinly bedded, moderate brown, moderately hard, r slightly fractured. Bedding joint dipping 25°, with some fine sand. ITrace fine sand.	C23			100	0				♦ × ♦	VOC=21.0 ppm	
	101	-	With some fine sand. SEDIMENTARY ROCK, (CLAYSTONE), laminated to									X		
492.27			very thinly bedded, moderate brown, moderately hard, slightly fractured. SEDIMENTARY ROCK, (SILTSTONE), laminated to very thinly bedded, moderate brown, moderately hard,									\ \ \ \		
	103		intensely fractured. SEDIMENTARY ROCK, (SANDSTONE), laminated to									\lambda		
490.27	105	11/1	very thinly bedded, moderate brown, very to extremely hard, intensely fractured, dipping 10°, silty, fine sand. SEDIMENTARY ROCK, (CLAYSTONE), laminated to very thinly bedded, moderate brown, very to extremely	C24			100	89				× 0 ×	VOC=22.1ppm	
488.27	106	1	hard, slightly fractured, dipping 10°. SEDIMENTARY ROCK, (SILTSTONE), laminated to very thinly bedded, moderate brown, very to extremely									\$X		
400.07	107		hard, slightly fractured. Laminated to very thinly bedded, hard, bedding joint dipping 20°.	Ç2\$			Aod	50				× ×		
486.27	108		Intensely to moderately fractured. Joint (clay), dipping 48°. Dipping 17°.									X		
484.27	110		Joint dipping 30°. SEDIMENTARY ROCK, (CLAYSTONE), laminated to very thinly bedded, moderate brown, moderately hard, intensely to moderately fractured.	C26			100	0				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	VOC=23.2 ppm	
482.27			SEDIMENTARY ROCK, (SILTSTONE), laminated to very thinly bedded, moderate brown, moderately hard, intensely to moderately fractured. Moderate brown mottled with light gray, hard, trace									000		
123 44	113	`.	fine sand. Joint dipping 50°. Bedding joint dipping 25°.											
480.27	114	<u>``</u>	With fine sand.	C27	1		93	18		0 1		\Diamond		
	110		(continued)	TE	EDOS)T T!							11	HOLEID
		1	Department of Transportation	10	BOR	ING	RE		RD	POL	TC	I por		R-09-Z3B8
	L	7	Division of Engineering Services Geotechnical Services		O7 ROJE		LA LR BE		E N	71		T/		07-07-187900
		1	Office of Geotechnical Design - South	11	SR-7	10 7	TUN	NE	LT	ECH	NICA	LST		l ourer
		-		В	RIDG	E NU	MRF	K			ED BY sbury	,	DATE	4 of 11

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION -	Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight	(pcf) Shear Strength (tsf)	Drilling Method	Casing Depth	Re	marks	
478.27	116		SEDIMENTARY ROCK, (CLAYSTONE), laminated to very thinly bedded, moderate brown, hard, intensely to moderately fractured. SEDIMENTARY ROCK, (SILTSTONE), laminated to	C27			93	18	10 12		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		VOC=15.9 ppm See note at the regarding RQD UW		
476.27	117		very thinly bedded, moderate brown, hard, intensely to moderately fractured. [Dipping 25°. [SEDIMENTARY ROCK, (SANDSTONE), laminated to	Ç28			-109-	22			000				
474.27	119 120	1./2	very thinly bedded, moderate brown, hard, intensely to moderately fractured, dipping 24°. SEDIMENTARY ROCK, (SILTSTONE), laminated to very thinly bedded, moderate brown, hard, intensely to moderately fractured, dipping 25°, excellent bedding	C29			100	45			XOX		VOC=24.2 ppm		
472.27	121	////	contact. SEDIMENTARY ROCK, (CLAYSTONE), laminated to very thinly bedded, moderate brown, hard, intensely to moderately fractured.	1				ń							
472.27	123	1//	SEDIMENTARY ROCK, (SILTSTONE), laminated to very thinly bedded, moderate brown, hard, intensely to moderately fractured. SEDIMENTARY ROCK, (CLAYSTONE), laminated to								0×0				
470.27 468.27	125	1///	very thinly bedded, moderate brown, hard, intensely to moderately fractured, dipping 25°. SEDIMENTARY ROCK, (SILTSTONE), laminated to very thinly bedded, moderate brown, hard, intensely to moderately fractured.	C30			98	0			XOX		VOC=26.9 ppm		
468.27	127	11/1	Dipping 18°, trace fine sand. Moderate brown to light gray, hard, intensely to moderately fractured. SEDIMENTARY ROCK, (CLAYSTONE), laminated to very thinly bedded, moderate brown, hard, intensely to								>>>>				
464.27 462.27 460.27	128		moderately fractured, random fracture (moderately healed), dipping 90°. SEDIMENTARY ROCK, (SILTSTONE), laminated to very thinly bedded, moderate brown, hard, intensely to								0×0				
464.27	130 131		moderately fractured. SEDIMENTARY ROCK, (CLAYSTONE), laminated to very thinly bedded, moderate brown, hard, intensely to moderately fractured.	C31			100	20			× 0×		VOC=23.5 ppm		
462.27	132	11/1/	SEDIMENTARY ROCK, (SILTSTONE), laminated to very thinly bedded, moderate brown, hard, intensely to moderately fractured. Laminated, moderate brown to light gray, sandy, fine sand.								\$X\$				
460.27		··	Dipping 16°. Dipping 18°. Thinly bedded, moderate brown. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded,								(0×0)				
			moderate brown, hard, intensely to moderately fractured. SEDIMENTARY ROCK, (SILTSTONE), laminated, moderate brown, hard, intensely to moderately fractured, dipping 18°, with fine sand.	C32			100	33			XOX		VOC=23.9 ppm		
456.27	137 138	/:://	SEDIMENTARY ROCK, (CLAYSTONE), laminated, moderate brown, hard, intensely to moderately fractured. SEDIMENTARY ROCK, (SILTSTONE), laminated,								0×0				
454.27	139 140		moderate brown, hard, intensely to moderately fractured, dipping 28°, sandy. SEDIMENTARY ROCK, (CLAYSTONE), laminated, moderate brown, hard, intensely to moderately	Ç3 3			77/	64)			0×0		uw, sp		
452.27	141 142	111	fractured. SEDIMENTARY ROCK, (SILTSTONE), laminated, moderate brown, hard, intensely to moderately fractured. SEDIMENTARY ROCK, (CLAYSTONE), laminated,	Ç3 4			Yog	48 /	9		XOX		VOC=19.5ppm		
458.27 456.27 454.27 452.27	143 144	11111	moderate brown, hard, intensely to moderately fractured. SEDIMENTARY ROCK, (SILTSTONE), moderately bedded, moderate brown, hard, intensely to moderately fractured, with fine sand, grayish brown	47			<u> </u>	(,,,,,)			0×0×0				
	145		mudstone clasts. (continued)							-1	1				
1115			Department of Transportation		EPOR			co	PD.	_				HOLE ID	0
	L	_/	Division of Engineering Services Geotechnical Services	D	BOR IST. 07	C	LA	VTY	R	0UTE 710		os I/T	TMILE	R-09-Z3E EA 07-07-18790	
			Office of Geotechnical Design - South	11		10 7	TUN	NE	PREP	HNICA ARED BY alisbur	,	TL	DATE	SHEET 5 of 1	ı

	140	Material	Graphics		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method		
	146		Bedd	ing 22°. Jing joint dipping 17°.	C35			100		8			X	VOC=18.4 ppm See note at the end of lo	g
	146		olive	IMENTARY ROCK, (SANDSTONE), laminated, gray, hard, moderately fractured, dipping 22°, fine sand.									X	regarding RQD.	
446.27	147		SEDI	IMENTARY ROCK, (SILTSTONE), moderately led, olive gray, hard, moderately fractured, dipping									\		
	149	1/	Lami	erate brown, dipping 28°. inated, olive gray, dipping 17°, sandy.									X		
444.27	150		SEDI	erate brown. IMENTARY ROCK, (CLAYSTONE), laminated, erate brown, hard, moderately fractured.									XX		
11	151		mode	IMENTARY ROCK, (SILTSTONE), laminated, erate brown, hard, moderately fractured.	C36			96	18				X		
442.27	152		mode	IMENTARY ROCK, (CLAYSTONE), laminated, erate brown, hard, moderately fractured. IMENTARY ROCK, (SILTSTONE), laminated,									X		
	153	///	_ mode	erate brown, hard, moderately fractured. ly bedded, light olive gray, dipping 28°. erately bedded, moderate brown, intensely									X		
440.27		1	fractu	ured.									X		
438.27	155	= ','	Mode	ing 25°. t olive gray, dipping 25°. erate brown. t (clay, partially healed), dipping 48°.									X	VOC=20.7 ppm	
	157		- Bedd	ding joint dipping 20°. ly bedded, dipping 14°, sandy. ing 10°.	C37			100	21	8			×	UW, PL	
436.27	158	1	SEDI	IMENTARY ROCK, (SANDSTONE), thinly led, moderate brown, hard, intensely fractured.	C38			100	0	μ			Š		
	159	<i>[` ` ` '</i>	- SEDI	ing 39°. IMENTARY ROCK, (SILTSTONE), thinly bedded, erate brown, hard, very intensely fractured, with	030			100	U				X		
434.27	160			sand, ing 29°. IMENTARY ROCK, (CLAYSTONE), thinly bedded,	C39			87	0				Š	VOC=26.0.6ppm	
	161		mode dippii	erate brown, hard, very intensely fractured, shear ing 25°.									Š		
432.27	162		mode	IMENTARY ROCK, (SILTSTONE), thinly bedded, erate brown, hard, very intensely fractured. IMENTARY ROCK, (SANDSTONE), thinly											
	163		. fraich	ied, moderate brown, hard, very intensely undigibling 45°. IMENTARY ROCK, (SILTSTONE), thinly bedded,											
430.27			mode SEDI	erate brown, hard, very intensely fractured. IMENTARY ROCK, (SANDSTONE), thinly					4						
100 00	166		fractu	ded, moderate brown, soft, very intensely ured, dipping 28°. IMENTARY ROCK, (SILTSTONE), thinly bedded,	C40			100	10						
	167	11.	to be	erate brown, hard, moderately fractured, parallel gedding (shale parting). IMENTARY ROCK, (SANDSTONE), thinly										PL.	
426.27	168	<i>() ()</i>	bedd fractu	ded, moderate brown, very hard, moderately ured, joint dipping 45°.											
	169	1/	mode	IMENTARY ROCK, (SILTSTONE), thinly bedded, erate brown, very hard, moderately fractured. ing 23°.	C41			100	100				\Diamond		
424.27	170	1/	S. Dippi		C42			100	60	8			\Diamond		
	171												0		
422.27	172	7::	. bedd	IMENTARY ROCK, (SANDSTONE), thinly led, moderate brown, very hard, moderately									0		
420.27	173 174		SEDI	ured, dipping 17 to 22°. IMENTARY ROCK, (SILTSTONE), thinly bedded, erate brown, very weak, very hard, moderately									0		
120.21	175		* fractu	ured, bedding joint (silt, not healed), dipping 32°. ient fracture (not healed), dipping 60°.						7	137	Ш	0	UC EM	
	10000			(continued)	I p	EPOR	T TIT	TE						HOLE ID	
				Department of Transportation Division of Engineering Services	10	BOR IST.	ING		-	RD	ROU	TF	POS	R-09	-Z3B8
	L	7	_	Geotechnical Services		07 ROJE		LA		E N	710)	T/	T 07-07-	187900
		1	1	Office of Geotechnical Design - South	11 📑	SR-7	10 1	TUN	NE	L T	ECH	NICAI ED BY	LST		HEET

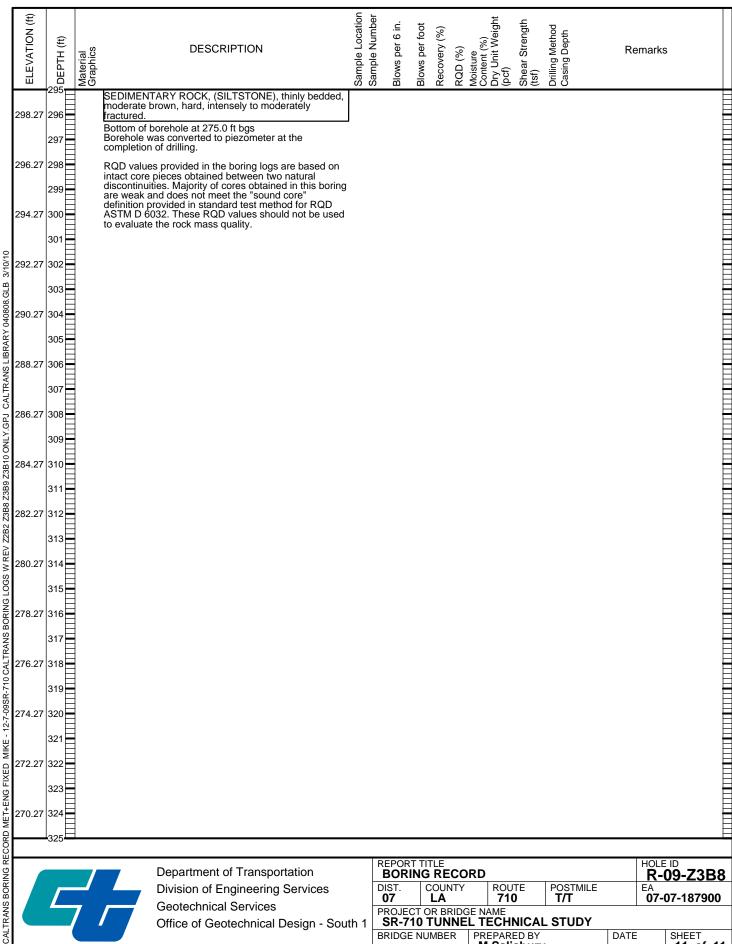
ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION DESCRIPTION	~	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight	(pct) Shear Strength (tst)	Drilling Method	Casing Depth	Remarks
418.27	176	1111	Laminated to very thinly bedded, dipping 22°, sandy, fine sand. (continued).	C43			100	32			XOX	Se	e note at the end of log garding RQD.
416.27	177 178	1	SEDIMENTARY ROCK, (CLAYSTONE), laminated to very thinly bedded, moderate brown, very hard, moderately fractured, dipping 15°.								000		
414.27	179 180	1//////	SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, olive gray, very hard, moderately fractured, joint (clay, partially healed), dipping 38°. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, moderately hard, moderately	C44			95	35			×0×		
412.27	181 182	(111)	fractured. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, intensely fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded,								XOX		note at the end of log garding RQD.
410.27	183	1///	moderate brown, moderately hard, intensely fractured. No sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded,								0×0		
710.27	185	113	moderate brown, moderately hard, intensely fractured, bedding joint. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, moderately hard, intensely fractured.	C45			100	20			XOX		
408.27	186	1/1/1/3/	with fine sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, intensely fractured.								$\Diamond \times \Diamond$		
406.27	188	1	SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, moderately hard, intensely fractured. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, intensely fractured.								XOX		
404.27 402.27 400.27		11/1/	SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, moderately hard, intensely fractured. SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, olive gray, moderately soft, intensely	C46			100	75			000		
402.27	191	/////	fractured, dipping 15°, silty, fine sand. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, intensely fractured, with fine sand.						11		>X \	SE), CR
400.27	193 194	-	intensely fractured. SEDIMENTARY ROCK. (SILTSTONE), thinly bedded.	C47			100	50			×0×		
398.27	195	-	moderate brown, moderately soft to moderately hard, intensely fractured. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately soft to moderately hard, intensely fractured, dipping 22°.	C48			100	32			0×0	EN	
	197	;;!:://	SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, moderately soft to moderately hard, intensely fractured. SEDIMENTARY ROCK, (SANDSTONE), thinly					1	8 13	1	XOX	ud	;
396.27	198	1/////	bedded, olive gray, moderately soft, intensely fractured, dipping 17°, silty, fine sand. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, intensely fractured.										
394.27	200 201	· · · · · · · · · · · · · · · · · · ·	SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, olive gray, moderately soft, intensely fractured, dipping 21°. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded,	C49			94	19			>X (0) X		
392.27	202		moderate brown, moderately soft, moderately \$₽₩₩ЧNTARY ROCK, (SANDSTONE), laminated, olive gray, very weak, very hard, slightly fractured, dipping 25°, fine sand.	0.5							X 0 X		
390.27		<i>'</i> .	SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately soft, moderately S판에(면) TARY ROCK, (SILTSTONE), thinly bedded, moderate brown, very hard, moderately fractured.	C50			67	50			0×0		
	205		(continued)										
			Department of Transportation		EPOR BOR			co	RD				HOLE ID R-09-Z3B8
	L	_/ 7	Division of Engineering Services Geotechnical Services	DI	IST. 07	C	LA	ITY	R	10 10		OSTM /T	EA 07-07-187900
		/	Office of Geotechnical Design - South	1 5	SR-7	10 T	TUN	NE	L TEC	HNICA		TUD	
				B	RIDGE	: NUI	MBE	K		RED BY			DATE SHEET 7 of 11

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	emarks	
388.27	205 206	7./	SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, very hard, moderately fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded,	C51			100	42	8 133		>×<	SD, EM UC See note at th		
386.27			moderate brown, very hard, moderately fractured. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, very hard, moderately fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, very hard, moderately fractured. SEDIMENTARY ROCK, (SANDSTONE), thinly								$\langle \Diamond \rangle \langle \Diamond \rangle$	regarding RQ	ь.	
384.27	209 210	=:-	bedded, brownish gray, very hard, intensely fractured, SEPRIENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, very hard, intensely fractured,	C52			95	33			$\langle \rangle \langle \rangle$			
382.27			sipping 17. SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, olive gray, very hard, intensely fractured, dipping 20°, fine sand. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, very hard, intensely fractured.								0			
380.27	213 214	17.7.7	SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, olive gray, very hard, intensely fractured, dipping 19°, fine sand. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded,	C53			100	89			× 0 ×			
378.27	215	~;·	moderate brown, weak, hard, intensely to moderately	C53			100	42			0×0	PTS		
570.27	217	17.1	moderately fractured, dipping 19°. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, intensely to moderately								$\langle \diamond \rangle$			
376.27	218 219	·~	fractured. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, hard, intensely to moderately fractured.	C54			100	21			\ \ \ \ \			
374.27		87.17	SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, olive gray, moderately soft, intensely to moderately fractured, dipping 21°. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded,	C55			100	50			$\Diamond \times \Diamond$			
372.27	221 222	(/;////	moderate brown, hard, intensely to moderately fractured. SEDIMENTARY ROCK, (SANDSTONE), thinly	C55			100	75			$\times \diamond \times$			
370.27	223 224	///////////////////////////////////////	bedded, olive gray, soft, intensely to moderately BECHINED TARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, intensely to moderately fractured. SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, olive gray, hard, intensely to moderately								$\times 0 \times 0$			
368.27	225 226	1/1///	TRICHITARY POCK (SILTSTONE) thinly hodded	C56			100	83			×0×0	SD		
366.27	227 228 229	11/1/	fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, intensely to moderately fractured, with fine sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded.						9		0X0X			
364.27		11111	fractured.	C56			100				$\times \Diamond \times \Diamond$			
362.27		}!!/(M/)	moderate brown, hard, moderately fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, moderately fractured. SEDIMENTARY ROCK, (SANDSTONE), thinly								$\Diamond \times \Diamond \rangle$			
360.27	1000		bedded, moderate brown, hard, moderately fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, moderately fractured, sandy, fine sand.	C57			100	81			0			
	235		(continued)								V			
	-		Department of Transportation Division of Engineering Services	DI	EPOR BOR	NG C	RE	_	ROU			OSTMILE	R-09-Z	
	L	7	Geotechnical Services Office of Geotechnical Design - South 1	PF		CT O			F NAME L TECH	I Van		TUDY	07-07-187	900
			Silies Si Goodstillied Doolgii Goddii 1		RIDGE	-		_	PREPAR M.Sali	ED BY		DATE	SHEET 8 of	11

ELEVATION (ft)	DEPTH (ft)	Material	Graphics	DESCRIPTION		Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight	(pcf) Shear Strength	(tst)	Casing Nethod	Re Bulleton Re	emarks	
259 27	235	\ ;;		SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, hard, moderately fractured.	C57			100	81	6 13	5		<	UC See note at the	end of loa	
358.27			•	SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, moderately fractured.	C58			100	92	0 13	3	>	<	regarding RQI		
	237			Thinly bedded, moderate brown, moderately soft, moderately fractured, dipping 10°. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded,								5	>			E
356.27		(`	moderate brown, hard, moderately fractured. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded.								<	>			Ē
	239	-	-	moderate brown, moderately soft, moderately fractured, dipping 10°.								1	>			
354.27			. ,	SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, moderately soft, moderately	C59			100	94			<	>			
	241	7.		Chiefugedy, sandy, fine sand. SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, olive gray, moderately soft, moderately								>	>			
352.27	242			fractured, dipping 25°. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded.									3			
	243		<u>.</u>	moderate brown, hard, moderately fractured, fracture zone dipping 50°.									<			
350.27	244	1:	-	SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, moderate brown, hard, moderately fractured.	C60			100	83			\ \ \	>			E
350.27 348.27	245	*		SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, in moderate brown, hard, moderately fractured.	C60			100	56			<	>			
348.27	246	1	1:	Olive gray, hard, intensely fractured. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, hard, intensely fractured.								<	>			
	247	1		SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, intensely fractured.								<	>			E
346.27	248	<u> </u>	ġ.	SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard to hard, intensely	C61			100	0			>	>			
- 1	249	1		fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded.				100					1			E
344.27		=		moderate brown, moderately hard to hard, intensely fractured.	004			100				>	<			Ė
	251		A	SEDIMENTARY ROCK, (SANDSTONE), very thinly bedded, olive gray, moderately hard to hard, intensely -	C61			100	92			>	>			
242.07		·	: /	fractured, dipping 22°, silty, fine sand. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, moderately hard to hard, intensely								(Ē
344.27 342.27 340.27		:	;;	Fractured: SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded.	C62			100	90	H		1	>			E
	253	.,	*	moderate brown, moderately hard to hard, intensely fractured.								2	>			Ē
340.27	254	-	1	SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, medium strong, very hard, slightly									<			Ē
	255	<u>`</u> ,	3.	fractured, bedding joint. Hard, dipping 15°.									<			
338.27	256	<u> </u>	1	SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, moderate brown, hard, slightly fractured,	C63			100	100	7 42	2	<	>	EM, UC		Ē
	257			ଓ୍ୟୁମନ୍ଧାନ୍ୟ (SILTSTONE), thinly bedded, moderate brown, hard, slightly fractured. Dipping 10°.				-1-1		7 13	2	<	>			Ė
336.27	258	-	1	SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, moderate brown, hard, slightly fractured,								K	>			E
	259	-	1:	SPDMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, slightly fractured.								2	>			E
334.27	260	1/1/		SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, moderate brown, hard, slightly fractured,	C64			100	87	141			>			
	261		.:	ଓଅମୟାନ୍ୟ ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, slightly fractured.	-94				24				3			
332.27	262	: :	: ;	SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, moderate brown, very hard, slightly fractured.								5	1			E
	263	-	1	Dipping 20°. Dipping 15°.								<	>			
330.27			1	SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, very hard, slightly fractured.								<	>			
330.27	204	1		SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, moderate brown, very hard, slightly fractured.								_ <	>			
338.27 336.27 334.27 332.27	200			(continued)	IB		T T								HOLEIS	
			1	Department of Transportation	E	BOR	ING	RE			N/==	-15	7.0	OTANI S	R-09-Z	3B8
	L			Division of Engineering Services Geotechnical Services	(IST.)7		LA		7	10 10		T/	STMILE I T	07-07-18	7900
		/	1	Office of Geotechnical Design - South	1 3	SR-7	10	TUN	NE	E NAM	HNIC		ST			
				The second classical control of a control	BI	RIDGI	E NU	MBE	R	M.S	ARED E			DATE		f 11

