COLETO CREEK POWER, LLC
Fannin, Texas

COAL COMBUSTION RESIDUALS
PRIMARY ASH POND
SAFETY FACTOR ASSESSMENT
5-Year Periodic Update

COLETO CREEK POWER PLANT
FANNIN, TEXAS

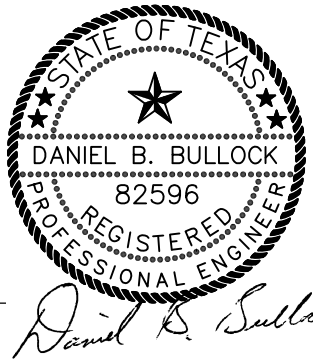
October 11, 2021

Bullock, Bennett & Associates, LLC
Engineering and Geoscience
Registrations: Engineering F-8542, Geoscience 50127
www.bbaengineering.com

Certification Statement 40 C.F.R § 257.73(e) and 30 T.A.C. § 352.731 - Structural Integrity Criteria for Existing CCR Surface Impoundments, Periodic Safety Factor Assessment

CCR Unit: Coleto Creek Power, LLC; Coleto Creek Power Plant; Coleto Creek Primary Ash Pond

I, Daniel Bullock, being a Registered Professional Engineer in good standing in the State of Texas, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this assessment report has been prepared in accordance with the accepted practice of engineering. I certify, for the above referenced CCR Unit, that the information contained in the Safety Factor Assessment, dated October 11, 2021, meets the requirements of 40 C.F.R. § 257.73(e) and 30 T.A.C. § 352.731.



Daniel B. Bullock, P.E. (TX 82596)

10-11-2021

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1.0 INTRODUCTION

Coleto Creek Power Plant is located at 45 FM 2987 just outside the city of Fannin in Goliad County, Texas. The power plant consists of one coal-fired boiler. Bottom ash and fly ash, or coal combustion residuals (CCR), generated in the boiler are either shipped off-site for beneficial re-use or managed in an on-site CCR surface impoundment (Coleto Creek Primary Ash Pond). Figures 1 and 2 provide site location maps showing the Primary Ash Pond configuration.

In April 2015, the Environmental Protection Agency (EPA) enacted rules codified in 40 C.F.R. Part 257, Subpart D to address potential risks associated with operating CCR surface impoundments at coal-fired power plants. The State of Texas subsequently codified 30 T.A.C. Chapter 352, which incorporated 40 C.F.R. Chapter 257 by reference, to address CCR management in surface impoundments and landfills. This report summarizes the results of the periodic Safety Factor Assessment (§ 257.73(e)(1)).

2.0 PERIODIC SAFETY FACTOR ASSESSMENTS

Section 257.63(e) requires that owners of existing and newly constructed CCR surface impoundments conduct initial and periodic safety factor assessments. The purpose of the safety factor assessment is to document that the as-constructed CCR surface impoundment configuration either meets or exceeds regulatory safety factor criteria under long-term, maximum storage pool loading conditions, and maximum surcharge pool loading conditions. In addition, the liquefaction and seismic factor of safety must be estimated.

The rule requires that the safety factor evaluation be performed across the critical cross section of the impoundment dikes. For the purposes of this initial assessment, previous data collected as part of historical site assessments were evaluated to determine whether it represented the critical cross section of the pond dikes that would be most susceptible to failure. The critical cross sections for the Primary Ash Pond, as shown in Figure 3, are in the areas of the pond that still contain water and generally have the tallest sections of dikes with representative side slopes.

Geotechnical sampling and analysis of as-constructed dike materials has been conducted during three different events. The first was performed by Sargent & Lundy (S&L) during and after construction of the pond in 1978 (S&L, December 1978). Subsequent studies were performed in 1981 by Underground Resource Management, Inc. (URM) (URM, July 29, 1981) and in 2012 by AECOM Technical Services, Inc. (AECOM, March 2012).

BBA reviewed the previous site geotechnical investigation data gathered by S&L, URM, and AECOM used in previously conducted stability analyses of the dikes and the data appears sufficient to provide a reliable estimation of current conditions; therefore, no further geotechnical testing was required for the current analysis. Coleto Creek Power provided all previous investigation data to BBA for use in evaluation and preparation of an updated structural stability analysis. The most recent stability analysis, conducted by AECOM in 2012, summarizes previous evaluations by others. A brief summary of previous geotechnical investigations was provided in the Initial Safety Factor Assessment.

BBA reviewed the data available from the S&L, URM, and the supplemental data gathered by AECOM including geotechnical data, cross sections, and methodology used by AECOM for modeling slope stability. The data and methods are suitable for evaluation of slope stability of

the critical cross section locations. The geotechnical investigation data from the AECOM study, including soil bore logs and geotechnical laboratory data is included in Appendices A and B, respectively, of this report.

BBA contracted T. Baker Smith (TBS) (formerly Naismith Marine Services) in August 2021 to complete an existing conditions topographic survey of Primary Ash Pond including the critical cross section areas. Using the 2021 existing conditions survey data and geotechnical data obtained from the previous studies (including similar lithology as indicated in the AECOM study for the critical cross sections), BBA graphically reconstructed the cross-section locations A and B for completion of further analysis. BBA compared the existing 2021 topographic survey cross sections at cross section locations A and B to the original design sections and topographic data collected in 2016. The 2021 and 2016 topographic data is very similar, but both sets of survey data differ from the original design cross section which could be due to as-build construction geometry vs. design geometry, erosion, or accumulation of ash material on the interior dike sideslope. For example, the interior dike sideslopes are consistent with design grades closer to the dike crest but appear to have a gentler slope toward the toe of slope. This difference may be ash accumulation along the slope, but since this area is below the water surface, it could not be verified and is unknown.

For modeling purposes, portions of the perimeter dike above the water line, on the crest, and the exterior dike sideslopes were modeled using the 2021 topographic data, but the interior slope was modeled using a combination of topographic data and design slopes. The 2021 topographic data was used for the portion of the interior dike sideslope closer to the crest (above the water line) and the design slope (generally 4(H):1(V)) was used for potions of the slope closer to the toe. Material identified from the survey results that may have accumulated on the interior dike slope was considered to be water with no structural strength or stabilizing forces.

Based on review of bore logs and geotechnical laboratory test data, the lithology and soil engineering strength properties used in previous stability analyses were conservative and representative of the field and laboratory data gathered.

Similar to the previous stability evaluations, BBA evaluated the dikes using two sets of time-dependent strength parameters, effective stress and total stress. Effective stress analysis was used to model drained, long-term, steady-state loading conditions where excess pore pressures

have had time to dissipate. This would be the normal steady state operating conditions (maximum storage pool) of the pond. Total stress analysis was used to model undrained, short-term loading conditions such as maximum surcharge pool, rapid drawdown, and seismic events, where excess pore water pressure could develop in fine grained silts and clays and not have had time to dissipate. The rapid drawdown case is representative of the conditions that would occur immediately after a significant flood event, or if the Secondary Pond was rapidly drained.

The seismic conditions analyze the effect an earthquake would have on the stability of the dike. BBA selected a maximum probable earthquake for the Coleto Creek Power Plant based on the 2014 United States Geological Survey National Seismic Hazard Maps found at (http://earthquake.usgs.gov/hazards/products/conterminous/2014/2014pga2pct.pdf). The maximum probable earthquake has a peak ground acceleration of 0.03 g with a 2 percent Probability of Exceedance in 50 years.

Table 2-1 summarizes the effective and total stress soil strength parameters used for each soil layer in the analysis:

TABLE 2-1
Soil Strength Parameters used in Geotechnical Stability Analysis
(color shading as shown in cross sections)

Cross Section A-A'

Soil Description	Unit Weight (pcf)	Effective Stress Strength Parameters		Total Stress Strength Parameters	
		c' (psf)	Ø'	c (psf)	Ø
Clayey Sand Fill Material (SC)	130	150	29	3,000	0
Natural Silty Clay or Clayey Sand (CL, SC, CL-Caliche)	130	150	27	4,000	0
Natural Sands (SM, SP, SC)	130	0	36	0	36

Cross Section B-B'

Soil Description	Unit Weight (pcf)	Effective Stress Strength Parameters		Total Stress Strength Parameters	
		c' (psf)	Ø'	c (psf)	Ø
Clayey Sand Fill Material (SC)	130	150	29	3,000	0
Caliche (SC)	135	250	34	250	0
Medium Dense to Dense Sands (SP)	130	0	36	0	36
Dense to Extremely Dense Sands (SP, SC, SM, SP-SM)	133	0	38	0	38
Very Stiff to Hard Silty Clay (CL, CL-ML, CH)	128	0	29	3,250	0

Based on field observations, the ash located within the Primary Ash Pond tends to set up, much like cement, into a hard, blocky mass of material. However, as was assumed in the previous evaluations, for conservative modeling purposes the interior material was considered to be water, with no structural strength that would add a stabilizing force.

Four model conditions were evaluated at each cross-section location, as deemed applicable, including: maximum storage pool (the highest normal operating level) and maximum surcharge pool (level reached during inundation from design storm) conditions, rapid drawdown, and the seismic condition. The normal operating water level, based on the Hydrologic and Hydraulic Capacity Requirements evaluation completed by BBA (BBA, January 2018) is 136.1 (NAVD88).

The water level projected in event of a design storm (the 100 year, 24-hour storm) is 138.0 (NAVD88). The lowest top of dike elevation observed in the 2021 survey was 139.7 (NAVD88).

Cross section A, located in the observed historical seep location near the southeast corner of the Primary Ash Pond, was assumed to have a water table elevation at the ground surface along the exterior toe of slope, as observed in the field and as documented in previous inspections and reports. Cross section B, located along the separator dike between the Primary Ash Pond and Secondary Pond, was modeled with the maximum storage and maximum surcharge pool elevations. Cross section B was also evaluated for the rapid draw down (RDD) condition. Based on historical field observations of wet soil, it is assumed the phreatic surface at cross section A exits the exterior dike surface at the toe of the dike. The phreatic surface for cross section B is at the same elevation as the assumed pond water levels.

Dikes should be designed with appropriate safety factors. Required safety factors per § 257.73(e)(1)(i) through (e)(1)(iv) for critical embankment sections are as follows:

Table 2-2
Required Factors of Safety

Condition	Required Factor of Safety
Long-Term, Maximum Storage Pool Loading Static Factor of Safety	1.50
Maximum Surcharge Pool Loading Static Factor of Safety	1.40
Seismic Factor of Safety	1.00
Liquefaction Factor of Safety	1.20

BBA used the 2D limit equilibrium computer program SLIDE2 9.018 by Rocscience to complete the slope stability analysis for the critical cross sections. The Morgenstern-Price method of slices, for both circular and non-circular type failures, was used to analyze the stability of the slopes. Eighteen stability cases were evaluated for the critical cross sections as summarized in Table 2-3. Both upstream and downstream slopes were evaluated, and the lowest factor of safety generated for each case is reported.

Table 2-3
Slope Stability Analysis Summary

Cross Section	Conditions	Effective Stress Analysis Safety Factor		Total Stress Analysis Safety Factor	
		Non-circular	Circular	Non-circular	Circular
A-A'	Max Storage Pool/Static	1.9 (1)	1.9 (2)	4.8 (3)	6.0 (4)
A-A'	Max Surcharge Pool/Static	1.9 (5)	1.9 (6)	5.1 (7)	6.0 (8)
A-A'	Max Storage Pool /Seismic	NA	NA	4.8 (9)	5.2 (10)
B-B'	Max Storage Pool /Static	2.6 (11)	2.7 (12)	4.0 (13)	5.1 (14)
B-B'	Max Surcharge Pool, Rapid Drawdown	NA	NA	2.7 (15)	3.1 (16)
B-B'	Max Storage Pool/Seismic	NA	NA	1.8 (17)	4.4 (18)

Note: (#) = Case Number (referenced on model output data in Appendix C).

Cross sections, bore logs, laboratory data, and SLIDE2 9.018 stability model output data are included in Figure 3 and Appendices A, B, and C, respectively of this report.

As shown in Table 2-3, eighteen stability cases were modeled, and all cases meet or exceed required factors of safety.

2.1 Liquefaction Assessment

BBA utilized the liquefaction assessment process outlined in the U.S. EPA guidance document titled RCRA Subtitle D (258) Seismic Design Guidance for Municipal Solid Waste Landfill Facilities, EPA/600/R-95/051, April 1995, published by the Office of Research and Development and other relevant source documents to perform this liquefaction factor of safety evaluation. As identified in those documents, the liquefaction assessment process begins by screening the subject site for its liquefaction potential using the following criteria.

- Geologic age and origin. If a soil layer is a fluvial, lacustrine or aeolian deposit of Holocene age, a greater potential for liquefaction exists than for till, residual deposits, or older deposits.

- Fines content and plasticity index. Liquefaction potential in a soil layer increases with decreasing fines content and plasticity of the soil. Cohesionless soils having less than 15 percent (by weight) of particles smaller than 0.005 mm, a liquid limit less than 35

percent, and an in-situ water content greater than 0.9 times the liquid limit may be susceptible to liquefaction.

- Saturation. Although low water content soils have been reported to liquefy, at least 80 to 85 percent saturation is generally deemed to be a necessary condition for soil liquefaction.

- Depth below ground surface. If a soil layer is within 50 feet of the ground surface, it is more likely to liquefy than deeper layers.

- Soil Penetration Resistance. Soil layers with a normalized SPT blowcount $[(N_1)_{60}]$ less than 22 have been known to liquefy. Other sources suggest an SPT value of $[(N_1)_{60}]$ less than 30 as the threshold to use for suspecting liquefaction potential.

If three or more of the above criteria indicate that liquefaction is not likely, the potential for liquefaction is considered to be negligible. Otherwise, further evaluation of the liquefaction potential at a facility is required. The soils at the Coleto Creek Power facility generally meet at least three of the specified screening criteria and their liquefaction potential is unlikely. However, there are exceptions such as certain layers that are described in the soil borings logs as SP, or sandy soils, which would by definition have a low fines content. In addition, some liquid limits are below 35 percent. Therefore, further evaluation of the soil data has been completed, and factors of safety against liquefaction calculated for each critical layer, as further described below.

A review of existing data regarding site conditions, soil stratigraphy, soil properties, and potential critical layers as well as the methods used to develop that data indicate that the findings presented in the AECOM report (AECOM, 2012) are sufficient for use in this assessment. As noted in previous sections of this report, AECOM drilled eight borings through critical areas of the site to depths ranging from approximately 30 to 120 feet bgs. Standard penetrometer (SPT) blows per foot, plastic limit, water content, and liquid limit data were collected at two to five foot intervals. In addition, samples were collected and sent to an off-site laboratory for analyses of general geotechnical properties. Copies of the boring logs and laboratory data used in this assessment are provided in Appendices A and B.

When available, site-specific information such as SPT blow count and percent fines content (soils passing the #200 sieve) was used in the evaluation of liquefaction potential. For strata with no site-specific data, conservative estimates were used based on industry accepted references and engineering judgement. For example, earthquake potential maps and tables presented in the

USEPA guidance document were used to estimate the worst-case earthquake magnitude and associated maximum ground acceleration. USGS references for low to mid-ranges of fines content for the reported soil types were used when no laboratory data existed.

A complete discussion of the methodology used and the calculation spreadsheets for each stratum identified in the eight boring logs are presented in Appendix D. The findings of the liquefaction assessment indicate that the factor of safety is well above the 1.2 required. This finding is expected given the generally high fines content of most soil strata, the low water content, and low ground acceleration that would be observed in the unlikely event that an earthquake was to occur in this area.

2.2 Periodic Safety Factor Assessment Summary

In accordance with 30 T.A.C § 352.731 and, by reference, 40 C.F.R. § 257.73, Structural Integrity Criteria for Existing CCR Surface Impoundments, the critical cross sections of the Primary Ash Pond at the Coleto Creek facility have been evaluated for slope stability under appropriate loading conditions, including steady-state seepage, maximum surcharge pool, rapid drawdown, and seismic. In addition, a liquefaction assessment has been completed. Based on review of historic studies, geotechnical data that has been previously gathered, and on the updated stability analysis evaluation, the Primary Ash Pond has an adequate factor of safety for all evaluated loading conditions.

3.0 REFERENCES

AECOM. (March 2012). *Geotechnical Stability and Hydraulic Analysis of the Coleto Creek Energy Facility Primary and Secondary Ash Ponds.* Green Bay, Wisconsin: AECOM Technical Services, Inc.

BBA. (January 2018). *Coal Combustion Residuals Surface Impoundment History of Construction and Initial Hazard Potential Assessment, Structural Integrity Assessment, and Safety Factor Assessment (Rev. 1) (Original Submittal Date September 2016).* Bullock, Bennett & Associates.

CDM. (March 2011). *Assessment of Dam Safety of Coal Combustion Surface Impoundments Coleto LP, LLC Coleto Creek Power, LP.*

S&L. (December 1978). *Design and Construction Summary for Coal Pile and Wastewater Pond Facilities, Coleto Creek Power Station Unit 1, Report SL-3689.* Sargent & Lundy Engineers.

URM. (1982). Evaluation and Recommendations Regarding Subsurface Drainage System at Coleto Creek Power Station for Central Power & Light Company. Underground Resource Management, Inc.

URM. (July 29, 1981). *Investigation of Seepage from Primary and Secondary Settling Ponds at the Coleto Creek Power Station.* Underground Resource Managment, Inc.

FIGURES

N

APPROXIMATE SCALE: 1" = 3000'

0 750 1500 3000

SOURCE: AERIAL PHOTO PROVIDED BY BING, PHOTO TAKEN 2021.

STATE OF TEXAS
DANIEL B. BULLOCK
82596
REGISTERED
PROFESSIONAL ENGINEER

10-11-2021

Coleto Creek Power, LLC

Figure 1

SITE LOCATION MAP

PROJECT: 21424-1	BY: RCAD-RR	DATE: OCT 2021	CHECKED: DBB

Bullock, Bennett & Associates, LLC
Engineering and Geoscience
Texas Registrations: Engineering F-8542, Geoscience 50127

Plot Date: 10/11/21 - 1:23pm, Plotted by: Admin
Drawing Path: K:\clients\bba\Coleto Ck\21424-1\, Drawing Name: C-ST-PL103.dwg

N

APPROXIMATE SCALE: 1" = 1000'

0 500 1000 2000

SOURCE: AERIAL PHOTO PROVIDED BY BING, PHOTO TAKEN 2021.

STATE OF TEXAS
DANIEL B. BULLOCK
82596
REGISTERED
PROFESSIONAL ENGINEER

10-11-2021

Coleto Creek Power, LLC

Figure 2

PRIMARY ASH POND LOCATION MAP

PROJECT: 21424-1	BY: RCAD-RR	DATE: OCT 2021	CHECKED: DBB

Bullock, Bennett & Associates, LLC
Engineering and Geoscience
Texas Registrations: Engineering F-8542, Geoscience 50127

Plot Date: 10/11/21 - 1:22pm, Plotted by: Admin
Drawing Path: K:\clients\bba\Coleto Ck\21424-1\, Drawing Name: C-ST-PL104.dwg

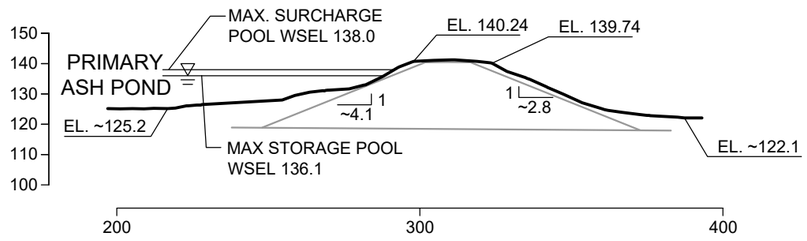
APPROXIMATE SCALE: 1"=800'

0 400 800 1600

SOURCES:

AERIAL PHOTO PROVIDED BY TBS, MAXAR TECHNOLOGIES, TEXAS GENERAL LAND OFFICE, PHOTO TAKEN 2021.

TOPOGRAPHIC MAP WAS PROVIDED BY: T. BAKER SMITH (TBS), 412 S. VAN AVE., HOUMA, LA 70363, (985) 868-1050, SEPTEMBER 2021. DATUM: TEXAS SOUTH CENTRAL ZONE, US FEET. DATUM: NAD83.

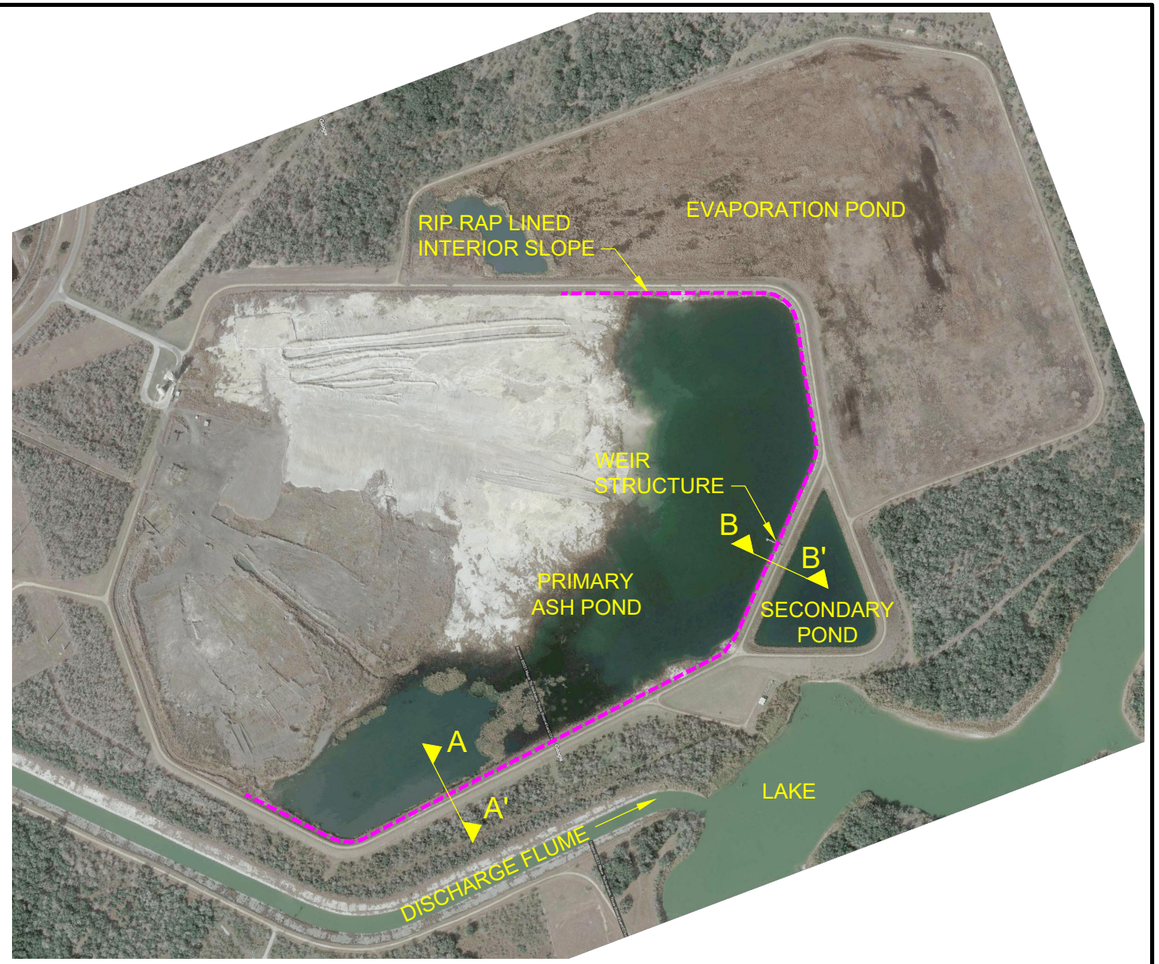


SECTION A-A'

SCALE: 1"=50'

SECTION B-B'

SCALE: 1"=50'



PARTIAL PLAN

STATE OF TEXAS
DANIEL B. BULLOCK
82596
REGISTERED
PROFESSIONAL ENGINEER

10-11-2021

Coleto Creek Power, LLC

Figure 3

ASH POND PLAN AND CROSS SECTIONS

PROJECT: 21424-1	BY: RCAD-RR	DATE: OCT 2021	CHECKED: DBB

Bullock, Bennett & Associates, LLC
Engineering and Geoscience
Texas Registrations: Engineering F-8542, Geoscience 50127

Plot Date: 10/11/21 - 1:24pm, Plotted by: Admin
Drawing Path: K:\clients\bba\Coleto Ck\21424-1\, Drawing Name: EG-9-13-21.dwg

APPENDIX A

Geotechnical Borelogs

AECOM

CLIENT: **IPR-GDF SUEZ North America**

LOG OF BORING NUMBER: **B-1-1**

PROJECT NAME: **Coleto Creek Energy Facility Ash Pond**

ARCHITECT/ENGINEER:

SITE LOCATION: **Goliad County, Fannin, Texas**

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10 20 30 40 50)

STANDARD PENETRATION BLOWS/FT. (10 20 30 40 50)

DEPTH (FT) / ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS. / Ft.^{3}	STANDARD PENETRATION BLOWS/FT.
					SURFACE ELEVATION: +139.6 (Continued)		
52.0	26	SS			50.4 Grayish brown fine to coarse sand (SP), trace fine to coarse gravel - wet - very dense		50
54.0							
56.0	27	SS				113.5	50
58.0							
60.0							
62.0	28	SS					66
64.0					65.1		
66.0	29	SS			White and gray clayey fine to coarse sand (SC-caliche) - wet - extremely dense		**50/0.3'
68.0							
70.0							
72.0	30	SS				117.3	92
74.0							
76.0	31	SS					**50/0.3'
78.0					78.0		
80.0					Light brown fine to coarse sand (SP) with occasional thin layers of white and gray silty fine to coarse sand (SM-Caliche) - moist to wet - extremely dense Drillers noted hard drilling and gravel while drilling form 80.0 to 85.0 feet		
82.0	32	SS					**50/0.4'
84.0					83.0 Gray and white silty fine to medium sand (SM) with caliche - wet - extremely dense		
86.0	33	SS					**50/0.1'
88.0					88.0		
90.0					Light gray silty clay (CL), some sand, trace caliche - moist to wet - hard		
92.0	34	SS				126.5	**50/0.4'
94.0							
96.0	35	SS				107.6	**50/0.5'
98.0					97.0 Light gray clayey fine to coarse sand (SC) - moist - extremely dense		
100.0							

. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60225561** SHEET NO. **2** OF **3**

STS060701 60225561.GPJ STS.GDT 1/4/12

AECOM

CLIENT: **IPR-GDF SUEZ North America**

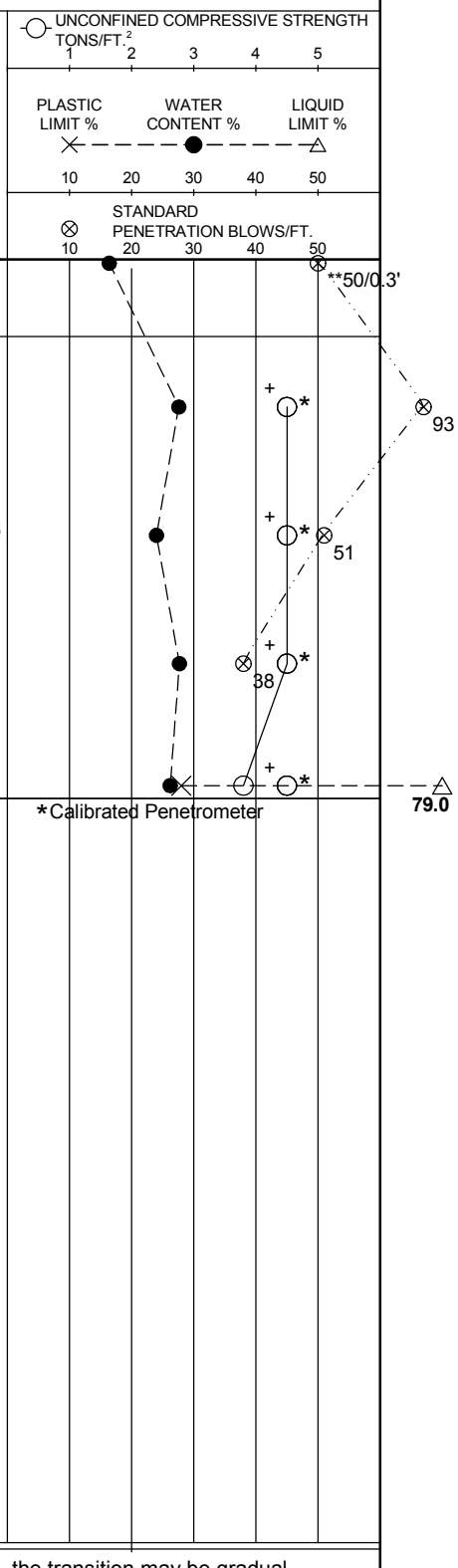
LOG OF BORING NUMBER: **B-1-1**

PROJECT NAME: **Coleto Creek Energy Facility Ash Pond**

ARCHITECT/ENGINEER:

SITE LOCATION: **Goliad County, Fannin, Texas**

DEPTH (FT) / ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS. / Ft.^{3}
					SURFACE ELEVATION: +139.6 (Continued)	
	36	SS				
102.0					Light gray clayey fine to coarse sand (SC) - moist - extremely dense	
					103.0	
104.0					Brown silty clay (CH) with irrgular gray silty clay lenses - moist - hard	
106.0	37	SS				92.5
108.0						
110.0						
	38	SS				102.6
112.0						
114.0						
116.0	39	SS				94.8
118.0						
120.0						
	40	ST				98.0
121.0					121.0	
					End of Boring Boring advanced to 6.0 feet with solid-stem auger HW casing driven to 5.0 feet Boring advanced from 6.0 feet to 50.0 feet with 4-inch rock bit and drilling fluid Boring advanced from 50.0 feet to 100.0 feet with 3-inch rock bit and drilling fluid Boring abandoned with bentonite quick grout using tremie method Split-spoons were driven with cathead and rope	



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Dry before casing installation**	BORING STARTED **11/5/11**	AECOM OFFICE	**1035 Kepler Drive Green Bay, Wisconsin 54311**
WL **10.0 to 12.0 feet WS**	BORING COMPLETED **11/6/11**	ENTERED BY **CAH**	SHEET NO. **3** OF **3**
WL	RIG/FOREMAN **D-25/BZ**	APP'D BY **TMT**	AECOM JOB NO. **60225561**

STS060701 60225561.GPJ STS.GDT 1/4/12

AECOM

CLIENT
IPR-GDF SUEZ North America

LOG OF BORING NUMBER **B-2-1**

PROJECT NAME
Coleto Creek Energy Facility Ash Pond

ARCHITECT/ENGINEER

SITE LOCATION
Goliad County, Fannin, Texas

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10 20 30 40 50)

STANDARD PENETRATION BLOWS/FT. (10 20 30 40 50)

DEPTH (FT) / ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS. / Ft.^{3}
					SURFACE ELEVATION: +139.2	
2.0	1	SS			Fill: Gray and brown mottled clayey sand (SC), trace fine gravel, trace caliche nodules and layers, occasional thin, saturated silty sand lenses - moist to wet - very stiff to hard	121.6
4.0	2	SS				
6.0	3	SS				116.1
8.0	4	SS				
10.0	5	SS				121.3
12.0	6	ST				118.6
14.0	7	SS				117.4
16.0	8	SS				
18.0	9	3" ST				114.0
20.0	10	ST				110.9
22.0	11	SS				114.5
24.0	12	SS				
26.0	13	SS				113.0
28.0	14	3" ST				
30.0	15	SS				
32.0	16	SS			32.0	
34.0	17	ST			White and light gray clayey sand (SC-caliche) - wet - loose to medium dense	118.4
36.0	18	SS				
38.0	19	SS			Note: Saturated loose zone from 36.0 feet to 36.9 feet	
40.0	20	SS				
	21	SS			40.9	
42.0	21A	SS			Grayish brown fine to coarse sand (SP) - wet - medium dense to dense	
44.0	22	SS			Note: Clayey sand (SC-Caliche) layers encountered from 42.9 feet to 43.3 feet and 44.0 feet to 45.0 feet	136.7
46.0	23	SS				
48.0	24	SS				
50.0	25	SS			50.0	

. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60225561** SHEET NO. **1** OF **3**

STS060701 60225561.GPJ STS.GDT 1/4/12

AECOM

CLIENT: **IPR-GDF SUEZ North America**

LOG OF BORING NUMBER: **B-2-1**

PROJECT NAME: **Coleto Creek Energy Facility Ash Pond**

ARCHITECT/ENGINEER:

SITE LOCATION: **Goliad County, Fannin, Texas**

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10 20 30 40 50)

STANDARD PENETRATION BLOWS/FT. (10 20 30 40 50)

DEPTH (FT) / ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS. / Ft.^{3}
					SURFACE ELEVATION: +139.2 (Continued)	
52.0	26	SS			Grayish brown silty fine sand (SM) - wet - dense	110.4
					53.0	
54.0					Light gray clayey fine sand (SC) - wet - dense	
56.0	27	SS				99.2
58.0						
60.0						
	28	SS				
62.0					63.0	
64.0					Light gray fine sand (SP-SM), trace silt - wet - dense	
66.0	29	SS				
68.0					68.0	
70.0					Light gray fine to coarse sand (SP) - wet - dense	
	30	SS			71.1	
72.0	30A	SS			Light gray and white clayey sand (SC-caliche) - wet - medium dense	
					73.0	
74.0					Light gray silty fine to medium sand (SM), trace to little clay, trace fine gravel - moist to wet - extremely dense	
76.0	31	SS				
78.0					78.0	
80.0					Tan clayey silt (CL-ML-Weathered Sandstone) - moist to wet - hard	
	32	SS				
82.0					83.0	
84.0					Light gray and brown mottled silty clay (CH), trace sand - moist - hard	
86.0	33	SS				91.6
88.0						
90.0						
	34	SS				117.3
92.0						
94.0						
	35	ST			95.1	
96.0					Light gray clayey fine sand (SC) - moist - extremely dense	110.9
98.0						
100.0						
					. . . continued	

Penetration values: 33, 39, 43, 40, **39, **16, **50/0.3', **60/0.4', 34, 41

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

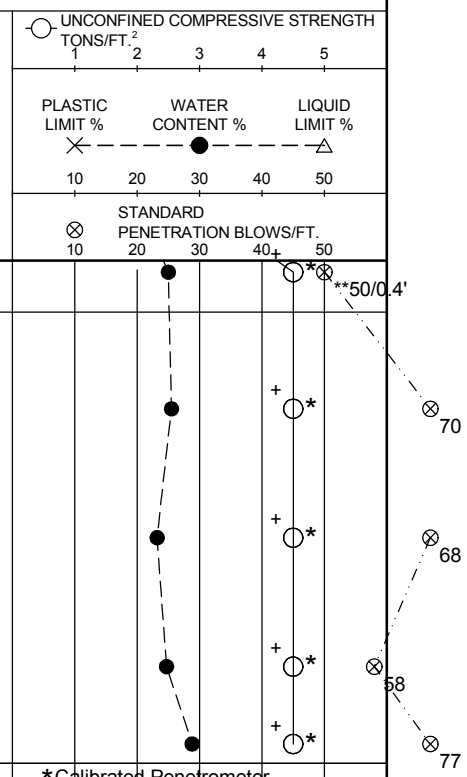
AECOM JOB NO. 60225561 | SHEET NO. 2 OF 3

STS060701 60225561.GPJ STS.GDT 1/4/12

AECOM	CLIENT: **IPR-GDF SUEZ North America**	LOG OF BORING NUMBER: **B-2-1**
	PROJECT NAME: **Coleto Creek Energy Facility Ash Pond**	ARCHITECT/ENGINEER:

SITE LOCATION: **Goliad County, Fannin, Texas**

DEPTH (FT) / ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS. / Ft.^{3}
					SURFACE ELEVATION: +139.2 (Continued)	
	36	SS			Light gray clayey fine sand (SC) - moist - extremely dense	
102.0					102.0	
104.0					Brown silty clay (CH) with gray silty clay and silt lenses, trace thin sand lenses - moist - hard	
106.0	37	SS				99.9
108.0						
110.0						
	38	SS				96.4
112.0						
114.0						
116.0	39	SS				96.7
118.0						
	40	SS			119.5	
119.5					End of Boring Boring advanced to 6.0 feet with solid-stem auger HW casing driven to 5.0 feet Boring advanced from 6.0 feet to 50.0 feet with 4-inch rock bit and drilling fluid Boring advanced from 50.0 feet to 118.0 feet with 3-inch rock bit and drilling fluid Boring abandoned with bentonite quick grout using tremie method Split-spools were driven with cathead and rope	



*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL: **Dry before casing installation**	BORING STARTED: **11/3/11**	AECOM OFFICE: **1035 Kepler Drive, Green Bay, Wisconsin 54311**	
WL: **8.0 to 10.0 feet WS**	BORING COMPLETED: **11/4/11**	ENTERED BY: **CAH**	SHEET NO. **3** OF **3**
WL	RIG/FOREMAN: **D-25/BZ**	APP'D BY: **TMT**	AECOM JOB NO.: **60225561**

STS060701 60225561.GPJ STS.GDT 1/4/12

AECOM

CLIENT
IPR-GDF SUEZ North America

LOG OF BORING NUMBER **B-2-2**

PROJECT NAME
Coleto Creek Energy Facility Ash Pond

ARCHITECT/ENGINEER

SITE LOCATION
Goliad County, Fannin, Texas

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10 20 30 40 50)

STANDARD PENETRATION BLOWS/FT. (10 20 30 40 50)

DEPTH (FT) / ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS. / Ft.^{3}	STANDARD PENETRATION BLOWS/FT.
					SURFACE ELEVATION: +105.1		
2.0	1	SS			Black and dark brown organic sandy clay (OL), little fine gravel, trace wood - moist - very stiff to hard		5
	2	SS			2.8		
4.0	2A	SS			Light gray and white clayey fine to coarse sand (SC-Caliche), trace fine to coarse gravel - moist to wet - dense to medium dense	90.9	**16
6.0	3	SS					15
8.0	4	SS			Note: Light brown fine to coarse sand (SP) layers encountered from 6.5 feet to 7.0 feet and 8.3 feet to 8.9 feet		16
10.0	5	SS					15
	6	SS			10.6	113.3	
12.0	6A	SS			Light gray fine to coarse sand (SP) - wet - medium dense		**18
					12.0		15
14.0					Light gray and brown mottled silt (ML), trace clay, trace sand - moist - medium dense		
	7	SS			14.9		
16.0	7A	SS			Light gray silty clay (CL), trace sand - moist - hard		**26
					17.0		**32
18.0					Light gray silt (ML), trace to little sand, trace clay - moist - medium dense		
20.0	8	SS					21
22.0					22.0		
24.0					Light brown fine sand (SP) - wet - dense		
	9	SS					35
26.0							
28.0							
30.0	10	SS					41
32.0							
34.0					33.5		
	11	SS			Light gray and light brown mottled clayey fine to coarse sand (SC), trace fine to coarse gravel - moist - dense to extremely dense		45
36.0					Drillers noted hard drilling from 34.0 to 39.0 feet and gravel while drilling		
38.0							
40.0	12	SS					**50/0.4'
42.0					42.0		
44.0					Light brown fine to coarse sand (SP) - wet - dense		
	13	SS					42
46.0					47.0		
48.0					Light gray and brown mottled silty clay (CL), trace sand - moist - hard		
50.0						100.6	26

. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60225561** | SHEET NO. **1** OF **2**

STS060701 60225561.GPJ STS.GDT 1/4/12

AECOM

CLIENT: **IPR-GDF SUEZ North America**

LOG OF BORING NUMBER: **B-2-2**

PROJECT NAME: **Coleto Creek Energy Facility Ash Pond**

ARCHITECT/ENGINEER:

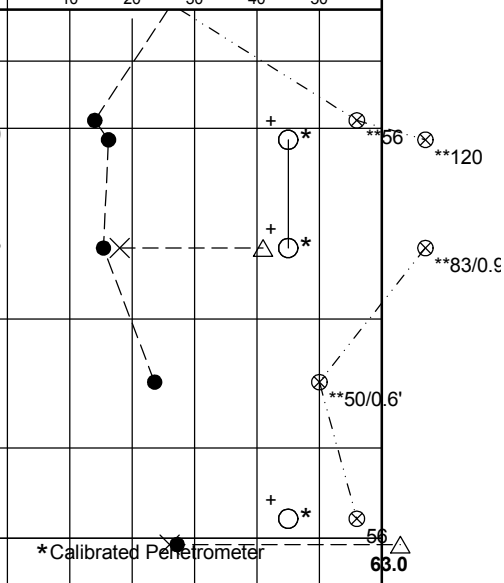
SITE LOCATION: **Goliad County, Fannin, Texas**

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5)

PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT % (10 20 30 40 50)

STANDARD PENETRATION BLOWS/FT. (10 20 30 40 50)

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS. / Ft.^{3}
						SURFACE ELEVATION: +105.1 (Continued)	
		14	SS			Light gray and brown mottled silty clay (CL), trace sand - moist - hard	
52.0						52.0	
						Light brown fine to coarse sand (SP) - wet - very dense	
54.0		15	SS			54.6	
		15A	SS			Light brown and light gray mottled silty sandy clay (CL), trace thin poorly-graded sand seams (SP) - moist - hard	115.0
56.0							
58.0							117.8
60.0		16	SS				
62.0						62.0	
						Light brown and brown mottled silty fine sand (SM) - wet - extremely dense	
64.0		17	SS				
66.0						67.0	
68.0						Light gray silty clay (CH), trace sand, trace fine to coarse gravel - moist - hard	
70.0		18	SS			70.5	
			SS			End of Boring	
70.5						Boring advanced to 6.0 feet with solid-stem auger HW casing driven to 8.0 feet Boring advanced from 6.0 feet to 16.0 feet with 3-inch rock bit and drilling fluid HW casing driven from 8.0 feet to 10.0 feet Boring advanced from 16.0 feet to 69.0 feet with 3-inch rock bit and drilling fluid Boring abandoned with bentonite quick grout using tremie method Split-spoons were driven with cathead and rope	



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **3.5 feet WS**	BORING STARTED **11/1/11**	AECOM OFFICE	**1035 Kepler Drive Green Bay, Wisconsin 54311**
WL **3.5 feet before casing installation**	BORING COMPLETED **11/1/11**	ENTERED BY **CAH**	SHEET NO. **2** OF **2**
WL	RIG/FOREMAN **D-25/BZ**	APP'D BY **TMT**	AECOM JOB NO. **60225561**

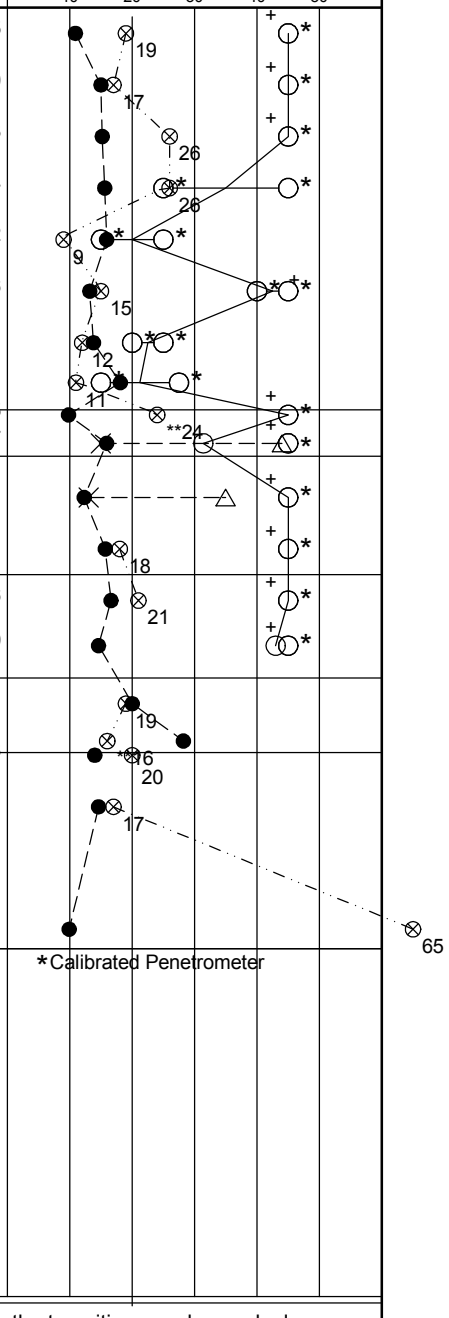
STS060701 60225561.GPJ STS.GDT 1/4/12

AECOM	CLIENT **IPR-GDF SUEZ North America**	LOG OF BORING NUMBER **B-3-1**
	PROJECT NAME **Coleto Creek Energy Facility Ash Pond**	ARCHITECT/ENGINEER

SITE LOCATION **Goliad County, Fannin, Texas**

SURFACE ELEVATION: +139.3

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS. / Ft.^{3}
2.0		1	SS	Fill: Gray and brown mottled clayey sand (SC), trace fine gravel, occasional irregular thin silty sand seams and lenses, trace caliche nodules and layers - moist to wet - stiff to hard	114.5
4.0		2	SS		114.0
6.0		3	SS		115.3
8.0		4	SS		110.4
10.0		5	SS		112.2
12.0		6	SS	Note: Saturated silty sand seams encountered from 10.5 feet to 10.9 feet, 12.5 feet to 12.7 feet, and from 15.4 feet to 15.5 feet	124.6
14.0		7	SS		
16.0	15.6	8	SS		106.1
		8A	SS		121.5
18.0	17.4	9	ST	Gray clayey fine to medium sand (SC), trace caliche nodules, trace thin silty sand seams - moist to wet - very stiff to hard	113.7
20.0		10	SS	Dark brown clayey sand (SC), trace caliche nodules - moist to wet - hard	
22.0	22.0	11	SS		109.1
24.0		12	SS	Light gray silty sandy clay (CL), occasional irregular silty clayey caliche (CL-caliche) layers and lenses - moist to wet - hard	113.6
26.0	26.0	13	SS		117.9
28.0		14	SS	Light gray clayey sand (SC), occasional silty clay (CL-caliche) layers and lenses, trace fine gravel - moist to wet - medium dense	
	28.9	15	SS		
		15A	SS		
30.0				Note: Saturated zone encountered from 28.0 feet to 28.5 feet	111.3
32.0		16	SS	Light gray silty fine to coarse and (SM), trace to little clay, trace fine gravel, trace caliche nodules - moist to wet - medium dense to very dense	
34.0					
36.0	36.5	17	SS		
36.5				End of Boring Boring advanced to 6.0 feet with solid-stem auger HW casing driven to 5.0 feet Boring advanced from 6.0 feet to 30.0 feet with 4-inch rock bit and drilling fluid Boring advanced from 30.0 feet to 35.0 feet with 3-inch rock bit and drilling fluid Boring abandoned with bentonite quick grout using tremie method Split-spoons were driven with cathead and rope	



*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Dry before casing installation**	BORING STARTED **11/8/11**	AECOM OFFICE	**1035 Kepler Drive Green Bay, Wisconsin 54311**
WL **8.0 to 10.0 feet WS**	BORING COMPLETED **11/8/11**	ENTERED BY **CAH**	SHEET NO. **1** OF **1**
WL	RIG/FOREMAN **D-25/BZ**	APP'D BY **TMT**	AECOM JOB NO. **60225561**

STS060701 60225561.GPJ STS.GDT 1/4/12

AECOM

CLIENT
IPR-GDF SUEZ North America

LOG OF BORING NUMBER **B-3-2**

PROJECT NAME
Coleto Creek Energy Facility Ash Pond

ARCHITECT/ENGINEER

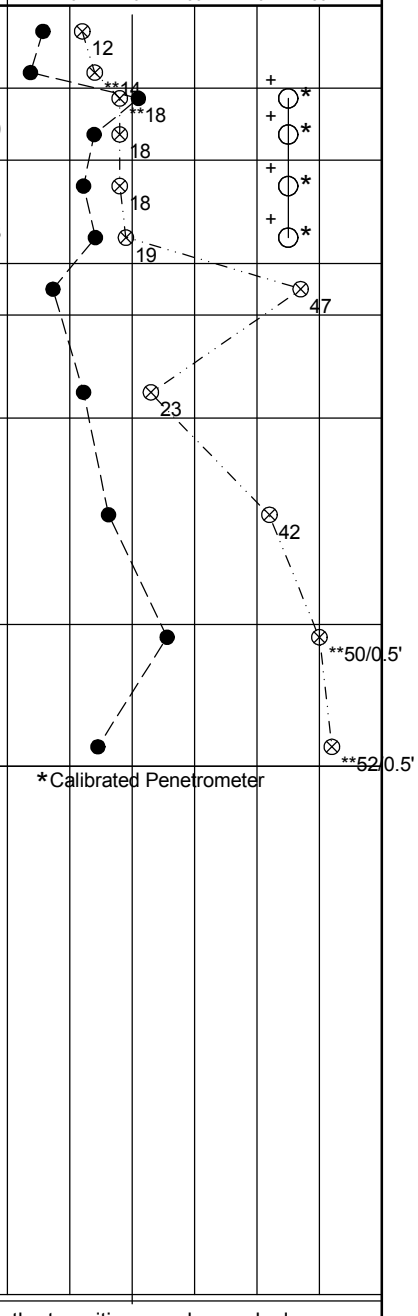
SITE LOCATION
Goliad County, Fannin, Texas

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10 20 30 40 50)

STANDARD PENETRATION BLOWS/FT. (10 20 30 40 50)

DEPTH (FT) / ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS. / Ft.^{3}
					SURFACE ELEVATION: +122.8	
2.0	1	SS			Fill: Dark brown or brown silty fine sand (SM), trace clay, trace roots - moist - medium dense	
	2	SS				
4.0	2A	SS				
	3	SS			Fill: Brown and gray mottled silty sandy clay (CL), trace fine gravel, trace roots - desiccated - hard	117.0
6.0					6.0	
	4	SS			Light gray and white silty sandy clay (CL-caliche), trace to little fine gravel - moist - hard	122.1
8.0						
	5	SS				113.8
10.0					10.0	
	6	SS			White silty fine sand (SM-caliche), trace to little clay - moist - dense	
12.0					12.0	
14.0					Light brown fine to coarse sand (SP), trace fine gravel - wet - dense to medium dense	
	7	SS				
16.0					16.0	
18.0					Brown sitly fine to coarse sand (SM), trace to little fine gravel - wet - dense	
20.0	8	SS			Drillers noted gravel while drilling from 16.0 feet to 19.0 feet and 23.0 feet and 24.0 feet	
22.0						
24.0					24.0	
	9	SS			Light brown fine to coarse sand (SP) - wet - extremely dense	
26.0						
28.0						
	10	SS			29.5	
29.5					End of Boring Boring advanced to 10.0 feet with solid-stem auger HW casing driven to 10.0 feet Boring advanced from 10.0 feet to 20.0 feet with 3-inch rock bit and drilling fluid Boring abandoned with bentonite quick grout using tremie method Split-spoons were driven with cathead and rope	



*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Dry before casing installation**	BORING STARTED **11/2/11**	AECOM OFFICE	**1035 Kepler Drive Green Bay, Wisconsin 54311**
WL **14.0 feet WS**	BORING COMPLETED **11/2/11**	ENTERED BY **CAH**	SHEET NO. **1** OF **1**
WL	RIG/FOREMAN **D-25/BZ**	APP'D BY **TMT**	AECOM JOB NO. **60225561**

STS060701 60225561.GPJ STS.GDT 1/4/12

AECOM

CLIENT: **IPR-GDF SUEZ North America**

LOG OF BORING NUMBER: **B-4-1**

PROJECT NAME: **Coleto Creek Energy Facility Ash Pond**

ARCHITECT/ENGINEER:

SITE LOCATION: **Goliad County, Fannin, Texas**

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10 20 30 40 50)

STANDARD PENETRATION BLOWS/FT. (10 20 30 40 50)

SURFACE ELEVATION: +139.2

DEPTH (FT) / ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS. / Ft.^{3}
2.0	1	SS			Fill: Gray and brown mottled clayey sand (SC), trace fine gravel, trace thin irregular silty sand seams and lenses, trace silty clay caliche nodules and layers - moist - very stiff to hard	117.3
4.0	2	SS				
6.0	3	SS				111.4
8.0	4	ST				124.4
10.0	5	ST				117.7
12.0	6	SS				114.9
14.0	7	3" ST				
16.0	8	SS				122.0
18.0	9	SS				118.2
20.0	10	SS				110.1
	11	SS			20.6	115.2
22.0	11A	SS			Light brown silty sandy clay (CL) with caliche - moist to wet - very stiff to hard	102.3
	12	SS			23.0	110.2
24.0	12A	SS			Light brown, dark brown, and gray mottled clayey sand (SC), trace organics, trace fine gravel, trace thin irregular silty sand seams and lenses - moist - hard	107.9
26.0	13	3" ST				110.8
28.0	14	SS			**Triaxial Test S-14**	
					28.0 **Dry Unit Weight = 121 pcf Ø' = 27 deg**	
30.0	15	SS			Light brown clayey sand (SC) - moist to wet - medium dense	115.7
32.0	16	SS			30.0 Light brown silty fine to coarse sand (SM), trace clay - moist to wet - medium dense	
34.0					33.0 Light brown silty sandy clay (CL) with caliche, trace fine gravel - moist to wet - hard	
36.0	17	SS			35.6	
38.0	17A	SS			Light brown fine to coarse sand (SP) - wet - medium dense	
40.0					38.0 Grayish brown fine to coarse sand (SP) - wet - dense	
42.0	18	SS			Drillers noted sporadic, thin gravel layers while drilling from 35.0 to 50.0 feet	
44.0						
46.0	19	SS				
48.0						
50.0					50.0	

. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60225561** SHEET NO. **1** OF **2**

STS060701 60225561.GPJ STS.GDT 1/4/12

AECOM

CLIENT: **IPR-GDF SUEZ North America**

LOG OF BORING NUMBER: **B-4-1**

PROJECT NAME: **Coleto Creek Energy Facility Ash Pond**

ARCHITECT/ENGINEER:

SITE LOCATION: **Goliad County, Fannin, Texas**

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS. / Ft.^{3}	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5) / PLASTIC LIMIT % / WATER CONTENT % / LIQUID LIMIT % (10 20 30 40 50) / STANDARD PENETRATION BLOWS/FT. (10 20 30 40 50)
						SURFACE ELEVATION: +139.2 (Continued)		
		20	SS			51.5 Grayish bown fine to coarse sand (SP), trace to little fine gravel, occasional thin layers of gray silty clay and caliche - moist to wet - very dense		60
51.5						End of Boring Boring advanced to 6.0 feet with solid-stem auger HW casing driven to 5.5 feet Boring advanced from 6.0 feet to 30.0 feet with 4-inch rock bit and drilling fluid Boring advanced from 30.0 feet to 50.0 feet with 3-inch rock bit and drilling fluid Boring abandoned with bentonite quick grout using tremie method Split-spoons were driven with cathead and rope		

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Dry before casing installation**	BORING STARTED **11/7/11**	AECOM OFFICE	**1035 Kepler Drive Green Bay, Wisconsin 54311**
WL **10.0 to 12.0 feet**	BORING COMPLETED **11/7/11**	ENTERED BY **CAH**	SHEET NO. **2** OF **2**
WL	RIG/FOREMAN **D-25/BZ**	APP'D BY **TMT**	AECOM JOB NO. **60225561**

STS060701 60225561.GPJ STS.GDT 1/4/12

AECOM

CLIENT: **IPR-GDF SUEZ North America**

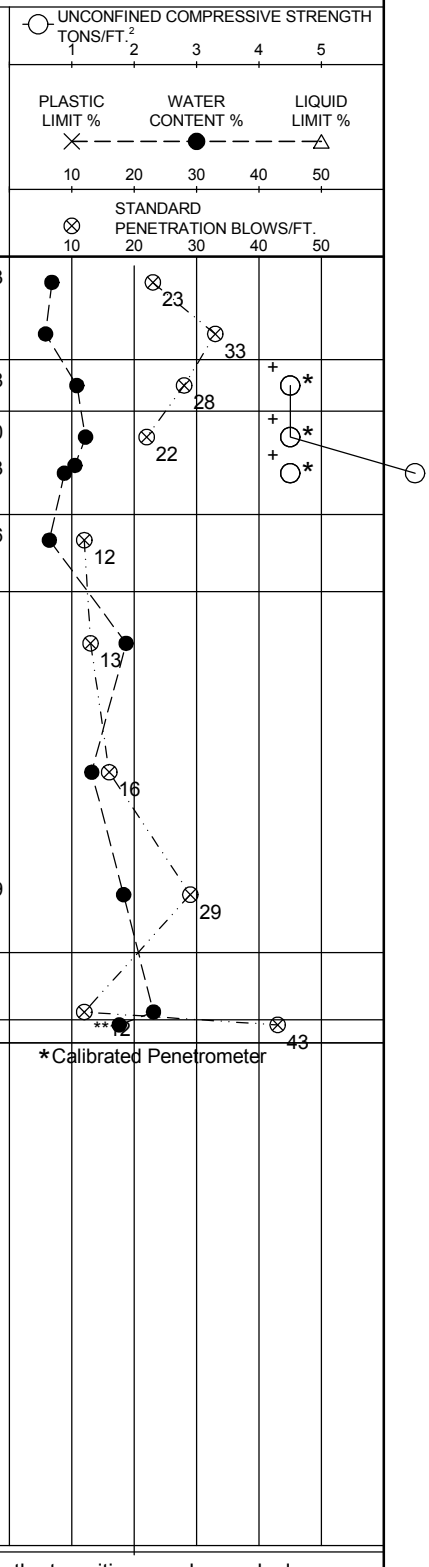
LOG OF BORING NUMBER: **B-4-2**

PROJECT NAME: **Coleto Creek Energy Facility Ash Pond**

ARCHITECT/ENGINEER:

SITE LOCATION: **Goliad County, Fannin, Texas**

DEPTH (FT) / ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS. / Ft.^{3}
					SURFACE ELEVATION: +119.6	
2.0	1	SS			Fill: Dark brown and brown silty fine to medium sand (SM), trace fine gravel, trace roots, trace clay - moist - medium dense	115.3
4.0	2	SS				122.1
					4.0	
6.0	3	SS			Buried Topsoil: Dark brown and black organic silty clay (OL), trace to little sand - desiccated - hard	125.8
					6.0	
8.0	4	SS			Light brown and light gray mottled silty clayey sand (SC), trace fine gravel, trace irregular caliche nodules - moist - hard	126.0
	5	ST				129.3
10.0					Note: Dark gray silty sandy clay (CL) layer from 8.0 feet to 8.3 feet	
					10.0	
12.0	6	SS			Light brown silty fine sand (SM), trace clay - moist - medium dense	124.6
					13.0 Note: Plastic liner was used within split-spoon for Sample 6	
14.0						
16.0	7	SS			Light brown fine to coarse sand (SP) - wet - medium dense	
18.0						
20.0	8	SS				
22.0					Drillers noted hard drilling at 22.0 feet	
24.0						
26.0	9	SS			Note: White silty clay (CL-caliche) layer from 24.7 feet to 25.1 feet	106.9
					27.0	
28.0					Light gray silty fine sand (SM), trace clay - wet - medium dense	
30.0	10	SS			29.6	
	10A	SS			30.5 Light brown fine to coarse sand (SP) - wet - dense	
30.5					End of Boring Boring advanced to 10.0 feet with solid-stem auger HW casing driven to 8.0 feet Boring advanced from 10.0 feet to 29.0 feet with 3-inch rock bit and drilling fluid Boring abandoned with bentonite quick grout using tremie method Split-spoons were driven with cathead and rope	



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Dry before casing installation**	BORING STARTED **11/2/11**	AECOM OFFICE	**1035 Kepler Drive Green Bay, Wisconsin 54311**
WL **14.0 feet WS**	BORING COMPLETED **11/2/11**	ENTERED BY **CAH**	SHEET NO. **1** OF **1**
WL	RIG/FOREMAN **D-25/BZ**	APP'D BY **TMT**	AECOM JOB NO. **60225561**

STS060701 60225561.GPJ STS.GDT 1/4/12

AECOM

CLIENT: **IPR-GDF SUEZ North America**

LOG OF BORING NUMBER: **B-5-1**

PROJECT NAME: **Coleto Creek Energy Facility Ash Pond**

ARCHITECT/ENGINEER:

SITE LOCATION: **Goliad County, Fannin, Texas**

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10 20 30 40 50)

STANDARD PENETRATION BLOWS/FT. (10 20 30 40 50)

DEPTH (FT) / ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS. / Ft.^{3}
					SURFACE ELEVATION: +139.6	
2.0	1	SS			Fill: Light gray and brown mottled clayey sand (SC), trace fine gravel, occasional thin irregular silty sand seams, trace silty clay caliche nodules and layers - moist to wet - very stiff to hard	128.2
4.0	2	SS				124.7
6.0	3	SS				127.5
8.0	4	SS				111.9
10.0	5	SS				
12.0	6	SS				118.7
	7	SS				
14.0	7A	SS				108.9
16.0	8	SS				
18.0	9	SS				111.3
20.0	10	SS				
	11	SS			20.8	
22.0	11A	SS			Gray and brown silty clay (CL), trace organics, trace sand, trace thin saturated silty sand seams and lenses - moist to wet - very stiff to hard	116.1
24.0	12	ST			24.0	118.2
26.0	13	SS			White and gray silty clay (CL-caliche), little sand - moist to wet - stiff to hard	107.5
	14	ST				99.1
28.0						
30.0	15	SS				102.5
32.0	16	SS			32.0	103.6
34.0	17	SS			Gray silty fine to coarse sand (SM), trace fine gravel, trace clay - wet - dense	
					35.0	
36.0	18	SS			Gray fine to coarse sand (SP), trace fine gravel - wet - extremely dense to very dense Note: Hard white silty clay (CL-caliche) in tip of Sample 18	
38.0						
40.0						
42.0	19	SS				
					43.0	
44.0					Gray silty fine sand (SM) - wet - dense to extremely dense	
46.0	20	SS			Drillers noted hard drilling and gravel and cobbles from 43.0 to 45.0 feet	
48.0						
50.0						

. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60225561**

SHEET NO. **1** OF **2**

STS060701 60225561.GPJ STS.GDT 1/4/12

AECOM

CLIENT: **IPR-GDF SUEZ North America**

LOG OF BORING NUMBER: **B-5-1**

PROJECT NAME: **Coleto Creek Energy Facility Ash Pond**

ARCHITECT/ENGINEER:

SITE LOCATION: **Goliad County, Fannin, Texas**

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS. / Ft.^{3}	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5) / PLASTIC LIMIT % / WATER CONTENT % / LIQUID LIMIT % (10 20 30 40 50) / STANDARD PENETRATION BLOWS/FT. (10 20 30 40 50)
						SURFACE ELEVATION: +139.6 (Continued)		
	50.4	21	SS	1		50.4 No recovery Sample 21		*Calibrated Penetrometer 50/0.4"
50.4						End of Boring Boring advanced to 6.0 feet with solid-stem auger HW casing driven to 5.0 feet Boring advanced from 6.0 feet to 32.0 feet with 4-inch rock bit and drilling fluid Boring advanced from 32.0 feet to 50.0 feet with 3-inch rock bit and drilling fluid Boring abandoned with bentonite quick grout using tremie method Split-spoons were driven with cathead and rope		

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Dry before casing installation**	BORING STARTED **11/7/11**	AECOM OFFICE	**1035 Kepler Drive Green Bay, Wisconsin 54311**
WL **8.0 to 10.0 feet WS**	BORING COMPLETED **11/7/11**	ENTERED BY **CAH**	SHEET NO. **2** OF **2**
WL	RIG/FOREMAN **D-25/BZ**	APP'D BY **TMT**	AECOM JOB NO. **60225561**

STS060701 60225561.GPJ STS.GDT 1/4/12

WELL/DRILLHOLE/BOREHOLE ABANDONMENT

(1) GENERAL INFORMATION

Unique Well No. | Well ID No. | County: Goliad

Common Well Name: B-1-1 | Gov't Lot (if applicable)

Grid Location: ___ 1/4 of ___ 1/4 of Sec. ___ ; T. ___ N; R. ___ ☐ E ☐ W

13453086.8 ft. ☒ N. ☐ S., 2543146.7 ft. ☒ E. ☐ W.

Local Grid Origin ☐ (estimated: ☐) or Well Location ☐

Lat ___ ° ___ ' ___ " Long ___ ° ___ ' ___ "

State Plane ___ ft. N. ___ ft. E. ☐ S ☐ C ☐ N Zone

Reason For Abandonment: Geotech Boring

Unique Well No. of Replacement Well:

(2) FACILITY /OWNER INFORMATION

Facility Name: Coleto Creek Energy Facility

Facility ID | License/Permit/Monitoring No.

Street Address of Well: 45 FM 2987

City, Village, or Town: Goliad County, Fannin, Texas 77960

Present Well Owner: Coleto Creek Energy Facility | Original Owner: Same

Street Address or Route of Owner: 45 FM 2987

City, State, Zip Code: Fannin, Texas 77960

(3) WELL/DRILLHOLE/BOREHOLE INFORMATION

Original Construction Date: 11/5/11

☐ Monitoring Well
☐ Water Well
☒ Drillhole / Borehole

If a Well Construction Report is available, please attach.

Construction Type:
☒ Drilled ☐ Driven (Sandpoint) ☐ Dug
☐ Other (Specify) ___

Formation Type:
☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth (ft) (From ground surface): 121.0
Casing Diameter (in.): 4.0
Casing Depth (ft.): 5.0
Lower Drillhole Diameter (in.): 3.0

Was Well Annular Space Grouted? ☐ Yes ☐ No ☐ Unknown
If Yes, To What Depth? N/A Feet
Depth to Water (Feet): 14.0

(4) PUMP, LINER, SCREEN, CASING, & SEALING MATERIAL

Pump & Piping Removed?	☐ Yes	☐ No	☒ Not Applicable
Liner(s) Removed?	☐ Yes	☐ No	☒ Not Applicable
Screen Removed?	☐ Yes	☐ No	☒ Not Applicable
Casing Left in Place?	☐ Yes	☐ No	
Was Casing Cut Off Below Surface?	☐ Yes	☒ No	
Did Sealing Material Rise to Surface?	☒ Yes	☐ No	
Did Material Settle After 24 Hours?	☐ Yes	☒ No	
If Yes, Was Hole Retopped?	☐ Yes	☒ No	

Required Method of Placing Sealing Material
☐ Conductor Pipe - Gravity ☒ Conductor Pipe - Pumped
☐ Screened & Poured (Bentonite Chips) ☐ Other (Explain)

Sealing Materials
☐ Neat Cement Grout
☐ Sand-Cement (Concrete) Grout
☐ Concrete
☐ Clay-Sand Slurry
☒ Bentonite-Sand Slurry
☐ Chipped Bentonite

For monitoring wells and monitoring well boreholes only
☐ Bentonite Chips
☐ Granular Bentonite
☐ Bentonite-Cement Grout
☐ Bentonite - Sand Slurry

(5) Sealing Material Used	From (Ft.)	To (Ft.)	No. Yards, Sacks, Sealant, or Volume	Mix Ratio or Mud Weight
Quik-Grout	Surface	121.0	50 gallons	

(6) Comments ___

(7) Name of Person or Firm Doing Sealing Work: AECOM Technical Services, Inc. | Date of Abandonment: 11/6/11

Signature of Person Doing Work | Date Signed: 11/6/11

Street or Route: 1035 Kepler Drive | Telephone Number: 920-468-1978

City, State, Zip Code: Green Bay, Wisconsin 54311

WELL/DRILLHOLE/BOREHOLE ABANDONMENT

(1) GENERAL INFORMATION

Unique Well No. | Well ID No. | County: Goliad

Common Well Name: B-2-1 | Gov't Lot (if applicable)

Grid Location: ___ 1/4 of ___ 1/4 of Sec. ___ ; T. ___ N; R. ___ ☐ E ☐ W

13453065.2 ft. ☒ N. ☐ S., 2543576.6 ft. ☒ E. ☐ W.

Local Grid Origin ☐ (estimated: ☐) or Well Location ☐

Lat ___ ° ___ ' ___ " Long ___ ° ___ ' ___ "

State Plane ___ ft. N. ___ ft. E. ☐ S ☐ C ☐ N Zone

Reason For Abandonment: Geotech Boring | Unique Well No. of Replacement Well:

(2) FACILITY /OWNER INFORMATION

Facility Name: Coleto Creek Energy Facility

Facility ID | License/Permit/Monitoring No.

Street Address of Well: 45 FM 2987

City, Village, or Town: Goliad County, Fannin, Texas 77960

Present Well Owner: Coleto Creek Energy Facility | Original Owner: Same

Street Address or Route of Owner: 45 FM 2987

City, State, Zip Code: Fannin, Texas 77960

(3) WELL/DRILLHOLE/BOREHOLE INFORMATION

Original Construction Date: 11/3/11

☐ Monitoring Well
☐ Water Well
☒ Drillhole / Borehole

If a Well Construction Report is available, please attach.

Construction Type:
☒ Drilled ☐ Driven (Sandpoint) ☐ Dug
☐ Other (Specify) ___

Formation Type:
☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth (ft) (From ground surface): 119.5 | Casing Diameter (in.): 4.0 | Casing Depth (ft.): 5.0

Lower Drillhole Diameter (in.): 3.0

Was Well Annular Space Grouted? ☐ Yes ☐ No ☐ Unknown

If Yes, To What Depth? N/A Feet

Depth to Water (Feet) ___

(4) PUMP, LINER, SCREEN, CASING, & SEALING MATERIAL

Pump & Piping Removed?	☐ Yes	☐ No	☒ Not Applicable
Liner(s) Removed?	☐ Yes	☐ No	☒ Not Applicable
Screen Removed?	☐ Yes	☐ No	☒ Not Applicable
Casing Left in Place?	☐ Yes	☐ No	
Was Casing Cut Off Below Surface?	☐ Yes	☒ No	
Did Sealing Material Rise to Surface?	☒ Yes	☐ No	
Did Material Settle After 24 Hours?	☐ Yes	☒ No	
If Yes, Was Hole Retopped?	☐ Yes	☒ No	

Required Method of Placing Sealing Material
☐ Conductor Pipe - Gravity ☒ Conductor Pipe - Pumped
☐ Screened & Poured (Bentonite Chips) ☐ Other (Explain)

Sealing Materials
☐ Neat Cement Grout
☐ Sand-Cement (Concrete) Grout
☐ Concrete
☐ Clay-Sand Slurry
☒ Bentonite-Sand Slurry
☐ Chipped Bentonite

For monitoring wells and monitoring well boreholes only
☐ Bentonite Chips
☐ Granular Bentonite
☐ Bentonite-Cement Grout
☐ Bentonite - Sand Slurry

(5) Sealing Material Used	From (Ft.)	To (Ft.)	No. Yards, Sacks, Sealant, or Volume	Mix Ratio or Mud Weight
Quik-Grout	Surface	19.5	50 gallons	

(6) Comments ___

(7) Name of Person or Firm Doing Sealing Work: AECOM Technical Services, Inc. | Date of Abandonment: 11/4/11

Signature of Person Doing Work | Date Signed: 11/4/11

Street or Route: 1035 Kepler Drive | Telephone Number: 920-468-1978

City, State, Zip Code: Green Bay, Wisconsin 54311

WELL/DRILLHOLE/BOREHOLE ABANDONMENT

(1) GENERAL INFORMATION

Unique Well No. | Well ID No. | County: Goliad

Common Well Name: B-2-2 | Gov't Lot (if applicable)

Grid Location: ___ 1/4 of ___ 1/4 of Sec. ___ ; T. ___ N; R. ___ ☐ E ☐ W

13452977.2 ft. ☒ N. ☐ S., 2543676.7 ft. ☒ E. ☐ W.

Local Grid Origin ☐ (estimated: ☐) or Well Location ☐

Lat ___ ° ___ ' ___ " Long ___ ° ___ ' ___ " or

State Plane ___ ft. N. ___ ft. E. S ☐ C ☐ N ☐ Zone

Reason For Abandonment: Geotech Boring | Unique Well No. of Replacement Well:

(2) FACILITY /OWNER INFORMATION

Facility Name: Coleto Creek Energy Facility

Facility ID | License/Permit/Monitoring No.:

Street Address of Well: 45 FM 2987

City, Village, or Town: Goliad County, Fannin, Texas 77960

Present Well Owner: Coleto Creek Energy Facility | Original Owner: Same

Street Address or Route of Owner: 45 FM 2987

City, State, Zip Code: Fannin, Texas 77960

(3) WELL/DRILLHOLE/BOREHOLE INFORMATION

Original Construction Date: 11/1/11

☐ Monitoring Well
☐ Water Well
☒ Drillhole / Borehole

If a Well Construction Report is available, please attach.

Construction Type:
☒ Drilled ☐ Driven (Sandpoint) ☐ Dug
☐ Other (Specify) ___

Formation Type:
☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth (ft) (From ground surface): 70.5 | Casing Diameter (in.): 4.0 | Casing Depth (ft.): 10.0

Lower Drillhole Diameter (in.): 3.0

Was Well Annular Space Grouted? ☐ Yes ☐ No ☐ Unknown

If Yes, To What Depth? N/A Feet

Depth to Water (Feet): 3.5

(4) PUMP, LINER, SCREEN, CASING, & SEALING MATERIAL

Pump & Piping Removed?	☐ Yes	☐ No	☒ Not Applicable
Liner(s) Removed?	☐ Yes	☐ No	☒ Not Applicable
Screen Removed?	☐ Yes	☐ No	☒ Not Applicable
Casing Left in Place?	☐ Yes	☒ No	
Was Casing Cut Off Below Surface?	☐ Yes	☒ No	
Did Sealing Material Rise to Surface?	☒ Yes	☐ No	
Did Material Settle After 24 Hours?	☐ Yes	☒ No	
If Yes, Was Hole Retopped?	☐ Yes	☒ No	

Required Method of Placing Sealing Material
☐ Conductor Pipe - Gravity ☒ Conductor Pipe - Pumped
☐ Screened & Poured (Bentonite Chips) ☐ Other (Explain)

Sealing Materials
☐ Neat Cement Grout
☐ Sand-Cement (Concrete) Grout
☐ Concrete
☐ Clay-Sand Slurry
☒ Bentonite-Sand Slurry
☐ Chipped Bentonite

For monitoring wells and monitoring well boreholes only
☐ Bentonite Chips
☐ Granular Bentonite
☐ Bentonite-Cement Grout
☐ Bentonite - Sand Slurry

(5) Sealing Material Used	From (Ft.)	To (Ft.)	No. Yards, Sacks, Sealant, or Volume	Mix Ratio or Mud Weight
Quik-Grout	Surface	70.5	30 gallons	

(6) Comments ___

(7) Name of Person or Firm Doing Sealing Work: AECOM Technical Services, Inc. | Date of Abandonment: 11/2/11

Signature of Person Doing Work | Date Signed: 11/2/11

Street or Route: 1035 Kepler Drive | Telephone Number: 920-468-1978

City, State, Zip Code: Green Bay, Wisconsin 54311

WELL/DRILLHOLE/BOREHOLE ABANDONMENT

(1) GENERAL INFORMATION

Unique Well No. | Well ID No. | County: Goliad

Common Well Name: B-3-1 | Gov't Lot (if applicable)

Grid Location: ___ 1/4 of ___ 1/4 of Sec. ___ ; T. ___ N; R. ___ ☐ E ☐ W

13451245.3 ft. ☒ N. ☐ S., 2543663.1 ft. ☒ E. ☐ W.

Local Grid Origin ☐ (estimated: ☐) or Well Location ☐

Lat ___ ° ___ ' ___ " Long ___ ° ___ ' ___ " or

State Plane ___ ft. N. ___ ft. E. S ☐ C ☐ N ☐ Zone

Reason For Abandonment: Geotech Boring | Unique Well No. of Replacement Well:

(2) FACILITY /OWNER INFORMATION

Facility Name: Coleto Creek Energy Facility

Facility ID | License/Permit/Monitoring No.

Street Address of Well: 45 FM 2987

City, Village, or Town: Goliad County, Fannin, Texas 77960

Present Well Owner: Coleto Creek Energy Facility | Original Owner: Same

Street Address or Route of Owner: 45 FM 2987

City, State, Zip Code: Fannin, Texas 77960

(3) WELL/DRILLHOLE/BOREHOLE INFORMATION

Original Construction Date: 11/8/11

☐ Monitoring Well
☐ Water Well
☒ Drillhole / Borehole

If a Well Construction Report is available, please attach.