DESCRIPTION DESCR	See note at the end of log regarding RQD.
326.27 SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, moderate brown, hard to very hard, intensely to moderately fractured, dipping 22°, silty, fine sand. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard to very hard, intensely to moderately fractured. Incipient fracture (not healed), dipping 90°. Sandy, fine sand. SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, moderate brown, hard to very hard, intensely to moderately fractured, dipping 18°.	
to moderately fractured, dipping 22°, silty, fine sand. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard to very hard, intensely to moderately fractured. Incipient fracture (not healed), dipping 90°. Sandy, fine sand. SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, moderate brown, hard to very hard, intensely to moderately fractured, dipping 18°.	
moderately fractured. Incipient fracture (not healed), dipping 90°. Sandy, fine sand. SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, moderate brown, hard to very hard, intensely to moderately fractured, dipping 18°.	
324.27 270 Incipient fracture (not healed), dipping 90°. Sandy, fine sand. SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, moderate brown, hard to very hard, intensely to moderately fractured, dipping 18°.	
SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, moderate brown, hard to very hard, intensely to moderately fractured, dipping 18°.	
CERTAIN POOR (OLAVOTONE) Aliabate haddad	
moderate brown, hard to very hard, intensely to moderately fractured.	
SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard to very hard, intensely to	
moderately fractured, bedding joint dipping 18°. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, hard to very hard, intensely to	
SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard to very hard, intensely to	
moderately fractured. Dipping 20°. SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, olive gray, hard, intensely to moderately	
fractured, fine sand. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded,	
moderate brown, hard, intensely to moderately fractured. Dipping 25°.	
SEDIMENTARY ROCK, (SANDS TONE), thinly bedded, moderate brown, hard, intensely to moderately fractured, dipping 22°.	
SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, intensely to moderately fractured.	
SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, hard, intensely to moderately fractured, dipping 20°.	
SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, intensely to moderately fractured.	
SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, hard, intensely to moderately fractured.	
SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, intensely to moderately fractured, with fine sand.	
SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, hard, intensely to moderately fractured.	
SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, intensely to moderately fractured.	
SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, moderate brown, hard, intensely to moderately fractured.	
Incipient fracture (not healed), dipping 90°. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, intensely to moderately	
fractured. Incipient fracture (not healed), dipping 90°.	
SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, olive gray, hard, intensely to moderately fractured, dipping 22°.	
(continued)	
Department of Transportation REPORT TITLE BORING RECORD	HOLE ID R-09-Z3B
07 14	ROUTE POSTMILE EA 07-07-18790
Geotechnical Services Office of Geotechnical Design - South 1 PROJECT OR BRIDGE NA SR-710 TUNNEL TE	ME
	PARED BY DATE SHEET

BOR	ING RECOR	D		R-09-Z3B8
DIST. 07	COUNTY	710	POSTMILE T/T	EA 07-07-187900
	CT OR BRIDGE		U CTUDY	



Division of Engineering Services Geotechnical Services Office of Geotechnical Design - South 1

ROUTE **710** POSTMILE **T/T** COUNTY EA 07-07-187900 07 ĽĂ PROJECT OR BRIDGE NAME
SR-710 TUNNEL TECHNICAL STUDY

PREPARED BY M.Salisbury **BRIDGE NUMBER** DATE SHEET 11 of 11

M. S	alist	oury	BEGIN DATE 3-26-09	COMPLETION DATE 4-10-09	BOREHOL 34° 6' 5										tum)		R-C	1D 9-Z 3	3B9	
DRILLII Caltr		ONTRA			BOREHOL									Aven	ue				EVATION AVD88	
DRILLII	_				DRILL RIG	;		,										HOLE D	DIAMETER	
SAMPL	ER T		ine AND SIZE(S) (ID) "),Punch Core(2	2 5") HQ Core	SPT HAMM	MER			40	lh	30 i	nck	dro	n			4 in HAMM 87%		FICIENCY,	ERi
BOREH	HOLE	BACK	FILL AND COMPLET stalled on Com	ION	GROUND\ READING	NAT			NG E			AF	TER	•				DEPT	H OF BORI	NG
(E)			otanoa on com	piction		L C	Ē									 	000.	0 10		
ELEVATION (f	DEPTH (#)	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		Rema	ırks	
622.25	1 2		dense; greenish gr GRAVEL, max. 2 in cementation; (Aggr SILTY GRAVEL (G light gray; dry to me	/EL with SILT (GW-GM ay; dry; mostly coarse, n. dia.; little fines; weak regate Base = 8"). GM); medium dense; ligl oist: mostly coarse, sub	subrounded ht brown to prounded		001			83						in a Soil and 200 A.1 Sun	ccordan & Rock Present 7), exce of the F nmary R	ce with Logging tation Month as no inal Geometry Section 1.5 Logical Control C	was prepa the Caltran g, Classifica lanual (Jun- oted in Apportechnical SR-710 Tun os Angeles	s atior e, endi
620.25	4		cementation; [ALL	n. día.; littlé fines; weak UVIUM]													ınty, Ca		dated Apri	l,
618.25	5 6	0.0	dense; light brown	ND with GRAVEL (SP); to light gray; dry to moi angular to subrounded stly SAND; weak cemen	st; little	S	802	9 10 13	23	100					00000	Har	nd Auger	from 1	' - 5'	
616.25	7 8 9	0.													22222					
614.25	10		light brown to light SAND; few fines; w		tly coarse	Ms	803	24 50		100					<u> </u>	VO	C=7.5 pp	om		
612.25	12		dense: olive to light	EL with SILT and SAN to brown; moist; mostly of EL, max. 2 in. dia.; tracementation.	coarse.										MMM					
610.25	14		Poorly graded SAAN	ID with SILT and CDA	/EI /QD QMA\.	\ Ac	804			100		9	133		DODOOD	1 11/4/	, PA			
608.25	16	<i>σ σ σ</i>	loose; light brown; subrounded GRAV	ND with SILT and GRA\ moist; some coarse to a EL, max. 2 in. dia.; moses; weak cementation.	red (SP-SM); fine, stly coarse to		oU4			100		9	133		00000		, 1 🖪			
606.25	18	0 0	At EL. 606.8 ft, co	ontains about 10 to 25%	6 COBBLES.										222222					
604.25	20		moist; about 20% l	nse; light brown to light ittle coarse GRAVEL, m ; weak cementation; Did ly hard.	nax. 3 in.	S	305	44 49 50	99	100					MANN		C=9.4 pp C=3.5 pp			
602.25	22														22222					
600.25	24														0000					
				(continued)			l Dr		T T17									100	N.E.ID	
	F		•	rtment of Transporta on of Engineering S			DI	EPOR BORI IST.	ING	RE OUN		RD	ROU			STMII	LE	FA EA		
		7		echnical Services of Geotechnical De	esign - Sout	th 1	PF)7 ROJE(SR-7	сто					0 NICA	│ T. L S1	·	······································	0	7-07-187	90
			500				_	RIDGE				PRI	EPAR	ED BY				ATE	SHEET 1 of	

ELEVATION (ft)		прертн (ft)	Material	DESCRIPTION - omeowy	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight	Shear Strength (tsf)	Drilling Method	Regular Re	emarks
598.25	5 2	26		COBBLES (continued).	S06	42 50		100				M	VOC=13.1 ppn	n E
		27										200		
596.25	5 2	28										000		
	2	29												
594.25	5 3	30			S07/	50		100/					VOC=8.8 ppm	
0	;	31												
592.25	5 3	32										200		
308.GLE		33										000		
\$ 590.25 590.25		34 35												
CALTRANS LIBRARY 040808. GLB 25. 888 25. 952 965 975 975 975 975 975 975 975 975 975 97		36		SILTY GRAVEL with SAND (GM); very dense; brown; dry to moist; mostly coarse to fine, subrounded GRAVEL, max. 3 in. dia,; few coarse to medium									VOC=7.0 ppm	
TRANS	3	37		SAND; some fines; weak cementation.								200		
	5 3	38	000									200		
ONLY.G	3	39												
584.25	5 4	40	78.0	SILTY SAND (SM); very dense; brown; moist; mostly SAND; some fines; weak cementation.	S08	33	79	100					VOC=5.6 ppm	
732 238 2389 2384 256 258 2387 0 0 0 1 5 8 4 . 25 8 2 . 2	4	41		SAND, some lines, weak cementation.		42 37						<u> </u>		
582.25 78		42										200		
		43										000		
580.25 580.25		⁺⁺ = 45												
			. 0	Well-graded SAND with GRAVEL (SW); very dense; brown to light brown; moist; few coarse to fine, subrounded GRAVEL, max. 3 in. dia.; mostly coarse								000	VOC=8.9 ppm	_
ANS BC	4	47		SAND; weak cementation. At EL. 577.3 ft, contains medium SAND.								200		
576.25	5 4	48	. 0 .									000		
SR-710	4	49										3000		
- 12-7-09SR-710 CALTRANS BORING 57.8-75 57.6-75 57.8-75 57.8-75 57.8-75	5 5	50		Well-graded SAND with SILT (SW-SM); very dense; light brown; moist; mostly fine SAND; little fines; weak	S09	21 46	91	100				000	VOC=11.0 ppm	
MIKE		51		cementation.		45						200		
572.25		52 53										<u> </u>		
570.25		E										<u> </u>		
CALTRANS BORING RECORD MET+ENG FIXED	<u> </u>	55										<u>Q</u> Q		
IG REC				(continued) Department of Transportation	R	EPOR BOR	T TIT	LE P F	CO	RD.				HOLE ID
BORIN		Γ		Division of Engineering Services		IST. 07	С	OUN LA		RO	UTE I 0	PO: T/	STMILE T	R-09-Z3B9 EA 07-07-187900
TRANS			7	Geotechnical Services Office of Geotechnical Design - South	1 P	ROJE SR-7	ст о 10 Т	r bi	INE	E NAME L TECH	INICA	L ST	UDY	
CA					В	RIDGE	NUN	MBE	R	PREPAI M.Sa	RED BY lisbury	,	DATE	SHEET 2 of 11

	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		Re	marks
	568.25	-55 - 56		A . A .	Yellowish brown. Well-graded SAND with SILT (SW-SM) (continued).										STATE	VOC=1	5.9 ppm	
	566.25	57 58 59													00000000			
	564.25	60 61			SILTY SAND (SM); very dense; yellowish brown to olive brown; moist; mostly fine SAND; some fines; weak cementation.		S10	13 19 27	46	100		20			00000	PA VOC=7	.0 ppm	
3LB 3/10/10	562.25	62 63													00000			
RY 040808.0	560.25	64 65													20000			
RANS LIBRA	558.25	66			Poorly graded SAND with SILT (SP-SM); very dense; yellowish brown; moist; mostly fine SAND; few fines; weak cementation.										00000	VOC=9	.3 ppm	
GPJ CALTF	556.25	67 68													00000			
.OGS W REV Z2B2 Z3B8 Z3B9 Z3B10 ONLY.GPJ CALTRANS LIBRARY 040808.GLB 3/10/10	554.25	697071			Poorly graded SAND (SP); very dense; yellowish brown; moist; mostly coarse SAND; weak cementation.	\ \[\]	S11	34 49	94	100					000000	VOC=8	.0 ppm	
:B2 Z3B8 Z3	552.25	72			<u> </u>	1		45							00000			
	550.25	73 74 ⁻ 75	V												00000000	VOC=1	5.4 ppm	
NS BORING	548.25	76 77													20000			
710 CALTRA	546.25	78 79													00000			
CALTRANS BORING RECORD MET+ENG FIXED MIKE - 12-7-09SR-710 CALTRANS BORING I	544.25	80 81				\ 	S12	33 35	78	100					00000	VOC=1	9.2 ppm	
FIXED MIKE	542.25	82			SILTY SAND (SM); dense; light brown; moist; mostly SAND; some fines; weak cementation.			43							00000			
MET+ENG	540.25	83			Poorly graded SAND (SP); dense; light brown; moist; mostly coarse SAND; weak cementation.										200000			
CORE		- 85 -	_:		(continued)										\sim	1		
3 REC						_	R	EPOR	T TIT	LE	~~	n-						HOLE ID
ORING		F			Department of Transportation Division of Engineering Services		D	BORI IST.	С	OUN		ĸυ	ROU		POS	STMILE		R-09-Z3B9
NS B		L			Geotechnical Services		P	07 ROJE	OT O	LA R BF	RIDG	E NA	710 AME)	T/	Τ		07-07-187900
\LTR/					Office of Geotechnical Design - South	า 1	1 📙	SR-7	10 T	UN	NE	L TE	ECHI	NICAL ED BY	_ ST	UDY	DATE	SHEET
Ċ						_		NIDGE	. INUI	VIDE	11	M	.Sali	sbury	'		DATE	3 of 11

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	ביים ביים ביים ביים ביים ביים ביים ביים		emarks
538.25	86			Poorly graded SAND (SP) (continued).											VOC=	:20.9 ppr	n
536.25	87			SILTY SAND (SM); dense; yellowish brown; moist; mostly fine SAND; some fines; weak cementation.										000000000000000000000000000000000000000			n
534.25	90				V/S ⁻	13	17 21 26	47	100		21			000000	PA VOC=	:6.4 ppm	
532.25	92 93						20							30000			
22.8.25 52.8.25 52.8.25				Well graded SAND with CRAVEL (SWA) year dense:										000000	V0C-	:10.6 ppr	n =
528.25				Well-graded SAND with GRAVEL (SW); very dense; yellowish brown to brown; moist; little coarse, subrounded GRAVEL, max. 1 in. dia.; mostly coarse SAND; weak cementation.										000000	V00-	. то.о ррг	''
E00 0E	98 99		0.0											000000			
526.25 526.25 524.25 524.25 522.25	100 101		0		\\S^	14	34 34 30	64	100					300000	VOC=	:5.1 ppm	
522.25	102 103	<u>ء</u> َ	0	·										00000			
520.25	104	∃ :	0.0											00000	VOC	4.2	
518.25	106	H.												300000	VOC=	:4.2 ppm	
518.25 518.25 516.25 514.25 514.25	108	Ħ.		SILTY SAND (SM); very dense; yellowish brown; moist; mostly fine SAND; some fines; weak cementation.										000000			
514.25	110 111	∃ .°	0	yellowish brown; dry to moist; few coarse, subrounded GRAVEL, max. 3 in. dia.; mostly fine SAND; weak	×s′	15	50		100					00000	VOC=	:4.5 ppm	
512.25				cementation.										000000			
21.2.25 510.25 5			0 0											00000			
χ. Σ				(continued)		DI	POR'	ד דוד	1 =								HOLE ID
2 All A			7	Department of Transportation		E	ST.	NG	RE OUN		RD	ROU	TE	DO.	STMILE		R-09-Z3B9
				Division of Engineering Services Geotechnical Services		0	31.)7 ROJE(LA		E NI	710		T	T	•	07-07-187900
CALIKA				Office of Geotechnical Design - South	n 1	8	RIDGE	10 T	UN	NE	L TI	E CHI EPARI	NICAL ED BY sbury		UDY	DAT	E SHEET 4 of 11

	ELEVATION (ft)	115 115	Material Graphics		Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Cassilla Cas	marks
	508.25	-		Well-graded SAND with GRAVEL (SW) (continued).									DDDD	VOC=4.2 ppm	
		118 119											00000000		
	504.25 502.25	121		SILTY SAND (SM); very dense; yellowish brown to dark yellowish brown; dry to moist; mostly fine SAND; some fines; weak cementation.	X	S16	50		100				000000000	VOC=4.6 ppm	
40808.GLB 3/10	502.25	123											MMM		
ANS LIBRARY 0	498.25	- 1		Well-graded SAND with GRAVEL (SW); very dense; yellowish brown; dry to moist; few coarse, subrounded GRAVEL, max. 3 in. dia.; mostly fine SAND; weak cementation.									200000000000	VOC=9.6 ppm	
ALY.GPJ CALTR	496.25												000		
Z3B9 Z3B10 ON	494.25	Е	*0 * 2	SILTY SAND (SM); very dense; yellowish brown; moist; mostly fine SAND; some fines; weak cementation.	M	S17	50 38 42	80	100		20		0000000	VOC=10.8 ppm	
EV Z2B2 2	492.25 490.25	133		SANDY SILT (ML); stiff; yellowish brown; moist; some fine SAND; some nonplastic to low plasticity fines; weak cementation.									22222222222		
NS BORING LOGS	488.25	_ ⊢		Well-graded SAND with SILT and GRAVEL (SW-SM); dense to very dense; yellowish brown to light brown; moist; few coarse, subrounded GRAVEL, max. 3 in. dia.; mostly coarse to fine SAND; few fines; weak cementation.									00000000	VOC=7.4 ppm	
CALTRANS BORING RECORD MET+ENG FIXED MIKE - 12-7-09SR-710 CALTRANS BORING	486.25	Ė											0000000		
E - 12-7-09	484.25	140 141		Well-graded SAND with GRAVEL (SW); dense to very dense; yellowish brown; moist; few coarse, subrounded GRAVEL, max75 in. dia.; mostly coarse	X	S18	38 50		100	-			0000	VOC=15.3 ppm	
IG FIXED MIK	482.25	142 143	* · · · · · · · · · · · · · · · · · · ·	to fine SAND; weak cementation.									00000000	VOC=20.9 ppm	
RD MET+EN	480.25	144 145	. 0 . 4												
ZECC.		-		(continued)		15	EDOD.	T T17	1 -						HOLE ID
RINGF				Department of Transportation			EPOR' BORI	NG	RE			.T.C	L DC:	OTAU F	R-09-Z3B9
S BO				Division of Engineering Services Geotechnical Services			IST. 07		LA		ROL 71	0	PO: T/	STMILE T	07-07-187900
CALTRAN				Office of Geotechnical Design - South	า 1	ا ا	ROJE(SR-7 RIDGE	10 T	UN	NE	E NAME L TECH PREPAR M.Sal	ED BY		DATE	SHEET 5 of 11

Cad Sinidod Sinvat IVO

ELEVATION (ft)	9 DEPTH (ft)	Material Graphics		Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Remarks
178.25	146	0.0	Well-graded SAND with GRAVEL (SW) (continued).										DODO	
176.25	147 148	. Q											MMM	
74.25	149 150	-0.	CLAYEY SAND (SC); very dense; reddish brown; moist; mostly medium to fine SAND; some low	\/s	319	17	57	100		14			rivin	PI, PA
72.25	151 152		moist; mostly medium to fine SAND; some low plasticity fines; weak cementation.	X.		27 30						-	MANA	VOC=1.8 ppm
70.25	153 154												MANNE	
68.25	155 156		At EL. 469.3 ft, grades to olive gray.										MANAGE	VOC=10.8 ppm
66.25	157 158								,				MANNE	
64.25	159 160		At EL. 464.3 ft, grades to reddish brown; moist.	Λs	520	15		100					<u> </u>	VOC=14.9 ppm
32.25	-	/./ 1 *	IGNEOUS ROCK, (DIORITE), pale reddish brown to grayish orange, decomposed, soft, very intensely fractured, fracture zone dipping 36°, [WILSON QUARTZ DIORITE]		221	50		100	70				\$X\$X	
30.25	164 165												X 0 X	
58.25			Pale reddish brown, fracture zone dipping 35°.	C	22			100	100	11	121		0×0	VOC=1.8 ppm
56.25		3 1	Pale yellowish brown, fracture zone dipping 36°.										X0X0	UW, PA
54.25	169 170 171	\	Graylsh orange, random fracture dipping 42°.	C	223			83	83				X0X0	
52.25	172	\. \.	Pale yellowish brown, fracture zone dipping 28°.										X 0 X	
50.25	173 174	∕. ÷.	Fracture zone dipping 60°.										\ \ \ \	
	170		(continued)	24	TE									Luciese
1	L	_/	Department of Transportation Division of Engineering Services Geotechnical Services		D	EPOR BOR IST 07 ROJE	C	LA	VTY		71	TE 0	POS T/	R-09-Z3B STMILE T HOLE ID R-09-Z3B EA 07-07-187900
		1	Office of Geotechnical Design - Sou	th 1	3	SR-7	10 1	TUN	NE	LT	ECH	NICA ED BY	LST	UDY DATE SHEET
					10		.,,0	,,,,,,,,	3.34	N	.Sali	sbury	,	6 of 1

ELEVATION (ft)	SDEPTH (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	Remarks
448.25	000.0	1	CLAYEY SAND (SC) (continued). (continued). Fracture zone dipping 70°.	C24			100	100				\ \ \ \	
	177	1										X	
146.25	178	* `	Fracture zone dipping 45°.									××	
	179	/	Fracture zone dipping 38°.										
144.25	180	/	Fracture zone dipping 35°.	C25			100	100	11	118		◇ ×	VOC=12.4 ppm
	181	*										\Diamond	
142.25	182	`	Shear dipping 45°										
	183	7	Shear dipping 45°									\langle	
140.25	184	1/+	Fracture zone dipping 90°.					100				\Diamond	
	185	1	Shear dipping 45°.	C26			100	100	e i			0	VOC=2.9 ppm
438.25	186	+		18.70			122					\Diamond	
	187											\Diamond	
436.25	188	$\dot{\mathcal{L}}$	Fracture zone dipping 51°. Fracture zone dipping 42°.										UW, PA
	189	^	Fracture zone dipping 45°.									1	
434.25	190	4		C27			100	80				\$ ×	
	191			027			100	00				\Diamond	
432.25	192	*											
	193	1	Fracture zone dipping 35°,									\rangle	
430.25	194	٠,										0	
	195	1.	Fracture zone dipping 25°.	C28			97	0.5				\Diamond	VOC=0.2 ppm
428.25		+	Grayish brown. Fracture zone dipping 45°.	620			97	85				\Diamond	VOC=0.2 ррні
	197	1	Fracture zone dipping 40°.									\Diamond	
426.25	198	1	Fracture zone dipping 42°.										
	199	1										×	
424.25	200	/	Fracture zone dipping 60°.	200			70	-00				× ×	V00-0.7
	201	* '		C29			72	60				\Diamond	VOC=0.7 ppm
422.25	E	>	Fracture zone dipping 30°.									\Diamond	
	203											\Diamond	
420.25												0	
	205	٠									100	\Diamond	
			(continued)	IR	EPOF	T TI	TLE						HOLE ID
	_		Department of Transportation Division of Engineering Services	10	BOR	ING	RE		RD	ROU	TE	POS	R-09-Z3
	L	7	Geotechnical Services	P	07 ROJE	CT C	LA R BF	RIDG	EN	710 AME	0	T/	T 07-07-1879
			Office of Geotechnical Design - Sou	ıth 1	SR-7	10	TUN	NE	L TI	ECH	NICAI ED BY	L ST	DATE SHEET 7 of

ELEVATION (ft)	S SDEPTH (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)	Casing Method		emarks
418.25	206	+					0	0			× 0 ×	VOC=4.3 ppm	
416.25	207										000		
414.25	209										× 0 ×		
174.20	211	,	Light olive gray, fracture zone dipping 45°, soft clay	C30			50	42			0×0		-
412.25	212	,	matrix.								XOX		
410.25	214										0 X Q		
408.25		(-	Light bluish gray, moderately soft to moderately hard. Fracture zone dipping 62°.	C31			100	0			\$ \$ X \$ X	VOC=3.6 ppm	
406.25	217	$\overset{\sim}{\sim}$	Fracture zone dipping 50°. Fracture zone dipping 50°.								000		
404.25	219	+		C32			44	0			X 0 X		
	221	-		C33			63	0			0×0	VOC=5.7 ppm	
402.25	222	٠									X		
400.25	224		Manual Control	004			0.1	10			0×0	V00=6.7 ppg	
398.25	226		Hard to very hard.	C34			81	10			× 6×	VOC=6.7 ppm	
396.25	227										0×0		
394.25	229			C35			100				× 0 ×	VOC=1.1 ppm	
	231	+		030			100	17			$\Diamond X \Diamond X$	1,1 ppin	
392.25	232	+	Extremely hard.	C37			100	0			0×0		
390.25	234	٠.	(actioned)				Ĺ				×<		
		_/	(continued) Department of Transportation	R	EPOF BOR				RD				HOLE ID R-09-Z3B9
	L	_/ 7	Division of Engineering Services Geotechnical Services	D	IST. 07	C	LA	ITY	71	0	POS T/	T T	EA 07-07-187900
			Office of Geotechnical Design - Sout		SR-7 RIDGI				E NAME L TECH PREPAR M.Sali	ED BY		DATE	SHEET 8 of 11

ELEVATION (ft)	235 PDEPTH (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)	Casing Method	Address of the Control of the Contro	
388.25	236	*	Very hard.	C38			50	15				× <	VOC=4.2 ppm	
	237	X.	Fracture zone dipping 45°. Fracture zone dipping 45°.									0	VOC=14.0ppm	
386.25	238	,										0		
	239											0		
384.25	241			C39			60	8				0		
382.25	F	T fall										0		
	243											0		
80.25	244											\\ \\		
	245	*		C40			90	0				0	VOC=11.6 ppm	
378.25	F											X		
376.25	247											\\		
70.23	248											\$ ×		
74.25	E		With soft clay matrix.	C41			83	0				\$ X	VOC=7.1 ppm	
	251	3	With Soit day matrix.	041			03	U				\$ \	VOC-121 ppm	
372.25	252											××		
	253											♦ × ♦		
370.25												\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
368.25	255	*		C42			77	15				× <	VOC=7.0 ppm	
000.23	257	1	Fracture zone dipping 51°.									× <	1	
366.25	F		Fracture zone dipping 45°.									X	7	
	259	. `	Traditio Zone dipping 45 .									0		
364.25	260	٠		C43			70	0				\\	VOC=6.9 ppm	14
	261											\Diamond		
362.25		T .										\Diamond		
360.25	263											0		
	264 265	٠.	A Viamor								100	0		
			(continued) Department of Transportation	R	EPOF	T TIT	LE	00	D.D.		٠	-	HOLE ID	7200
	_	_/	Division of Engineering Services	D	BOR IST 07	C	OUN		עט	ROU 71	TE.	POS T/	R-09- STMILE EA 07-07-1	
		7	Geotechnical Services Office of Geotechnical Design - Sou	uth 1	ROJE SR-7	CT 0	R BF	NE	LT	AME ECH	NICA		UDY	
			A STATE OF STREET		RIDG				PR	EPAR	ED BY			of 11

ELEVATION (ft)	260 260 260 260	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		arks
358.25		4		C44			95	15				×	VOC=7,2 ppm	
356.25	267	1	Fracture zone dipping 60°.									X		
	269	X	Fracture zone dipping 60°. Fracture zone dipping 60°.									× ×		
54.25	270	Ÿ	Fracture zone dipping 43°.	C45			83	15				0 X C	UW, PL VOC=3.0 ppm	
	271	+							3	129		×<	VOC=3.0 ррпп	
52.25	272											0		
50.25												\Diamond		
	275	+		C46			75	0				0	VOC=3.0 ppm	
48.25	276											0	1.00	
346.25	277											\$		
	279	٠						h				× ×		
44.25	280	*	Some vertical fractures.	C47			96	0				0×0	VOC=4.0ppm	
	281	٠										×<	12 11 7 2	
42.25	282											\Diamond	PTS	
40.25		4		C48			100	0				0		
1	285	5		C49			100	24				0	VOC=11.0 ppm	
38.25	286	3	Fracture zone dipping 45°. Moderately fractured. Fracture zone dipping 45°. Fracture zone dipping 90°.									00	12.00	
	287	(Fracture zone dipping 90°.									\$		
36.25	288	٠,	Moderately hard.									× ×		
34.25	290			C50			100	0	ji			0×0	VOC=6.5 ppm	
	291	* .										Š		
32.25									ų.	150		0	UW, PL	
30.25	293	*							1	152		0	JVV, PL	
	295	4	(continued)									\Diamond		
		7	Department of Transportation	R	EPOF BOR	ING	RE	СО	RD					OLE ID R-09-Z3B
		_/	Division of Engineering Services Geotechnical Services	D	IST. 07	C	LA	YTY		71	TE 0	POS T/	STMILE E	A 07-07-187900
		/ ,	Office of Geotechnical Design - Sout	h 1	ROJE SR-7	10 1	TUN	NE	LT	ECH	NICA	LST	UDY	

ELEVATION (ft)	6 60 60 60 60 60 60 60 60 60 60 60 60 60	Material Graphics	DESCRIPTION Jamble 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
328.25		1		51	ш		100	0	20		0,0	×	VOC=	=8.0 ppm
	297	•										\\		
326.25												×		
1	299	•										> <		
324.25	300	+ 1	Rottom of horsholo at 200 0 ft has									\Diamond	VOC=	=6.4 ppm
	301		Bottom of borehole at 300.0 ft bgs Borehole was converted to piezometer at the completion of drilling.										V00-	-0.4 ррш
22.25	302													
	303													
20.25	304													
	305													
18.25	306													
	307													
16.25	308													
	309													
14.25	310													
	311													
12.25	312													
	313													
	314													
	315													
08.25	=													
	317													
	318													
	319													
04.25														
02.25	321													
	323													
00.25	E													
-5.20	325													
			Department of Transaction	RE	POR	ŢŢĬŢ	LE		14					HOLE ID R-09-Z3E
	_	_/	Department of Transportation Division of Engineering Services	DIS	ST	NG	RE		RD	ROU 71	TE	PC	STMILE	R-09-Z3E
	L	7	Geotechnical Services	PR	7 ROJE	CTO	R BF	RIDG	E N/	AME	CAG		San San	07-07-18790
-			Office of Geotechnical Design - South 1		RIDGE				PRI	PAR	NICA ED BY sbur	LS	TUDY	DATE SHEET 11 of

M. S	alisb	-	2-23	N DATE 3-09		MPLETIO -11-09	N DATE	34° 6' 2	26.07	" /	118	° 10	53 '	" 1	NAD	83	and Da	tum)			-Z3B10	
DRILLII Caltr								BOREHOL									Dr.				E ELEVATION TE NAVD88	
Bulk	ER TY	re-L PE(S) (1.4	.ine) AND SIZE "),Punch	Core	•	IQ Core)	CME 85 SPT HAMI	MER T	nat	ic, 1		-				•			4 in HAMMEI 87%	OLE DIAMETE	Y, ERi
			FILL AND C stalled o			n		GROUND! READING		RI	DURII NM		ORILI	ING			DRILLI f t on			375.0	EPTH OF BO	RING
ELEVATION (ft)	DEPTH (ft)	Material Graphics			DESC	RIPTION	N			Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	F	Remarks	
624.80 622.80	1 2 3 4		ASPHALT Poorly gradense; brousubangula cementatic SANDY S some fine cementatic	ided GF own; dry ar GRA\ on; (Age ILT (ML SAND;	RAVEL (0 r; mostly /EL, max gregate I); mediu mostly r	GP); medi coarse, a x. 2 in. dia Base = 6" m stiff; brannlastic	angular to a.; weak). own; dry t	o moist;	B	01			100					XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	in a Soi and 200 A.1 Sur Ted	accordance I & Rock Lot I Presentat I)T), except of the Fina mmary Rep chnical Stu- unty, Califo	ecord was pre with the Caltri ogging, Classif ion Manual (Ju as noted in Ap al Geotechnica oort, SR-710 T dy, Los Angele ornia, dated Ap	ans fication une, opend al unnel es
620.80	5		SILTY CL dry to moi	AY (CL- st; nonp	·ML); me plastic fin	edium stiff nes; weak	; yellowish cementat	n brown; ion.	S	02	3 3 2	5	100							nd Auger fr C=3.5 ppm		
618.80	7 8 9 10		SILTY CL yellowish nonplastic	brown;	moist; fe	w fine SA	ND; most	ly	P	03			100		23	107		DODDODDDDDDDDD	UW VO	/ C=1.1 ppm	1	
614.80	12		nonpiastic	to low	piasticity	Tines; we	eak cemer	itation.										DOODDOOD				
610.80	15								So	04	4 7 10	17	100					Manna	VO	C=6.0ppm		
608.80	17 18																	MANNA				
	20 21		SANDY S to moist; for cementation	ew fine); mediu SAND; r	m stiff; ye nostly nor	ellowish br nplastic fir	rown; dry nes; weak	P	05			33					mann	VO	C=3.5 ppm	1	
604.80	23																	mannana				
	25				(00	ntinued)												20				
				Divis	artment ion of I	t of Tran Enginee	sportation			DIS	POR BORI ST.	NG	TLE RE		RD	ROL 71		PC T	о ст мі	LE	HOLE ID R-09-2 EA 07-07-18	
		7				al Service eotechnic		gn - Sou	th 1	PR S	ROJE	10 T	R BF	NE	L TI	ME ECH	NICA ED BY	L S		Y		

ELEVATION (ft)) DEPTH (ft)	Material	Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	(pcf)	Shear Strength (tsf)	Drilling Method	R R	emarks
600.80			·//	Fat CLAY with SAND (CH); soft to medium stiff; yellowish brown; moist; mostly low plasticity fines; weak cementation.	M	S06	5 8 11	19	100		24			NOVO	PI, PA VOC=4.1 ppm	
598.80	27 28 29		0	SILTY CLAY with GRAVEL (CL-ML); medium stiff; yellowish brown mottled with dark gray; moist; about 25% few fine, subangular GRAVEL, max. 1 in. dia.; about 10% medium SAND; mostly nonplastic to low plasticity fines; weak cementation.										00000000		
596.80	30			CLAYEY SAND with GRAVEL (SC); medium stiff; yellowish brown mottled with dark gray; moist; about 20% few fine, subangular GRAVEL, max. 1 in. dia.; about 45% mostly fine SAND; some fines; weak		P07			100					00000	VOC=0.8 ppm	
594.80	32 33			cementation. SILTY CLAY (CL-ML); soft to medium stiff; olive gray;										000000		
592.80	34			moist; mostly nonplastic to low plasticity fines; weak cementation; wood fragments.										MINIO		
590.80	36			SILTY CLAY with SAND (CL-ML); medium stiff; yellowish brown; dry to moist; few fine SAND; mostly nonplastic to low plasticity fines; weak cementation.	M	S08	6 7 12	19	100					0000	VOC=0.8 ppm	
588.80				About 15% fine GRAVEL, max. 3/4 in. dia										0000000		
586.80				SANDY SILTY CLAY (CL-ML); medium stiff; yellowish brown mottled with dark gray; moist; little medium		P09			100					000000	VOC=0.8 ppm	
584.80	41 42 43		ľИ	SAND; mostly nonplastic to low plasticity fines; weak cementation; wood fragments.										assassas		
582.80	44													00000		
580.80				SILTY CLAY with SAND (CL-ML); medium stiff to stiff; brownish yellow; moist; few fine SAND; mostly nonplastic to low plasticity fines; weak cementation.	M	S10	6 6 7	13	100				PP = 3.5	00000	VOC=0.7 ppm	
578.80		Y												00000		
576.80	50 51			Lean CLAY (CL); hard; yellowish brown; dry to moist; few fine SAND; mostly nonplastic to low plasticity fines; weak cementation; >4.0 TSF.		P11			100		24 1	107	PP = 4	000000	UW, PI VOC=0.7 ppm	
574.80	52 53													MANNA		
572.80				1.5 TSF.										DDDDD		
	-00			(continued)												
			/	Department of Transportation Division of Engineering Services			REPOR BOR DIST. 07	ING	RE OUN		ı	ROU 71 (PO:	STMILE	HOLE ID R-09-Z3B EA 07-07-18790
	L	7	/	Geotechnical Services Office of Geotechnical Design - Sout	:h ′	1 _	ROJE	ст о 10 Т	UN	NE	E NAM L TE PREI	ME CH I PARI	NICAI ED BY sbury	L ST		

570.80 568.80 566.80	56 57 58		Lean CLAY with SAND (CL); very stiff; yellowish brown; dry; few fine SAND; mostly nonplastic to low plasticity fines; weak cementation; 3.5 TSF, fragments		Sample Number	Blows per	Blows per foot	Recovery	RQD (%)	Moisture Content (9	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Re	marks
		-	of strongly cemented olive gray silty fine sandstone.	X	S12	6 5 5	10	100				PP = 3	MANA		
			SANDY SILT (ML); hard; yellowish brown; dry; some fine SAND; mostly nonplastic fines; weak cementation; >4 TSF.										MANN		
00.00	59 60			T	P13			100					DODODODODO	VOC=0.3 ppm	
72.51	62			1									mm		
562.80	63												400000000		
60.80	66	11/11/11	SEDIMENTARY ROCK, (MUDSTONE), moderately bedded, moderate yellowish brown and dark gray, slightly weathered, moderately hard, slightly fractured, sandy, fine sand. [TOPANGA FORMATION]		C14			100	100				X 0 X	See note at the regarding RQD	
558.80	67 68 69				C15			100	100				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
56.80	70		Very thinly bedded, pale yellowish brown, dipping 22°. Dark gray.		C16			100	100	10	128		000	UW, PI, PA	
554.80	71									10	120		0×0×		
552.80	73) 	Laminated, olive gray, dipping 18°. Moderately bedded, dark gray, incipient fracture (not healed), dipping 90°.										X0X		
50.80	75 76	//	Moderate brown. Joint (CL, not healed), dipping 25°,		C17			100	80				\\ \\ \\	VOC=1.7.6ppm	
548.80	77 78 79		Joint (CL, not healed), dipping 24°. Joint (CL, not healed), dipping 32°. Joint (CL, not healed), dipping 29°, bedding dipping 19 int (CL, not healed), dipping 35°. Joint (CL, not healed), dipping 31°. Very thinly interbedded lenses of weakly cemented silty fine sandstone.										00000		
46.80	80 81		Joint (CL, not healed), dipping 31°. SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, light gray, hard, slightly fractured, silty.		C18			100	92				× 0×	VOC=1.5 ppm	
644.80	82 83		Very to extremely hard. Wet. SEDIMENTARY ROCK, (SILTSTONE), moderately bedded, moderate brown to dusky brown, very to extremely hard, slightly fractured, dipping 17°.	7									×0×0		
542.80	84		SEDIMENTARY ROCK, (CLAYSTONE), moderately bedded, light brown, moderately hard, slightly							jes j			0×0		
	-00		(continued)	ï											
			Department of Transportation Division of Engineering Services		D	EPOR BOR IST.	ING		_	RD	ROU 710		POS T/	STMILE T	HOLE ID R-09-Z3B1 EA 07-07-187900
	L	7	Geotechnical Services		P	ROJE	сто	R BF			AME	6.34			01-01-101900
			Office of Geotechnical Design - Sout	th	-	SR-7			_			NICAI ED BY	ST	UDY DATE	SHEET

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		emarks
540.80	86		dipping 18°, sandy, fine sand. Moderate brown, moderately soft. (continued).	C19			100	0				× 6 × 4	VOC=1.4 ppm See note at the regarding RQI	
538.80	87		SEDIMENTARY ROCK, (SILTSTONE), moderately bedded, moderate brown, moderately soft, slightly fractured, sandy, fine sand.									0 X Q		
	89	·	Light gray.											
536.80	90		Moderate brown. SEDIMENTARY ROCK, (CLAYSTONE), moderately bedded, moderate brown, moderately soft, slightly fractured, sandy, fine sand.	C20			63	20				XOX	VOC=2.9 ppm	
534.80	92	7	SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, light brown, moderately soft, slightly fractured, dipping									\$		- 6
532.80	93 94	////	SEDIMENTARY ROCK, (CLAYSTONE), moderately bedded, moderate brown, moderately soft, slightly fractured, sandy, fine sand.									>X0X0		
530.80	95 96	// ::://	SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, light gray, very hard, slightly fractured, dipping \[\47^\circ, fine sand, some medium sand. \]	C21			100	70				20%	VOC=2.0 ppm	
528.80	97 98	1///:	SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, hard, slightly fractured, bedding joint (clay), dipping 42°. SEDIMENTARY ROCK, (SANDSTONE), moderately									0 X Q		
26.80	99 100		bedded, moderate brown, moderately hard, slightly fractured, medium sand, moderately graded. Silty, fine sand. SEDIMENTARY ROCK, (SILTSTONE), moderately	C22			100	100				X	VOC=1.1 ppm	
	101		bedded, moderate brown to light brown, moderately hard, slightly fractured, sandy, fine sand. SEDIMENTARY ROCK (SANDSTONE) moderately				7.70	10.75	-			\ \ \ \	5. 7	
524.80	102		bedded, moderate brown, moderately hard, slightly fractured, dipping 28°, fine sand. SEDIMENTARY ROCK, (SILTSTONE), moderately bedded, moderate brown, moderately hard, slightly						16	112			UW	
522.80		**	fractured. SEDIMENTARY ROCK, (SANDSTONE), moderately bedded, moderate brown, moderately hard, slightly fractured, dipping 27°.									0×0		
20.80	105		SEDIMENTARY ROCK, (SILTSTONE), moderately bedded, moderate brown, moderately hard, slightly fractured.	C23			100	100				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	VOC=0.5 ppm	
518.80	107 108		SEDIMENTARY ROCK, (CLAYSTONE), moderately bedded, moderate brown, moderately hard, slightly fractured. SEDIMENTARY ROCK, (SILTSTONE), moderately									0 X Q		
	109	111	bedded, moderate brown, moderately hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), very thinly bedded, light gray, very to extremely hard, slightly									X O X		
516.80	110		fractured. SEDIMENTARY ROCK, (CLAYSTONE), thinly to moderately bedded, moderate brown, moderately hard, slightly fractured.	C24			100	100				X	VOC=3.9 ppm	
14.80	112	1	SEDIMENTARY ROCK, (SILTSTONE), thinly to moderately bedded, moderate brown, moderately hard, slightly fractured, with fine sand.									2×4		
12.80	113 114		SEDIMENTARY ROCK, (SANDSTONE), thinly to moderately bedded, light gray, moderately hard, slightly fractured, silty with some clay, fine sand, SEDIMENTARY ROCK, (CLAYSTONE), thinly to moderately bedded, moderate brown, very hard,									0×0×		
	115		" slightly" (continued)											
1			Department of Transportation	.50	EPOR BOR IST.	ING	RE		RD	ROU	ITE	POS	STMILE	R-09-Z3B1
	L	7	Division of Engineering Services Geotechnical Services	P	07 ROJE	CTC	LA R B	RIDG	SE N.	710 AME	0	T/	T	07-07-187900
		1	Office of Geotechnical Design - South	11	SR-7	10	TUN	NE	LT	ECH EPAR	NICA	LST	UDY DATE	SHEET

ELEVATION (ft)	ў DЕРТН (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	
510.80	116	11:11	fractured, bedding joint (CL, not healed), dipping 28°. SEDIMENTARY ROCK, (SILTSTONE), thinly to moderately bedded, moderate brown, very hard, slightly fractured, sandy, fine sand. Light gray, dipping 18°, with fine sand.	C25			100	100				XOX	VOC=1.5 ppm See note at the end of log regarding RQD.
508.80	118	::]]]]	SEDIMENTARY ROCK, (SANDSTONE), moderate brown. SEDIMENTARY ROCK, (CLAYSTONE), laminated, dark gray, moderately hard, slightly fractured, dipping										
506.80	119	11/2:	18°, fine sand. SEDIMENTARY ROCK, (SILTSTONE), thinly to moderately bedded, moderate brown, moderately hard, slightly fractured, with some fine sand.	C26			100	100	8			OXO)	VOC=1.3 ppm
504.80	121	//:::	(continued). SEDIMENTARY ROCK, (SANDSTONE), thinly to moderately bedded, moderate brown, hard, slightly fractured, sandy, fine sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly to									X 0 X	
502.80	123 124	1///	moderately bedded, light gray, soft, slightly fractured, fine sand. SEDIMENTARY ROCK, (SILTSTONE), thinly to moderately bedded, moderate brown, hard, slightly	C27			113	93				\$ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	LINA DI DA
500.80	125	11/11	fractured. Thinly to moderately bedded, moderate brown, hard, slightly fractured. Dark gray, dipping 25°.	C28			94	39	13	116		OXO)	VOC=0.9 ppm
1 4 4	127	(1)//	Moderate brown. Bedding joint (CL, not healed), dipping 17°. SEDIMENTARY ROCK, (SANDSTONE), laminated, light gray, hard, slightly fractured, silty, fine sand.					41				× 0 ×	
	129	11/1//	SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), very thinly bedded, light gray, hard, slightly fractured, dipping 38°, sitty, fine sand.	C29			167	58				♦ × ♦	VOC=1.3 ppm
496.80	130	1111	SEDIMENTARY ROCK, (SILTSTONE), thinly to moderately bedded, moderate brown, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), laminated,	C30			100	0				0X0	
494.80	132	÷:///	light gray, hard, slightly fractured, dipping 26°, silty, fine sand. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, slightly fractured.	- C31			88	75				XOX	
492.80	134 135	11.11	SEDIMENTARY ROCK, (SANDSTONE), laminated, light gray, hard, slightly fractured, dipping 25°, silty, fine sand. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, slightly fractured.	C32			100	100				♦ × ♦	VOC-0 8
490.80	E	1/1/1/2	SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, hard, slightly fractured, bedding joint dipping 24°. SEDIMENTARY ROCK, (SANDSTONE), thinly				100	100				\ \ \ \ \ \ \	VOC=0.8 ppm
488.80	138	///:::/	bedded, light gray, hard, slightly fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), thinly									XOX	
	139	<i>M</i> .	bedded, light gray, moderately hard, slightly fractured, silty, fine sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, slightly fractured,	C33			93	90				0×0	VOC=0.8 ppm
484.80	141		bedding joint dipping 17°. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, moderately hard, very slightly fractured. Dipping 12°.									\ \ \ \ \ \	
482.80	143 144	11/1	SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, very slightly fractured, shear (CL), dipping 18°. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, moderately hard, very slightly									>X \ \ \	
	145		(continued)	ш								V	
			Department of Transportation		EPOF BOR			co	BU.				HOLE ID
	L	_/	Division of Engineering Services Geotechnical Services	D	IST. 07 ROJE	C	LA	ITY		710 AME	TE 0	PO:	R-09-Z3B STMILE T EA 07-07-187900
			Office of Geotechnical Design - Sout	h 1	SR-7	10 1	UN	NE	L T	ECH EPAR	NICA ED BY sbury		DATE SHEET 5 of 13