Construction Type:
☒ Drilled ☐ Driven (Sandpoint) ☐ Dug
☐ Other (Specify) ___

Formation Type:
☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth (ft) (From ground surface) ___ Casing Diameter (in.) 4.0

Casing Depth (ft.) 5.0

Lower Drillhole Diameter (in.) 3.0

Was Well Annular Space Grouted? ☐ Yes ☐ No ☐ Unknown

If Yes, To What Depth? N/A Feet

Depth to Water (Feet) N/A

(4) PUMP, LINER, SCREEN, CASING, & SEALING MATERIAL

Pump & Piping Removed?	☐ Yes	☐ No	☒ Not Applicable
Liner(s) Removed?	☐ Yes	☐ No	☒ Not Applicable
Screen Removed?	☐ Yes	☐ No	☒ Not Applicable
Casing Left in Place?	☐ Yes	☒ No	
Was Casing Cut Off Below Surface?	☐ Yes	☒ No	
Did Sealing Material Rise to Surface?	☒ Yes	☐ No	
Did Material Settle After 24 Hours?	☐ Yes	☒ No	
If Yes, Was Hole Retopped?	☐ Yes	☒ No	

Required Method of Placing Sealing Material
☐ Conductor Pipe - Gravity ☒ Conductor Pipe - Pumped
☐ Screened & Poured (Bentonite Chips) ☐ Other (Explain)

Sealing Materials
☐ Neat Cement Grout
☐ Sand-Cement (Concrete) Grout
☐ Concrete
☐ Clay-Sand Slurry
☒ Bentonite-Sand Slurry
☐ Chipped Bentonite

For monitoring wells and monitoring well boreholes only
☐ Bentonite Chips
☐ Granular Bentonite
☐ Bentonite-Cement Grout
☐ Bentonite - Sand Slurry

(5) Sealing Material Used	From (Ft.)	To (Ft.)	No. Yards, Sacks, Sealant, or Volume	Mix Ratio or Mud Weight
Quik-Grout	Surface	36.5	20 gallons	

(6) Comments ___

(7) Name of Person or Firm Doing Sealing Work: AECOM Technical Services, Inc. | Date of Abandonment: 11/8/11

Signature of Person Doing Work | Date Signed: 11/8/11

Street or Route: 1035 Kepler Drive | Telephone Number: 920-468-1978

City, State, Zip Code: Green Bay, Wisconsin 54311

WELL/DRILLHOLE/BOREHOLE ABANDONMENT

(1) GENERAL INFORMATION

Unique Well No. | Well ID No. | County: Goliad

Common Well Name: B-3-2 | Gov't Lot (if applicable)

Grid Location: ___ 1/4 of ___ 1/4 of Sec. ___ ; T. ___ N; R. ___ ☐ E ☐ W

1341251.3 ft. ☒ N. ☐ S., 2543721.2 ft. ☒ E. ☐ W.

Local Grid Origin ☐ (estimated: ☐) or Well Location ☐

Lat ___ ° ___ ' ___ " Long ___ ° ___ ' ___ "

State Plane ___ ft. N. ___ ft. E. ☐ S ☐ C ☐ N Zone

Reason For Abandonment: Geotech Boring

Unique Well No. of Replacement Well:

(2) FACILITY /OWNER INFORMATION

Facility Name: Coleto Creek Energy Facility

Facility ID | License/Permit/Monitoring No.

Street Address of Well: 45 FM 2987

City, Village, or Town: Goliad County, Fannin, Texas 77960

Present Well Owner: Coleto Creek Energy Facility | Original Owner: Same

Street Address or Route of Owner: 45 FM 2987

City, State, Zip Code: Fannin, Texas 77960

(3) WELL/DRILLHOLE/BOREHOLE INFORMATION

Original Construction Date: 11/2/11

☐ Monitoring Well
☐ Water Well
☒ Drillhole / Borehole

If a Well Construction Report is available, please attach.

Construction Type:
☒ Drilled ☐ Driven (Sandpoint) ☐ Dug
☐ Other (Specify) ___

Formation Type:
☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth (ft) (From ground surface): 29.5
Casing Diameter (in.): 4.0
Casing Depth (ft.): 5.0
Lower Drillhole Diameter (in.): 3.0

Was Well Annular Space Grouted? ☐ Yes ☐ No ☐ Unknown
If Yes, To What Depth? N/A Feet
Depth to Water (Feet): 14.0

(4) PUMP, LINER, SCREEN, CASING, & SEALING MATERIAL

Pump & Piping Removed?	☐ Yes	☐ No	☒ Not Applicable
Liner(s) Removed?	☐ Yes	☐ No	☒ Not Applicable
Screen Removed?	☐ Yes	☐ No	☒ Not Applicable
Casing Left in Place?	☐ Yes	☒ No	
Was Casing Cut Off Below Surface?	☐ Yes	☒ No	
Did Sealing Material Rise to Surface?	☒ Yes	☐ No	
Did Material Settle After 24 Hours?	☐ Yes	☒ No	
If Yes, Was Hole Retopped?	☐ Yes	☒ No	

Required Method of Placing Sealing Material
☐ Conductor Pipe - Gravity ☒ Conductor Pipe - Pumped
☐ Screened & Poured (Bentonite Chips) ☐ Other (Explain)

Sealing Materials
☐ Neat Cement Grout
☐ Sand-Cement (Concrete) Grout
☐ Concrete
☐ Clay-Sand Slurry
☒ Bentonite-Sand Slurry
☐ Chipped Bentonite

For monitoring wells and monitoring well boreholes only
☐ Bentonite Chips
☐ Granular Bentonite
☐ Bentonite-Cement Grout
☐ Bentonite - Sand Slurry

(5) Sealing Material Used	From (Ft.)	To (Ft.)	No. Yards, Sacks, Sealant, or Volume	Mix Ratio or Mud Weight
Quik-Grout	Surface	29.5	20 gallons	

(6) Comments ___

(7) Name of Person or Firm Doing Sealing Work: AECOM Technical Services, Inc. | Date of Abandonment: 11/2/11

Signature of Person Doing Work | Date Signed: 11/2/11

Street or Route: 1035 Kepler Drive | Telephone Number: 920-468-1978

City, State, Zip Code: Green Bay, Wisconsin 54311

WELL/DRILLHOLE/BOREHOLE ABANDONMENT

(1) GENERAL INFORMATION

Unique Well No. | Well ID No. | County: Goliad

Common Well Name: B-4-1 | Gov't Lot (if applicable)

Grid Location: ___ 1/4 of ___ 1/4 of Sec. ___ ; T. ___ N; R. ___ ☐ E ☐ W

1340613.7 ft. ☒ N. ☐ S., 2543740.9 ft. ☒ E. ☐ W.

Local Grid Origin ☐ (estimated: ☐) or Well Location ☐

Lat ___ ° ___ ' ___ " Long ___ ° ___ ' ___ "

State Plane ___ ft. N. ___ ft. E. ☐ S ☐ C ☐ N Zone

Reason For Abandonment: Geotech Boring | Unique Well No. of Replacement Well:

(2) FACILITY /OWNER INFORMATION

Facility Name: Coleto Creek Energy Facility

Facility ID | License/Permit/Monitoring No.:

Street Address of Well: 45 FM 2987

City, Village, or Town: Goliad County, Fannin, Texas 77960

Present Well Owner: Coleto Creek Energy Facility | Original Owner: Same

Street Address or Route of Owner: 45 FM 2987

City, State, Zip Code: Fannin, Texas 77960

(3) WELL/DRILLHOLE/BOREHOLE INFORMATION

Original Construction Date: 11/7/11

☐ Monitoring Well
☐ Water Well
☒ Drillhole / Borehole

If a Well Construction Report is available, please attach.

Construction Type:
☒ Drilled ☐ Driven (Sandpoint) ☐ Dug
☐ Other (Specify) ___

Formation Type:
☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth (ft) (From ground surface): 51.5 | Casing Diameter (in.): 5.0 | Casing Depth (ft.): 4.0

Lower Drillhole Diameter (in.): 3.0

Was Well Annular Space Grouted? ☐ Yes ☐ No ☐ Unknown

If Yes, To What Depth? N/A Feet

Depth to Water (Feet): N/A

(4) PUMP, LINER, SCREEN, CASING, & SEALING MATERIAL

Pump & Piping Removed?	☐ Yes	☐ No	☒ Not Applicable
Liner(s) Removed?	☐ Yes	☐ No	☒ Not Applicable
Screen Removed?	☐ Yes	☐ No	☒ Not Applicable
Casing Left in Place?	☐ Yes	☒ No	
Was Casing Cut Off Below Surface?	☐ Yes	☒ No	
Did Sealing Material Rise to Surface?	☒ Yes	☐ No	
Did Material Settle After 24 Hours?	☐ Yes	☒ No	
If Yes, Was Hole Retopped?	☐ Yes	☒ No	

Required Method of Placing Sealing Material
☐ Conductor Pipe - Gravity ☒ Conductor Pipe - Pumped
☐ Screened & Poured (Bentonite Chips) ☐ Other (Explain)

Sealing Materials
☐ Neat Cement Grout
☐ Sand-Cement (Concrete) Grout
☐ Concrete
☐ Clay-Sand Slurry
☒ Bentonite-Sand Slurry
☐ Chipped Bentonite

For monitoring wells and monitoring well boreholes only
☐ Bentonite Chips
☐ Granular Bentonite
☐ Bentonite-Cement Grout
☐ Bentonite - Sand Slurry

(5) Sealing Material Used	From (Ft.)	To (Ft.)	No. Yards, Sacks, Sealant, or Volume	Mix Ratio or Mud Weight
Quik-Grout	Surface	51.5	25 gallons	

(6) Comments ___

(7) Name of Person or Firm Doing Sealing Work: AECOM Technical Services, Inc. | Date of Abandonment: 11/7/11

Signature of Person Doing Work | Date Signed: 11/7/11

Street or Route: 1035 Kepler Drive | Telephone Number: 920-468-1978

City, State, Zip Code: Green Bay, Wisconsin 54311

WELL/DRILLHOLE/BOREHOLE ABANDONMENT

(1) GENERAL INFORMATION

Unique Well No. | Well ID No. | County: Goliad

Common Well Name: B-4-2 | Gov't Lot (if applicable)

Grid Location: ___ 1/4 of ___ 1/4 of Sec. ___ ; T. ___ N; R. ___ ☐ E ☐ W

13450619.3 ft. ☒ N. ☐ S., 2543806.7 ft. ☒ E. ☐ W.

Local Grid Origin ☐ (estimated: ☐) or Well Location ☐

Lat ___ ° ___ ' ___ " Long ___ ° ___ ' ___ " or

State Plane ___ ft. N. ___ ft. E. S ☐ C ☐ N ☐ Zone

Reason For Abandonment: Geotech Boring

Unique Well No. of Replacement Well:

(2) FACILITY /OWNER INFORMATION

Facility Name: Coleto Creek Energy Facility

Facility ID | License/Permit/Monitoring No.

Street Address of Well: 45 FM 2987

City, Village, or Town: Goliad County, Fannin, Texas 77960

Present Well Owner: Coleto Creek Energy Facility | Original Owner: Same

Street Address or Route of Owner: 45 FM 2987

City, State, Zip Code: Fannin, Texas 77960

(3) WELL/DRILLHOLE/BOREHOLE INFORMATION

Original Construction Date: 11/2/11

☐ Monitoring Well
☐ Water Well
☒ Drillhole / Borehole

If a Well Construction Report is available, please attach.

Construction Type:
☒ Drilled ☐ Driven (Sandpoint) ☐ Dug
☐ Other (Specify) ___

Formation Type:
☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth (ft) (From ground surface): 31.0
Casing Diameter (in.): 4.0
Casing Depth (ft.): 5.0
Lower Drillhole Diameter (in.): 3.0

Was Well Annular Space Grouted? ☐ Yes ☐ No ☐ Unknown
If Yes, To What Depth? N/A Feet
Depth to Water (Feet): 14.0

(4) PUMP, LINER, SCREEN, CASING, & SEALING MATERIAL

Pump & Piping Removed?	☐ Yes	☐ No	☒ Not Applicable
Liner(s) Removed?	☐ Yes	☐ No	☒ Not Applicable
Screen Removed?	☐ Yes	☐ No	☒ Not Applicable
Casing Left in Place?	☐ Yes	☒ No	
Was Casing Cut Off Below Surface?	☐ Yes	☒ No	
Did Sealing Material Rise to Surface?	☒ Yes	☐ No	
Did Material Settle After 24 Hours?	☐ Yes	☒ No	
If Yes, Was Hole Retopped?	☐ Yes	☒ No	

Required Method of Placing Sealing Material
☐ Conductor Pipe - Gravity ☒ Conductor Pipe - Pumped
☐ Screened & Poured (Bentonite Chips) ☐ Other (Explain)

Sealing Materials
☐ Neat Cement Grout
☐ Sand-Cement (Concrete) Grout
☐ Concrete
☐ Clay-Sand Slurry
☒ Bentonite-Sand Slurry
☐ Chipped Bentonite

For monitoring wells and monitoring well boreholes only
☐ Bentonite Chips
☐ Granular Bentonite
☐ Bentonite-Cement Grout
☐ Bentonite - Sand Slurry

(5) Sealing Material Used	From (Ft.)	To (Ft.)	No. Yards, Sacks, Sealant, or Volume	Mix Ratio or Mud Weight
Quik-Grout	Surface	31.0	20 gallons	

(6) Comments ___

(7) Name of Person or Firm Doing Sealing Work: AECOM Technical Services, Inc. | Date of Abandonment: 11/2/11

Signature of Person Doing Work | Date Signed: 11/2/11

Street or Route: 1035 Kepler Drive | Telephone Number: 920-468-1978

City, State, Zip Code: Green Bay, Wisconsin 54311

WELL/DRILLHOLE/BOREHOLE ABANDONMENT

(1) GENERAL INFORMATION

Unique Well No. | Well ID No. | County: Goliad

Common Well Name: B-5-1 Gov't Lot (if applicable)

Grid Location: ___ 1/4 of ___ 1/4 of Sec. ___ ; T. ___ N; R. ___ ☐ E ☐ W

13451003.7 ft. ☒ N. ☐ S., 2543693.8 ft. ☒ E. ☐ W.

Local Grid Origin ☐ (estimated: ☐) or Well Location ☐

Lat ___ ° ___ ' ___ " Long ___ ° ___ ' ___ "

State Plane ___ ft. N. ___ ft. E. ☐ S ☐ C ☐ N Zone

Reason For Abandonment: Geotech Boring

Unique Well No. of Replacement Well:

(2) FACILITY /OWNER INFORMATION

Facility Name: Coleto Creek Energy Facility

Facility ID | License/Permit/Monitoring No.

Street Address of Well: 45 FM 2987

City, Village, or Town: Goliad County, Fannin, Texas 77960

Present Well Owner: Coleto Creek Energy Facility | Original Owner: Same

Street Address or Route of Owner: 45 FM 2987

City, State, Zip Code: Fannin, Texas 77960

(3) WELL/DRILLHOLE/BOREHOLE INFORMATION

Original Construction Date: 11/7/11

☐ Monitoring Well
☐ Water Well
☒ Drillhole / Borehole

If a Well Construction Report is available, please attach.

Construction Type:
☒ Drilled ☐ Driven (Sandpoint) ☐ Dug
☐ Other (Specify) ___

Formation Type:
☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth (ft) (From ground surface): 50.9
Casing Diameter (in.): 4.0
Casing Depth (ft.): 5.0
Lower Drillhole Diameter (in.): 3.0

Was Well Annular Space Grouted? ☐ Yes ☐ No ☐ Unknown
If Yes, To What Depth? N/A Feet
Depth to Water (Feet): N/A

(4) PUMP, LINER, SCREEN, CASING, & SEALING MATERIAL

Pump & Piping Removed?	☐ Yes	☐ No	☒ Not Applicable
Liner(s) Removed?	☐ Yes	☐ No	☒ Not Applicable
Screen Removed?	☐ Yes	☐ No	☒ Not Applicable
Casing Left in Place?	☐ Yes	☒ No	
Was Casing Cut Off Below Surface?	☐ Yes	☒ No	
Did Sealing Material Rise to Surface?	☒ Yes	☐ No	
Did Material Settle After 24 Hours?	☐ Yes	☒ No	
If Yes, Was Hole Retopped?	☐ Yes	☒ No	

Required Method of Placing Sealing Material
☐ Conductor Pipe - Gravity ☒ Conductor Pipe - Pumped
☐ Screened & Poured (Bentonite Chips) ☐ Other (Explain)

Sealing Materials
☐ Neat Cement Grout
☐ Sand-Cement (Concrete) Grout
☐ Concrete
☐ Clay-Sand Slurry
☒ Bentonite-Sand Slurry
☐ Chipped Bentonite

For monitoring wells and monitoring well boreholes only
☐ Bentonite Chips
☐ Granular Bentonite
☐ Bentonite-Cement Grout
☐ Bentonite - Sand Slurry

(5) Sealing Material Used	From (Ft.)	To (Ft.)	No. Yards, Sacks, Sealant, or Volume	Mix Ratio or Mud Weight
Quik-Grout	Surface	50.9	25 gallons	

(6) Comments ___

(7) Name of Person or Firm Doing Sealing Work: AECOM Technical Services, Inc. | Date of Abandonment: 11/7/11

Signature of Person Doing Work | Date Signed: 11/7/11

Street or Route: 1035 Kepler Drive | Telephone Number: 920-468-1978

City, State, Zip Code: Green Bay, Wisconsin 54311

AECOM

AECOM General Notes

Drilling and Sampling Symbols:

SS : Split Spoon - 1-3/8" I.D. 2" O.D. (Unless otherwise noted)	HS : Hollow Stem Auger
ST : Shelby Tube-2" O.D. (Unless otherwise noted)	WS : Wash Sample
PA : Power Auger	FT : Fish Tail
DB : Diamond Bit-NX, BX, AX	RB : Rock Bit
AS : Auger Sample	BS : Bulk Sample
JS : Jar Sample	PM : Pressuremeter Test
VS : Vane Shear	GS : Giddings Sampler
OS : Osterberg Sampler	

Standard "N" Penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch O.D. split spoon sampler, except where otherwise noted.

Water Level Measurement Symbols:

WL : Water Level	WCI : Wet Cave In
WS : While Sampling	DCI : Dry Cave In
WD : While Drilling	BCR : Before Casing Removal
AB : After Boring	ACR : After Casing Removal

Water levels indicated on the boring logs are the levels measured in the boring at the time indicated. In pervious soils, the indicated elevations are considered reliable groundwater levels. In impervious soils, the accurate determination of groundwater elevations may not be possible, even after several days of observations; additional evidence of groundwater elevations must be sought.

Gradation Description and Terminology:

Coarse grained or granular soils have more than 50% of their dry weight retained on a #200 sieve; they are described as boulders, cobbles, gravel or sand. Fine grained soils have less than 50% of their dry weight retained on a #200 sieve; they are described as clay or clayey silt if they are cohesive and silt if they are non-cohesive. In addition to gradation, granular soils are defined on the basis of their relative in-place density and fine grained soils on the basis of their strength or consistency and their plasticity.

Major Component of Sample	Size Range	Description of Other Components Present in Sample	Percent Dry Weight
Boulders	Over 8 in. (200 mm)	Trace	1-9
Cobbles	8 inches to 3 inches (200 mm to 75 mm)	Little	10-19
Gravel	3 inches to #4 sieve (75 mm to 4.76 mm)	Some	20-34
Sand	#4 to #200 sieve (4.76 mm to 0.074 mm)	And	35-50
Silt	Passing #200 sieve (0.074 mm to 0.005 mm)		
Clay	Smaller than 0.005 mm		

Consistency of Cohesive Soils:

Unconfined Compressive Strength, Qu, tsf	Consistency
<0.25	Very Soft
0.25 - 0.49	Soft
0.50 - 0.99	Medium (firm)
1.00 - 1.99	Stiff
2.00 - 3.99	Very Stiff
4.00 - 8.00	Hard
>8.00	Very Hard

Relative Density of Granular Soils:

N-Blows per foot	Relative Density
0 - 3	Very Loose
4 - 9	Loose
10 - 29	Medium Dense
30 - 49	Dense
50 - 80	Very Dense
>80	Extremely Dense

AECOM Field and Laboratory Procedures

Field Sampling Procedures

Auger Sampling (AS)

In this procedure, soil samples are collected from cuttings off of the auger flights as they are removed from the ground. Such samples provide a general indication of subsurface conditions; however, they do not provide undisturbed samples, nor do they provide samples from discrete depths.

Split-Barrel Sampling (SS) - (ASTM Standard D-1586-99)

In the split-barrel sampling procedure, a 2-inch O.D. split barrel sampler is driven into the soil a distance of 18 inches by means of a 140-pound hammer falling 30 inches. The value of the Standard Penetration Resistance is obtained by counting the number of blows of the hammer over the final 12 inches of driving. This value provides a qualitative indication of the in-place relative density of cohesionless soils. The indication is qualitative only, however, since many factors can significantly affect the Standard Penetration Resistance Value, and direct correlation of results obtained by drill crews using different rigs, drilling procedures, and hammer-rod-spoon assemblies should not be made. A portion of the recovered sample is placed in a sample jar and returned to the laboratory for further analysis and testing.

Shelby Tube Sampling Procedure (ST) - ASTM Standard D-1587-94

In the Shelby tube sampling procedure, a thin-walled steel seamless tube with a sharp cutting edge is pushed hydraulically into the soil and a relatively undisturbed sample is obtained. This procedure is generally employed in cohesive soils. The tubes are identified, sealed and carefully handled in the field to avoid excessive disturbance and are returned to the laboratory for extrusion and further analysis and testing.

Giddings Sampler (GS)

This type of sampling device consists of 5-foot sections of thin-wall tubing which are capable of retrieving continuous columns of soil in 5-foot maximum increments. Because of a continuous slot in the sampling tubes, the sampler allows field determination of stratification boundaries and containerization of soil samples from any sampling depth within the 5-foot interval.

AECOM

AECOM Field and Laboratory Procedures

Subsurface Exploration Procedures

Hand-Auger Drilling (HA)

In this procedure, a sampling device is driven into the soil by repeated blows of a sledge hammer or a drop hammer. When the sampler is driven to the desired sample depth, the soil sample is retrieved. The hole is then advanced by manually turning the hand auger until the next sampling depth increment is reached. The hand auger drilling between sampling intervals also helps to clean and enlarge the borehole in preparation for obtaining the next sample.

Power Auger Drilling (PA)

In this type of drilling procedure, continuous flight augers are used to advance the boreholes. They are turned and hydraulically advanced by a truck, trailer or track-mounted unit as site accessibility dictates. In auger drilling, casing and drilling mud are not required to maintain open boreholes.

Hollow Stem Auger Drilling (HS)

In this drilling procedure, continuous flight augers having open stems are used to advance the boreholes. The open stem allows the sampling tool to be used without removing the augers from the borehole. Hollow stem augers thus provide support to the sides of the borehole during the sampling operations.

Rotary Drilling (RB)

In employing rotary drilling methods, various cutting bits are used to advance the boreholes. In this process, surface casing and/or drilling fluids are used to maintain open boreholes.

Diamond Core Drilling (DB)

Diamond core drilling is used to sample cemented formations. In this procedure, a double tube (or triple tube) core barrel with a diamond bit cuts an annular space around a cylindrical prism of the material sampled. The sample is retrieved by a catcher just above the bit. Samples recovered by this procedure are placed in sturdy containers in sequential order.

AECOM Laboratory Procedures

Water Content (Wc)

The water content of a soil is the ratio of the weight of water in a given soil mass to the weight of the dry soil. Water content is generally expressed as a percentage.

Hand Penetrometer (Qp)

In the hand penetrometer test, the unconfined compressive strength of a soil is determined, to a maximum value of 4.5 tons per square foot (tsf) or 7.0 tsf depending on the testing device utilized, by measuring the resistance of the soil sample to penetration by a small, spring-calibrated cylinder. The hand penetrometer test has been carefully correlated with unconfined compressive strength tests, and thereby provides a useful and a relatively simple testing procedure in which soil strength can be quickly and easily estimated.

Unconfined Compression Tests (Qu)

In the unconfined compression strength test, an undisturbed prism of soil is loaded axially until failure or until 20% strain has been reached, whichever occurs first.

Dry Density (γd)

The dry density is a measure of the amount of solids in a unit volume of soil. Use of this value is often made when measuring the degree of compaction of a soil.

Classification of Samples

In conjunction with the sample testing program, all soil samples are examined in our laboratory and visually classified on the basis of their texture and plasticity in accordance with the AECOM Soil Classification System which is described on a separate sheet. The soil descriptions on the boring logs are derived from this system as well as the component gradation terminology, consistency of cohesive soils and relative density of granular soils as described on a separate sheet entitled "AECOM General Notes". The estimated group symbols included in parentheses following the soil descriptions on the boring logs are in general conformance with the Unified Soil Classification System (USCS) which serves as the basis of the AECOM Soil Classification System.

AECOM

AECOM Standard Boring Log Procedures

In the process of obtaining and testing samples and preparing this report, standard procedures are followed regarding field logs, laboratory data sheets and samples.

Field logs are prepared during performance of the drilling and sampling operations and are intended to essentially portray field occurrences, sampling locations and procedures.

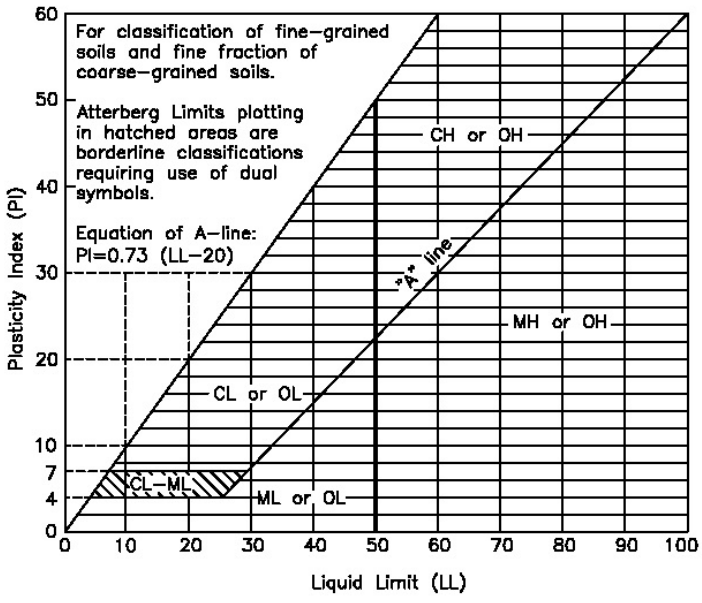
Samples obtained in the field are frequently subjected to additional testing and reclassification in the laboratory by experienced geotechnical engineers, and as such, differences between the field logs and the final logs may exist. The engineer preparing the report reviews the field logs, laboratory test data and classifications, and using judgment and experience in interpreting this data, may make further changes. It is common practice in the geotechnical engineering profession not to include field logs and laboratory data sheets in engineering reports, because they do not represent the engineer's final opinions as to appropriate descriptions for conditions encountered in the exploration and testing work. Results of laboratory tests are generally shown on the boring logs or are described in the text of the report, as appropriate.

Samples taken in the field, some of which are later subjected to laboratory tests, are retained in our laboratory for sixty days and are then discarded unless special disposition is requested by our client. Samples retained over a long period of time, even in sealed jars, are subject to moisture loss which changes the apparent strength of cohesive soil, generally increasing the strength from what was originally encountered in the field. Since they are then no longer representative of the moisture conditions initially encountered, observers of these samples should recognize this factor.

AECOM Soil Classification System [1]

	Major Divisions		Group Symbols	Typical Names	Laboratory Classification Criteria
Coarse-grained soils (More than half of material is *larger* than No. 200 sieve size)	Gravel (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravel (Little or no fines)	GW	Well-graded, gravel, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 percent . . . . . GW, GP, SW, SP; More than 12 percent . . . . . GM, GC, SM, SC; 5 to 12 percent . . . . . Borderline cases *requiring* dual symbols [3]
			GP	Poorly graded gravel, gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 & 3
		Gravel with fines (Appreciable amount of fines)	GM	Silty gravel, gravel-sand-silt mixtures	Not meeting all gradation requirements for GW
			GC	Clayey gravel, gravel-sand-clay mixtures	Atterberg limits below "A" line or PI less than 4
	Sand (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sand (Little or no fines)	SW	Well-graded sand, gravelly sand, little or no fines	Atterberg limits above "A" line or PI greater than 7
			SP	Poorly graded sand, gravelly sand, little or no fines	Above "A" line with PI between 4 and 7 are *borderline* cases requiring use of dual symbols
		Sand with fines (Appreciable amount of fines)	SM	Silty sand, sand-silt mixtures	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 & 3
			SC	Clayey sand, sand-clay mixtures	Not meeting all gradation requirements for SW
Fine-grained soils (More than half of material is *smaller* than No. 200 sieve size)	Silt and clay (Liquid limit less than 50)		ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or clayey silt with slight plasticity	Atterberg limits below "A" line or PI less than 4
			CL	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay, silty clay, lean clay	Atterberg limits above "A" line or PI greater than 7
			OL	Organic silt and organic silty clay of low plasticity	Limits plotting in hatched zone with PI between 4 and 7 are *borderline* cases requiring use of dual symbols
	Silt and clay (Liquid limit greater than 50)		MH	Inorganic silt, micaceous or diatomaceous fine sandy or silty soils, elastic silt	
			CH	Inorganic clay of high plasticity, fat clay	
			OH	Organic clay of medium to high plasticity, organic silt	
	Highly organic soils		PT	Peat and other highly organic soil	

Plasticity Chart [2]

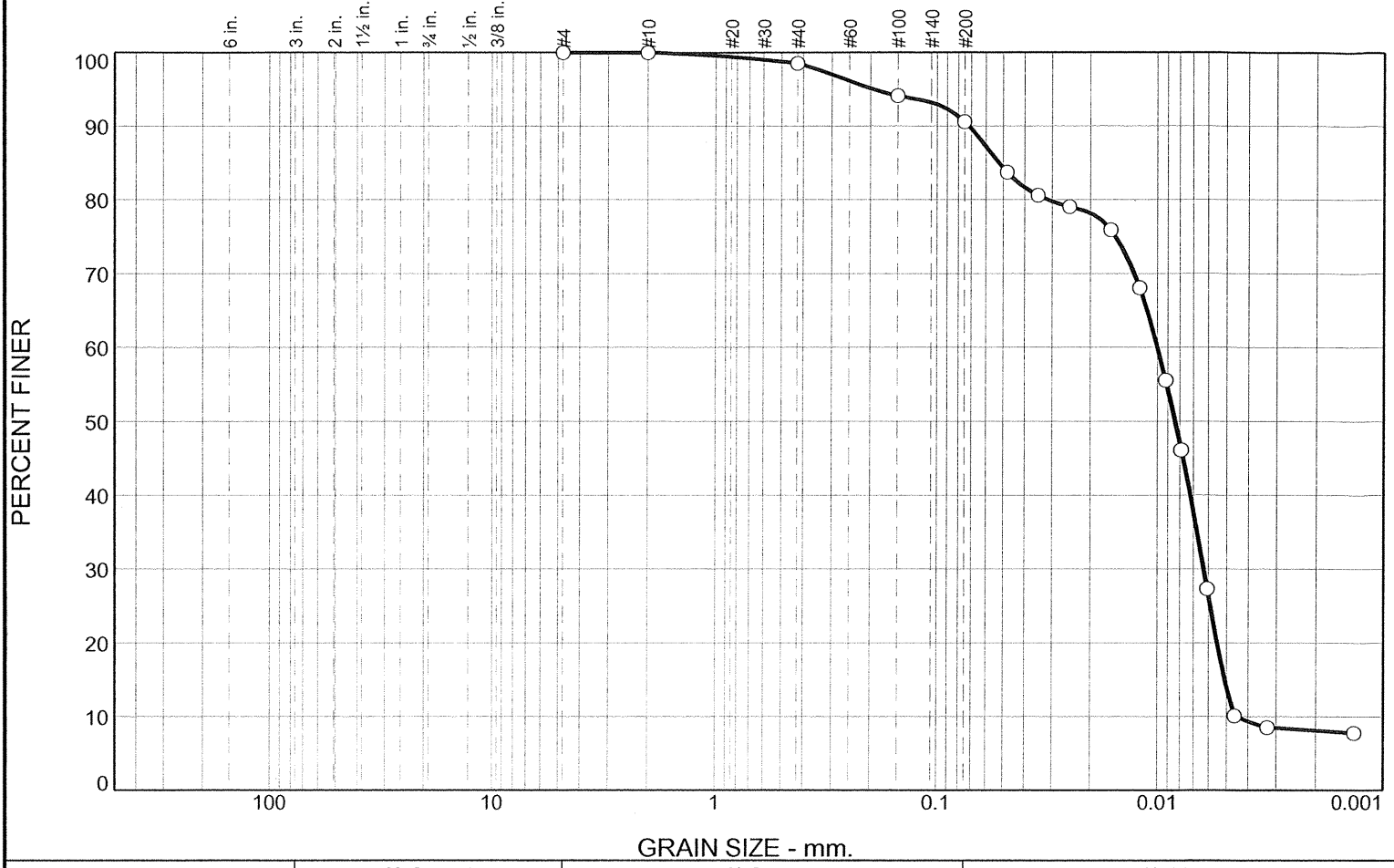


1. See AECOM General Notes for component gradation terminology, consistency of cohesive soils and relative density of granular soils.
2. Reference: Unified Soil Classification Systems
3. Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC, well-graded gravel-sand mixture with clay binder.

APPENDIX B

Geotechnical Laboratory Data

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.5	7.9	76.7	13.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#40	98.5		
#100	94.1		
#200	90.6		

* (no specification provided)

Material Description

LIGHT GRAY SILTY CLAY, TRACE SAND

Atterberg Limits

PL= 14 LL= 22 PI= 8

Coefficients

D_{90}= 0.0716 D_{85}= 0.0523 D_{60}= 0.0100
D_{50}= 0.0084 D_{30}= 0.0063 D_{15}= 0.0051
D_{10}= 0.0045 C_u= 2.21 C_c= 0.88

Classification

USCS= CL AASHTO= A-4(5)

Remarks

Source of Sample: B-1-1 **Depth:** 8'-10'
Sample Number: B-1-1 S-5

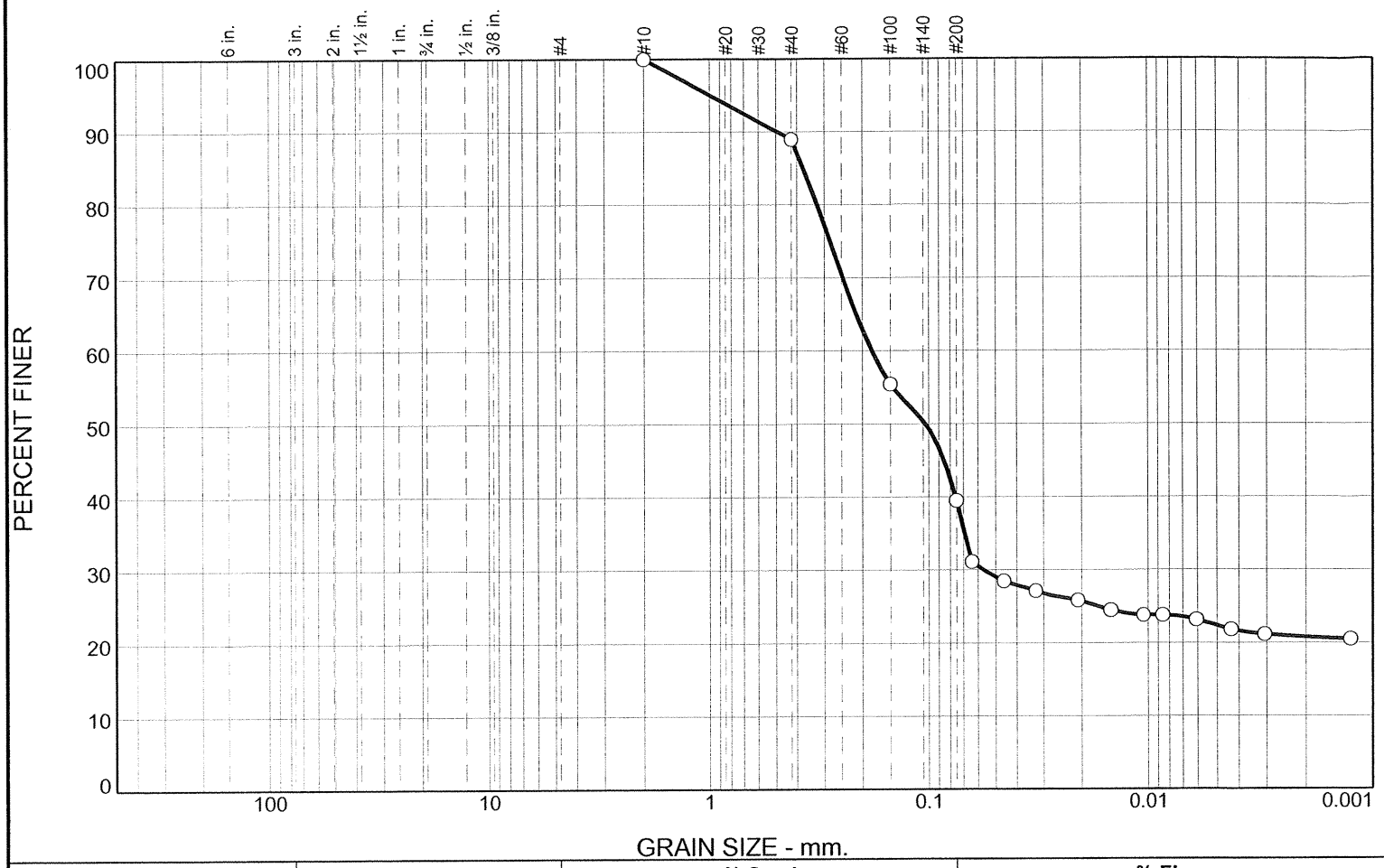
Date: 12/09/11

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No: 60225561 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	11.0	49.5	17.1	22.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	89.0		
#100	55.5		
#200	39.5		

* (no specification provided)

Material Description

CLAYEY FINE TO MEDIUM SAND, BROWNISH GRAY

Atterberg Limits

PL= 14 LL= 38 PI= 24

Coefficients

D_{90}= 0.4902 D_{85}= 0.3732 D_{60}= 0.1816
D_{50}= 0.1036 D_{30}= 0.0564 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-6(4)