ELEVATION (ft)	PPDEPTH (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	
480.80			fractured. SEDIMENTARY ROCK, (SANDSTONE), very thinly bedded, light gray, moderately hard, very slightly fractured, dipping 24°.	C34			100	100				X0X	VOC=0.8 ppm See note at the end of log regarding RQD.
478.80		4.	SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), laminated to very thinly bedded, light gray, hard, slightly fractured, fine sand.									\$ \ \$ \ \$ \ \$ \	
476.80	149) J	Dipping 17°. Laminated, bedding joint dipping 42°. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, slightly fractured, sandy, fine	C35			100	100				0 X Q	VOC=1.0 ppm
474.80	151 152	11/1/2	sand. Bedding joint dipping 29°. Very hard, bedding joint dipping 29°. SEDIMENTARY ROCK, (SANDSTONE), laminated to very thinly bedded, moderate brown to light gray, hard,						11	116		>X \ \ \ \	uw
472.80	153 154		slightly fractured, fine sand. Dipping 27°. Dipping 26°. SEDIMENTARY ROCK, (CLAYSTONE), laminated to very thinly bedded, moderate brown, hard, slightly									XOX	
470.80	155 156	11111	fractured, shear (CL, not healed), dipping 32°, slightly plastic. SEDIMENTARY ROCK, (SANDSTONE), laminated to very thinly bedded, moderate brown, hard, slightly fractured.	C36			75	75	8			♦ × ♦	VOC=0.8 ppm
	157 158	111	SEDIMENTARY ROCK, (CLAYSTONE), laminated to very thinly bedded, moderate brown, hard, slightly fractured. SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, olive gray, moderately hard to hard, slightly	C37			100	100				(OXO)	VOC=0.4 ppm
468.80 466.80	159 160	1111	fractured, fine sand. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, slightly fractured, sandy, fine sand. SEDIMENTARY ROCK, (SANDSTONE), thinly	C38			97	97				000	VOC=0.4 ppm
	161	11/18:	bedded, light gray, moderately hard to hard, slightly fractured, dipping 42°, silty, fine sand, poorly graded. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, slightly fractured.									000	
464.80 462.80		(1)(1)	Thinly bedded, moderate brown, hard, slightly fractured, sandy, fine sand, poorly graded. Hard to very hard, bedding joint dipping 36°. SEDIMENTARY ROCK, (SANDSTONE), laminated, light gray to olive gray, hard, slightly fractured, dipping									0X0X	
		11/11/1	52°, fine sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately soft to moderately hard, slightly fractured. SEDIMENTARY ROCK, (SILTSTONE), laminated,	C39			92	92				XOX	VOC=0.6 ppm
458.80		111	moderate brown, moderately soft to moderately hard, slightly fractured, dipping 36°, sandy, fine sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, slightly fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded.	C40			100	100				XOXO	
456.80	169 170	1511	light gray mottled with moderate brown, hard to very hard, slightly to very slightly fractured, sandy, fine Manderate brown. Incipient fracture dipping 90°.	C41			100	94		-		X0X0	VOC=0.6 ppm
454.80	E		SEDIMENTARY ROCK, (SANDSTONE), laminated, light gray, moderately hard, slightly to very slightly fractured, bedding joint (gypsum, not healed), dipping						10	121		\$X\$X	luw
452.80	E	1.1.1	12°. SEDIMENTARY ROCK, (SILTSTONE), laminated, moderate brown, hard, slightly to very slightly SECHMENTARY ROCK, (SANDSTONE), laminated,	C42			108	100				\\	
	110		(continued)										
	_		Department of Transportation Division of Engineering Services	D	EPOR BOR IST. 07	ING	RE OUN LA	ITY		ROU 710	TE D	POS T/	HOLE ID R-09-Z3B10 STMILE EA 07-07-187900
			Geotechnical Services Office of Geotechnical Design - South	11 3	ROJE SR-7 RIDGI	10 7	UN	NE	PRI	EPAR	NICAI ED BY sbury	-	

ELEVATION (ft)	DEPTH (ft)	Material Graphics		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Remarks
450.80	176		light gray, moderately hard, slightly to very slightly fractured, dipping 10°.	C43			100	100				Ž	VOC=1.4 ppm See note at the end of log
	177		SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, slightly to very slightly fractured, sandy, fine sand, poorly graded. SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, light gray, hard, slightly to very slightly fractured, dipping 12°, silty, fine sand.									>X	regarding RQD.
	179	///	SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard to very hard, slightly to very	C44			183	0				×	
446.80	180	W://	slightly fractured, sandy, fine sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, slightly to very	C45		16	111	100				♦ × ♦	VOC=2.5 ppm
444.80	181 182	1/1/2	slightly fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, slightly to very slightly S환화내면NTARY ROCK, (CLAYSTONE), thinly bedded,										
	183		moderate brown, moderately hard, slightly to very slightly fractured.	046			447	67				0	
442.80	184		SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, slightly to very slightly set set bedded, moderate brown, moderately hard, slightly to very moderate brown, moderately hard, slightly to very	C46			117	0/				\ \ \ \	
442.80 440.80	185 186	11/11/	slightly fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard to very hard, slightly to very	C47			108	63				0 X Q	VOC=3.4 ppm
	187)]/;/ <u>/</u> /	slightly fractured. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, slightly to very slightly fractured.									\ \ \ \	
	188 189	· · · ·	SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, slightly to very slightly settlers. SECHIMENTARY ROCK, (CLAYSTONE), thinly bedded,						17	110			uw
436.80			moderate brown, moderately hard, slightly to very slightly fractured.	C48			100					X	V00-2 5
	191		SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, slightly to very slightly setwing thinly bedded, setwing thinly bedded,	C49			111	26				\$	VOC=2.5 ppm
434.80		11/1/	moderate brown, moderately hard, slightly to very slightly fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, slightly to very slightly									000	
432.80	193 194	· · ·	fractured, gradational contact. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, slightly to very slightly fractured.										
	195	-	signity fractured. Signity fractured. Signity fractured. Signity fractured. Signity fractured.	C50			114	33				♦ ×	VOC=1.8 ppm
430.80	196 197	Nii)))	SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, dark gray, very to extremely hard, slightly to very slightly fractured, incipient fracture (gypsum), silty,									♦ × ♦	
428.80	198		学的例色NTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, slightly to very slightly fractured, with some fine sand.	C51			125	58	,				
426.80	199 200		SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, very hard, slightly to very slightly fractured, incipient fracture (CL, not healed), dipping 28°.										
.20.00	201	//:/	Incipient fracture (CL, not healed), dipping 36°. Incipient fracture (CL, not healed), dipping 39°. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded,	C52			133	53				♦ × ♦	VOC=1.7 ppm
424.80		//: //	moderate brown, very hard, slightly to very slightly fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, very hard, slightly to very slightly									SX SX	
428.80 426.80 424.80 422.80	203	1	fractured, sandy, fine sand, poorly graded. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, very hard, slightly to very slightly fractured, with some fine sand.	C53			100	100				X	
	205		(continued)						ALC: A			$ \lozenge $	I F
			Department of Transportation		EPOR BOR			СО	RD				HOLE ID R-09-Z3B10
	L		Division of Engineering Services Geotechnical Services	D	IST. 07	C	LA	ITY		710		PO:	STMILE EA
		/	Office of Geotechnical Design - South	11 3		10 1	UN	NE	LT	ECH	NICA	LST	
				BI	RIDGI	= NU	MRF	K			ED BY sbur y	,	DATE SHEET 7 of 13

ELEVATION (ft)	дрертн (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		
420.80	205	3.7	SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, very hard, slightly to very slightly fractured.	C54			100		11			0 × <	VOC=2.8 ppm See note at the end of log regarding RQD.	
418.80	207 208 209	X	SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, olive gray, very hard, slightly to very slightly setwire. Setwire and the slightly to very slightly setwire. Setwire and the slightly bedded, moderate brown, very hard, intensely fractured, sandy, fine sand, poorly graded. Joint (CL, not healed), dipping 10°. Joint (CL, not healed), dipping 45°. Joint (CL, not healed), dipping 45°.	C55			92	92				X0X0X		
416.80	210	7	Joint (CL, not healed), dipping 43°. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, intensely fractured.	C56			100	100	8			200	VOC=2.3 ppm	
414.80	211 212 213		SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, moderately hard, intensely fractured. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, intensely fractured. SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, moderate brown to dark gray, moderately									XOXOX		
412.80	214		hard, intensely fractured, dipping 27°, silty, fine sand. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, intensely fractured, sandy, fine									X		
410.80		,	sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, intensely fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, moderately hard, intensely fractured.	C57			100	100				XOX	VOC=1.4 ppm	
408.80	217 218 219	1	SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, intensely fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, moderately hard, intensely fractured. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded.									\$X\$X\$		
406.80	220		moderate brown, moderately hard, intensely fractured. SEDIMENTARY ROCK, (SILTSTONE), laminated, moderate brown, moderately hard, intensely fractured. Dipping 60°.	C58		-	93	93				000	VOC=2.9 ppm	
404.80	221	1.11	SEDIMENTARY ROCK, (CLAYSTONE), laminated, moderate brown, moderately hard, intensely fractured. SEDIMENTARY ROCK, (SILTSTONE), laminated, moderate brown, moderately hard, intensely fractured. SEDIMENTARY ROCK, (CLAYSTONE), laminated,									XOXO.		
402.80		****	moderate brown, moderately hard, intensely fractured. SEDIMENTARY ROCK, (SILTSTONE), laminated, moderate brown, moderately hard, intensely fractured. SEDIMENTARY ROCK, (SANDSTONE), laminated, olive gray, moderately hard, intensely fractured, silty, fine sand.	C59			100	100	4.2	422		XOXOX	EM, UC VOC=1.8 ppm	
	227	77.	SEDIMENTARY ROCK, (CLAYSTONE), laminated, moderate brown, moderately hard, intensely fractured. SEDIMENTARY ROCK, (SANDSTONE), laminated, olive gray to light gray, moderately hard, intensely fractured, silty, fine sand.						13	123		XOXO	VOC-1.0 ppm	
398.80	228	. "	Shear (CL, not healed), dipping 90°, moderately plastic, multiple planes that merge into vertical from bedding orientation. Dipping 50°.	C60			100	100				000		
396.80	230	1 1	(continued). Light brown, moderately fractured, incipient fracture dipping 65°. Light gray, incipient fracture (ML, not healed), dipping 45°									X 0 X	VOC=1.9 ppm	
394.80		3	Incipient fracture (ML, not healed), dipping 40°. Incipient fracture (ML, not healed), dipping 40°. Incipient fracture (ML, not healed), dipping 10 to 30°, multiple planes at different strikes. Incipient fracture (ML, not healed), dipping 45°.									(0×0)		
392.80	E		Incipient fracture (ML, not healed), dipping 45°. Incipient fracture (ML, not healed), dipping 5 to 15°, multiple planes with similar strikes. Incipient fracture (ML, not healed), dipping 10°. Incipient fracture (ML, not healed), dipping 10°.	C61			86	67				OXO	VOC=2.3 ppm	
	235		(continued)											
1	_		Department of Transportation Division of Engineering Services	D	EPOR BOR IST. 07	ING	OUN LA	ITY		ROU 710	TE)	POS T/	HOLE ID R-09-Z3 STMILE EA 07-07-1879	C. 1
			Geotechnical Services Office of Geotechnical Design - South	11 3	ROJE SR-7 RIDGI	10 T	UN	NE	PRE	EPAR	NICA ED BY sbury		DATE SHEET 8 of	13

ELEVATION (ft)	SDEPTH (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	
390.80	E		Incipient fracture (ML, not healed), dipping 20°. Incipient fracture (ML, not healed), dipping 15°. Incipient fracture (ML, not healed), dipping 45°. Incipient fracture (ML, not healed), dipping 60°.	C61			86	67				XOX	See note at the end of log regarding RQD.
388.80	237	13/13/	Joint dipping 45°. Shear dipping 75°. Shear dipping 25°. Shear dipping 50°. Shear (CL, not healed), dipping 80°.	C62			108	83				0×0	
386.80			Shear (CL, not healed), dipping 80°. Moderate brown, shear (CL, not healed), dipping 40°. Shear (CL, not healed), dipping 45°. Shear (CL, not healed), dipping 30 to 45°. Light gray, extremely weak. Fine sand, some medium sand.	C63			100	68				X0X0	VOC=14.1 ppm
384.80	241	11/1/1	Incipient fracture dipping 90°. Joint (ML, not healed), dipping 45°. Laminated, dipping 50°. Thinly bedded, joint (CL, not healed), dipping 50°. Joint (CL, not healed), dipping 40°.									2000	
382.80	243 244	11.1.1.1	Incipient fracture dipping 70°. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, moderately hard, moderately fractured, dipping 30°, with some fine sand, poorly graded.									×0×4	
380.80	245 246	W. 22.	SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, moderately fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, moderately hard, moderately	C64			90	87	d			XOXC	VOC=0.2 ppm
378.80	E	11/1/11	fractured. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, light olive gray, moderately hard, moderately fractured, incipient fracture dipping 45°.									\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	
376.80		1//	SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, light olive gray, moderately hard, moderately fractured, sandy, fine sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, light brown, soft, moderately fractured.	C65		4	97	87				(0×0)	VOC=0.1 ppm
374.80			SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, light gray, moderately hard, moderately fractured, dipping 30°, Silty, fine sand. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, moderately fractured, sandy,									000	
372.80		/////	fine sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, hard, moderately fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, moderately fractured.					4				2000	
370.80	E	////////	SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, hard, moderately fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, moderately fractured.	C66			107	0	16	110		XOX	VOC=0.2 ppm UW, CR
368.80	257	1/1/1/1/	SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, light gray, moderately hard, moderately fractured, dipping 20°, medium sand, moderately SIZORNENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, moderately									XOX	
366.80	259 260 261	1////	fractured, dipping 20°. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, moderately hard, moderately fractured, sandy, fine sand, poorly graded. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded,	C67			100	72	X			X0X0	VOC=0.1 ppm
364.80	E	11.1.1	moderate brown, moderately hard, moderately fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, moderately hard, moderately fractured, sandy, fine sand, poorly graded.									(0XQ)	
362.80	E		reactived, saridy, life saild, poorly graded. SCDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, moderately fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded,			1			gere y			000	
	265		(continued)										
			Department of Transportation	R	EPOR	TIT	LE	00	חם				HOLE ID
	L	_/	Division of Engineering Services Geotechnical Services	DI (SOR IST. D7 ROJE	С	OUN LA	ITY		710		POS T/	R-09-Z3B10 STMILE EA 07-07-187900
			Office of Geotechnical Design - South	11 5		10 T	UN	NE	PRI	EPARI	NICA ED BY sbury		DATE SHEET 9 of 13

ELEVATION (ft)	DEPTH (#)	Material		DESCRIPTION	Sample Location	Domina pidiupo	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Re	marks
360.80	205	1	fractu	rate brown, moderately hard, moderately red, sandy, fine sand.	Ce	88			100	80	F			×	VOC=0.2 ppm See note at the	
300.00	267		bedde	MENTARY ROCK, (SANDSTONE), thinly ed, light gray to dark gray, extremely hard, rately fractured, incipient fracture dipping 45°,	Ш									X	regarding RQD	
358.80			STEP SH	MENTARY ROCK, (SILTSTONE), thinly bedded rate brown, hard, moderately fractured, dipping											1	
330.00	269	= , 1	SEDIM	vith some fine sand. MENTARY ROCK, (CLAYSTONE), thinly bedder	d,									\		
356.80		∃^;s	fractu	rate brown, moderately hard, moderatelý red, dipping 30°. MENTARY ROCK, (SILTSTONE), thinly bedded	\blacksquare									0	15	
550.00	271	*	moder SEDIN	rate brown, hard, moderately fractured. MENTARY ROCK, (CLAYSTONE), thinly bedder	C6	9			100	92				0	VOC=0.1 ppm	
354.80			fractu											0		
554.00	273		mode	MENTARY ROCK, (SILTSTONE), thinly bedded rate brown, moderately hard, moderately red.	·									0		
352.80		1/:/	mode: fractu													
	275			MENTARY ROCK, (SILTSTONE), thinly bedded rate brown, moderately hard, moderately	, C7	0		- 6	100	0	d			\Diamond	VOC=0.0 ppm	
350.80	276		SEDIM	MENTARY ROCK, (CLAYSTONE), thinly bedder rate brown, moderately hard, moderately	d,									\Diamond		
	277		fractur SEDIN	red. MENTARY ROCK, (SILTSTONE), thinly bedded	-									0		
348.80	278		fractu		- C7	1		100	75	0						
	279		mode	MENTARY ROCK, (CLAYSTONE), thinly bedder rate brown, moderately hard, moderately red, dipping 35°.	u,-											
346.80	280	1.5	SEDIN bedde	MENTARY ROCK, (SANDSTONE), thinly ed, light brown, moderately hard, moderately red, silty, fine sand.	C7	2		10	100	87				××	VOC=0.3 ppm	
	281	<u>``</u>	mode	MENTARY ROCK, (CLAYSTONE), thinly bedder rate brown, moderately hard, moderately	d, -											
344.80	282 283		mode	MENTARY ROCK, (SILTSTONE), thinly bedded rate brown, moderately hard, moderately	í											
342.80		- ·	SEDI	red, with fine sand. MENTARY ROCK, (CLAYSTONE), thinly bedder rate brown, moderately hard, moderately	d,									0		
	285		SEDIN moder	MENTARY ROCK, (SILTSTONE), thinly bedded rate brown, moderately hard, moderately	, C7	'3			100	79				0	VOC=0.2 ppm	
340.80	286		SEDI	red, sandy, fine sand. MENTARY ROCK, (CLAYSTONE), thinly bedder rate brown, moderately hard, moderately	d, ^E	1								0		
	287		fractui Dippir	red. ng 10°.										\Diamond		
338.80	288		SEDIN	ent fracture dipping 90°. MENTARY ROCK, (SILTSTONE), thinly bedded	1									\Diamond	11 1 1	
	289	::\ :\	fractur Shear	rate brown, moderately hard, moderately red, sandy, fine sand. (ML, not healed), dipping 15°.	C7	'3	Н		111	83				\Diamond	SD, EM, UC	
336.80	290		Patch SEDIN	es of petroleum?. MENTARY ROCK, (CLAYSTONE), thinly bedde	d, - C7	4			100	90	11	127		0	VOC=0.3 ppm	
	291	<u>**</u>	fractu	rate brown, moderately hard, moderately red, dipping 40°. MENTARY ROCK, (SANDSTONE), thinly	-111											
334.80	292		bedde	ed, light gray, moderately hard, moderately MENTARY ROCK, (SILTSTONE), thinly bedded	-									X		
	293		mode	rate brown, moderately hard, moderately red, dipping 60°, clasts of light brown to dark										X		
332.80	294	7:7	Seyal bedde	silty fine sandstone and moderate brown MENTARY ROCK, (SANDSTONE), thinly ed, light gray, moderately hard, moderately										XX		
	295		fractu	red_medium sand with some fine sand (continued)	Ш	_								$ \vee $		
				Department of Transportation			POR			co	RD				11	R-09-Z3B1
	ſ	_/	-	Division of Engineering Services		DIS	ST.	C	OUN			71		POS T/	STMILE T	EA 07-07-187900
	-	7		Geotechnical Services Office of Geotechnical Design - So	uth 1	PR	OJE	OTO	R BF			AME	NICA			
					agest N		IDGE	_			PR	EPAR	ED BY	-	DATE	SHEET 10 of 13

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method		marks
330.80	296	/	Incipient fracture (gypsum, not healed), dipping 40°. Incipient fracture (gypsum, not healed), dipping 50°, silty, fine sand.	C75			100	100				0 X 4	VOC=0.0 ppm See note at the regarding RQD	
328.80			SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, moderately fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, light olive, moderately hard, moderately fractured, sandy, fine sand, with lenses of moderate brown									XOXOX		
326.80	300		claystone. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, moderately hard, moderately fractured, dipping 40°.	C76			100	80				0×0	VOC=0.8 ppm	
324.80	301		SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, moderately hard, moderately fractured, sandy, fine sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded,									\ \ \ \ \		
	303	1	moderate brown, moderately hard, moderately fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, moderately fractured, dipping									200		
322.80 320.80	305		70°. Laminated, dipping 40°. SEDIMENTARY ROCK, (CLAYSTONE), laminated, moderate brown, hard, moderately fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, light gray, hard, moderately fractured, sandy, fine	C77		1	100	100				0000	VOC=0.6 ppm	
	307	``	発動MENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, hard, moderately fractured, dipping 25°.									XOX	PTS	
318.80	308	.	SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard, moderately fractured. SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, light brown, hard, moderately fractured, fine									0×0		
316.80	310 311	277	Baxidient fracture (ML), dipping 10°. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, very hard, moderately fractured, bedding joint dipping 40°.	C78			87	0				XOX	VOC=0.0 ppm	
314.80	E		SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, very hard, moderately fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, very hard, moderately fractured, fine sand.									000		
312.80	314	• .	SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, light gray, very hard, moderately fractured, bedding joint dipping 30°. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded,				1	4				0 X Q		
310.80	315 316	1.	moderate brown, very hard, moderately fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, very hard, moderately fractured. Incipient fracture (ML), dipping 30°.	C79			124	0	9	133		X0X	VOC=1.0 ppm EM, UC	
308.80	317 318	· · ·	SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, light brown, weak, very hard, moderately 통존해내면NTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, very hard, moderately fractured.									0×0		
306.80	319	7.1.	SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, moderate brown, very hard, moderately fractured, dipping 50°, fine sand. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded,	C80			110	0				XOX	lian in the	
	321	11.11	moderate brown, very hard, moderately fractured, bedding joint dipping 50°. SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, moderate brown, very hard, moderately									000	VOC=0.5 ppm	
304.80	322	/////	fractured, fault dipping 20°. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, very hard, moderately fractured. SEDIMENTARY ROCK, (SANDSTONE), thinly	C81			100	0				× 0 ×		
302.80	324	1111	bedded, moderate brown, very hard, moderately fractured, fault dipping 45°. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded,	C82			100	0				0×0		
			(continued)											
	F		Department of Transportation Division of Engineering Services	D	EPOR BOR	ING	OUN		RD	ROU	TE		STMILE	R-09-Z3B1
	L	7	Geotechnical Services Office of Geotechnical Design - South	P	07 ROJE SR-7	сто	R BR	RIDG	E N/	710 AME FCHI	NICA	T/		07-07-187900
			Since of George Inical Design - South		RIDGI				PRI	EPARI	ED BY sbury		DATE	SHEET 11 of 13

ELEVATION (ft)	SDEPTH (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	
300.80	326	1111	moderate brown, very hard, moderately fractured. SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, moderate brown, very hard, moderately fractured, dipping 40°.	C82			100	0				<0×<	VOC=0.8 ppm See note at the end of log regarding RQD.
298.80	327 328 329	1/://:/	SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, very hard, moderately fractured. SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, light gray, very hard, moderately fractured. Joint dipping 30°, fine sand, some medium.									XOXOX	
296.80	E	11/1	Dipping 70°. Shear (ML, not healed), dipping 60°. Incipient fracture (ML, not healed), dipping 15°. Extremely hard, incipient fracture dipping 70°. Bedding joint dipping 45°.	C83			100	95				0×0	VOC=0.2 ppm
294.80	331	1	Moderately hard. Very to extremely hard, intensely fractured. Incipient fracture dipping 60°. Unit is very weak. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded,						12	121		X0X.	SD, EM, UC
	333	1/5	moderate brown, very to extremely hard, intensely fractured, dipping 20°. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, pale olive, very to extremely hard, intensely fractured,									000	
292.80 290.80	335 336	<i>///</i>	sandy, fine sand. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, pale olive, very to extremely hard, intensely fractured. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, pale olive, very to extremely hard, intensely fractured. SEDIMENTARY ROCK, (SANDSTONE), thinly	C84			95	100				X0X0X	VOC=0.6 ppm
		1/////	bedded, dark gray, very to extremely hard, intensely fractured, dipping 15°. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, very to extremely hard, intensely fractured, dipping 45°.									(OXOX	
286.80	339 340 341	11/1/1	SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, light brown, moderately hard, intensely fractured, dipping 30°. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, extremely weak, hard, intensely	C85			100	50				(OXO)	VOC=0.3 ppm
284.80	342		fractured. Shear (CL), dipping 40°. Shear (CL), dipping 60°. Shear (CL), dipping 40°. SEDIMENTARY ROCK, (SANDSTONE), thinly									0×0	
282.80			bedded, light gray to light olive, moderately hard, intensely fractured, dipping 25°. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard to very hard, intensely fractured.									X0X0	
	345 346		SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, light gray to light clive, hard to very hard, intensely fractured, dipping 20°. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard to very hard, intensely fractured.	C86			120	0				XOX	VOC=0.2 ppm
278.80	347 348	<i>``.</i> '	SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, hard to very hard, intensely fractured, with fine sand. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, hard to very hard, intensely fractured.	C87			120	0	1			\$ \$ \$ \$	
276.80		1111	Light olive. SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, light olive mottled with dark greenish gray, hard to very hard, intensely fractured, dipping 12°, with fine sand. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded.	C88		1	98	75				\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	VOC=1.5 ppm
274.80	351 352 353	1111	light olive mottled with dark greenish gray, hard to very hard, intensely fractured. Light olive. Moderately soft to moderately hard, shear (CL), dipping 50°.									\\ \\ \\ \\ \\	
272.80	E	11/1	Hard. Very hard. Sandy, medium sand with some fine sand. Light gray.	C89			100	75			ij	000	
	-300		(continued)										- Accounts
	_		Department of Transportation Division of Engineering Services Geotechnical Services	DI	BOR IST.	ING C	OUN LA	ITY		ROU 71 0		PO:	HOLE ID R-09-Z3B10 STMILE T EA 07-07-187900
			Office of Geotechnical Design - South	11 5	ROJE SR-7 RIDGE	10 T	UN	NEL	PRI	EPAR	NICAI ED BY sbury		DATE SHEET 12 of 13

ELEVATION (ft)	SDEPTH (ft)	Material	Graphics		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Annual Control of the
270.80		Ħ		SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, light gray, very weak, extremely hard, intensely fractured, silty, medium sand with some Madeesselychard.	C89			100	75	, a			X0X	VOC=0.1 ppm See note at the end of log regarding RQD. EM, UC
268.80	357 358	Ξ,			C90			100	50	8	134		♦ × ♦	regarding RQD. EM, UC
266.80	359 360	\exists	1/	SEDIMENTARY ROCK, (CLAYSTONE), thinly bedded, moderate brown, hard, intensely fractured, dipping 15°, with fine sand.									X0X0	VOC=0.2 ppm
264.80	361 362		1	SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, grayish brown, very hard, intensely fractured,	C91		16	100	83				X 0 X	VOC=0.2 ppm
262.80	363 364	⊟ ነ		bedding joint dipping 50°, with silt, fine sand. Light gray, moderately hard.									\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
260.80		Ħ;	" / " /	SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown, moderately hard, intensely fractured.	C92			89	64				\\ \\ \\	
258.80		Ξ,	111		C93		豚	100	63				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
256.80		_	1111	Incipient fracture dipping 50°. Joint (CL, not healed), dipping 45°.									0×0	
254.80		Ξ.	1111	SEDIMENTARY ROCK, (SANDSTONE), thinly bedded, light gray, extremely hard, intensely fractured, dipping 20°, fine sand. SEDIMENTARY ROCK, (SILTSTONE), thinly bedded, moderate brown to light olive, extremely hard,	C94		-4	131	67				000	
252.80		, , , ,	11111	intensely fractured, dipping 40°, sandy, fine sand. Dipping 25°. Joint (CL, not healed), dipping 40°. Dipping 20°.									>>	
250.80	375 376		-	Bottom of borehole at 375.0 ft bgs Borehole was converted to piezometer at the completion of drilling.							-4		NZI.	
248.80	377 378			RQD values provided in the boring logs are based on intact core pieces obtained between two natural discontinuities. Majority of cores obtained in this boring are weak and does not meet the "sound core" definition provided in standard test method for RQD ASTM D 6032. These RQD values should not be used										
246.80	379 380			to evaluate the rock mass quality.										
244.80	381 382													
242.80	383													
	385		/	Department of Transportation	1,50	EPOR BOR	ING	RE			D.C		[na-	HOLE ID R-09-Z3B1
	L			Division of Engineering Services Geotechnical Services		IST. 07		LA			710		PO:	T EA 07-07-187900
		1	1	Office of Geotechnical Design - South	11 3	SR-7	10	ΓUΝ	NE		CH	VICA	ST	
					В	RIDGI	E NU	MBE	R	PRE	PARE	D BY		DATE SHEE

PREPARED BY M.Salisbury

SHEET 13 of 13

	GED E Bark		BEGIN DATE 1-13-09	COMPLETION DATE 1-21-09	BOREHOL 34° 5' 5							and Dat	um)		LE ID 2-09-	Z3B11	
		CONTR. IS Drill	ACTOR ing Services		BOREHOL Lt Sta							nbra R	d.			ELEVATION NAVD8	
		METHO Wire-L			DRILL RIG										REHOL in	E DIAMET	ER
SAM	PLER	TYPE(S) AND SIZE(S) (ID) "),Punch Core(2.5	5") HO Core	SPT HAMN	IER TY		40 I	h 3	RO in	sh dra	'n		HA		EFFICIENC	Y, ERi
BOR	EHOL	E BACK	FILL AND COMPLETION	ON	GROUNDV READINGS	VATER	DURI				AFTER	DRILLIN		ATE) TO	TAL DE	PTH OF B	ORING
₽I6 €	zom	neter in	stalled on Comp	Dietion	KLADINGC		NM				_	ft on	/-1-	09 2	75.0 ft		
LEVATION	ODEPTH (#)	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	_		marks	
EAC V184 V188 V285 V285 V285 V194 V188 V288 V194 V188 V288 V194 V188 V288 V194 V188 V288 V194 V194 V194 V194 V194 V194 V194 V194	3		ASPHALT (6"). SILTY, CLAYEY SA Very dark brown; dry fine SAND; [ALLUV	ND (SC-SM); medium do y; few fine GRAVEL; med IUM]	ense; dium to	D01			100					in accord Soil & Ro and Pres 2007), e A.1 of th Summar Technica	dance wock Log sentation scept as e Final of y Report al Study	ord was pro ith the Calt ging, Class n Manual (.s noted in A Geotechnic t, SR-710 - , Los Ange nia, dated A	rans ification lune, ppendix al runnel
ONLY.GPJ CALIKAN	5 1 6 7		CLAYEY SAND (SC moist; medium to fin	c); medium dense; olive be se SAND.	 prown;	S02	8 14 15	29	100					Hand Au VOC=2.		n 0.5' - 5'	
525.1 525.1 523.1	9												<u> </u>	VOC=2.	3 ppm		
	11 12 13 11 14 15		SILTY SAND (SM); trace fine GRAVEL;	medium dense; olive bro mostly medium to fine S	wn; moist; AND.	O03			17	1	3 113		DODODÓDODODÓ	UW, PA			es pril,
517.1	1 16		At EL. 516.1 ft, obs	served 0.5' lens of (Poorl	y graded	S04	6 13 13	26	100				00000000	VOC=2.			
CALIKANS BOKING KECOKD ME HENG TIXED KKIS - SK-710 CALIKANS BOKING LOGS WITH	19		, (ci), coals										<u> </u>	35-0.	F.E		
211.1 511.1	23		At EL. 512.1 ft, cor GRAVEL.	ntains few fine, subangul	ar	O05			33	1	1 107		00000000	UW, PI			
509.1	1 24									'			200				
Ž.	 25		1	(continued)								'		•			
AS BORING R			Divisio	ment of Transportati n of Engineering Ser chnical Services		D	EPOR BORI IST. 07	NG C	REO OUN LA	TY	ROL 71		POS T/	STMILE T		HOLE ID R-09- EA 07-07-1	Z3B1 87900
K KA				of Geotechnical Des	ign - Sout	h 1 📑		10 T	UNI	NEL	TECH	NICAL	_ ST	UDY	D.*==		
Ď.						В	RIDGE	: NUI	NREH	Υ Ρ	REPAR K. Ba	r ker			DATE	SHI 1	of 10

ELEVATION (ft)	й 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	Real Real	emarks
507.11	26		At EL. 508.1 ft, with 0.5' to 1' interbeds of (SANDY SILT) (ML/SM); fine SAND. SILTY SAND (SM) (continued).	\/	S06	11	33	100					MM	VOC=1.7 ppm	
	27			X		15 18							000		
505.11	28 29												DDDD		
503.11	30												0000	VOC=1.5 ppm	
501.11	31			1	O07			33					<u> </u>	UW	
ARY 0408	33												0000		
499.11	34									14	102		000000		
497.11	35				S08	6	19	100					000		
ONLY.GF	37			X	300	9	19	100					DOWN		
495.11	38												<u> </u>		
493.11	40													VOC=3.3 ppm	
2B3 22B4	41		Poorly graded SAND with SILT (SP-SM); medium dense; olive brown; moist; mostly medium to fine	1	O09			17						UW, PA	
491.11	42		SAND.												
489.11	44									22	98		00000		
487.11	45												000		
D KING LC	47			M	S10	7 7 9	16	100					MANN		
485.11	48														
483.11	49 50		SILTY SAND with GRAVEL (SM); medium dense; alive										00000000	VOC=3.1 ppm	
XX - XX	51	0.0	SILTY SAND with GRAVEL (SM); medium dense; olive brown; moist; little fine GRAVEL; fine SAND.	1)10A			0							
481.11	52	0											000000000	No Recovery	
503.111 503.111 503.111 503.111 497.112 498.7111 497.111 497.111 497.111 497.111 497.111 497.111 497.111 497.111 497.111 497.111 497.111 497.111 497.111	54	0											0000		
COKO	55	[⁰] 4	(continued)										\triangleright		
NG. KE			Department of Transportation		R	EPOR BOR	T TIT	LE RE	CO						HOLE ID R-09-Z3B1 1
A POR S			Division of Engineering Services Geotechnical Services			IST. 07		OUN LA			ROU 71 (TE D	POS T/	STMILE T	EA 07-07-187900
L I KAN			Office of Geotechnical Design - Sout	h ′	1 📑		10 T	TUN	NEI	_ TE	CHI	NICAI	_ ST		OUEET
3					B	RIDGE	IVUI	MRF	ľζ	K .	Bar	ED BY ker		DATE	SHEET 2 of 10

ELEVATION (ft)	יי ייDEPTH (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	Regular Re	emarks
477.11	56		SILTY SAND with GRAVEL (SM) (continued).	D10,			0) (M		
4//.11	57		Well-graded SAND with SILT and GRAVEL (SW-SM); very dense; olive brown; moist; fine GRAVEL; coarse to fine SAND; weak cementation.	S11	31	56	100				000		
475.11			to line SAND, weak cementation.	<u> </u>	25						200		
4/3.11	59										MMM	VOC=1.1 ppm	
و 473.11											000		
3/10/	61		At EL. 473.1 ft, contains 1' lens of trace coarse GRAVEL; moderate cementation.								000		
5 8 471.11		: 1 .	At EL. 472.1 ft, becomes dense; little coarse to fine GRAVEL; mostly coarse to fine SAND; few low	012	2		33				000000000	UW, PA	
× 040%			plasticity fines.								DIVI		
469.11								1	0 138		000	VOC=8.1 ppm	
NAN NAN NAN NAN NAN NAN NAN NAN NAN NAN	65										MM		
467.11											\triangleright		
GB 467.11	67			S13	19	46	100				000		
100 100 100 100 100 100 100 100 100 100		:0		H	27						200		
465.11			SANDY elastic SILT (MH); very stiff; olive brown; moist; some fine SAND; medium plasticity, low dry								200		
85 ANI	69		strength, low toughness fines.								000		
463.11			SILTY SAND (SM); dense; olive brown; moist; fine GRAVEL; mostly fine SAND; some low plasticity fines;										
2B3 Z			weak cementation.	014			17				0000	UW, PA VOC=7.3 ppm	
2461.11 461.11													
Z1B4	73							2	1 101		0000000	VOC=4.1 ppm	
A 보 보 보			SANDY elastic SILT (MH); very stiff; olive brown; moist; some fine SAND; medium plasticity, low dry								200		
S 457.44	1		strength, low toughness fines.										
ဗို 457.11 ဗို	1			S15	11 12	26	100				000		
NO NO NO NO NO NO NO NO NO NO NO NO NO N	77			4	14						200		
28 455.11 455.11											DDD		
0 CAL	79												
453.11											2000		
X	81		Poorly graded SAND (SP); medium dense; olive brown; moist; medium to fine SAND; few fines.	016	5		50	1	8 112		000000	UW	
451.11 X											000		
D E E E E	83										MM	VOC=1.4 ppm	
CALTRANS BORING RECORD METHENG FIXED KRIS - SR-740 CALTRANS BORING RECORD FIXED KRIS - SR-740 CALTRANS BORING RECORD FIXED KRIS - SR-740 CALTRANS BORING RECORD FIXED KRIS - SR-740 CALTRANS BORING RECORD FIXED KRIS - SR-740 CALTRANS BORING RECORD FIXED KRIS - SR-740 CALTRANS BORING RECORD FIXED KRIS - SR-740 CALTRANS BORING RECORD FIXED KRIS - SR-740 CALTRANS BORING FIXED KRIS - SR-740 CALTRANS BORING FIXED KRIS	84										200		
ECOX X	-85 <u>-</u>		(continued)			·:							LUCIEZ
RING I			Department of Transportation		BOR	ING	RE			ITC	DO:	CTMII F	HOLE ID R-09-Z3B11
NS BO			Division of Engineering Services Geotechnical Services		DIST. 07		LA LA		71		T/	STMILE T	O7-07-187900
ALIKA			Office of Geotechnical Design - South	th 1 📙	SR-7 BRIDG	'10 T	ΓUN	NEL	NAME TECH PREPAR	NICAI	_ ST	TUDY DATE	SHEET
3				1	טטואכ	LINU	IVIDE	\ F	K. Ba	rker		DATE	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	Real Real	emarks
447.11	86		Poorly graded SAND (SP) (continued).										200		
	l		SANDY SILT (ML); very stiff; dark yellowish brown; moist; some fine SAND; mostly low to medium plasticity fines.	X	S17	28 14	28	100		17			<u> </u>	PI	
445.11	88		patients, inico.			14							200		
	l F												000000	VOC=1.4 ppm	
443.11	F)))))		
B 3/10	91				040			47		00	404		200	UW, PA	
9 80 80 441.11	92				O18			17		20	101		0000000	VOC=1.4 ppm	
RY 040	93												200	VOC=1.4 ppiii	
439.11	94												000000		
TRANS	95												200		
437.11					S19	12	35	100					100		
HIL KEV Z184 Z183 Z284 Z285 AND Z3811 ONLYGPJ CALIRANS LIBRARKS 040808.GLB 3/10/10 443.111 439.11 437.111 439.111 431.111 431.111 431.111 431.111 431.111	97			X		17 18							200		
5 435.11	98												000		
Z QNA	99												2000		
433.11	100		CLAYEY SAND (SC); dense; dark yellowish brown;	-									0000000	VOC=2.1 ppm	
3 22B4	101		moist; trace fine ĠRÁVEL; some fine SAND; medium plasticity, very high dry strength, high toughness fines.		O20			67		10	101		200	UW, PI	
431.11	102		SILTY SAND with GRAVEL (SM); dense to very dense; dark yellowish brown mottled with very pale brown and moderate yellowish brown; moist; some	4	C21			10						VOC=20.1 ppn	
184 21	103		coarse to fine, subangular GRAVEL; weak cementation; gravels are granodiorite, fine to medium											VOC=2.5 ppm	
429.11		1 14 1	grained, dark yellowish brown, intensely weathered, hard.										\Diamond		
H H M	105												\Diamond		
427.11	106			H	C22			10						VOC=2.5 ppm	
ORING	107														
425.11	108												Ž		
CALTH	109												X		
423.11	110												X		
S S	111		At EL. 422.1 ft, becomes about 10% COBBLES; about 20 to 30% GRAVEL.	H	C23			33						VOC=3.0 ppm	
421.11	112		about 20 to 50 % OffAVEE.												
ENG ENG ENG ENG ENG ENG ENG ENG ENG ENG	113														
427.11 42	114														
ECOXI	115		(continued)										r Y		
SING K			Department of Transportation			BOR	ING	RE		RD					HOLE ID R-09-Z3B11
NS BOI			Division of Engineering Services Geotechnical Services			07		LA LA		E NIA	710	0	PO: T/	STMILE T	07-07-187900
ALTRAI			Office of Geotechnical Design - Sou	th	1	ROJE SR-7 BRIDGE	10 T	ΓUN	NE	L TE	ECH	NICAI ED BY	_ ST	UDY DATE	SHEET
· j						וטטוייי	LINU	יאוטב	11	K.	Bar	ker		DATE	4 of 10

CINIOCA CINVOT IV

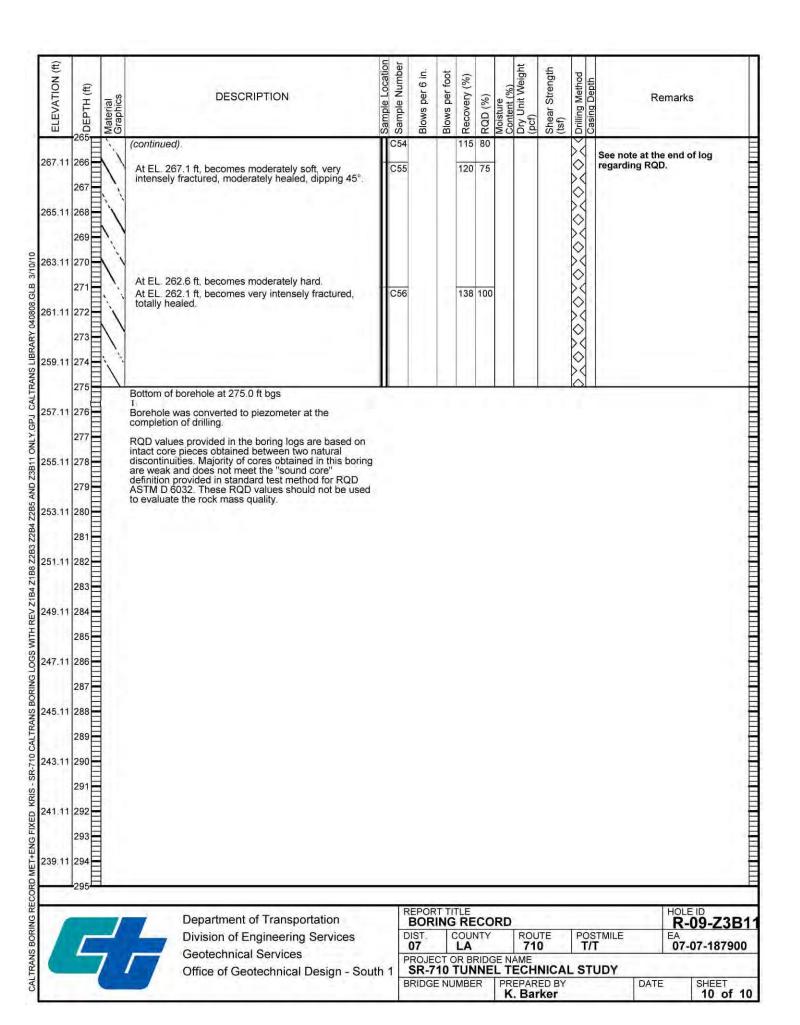
	ELEVATION (ft)	ក ភ DEPTH (ft)		Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weignt (pcf)	Shear Strength (tsf)	Drilling Method	Re	emarks
	417.11			Ø 2	SILTY SAND with GRAVEL (SM) (continued). At EL. 417.1 ft, observed little coarse to fine GRAVEL; mostly coarse to fine SAND.	C23			33 67		12			\ \ \ \ \	PI, PA	
	415.11	117118119		0.0										\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\		
3 3/10/10	413.11	120		0 2										$\Diamond \Diamond \Diamond \Diamond \Diamond$		
₹Y 040808.GLE	411.11	121122123		Ò.	SILTY SAND (SM); dense; yellowish brown; moist; trace fine GRAVEL; mostly medium to fine SAND; little fines; weak cementation.	C25			100					\ \ \ \ \	PA	
RANS LIBRAF	409.11				At EL. 409.1 ft, contains trace fine, subangular GRAVEL.									\ \ \ \ \ \	VOC=1.9 ppm	
CALTRANS BORING RECORD MET+ENG FIXED KRIS - SR-710 CALTRANS BORING LOGS WITH REV 21B4 21B8 22B3 22B4 22B5 AND 23B11 ONLY GPJ CALTRANS LIBRARY 040808.GLB 3/10/10	407.11	126 127	\exists		At EL. 407.1 ft, observed no gravel.	C26			95		11			X	PA	
AND Z3B11 ON	405.11	128 129			SANDY lean CLAY (CL); stiff; yellowish brown; moist;	-								X		
3 Z2B4 Z2B5 /	403.11	130 131			trace fine GRAVEL; some medium to fine SAND; mostly medium plasticity fines.	C27			20					×	PI, PA	
IB4 Z1B8 Z2B	401.11	132 133									26			>>>>		
WITH REV Z1	399.11	134 135			CLAYEY SAND (SC); dense to very dense; dark									\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
ORING LOGS	397.11	136 137			yellowish brown; moist; trace fine, subangular GRAVEL; coarse to medium SAND.	C28			0					\Diamond	VOC=2.1 ppm	
CALTRANS B	395.11	138 139												\Diamond		
KRIS - SR-710	393.11	140 141		$\left \right $	Poorly graded SAND with SILT and GRAVEL (SP-SM); dense; dark yellowish brown mottled with yellowish	C29			100							
ENG FIXED F	391.11	142 143		0 0	brown and pale orange; moist; few coarse to fine, subangular GRAVEL; fine SAND; few fines.									X \ \ \	VOC=2.0 ppm	
ORD MET+	389.11	144 145		ο.]	(anti											
REC					(continued)	P	EPOR	Т ТІТ	LF							HOLE ID
BORING		L			Department of Transportation Division of Engineering Services	D	BOR IST. 07	ING C	RE OUN LA			ROU ⁻	ΤΕ)	POS T/	STMILE T	R-09-Z3B11
ANS		L	7		Geotechnical Services	Р	ROJE	CT OI	R BF	RIDG	E NA	ME				3. 0. 10.000
ALTF					Office of Geotechnical Design - Sout		SR-7 RIDGE						NICAL ED BY	_ 51	DATE DATE	SHEET
Ċ			_							`	K.	Barl	ker		5,(11	5 of 10

ELEVATION (ft)	145 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	Remarks
87.11	146	o o	At EL. 388.1 ft, contains trace fine GRAVEL. Poorly graded SAND with SILT and GRAVEL (SP-SM) (continued).	C29			100					X 0 X <	
85.11	147 148 149		At EL. 384.6 ft, observed 6" lens cobbles.									\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	
33.11	150 151	3°	Well-graded SAND with SILT (SW-SM); dense; dark						14			0%0	PA
1.11] * }	yellowish brown mottled with yellowish brown and pale orange; moist; few fine GRAVEL; mostly medium to fine SAND.	C31			100					0%0	VOC=18.2 ppm
9.11	153 154 155	0	At EL. 380.6 ft, becomes some coarse to fine GRAVEL. At EL. 380.1 ft, becomes trace GRAVEL; coarse SAND. At EL. 379.1 ft, becomes about 10 to 15% coarse to fine GRAVEL. At EL. 378.1 ft, becomes trace GRAVEL.									X0X0X	
7.11	156 157	0	Poorly graded SAND with GRAVEL and COBBLES (SP); dense; dark yellowish brown; moist; about 20% COBBLES; coarse SAND; COBBLES consist of.	C32			60		100			000	VOC=20.1 ppm
5.11	158 159	- "										>>	
3.11	160		Elastic SILT (MH); very stiff; brown and dark yellowish brown; moist; medium plasticity fines.								PP = 2.5	X 0 X (
1.11			SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, laminated, dark yellowish brown, intensely weathered, moderately soft to moderately hard, intensely fractured, shear (silt, moderately healed), dipping 20 to 45°, [TOPANGA FORMATION]	C33			100	35				(0)	VOC=0.4 ppm See note at the end of log regarding RQD.
9.11	164 165		At EL. 369.6 ft, becomes soft to moderately soft.									000	
7.11	166 167			C34			100	40				0×0×	VOC=13.4 ppm
5.11	168 169		At EL. 365.1 ft, becomes very intensely fractured, moderately healed.									\ \ \ \ \	
- 11	170 171	/ ; ;		C35			100	80				XOX	
1.11	172 173	()	At EL 361.1 ft, becomes slightly mottled with greenish gray, extremely weak, moderately soft, slightly fractured, shear, dipping 45°.	933			100	JU	25	101		X0X	PI, PA, UU, CR
9.11	174	11	At EL. 358.6 ft, contains fine sandstone lenses.						- 1			♦ × ♦	
-			Department of Transportation	R	EPOF BOR	ING	LE RE	co	RD				HOLE ID R-09-Z3B
	L	_/ 7	Division of Engineering Services Geotechnical Services	D	IST. 07 ROJE	C	LA	ITY		ROU 710	TE)	POS T/	STMILE EA
			Office of Geotechnical Design - South		SR-7	10 1	UN	NE R	LTI	ECHI	NICA	LST	UDY