Remarks

Source of Sample: B-1-1 **Depth:** 20'-22'
Sample Number: B-1-1 S-11

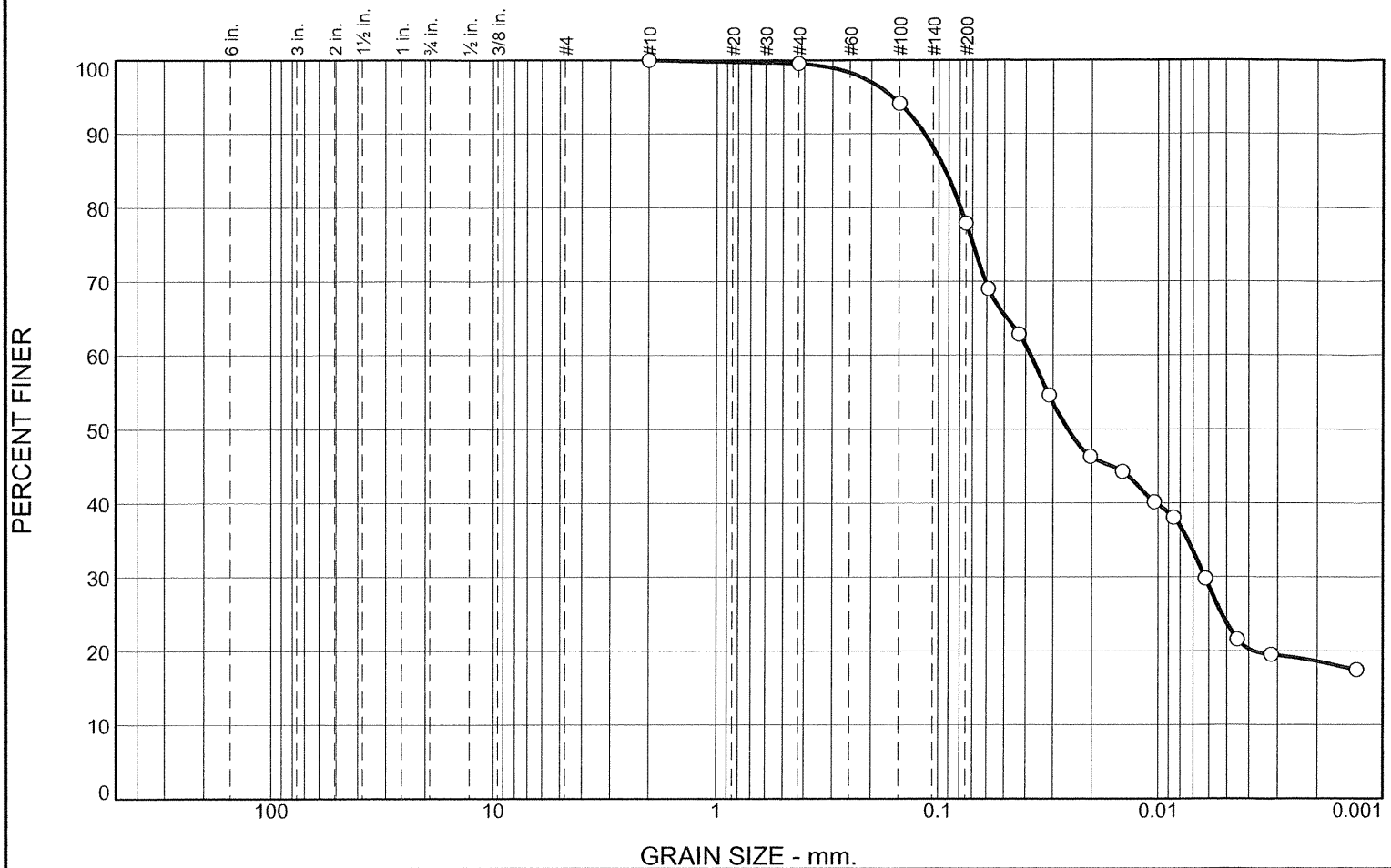
Date: 12/9/11

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No: 60225561 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.4	21.7	54.2	23.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.6		
#100	94.1		
#200	77.9		

* (no specification provided)

Material Description

SILTY CLAY, SOME SAND, LIGHT GRAY

Atterberg Limits

PL= 17 LL= 42 PI= 25

Coefficients

D_{90}= 0.1156 D_{85}= 0.0934 D_{60}= 0.0380
D_{50}= 0.0258 D_{30}= 0.0062 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(18)

Remarks

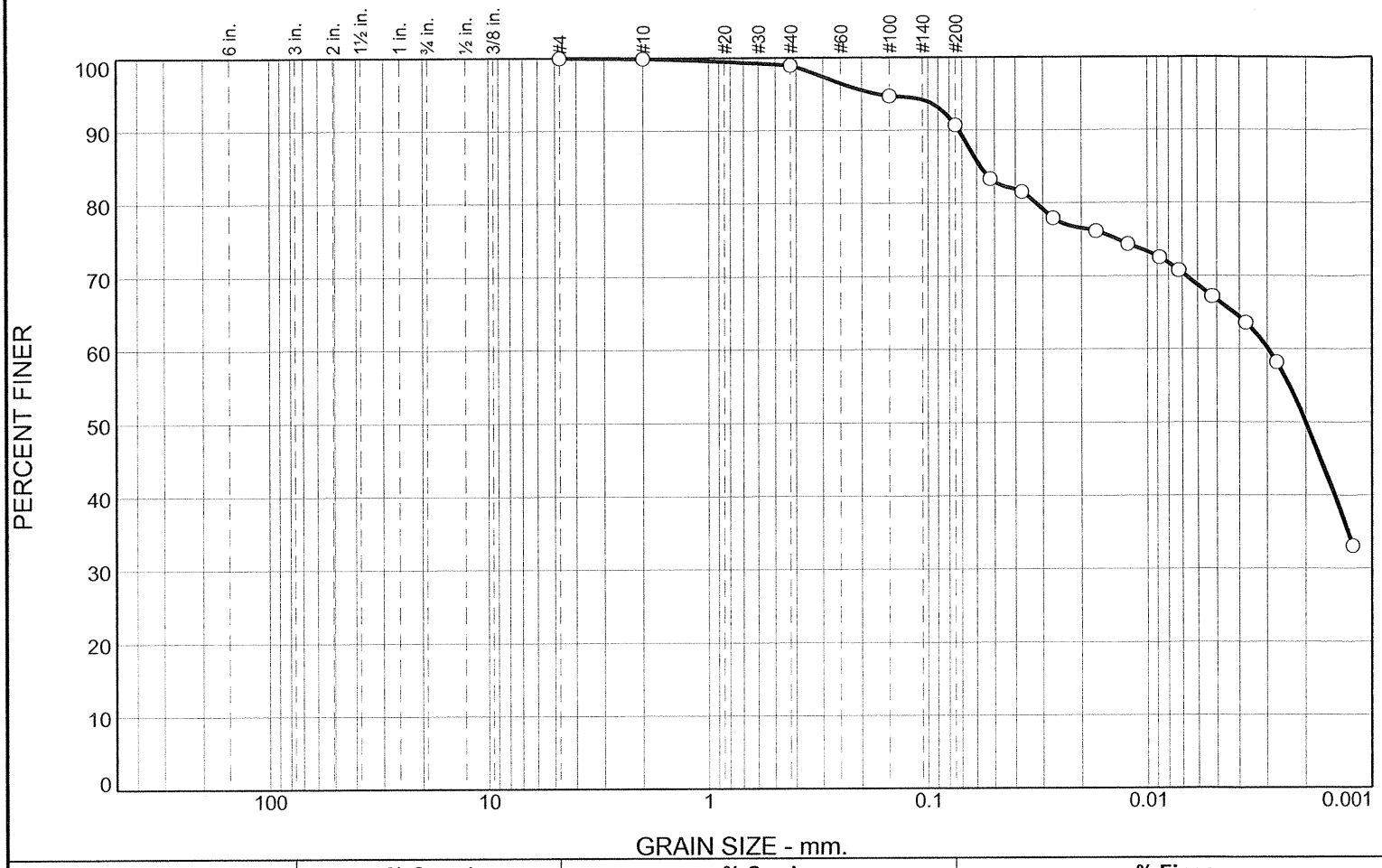
Source of Sample: B-1-1 **Depth:** 90'-90.4'
Sample Number: B-1-1 S-34 **Date:** 12/15/11

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No: 60225561 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.0	8.2	23.9	66.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#40	98.9		
#100	94.7		
#200	90.7		

* (no specification provided)

Material Description

SILTY CLAY, TRACE SAND, BROWN

Atterberg Limits

PL= 28 LL= 79 PI= 51

Coefficients

D_{90}= 0.0724 D_{85}= 0.0576 D_{60}= 0.0030
D_{50}= 0.0020 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(53)

Remarks

Source of Sample: B-1-1 **Depth:** 120'-121'
Sample Number: B-1-1 S-40

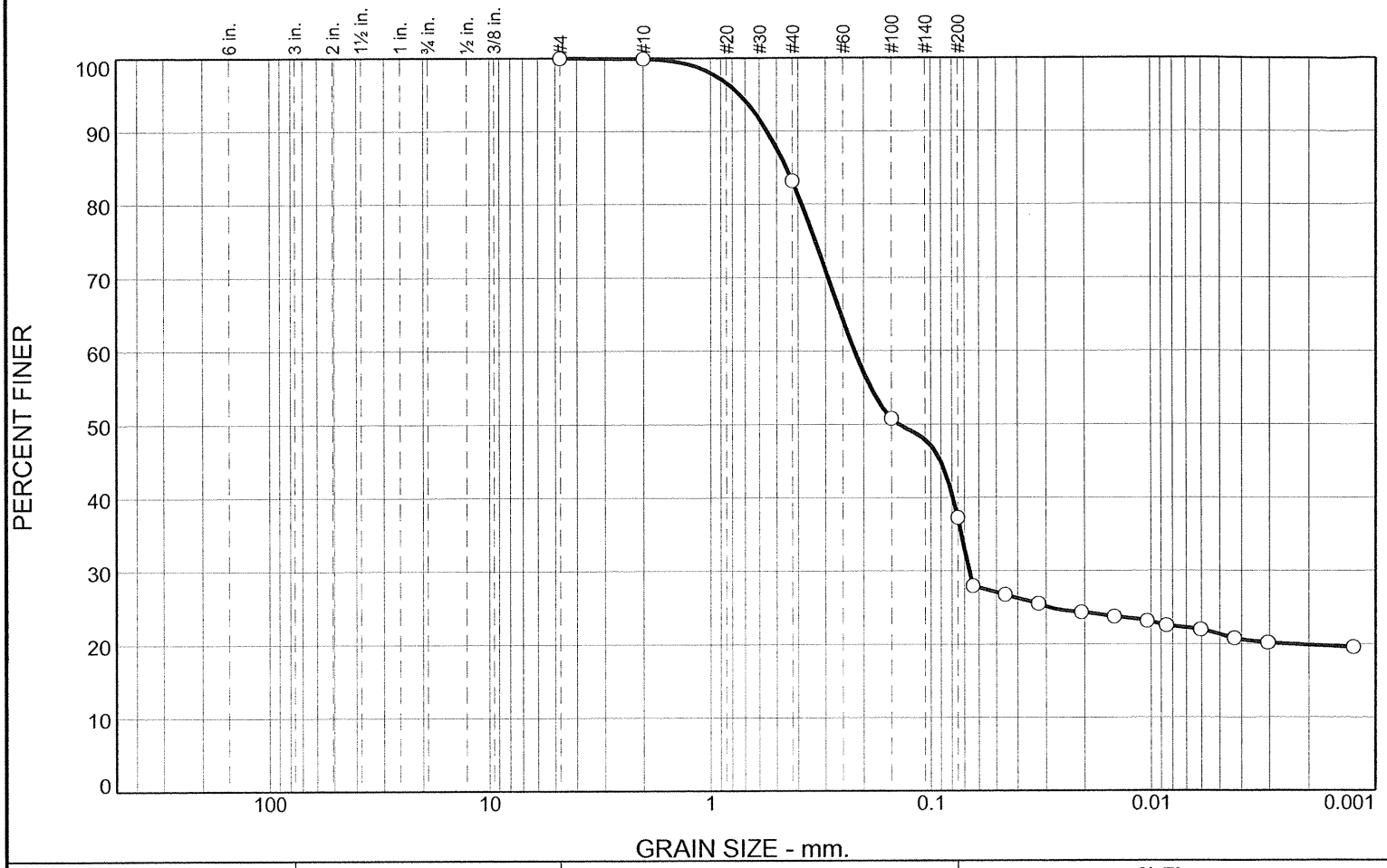
Date: 12/9/11

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No: 60225561 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	16.7	45.9	15.9	21.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#40	83.2		
#100	50.8		
#200	37.3		

* (no specification provided)

Material Description

CLAYEY FINE TO MEDIUM SAND, GRAYISH BROWN

Atterberg Limits

PL= 14 LL= 38 PI= 24

Coefficients

D_{90}= 0.5520 D_{85}= 0.4512 D_{60}= 0.2202
D_{50}= 0.1389 D_{30}= 0.0666 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-6(3)

Remarks

Source of Sample: B-2-1 **Depth:** 10'-12'
Sample Number: B-2-1 S-6

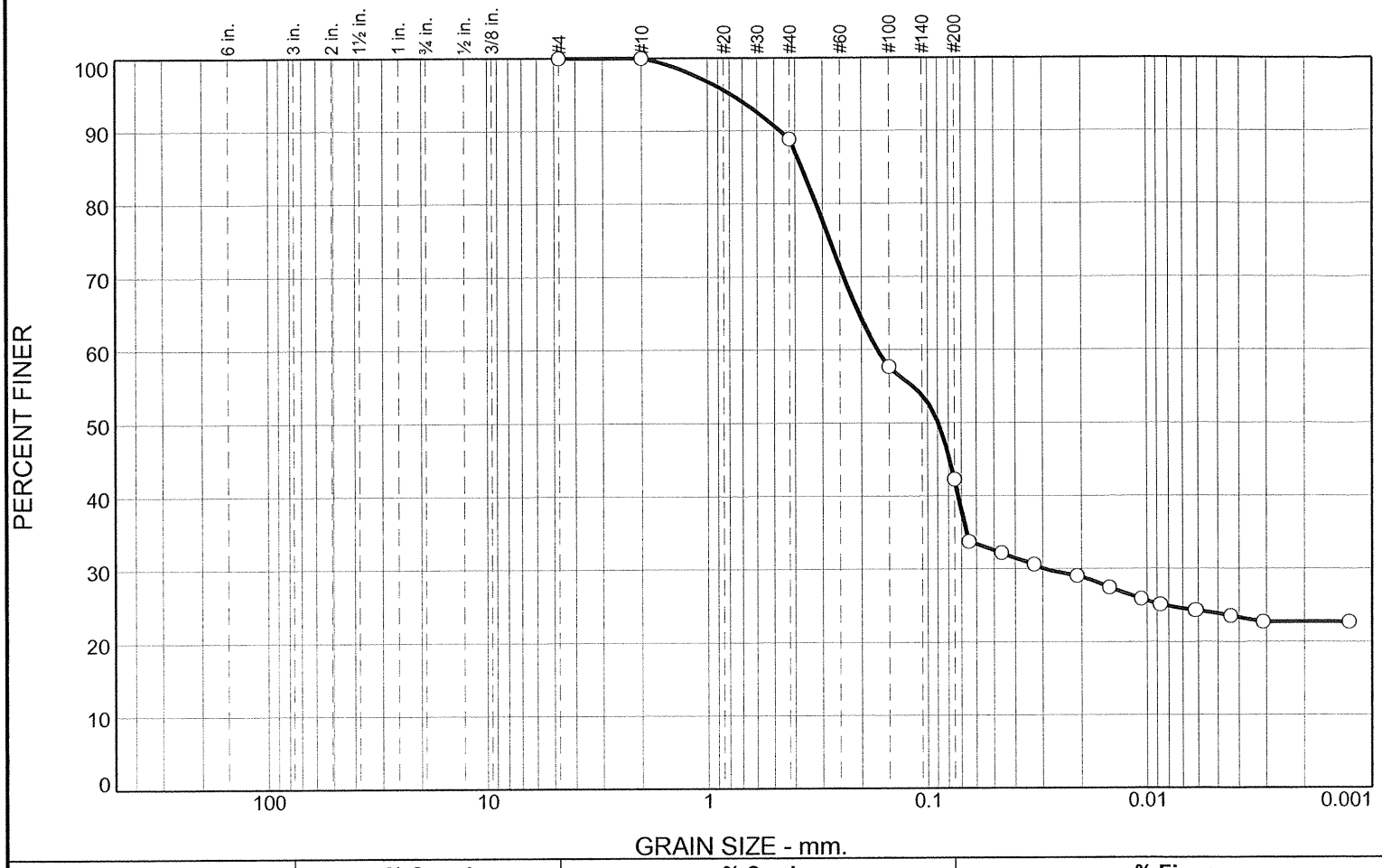
Date: 12/9/11

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No: 60225561 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	11.1	46.6	18.4	23.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#40	88.9		
#100	57.7		
#200	42.3		

* (no specification provided)

Material Description

CLAYEY FINE TO MEDIUM SAND, GRAYISH BROWN

Atterberg Limits

PL= 13 LL= 41 PI= 28

Coefficients

D_{90}= 0.4679 D_{85}= 0.3722 D_{60}= 0.1697
D_{50}= 0.0893 D_{30}= 0.0293 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-7-6(6)

Remarks

Source of Sample: B-2-1 **Depth:** 18'-20'
Sample Number: B-2-1 S-10

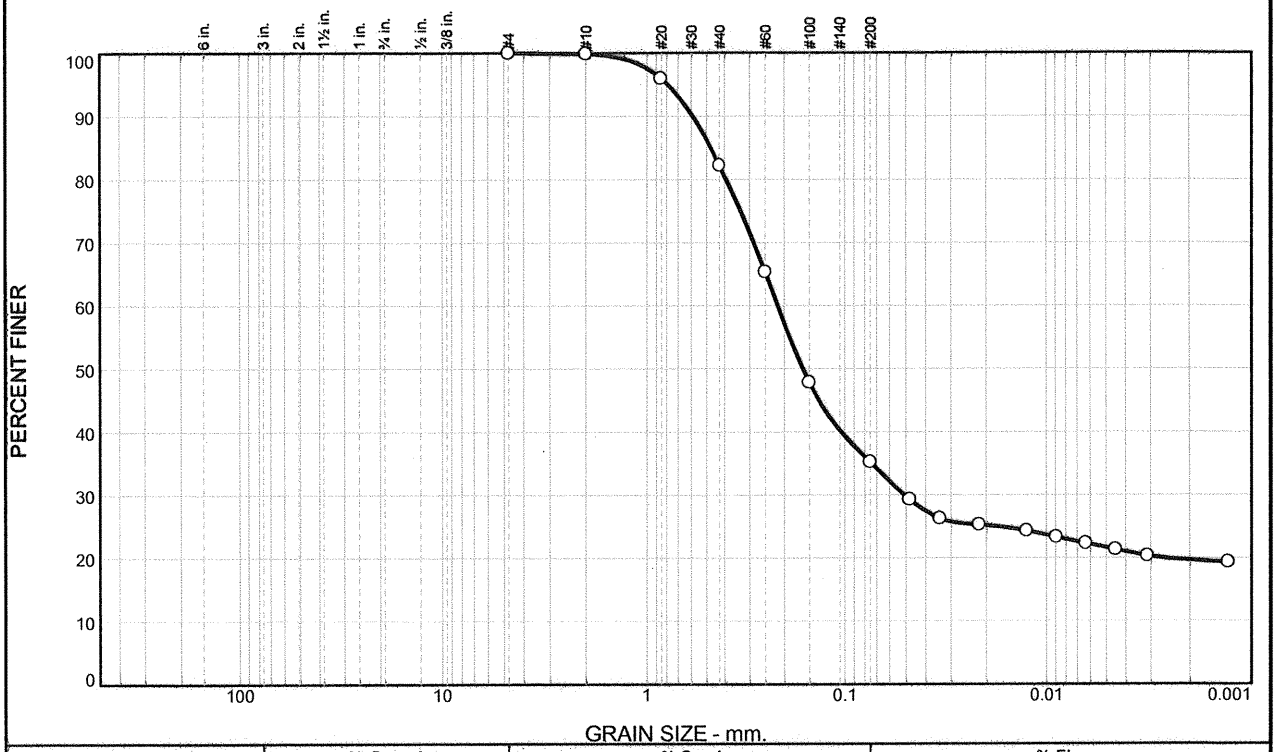
Date: 12/9/11

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No: 60225561 **Figure**

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	17.7	47.0	13.6	21.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	96.0		
#40	82.2		
#60	65.3		
#100	47.8		
#200	35.2		

* (no specification provided)

Material Description

Clayey F-M Sand Little Silt - Brownish Gray

Atterberg Limits

PL= 18 LL= 42 PI= 24

Coefficients

D_{90}= 0.5889 D_{85}= 0.4733 D_{60}= 0.2159
D_{50}= 0.1616 D_{30}= 0.0509 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-2-7(3)

Remarks

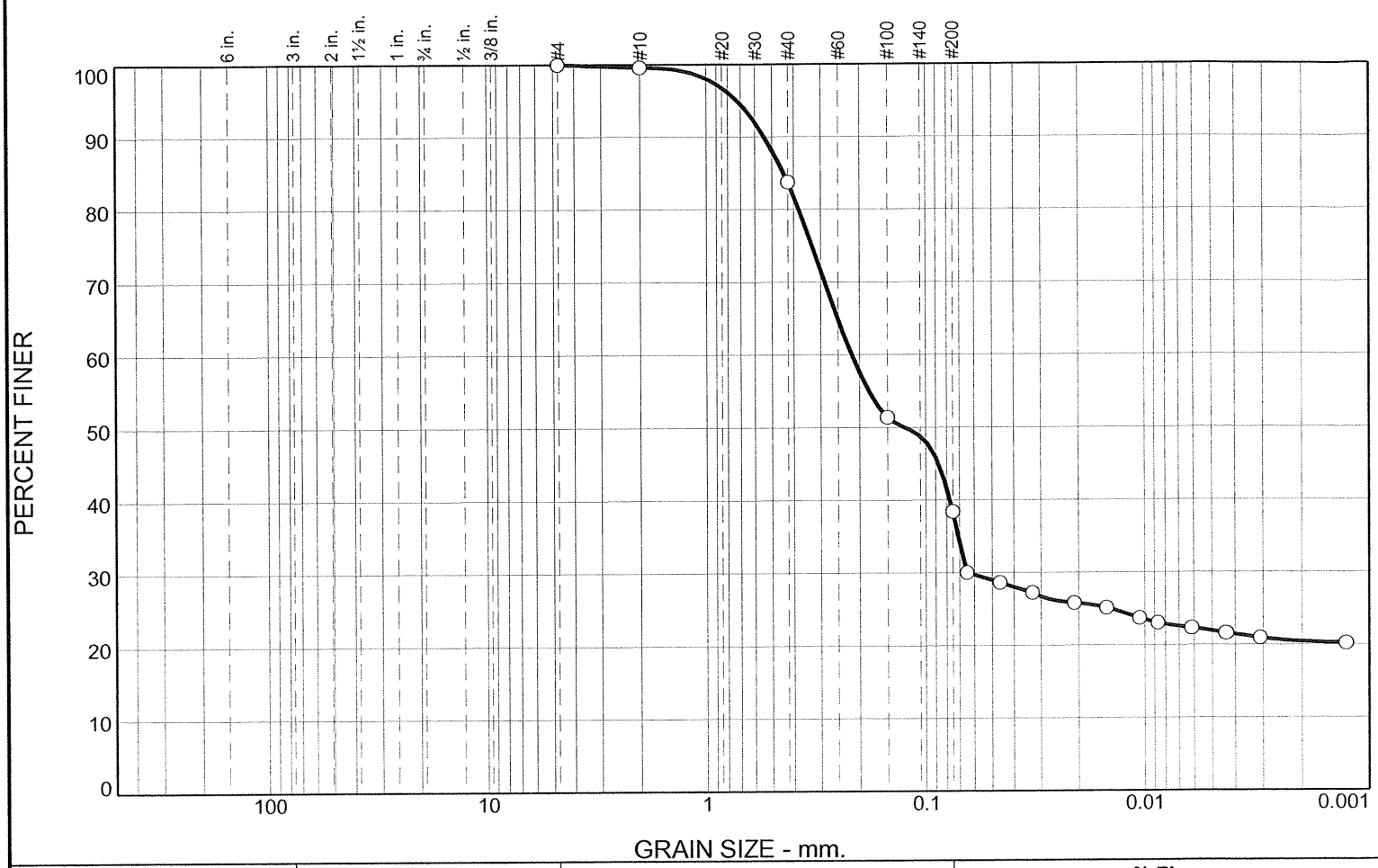
Source of Sample: Boring 2-1 **Depth:** 26.0-28.0
Sample Number: S-14 **Date:** 12/7/2011

AECOM

Client: IPR-GDP Suez
Project: Coleto Creek Facility
Project No: 60225561

Tested By: BCM **Checked By:** WPQ

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.4	15.8	45.4	16.4	22.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.6		
#40	83.8		
#100	51.4		
#200	38.4		

* (no specification provided)

Material Description

CLAYEY FINE TO MEDIUM SAND, GRAY

Atterberg Limits

PL= 14 LL= 29 PI= 15

Coefficients

D_{90}= 0.5414 D_{85}= 0.4433 D_{60}= 0.2165
D_{50}= 0.1251 D_{30}= 0.0637 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-6(2)

Remarks

Source of Sample: B-2-1 **Depth:** 32'-34'
Sample Number: B-2-1 S-17

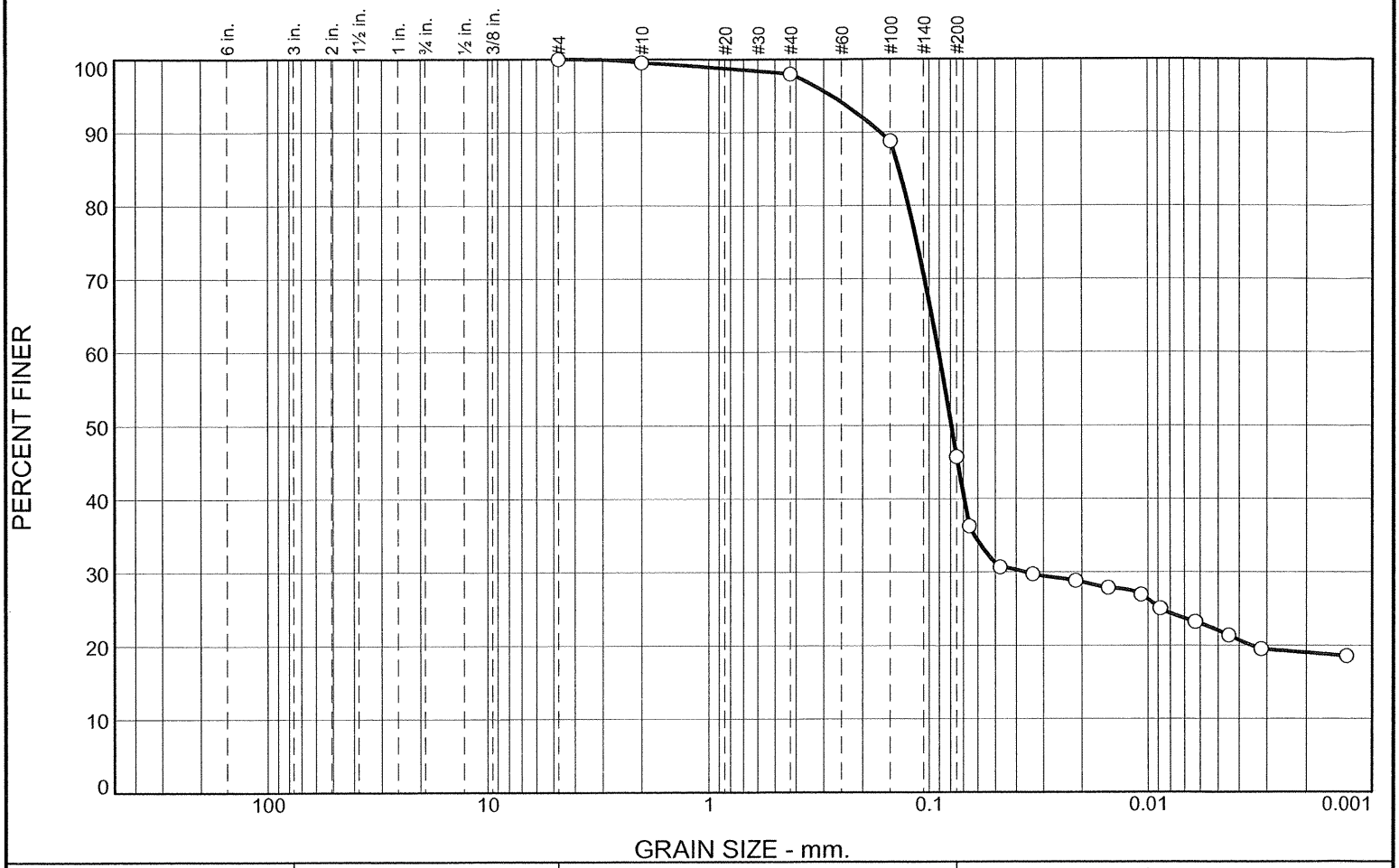
Date: 12/9/11

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No: 60225561 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.5	1.5	52.3	23.7	22.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.5		
#40	98.0		
#100	88.8		
#200	45.7		

* (no specification provided)

Material Description

CLAYEY FINE SAND, LIGHT GRAY

Atterberg Limits

PL= 17 LL= 28 PI= 11

Coefficients

D_{90}= 0.1663 D_{85}= 0.1371 D_{60}= 0.0906
D_{50}= 0.0793 D_{30}= 0.0362 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-6(2)

Remarks

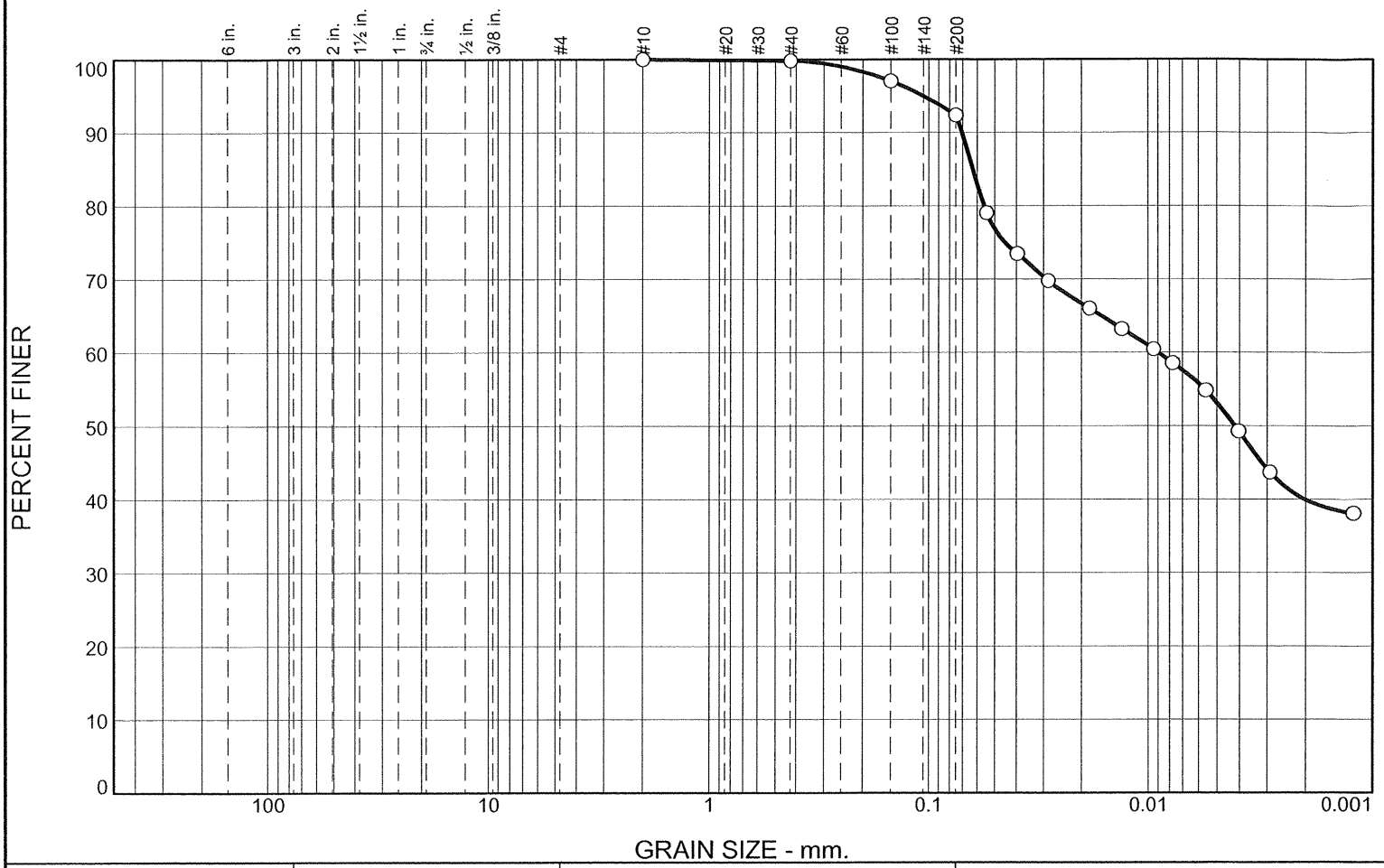
Source of Sample: B-2-1 **Depth:** 55.0'-56.6'
Sample Number: B-2-1 S-27 **Date:** 12/15/11

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No: 60225561 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	7.4	39.2	53.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.8		
#100	97.0		
#200	92.4		

* (no specification provided)

Material Description

SILTY CLAY, TRACE SAND, LIGHT GRAYISH BROWN

Atterberg Limits

PL= 25 LL= 59 PI= 34

Coefficients

D_{90}= 0.0705 D_{85}= 0.0630 D_{60}= 0.0090
D_{50}= 0.0042 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(35)

Remarks

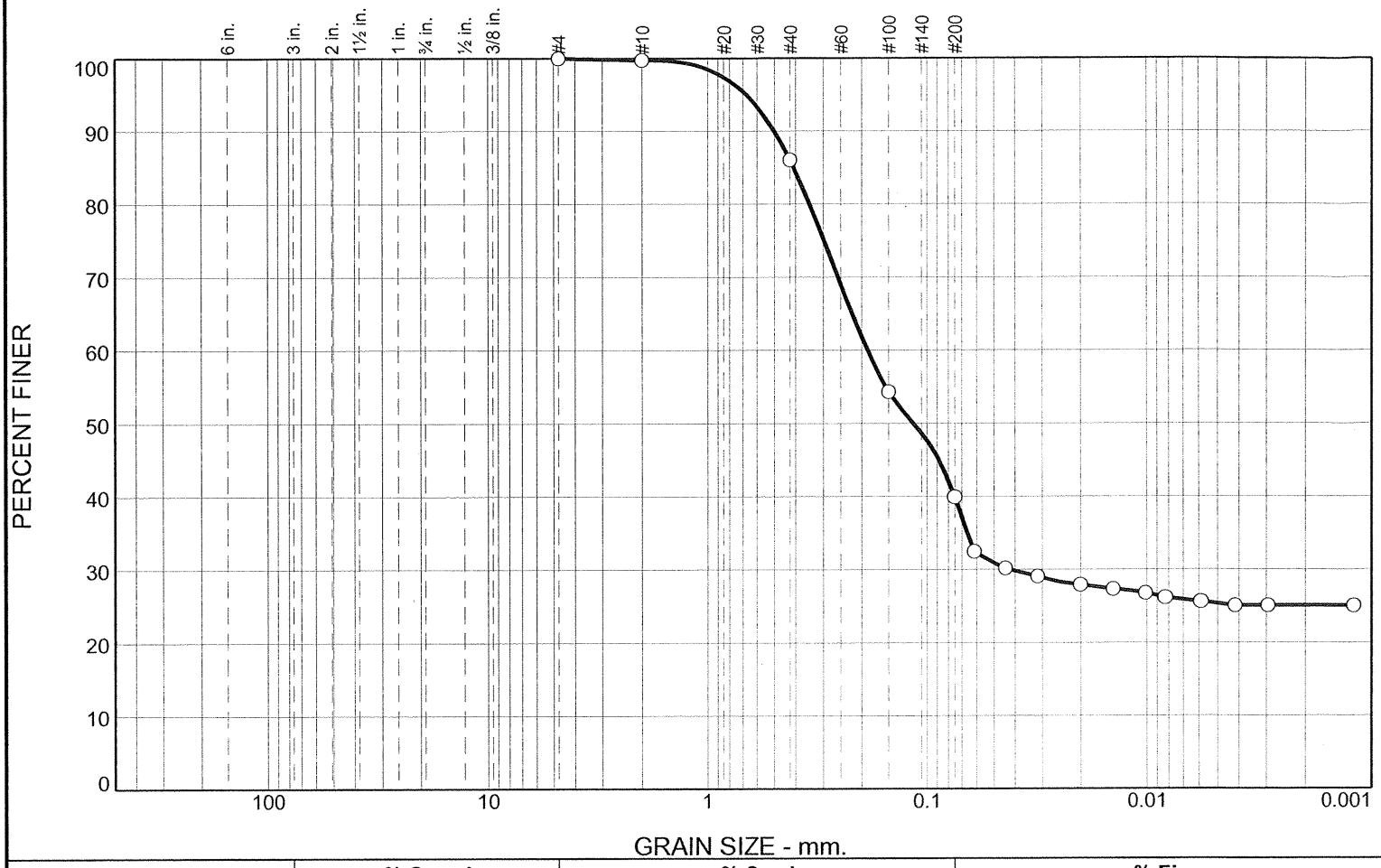
Source of Sample: B-2-1 **Depth:** 85.0'-86.5'
Sample Number: B-2-1 S-33 **Date:** 12/15/11

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No: 60225561 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	13.6	46.1	14.6	25.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.7		
#40	86.1		
#100	54.4		
#200	40.0		

* (no specification provided)

Material Description

CLAYEY FINE TO MEDIUM SAND, GRAY

Atterberg Limits

PL= 15 LL= 44 PI= 29

Coefficients

D_{90}= 0.5011 D_{85}= 0.4085 D_{60}= 0.1882
D_{50}= 0.1152 D_{30}= 0.0416 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-7-6(6)

Remarks

Source of Sample: B-3-1 **Depth:** 16.0'-17.8'
Sample Number: B-3-1 S-9

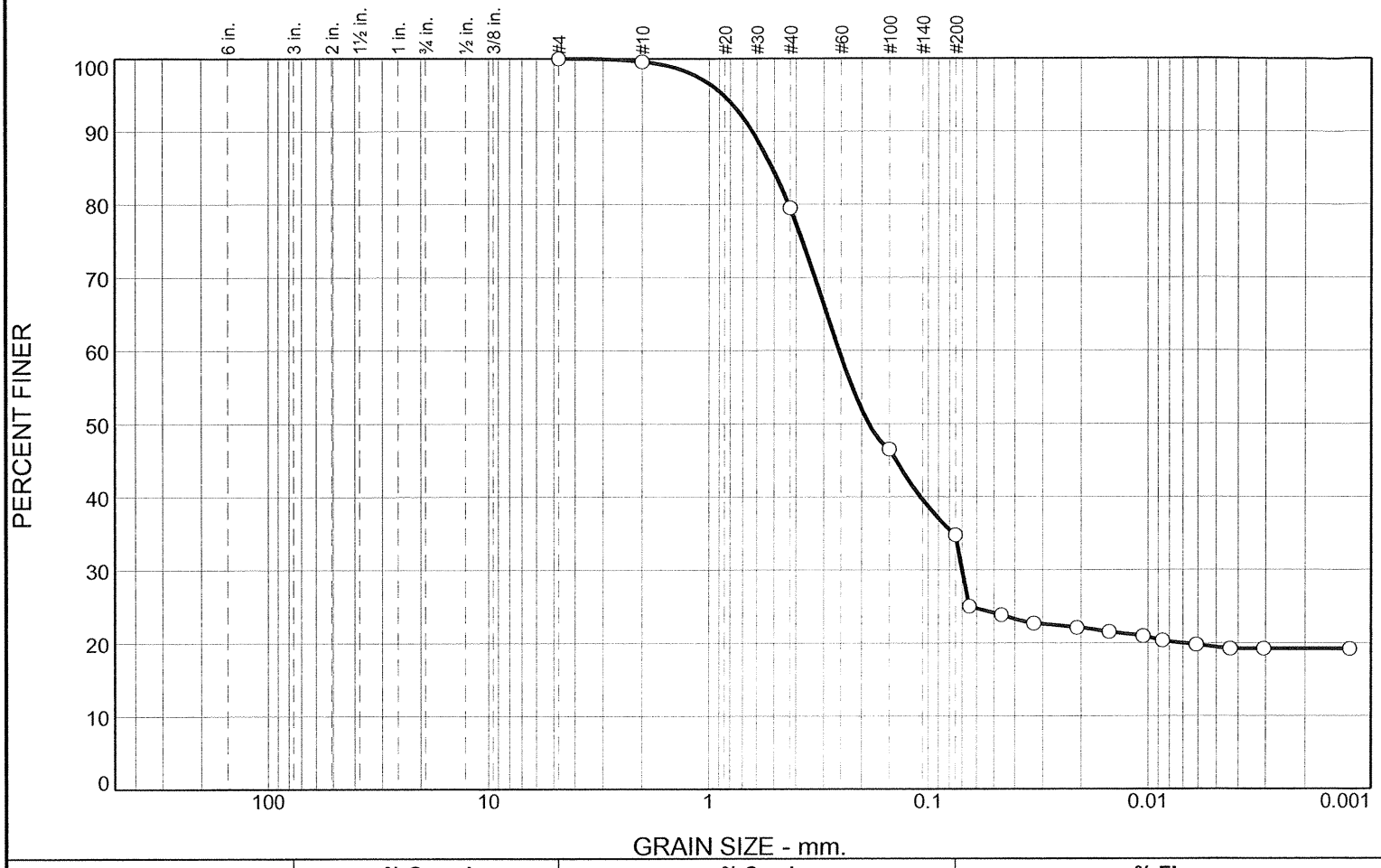
Date: 12/9/11

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No: 60225561 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.4	20.1	44.7	15.4	19.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.6		
#40	79.5		
#100	46.5		
#200	34.8		