ELEVATION (ft)	OVEPTH (ft)	Material Graphics		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		emarks	
357.11	E	∃ ``	Poorly graded SAND with GRAVEL and COBBLES (SP) (continued). Elastic SILT (MH) (continued). (continued). At EL. 357.1 ft, becomes moderately to slightly fractured, dipping 90 to 20°.	C35			100					\ \ \ \ \ \	VOC=8.4 ppm See note at the regarding RQD VOC=3.3 ppm	e end of log).	THE PERSON NAMED IN
355.11	179	, , , ,	At EL. 355.1 ft, contains 6" fracture zone.									\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			THE PERSON NAMED IN
353.11 351.11	181 182		At EL. 352.1 ft, contains 6" fracture zone. SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, with fine sandstone lenses, massive, moderate yellowish brown mottled with olive gray, moderately weathered, soft to moderately soft, slightly fractured,	C37			110	100	7			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	VOC=20.4 ppm VOC=20.6 ppm		
	183 184 185	···\	At EL. 349.6 ft, contains 4" fracture zone. SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, laminated, moderate yellowish brown, intensely weathered, extremely weak, moderately soft, moderately fractured, (carbonate), dipping 40°. At EL. 348.2 ft, contains 5" fracture zone.						22	103		X0X0X	uc		
347.11 345.11	187 188		At EL. 347.1 ft, becomes moderately soft to moderately hard, incipient joint.	C38			80	70				\$\\\$\\\$\\\$\\	VOC=1.8 ppm		
343.11 341.11	191		At EL. 342.8 ft, contains 6" shear/fault zone, dipping 55°. At EL. 342.1 ft, becomes soft to moderately soft, slightly fractured, partially healed, dipping 45°.	C39			100	95	d e			X0X0X	UW VOC=4.0 ppm		The state of the s
339.11	193 194 195		At EL. 339.1 ft, contains 4" lens hard.									\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			
337.11 335.11	196 197 198	.,	At EL. 336.7 ft, contains 4" lens hard.	C40			100	95				>X \ \ \			
	199		At EL. 334.1 ft, becomes moderately hard, unfractured.									0X0X0			
331.11 329.11	203		At EL. 331,3 ft, contains 2" lens hard. At EL. 331,1 ft, becomes dark brown.	C41			100	100				<0X0X0	VOC=3.6 ppm VOC=2.7 ppm		
	205		(continued)									\Diamond			
				RI	EPOR	TI	ΓLE						- 1	HOLE ID	
	L	_/	Department of Transportation Division of Engineering Services Geotechnical Services	DI (ST.	(LA	ITY		ROU 710	TE 0	POS T/	STMILE T	R-09-Z3B 07-07-18790	
		/	Office of Geotechnical Design - South		ROJE	10	R BF	NE	ENA	ECH	NICAI	ST	UDY		
					RIDGE				PRE		ED BY	4 *	DATE	SHEET 7 of 10	_

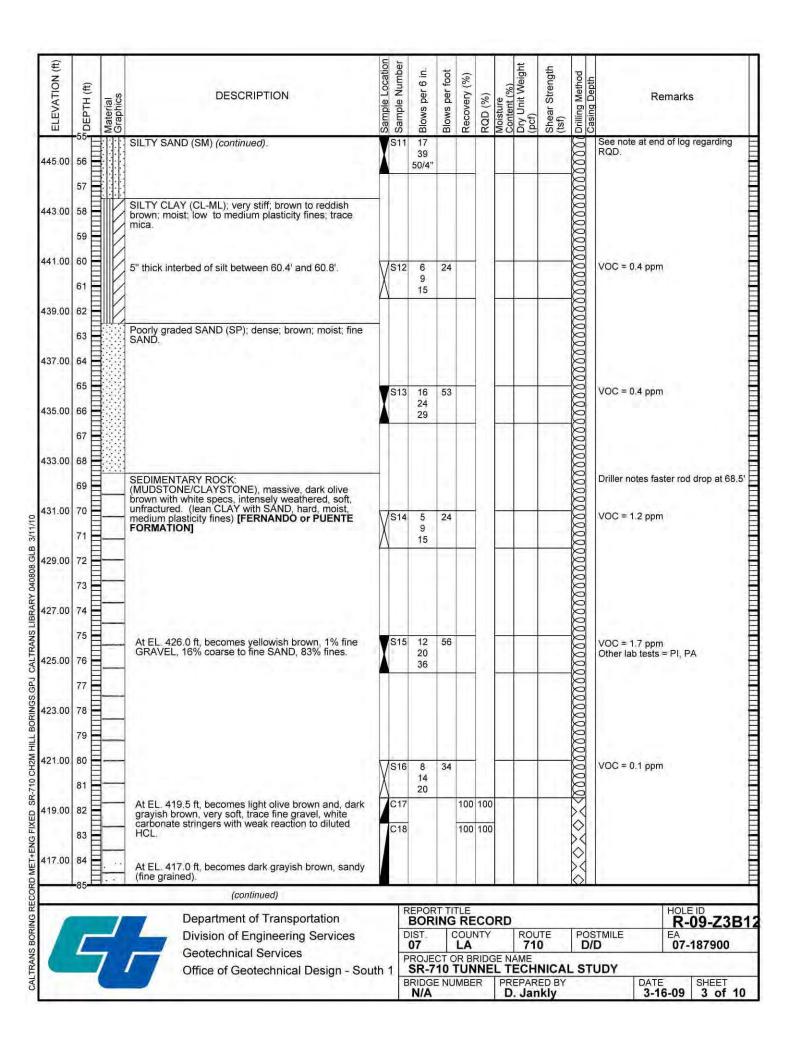
ELEVATION (ft)	SDEPTH (ft)	Material Graphics		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Casing Method	Remarks
327.11	206		(continued). At EL. 327.1 ft, becomes slightly fractured, dipping 50 to 45°.	C41			100					X0X0	See note at the end of log regarding RQD. VOC=1.0 ppm
325.11	208											× 0 ×	
323.11	210		At EL. 323.6 ft, contains lenses of fine sandstone, 1-3" thick. Unit is extremely weak. At EL. 323.1 ft, observed shear, dipping 45°.						21	112		0×0	PTS, SD, EM, UC
321.11	211		At EL. 322.3 ft, observed shear/fault zone, dipping ®EL. 322.1 ft, contains 6" slightly weathered, hard, fracture zone, not healed. At EL. 321.6 ft, becomes moderately soft, slightly fractured, dipping 45°.	C43			100	90				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	uw
19.11	213		SEDIMENTARY ROCK, (SANDSTONE), fine-grained, massive, dark reddish brown, intensely weathered, moderately soft, unfractured.									X0X	
317.11	215		SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, laminated, dark reddish brown, intensely weathered, moderately soft, slightly fractured.	C44			100	100	51			000	UU
15.11	217		At EL. 316.3 ft, becomes intensely weathered, moderately soft, moderately to slightly fractured, incipient fracture, dipping 60 to 30°, with lenses of fine sandstone.						22	101		0×0	VOC=0.9 ppm PI, UC
13.11	219 220 221	1	At EL. 314.3 ft, contains 2" slightly weathered, hard, fracture zone, not healed. Unit is extremely weak. SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, laminated, dusky yellowish brown and dark greenish gray, intensely weathered, moderately hard, very intensely to intensely fractured, (moderately healed), dipping 40 to 80°, swells when excavated.	C45			110	80	4-7			X0X0X	VOC=2.8 ppm
11.11 09.11	223		dipping 40 to 60 , swells when excavated.									\$X\$X\$X\$	
07.11	225 226 227		At EL. 307.1 ft, becomes totally healed, Unit is extremely weak.	C46		95	110	50	15	119		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	EM, UC VOC=4.2 ppm
05.11	229	1	At EL. 304.1 ft, becomes fresh, hard, intensely fractured, random fracture, totally healed, dipping ADEL. 303,3 ft, becomes intensely weathered, moderately hard, very intensely fractured, incipient									0000	
01.11	232		joint. At EL. 302.1 ft, becomes intensely fractured, partially healed, with light gray sandstone lenses, 1-2" thick, 1' spacing.	C47			110	80				XOXOX	VOC=5.7 ppm PTS
99.11	234	1										♦ × ♦	
			(continued)	l n	EPOF	T T	TIE						THOIRIN
1	_	_/	Department of Transportation Division of Engineering Services	D	EPOR BOR IST. 07	ING			RD	ROU 71		POS T/	R-09-Z3B ETMILE EA 07-07-187900
		7	Geotechnical Services Office of Geotechnical Design - South		ROJE						NICAI		
	- 11		Office of Geotechnical Design - South		RIDGI						ED BY ker	_ 0,	DATE SHEET

ELEVATION (ft)	235 24 25 25 25 25 25 26 26 27	Material Graphics	DESCRIPTION	_	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Casing Method	Remarks
297.11	236	1	At EL. 298.3 ft, contains 3" lens of fresh, very hard. (continued).	C47			110	60	ž.			Š	See note at the end of log regarding RQD.
	237							7					VOC=5.5 ppm
95.11	238	1											
	239	1										\Diamond	
93.11		1										\Diamond	
91.11	241	`		C49			120	90				0	VOC=1.1 ppm
	243	1	At EL. 290.8 ft, contains 6" fracture zone, not healed, dipping 45 to 30°.										
89.11	244	1	At EL. 290.3 ft, becomes moderately soft, intensely fractured, shear, moderately healed.									0	
	245	1	Unit is extremely weak.									0	SD, EM, PI, UC
87.11	246	1		C50			110	80	13	124		\$	VOC=2.5 ppm
	247	1.								٠		\\	
85.11	248	,										X	
83.11	250	1										\	
	251		At EL. 283.1 ft, observed At EL. 282.1 ft, becomes soft, unfractured.	C51			100	60				>	VOC=1.6, 3.8 ppm
81.11	252			031			100	00				\	VOC-1.0, 3.0 ppm
79.11	253 254	,	SEDIMENTARY ROCK, (SANDSTONE), fine-grained, massive, medium gray, intensely weathered, very soft. SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, thickly to very thickly bedded, dark greenish gray, intensely weathered, moderately soft, unfractured, incipient joint.									\$\\ \\ \\ \\ \\ \\ \	
	255	1	At EL. 278.1 ft, contains 3" lens of fine-grained sandstone.									\$ X	
	256	1		C52			100	90				◇ ×	
75.11	257	1)										♦ × ♦	
	259		SEDIMENTARY ROCK, (SANDSTONE), fine-grained, massive, light gray, slightly weathered, hard, unfractured.	C53			100	100				×<	UU, PI
73.11	260	\	SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, dark greenish gray, intensely weathered, moderately flooft.	000			100	100					
71.11	261	1	SEDIMENTARY ROCK, (SANDSTONE), fine-grained, light gray, fresh, very hard. SEDIMENTARY ROCK, (SILTSTONE)/MUDSTONE, laminated, dark greenish gray, intensely weathered,	C54		3	115	80				X 0 X	
	263	1	extremely weak, moderately soft, very intensely fractured, shear (totally healed), with fine-grained sandstone laminations.									>	SD, EM, UC
69.11	264	1,	At EL. 272.1 ft, contains 3" lens of fracture zone, At EL. 271.9 ft, becomes extremely weak, soft, slightly fractured, moderately healed, dipping 45 to 0°						14	119		0×0	
	265	-11	(continued)									. ~ !	The state of the s
1		/	Department of Transportation	- 1	BOR	ING	RE		RD	DO:		[BO:	R-09-Z3B
		7	Division of Engineering Services Geotechnical Services	(IST. D7 ROJE		LA R BE		E N	710)	T/	T EA 07-07-187900
			Office of Geotechnical Design - South	1 3	SR-7	10	TUN	NE	LT	ECHI EPARI	VICAI	ST	UDY DATE SHEET



Deliturio Methodo Rotary Wash SAMPLER TYPE(S) AND SIZE(S) (ID) SOME SIZE(S) (ID) SOME SIZE(S) (ID) DESCRIPTION SOME SIZE(S) (ID) SOME SIZE(S)	TION	R-09-Z3B1 SURFACE ELEVATI 501.0 ft NAVD	R			D83	IAD	" N ne)	124 ı, Lir	4.1 4	9' 3 et, S	Offse	' / 1	14 CAT	2.8 (BOREHOL 34° 5' 3 BOREHOL ' Lt St	COMPLETION DATE 1-13-09	N DATE -09	1-6	NTRA	ig co	OGGE R. Ch RILLIN Casc
BORRIFOLE BACKFILL AND COMPLETION READINGS NM AFTER DRILLING GATE TOTAL DEPTH OF 275.0 ft Remarks DESCRIPTION DESCRIPTI		HAMMER EFFICIEN	6 HAN									00	I A4	and YP	II R	Ingerso			AND SIZE	THOD ash PE(S)	IG ME TY W	RILLIN Rota SAMPLI
Piezometer Installed on Completion	BORING			(DATI		•											•				-	
ASPIALT of thick. Road base material, 6' thick. SANDY lean CLAY (CL): dark yellowish brown to olive prown; mist trace fine, rounded GRAVEL; medium to fine SAND; low brown; moist; trace fine, rounded GRAVEL; nonplastic fines. Department of Transportation Division of Engineering Services DET. Continued Department of Transportation Division of Engineering Services DET. COUNTY ROUTE POSTMILE REPORT TILE BORING RECORD Tale accordance with the CS old & Rock Logging, Claim accordance with the CS old & Rock Logging, C							ft o	2.8	1						<u> </u>							
ASPIALT of thick. Road base material, 6' thick. SANDY lean CLAY (CL): dark yellowish brown to olive prown; mist trace fine, rounded GRAVEL; medium to fine SAND; low brown; moist; trace fine, rounded GRAVEL; nonplastic fines. Department of Transportation Division of Engineering Services DET. Continued Department of Transportation Division of Engineering Services DET. COUNTY ROUTE POSTMILE REPORT TILE BORING RECORD Tale accordance with the CS old & Rock Logging, Claim accordance with the CS old & Rock Logging, C		Remarks		Casing Depth	Drilling Method	Shear Strength (tsf)	Shear Strength	Dry Unit Weight (pcf)	Moisture Content (%)	RQD (%)	Recovery (%)	Blows per foot	Blows per 6 in.		Sample Location		DESCRIPTION				ОЕРТН (ft)	ELEVATION (ft)
493.00 8 491.00 10 491.00 10 489.00 12 489.00 12 487.00 14 489.00 12 487.00 14 487.00 15 15 16 17 18 18 18 18 18 18 18 18 18 18 18 18 18	Caltrans assification al (June, in Append nnical 10 Tunnel ngeles ed April,	ccordance with the Ca & Rock Logging, Clas Presentation Manual 7), except as noted in of the Final Geotechn mary Report, SR-710 hnical Study, Los Ang inty, California, dated 0.	accord oil & Ro d Pres 07), ex 1 of the ammary echnica bunty, 10.	in So ar 20 A. Su Te Co 20										1	2	wn to olive fines	(CL); dark yellowish brov AND: medium plasticity f	e material ean CLAY oist: fine S	Road bas SANDY le		2 3 4 5 6	99.00 97.00 95.00
487.00 14		C = 0.4 ppm	OC = 0		mm							7	3	2	S			∕n.	Stiff; brow		8 9	93.00
483.00 18 SILT (ML); hard; light olive brown; moist; trace fine, rounded GRAVEL; nonplastic fines. 481.00 20 S4 10 60 20 40 40 40 40 40 40 40		C = 0.2 ppm	DC = 0.		DODODO							67			. S	sh brown; AND; low	very dense; light yellowis AVEL; medium to fine S				13 1 4 1 5	37.00
479.00 22 479.00 22 479.00 24 477.00 24 Department of Transportation Division of Engineering Services SILTY SAND (SM); dense; light olive brown; moist; medium to fine SAND; trace mica. Continued REPORT TITLE BORING RECORD ROUTE POSTMILE ROUTE POSTMILE					200								41			ce fine,	nt olive brown; moist; trac nonplastic fines.); hard; ligl GRAVEL; ı	SILT (ML) rounded (17	33.00
23 SILTY SAND (SM); dense; light olive brown; moist; medium to fine SAND; trace mica. (continued) Continued Continued Report Title Boring Record Report Title Boring Record Reco		C = 0.3 ppm	OC = 0	V	M							60	20		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\						21	
Department of Transportation Division of Engineering Services REPORT TITLE BORING RECORD R-09					MM											, moist;	dense; light olive brown; D; trace mica.	ND (SM); o fine SAN	SILTY SA medium to			
Department of Transportation Division of Engineering Services BORING RECORD R-09		1,,,,,,											DC-				(continued)					
PROJECT OR BRIDGE NAME	9-Z3E 87900	R-09 EA 07-18		D/D	_ C		10	71 AME	E NA	TY	RE OUN A R BF	NG C I	ORI T. 7 OJEC	DIS O			· · · · · · · · · · · · · · · · · · ·	Divisio				
Office of Geotechnical Design - South 1 SR-710 TUNNEL TECHNICAL STUDY	SHEET		Υ	TUE	L S			ECH	<u>. TI</u>	NE	UN	0 T	R-7	S	h 1	ign - Sou	of Geotechnical Des	Office				

	ELEVATION (ft)	ם חדלם חל	Material Graphics		Sample Location Sample Number		Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Rema	
	175.00	26		SILTY SAND (SM) (continued).	S5	15 22 29	51					0000	See note at end of RQD. VOC = 0.2 ppm	log regarding
		27												I, PA
-	173.00			Elastic SILT (MH); very stiff; dark brown; moist; trace mica.								3000		
	171.00	30										000		
		31			\ S€	6 14	20					2000	VOC = 0.2 ppm	
	169.00	32										3333		
	167.00	33		SILT with SAND (ML); hard; dark brown; moist; fine SAND.								2000		
ľ	107.00	35		250/ fine SAND 750/ fines	W 87	7	42						V00 00	
	165.00	36	•	25% fine SAND, 75% fines.		14 28	42						VOC = 0.3 ppm Other lab tests = P	I, PA
		37										2000		
ľ	163.00	38										MM		
0	161.00			8" Silty Sand layer between 40' and 40.7'.	\ / S8	14	34						VOC = 0.2 ppm	
B 3/11/10		41		,		15 19						2000		
NS LIBRARY 040808.GLB	159.00		<u> </u>	SILTY SAND (SM); very dense; olive brown; moist;	-							000		
RARY 04	157.00	43		SILTY SAND (SM); very dense; olive brown; moist; fine SAND; micaceous.										
		45		78% fine SAND, 22% low plasticity fines.	SS	18	75					3300	VOC = 0.0 ppm	
Ö	155.00	46			L	34 41						0000	Other Lab tests = F	PA 🖺
NGS.GP.	153.00	47										2000		
LL BORII	+55.00	49										0000		
SR-710 CH2M HILL BORINGS.GPJ	151.00	50		Light olive brown.	\/S1		49					2000	VOC = 0.0 ppm	
SR-710		51			<u> </u>	21 28								
	149.00	52 53										0000		PA III
CALTRANS BORING RECORD MET+ENG FIXED	147.00											3000		
CORD A		L ₅₅ E	<u> </u>	(continued)										<u></u>
RING RE				Department of Transportation		REPOF BOR DIST.		RE OUN		RD ROL	ITE	DO:		OLE ID R-09-Z3B12
ANS BO			7	Division of Engineering Services Geotechnical Services	-	07		LA		71 E NAME L TECH	0		/D ()7-187900
CALTF				Office of Geotechnical Design - Sout	n 1 	SR-7 BRIDG N/A	E NUI	MBE	R R	PREPAR D. Jar	INICAI ED BY I kly	∟ 51 _	DATE 3-16-0	SHEET 2 of 10



ELEVATION (ft)	DEPTH (ft)	Material Graphics		Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight	Shear Strength (tsf)	Drilling Method	Ren	narks
415.00	86		olive brown and, dark grayish brown, intensely weathered, very soft, trace fine gravel, trace sand, white carbonate stringers with weak reaction to diluted HCL. (lean CLAY with trace SAND, hard, moist,	C18			100	100			XOX	See note at end of RQD.	of log regarding
413.00	88		mostly low plastic fines). (continued). At EL. 413.5 ft, grades to thickly bedded, light olive brown and dark yellowish brown, medium plasticity with trace fine to coarse sand.	C19			100	100			XOXO	VOC = 0.1 ppm	
411.00	90	o .	At EL. 411.5 ft, becomes sandy and gravelly 91.5'.								♦ × ♦		
409.00	92	• .	At EL. 409.5 ft, becomes very dark gray, very thickly bedded. At EL. 408.5 ft, becomes moderately weathered, soft.	C20		574	100	100			OXO		
407.00	94	50	At EL. 406,9 ft, observed approximately 0.4' thick bed with abundant siltstone fragments.								\$ \$ \$ \$	V00 = 0.3 = = =	
405.00	96 97			C21			100	100			X0X0	VOC = 0.2 ppm	
403.00	98 99	6	At EL. 403.5 ft, becomes massive, dark grayish brown with trace angular gravel, no reaction to diluted HCL.								XOX	VOC = 0.2 ppm	
401.00	100										XOX	VOC = 0.1 ppm	
399.00	102	-	At EL. 398.5 ft, becomes oxidized, strong brown.	C22			100	100			\$ \$ \$ \$ \$		
397.00	104 105		At EL. 397.5 ft, becomes dark grayish brown and light olive gray, unfractured, low plasticity with trace fine gravel.								X0X0		
395.00	106 107		occasional olive brown, thin beds of coarse grained	C23			100	100			OXO.	VOC = 0.1 ppm	
393.00	108	=	sandstone, unfractured. At FL 392.0 ft, observed bedding joint, dipping 30°								\$\\ \	PI, UU	
391.00	110 111	1:/	2 trick coarse grained clayey sandstone bed with some well rounded gravel. Extremely weak. At EL, 391.0 ft, observed 1" thick, fine to coarse grained, clayey sandstone interbed, dipping 20 to 30 degrees.								>X \ \ \		
389.00	112 113	-	At El 200 0 ft observed 1" thick firs to source	C24			60	60	N		XOX	VOC = 0.2 ppm	
387.00	114	/	At EL. 387.5 ft, observed 2" thick sandstone bed, brown, fine grained with some gravel.								$\Diamond \times \Diamond$		
			(continued)	l Di	EDOF	ייד דו	ri-E					T:	JOI E ID
	Γ	_/	Department of Transportation Division of Engineering Services Geotechnical Services	DI	ST.	ING	RE OUN LA	ITY	RO 7'		POS D/	STMILE I	R-09-Z3E A-09-Z3E 07-187900
			Office of Geotechnical Design - South 1	BI	ROJE SR-7 RIDGI N/A	10 T	ΓUΝ	NE	E NAME L TECH PREPAR D. Ja	HNICA RED BY		UDY DATE 3-16	09 SHEET 4 of 1