* (no specification provided)

Material Description

CLAYEY FINE TO MEDIUM SAND, DARK BROWN

Atterberg Limits

PL= 13 LL= 35 PI= 22

Coefficients

D_{90}= 0.6299 D_{85}= 0.5094 D_{60}= 0.2547
D_{50}= 0.1856 D_{30}= 0.0701 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-2-6(2)

Remarks

Source of Sample: B-3-1 **Depth:** 18'-20'
Sample Number: B-3-1 S-10

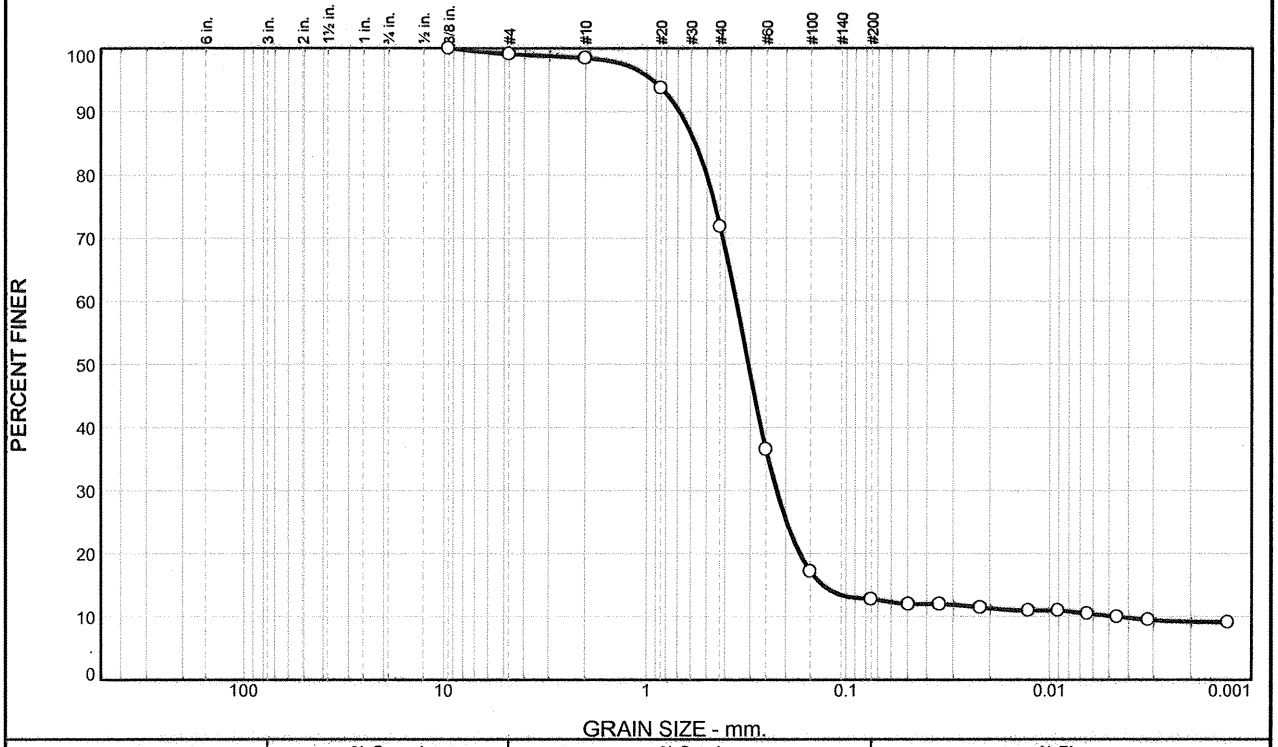
Date: 12/9/11

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No: 60225561 **Figure**

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.9	0.6	26.7	59.0	2.7	10.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	99.1		
#10	98.5		
#20	93.7		
#40	71.8		
#60	36.5		
#100	17.2		
#200	12.8		

* (no specification provided)

Material Description

F-M Sand Little Clay Trace Silt - Brownish Gray

Atterberg Limits

PL= 16 LL= 27 PI= 11

Coefficients

D_{90}= 0.6879 D_{85}= 0.5721 D_{60}= 0.3538
D_{50}= 0.3070 D_{30}= 0.2214 D_{15}= 0.1304
D_{10}= 0.0046 C_u= 76.58 C_c= 29.98

Classification

USCS= SC AASHTO= A-2-6(0)

Remarks

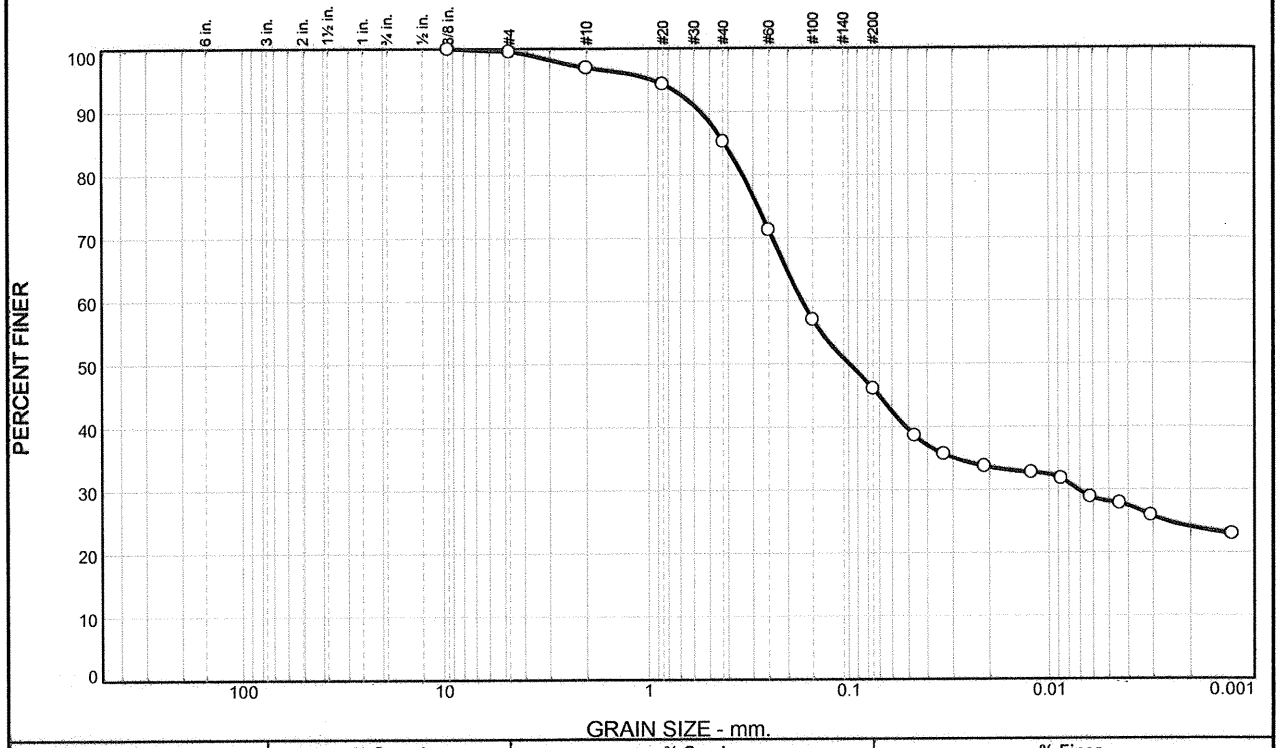
Source of Sample: Boring 4-1 **Depth:** 12.0-14.0
Sample Number: S-7 **Date:** 12/7/11

AECOM

Client: IPR-GDP Suez
Project: Coleto Creek Facility
Project No: 60225561

Tested By: BCM **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.4	2.6	11.8	39.2	17.9	28.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	99.6		
#10	97.0		
#20	94.3		
#40	85.2		
#60	71.3		
#100	57.0		
#200	46.0		

* (no specification provided)

Material Description

Clayey F-M Sand Little Silt - Brownish Gray

Atterberg Limits

PL= 16 LL= 40 PI= 24

Coefficients

D_{90}= 0.5576 D_{85}= 0.4206 D_{60}= 0.1695
D_{50}= 0.0994 D_{30}= 0.0071 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-6(7)

Remarks

Source of Sample: Boring 4-1 **Depth:** 24.0-26.0
Sample Number: S-13

Date: 12/7/11

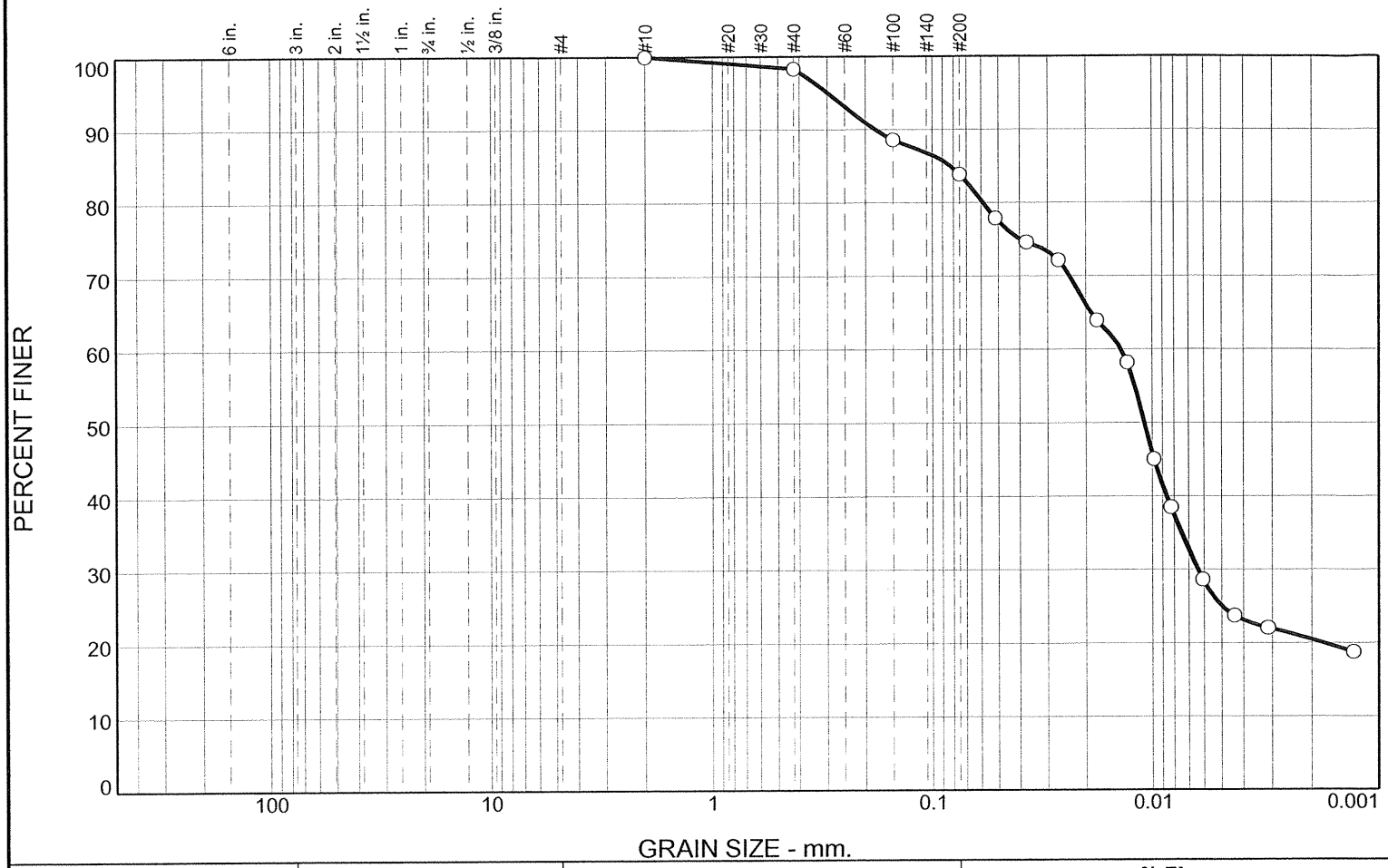
AECOM

Client: IPR-GDP Suez
Project: Coleto Creek Facility

Project No: 60225561

Tested By: BCM **Checked By:** WPQ

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.7	14.4	58.8	25.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	98.3		
#100	88.6		
#200	83.9		

* (no specification provided)

Material Description

SILTY CLAY, LITTLE FINE TO MEDIUM SAND, WHITE AND GRAY

Atterberg Limits

PL= 18 LL= 30 PI= 12

Coefficients

D_{90}= 0.1803 D_{85}= 0.0826 D_{60}= 0.0138
D_{50}= 0.0108 D_{30}= 0.0064 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(9)

Remarks

Source of Sample: B-5-1 **Depth:** 26'-27'
Sample Number: B-5-1 S-14

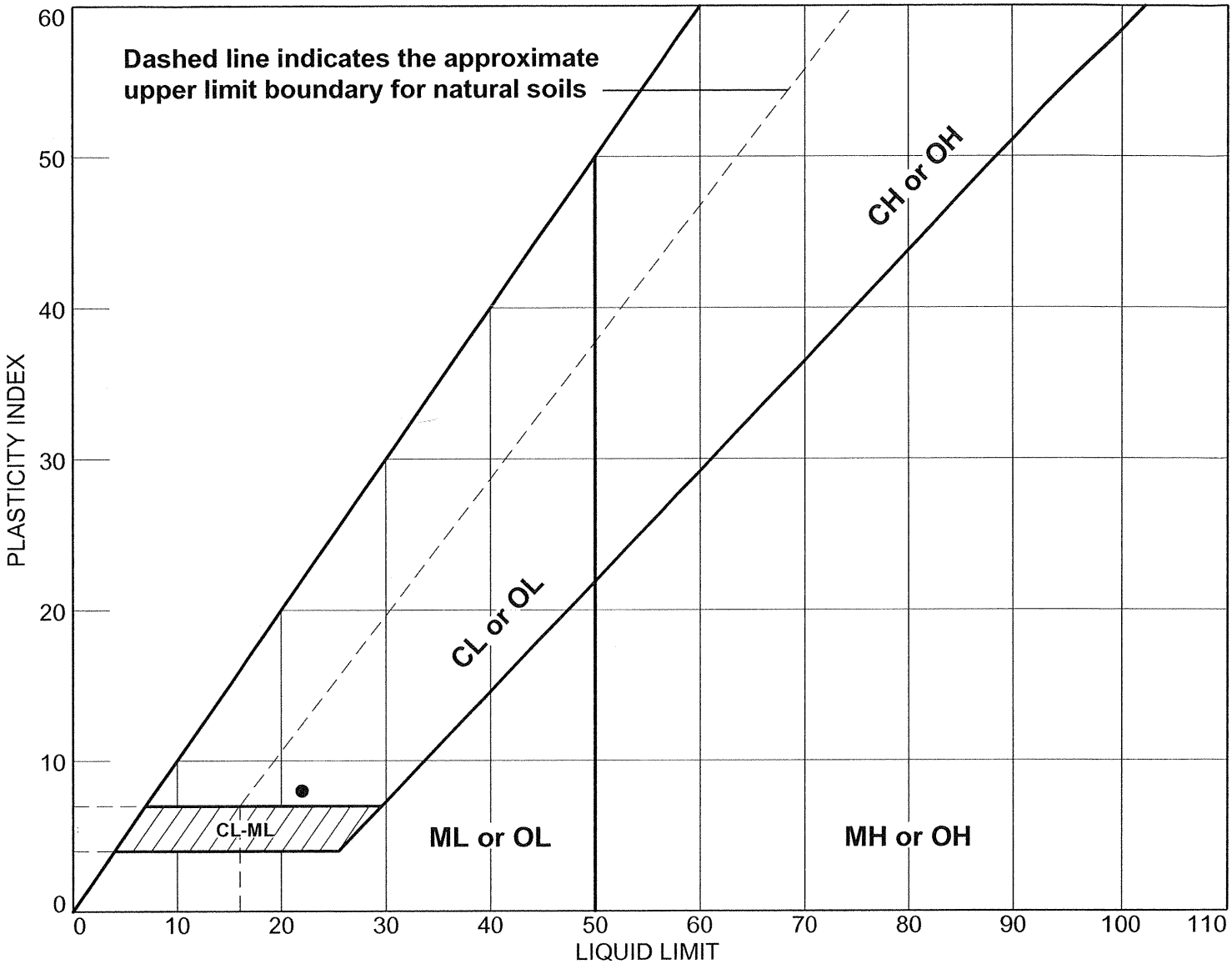
Date: 12/9/11

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No: 60225561 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

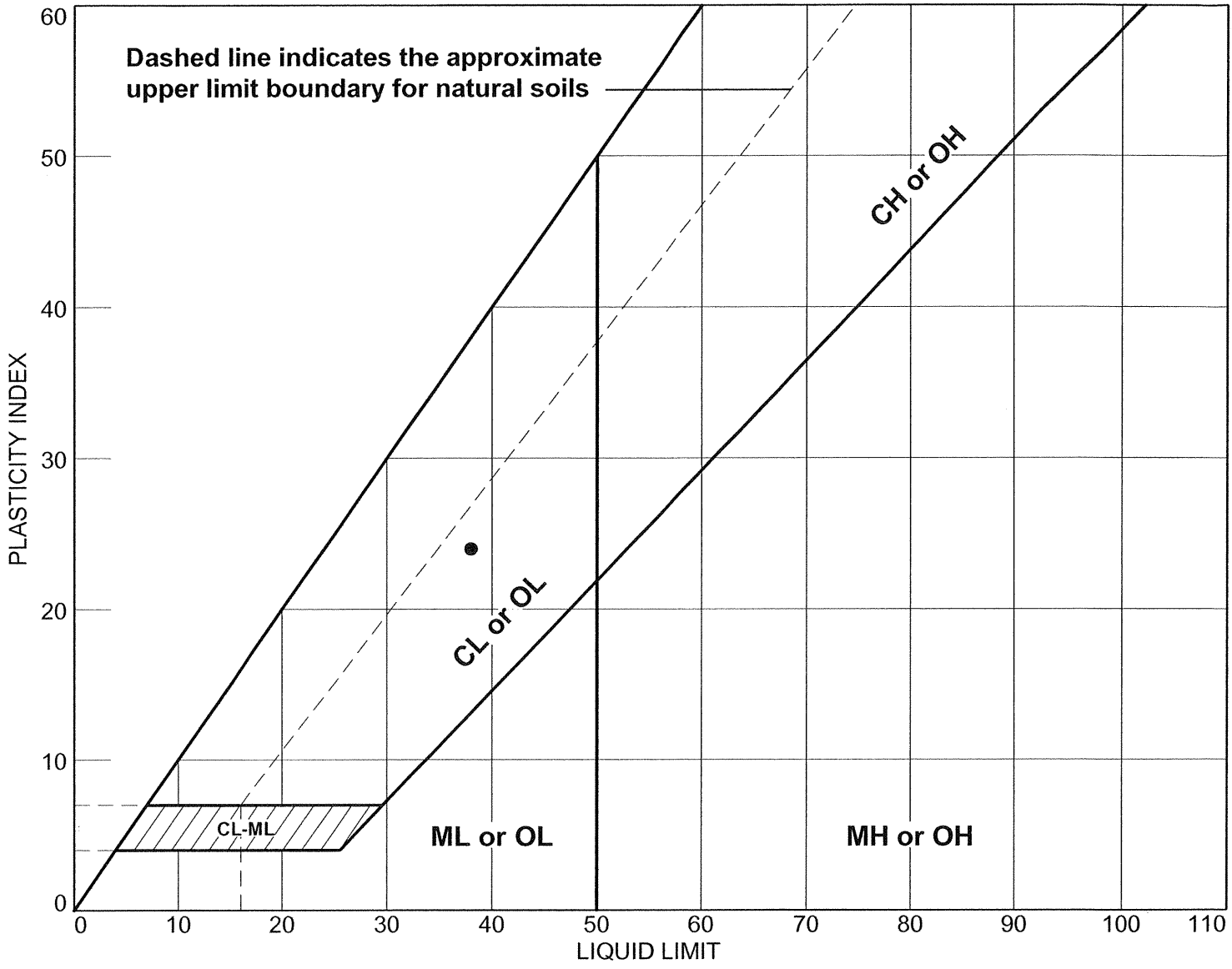
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-1-1	B-1-1 S-5	8'-10'		14	22	8	CL

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No.: 60225561 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT



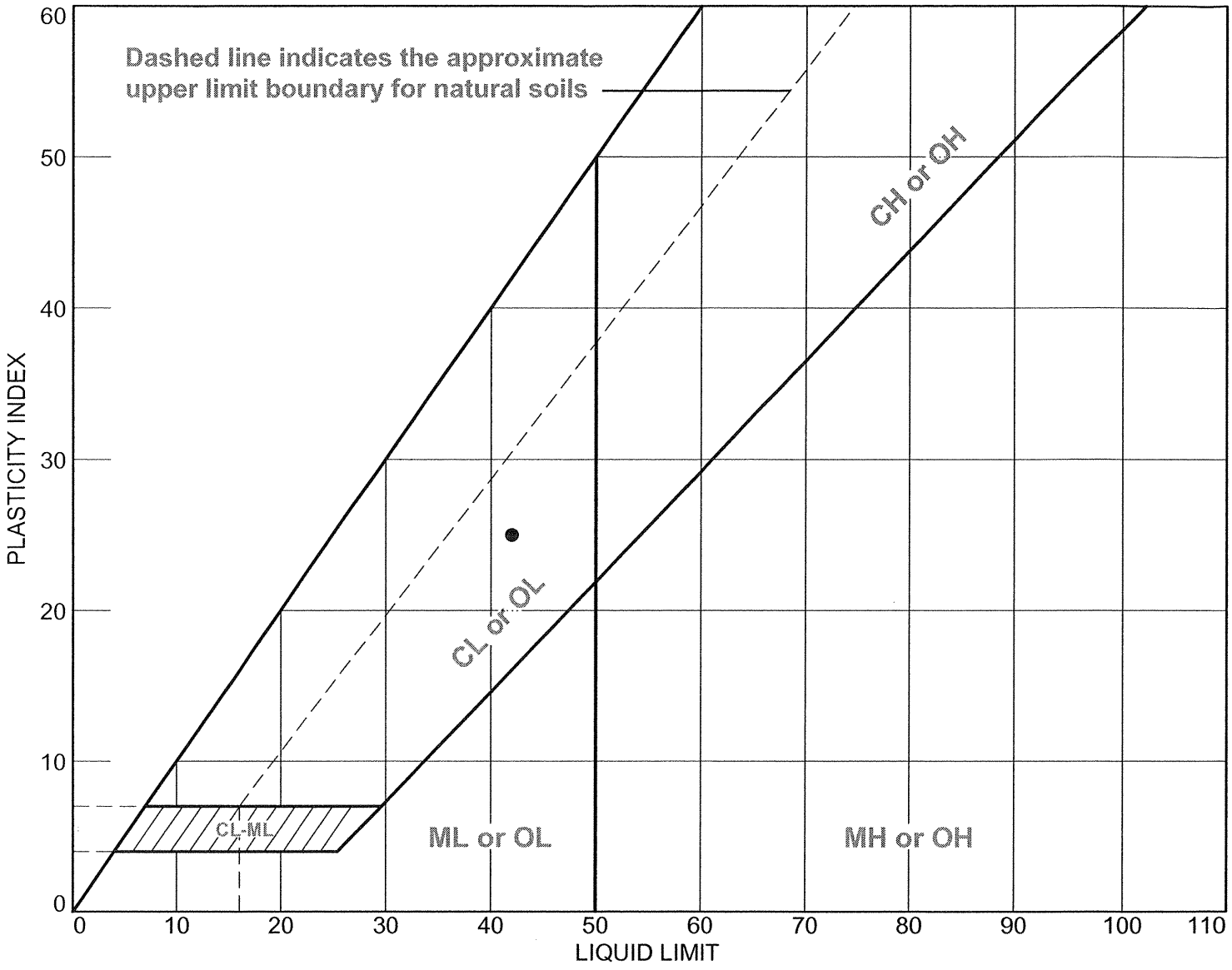
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-1-1	B-1-1 S-11	20'-22'		14	38	24	SC

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No.: 60225561 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT



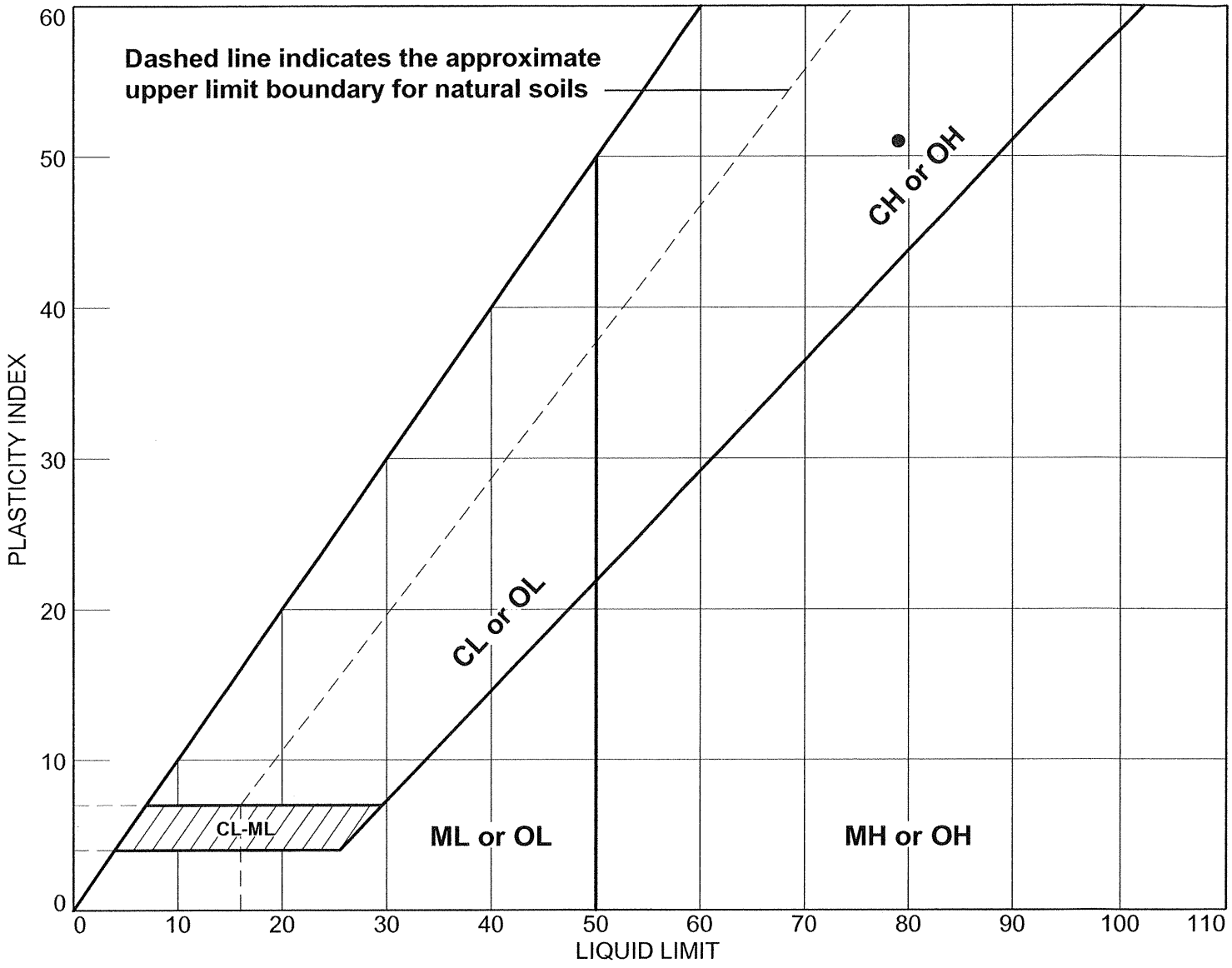
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-1-1	B-1-1 S-34	90'-90.4'		17	42	25	CL

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No.: 60225561 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT



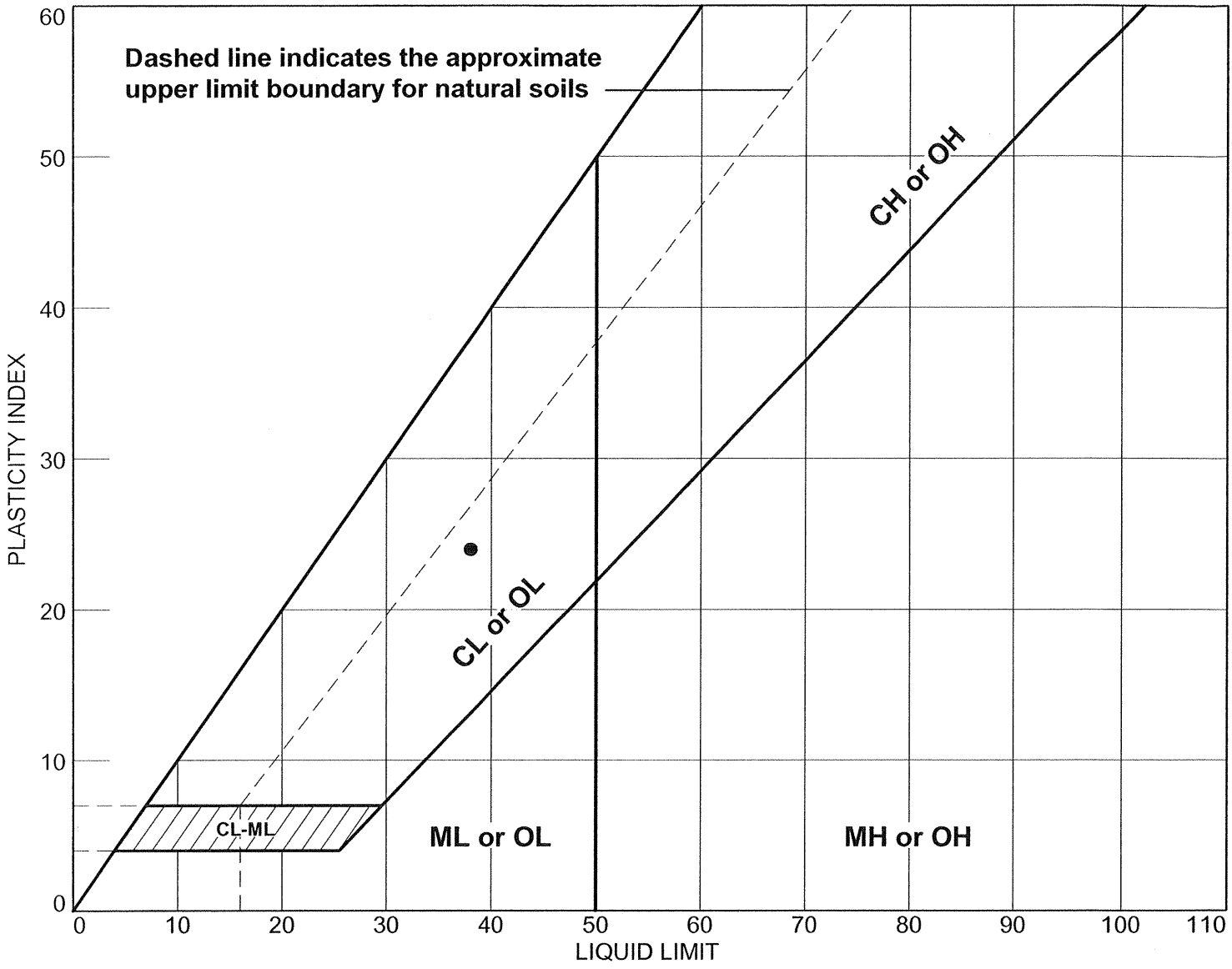
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-1-1	B-1-1 S-40	120'-121'		28	79	51	CH

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No.: 60225561 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

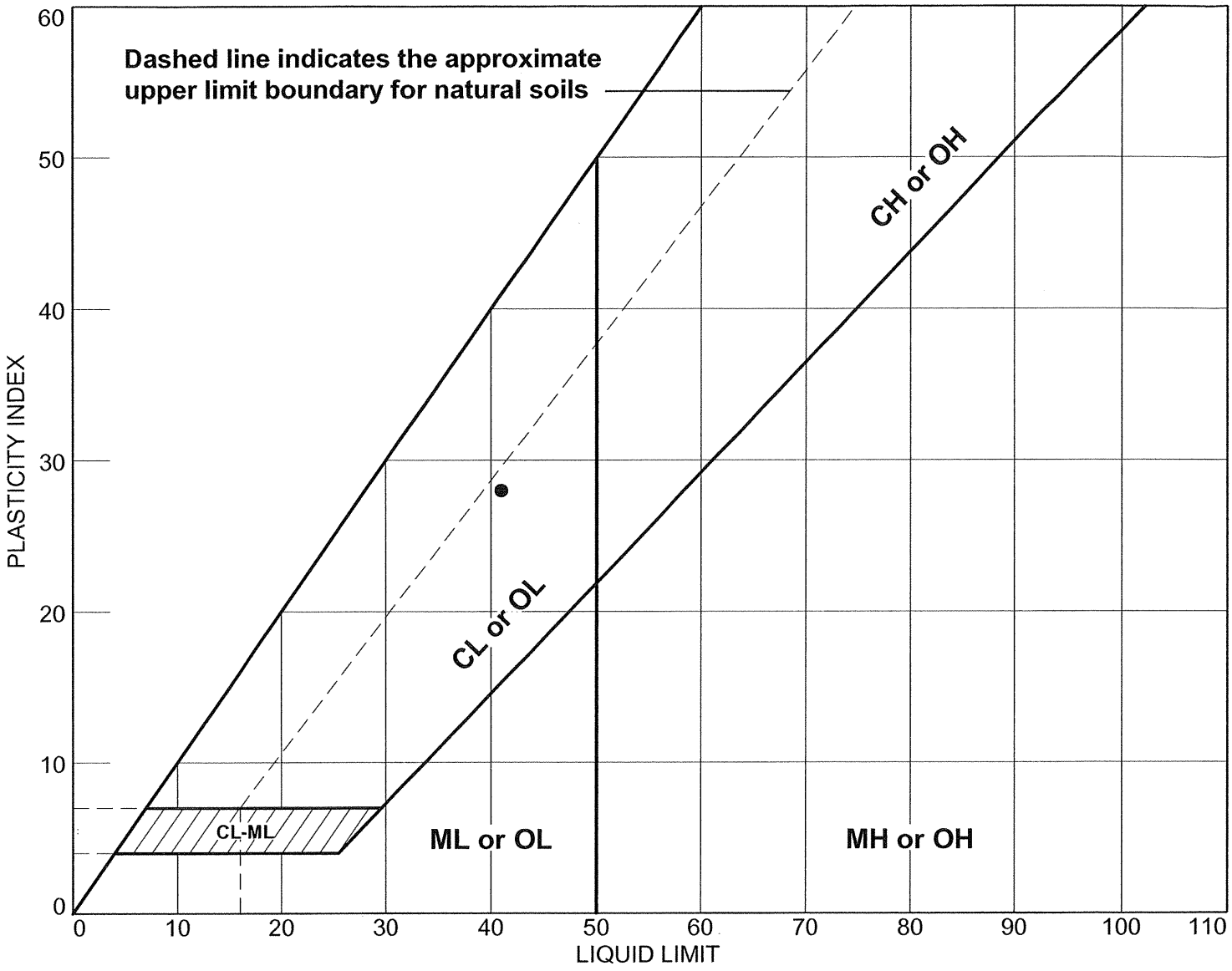
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-2-1	B-2-1 S-6	10'-12'		14	38	24	SC

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No.: 60225561 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT



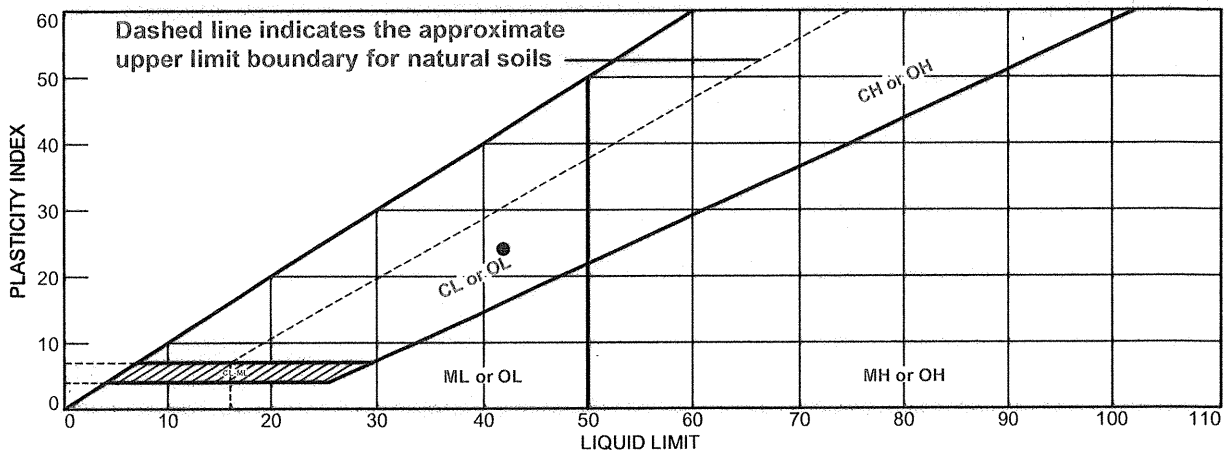
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-2-1	B-2-1 S-10	18'-20'		13	41	28	SC