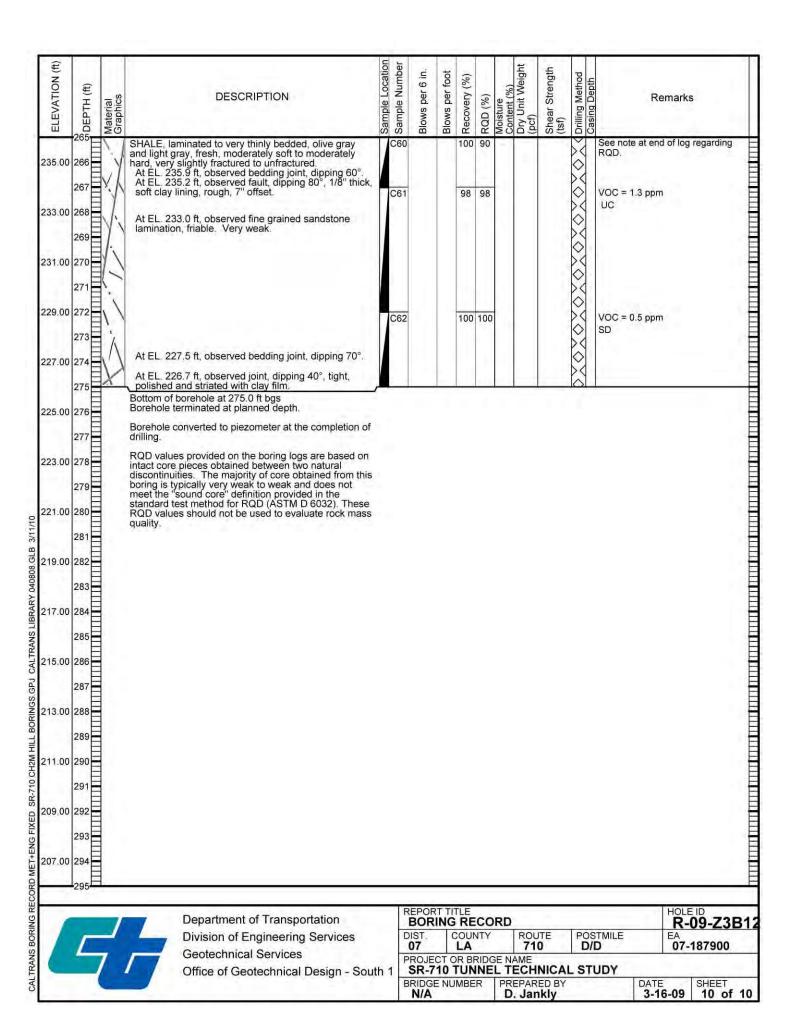
ELEVATION (ft)	STDEPTH (ft)	/ Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	S Recovery (%)	8 RQD (%)	Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Casing Method	See note at end of log regarding	g
385.00		-	At EL. 384.8 ft, becomes slightly weathered, very dark gray with scattered well rounded gravel, highly	C25			100		s.,		× 0 ×	RQD. VOC = 0.1 ppm	
383.00	117 118	/6/	plastic, unfractured.								♦ × ♦		
381.00	119	= 0									X		
-11	121	\	At EL. 380.5 ft, becomes fresh.								\(\)	VOC = 0.1 ppm	
379.00		4		C26			100	100			0 X Q		
377.00	123 124	0									× 0 ×	PI, PA	
-	125	_									\		
375.00		/0	At EL. 374.5 ft, becomes moderately weathered, olive brown, low plasticity, with few elongated gravel.	C27			100	100			× ×	VOC = 0 ppm	
73.00		= ,	brown, low plasticity, with lew elongated gravel.								×<		
71.00	129	=~									× × ×		
869.00		0	At EL. 370.0 ft, contains white calcareous gravel. Unit is massive.	C28			91	91	9.		0 X 0 X		
Ī	133	= \									\		
867.00	134 135	%									0×0		
65.00	136	()		C29			84	84	ii		X 0 X	VOC = 0.0 ppm	
63.00	137	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \									♦ × ♦		
361.00	139 140		SEDIMENTARY ROCK, (SILTSTONE), thickly bedded, pale olive mottled with white, moderately weathered, extremely weak, moderately soft, unfractured, mostly non plastic; moderate reaction to diluted HCL. [PUENTE FORMATION] At EL. 362.6 ft, observed bedding joint, dipping 30°, roughly 2" thick calcareous bed with strong reaction								XOXOX	PA, UU	
359.00	142	1.	to HCL solution. SEDIMENTARY ROCK, (SHALE) with interbedded SILTSTONE, and CALCAREOUS SILTSTONE, and CALCAREOUS SILTSTONE, laminated to very thinly bedded, pale olive to olive gray, fresh, very slightly fractured, calcareous interbeds are white and hard.	C30			94	94			×0×0	VOC = 0 ppm	
357.00		\ \ \	fractured, calcareous interbeds are white and hard. Bedding dipping 40 degrees. At EL. 359,5 ft, observed joint, dipping 80°, tight.								0×0		
	145		(continued)							k .	V.I.	k-	
1	_		Department of Transportation Division of Engineering Services	D	EPOR BOR IST.	ING	RE OUN		RD ROL 71	ITE 0	POS D/	HOLE ID R-09-Z3 STMILE EA 07-187900	
	L	7	Geotechnical Services Office of Geotechnical Design - South	P	ROJE	сто	R BF	RIDG	E NAME L TECH			7.4.	0
			Office of Geolechinical Design - South	В	RIDGI N/A			_	PREPAR D. Jar	ED BY	,	DATE SHEET 3-16-09 5 of	

ELEVATION (ft)	5 5 5 0 6 7 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Material Graphics		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method		
355.00	146	1.	SHALE with interbedded SILTSTONE, DIATOMACEOUS SILTSTONE, and CALCAREOUS SILTSTONE, laminated to very thinly bedded, pale olive to olive gray, fresh, very slightly fractured, calcareous interbeds are white and hard.	C30			94	72			×0×	See note at end of log rega RQD. VOC = 0.1 ppm	rding
353.00	148	/	(continued). At EL. 354.7 ft, becomes soft with hard SHALE beds.								\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\		
351.00		1									000		
349.00	151 152 153	1:1	At EL. 349.0 ft, becomes soft, unfractured, bedding joint, dipping 45°, breaks along bedding plane, slightly calcareous.	C32			77	77			000	VOC = 0.2 ppm	
347.00	E	111	signity calcareous.								0×0×	VOC = 0.1 ppm	
345.00	156	1	At EL 344.4 ft, becomes very slightly fractured.	C33		1	91	91	S _{ee}		000		
343.00	158	X	At EL. 343.0 ft, observed bedding joint, dipping 50°.								X0X0	VOC = 0.0 ppm	
341.00	161	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	At EL. 340.4 ft, observed joint, dipping 30°, tight, smooth. At EL. 339.9 ft, observed joint, dipping 40°, tight,	C34			100	100			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
339.00 337.00	163	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	At EL. 337.4 ft, observed bedding joint, dipping 60°.								X OXO		
	165	V	SEDIMENTARY ROCK, (SILTSTONE) and DIATOMACEOUS SILTSTONE, joint dipping 60°, tight, smooth.						2.1		\ \ \ \ \ \	CR	
335.00	167	1	At EL. 335.0 ft, becomes soft to hard, with hard, interval with calcareous/dolomitic interbeds, unfractured.	C35			76	0	3		X0X	VOC = 0.0 ppm	
333.00	168	1		C36			02	Ü				- 0.0 ppm	
	171	The state of the s	At EL. 330.2 ft, becomes yellowish brown, oxidized, intensely weathered, soft, very intensely fractured (between 170.8' to 172'). Possible faulted zone.	C37			100	70			\ \ \ \ \ \ \	VOC = 0 ppm	
329.00	173	メンド	(between 170.8' to 172'). Possible faulted zone. At EL. 329.0 ft, observed bedding joint, dipping 60°, on hard, siliceous interbed. At EL. 328.5 ft, becomes slightly fractured, joint, dipping 30°, moderately rough.								X0X0X0		
	175	M	(continued)									l-	
	_	_/	Department of Transportation Division of Engineering Services	D	BOR IST.	ING	RE OUN LA	VTY	71	ITE 0	POS D/	HOLE ID R-09- STMILE EA 07-1879	
		1	Geotechnical Services Office of Geotechnical Design - South						E NAME L TECH	NICAI	LST	UDY	
				В	RIDGI N/A				PREPAR D. Jan	ED BY		DATE SHE	of 10

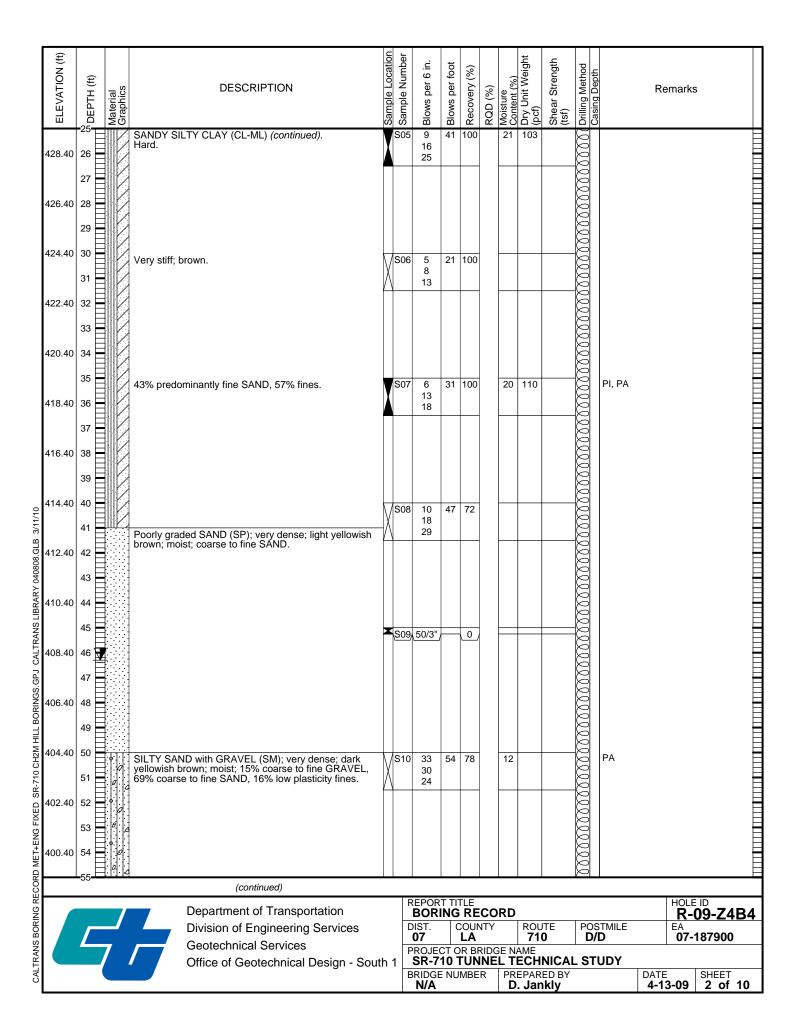
ELEVATION (ft)	24DEPTH (ft)	Material Graphics		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method		marks	
325.00		1	(continued). At EL. 325.9 ft, observed joint, dipping 70°, tight, iron oxide stained, slightly rough. SEDIMENTARY ROCK, (SHALE), very thinly to thinly bedded, olive gray and light gray, fresh, soft, very slightly fractured, oxidized bedding plane joints, no	C37 C38			92	92			0000	See note at end RQD. VOC = 0 ppm	of log regarding	
323.00		,	clay seams. At EL. 323.0 ft, observed bedding joint, dipping 60°.								X			
321.00	179	L	At EL. 321.7 ft, observed color change to very dark gray with gray banding. At EL. 321.0 ft, observed syndepositional erosional features to 180.2'.								0×0			
319.00	181	1.	At EL. 320.0 ft, becomes laminated to very thinly bedded, black, moderately fractured, low plasticity.	C39			50	O			>> >>	VOC = 0 ppm		
317.00	183	X	At EL. 318.0 ft, observed bedding joint, dipping 50°.								×0×0			
315.00	185 186 187	1	At EL. 315.2 ft, becomes black and light greenish gray, extremely weak, unfractured, unoxidized, with thin interbeds hard, siliceous material, weak reaction to diluted HCL.	C40			72	50	<		00000	VOC = 1.1 ppm UC		
313.00	188	X	At EL. 312.8 ft, observed bedding joint, dipping 70°.								\ \ \ \ \ \ \ \			
311.00 309.00	191	A	At EL. 310.2 ft, becomes moderately soft, well bedded. At EL. 309.5 ft, observed phosphatic nodule, strong brown. At EL. 308.5 ft, observed bedding joint, dipping 60°, weak reaction to diluted HCL, breaks along bedding.	C41			100	100			X0X0X0X	VOC = 0.4 ppm SD		
307.00	E	× 1	weak reaction to diluted FIGE, breaks along bedding.	C42			79	79			000	VOC = 1.3 ppm		
305.00	i E	X	At EL. 305.5 ft, observed bedding joint, dipping 60°, Scattered 1/8" thick phosphate nodules. At EL. 305.2 ft, becomes moderately soft to moderately hard, moderately fractured.	C43			83	61	9		> × 0 ×	VOC = 2.5 ppm		
303.00	E		At EL. 302.9 ft, observed three joints dipping 10 degrees, tight, stepped. At EL. 302.7 ft, observed bedding joint, dipping 60°.								>X			
301.00	200	:/	74. EE. 552,7 N, 655crved bedding john, dipping 65.	C44			100	100			X 0 X	VOC = 1.1 ppm		
299.00	202	19	At EL. 299.3 ft, observed bedding joint, dipping 55°, fish scales present. Extremely weak.								\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	uc		
297.00		1	At EL. 297.0 ft, observed bedding joint, dipping 60°, weak reaction to diluted HCL, scattered 1/8" dia.	C45			100	100			φ×φ	VOC = 1.7 ppm	ga -	
	77.5		(continued)	-										
1	_	_/	Department of Transportation Division of Engineering Services	D	EPOR BOR IST.	ING			RD ROU 71	ITE 0	POS D/	STMILE D	R-09-Z3E EA 07-187900	312
		7	Geotechnical Services	PI	ROJE	сто	R BF	IDG	E NAME		-	7.5.	0. 10/300	
			Office of Geotechnical Design - South		RIDGI				PREPAR		L 31	DATE	SHEET	

ELEVATION (ft)	900 EPTH (#)	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		
295.00		:	phosphatic nodules. SHALE, laminated to very thinly bedded, black and light greenish gray, fresh, moderately soft to moderately hard, moderately to slightly fractured. (continued). At EL. 294.0 ft, observed bedding joint, dipping 60°.	C45			100	100			>	See note at end of log regarding RQD.	
293.00	208	17							s .		XOX	V04 24	
291.00	E	<i>'</i> √ν <i>'</i> χ',	At EL. 291.5 ft, with scattered 1/8" dia. phosphate nodules.	C46			100	100			×0×0	VOC = 0.9 ppm	
289.00	212	X	At EL. 288.6 ft, observed bedding joint, dipping 60°, on 1/2" thick CLAY seam, along bedding, highly								\$ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	VOC = 5.8 ppm	
287.00	214	1/2	At EL. 286.5 ft, observed bedding joint, dipping 60°, Very weak.	C47			61	61			\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	uc	
285.00	216		At EL. 284.3 ft, observed bedding joint, dipping 60°.								(0×0)		
83.00	218	$\langle \rangle$	At EL. 283.2 ft, observed two joints dipping 30 and 40 degrees, tight, smooth.	C48			83	37			000	VOC = 38 ppm	
281.00	221	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	At EL. 280.8 ft, observed bedding joint, dipping 60°,								\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
279.00	223	'\	At EL. 277.8 ft, observed bedding joint, dipping 60°,	C49			52	52			X0X0	VOC = 2.5 ppm	
	225	1	At EL. 275.8 ft, becomes very slightly fractured to	C50			80 89	0			× 6×	VOC = 0.4 ppm	
275.00	226	Y	unfractured. At EL. 275.2 ft, observed bedding joint, dipping 65°, tight, smooth.								0×0		
273.00	228	1,	At EL. 272.7 ft, observed bedding joint, dipping 65°, tight, smooth.								000	CR	
271.00	230	,	At EL. 271.0 ft, becomes olive gray to light olive gray.	C52			68	68			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	VOC = 3.4 ppm	
269.00 267.00	233	A.	At EL. 269.0 ft, observed 4" thick siliceous bed, hard, very intensely fractured, no reaction to HCL solution, At EL. 268.3 ft, observed bedding joint, dipping 65°. At EL. 267.8 ft, observed joint, dipping 30°, tight, calcite lined, slightly rough.								\$X\$X\$X		
	235		(continued)										
	_		Department of Transportation Division of Engineering Services Geotechnical Services	D	BOR IST.	ING	RE OUN LA	ITY	71		POS D/	HOLE ID R-09-Z3B ETMILE EA 07-187900	12
			Office of Geotechnical Design - South	11 B		10 1	UN	NE	E NAME L TECH PREPAR D. Jan	ED BY	_ ST	DATE SHEET 3-16-09 8 of 10	0

ELEVATION (ft)	э ЯОЕРТН (ft)	Material Graphics		Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight	(pcf) Shear Strength	(tsf)	Casing Depth	Remarks
265.00	236	1	SHALE, laminated to very thinly bedded, olive gray and light gray, fresh, moderately soft to moderately hard, very slightly fractured to unfractured.	C53			68	68			1	1	VOC = 2.4 ppm See note at end of log regarding RQD,
263.00	237	Ý	At EL. 263.8 ft, observed bedding joint, dipping 60°.								\\ \\ \\	>	
261.00	239		PTS - Fine-grained shale or siltstone, planar bedded at the millimeter scale	C54		4	100	100	×		^ / ^		PTS VOC = 2.2 ppm
259.00	241	Ϋ́	At EL. 259.5 ft, observed bedding joint, dipping 60°.								\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
257.00	243	1	At EL. 257.0 ft, observed joint, dipping 90°, tight moderately rough, approximately 1' long. At EL. 256.3 ft, observed bedding joint, dipping 60°.	C55			100	100			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	\ \ \	VOC = 0.4 ppm
255.00	245	\ \ \ \	At EL. 256.3 ft, observed bedding joint, dipping 60°. At EL. 254.7 ft, observed bedding joint, dipping 60°.								\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	>>	
253.00	248	1		C56		110	76	60			\ \ \	4	VOC = 0.2 ppm
251.00	249	1	At EL. 252.2 ft, observed bedding joint, dipping 60°, . Very weak.								^	1	uc
249.00	251 252 253	1 September 1	At EL. 250.0 ft, observed bedding joint, dipping 60°. At EL. 249.5 ft, observed shear/fault zone, 3" thick, highly plastic, clay infilling, intensely fractured, parallel to bedding.	C57			63	63			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	0000	VOC = 0.0 ppm
247.00 245.00	255	1									\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	\ \ \	
	257	1		C58			56	56			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
243.00	259	11	At EL. 243,2 ft, observed bedding joint, dipping 60°.	C59			100	100			V > V >	1	VOC = 0.9 ppm
241.00	261	Ϋ́	At EL. 241.2 ft, observed bedding joint, dipping 60°. At EL. 240.5 ft, observed bedding joint, dipping 60°.								<><	1	
239,00	262	1/		C60			100	90			2	2	
237.00	264	X	At EL. 236.5 ft, observed bedding joint, dipping 60°.								><	>	
			Department of Transportation	R	POR	TTI	LE	-	DP.				HOLE ID
	L	_/	Division of Engineering Services Geotechnical Services	DI	ST.	C	LA	ITY	R	0UTE 710	F	05 D /	R-09-Z3B EA 07-187900
		/	Office of Geotechnical Design - South	1 5	SR-7	10 1	UN	NE	E NAM L TEC	HNIC		ST	
				BF	RIDGE N/A	= NU	MBE	R	PREP. D. J	aRED ankly	RA.		3-16-09 SHEET 9 of 10



Cascado Drilling Inc. 1. LI Sta (Westminster Avo. n/o W. Mission Rd.) 544.4 ft NAVD 88 ROBERLOTE Special Representation of Special Special Representation Special Special Special Representation Special Special Representation Special Special Representation Special Special Representation Special Special Representation Special Special Representation Special Special Representation Special Special Representation Special Representation Special Representation Special Spe		nkl NG C	y Ontr	3-10 ACTOR	1 DATE 1-09	3-16-0	ETION DATE 19	34° 4' 5 BOREHOL	1.595 E LOC	8" / 1 ATION	18° (Offs	9' 2 set, S	0.79	936 n, Lin	" N / ne)	AD83			SURFA	9-Z4 CE ELE	VATION	
Piezometer Installed on Completion READINGS NM 46.3 to n7/1/109 277.0 tt	DRILLIN Rotai SAMPLI SPT(NG M ry V ER T	Vash YPE(S	B) AND SIZE(Q core			DRILL RIG Speeds SPT HAMM Automa	tar 30)k PE amm	er 1	40 I	b. 3	80 ir	nch (drop		•	BOREH 6 in HAMME 70%	OLE DI	AMETER CIENCY, E	
ASPAND (SM) Todas brown ray to most few mosts few course for fine SAND, some low plasticity fines for fine SAND (SM) rodas brown ray to most few mostly coarse to fine SAND, some low plasticity fines for fine SAND, some low plasticity fines fi												JRILL	ING								OF BORIN	.G
ASPHALT 4* thick. Coordinated Coordina	ELEVATION (ft)	DEPTH (ft)	Material Graphics		[DESCRIPT	TION		Sample Location Sample Number	Blows per 6 in.	Blows per foot		RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Deput		Remar	ks	
448.40 6		2 3 4		Road base SILTY SAI coarse to f mostly coa	e material, ND (SM); ine, suba	reddish bro ngular to su	ıbrounded GF	RAVEL;	D01									This in ac Soil and 2007 A.1 Sum Teck Cou	ccordance & Rock Presenta 7), excep of the Fin mary Re nnical St nty, Cal	e with the Logging ation Mation ne Caltrans, Classification (June ed in Apperechnical R-710 Tunns Angeles	ion , ndi	
444.40 10		6		coarse to f	ine, subro ; some lo	ounded GR/	AVEL; mostly	coarse to									000000	Han	d Auger	to 5'		
SANDY SILTY CLAY (CL-ML); very stiff; dark yellowish brown; moist; 31% medium to fine SAND, 69% fines. So3 5 18 113	144.40	9							S02	10	30	61					00000					
SANDY SILTY CLAY (CL-ML); very stiff; dark yellowish brown; moist; 31% medium to fine SAND, 69% fines. Solution Solu	442.40	12							V V	20			_				<u>Mannana</u>					
434.40 20 Hard. 432.40 22 Hard. 430.40 24 Department of Transportation Division of Engineering Services Geotechnical Services Geotechnical Services PROJECT OR BRIDGE NAME HOLE ID R-09-Z4 07-187900		15			LTY CLA ist; 31% r	Y (CL-ML); nedium to f	very stiff; dar ine SAND, 69	k yellowish 9% fines.	S03	18	32	100	-	18	113		222222	PI, F	PA			
Hard. Solution Figure F	436.40	18															<u> </u>					
(continued) Department of Transportation Division of Engineering Services Geotechnical Services Geotechnical Services Continued Con		E		Hard.					S04	12	26	100					22222					
(continued) Department of Transportation Division of Engineering Services Geotechnical Services Geotechnical Services Continued Con		23															<u> </u>					
Department of Transportation Division of Engineering Services Geotechnical Services Department of Transportation Division of Engineering Services Geotechnical Services DIST. COUNTY ROUTE POSTMILE TO DID DID DID DID DID DID DID DID DID DI		25 E	3III/	1		(continue	ed)										\triangleright	<u> </u>				_
Geotechnical Services PROJECT OR BRIDGE NAME		<u></u>			ransportati neering Ser			BOR IST.	ING	RE		RD	ROU 71	ITE N	PO	STMIL	.E	R EA	-09-Z4			
			7					ign - Sout	h 1	ROJE SR-7	CT C	R BF	NEI	L TE	ME ECH	NICA				'	SHEET	