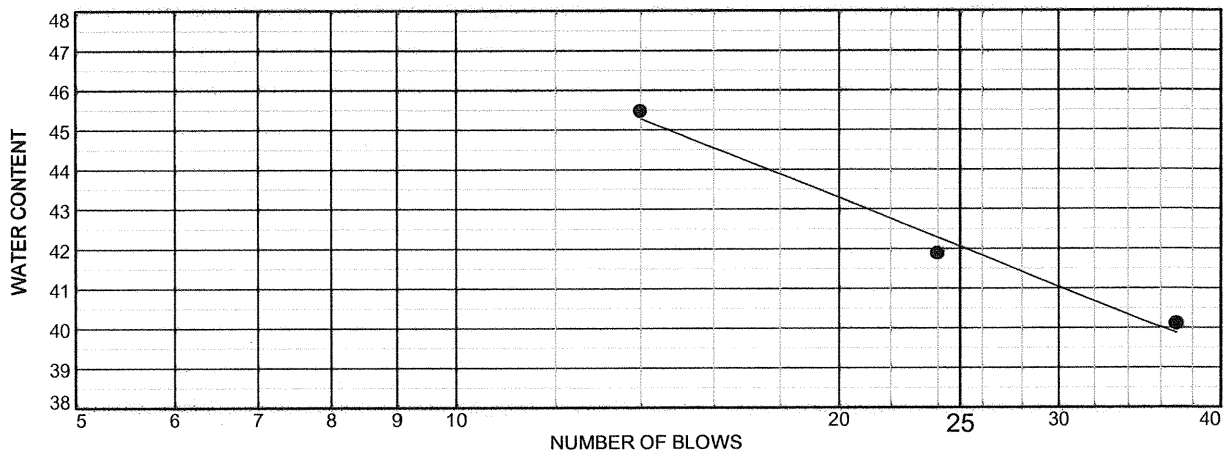
AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No.: 60225561 **Figure**

LIQUID AND PLASTIC LIMITS TEST ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Clayey F-M Sand Little Silt - Brownish Gray	42	18	24	82.2	35.2	SC

Project No. 60225561 **Client:** IPR-GDP Suez

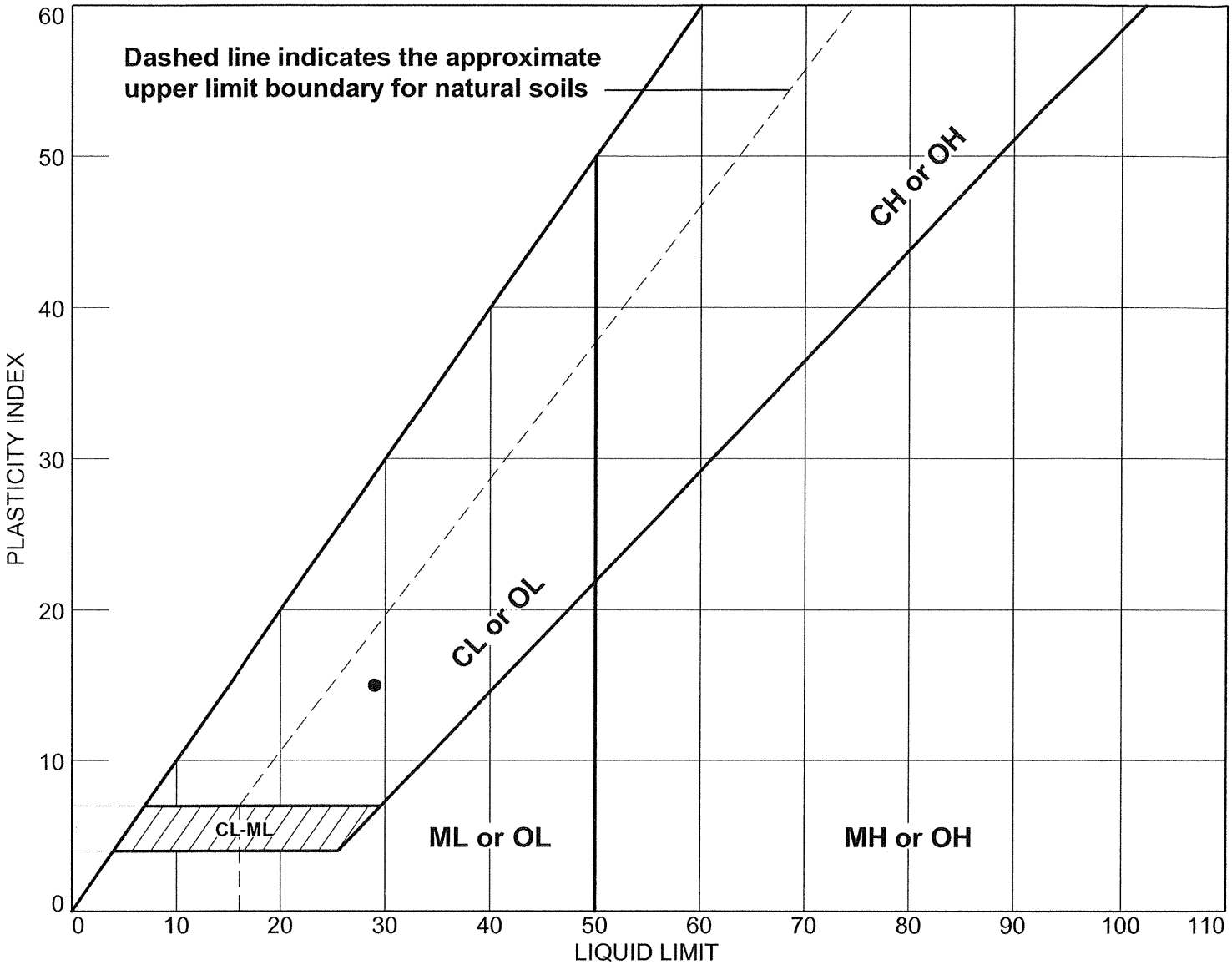
Project: Coleto Creek Facility

●**Source of Sample:** Boring 2-1 **Depth:** 26.0-28.0 **Sample Number:** S-14

Remarks:

AECOM

LIQUID AND PLASTIC LIMITS TEST REPORT



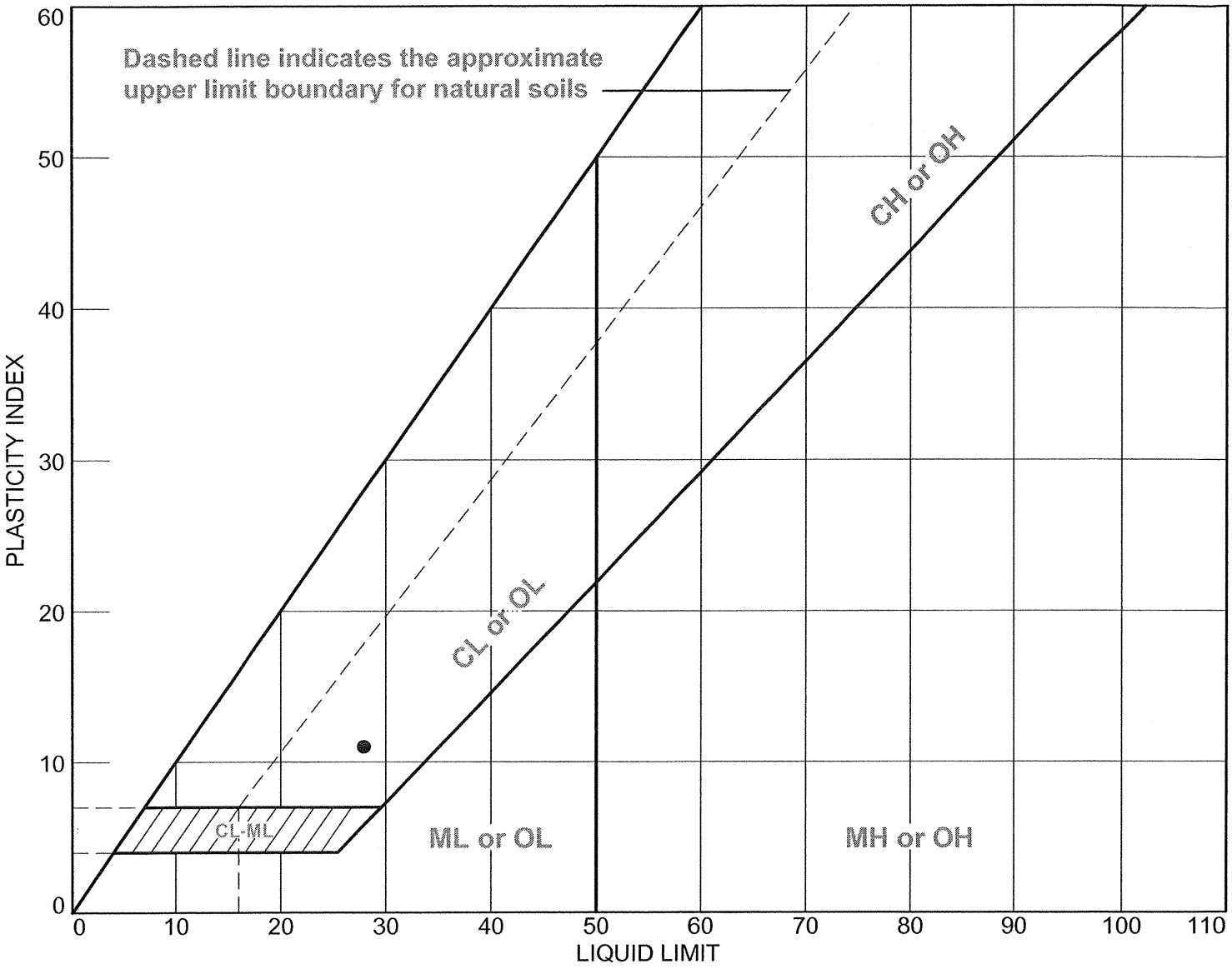
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-2-1	B-2-1 S-17	32'-34'		14	29	15	SC

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No.: 60225561 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

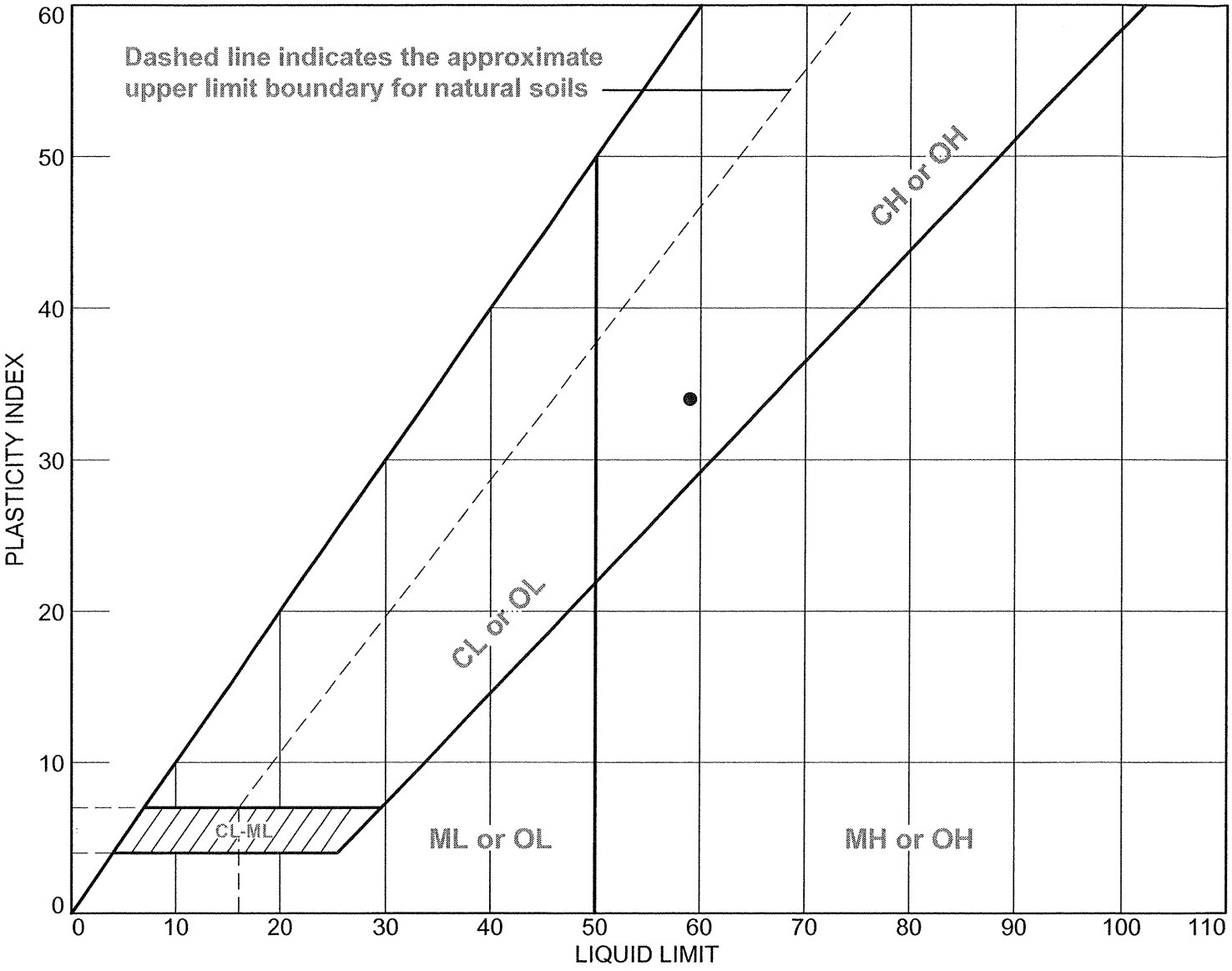
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-2-1	B-2-1 S-27	55.0'-56.6'		17	28	11	SC

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No.: 60225561 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT



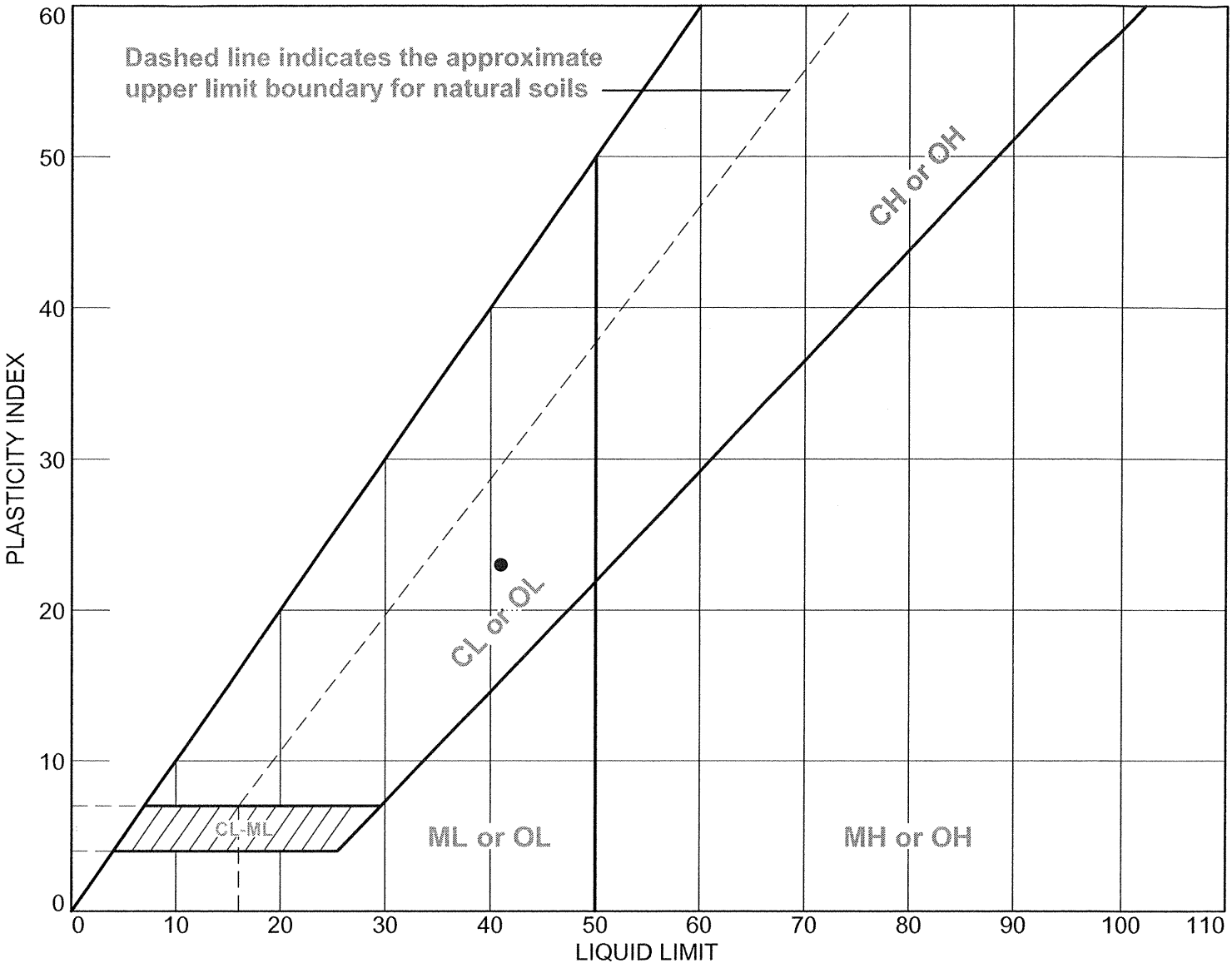
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-2-1	B-2-1 S-33	85.0'-86.5'		25	59	34	CH

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No.: 60225561 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT



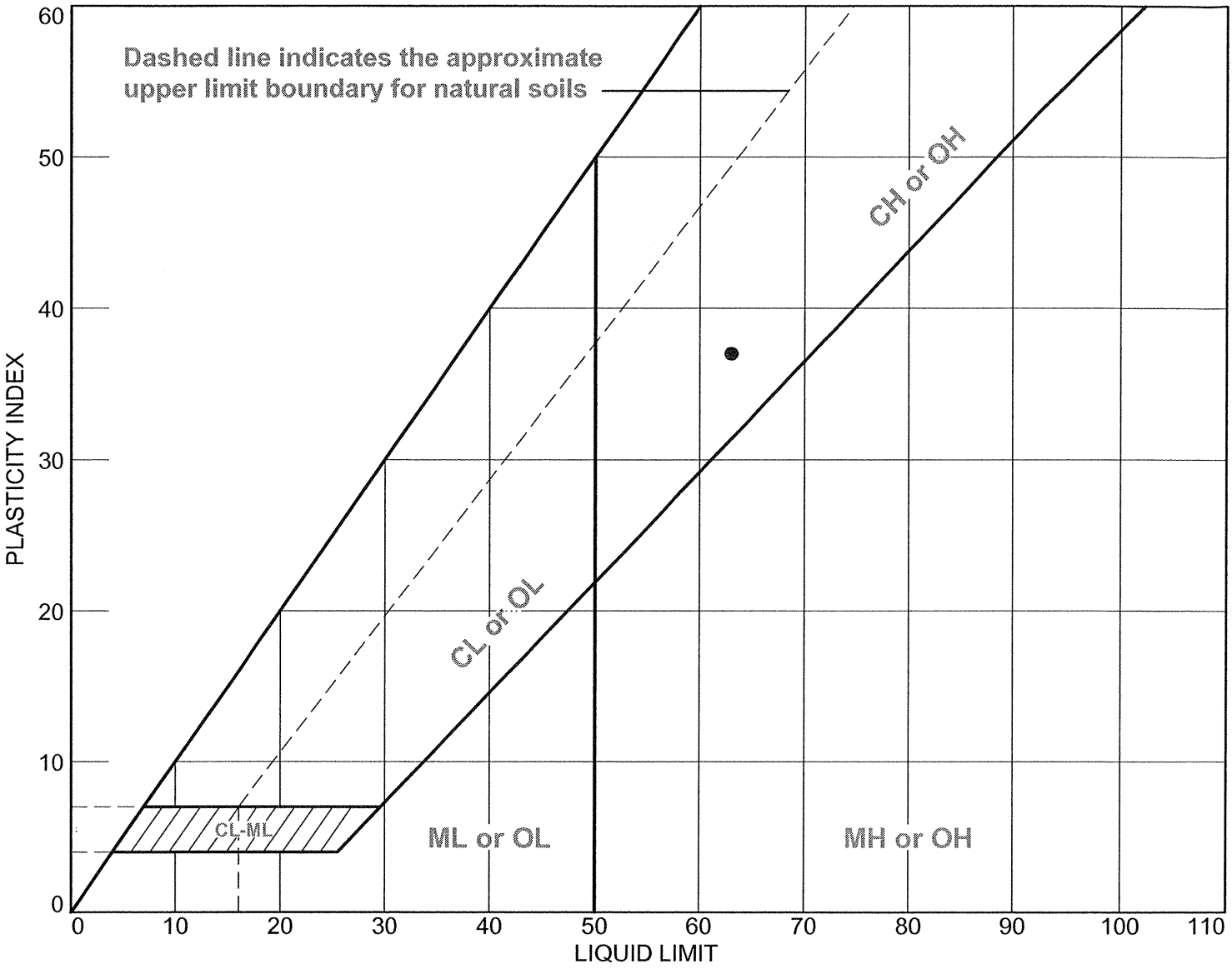
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-2-2	B-2-2 S-16	59.0'-60.5'		18	41	23	CL

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No.: 60225561 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT



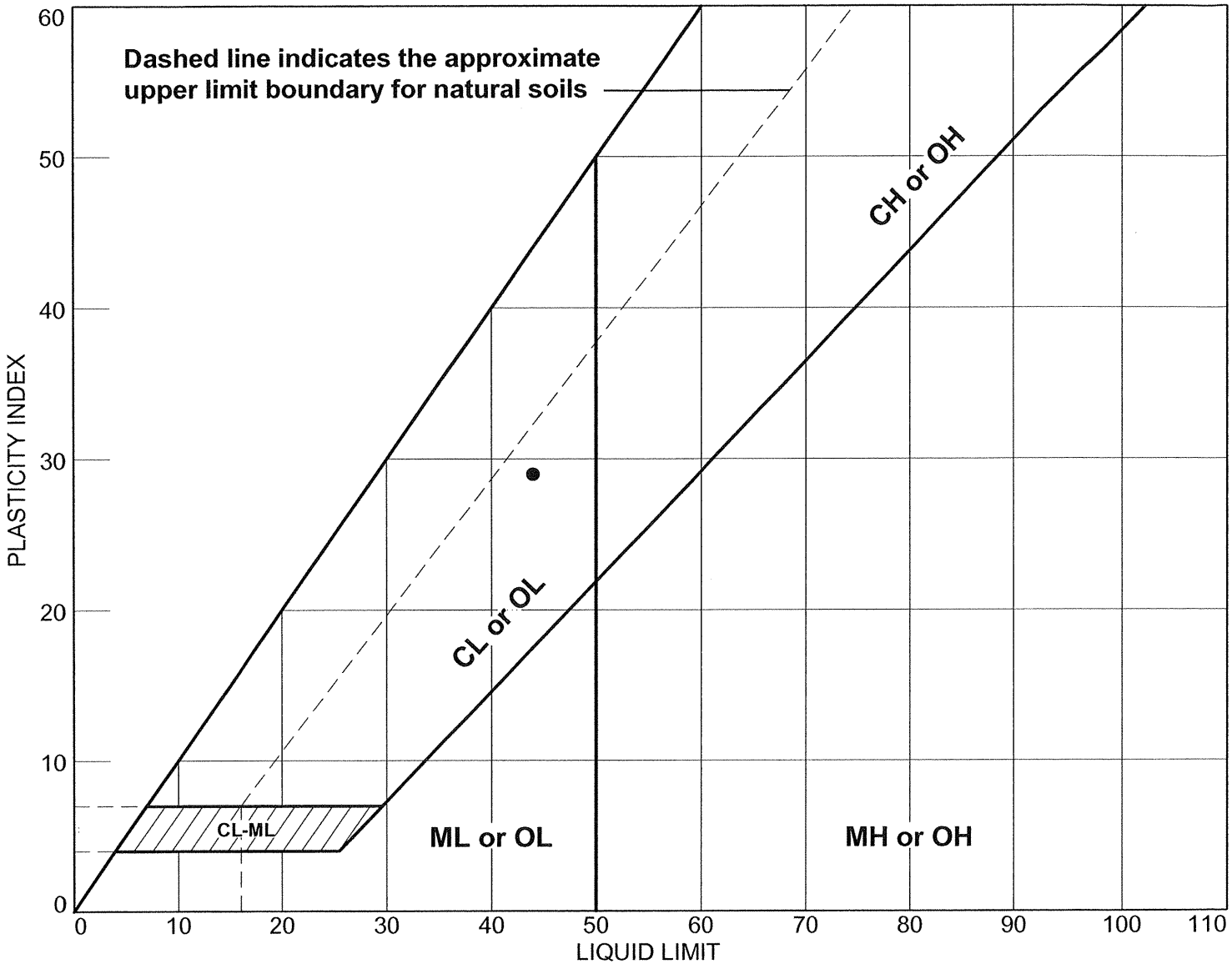
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-2-2	B-2-2 S-18	69.0'-70.5'		26	63	37	CH

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No.: 60225561 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT



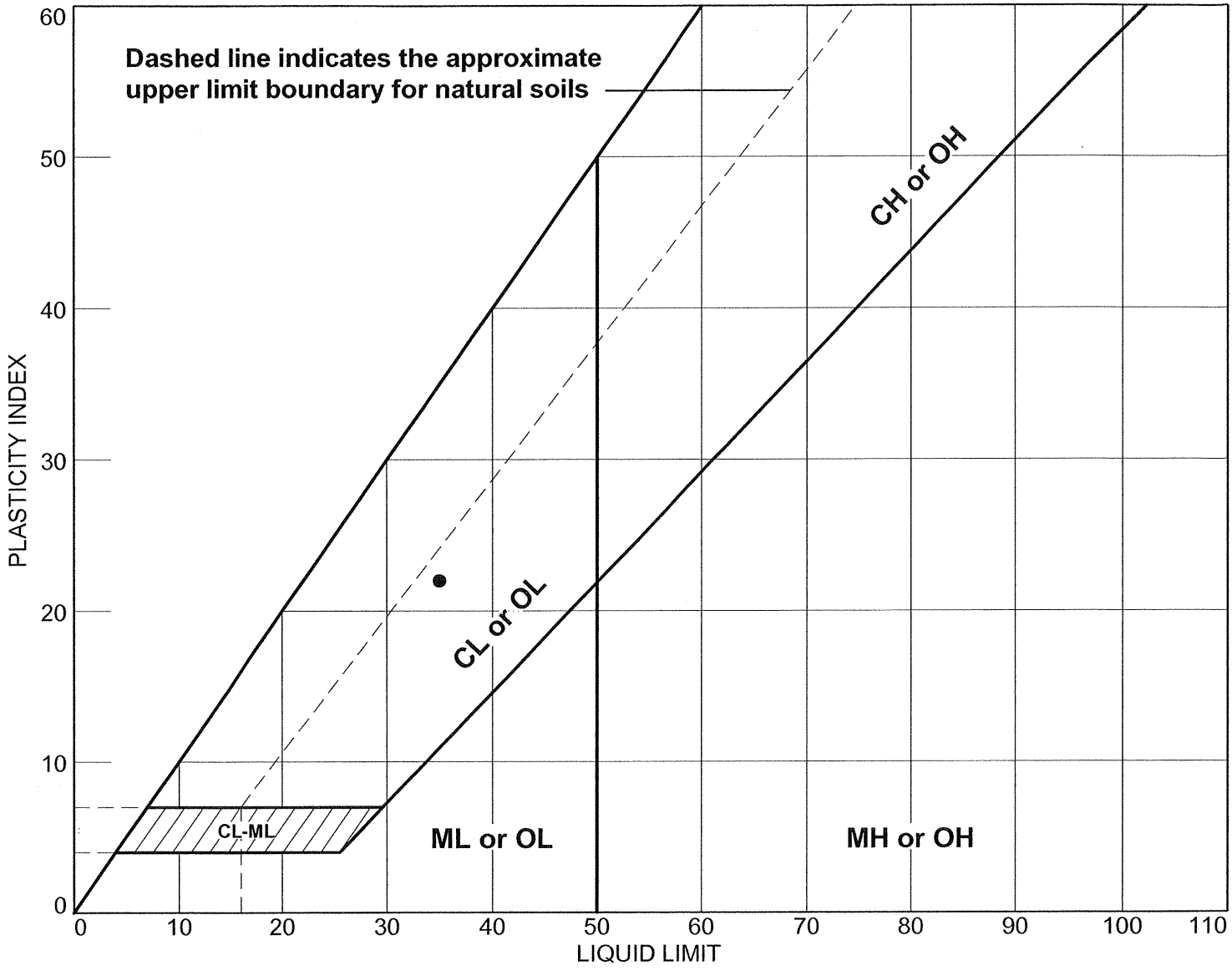
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-3-1	B-3-1 S-9	16.0'-17.8'		15	44	29	SC

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No.: 60225561 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT



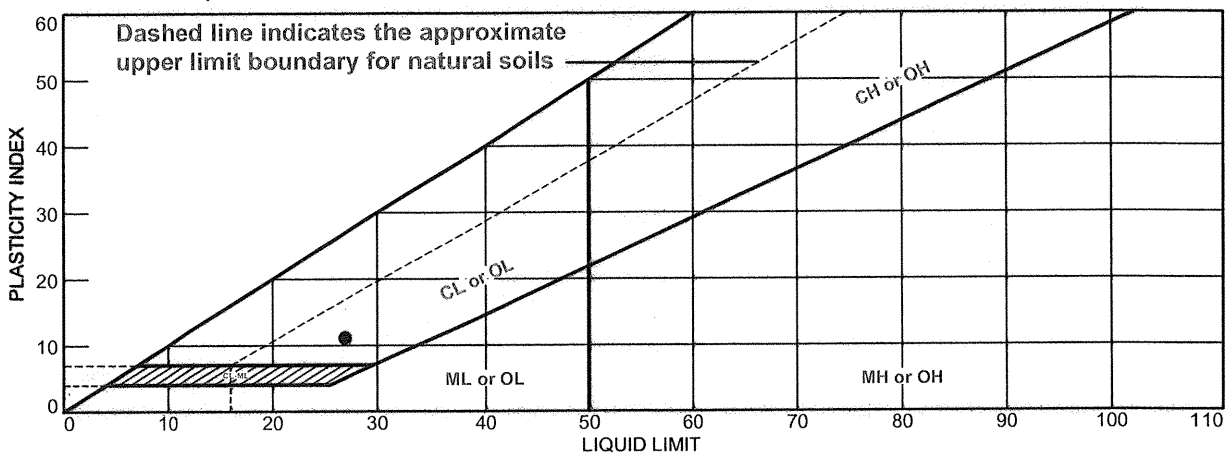
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-3-1	B-3-1 S-10	18'-20'		13	35	22	SC

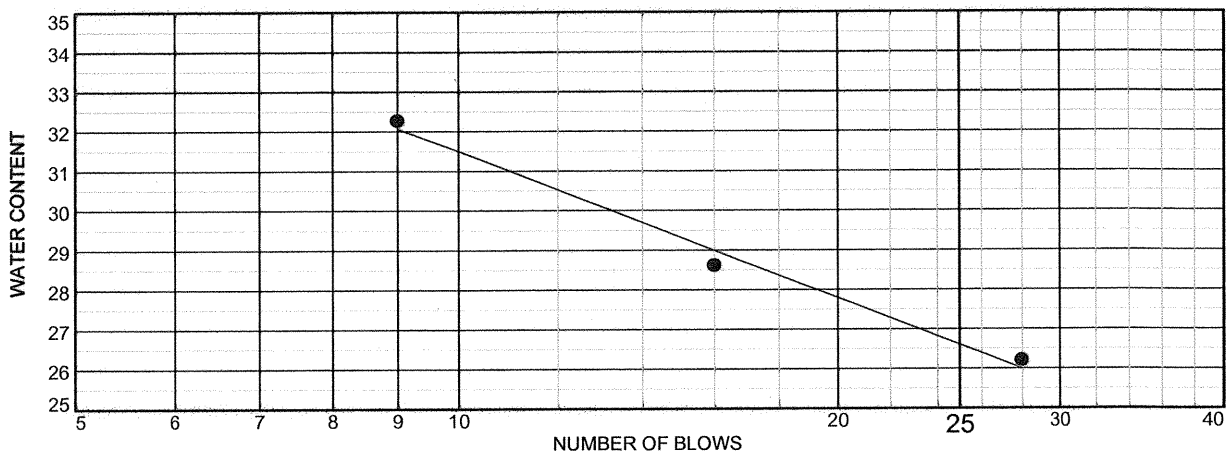
AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No.: 60225561 **Figure**

LIQUID AND PLASTIC LIMITS TEST ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	F-M Sand Little Clay Trace Silt - Brownish Gray	27	16	11	71.8	12.8	SC

Project No. 60225561 **Client:** IPR-GDP Suez

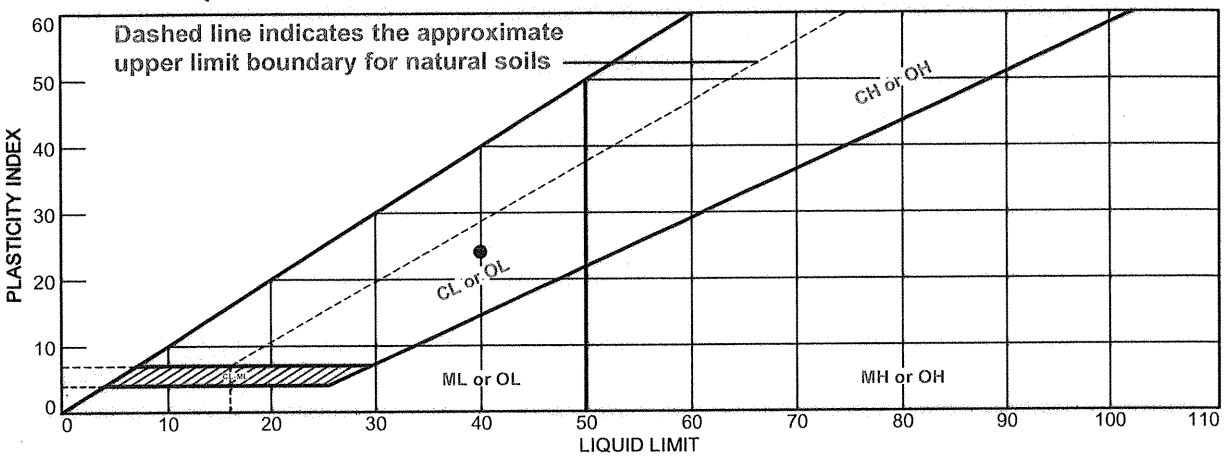
Project: Coleto Creek Facility

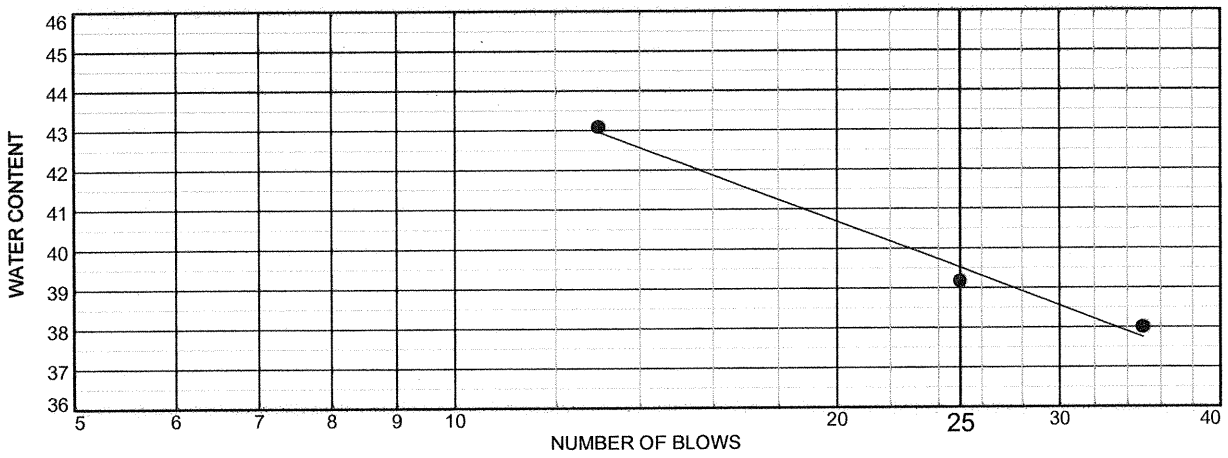
●**Source of Sample:** Boring 4-1 **Depth:** 12.0-14.0 **Sample Number:** S-7

Remarks:

AECOM

LIQUID AND PLASTIC LIMITS TEST ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Clayey F-M Sand Little Silt - Brownish Gray	40	16	24	85.2	46.0	SC

Project No. 60225561 **Client:** IPR-GDP Suez

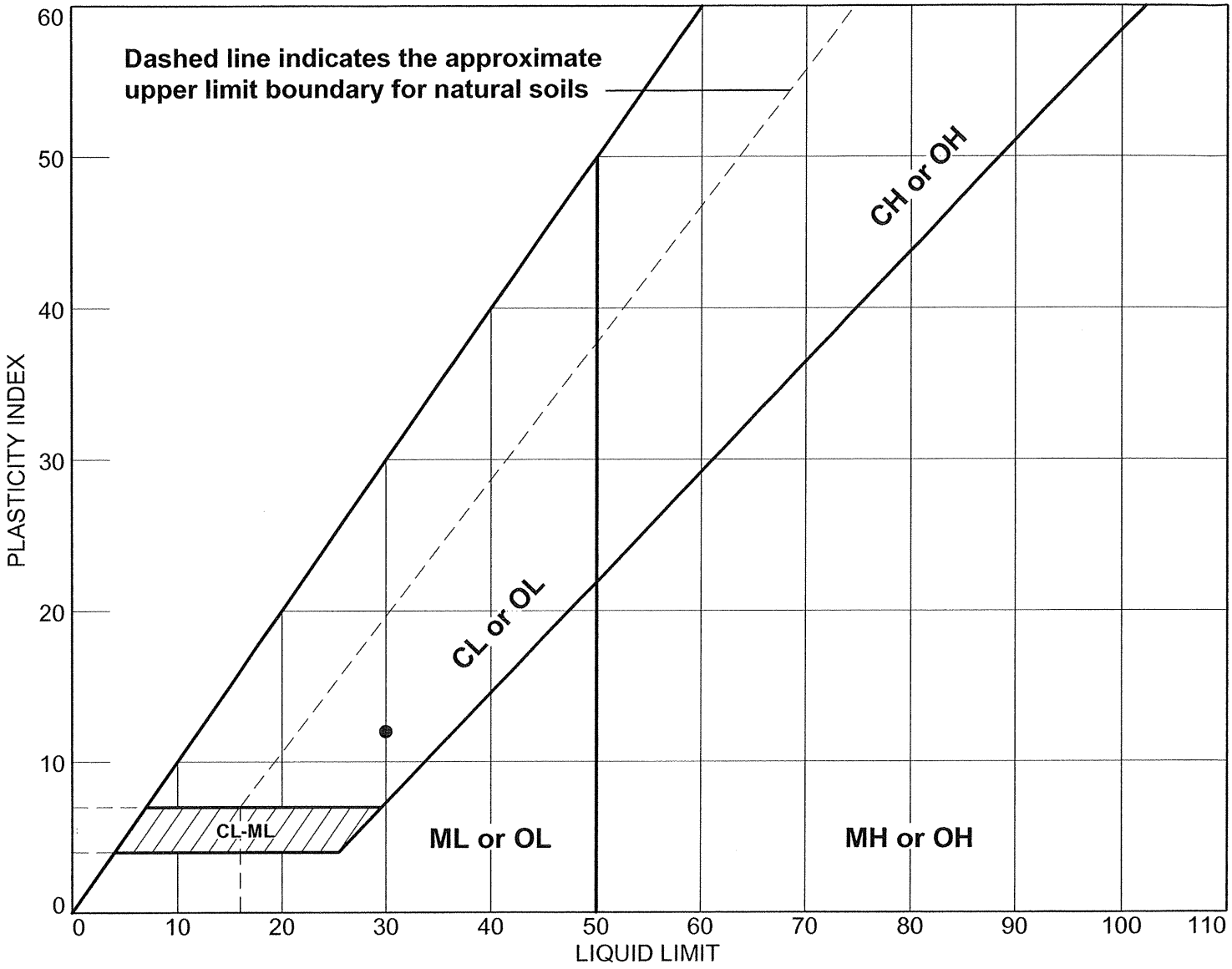
Project: Coleto Creek Facility

●**Source of Sample:** Boring 4-1 **Depth:** 24.0-26.0 **Sample Number:** S-13

Remarks:

AECOM

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-5-1	B-5-1 S-14	26'-27'		18	30	12	CL

AECOM

Client: IPR-GDF SUEZ
Project: COLETO CREEK

Project No.: 60225561 **Figure**

AECOM

SPECIFIC GRAVITY OF SOIL SOLIDS
ASTM D-854

Laboratory Services Group *750 Corporate Woods Parkway* *Vernon Hills, IL 60061* *Phone: (847) 279-2500* *Fax: (847) 279-2550*

AECOM Project No.: 60225561 **Test Date: 12/6/2011**

Project Name: **Coleto Creek Facility**
IPR-GDP Suez

Boring/Source: 1-1
Sample No.: 16,17,18
Depth (ft.): 30.0-36.7
Description: Caliche - White

	Test 1
Flask No.	**SG-3**
Wt. Flask + Soil + Water (W2)	742.20
Wt. Flask + Water (W3)	677.46
Temperature (C)	21.5
Density of Water @ test Tem.	0.99789
Tare No.	**ED-4**
Wt. Tare	578.17
Wt. Tare + Soil	681.20
Wt. Soil (W2-W3)	103.03
(k) Temp. Correction	0.99968
Specific Gravity (Gs)	**2.690**

Boring/Source: 4-1
Sample No.: 7
Depth (ft.): 12.0-14.0
Description: F-M Sand Little Clay Trace Silt - Brownish Gray SC

	Test 2
Flask No.	**SG-10**
Wt. Flask + Soil + Water (W2)	742.38
Wt. Flask + Water (W3)	668.44
Temperature (C)	21.5
Density of Water @ test Tem.	0.99789
Tare No.	**ED-4**
Wt. Tare	576.51
Wt. Tare + Soil	695.11
Wt. Soil (W2-W3)	118.60
(k) Temp. Correction	0.99968
Specific Gravity (Gs)	**2.655**

Boring/Source: 4-1
Sample No.: 13
Depth (ft.): 24.0-26.0
Description: Clayey F-M Sand Little Silt - Brownish Gray SC

	Test 3
Flask No.	**SG-1**
Wt. Flask + Soil + Water (W2)	726.62
Wt. Flask + Water (W3)	675.32
Temperature (C)	21.5
Density of Water @ test Tem.	0.99789
Tare No.	**ED-6**
Wt. Tare	602.23
Wt. Tare + Soil	684.30
Wt. Soil (W2-W3)	82.07
(k) Temp. Correction	0.99680
Specific Gravity (Gs)	**2.659**

Boring/Source: 2-1
Sample No.: 14
Depth (ft.): 26.0-28..0
Description: Clayey F-M Sand Little Silt - Brownish Gray SC

	Test 4
Flask No.	**SG-2**
Wt. Flask + Soil + Water (W2)	738.44
Wt. Flask + Water (W3)	668.48
Temperature (C)	21.5
Density of Water @ test Tem.	0.99789
Tare No.	**ED-10**
Wt. Tare	619.18
Wt. Tare + Soil	730.96
Wt. Soil (W2-W3)	111.78
(k) Temp. Correction	0.99968
Specific Gravity (Gs)	**2.672**

Technician **BCM** Calculated **BCM** Checked **WPQ**
Date **12/2/11** Date **12/2/11** Date **12/6/11**

AECOM

ORGANIC CONTENT TEST
ASTM D-2974
Method C

Laboratory Services Group *750 Corporate Woods Parkway, Vernon Hills, Illinois 60061* *Phone: (847) 279-2500 Fax:(847) 279-2550*

AECOM Project No.: 60225561
Project Name: Coleto Creek Facility - IPR-GDP Suez
Date Tested: 12/6/2011

Sample Information

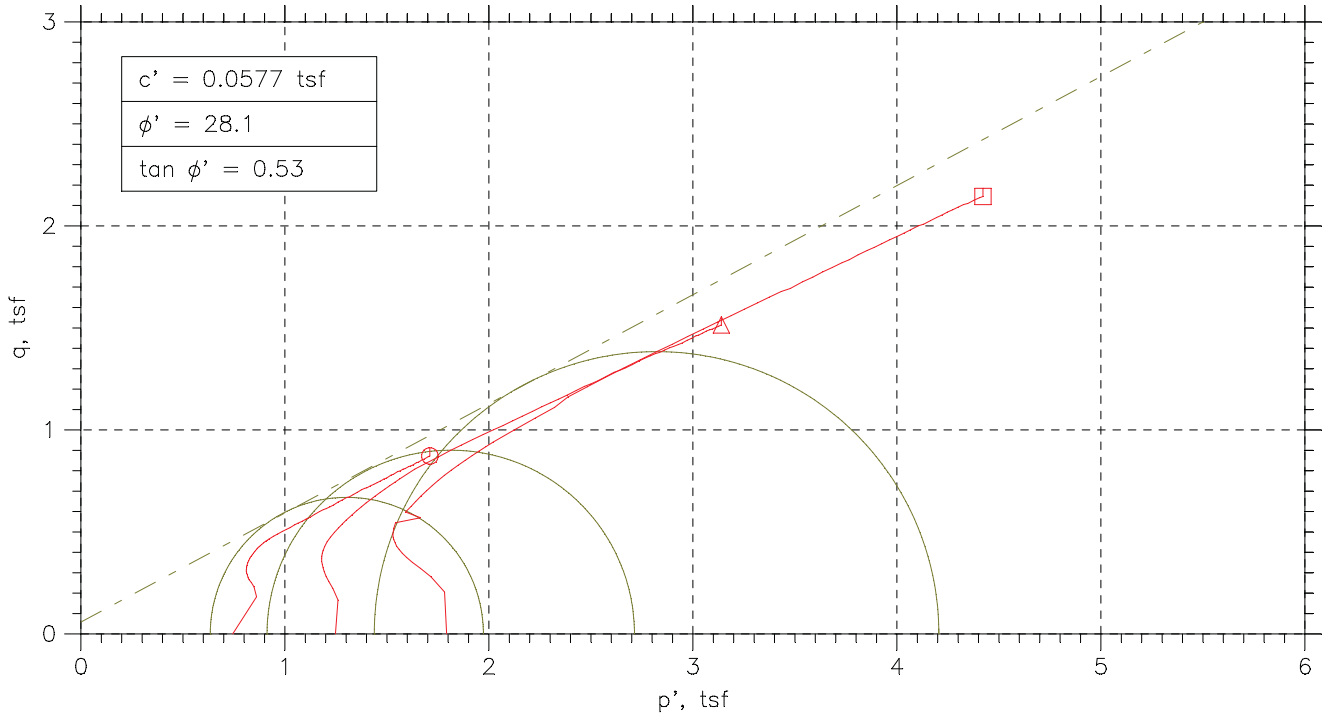
Boring / Source:	B-4-1
Sample No.:	13
Depth (ft.):	24.0-26.0

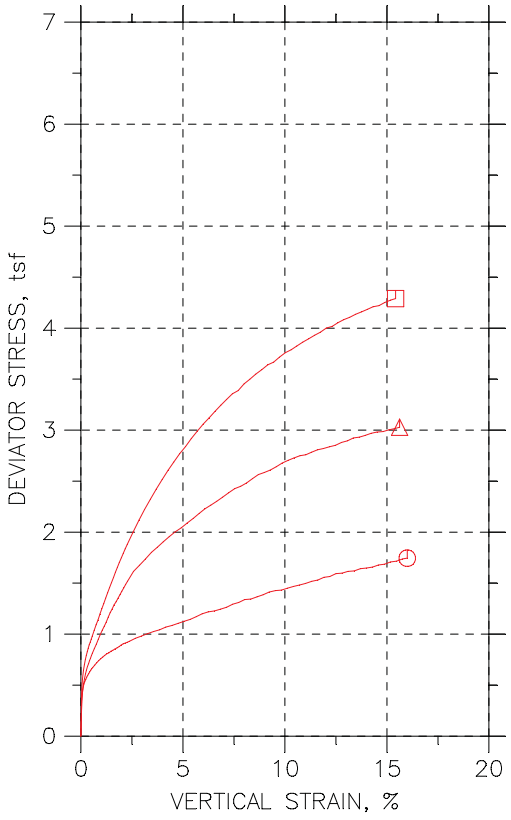
Organic Content Test Data

Tare No.:	N
Tare Wt. (gm): T	17.71
Wet Wt. + Tare (gm): A+T	48.27
Dry Wt. + Tare (gm): B+T	44.70
Moisture Content (%):	**13.23**
Wt. of Ash + Tare (gm): D+T	44.65
Percent Ash: (D-T/B-T)x100 = E	99.81
Organic Content (%):	**0.19**

** Note: Test performed by heating the sample to 440 degrees centigrade for a period of three hours.

TRIAXIAL COMPRESSION TEST REPORT





Symbol		⏲	△	⊡	
Test No.		10.4 PSI	17.4 PSI	24.3 PSI	
Initial	Diameter, in	2.8362	2.8441	2.8457	
	Height, in	5.9134	6.0831	6.0173	
	Water Content, %	21.81	14.93	13.70	
	Dry Density, pcf	105.5	115.9	120.2	
	Saturation, %	100.17	90.88	94.34	
	Void Ratio	0.58172	0.4389	0.38805	
Before Shear	Water Content, %	21.39	15.80	14.06	
	Dry Density, pcf	106.1	117.3	121.3	
	Saturation, %	100.00	100.00	100.00	
	Void Ratio	0.57165	0.42209	0.37567	
	Back Press., tsf	5.0449	5.0454	5.0404	
Minor Prin. Stress, tsf		0.74395	1.2474	1.7924	
Max. Dev. Stress, tsf		1.7444	3.0288	4.2889	
Time to Failure, min		1612.1	1613.1	1614.3	
Strain Rate, %/min		0.02	0.02	0.03	
B-Value		.98	.97	.95	
Measured Specific Gravity		2.67	2.67	2.67	
Liquid Limit		42	42	42	
Plastic Limit		24	24	24	
Plasticity Index		18	18	18	

Project: COLETO CREEK FACILITY

Location: IPR-GDF SUEZ

Project No.: 60225561

Boring No.: B-2-1 S-14

Sample Type: 3" ST

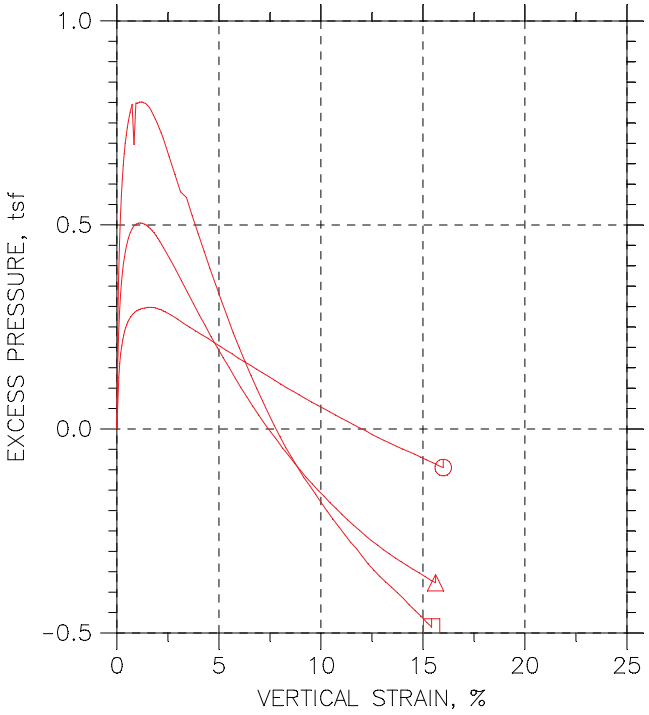
Failure Sketch

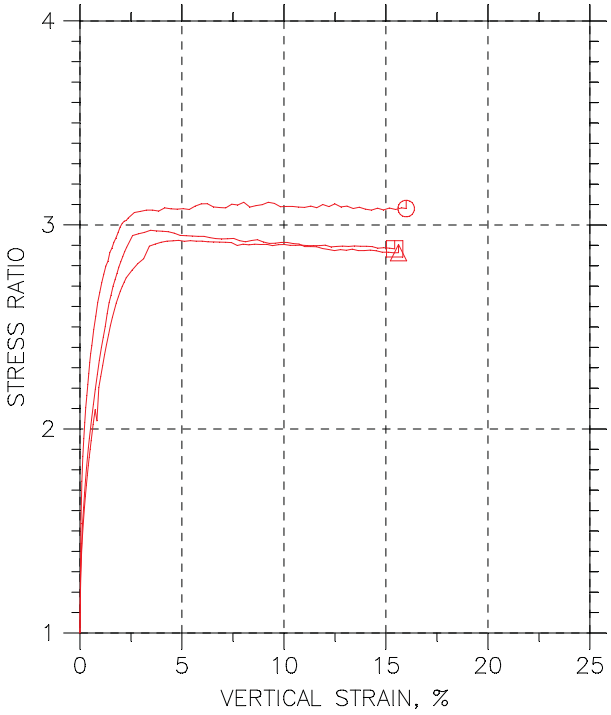
Description: CLAYEY F-M SAND LITTLE SILT- BROWNISH GRAY SC

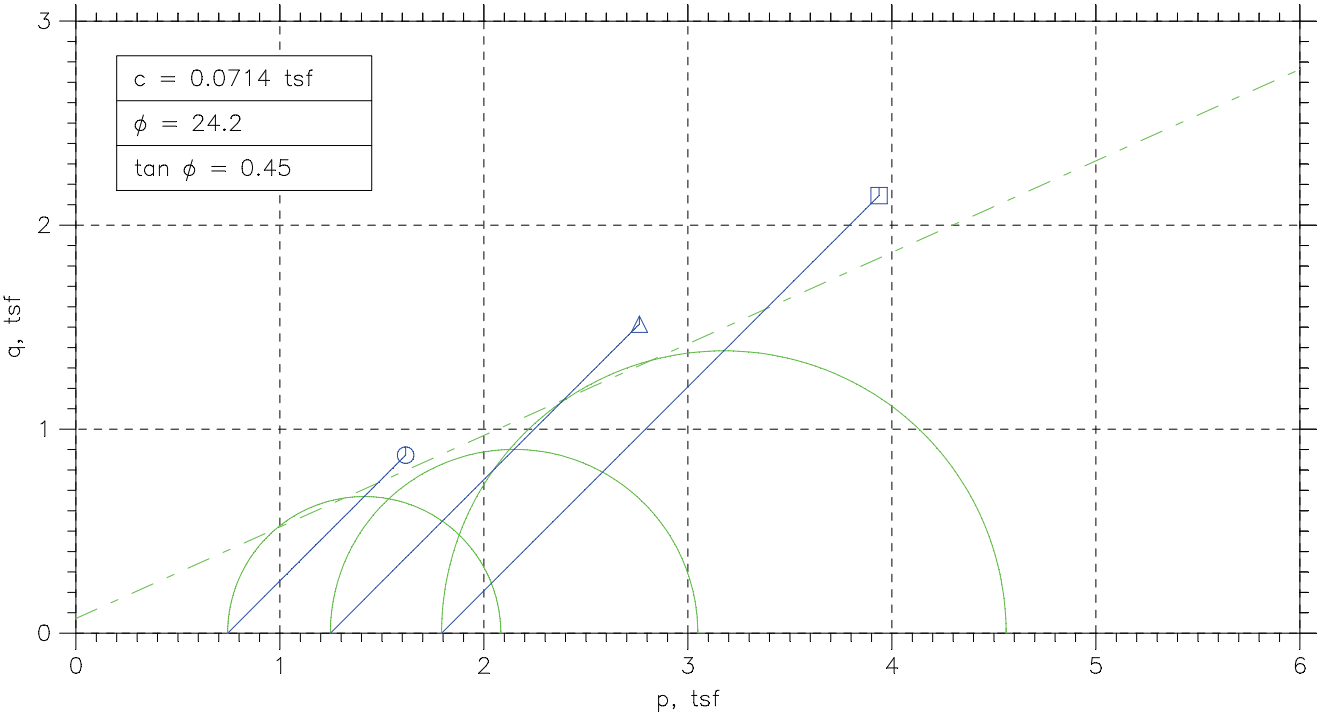
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

Mon, 12-DEC-2011 10:07:19

TRIAXIAL COMPRESSION TEST REPORT







Project: COLETO CREEK FACILITY	Location: IPR-GDF SUEZ	Project No.: 60225561
Boring No.: B-2-1 S-14	Tested By: BCM	Checked By: WPQ
Sample No.: S-14	Test Date: 12/5/11	Depth: 26.0'-28.0'
Test No.: B-2-1 S-14	Sample Type: 3" ST	Elevation: ----
Description: CLAYEY F-M SAND LITTLE SILT- BROWNISH GRAY SC		
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767		

TRIAXIAL TEST

Project: COLETO CREEK FACILITY | Location: IPR-GDF SUEZ | Project No.: 60225561
Boring No.: B-2-1 S-14 | Tested By: BCM | Checked By: WPQ
Sample No.: S-14 | Test Date: 12/5/11 | Depth: 26.0'-28.0'
Test No.: 10.4 PSI | Sample Type: 3" ST | Elevation: ----

Soil Description: CLAYEY F-M SAND LITTLE SILT- BROWNISH GRAY SC
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

Specimen Height: 5.91 in | Piston Area: 0.00 in^2 | Filter Strip Correction: 0.00 tsf
Specimen Area: 6.32 in^2 | Piston Friction: 0.00 lb | Membrane Correction: 0.00 lb/in
Specimen Volume: 37.36 in^3 | Piston Weight: 0.00 lb | Correction Type: Uniform

Liquid Limit: 42 | Plastic Limit: 24 | Measured Specific Gravity: 2.67

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.3179	0	0	5.0449	5.7888	5.7888
2	5.0001	0.045204	6.3207	31.887	0.36323	5.1097	5.7888	6.152
3	10	0.094782	6.3239	40.44	0.46042	5.1704	5.7888	6.2492
4	15	0.14144	6.3268	44.344	0.50464	5.2061	5.7888	6.2934
5	20	0.18956	6.3299	46.761	0.53189	5.2306	5.7888	6.3207
6	25	0.23768	6.3329	48.992	0.557	5.2487	5.7888	6.3458
7	30.001	0.28726	6.3361	51.038	0.57997	5.2633	5.7888	6.3688
8	35.001	0.33538	6.3391	52.618	0.59764	5.275	5.7888	6.3864
9	40.001	0.3835	6.3422	54.012	0.61318	5.2849	5.7888	6.402
10	45.001	0.43308	6.3453	55.5	0.62975	5.2931	5.7888	6.4186
11	50.001	0.4812	6.3484	57.08	0.64737	5.3001	5.7888	6.4362
12	55.001	0.53078	6.3516	58.289	0.66075	5.3066	5.7888	6.4495
13	60.001	0.5789	6.3546	59.311	0.67202	5.3112	5.7888	6.4608
14	70.001	0.6766	6.3609	61.636	0.69766	5.3194	5.7888	6.4865
15	80.001	0.77576	6.3673	63.588	0.71904	5.3258	5.7888	6.5078
16	90.002	0.87346	6.3735	65.633	0.74144	5.3311	5.7888	6.5302
17	100	0.97115	6.3798	67.213	0.75854	5.3346	5.7888	6.5473
18	110	1.0703	6.3862	68.794	0.7756	5.3369	5.7888	6.5644
19	120	1.1695	6.3926	70.281	0.79158	5.3387	5.7888	6.5804
20	130	1.2701	6.3991	71.676	0.80646	5.3404	5.7888	6.5953
21	140	1.3707	6.4057	72.605	0.81609	5.341	5.7888	6.6049
22	150	1.4699	6.4121	74.093	0.83197	5.3428	5.7888	6.6208
23	160	1.5676	6.4185	75.023	0.84157	5.3428	5.7888	6.6304
24	170	1.6682	6.425	76.231	0.85426	5.3428	5.7888	6.6431
25	180	1.7688	6.4316	77.254	0.86483	5.3422	5.7888	6.6536
26	190	1.8694	6.4382	78.462	0.87746	5.3416	5.7888	6.6663
27	200	1.9715	6.4449	79.95	0.89316	5.3399	5.7888	6.682
28	210	2.0706	6.4514	81.065	0.90471	5.3381	5.7888	6.6935
29	220	2.1712	6.4581	81.809	0.91207	5.3369	5.7888	6.7009
30	230	2.2719	6.4647	82.553	0.91942	5.334	5.7888	6.7082
31	240	2.3725	6.4714	83.575	0.92985	5.3317	5.7888	6.7186
32	270	2.6699	6.4912	86.457	0.95898	5.3235	5.7888	6.7478
33	300	2.9674	6.5111	88.688	0.98072	5.3142	5.7888	6.7695
34	330	3.2678	6.5313	91.198	1.0054	5.3036	5.7888	6.7942
35	360	3.5609	6.5511	93.244	1.0248	5.2943	5.7888	6.8136
36	390	3.8584	6.5714	95.103	1.042	5.2849	5.7888	6.8308
37	420	4.1602	6.5921	97.892	1.0692	5.2756	5.7888	6.858
38	450	4.4621	6.6129	99.658	1.0851	5.2668	5.7888	6.8739
39	480	4.761	6.6337	101.8	1.1049	5.2569	5.7888	6.8937
40	510	5.0585	6.6545	104.03	1.1256	5.2476	5.7888	6.9144
41	540	5.3574	6.6755	106.07	1.1441	5.2376	5.7888	6.9329
42	570	5.6505	6.6962	108.95	1.1715	5.2289	5.7888	6.9603
43	600	5.9465	6.7173	111.93	1.1997	5.2184	5.7888	6.9885
44	630	6.244	6.7386	114.07	1.2188	5.2096	5.7888	7.0076
45	660	6.5458	6.7604	115.28	1.2277	5.2008	5.7888	7.0165
46	690	6.8477	6.7823	117.32	1.2455	5.1915	5.7888	7.0343
47	720	7.1466	6.8041	119.46	1.2641	5.1821	5.7888	7.0529
48	750	7.4441	6.826	122.62	1.2934	5.1734	5.7888	7.0822
49	780	7.7386	6.8478	124.67	1.3108	5.164	5.7888	7.0996
50	810	8.0332	6.8697	127.73	1.3387	5.1547	5.7888	7.1275
51	840	8.3306	6.892	128.57	1.3432	5.1453	5.7888	7.132
52	870	8.6296	6.9146	131.08	1.3649	5.1372	5.7888	7.1537
53	900	8.9329	6.9376	133.59	1.3864	5.1284	5.7888	7.1752
54	930	9.2333	6.9605	136.57	1.4126	5.1196	5.7888	7.2014
55	960	9.5336	6.9837	138.42	1.4271	5.1109	5.7888	7.2159
56	990	9.8282	7.0065	139.35	1.432	5.1033	5.7888	7.2208
57	1020	10.121	7.0293	141.59	1.4502	5.0951	5.7888	7.239
58	1050	10.419	7.0527	143.72	1.4673	5.0869	5.7888	7.2561
59	1080	10.718	7.0763	145.68	1.4822	5.0787	5.7888	7.271
60	1110	11.017	7.1	147.72	1.498	5.0706	5.7888	7.2868
61	1140	11.317	7.1241	150.23	1.5183	5.063	5.7888	7.3071
62	1170	11.613	7.148	151.9	1.5301	5.0548	5.7888	7.3189
63	1200	11.91	7.1721	155.16	1.5576	5.0472	5.7888	7.3464
64	1230	12.205	7.1962	156.37	1.5645	5.0402	5.7888	7.3533
65	1260	12.5	7.2204	159.71	1.5926	5.0314	5.7888	7.3814
66	1290	12.794	7.2448	160.74	1.5974	5.0238	5.7888	7.3862
67	1320	13.092	7.2696	163.06	1.615	5.0168	5.7888	7.4038
68	1350	13.395	7.295	164.18	1.6204	5.0098	5.7888	7.4092
69	1380	13.697	7.3205	166.87	1.6412	5.0022	5.7888	7.43
70	1410	13.996	7.346	168.08	1.6474	4.9958	5.7888	7.4362
71	1440	14.293	7.3715	169.66	1.6571	4.9894	5.7888	7.4459
72	1470	14.589	7.397	172.36	1.6777	4.9829	5.7888	7.4665
73	1500	14.881	7.4224	173.75	1.6855	4.9759	5.7888	7.4743
74	1530	15.174	7.448	176.63	1.7075	4.9689	5.7888	7.4963
75	1560	15.473	7.4744	178.03	1.7149	4.9625	5.7888	7.5037
76	1590	15.773	7.501	181	1.7374	4.9549	5.7888	7.5262
77	1612.1	15.995	7.5208	182.21	1.7444	4.9502	5.7888	7.5332

TRIAXIAL TEST

Project: COLETO CREEK FACILITY | Location: IPR-GDF SUEZ | Project No.: 60225561
Boring No.: B-2-1 S-14 | Tested By: BCM | Checked By: WPQ
Sample No.: S-14 | Test Date: 12/5/11 | Depth: 26.0'-28.0'
Test No.: 10.4 PSI | Sample Type: 3" ST | Elevation: ----

Soil Description: CLAYEY F-M SAND LITTLE SILT- BROWNISH GRAY SC
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

Specimen Height: 5.91 in | Piston Area: 0.00 in^2 | Filter Strip Correction: 0.00 tsf
Specimen Area: 6.32 in^2 | Piston Friction: 0.00 lb | Membrane Correction: 0.00 lb/in
Specimen Volume: 37.36 in^3 | Piston Weight: 0.00 lb | Correction Type: Uniform

Liquid Limit: 42 | Plastic Limit: 24 | Measured Specific Gravity: 2.67

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	5.7888	5.7888	0	0.000	0.74395	0.74395	1.000	0.74395	0
2	0.05	6.152	5.7888	0.064842	0.179	1.0423	0.6791	1.535	0.86072	0.18161
3	0.09	6.2492	5.7888	0.1256	0.273	1.0788	0.61835	1.745	0.84856	0.23021
4	0.14	6.2934	5.7888	0.16123	0.319	1.0874	0.58272	1.866	0.83504	0.25232
5	0.19	6.3207	5.7888	0.18576	0.349	1.0901	0.55818	1.953	0.82413	0.26595
6	0.24	6.3458	5.7888	0.20387	0.366	1.0971	0.54007	2.031	0.81857	0.2785
7	0.29	6.3688	5.7888	0.21848	0.377	1.1054	0.52547	2.104	0.81545	0.28998
8	0.34	6.3864	5.7888	0.23016	0.385	1.1114	0.51379	2.163	0.8126	0.29882
9	0.38	6.402	5.7888	0.24009	0.392	1.117	0.50385	2.217	0.81044	0.30659
10	0.43	6.4186	5.7888	0.24827	0.394	1.1254	0.49568	2.270	0.81055	0.31488
11	0.48	6.4362	5.7888	0.25528	0.394	1.136	0.48867	2.325	0.81235	0.32369
12	0.53	6.4495	5.7888	0.26171	0.396	1.143	0.48224	2.370	0.81262	0.33037
13	0.58	6.4608	5.7888	0.26638	0.396	1.1496	0.47757	2.407	0.81358	0.33601
14	0.68	6.4865	5.7888	0.27456	0.394	1.1671	0.46939	2.486	0.81822	0.34883
15	0.78	6.5078	5.7888	0.28098	0.391	1.182	0.46296	2.553	0.82248	0.35952
16	0.87	6.5302	5.7888	0.28624	0.386	1.1991	0.45771	2.620	0.82842	0.37072
17	0.97	6.5473	5.7888	0.28975	0.382	1.2127	0.4542	2.670	0.83347	0.37927
18	1.07	6.5644	5.7888	0.29208	0.377	1.2275	0.45186	2.716	0.83966	0.3878
19	1.17	6.5804	5.7888	0.29384	0.371	1.2417	0.45011	2.759	0.8459	0.39579
20	1.27	6.5953	5.7888	0.29559	0.367	1.2548	0.44836	2.799	0.85159	0.40323
21	1.37	6.6049	5.7888	0.29617	0.363	1.2639	0.44777	2.823	0.85582	0.40804
22	1.47	6.6208	5.7888	0.29792	0.358	1.278	0.44602	2.865	0.86201	0.41599
23	1.57	6.6304	5.7888	0.29792	0.354	1.2876	0.44602	2.887	0.86681	0.42079
24	1.67	6.6431	5.7888	0.29792	0.349	1.3003	0.44602	2.915	0.87315	0.42713
25	1.77	6.6536	5.7888	0.29734	0.344	1.3114	0.44661	2.936	0.87902	0.43242
26	1.87	6.6663	5.7888	0.29676	0.338	1.3247	0.44719	2.962	0.88592	0.43873
27	1.97	6.682	5.7888	0.295	0.330	1.3421	0.44894	2.989	0.89553	0.44658
28	2.07	6.6935	5.7888	0.29325	0.324	1.3554	0.4507	3.007	0.90305	0.45236
29	2.17	6.7009	5.7888	0.29208	0.320	1.3639	0.45186	3.018	0.9079	0.45604
30	2.27	6.7082	5.7888	0.28916	0.315	1.3742	0.45478	3.022	0.91449	0.45971
31	2.37	6.7186	5.7888	0.28683	0.308	1.387	0.45712	3.034	0.92205	0.46492
32	2.67	6.7478	5.7888	0.27865	0.291	1.4243	0.4653	3.061	0.94479	0.47949
33	2.97	6.7695	5.7888	0.2693	0.275	1.4554	0.47465	3.066	0.96501	0.49036
34	3.27	6.7942	5.7888	0.25879	0.257	1.4905	0.48516	3.072	0.98784	0.50268
35	3.56	6.8136	5.7888	0.24944	0.243	1.5193	0.49451	3.072	1.0069	0.51239
36	3.86	6.8308	5.7888	0.24009	0.230	1.5459	0.50385	3.068	1.0249	0.521
37	4.16	6.858	5.7888	0.23075	0.216	1.5824	0.5132	3.083	1.0478	0.5346
38	4.46	6.8739	5.7888	0.22198	0.205	1.607	0.52196	3.079	1.0645	0.54253
39	4.76	6.8937	5.7888	0.21205	0.192	1.6368	0.53189	3.077	1.0843	0.55243
40	5.06	6.9144	5.7888	0.20271	0.180	1.6668	0.54124	3.080	1.104	0.56278
41	5.36	6.9329	5.7888	0.19277	0.168	1.6952	0.55117	3.076	1.1232	0.57204
42	5.65	6.9603	5.7888	0.18401	0.157	1.7314	0.55993	3.092	1.1457	0.58576
43	5.95	6.9885	5.7888	0.1735	0.145	1.7702	0.57045	3.103	1.1703	0.59986
44	6.24	7.0076	5.7888	0.16473	0.135	1.798	0.57921	3.104	1.1886	0.60939
45	6.55	7.0165	5.7888	0.15597	0.127	1.8157	0.58797	3.088	1.2018	0.61386
46	6.85	7.0343	5.7888	0.14663	0.118	1.8428	0.59732	3.085	1.2201	0.62274
47	7.15	7.0529	5.7888	0.13728	0.109	1.8708	0.60667	3.084	1.2387	0.63205
48	7.44	7.0822	5.7888	0.12852	0.099	1.9088	0.61543	3.102	1.2621	0.6467
49	7.74	7.0996	5.7888	0.11917	0.091	1.9356	0.62478	3.098	1.2802	0.65539
50	8.03	7.1275	5.7888	0.10982	0.082	1.9729	0.63412	3.111	1.3035	0.66937
51	8.33	7.132	5.7888	0.10048	0.075	1.9866	0.64347	3.087	1.315	0.67158
52	8.63	7.1537	5.7888	0.092298	0.068	2.0166	0.65165	3.095	1.3341	0.68246
53	8.93	7.1752	5.7888	0.083536	0.060	2.0468	0.66041	3.099	1.3536	0.69322
54	9.23	7.2014	5.7888	0.074773	0.053	2.0818	0.66917	3.111	1.3755	0.70632
55	9.53	7.2159	5.7888	0.066011	0.046	2.1051	0.67794	3.105	1.3915	0.71356
56	9.83	7.2208	5.7888	0.058417	0.041	2.1176	0.68553	3.089	1.4015	0.71602
57	10.12	7.239	5.7888	0.050238	0.035	2.1439	0.69371	3.091	1.4188	0.72512
58	10.42	7.2561	5.7888	0.04206	0.029	2.1691	0.70189	3.090	1.4355	0.73363
59	10.72	7.271	5.7888	0.033882	0.023	2.1923	0.71006	3.087	1.4512	0.74111
60	11.02	7.2868	5.7888	0.025703	0.017	2.2162	0.71824	3.086	1.4672	0.749
61	11.32	7.3071	5.7888	0.018109	0.012	2.2442	0.72584	3.092	1.485	0.75916
62	11.61	7.3189	5.7888	0.0099308	0.006	2.2641	0.73402	3.085	1.4991	0.76505
63	11.91	7.3464	5.7888	0.0023367	0.002	2.2992	0.74161	3.100	1.5204	0.77881
64	12.21	7.3533	5.7888	-0.0046733	-0.003	2.3131	0.74862	3.090	1.5309	0.78225
65	12.50	7.3814	5.7888	-0.013436	-0.008	2.35	0.75738	3.103	1.5537	0.79631
66	12.79	7.3862	5.7888	-0.02103	-0.013	2.3624	0.76498	3.088	1.5637	0.79871
67	13.09	7.4038	5.7888	-0.02804	-0.017	2.387	0.77199	3.092	1.5795	0.8075
68	13.39	7.4092	5.7888	-0.03505	-0.022	2.3994	0.779	3.080	1.5892	0.81019
69	13.70	7.43	5.7888	-0.042644	-0.026	2.4278	0.78659	3.087	1.6072	0.82062
70	14.00	7.4362	5.7888	-0.04907	-0.030	2.4404	0.79302	3.077	1.6167	0.8237
71	14.29	7.4459	5.7888	-0.055496	-0.033	2.4566	0.79944	3.073	1.628	0.82857
72	14.59	7.4665	5.7888	-0.061922	-0.037	2.4835	0.80587	3.082	1.6447	0.83883
73	14.88	7.4743	5.7888	-0.068932	-0.041	2.4983	0.81288	3.073	1.6556	0.84273
74	15.17	7.4963	5.7888	-0.075942	-0.044	2.5274	0.81989	3.083	1.6736	0.85376
75	15.47	7.5037	5.7888	-0.082367	-0.048	2.5412	0.82631	3.075	1.6838	0.85746
76	15.77	7.5262	5.7888	-0.089961	-0.052	2.5713	0.83391	3.083	1.7026	0.86869
77	15.99	7.5332	5.7888	-0.094635	-0.054	2.583	0.83858	3.080	1.7108	0.87219

TRIAXIAL TEST

Project: COLETO CREEK FACILITY | Location: IPR-GDF SUEZ | Project No.: 60225561
Boring No.: B-2-1 S-14 | Tested By: BCM | Checked By: WPQ
Sample No.: S-14 | Test Date: 12/5/11 | Depth: 26.0'-28.0'
Test No.: 17.4 PSI | Sample Type: 3" ST | Elevation: ----

Soil Description: CLAYEY F-M SAND LITTLE SILT- BROWNISH GRAY SC
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

Specimen Height: 6.08 in | Piston Area: 0.00 in^2 | Filter Strip Correction: 0.00 tsf
Specimen Area: 6.35 in^2 | Piston Friction: 0.00 lb | Membrane Correction: 0.00 lb/in
Specimen Volume: 38.65 in^3 | Piston Weight: 0.00 lb | Correction Type: Uniform