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
398.40	-55 56		0	At EL. 399.4 ft, with coarse GRAVEL. SILTY SAND with GRAVEL (SM) (continued).		(20.2011)	50/5"		40	Tic			0		
396.40	57 58 59		0										<u>ión o contractor de contracto</u>		
394.40	60		0. 7	SILTY SAND (SM); very dense; reddish brown; moist; mostly coarse to fine SAND; little low plasticity fines.	X	S12	19 50/5"		80				man		
392.40													00000		
390.40				1% fine GRAVEL (subangular), 61% predominantly		S13	18	75	100				รช่องของ	PA	
388.40	66 67			1% fine GRAVEL (subangular), 61% predominantly fine SAND, 38% low plasticity fines.	X		31 44						manna		
386.40	68 69												00000		
384.40					X	S14	18 38 56	94	89				000000		
382.40													000000		
380.40	74 75			At EL. 379.4 ft, becomes mostly coarse to fine SAND;	x	S15	50/6"		33				somme		
378.40	76 77			little low plasticity fines.									00000		
376.40													DOODSOODSOODS		
374.40					X	S16	24 33 47	80	72		-		000000		
372.40	1				/ \								STATEST STATEST STATES		
370.40	84		art	SEDIMENTARY ROCK, (CLAYSTONE), massive, strong brown, decomposed, soft, moist, oxidized, no reaction to diluted HCL. (fat CLAY (CH), moist, very									00000		
	-00			(continued)		Ţ									
			/	Department of Transportation Division of Engineering Services		D	EPOR BOR IST	ING	RE COUI LA		RD ROU	TE.	PC	OSTMILE D/D	R-09-Z4E EA 07-187900
	_	7		Geotechnical Services	41-	P	ROJE	CT C	RB	RIDG	E NAME L TECH	5.45			1
				Office of Geotechnical Design - Sour	ın '		RIDGE N/A				PREPAR D. Jar	ED BY	_ 3		OATE SHEET 4-13-09 3 of 1

ELEVATION (ft)	^я DЕРТН (ft)	Material		Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)		Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing	emarks
368.40	86		- (continued).	S17	13 19 23	42	100	100	28			× 0 ×	See note at en RQD. PI	d of log regarding
366.40	87 88		SEDIMENTARY ROCK, (CLAYSTONE TO SILTSTONE), massive, light greenish gray and dark yellowish brown, moderately weathered, soft, unfractured, iron oxide staining.	C18								$\langle \Diamond \times \Diamond \rangle$		m
364.40				C19			100	100				$\Diamond \times \Diamond$		
362.40			At FL 361.9 ft, observed bedding joint, faint									$\langle \Diamond \rangle \langle \Diamond \rangle$		
360,40			strong brown with black stained remnant fractures,									X \ \		
358.40	95 96	7	subhorizontal. At EL. 358.6 ft, observed shear, dipping 75°, polished, paperthin clay lining, faint shear surface extended from 95.8 feet to 96.5 feet.									\$\$X\$X		
356.40			At EL. 357.9 ft, observed faint subhorizontal bedding plane. Extremely weak.						27	95		\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	PI, PA, CR, UU	
354.40		_	At EL. 355.4 ft, observed bedding joint, dipping 20 to 10°, 3/8" to 1/2" thick Siltstone bed with iron oxide stained halo, undulatory.	C20			100	100				$\Diamond \times \Diamond$		
352.40 350.40	101 102		At EL. 353.4 ft, observed bedding joint, dipping 10°.									$\times \wedge \times \wedge$	VOC = 32.6 pp	m
350.40	103 104	=\	At EL. 351.4 ft, observed joint, dipping 60°, very faint, non-continuous, black lined joint. At EL. 350.4 ft, observed undulatory bedding, rolls over, dipping up to 20 degrees in opposite direction.									X 0 X		
348.40	107	=5	soft sediment deformation present. At EL. 349.4 ft, observed shear, dipping 25 to 20°, four shears observed between 105' to 106.5'. Shears are tight, up to 1/16" thick, black lined, truncate	C21			100	100				X0X0X		
346.40	109 110		At EL. 347.4 ft, becomes light brownish gray, very slightly fractured. At EL. 346.4 ft, observed shear, dipping 60°, faintly polished shear, bedding is undulatory, subhorizontal. At EL. 345.3 ft, observed shear, dipping 40°, 1mm aperture, moderately rough. At EL. 345.0 ft, observed bedding joint, dipping 10°, 3/8" thick iron oxide stained bed with abundant black									$\langle \Diamond X \Diamond X \Diamond X \rangle$	VOC = 51.5 pp	m
342.40	112		staining.	C22			78	78	b			$\Diamond X \Diamond$		
340.40	113	1/1	deformation. At EL. 343.5 ft, observed shear, dipping 45°. At EL. 342.0 ft, observed bedding joint, dipping 40°, local faint laminations. At EL. 341.8 ft, observed joint, dipping 70°, tight.									X0X0	VOC = 49.2 pp	m
	115		(continued)											
	L	_/	Department of Transportation Division of Engineering Services Geotechnical Services	D (EPOR BOR IST. D7 ROJE	ING	RE OUN LA	VTY		ROU 710		PO D	STMILE /D	HOLE ID R-09-Z4B4 EA 07-187900
			Office of Geotechnical Design - South 1	BI	SR-7 RIDGE N/A	10 7	TUN	NE	PRE	CH	D BY	_ \$1	DATE 4-1	SHEET 3-09 4 of 10

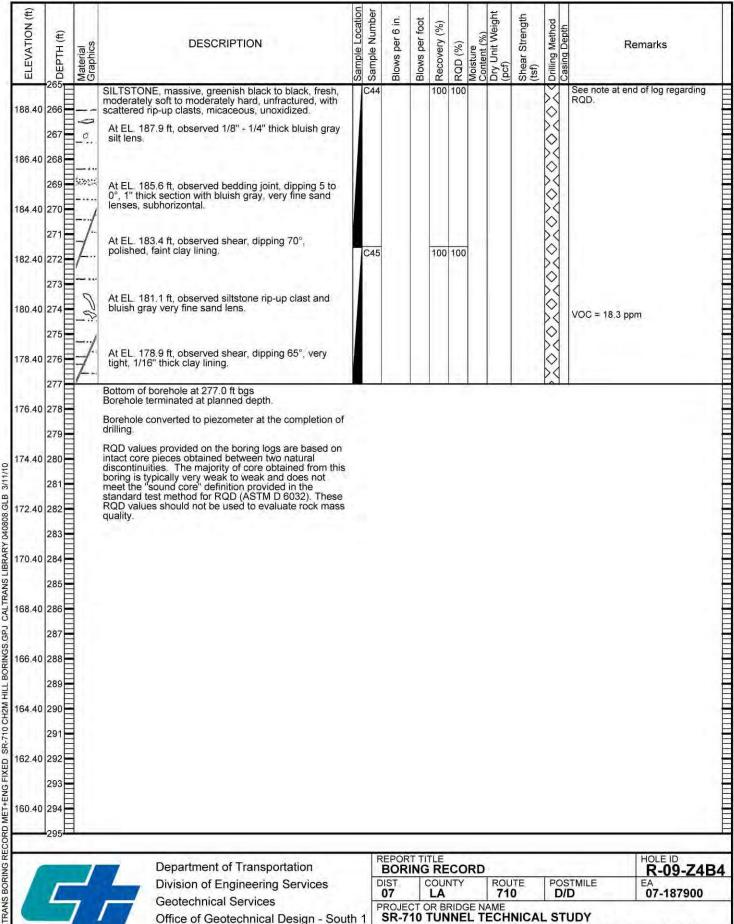
ELEVATION (ft)	SDEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf) Shear Strength (tsf)	_	Casing Depth	Remarks
338.40	116	X	At EL. 341.6 ft, observed bedding joint, dipping 45°, possible bedding on strong brown and light brown gray contact.	C22			78	78			X		ee note at end of log regarding QD.
	117	X	At EL. 341.4 ft, becomes greenish black, contact between light greenish gray above and greenish black dipping 60 degree.								\Diamond		
336.40	E	X	black dipping 60 degree. (continued). At EL. 338.6 ft, observed shear, dipping 70 to 45°,										
	E	1	two very faint shears								0		
10.00	119	1	At EL. 337.9 ft, observed joint, dipping 60 to 50°, aperture 2mm, moderately rough. At EL. 336.9 ft, observed bedding joint, dipping 25°, bedding on contact between strong brown and light								0		
334.40	F	1	brownish gray beds. At EL. 336.4 ft, observed joint, dipping 50°. At EL. 334.4 ft, grades to unoxidized. Unit is micaceous, no reaction to HCL solution. At EL. 334.0 ft, observed bedding joint, dipping 40°,	C23		П	100	80			0		
100	121	- 1	At EL. 334.4 ft, grades to unoxidized. Unit is micaceous, no reaction to HCL solution. At El. 334.0 ft, observed bedding joint dipping 40°	1							0	V	OC = 25.6 ppm
332.40	=	1/	local iron oxide stained bed. At EL. 333.8 ft, observed shear, dipping 70°.	C24		1	100	100			0		
	123	-	At EL. 332.9 ft, observed irregular gradational contact from 121' to 122.1' dipping 65 degrees to vertical, greenish black above light gray below				,,,,	1100			0		
330.40		1	At EL. 333.8 ft, observed shear, dipping 70°. At EL. 332.9 ft, observed irregular gradational contact from 121' to 122.1' dipping 65 degrees to vertical, greenish black above, light gray below. At EL. 332.1 ft, observed shear, dipping 70°, iron oxide stained below shear, light brownish gray above. At EL. 331.5 ft, observed bedding joint, dipping 60°, 1" diameter concretionary nodule, beds folded around podule.								×		
	125		At EL. 331.5 ft, observed bedding joint, dipping 60°, 1" diameter concretionary nodule, beds folded around nodule.								0	V	OC = 26.5 ppm
328.40	126	- "	SEDIMENTARY ROCK, (SILTSTONE), massive, greenish black to black, slightly weathered to fresh.						20	102	0	Di	, UC
	127		moderately soft, unfractured, with scattered rip-up clasts, micaceous, unoxidized. At EL. 329.9 ft, observed 8" thick strong brown zone.						20	102	0		, 00
326.40	128		At EL. 329.9 π, observed 8" thick strong brown zone. Very weak.								0		
	129		At EL. 325.4 ft, observed scattered black rip-up										
324.40	130	00	clasts, randomly oriented, bedding unknown.								8		
ļ,	131			C25			100	100			× <		
322.40	132												
	133	W	At EL. 321.4 ft, observed 1.5' thick zone with very								\$X	V	OC = 21.8 ppm
320.40	134	, i	faint black siltstone rip-up clasts and very faint laminations indicating possible subhorizontal bedding (<10 degrees).								\		
4	135	٧.,	At EL. 319.4 ft, becomes fresh, micaceous.								0		
318.40	136										\Diamond		
	137	_*	At EL. 317.9 ft, observed charcoal fragment, 1/8"x3/8".	C26			90	83			0	V	OC = 31.7 ppm
316.40	138							5472			0		
	139	4 1							40	100	0	Ü	
314.40	140	7	Very weak.						18	102	×	100	•
	141	1/7											
312.40	142	1	At EL. 312.4 ft, observed shear, dipping 70°,								X		
	143	1	polished, tight, faint clay lining.	C27		8	100	100			\Diamond		
310.40	144	n	At EL. 311.4 ft, observed shear, dipping 70°, tight shear with 1/16" clay lining, black.	1							0		
	145	000	At EL. 310.2 ft, contains black siltstone rip-up clasts.	4							\Diamond		
			(continued)			RT TI		-	55				HOLE ID
	_	_/	Department of Transportation Division of Engineering Services	71	DIST.		OUI	_		ROUTE		STM	R-09-Z4E
	L	7	Geotechnical Services	F	07 PROJ	ECT C	LA OR BI	RIDG	E NA	710 ME)/D	07-187900
-			Office of Geotechnical Design - South			E NU			PRE	CHNICA PARED BY Jankly	LS	IUL	DATE SHEET 4-13-09 5 of 1

ELEVATION (ft)	э Боертн (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	emarks	
308.40	146	Z	SILTSTONE, massive, greenish black to black, fresh, moderately soft to moderately hard, unfractured, with scattered rip-up clasts, micaceous, unoxidized. (continued). At EL. 307.9 ft, observed shear, dipping 65°, tight shear with 1/16" clay lining, faint.	C27			100					>X >X >X >X	See note at end RQD. VOC = 15.4 pp	d of log regarding	
306.40	148	 	At EL. 306.9 ft, observed 2" thick soft zone, no visible shearing observed.									X \ \ \			
304.40				C28			100	100	17			$\Diamond \times \Diamond$	SD		
302.40	151 152 153	1	At EL. 303.4 ft, observed shear, dipping 70 to 50°, two shears, tight, very faint, 1/16" thick clay lining. At EL. 302.4 ft, observed shear, dipping 75 to 70°, tight, 1/16"-1/8" thick, fat clay lining.									\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			
300.40		1	At EL. 299.9 ft, observed black siltstone rip-up clasts. At EL. 299.6 ft, observed shear, dipping 60°, Aperture 1mm, clay lined, moderately rough.									X0X0X			
298.40	156	···-	Very weak.						17	105		>×<	uc		
296.40		•••=		C29			100	100				X \ \ \			
294.40	160 161	100										\$\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\			
292.40		7										×0×0	VOC = 25_1 pp	n	
290.40	164											XOXO			
288.40	166	0000	At EL. 289.1 ft, observed abundant rip-up clasts, randomly oriented. At EL. 287.9 ft, observed possible 10 degree bedding on numerous similarly oriented rip-up clasts.									000			
286.40	168	0 0	on numerous similarly oriented rip-up clasts.	C30			95	95				× 0 ×			
284.40		2 · · · · · · · · · · · · · · · · · · ·	At EL. 285.2 ft, observed charcoal fleck 1/8"x3/8".									X0X			
282.40			At EL. 282.4 ft, observed fine, white lined nodules up to 1/8" thick and 3/8" long. Possible shells/shell fragments.									$\times \times \times \diamond$			
280.40	174			C31			100	100				♦ × ♦	VOC = 15.1 pp	n	
	113-		(continued)												_
1		_/	Department of Transportation Division of Engineering Services Geotechnical Services	C	BOR DIST.	ING	RE OUN LA	VTY		710		PO D	STMILE /D	HOLE ID R-09-Z4E EA 07-187900	1
			Office of Geotechnical Design - South	11		10	TUN	NE	L TI	ECH		L ST	TUDY		
				E	RIDG N/A	E NU	MBE	R		EPAR . Jan	ED BY		DATE 4-1	3-09 SHEET	(

ELEVATION (ft)	SZDEPTH (ft)	Material Graphics	DESCRIPTION - I elumber	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight	(pcf) Shear Strength	Drilling Method	Remarks
278.40			moderately soft to moderately hard, unfractured, with scattered rip-up clasts, micaceous, unoxidized. At EL. 278.9 ft, observed scattered charcoal flecks <1/8" diameter and scattered white lined nodules as	C31	Tier		100	100			XOX	See note at end of log regarding RQD.
276.40			El. 282.4 ft.								000	
274.40	179 180	7	At EL. 275.4 ft, observed 1/4" x 1-1/2" bluish gray, subhorizontal lens. At EL. 274.8 ft, observed 3/8" x 5" laminated lens	C32			100	100			X \ \ \	
272.40	181	0000	At EL. 274.8 ft, observed 3/8" x 5" laminated lens dipping 50 degrees, non-continuous around core. At EL. 274.2 ft, observed 3/8" diameter concretionary nodule. At EL. 273.4 ft, observed abundant rip-up clasts, randomly oriented, from 181' to 185'.	C33			100	100			♦ × ♦	
	183	00	taliadily diched, fidit 101 to 100.								× < ×	
270.40	184	8:-										VOC = 35.8 ppm
268.40	186										0X0	PI
266.40	188	٠	At EL. 265.9 ft, observed white lined nodules as El.								XOX,	
264.40	190		282.4 ft.	C34			100	100			\$X\$	
262.40	191										× < ×	VOC = 15.7 ppm
260.40	193 194										\$X\$X	
258.40	195										0×0	
	197	/	At EL. 257.4 ft, observed faint white lens, 4" long x 1/8" thick, dipping 60 degrees, non-continuous	C35			100	100			X 0 X	
256.40	198		around core.						14 10	6	$\Diamond \times \Diamond$	SD, UC
254.40	200	0	At EL. 254.9 ft, observed black siltstone rip-up clasts. Very weak. PTS - Siltstone with red-brown iron oxide rich matrix (86%).								× < ×	PTS VOC = 28.2 ppm
252.40	202		At EL. 253.7 ft, observed 1" long x 1/8" thick white nodule. At EL. 252.4 ft, observed scattered charcoal flecks <1/8" diameter, from 201.3' to 205'. At EL. 251.9 ft, observed 1" x 3/4" stone in center of								\$ \$ X \$	et.,,
250.40	204		core, polished, rectangular.								0 X Q	
	205		(continued)								1.4.1	
	_	_/	Department of Transportation Division of Engineering Services Geotechnical Services	D	EPOR BOR IST.	ING	RE OUN LA	ITY	R	OUTE 10	PO D	HOLE ID R-09-Z4B STMILE EA 07-187900
			Office of Geotechnical Design - South	1 3 B	ROJE SR-7 RIDG N/A	10 7	TUN	NE	PREP	HNICARED B		DATE SHEET 4-13-09 7 of 10

ELEVATION (ft)	SOEPTH (ft) Material Graphics				Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing	marks
248.40	206		SILTSTONE, massive, greenish black to black, fresh, moderately soft, unfractured, with scattered rip-up clasts, micaceous, unoxidized.	C36			100	100				$\overset{\checkmark}{\diamond}$	See note at end RQD.	of log regarding
	207		clasts, micaceous, unoxidized. At EL. 249.3 ft, observed possible bedding dip of 10 degrees, scarce charcoal flecks <1/8" dia.									X		
246.40	208	٠										×	VOC = 48.4 ppr	n
	209	~·	At EL. 245.9 ft, observed 1" x 1/2" lens of fine to medium grained silty sandstone, dipping 10 degrees.									$\stackrel{\wedge}{\vee}$	тоо чентрр	
244.40	210	-		C37			100	100				X		
	211						100	,,,,,				$\stackrel{\diamond}{\sim}$		
242.40	212	00	NEW COOK									\Diamond		
Н	213		At EL. 242.2 ft, observed siltstone rip-up clasts.									0	VOC = 46.2 ppr	m
240.40	214											0		
	215	0.0	At EL. 239.6 ft, observed irregular lenses of bluish									\Diamond		
238.40	216	,. <u>.</u>	At EL. 239.6 ft, observed irregular lenses of bluish gray silt, subhorizontal. At EL. 239.4 ft, observed some fine white lined nodules as El. 282.4 ft.									0		
	217											\Diamond		
236.40	218	· · ·		C38			100	100						
	219	```					1000					3		
234.40	220		72.22.5									×		
E 148	221	0.	At EL. 234.2 ft, observed scarce siltstone rip-up clasts, Scattered charcoal flecks at 220.5 to 222.5'. Very weak.						20	101		X	CR, UU	
232.40	222								h			X		
	223	0;	At FL 231.4 ft observed 3/4" x 3/8" bluish gray rip-up									\Diamond		
230.40	224		At EL. 231.4 ft, observed 3/4" x 3/8" bluish gray rip-up clast, internally laminated, subhorizontal.	C39			100	100				\(\)	VOC = 22.2 ppr	m
H	225	~		1			1000					0		
228.40	226	is	At EL. 228,3 ft, observed siltstone rip-up clasts.									\Diamond		
	227	-	At E.E. 220,3 II, observed sitistorie rip-up classis.									0		
226.40	228		At EL. 226.4 ft, observed white lined nodules as El.									0		
	229		282.4 ft, generally subhorizontally dipping. At EL. 226.1 ft, observed 3/8" x 1/8" charcoal fleck.											
224.40	230		At EL. 224.8 ft, contains siltstone rip-up clasts.									0		
	231	7	At EL. 223.9 ft, observed faint, 3" x 3/8" sandy lens dipping 20 degrees, dips against faint 10 degree									X		
222.40	232	S	dipping 20 degrees, dips against faint 10 degree fabric in rock (possible bedding dipping 10 degrees). At EL. 223.4 ft, observed dark greenish gray, hard, 4" thick limestone bed, highly reactive to HCL solution.	C40			100	100				X		
	233	0	some very tight internal fractures with possible calcite lining. Upper contact dipping 20 degrees, lower contact is undulatory, subhorizontal.					0.54				X		
220.40	234	****	contact is undulatory, subhorizontal. At EL. 221.4 ft, observed bluish gray siltstone rip-up clast. Unit is very weak.						14			\Diamond	SD	
	235		(continued)						100			\Diamond		
			Department of Transportation		EPOF			-	D.				11	HOLE ID
	_	_/	Division of Engineering Services	D	BOR IST. 07	0	COU		ΚD	ROU 71	TE	PO	STMILE /D	R-09-Z4B EA 07-187900
	L	7	Geotechnical Services Office of Geotechnical Design - South	P	ROJE	CTC	R BI	RIDG	E NA	ME	SA.		TUDY	01-10/300
			Office of Geolechnical Design - South	В	RIDG N/A	_			PRE		ED BY	_ 3	DATE	3-09 SHEET

ELEVATION (ft)	S SDEPTH (ft)	Material Graphics		Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%) Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling	Casing Depth Casing	100
218.40	236		SILTSTONE, massive, greenish black to black, fresh, moderately soft to moderately hard, unfractured, with scattered rip-up clasts, micaceous, unoxidized. At EL. 218.1 ft, observed 1-1/2" x 3/8" charcoal/remnant wood fragment.	C40			100	100			$\times \diamond \times \checkmark$	See note at end of RQD. VOC = 43.2 ppm	log regarding
216.40	238		At EL. 216.9 ft, observed scattered charcoal flecks. At EL. 216.4 ft, observed faint siltstone fabric indicates possible subhorizontal bedding.								$\Diamond X \Diamond X$		
214.40	240										$\langle \Diamond \times \Diamond \rangle$		
212.40				C41			100	100	100		$\Diamond X \Diamond X$		
210.40	244		At EL. 211.4 ft, observed possible subhorizontal bedding based on siltstone rip-up clast orientation.								$\Diamond X \Diamond X \Diamond$		
208.40	E		At EL. 208.9 ft, observed faint siltstone fabric, possible subhorizontal bedding.	C42			97	97			>X >X >X >X	VOC = 3.6 ppm	
206.40	247 248 249	/	At EL. 207.4 ft, observed shear, dipping 60°, tight, paperthin clay lining, polished. At EL. 206.4 ft, with scattered fine (<1/16" diameter) white flecks at 248' to 254'.								$\times \Diamond \times \Diamond$		
204.40		0"									$\wedge \times \wedge \times \wedge$	VOC = 2.4 ppm	
202.40		a 1 H for	At EL. 203.4 ft, observed scarce charcoal flecks up to 1/8" dia. At EL. 201.9 ft, observed siltstone rip-up clast.								<0×0>		
200.40	254 255		At EL. 200.4 ft, observed local fabric dipping 50 degrees, adjacent and parallel to 1/16" to 1/8" thick very fine sand lens, possible soft sediment	C43			100	100	,44		$\langle \diamond \times \diamond \rangle$		
198.40	E	Dag	As 123.5' with trace fine sand. Siltstone fabric indicates subhorizontal bedding. At EL. 197.9 ft, observed siltstone rip-up clasts. At EL. 197.4 ft, observed scattered charcoal flecks	043			100	100			$\langle \Diamond \rangle \langle \Diamond \rangle$		
196.40	258 259	_	between 257' and 265'.								$\Diamond X \Diamond X \Diamond$		
194.40											>X >X >X >X	VOC = 22.4 ppm	
192.40	262) \ \ \		
190.40	263 264		Very weak.						21 102		>×<>×<	UU	
	265		(continued)								\vee	4	
	_		Department of Transportation Division of Engineering Services	D	REPORT TITLE BORING RECORD DIST. COUNTY ROUTE 07 LA 710				PC	STMILE E	OLE ID R-09-Z4E 07-187900		
		7	Geotechnical Services Office of Geotechnical Design - South 1		ROJE SR-7	CTO	R BF	RIDG	E NAME L TECH	NICAI	s	TUDY	
				В	RIDGE N/A			_	PREPAR D. Jan	ED BY		DATE 4-13-0	SHEET 9 9 of 1



BRIDGE NUMBER

PREPARED BY D. Jankly

4-13-09

10 of 10

Office of Geotechnical Design - South 1

CALTRANS BORING RECORD MET+ENG FIXED