Liquid Limit: 42 | Plastic Limit: 24 | Measured Specific Gravity: 2.67

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.353	0	0	5.0454	6.2928	6.2928
2	5.0038	0.0388	6.3555	29.35	0.3325	5.1985	6.2928	6.6253
3	10.004	0.085062	6.3584	39.31	0.44513	5.2806	6.2928	6.7379
4	15.004	0.13132	6.3613	45.38	0.51363	5.3339	6.2928	6.8064
5	20.004	0.17908	6.3644	50.036	0.56606	5.3744	6.2928	6.8589
6	25	0.22683	6.3674	53.985	0.61044	5.4054	6.2928	6.9032
7	30	0.27459	6.3705	57.344	0.64811	5.4298	6.2928	6.9409
8	35	0.32234	6.3735	60.35	0.68176	5.4504	6.2928	6.9746
9	40	0.37159	6.3767	62.884	0.71004	5.4676	6.2928	7.0028
10	45	0.42083	6.3798	65.477	0.73895	5.482	6.2928	7.0317
11	50	0.46859	6.3829	67.658	0.76319	5.4936	6.2928	7.056
12	55.001	0.51634	6.386	70.074	0.79007	5.5042	6.2928	7.0829
13	60.001	0.5641	6.389	72.196	0.8136	5.513	6.2928	7.1064
14	70.001	0.65961	6.3952	76.204	0.85794	5.5269	6.2928	7.1507
15	80.001	0.75512	6.4013	80.27	0.90285	5.5375	6.2928	7.1957
16	90.001	0.85361	6.4077	84.573	0.9503	5.5436	6.2928	7.2431
17	100	0.95061	6.414	88.698	0.99568	5.5474	6.2928	7.2885
18	110	1.0491	6.4203	92.706	1.0396	5.5497	6.2928	7.3324
19	120	1.1446	6.4265	96.124	1.0769	5.5502	6.2928	7.3697
20	130	1.2401	6.4328	99.719	1.1161	5.5497	6.2928	7.4089
21	140	1.3356	6.439	104.26	1.1658	5.5474	6.2928	7.4586
22	150	1.4326	6.4453	108.32	1.2101	5.5452	6.2928	7.5029
23	160	1.5266	6.4515	111.57	1.2451	5.5408	6.2928	7.5379
24	170	1.6251	6.4579	115.28	1.2852	5.5369	6.2928	7.578
25	180	1.7206	6.4642	118.28	1.3175	5.5314	6.2928	7.6103
26	190	1.8162	6.4705	121.41	1.351	5.5258	6.2928	7.6438
27	200	1.9102	6.4767	124.71	1.3863	5.5197	6.2928	7.6791
28	210	2.0057	6.483	127.83	1.4197	5.5125	6.2928	7.7125
29	220	2.1012	6.4893	131.01	1.4536	5.5053	6.2928	7.7464
30	230	2.1967	6.4957	134.2	1.4875	5.4975	6.2928	7.7803
31	240	2.2907	6.5019	137.2	1.5193	5.4892	6.2928	7.8121
32	270	2.5817	6.5213	146.28	1.615	5.4637	6.2928	7.9078
33	300	2.8757	6.5411	152.23	1.6757	5.4365	6.2928	7.9685
34	330	3.1682	6.5608	158.3	1.7372	5.4082	6.2928	8.03
35	360	3.4592	6.5806	164.61	1.801	5.3805	6.2928	8.0938
36	390	3.7502	6.6005	169.79	1.8521	5.3527	6.2928	8.1449
37	420	4.0397	6.6204	175.22	1.9055	5.325	6.2928	8.1983
38	450	4.3292	6.6405	180.28	1.9547	5.2989	6.2928	8.2475
39	480	4.6202	6.6607	185.23	2.0023	5.2712	6.2928	8.2951
40	510	4.9127	6.6812	189.48	2.0419	5.2451	6.2928	8.3347
41	540	5.2082	6.702	194.43	2.0887	5.2201	6.2928	8.3815
42	570	5.5007	6.7228	199.32	2.1347	5.1957	6.2928	8.4275
43	600	5.7902	6.7434	204.39	2.1823	5.1702	6.2928	8.4751
44	630	6.0782	6.7641	209.28	2.2277	5.1469	6.2928	8.5205
45	660	6.3692	6.7851	213.41	2.2645	5.1242	6.2928	8.5573
46	690	6.6587	6.8062	217.65	2.3024	5.1014	6.2928	8.5952
47	720	6.9497	6.8275	222.13	2.3425	5.0798	6.2928	8.6353
48	750	7.2407	6.8489	226.9	2.3853	5.0582	6.2928	8.6781
49	780	7.5362	6.8708	231.56	2.4265	5.0382	6.2928	8.7193
50	810	7.8302	6.8927	234.5	2.4496	5.0188	6.2928	8.7424
51	840	8.1197	6.9144	238.39	2.4824	4.9982	6.2928	8.7752
52	870	8.4107	6.9364	243.17	2.5241	4.9805	6.2928	8.8169
53	900	8.6987	6.9583	247.82	2.5643	4.9622	6.2928	8.8571
54	930	8.9883	6.9804	250.54	2.5842	4.9444	6.2928	8.877
55	960	9.2793	7.0028	253.72	2.6086	4.9267	6.2928	8.9014
56	990	9.5718	7.0254	257.61	2.6401	4.9106	6.2928	8.9329
57	1020	9.8643	7.0482	261.97	2.6761	4.8945	6.2928	8.9689
58	1050	10.157	7.0712	265.5	2.7034	4.8806	6.2928	8.9962
59	1080	10.446	7.094	268.63	2.7264	4.8646	6.2928	9.0192
60	1110	10.736	7.1171	271.69	2.7486	4.8507	6.2928	9.0414
61	1140	11.024	7.1401	273.58	2.7587	4.8363	6.2928	9.0515
62	1170	11.31	7.1632	277	2.7842	4.8224	6.2928	9.077
63	1200	11.6	7.1866	280.18	2.807	4.8096	6.2928	9.0998
64	1230	11.889	7.2102	282.3	2.819	4.7969	6.2928	9.1118
65	1260	12.183	7.2344	285.01	2.8366	4.7836	6.2928	9.1294
66	1290	12.477	7.2587	287.49	2.8516	4.7714	6.2928	9.1444
67	1320	12.771	7.2831	291.2	2.8788	4.7608	6.2928	9.1716
68	1350	13.064	7.3076	293.85	2.8952	4.7492	6.2928	9.188
69	1380	13.355	7.3322	297.62	2.9226	4.7392	6.2928	9.2154
70	1410	13.643	7.3566	299.45	2.9308	4.7292	6.2928	9.2236
71	1440	13.932	7.3814	302.28	2.9485	4.7198	6.2928	9.2413
72	1470	14.226	7.4067	305.4	2.9688	4.7109	6.2928	9.2616
73	1500	14.519	7.432	307.76	2.9815	4.7015	6.2928	9.2743
74	1530	14.814	7.4578	309.29	2.986	4.6926	6.2928	9.2788
75	1560	15.107	7.4835	312.12	3.003	4.6837	6.2928	9.2958
76	1590	15.398	7.5092	314.54	3.0159	4.6743	6.2928	9.3087
77	1613.1	15.62	7.529	316.72	3.0288	4.6682	6.2928	9.3216

TRIAXIAL TEST

Project: COLETO CREEK FACILITY | Location: IPR-GDF SUEZ | Project No.: 60225561
Boring No.: B-2-1 S-14 | Tested By: BCM | Checked By: WPQ
Sample No.: S-14 | Test Date: 12/5/11 | Depth: 26.0'-28.0'
Test No.: 17.4 PSI | Sample Type: 3" ST | Elevation: ----

Soil Description: CLAYEY F-M SAND LITTLE SILT- BROWNISH GRAY SC
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

Specimen Height: 6.08 in | Piston Area: 0.00 in^2 | Filter Strip Correction: 0.00 tsf
Specimen Area: 6.35 in^2 | Piston Friction: 0.00 lb | Membrane Correction: 0.00 lb/in
Specimen Volume: 38.65 in^3 | Piston Weight: 0.00 lb | Correction Type: Uniform

Liquid Limit: 42 | Plastic Limit: 24 | Measured Specific Gravity: 2.67

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	6.2928	6.2928	0	0.000	1.2474	1.2474	1.000	1.2474	0
2	0.04	6.6253	6.2928	0.15311	0.460	1.4268	1.0943	1.304	1.2605	0.16625
3	0.09	6.7379	6.2928	0.23521	0.528	1.4573	1.0122	1.440	1.2348	0.22257
4	0.13	6.8064	6.2928	0.28847	0.562	1.4726	0.95893	1.536	1.2158	0.25682
5	0.18	6.8589	6.2928	0.32896	0.581	1.4845	0.91844	1.616	1.2015	0.28303
6	0.23	6.9032	6.2928	0.36003	0.590	1.4978	0.88737	1.688	1.1926	0.30522
7	0.27	6.9409	6.2928	0.38444	0.593	1.5111	0.86296	1.751	1.187	0.32406
8	0.32	6.9746	6.2928	0.40496	0.594	1.5242	0.84244	1.809	1.1833	0.34088
9	0.37	7.0028	6.2928	0.42216	0.595	1.5353	0.82524	1.860	1.1803	0.35502
10	0.42	7.0317	6.2928	0.43658	0.591	1.5498	0.81082	1.911	1.1803	0.36947
11	0.47	7.056	6.2928	0.44823	0.587	1.5624	0.79917	1.955	1.1808	0.3816
12	0.52	7.0829	6.2928	0.45877	0.581	1.5787	0.78863	2.002	1.1837	0.39504
13	0.56	7.1064	6.2928	0.46765	0.575	1.5934	0.77975	2.043	1.1866	0.4068
14	0.66	7.1507	6.2928	0.48152	0.561	1.6238	0.76588	2.120	1.1949	0.42897
15	0.76	7.1957	6.2928	0.49206	0.545	1.6582	0.75534	2.195	1.2068	0.45143
16	0.85	7.2431	6.2928	0.49816	0.524	1.6995	0.74924	2.268	1.2244	0.47515
17	0.95	7.2885	6.2928	0.50204	0.504	1.741	0.74536	2.336	1.2432	0.49784
18	1.05	7.3324	6.2928	0.50426	0.485	1.7828	0.74314	2.399	1.263	0.51982
19	1.14	7.3697	6.2928	0.50482	0.469	1.8195	0.74258	2.450	1.281	0.53846
20	1.24	7.4089	6.2928	0.50426	0.452	1.8593	0.74314	2.502	1.3012	0.55806
21	1.34	7.4586	6.2928	0.50204	0.431	1.9111	0.74536	2.564	1.3283	0.5829
22	1.43	7.5029	6.2928	0.49982	0.413	1.9576	0.74758	2.619	1.3526	0.60504
23	1.53	7.5379	6.2928	0.49539	0.398	1.9971	0.75202	2.656	1.3746	0.62255
24	1.63	7.578	6.2928	0.4915	0.382	2.0411	0.7559	2.700	1.3985	0.64262
25	1.72	7.6103	6.2928	0.48596	0.369	2.0789	0.76145	2.730	1.4202	0.65874
26	1.82	7.6438	6.2928	0.48041	0.356	2.1179	0.76699	2.761	1.4425	0.67548
27	1.91	7.6791	6.2928	0.47431	0.342	2.1594	0.7731	2.793	1.4663	0.69317
28	2.01	7.7125	6.2928	0.46709	0.329	2.2	0.78031	2.819	1.4902	0.70984
29	2.10	7.7464	6.2928	0.45988	0.316	2.2411	0.78752	2.846	1.5143	0.72681
30	2.20	7.7803	6.2928	0.45212	0.304	2.2828	0.79529	2.870	1.539	0.74374
31	2.29	7.8121	6.2928	0.4438	0.292	2.3229	0.80361	2.891	1.5633	0.75966
32	2.58	7.9078	6.2928	0.41828	0.259	2.4441	0.82912	2.948	1.6366	0.8075
33	2.88	7.9685	6.2928	0.39109	0.233	2.532	0.85631	2.957	1.6941	0.83783
34	3.17	8.03	6.2928	0.3628	0.209	2.6218	0.8846	2.964	1.7532	0.86861
35	3.46	8.0938	6.2928	0.33507	0.186	2.7133	0.91234	2.974	1.8128	0.9005
36	3.75	8.1449	6.2928	0.30733	0.166	2.7922	0.94007	2.970	1.8661	0.92607
37	4.04	8.1983	6.2928	0.27959	0.147	2.8734	0.96781	2.969	1.9206	0.95277
38	4.33	8.2475	6.2928	0.25352	0.130	2.9486	0.99388	2.967	1.9713	0.97737
39	4.62	8.2951	6.2928	0.22578	0.113	3.0239	1.0216	2.960	2.0228	1.0012
40	4.91	8.3347	6.2928	0.19971	0.098	3.0896	1.0477	2.949	2.0686	1.021
41	5.21	8.3815	6.2928	0.17474	0.084	3.1614	1.0727	2.947	2.117	1.0444
42	5.50	8.4275	6.2928	0.15034	0.070	3.2318	1.0971	2.946	2.1644	1.0673
43	5.79	8.4751	6.2928	0.12482	0.057	3.3048	1.1226	2.944	2.2137	1.0911
44	6.08	8.5205	6.2928	0.10152	0.046	3.3735	1.1459	2.944	2.2597	1.1138
45	6.37	8.5573	6.2928	0.078774	0.035	3.4332	1.1686	2.938	2.3009	1.1323
46	6.66	8.5952	6.2928	0.056029	0.024	3.4938	1.1914	2.933	2.3426	1.1512
47	6.95	8.6353	6.2928	0.034394	0.015	3.5555	1.213	2.931	2.3842	1.1712
48	7.24	8.6781	6.2928	0.012759	0.005	3.62	1.2346	2.932	2.4273	1.1927
49	7.54	8.7193	6.2928	-0.0072117	-0.003	3.6811	1.2546	2.934	2.4679	1.2133
50	7.83	8.7424	6.2928	-0.026628	-0.011	3.7236	1.274	2.923	2.4988	1.2248
51	8.12	8.7752	6.2928	-0.047153	-0.019	3.777	1.2946	2.918	2.5358	1.2412
52	8.41	8.8169	6.2928	-0.064905	-0.026	3.8364	1.3123	2.923	2.5744	1.262
53	8.70	8.8571	6.2928	-0.083212	-0.032	3.895	1.3306	2.927	2.6128	1.2822
54	8.99	8.877	6.2928	-0.10096	-0.039	3.9325	1.3484	2.917	2.6404	1.2921
55	9.28	8.9014	6.2928	-0.11872	-0.046	3.9747	1.3661	2.910	2.6704	1.3043
56	9.57	8.9329	6.2928	-0.1348	-0.051	4.0223	1.3822	2.910	2.7022	1.32
57	9.86	8.9689	6.2928	-0.15089	-0.056	4.0744	1.3983	2.914	2.7363	1.338
58	10.16	8.9962	6.2928	-0.16476	-0.061	4.1156	1.4122	2.914	2.7639	1.3517
59	10.45	9.0192	6.2928	-0.18085	-0.066	4.1547	1.4282	2.909	2.7915	1.3632
60	10.74	9.0414	6.2928	-0.19472	-0.071	4.1907	1.4421	2.906	2.8164	1.3743
61	11.02	9.0515	6.2928	-0.20914	-0.076	4.2153	1.4565	2.894	2.8359	1.3794
62	11.31	9.077	6.2928	-0.22301	-0.080	4.2546	1.4704	2.893	2.8625	1.3921
63	11.60	9.0998	6.2928	-0.23577	-0.084	4.2902	1.4832	2.893	2.8867	1.4035
64	11.89	9.1118	6.2928	-0.24853	-0.088	4.3149	1.4959	2.884	2.9054	1.4095
65	12.18	9.1294	6.2928	-0.26184	-0.092	4.3458	1.5092	2.879	2.9275	1.4183
66	12.48	9.1444	6.2928	-0.27404	-0.096	4.3731	1.5214	2.874	2.9473	1.4258
67	12.77	9.1716	6.2928	-0.28458	-0.099	4.4108	1.532	2.879	2.9714	1.4394
68	13.06	9.188	6.2928	-0.29623	-0.102	4.4389	1.5436	2.876	2.9913	1.4476
69	13.35	9.2154	6.2928	-0.30622	-0.105	4.4762	1.5536	2.881	3.0149	1.4613
70	13.64	9.2236	6.2928	-0.3162	-0.108	4.4944	1.5636	2.874	3.029	1.4654
71	13.93	9.2413	6.2928	-0.32563	-0.110	4.5216	1.573	2.874	3.0473	1.4743
72	14.23	9.2616	6.2928	-0.33451	-0.113	4.5507	1.5819	2.877	3.0663	1.4844
73	14.52	9.2743	6.2928	-0.34394	-0.115	4.5729	1.5913	2.874	3.0821	1.4908
74	14.81	9.2788	6.2928	-0.35282	-0.118	4.5862	1.6002	2.866	3.0932	1.493
75	15.11	9.2958	6.2928	-0.36169	-0.120	4.6121	1.6091	2.866	3.1106	1.5015
76	15.40	9.3087	6.2928	-0.37112	-0.123	4.6344	1.6185	2.863	3.1265	1.5079
77	15.62	9.3216	6.2928	-0.37723	-0.125	4.6534	1.6246	2.864	3.139	1.5144

TRIAXIAL TEST

Project: COLETO CREEK FACILITY | Location: IPR-GDF SUEZ | Project No.: 60225561
Boring No.: B-2-1 S-14 | Tested By: BCM | Checked By: WPQ
Sample No.: S-14 | Test Date: 12/5/11 | Depth: 26.0'-28.0'
Test No.: 24.3 PSI | Sample Type: 3" ST | Elevation: ----

Soil Description: CLAYEY F-M SAND LITTLE SILT- BROWNISH GRAY SC
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

Specimen Height: 6.02 in | Piston Area: 0.00 in^2 | Filter Strip Correction: 0.00 tsf
Specimen Area: 6.36 in^2 | Piston Friction: 0.00 lb | Membrane Correction: 0.00 lb/in
Specimen Volume: 38.27 in^3 | Piston Weight: 0.00 lb | Correction Type: Uniform

Liquid Limit: 42 | Plastic Limit: 24 | Measured Specific Gravity: 2.67

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.36	0	0	5.0404	6.8328	6.8328
2	5.0037	0.032682	6.3621	36.347	0.41134	5.2561	6.8328	7.2441
3	10.004	0.078153	6.365	49.512	0.56007	5.3969	6.8328	7.3929
4	15.004	0.12504	6.368	56.855	0.64283	5.4904	6.8328	7.4756
5	20.004	0.17194	6.371	61.995	0.70062	5.5581	6.8328	7.5334
6	25.004	0.22025	6.3741	66.401	0.75005	5.6109	6.8328	7.5828
7	30	0.26714	6.3771	70.072	0.79115	5.6527	6.8328	7.6239
8	35	0.31261	6.38	73.376	0.82808	5.6874	6.8328	7.6609
9	40	0.3595	6.383	76.366	0.86141	5.716	6.8328	7.6942
10	45	0.40924	6.3862	79.355	0.89468	5.7402	6.8328	7.7275
11	50	0.45755	6.3893	81.978	0.9238	5.7605	6.8328	7.7566
12	55	0.50444	6.3923	84.443	0.95113	5.7781	6.8328	7.7839
13	60.001	0.55133	6.3953	86.961	0.97903	5.793	6.8328	7.8118
14	70.001	0.64512	6.4013	92.153	1.0365	5.8172	6.8328	7.8693
15	80.001	0.74458	6.4077	97.083	1.0909	5.8354	6.8328	7.9237
16	90.001	0.83695	6.4137	101.44	1.1387	5.7374	6.8328	7.9715
17	100	0.92789	6.4196	106.63	1.1959	5.8392	6.8328	8.0287
18	110	1.0217	6.4257	111.51	1.2494	5.8392	6.8328	8.0822
19	120	1.1169	6.4319	116.07	1.2993	5.8414	6.8328	8.1321
20	130	1.2107	6.438	120.95	1.3526	5.842	6.8328	8.1854
21	140	1.3059	6.4442	125.67	1.4041	5.8398	6.8328	8.2369
22	150	1.4039	6.4506	130.28	1.4542	5.8381	6.8328	8.287
23	160	1.4949	6.4565	134.85	1.5037	5.8337	6.8328	8.3365
24	170	1.5943	6.4631	139.57	1.5548	5.8282	6.8328	8.3876
25	180	1.6924	6.4695	144.34	1.6064	5.8194	6.8328	8.4392
26	190	1.7862	6.4757	148.8	1.6544	5.8101	6.8328	8.4872
27	200	1.8814	6.482	153.15	1.7012	5.8002	6.8328	8.534
28	210	1.9794	6.4885	157.5	1.7478	5.7892	6.8328	8.5806
29	220	2.076	6.4949	161.7	1.7926	5.777	6.8328	8.6254
30	230	2.1727	6.5013	165.74	1.8355	5.766	6.8328	8.6683
31	240	2.2707	6.5078	169.99	1.8807	5.7523	6.8328	8.7135
32	270	2.5577	6.527	181.26	1.9996	5.7083	6.8328	8.8324
33	300	2.8433	6.5462	192.44	2.1166	5.6637	6.8328	8.9494
34	330	3.1219	6.565	202.56	2.2215	5.6214	6.8328	9.0543
35	360	3.406	6.5843	212.47	2.3234	5.6076	6.8328	9.1562
36	390	3.6945	6.604	222.12	2.4217	5.5625	6.8328	9.2545
37	420	3.9815	6.6238	231.46	2.5159	5.519	6.8328	9.3487
38	450	4.2714	6.6438	240.43	2.6055	5.4761	6.8328	9.4383
39	480	4.557	6.6637	248.71	2.6873	5.4343	6.8328	9.5201
40	510	4.8398	6.6835	256.9	2.7675	5.3947	6.8328	9.6003
41	540	5.1254	6.7036	264.34	2.8392	5.354	6.8328	9.672
42	570	5.411	6.7239	272.37	2.9166	5.316	6.8328	9.7494
43	600	5.6995	6.7444	280.03	2.9894	5.2759	6.8328	9.8222
44	630	5.9894	6.7652	287.37	3.0584	5.2401	6.8328	9.8912
45	660	6.2778	6.786	294.03	3.1197	5.2054	6.8328	9.9525
46	690	6.5705	6.8073	301.01	3.1837	5.1713	6.8328	10.016
47	720	6.8604	6.8285	307.77	3.2452	5.1389	6.8328	10.078
48	750	7.1432	6.8493	314.07	3.3015	5.1086	6.8328	10.134
49	780	7.426	6.8702	320.31	3.3568	5.0784	6.8328	10.19
50	810	7.7101	6.8914	324.19	3.3871	5.0492	6.8328	10.22
51	840	7.9943	6.9126	331.48	3.4526	5.0212	6.8328	10.285
52	870	8.2828	6.9344	336.93	3.4984	4.9942	6.8328	10.331
53	900	8.5741	6.9565	342.91	3.5492	4.9705	6.8328	10.382
54	930	8.8668	6.9788	348.21	3.5925	4.9458	6.8328	10.425
55	960	9.1609	7.0014	353.93	3.6396	4.9216	6.8328	10.472
56	990	9.448	7.0236	357.76	3.6674	4.9012	6.8328	10.5
57	1020	9.7336	7.0458	363.58	3.7153	4.8809	6.8328	10.548
58	1050	10.022	7.0684	368.98	3.7585	4.8589	6.8328	10.591
59	1080	10.301	7.0904	373.02	3.7879	4.8391	6.8328	10.621
60	1110	10.585	7.1129	377.95	3.8258	4.8192	6.8328	10.659
61	1140	10.877	7.1363	382.93	3.8635	4.8005	6.8328	10.696
62	1170	11.167	7.1596	387.34	3.8952	4.7813	6.8328	10.728
63	1200	11.457	7.183	392.06	3.9299	4.7626	6.8328	10.763
64	1230	11.743	7.2062	396.36	3.9601	4.7472	6.8328	10.793
65	1260	12.027	7.2295	401.76	4.0012	4.7279	6.8328	10.834
66	1290	12.308	7.2527	404.59	4.0165	4.7098	6.8328	10.849
67	1320	12.591	7.2762	409.47	4.0518	4.6944	6.8328	10.885
68	1350	12.88	7.3003	413.98	4.0829	4.6795	6.8328	10.916
69	1380	13.172	7.3249	417.76	4.1063	4.6652	6.8328	10.939
70	1410	13.464	7.3495	422.16	4.1357	4.6526	6.8328	10.969
71	1440	13.758	7.3746	425.99	4.1591	4.6388	6.8328	10.992
72	1470	14.042	7.399	429.93	4.1836	4.625	6.8328	11.016
73	1500	14.323	7.4233	434.02	4.2096	4.6096	6.8328	11.042
74	1530	14.609	7.4481	436.53	4.2199	4.5953	6.8328	11.053
75	1560	14.897	7.4734	441.31	4.2516	4.5816	6.8328	11.084
76	1590	15.19	7.4992	445.29	4.2753	4.5662	6.8328	11.108
77	1614.3	15.429	7.5203	447.97	4.2889	4.5552	6.8328	11.122

TRIAXIAL TEST

Project: COLETO CREEK FACILITY | Location: IPR-GDF SUEZ | Project No.: 60225561
Boring No.: B-2-1 S-14 | Tested By: BCM | Checked By: WPQ
Sample No.: S-14 | Test Date: 12/5/11 | Depth: 26.0'-28.0'
Test No.: 24.3 PSI | Sample Type: 3" ST | Elevation: ----

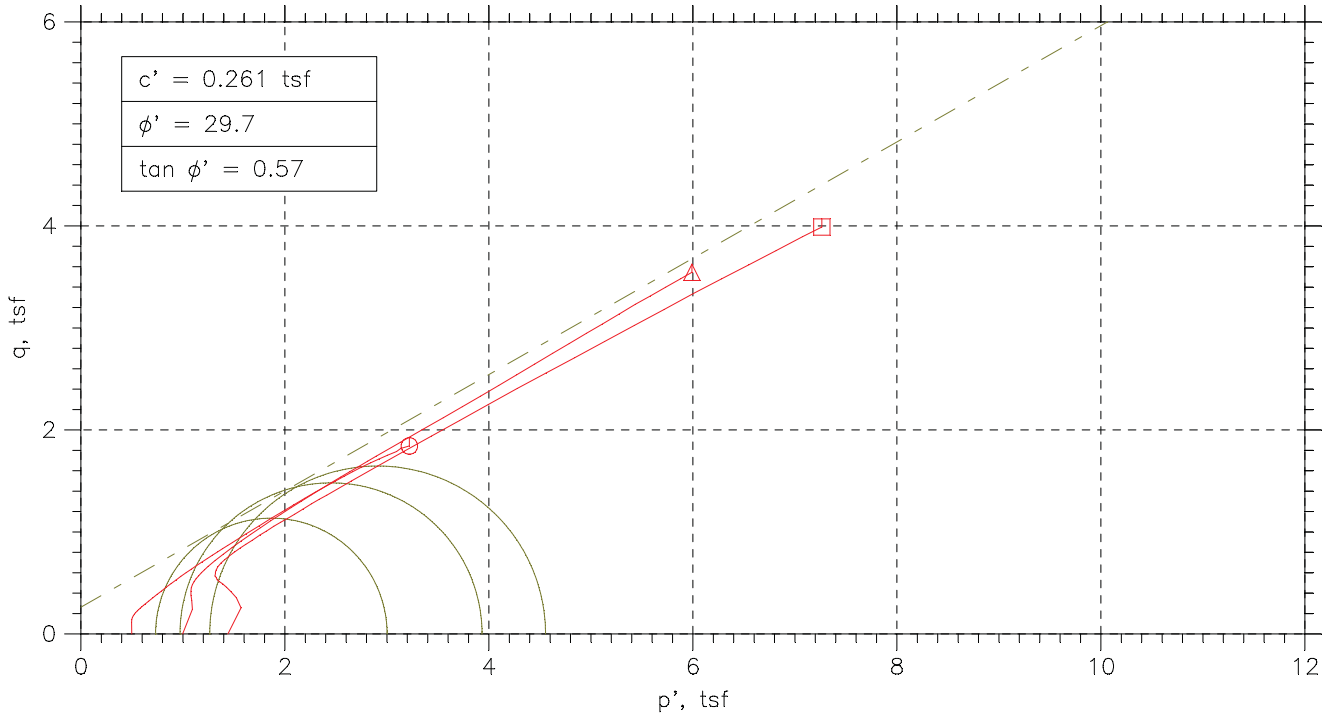
Soil Description: CLAYEY F-M SAND LITTLE SILT- BROWNISH GRAY SC
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

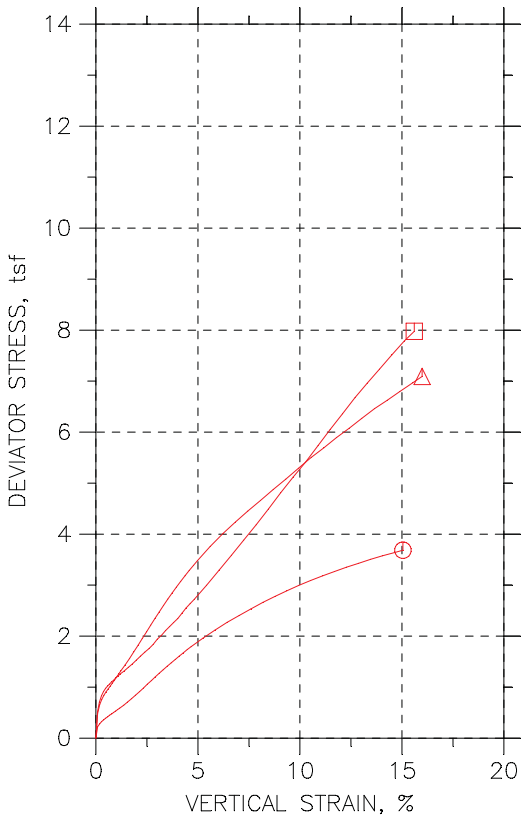
Specimen Height: 6.02 in | Piston Area: 0.00 in^2 | Filter Strip Correction: 0.00 tsf
Specimen Area: 6.36 in^2 | Piston Friction: 0.00 lb | Membrane Correction: 0.00 lb/in
Specimen Volume: 38.27 in^3 | Piston Weight: 0.00 lb | Correction Type: Uniform

Liquid Limit: 42 | Plastic Limit: 24 | Measured Specific Gravity: 2.67

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	6.8328	6.8328	0	0.000	1.7924	1.7924	1.000	1.7924	0
2	0.03	7.2441	6.8328	0.21566	0.524	1.9881	1.5767	1.261	1.7824	0.20567
3	0.08	7.3929	6.8328	0.35649	0.637	1.996	1.4359	1.390	1.7159	0.28004
4	0.13	7.4756	6.8328	0.45002	0.700	1.9852	1.3424	1.479	1.6638	0.32142
5	0.17	7.5334	6.8328	0.51768	0.739	1.9753	1.2747	1.550	1.625	0.35031
6	0.22	7.5828	6.8328	0.5705	0.761	1.9719	1.2219	1.614	1.5969	0.37502
7	0.27	7.6239	6.8328	0.61231	0.774	1.9712	1.1801	1.670	1.5757	0.39557
8	0.31	7.6609	6.8328	0.64697	0.781	1.9735	1.1454	1.723	1.5595	0.41404
9	0.36	7.6942	6.8328	0.67558	0.784	1.9782	1.1168	1.771	1.5475	0.4307
10	0.41	7.7275	6.8328	0.69978	0.782	1.9873	1.0926	1.819	1.54	0.44734
11	0.46	7.7566	6.8328	0.72014	0.780	1.9961	1.0723	1.862	1.5342	0.4619
12	0.50	7.7839	6.8328	0.73774	0.776	2.0058	1.0547	1.902	1.5302	0.47557
13	0.55	7.8118	6.8328	0.7526	0.769	2.0188	1.0398	1.942	1.5293	0.48951
14	0.65	7.8693	6.8328	0.7768	0.749	2.0521	1.0156	2.021	1.5338	0.51825
15	0.74	7.9237	6.8328	0.79496	0.729	2.0883	0.99744	2.094	1.5429	0.54543
16	0.84	7.9715	6.8328	0.69703	0.612	2.2341	1.0954	2.040	1.6647	0.56936
17	0.93	8.0287	6.8328	0.79881	0.668	2.1895	0.99359	2.204	1.5915	0.59796
18	1.02	8.0822	6.8328	0.79881	0.639	2.243	0.99359	2.258	1.6183	0.62472
19	1.12	8.1321	6.8328	0.80101	0.616	2.2907	0.99139	2.311	1.641	0.64966
20	1.21	8.1854	6.8328	0.80156	0.593	2.3435	0.99084	2.365	1.6672	0.67632
21	1.31	8.2369	6.8328	0.79936	0.569	2.3971	0.99304	2.414	1.6951	0.70204
22	1.40	8.287	6.8328	0.79771	0.549	2.4489	0.99469	2.462	1.7218	0.7271
23	1.49	8.3365	6.8328	0.79331	0.528	2.5028	0.99909	2.505	1.751	0.75187
24	1.59	8.3876	6.8328	0.7878	0.507	2.5594	1.0046	2.548	1.782	0.7774
25	1.69	8.4392	6.8328	0.779	0.485	2.6198	1.0134	2.585	1.8166	0.80319
26	1.79	8.4872	6.8328	0.76965	0.465	2.6772	1.0227	2.618	1.8499	0.82721
27	1.88	8.534	6.8328	0.75975	0.447	2.7338	1.0326	2.647	1.8832	0.85058
28	1.98	8.5806	6.8328	0.74874	0.428	2.7914	1.0436	2.675	1.9175	0.87389
29	2.08	8.6254	6.8328	0.73664	0.411	2.8483	1.0558	2.698	1.952	0.89628
30	2.17	8.6683	6.8328	0.72564	0.395	2.9023	1.0668	2.721	1.9845	0.91776
31	2.27	8.7135	6.8328	0.71188	0.379	2.9612	1.0805	2.741	2.0209	0.94034
32	2.56	8.8324	6.8328	0.66787	0.334	3.1241	1.1245	2.778	2.1243	0.99978
33	2.84	8.9494	6.8328	0.62331	0.294	3.2856	1.1691	2.810	2.2274	1.0583
34	3.12	9.0543	6.8328	0.58095	0.262	3.433	1.2114	2.834	2.3222	1.1108
35	3.41	9.1562	6.8328	0.5672	0.244	3.5486	1.2252	2.896	2.3869	1.1617
36	3.69	9.2545	6.8328	0.52209	0.216	3.692	1.2703	2.906	2.4811	1.2108
37	3.98	9.3487	6.8328	0.47862	0.190	3.8297	1.3138	2.915	2.5717	1.258
38	4.27	9.4383	6.8328	0.43571	0.167	3.9622	1.3567	2.921	2.6595	1.3028
39	4.56	9.5201	6.8328	0.3939	0.147	4.0858	1.3985	2.922	2.7421	1.3437
40	4.84	9.6003	6.8328	0.35429	0.128	4.2056	1.4381	2.924	2.8218	1.3837
41	5.13	9.672	6.8328	0.31358	0.110	4.318	1.4788	2.920	2.8984	1.4196
42	5.41	9.7494	6.8328	0.27562	0.095	4.4333	1.5168	2.923	2.9751	1.4583
43	5.70	9.8222	6.8328	0.23546	0.079	4.5463	1.5569	2.920	3.0516	1.4947
44	5.99	9.8912	6.8328	0.1997	0.065	4.6511	1.5927	2.920	3.1219	1.5292
45	6.28	9.9525	6.8328	0.16504	0.053	4.747	1.6274	2.917	3.1872	1.5598
46	6.57	10.016	6.8328	0.13093	0.041	4.8452	1.6615	2.916	3.2533	1.5918
47	6.86	10.078	6.8328	0.098476	0.030	4.9391	1.6939	2.916	3.3165	1.6226
48	7.14	10.134	6.8328	0.068218	0.021	5.0256	1.7242	2.915	3.3749	1.6507
49	7.43	10.19	6.8328	0.03796	0.011	5.1113	1.7544	2.913	3.4328	1.6784
50	7.71	10.22	6.8328	0.0088023	0.003	5.1707	1.7836	2.899	3.4771	1.6935
51	7.99	10.285	6.8328	-0.019255	-0.006	5.2642	1.8116	2.906	3.5379	1.7263
52	8.28	10.331	6.8328	-0.046212	-0.013	5.337	1.8386	2.903	3.5878	1.7492
53	8.57	10.382	6.8328	-0.069868	-0.020	5.4114	1.8623	2.906	3.6368	1.7746
54	8.87	10.425	6.8328	-0.094625	-0.026	5.4795	1.887	2.904	3.6832	1.7962
55	9.16	10.472	6.8328	-0.11883	-0.033	5.5509	1.9112	2.904	3.731	1.8198
56	9.45	10.5	6.8328	-0.13919	-0.038	5.599	1.9316	2.899	3.7653	1.8337
57	9.73	10.548	6.8328	-0.15954	-0.043	5.6673	1.9519	2.903	3.8096	1.8577
58	10.02	10.591	6.8328	-0.18155	-0.048	5.7324	1.9739	2.904	3.8532	1.8792
59	10.30	10.621	6.8328	-0.20135	-0.053	5.7816	1.9937	2.900	3.8877	1.8939
60	10.58	10.659	6.8328	-0.22116	-0.058	5.8393	2.0136	2.900	3.9264	1.9129
61	10.88	10.696	6.8328	-0.23986	-0.062	5.8958	2.0323	2.901	3.964	1.9318
62	11.17	10.728	6.8328	-0.25912	-0.067	5.9468	2.0515	2.899	3.9991	1.9476
63	11.46	10.763	6.8328	-0.27782	-0.071	6.0001	2.0702	2.898	4.0351	1.9649
64	11.74	10.793	6.8328	-0.29323	-0.074	6.0458	2.0856	2.899	4.0657	1.9801
65	12.03	10.834	6.8328	-0.31248	-0.078	6.1061	2.1049	2.901	4.1055	2.0006
66	12.31	10.849	6.8328	-0.33064	-0.082	6.1395	2.123	2.892	4.1313	2.0083
67	12.59	10.885	6.8328	-0.34604	-0.085	6.1903	2.1384	2.895	4.1643	2.0259
68	12.88	10.916	6.8328	-0.36089	-0.088	6.2362	2.1533	2.896	4.1948	2.0415
69	13.17	10.939	6.8328	-0.3752	-0.091	6.2739	2.1676	2.894	4.2208	2.0532
70	13.46	10.969	6.8328	-0.38785	-0.094	6.316	2.1802	2.897	4.2481	2.0679
71	13.76	10.992	6.8328	-0.4016	-0.097	6.3531	2.194	2.896	4.2735	2.0795
72	14.04	11.016	6.8328	-0.41536	-0.099	6.3914	2.2078	2.895	4.2996	2.0918
73	14.32	11.042	6.8328	-0.43076	-0.102	6.4328	2.2232	2.894	4.328	2.1048
74	14.61	11.053	6.8328	-0.44507	-0.105	6.4574	2.2375	2.886	4.3474	2.11
75	14.90	11.084	6.8328	-0.45882	-0.108	6.5029	2.2512	2.889	4.377	2.1258
76	15.19	11.108	6.8328	-0.47422	-0.111	6.5419	2.2666	2.886	4.4043	2.1376
77	15.43	11.122	6.8328	-0.48523	-0.113	6.5665	2.2776	2.883	4.4221	2.1444

TRIAXIAL COMPRESSION TEST REPORT





Symbol		⏲	△	⊡	
Test No.		7 PSI	13.9 PSI	20.8 PSI	
Initial	Diameter, in	2.8457	2.8382	2.837	
	Height, in	5.9839	5.9646	5.7075	
	Water Content, %	13.01	13.76	17.65	
	Dry Density, pcf	117.3	118.	109.8	
	Saturation, %	83.50	90.24	92.02	
	Void Ratio	0.41352	0.40495	0.50912	
Before Shear	Water Content, %	15.40	14.54	18.60	
	Dry Density, pcf	117.7	119.6	111.	
	Saturation, %	100.00	100.00	100.00	
	Void Ratio	0.40877	0.3861	0.49381	
	Back Press., tsf	5.046	5.0443	5.0958	
Minor Prin. Stress, tsf		0.49798	0.99651	1.4418	
Max. Dev. Stress, tsf		3.6849	7.0909	7.9769	
Time to Failure, min		770.98	772.22	773.86	
Strain Rate, %/min		0.02	0.02	0.02	
B-Value		.97	.95	.99	
Measured Specific Gravity		2.65	2.65	2.65	
Liquid Limit		27	27	27	
Plastic Limit		11	11	11	
Plasticity Index		16	16	16	

Project: COLETO CREEK FACILITY

Location: IPR-GDF SUEZ

Project No.: 60225561

Boring No.: B-4-1 S-7

Sample Type: 3" ST

Failure Sketch

Description: F-M SAND LITTLE CLAY TRACE SILT - BROWNISH GRAY SC

Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D 4767

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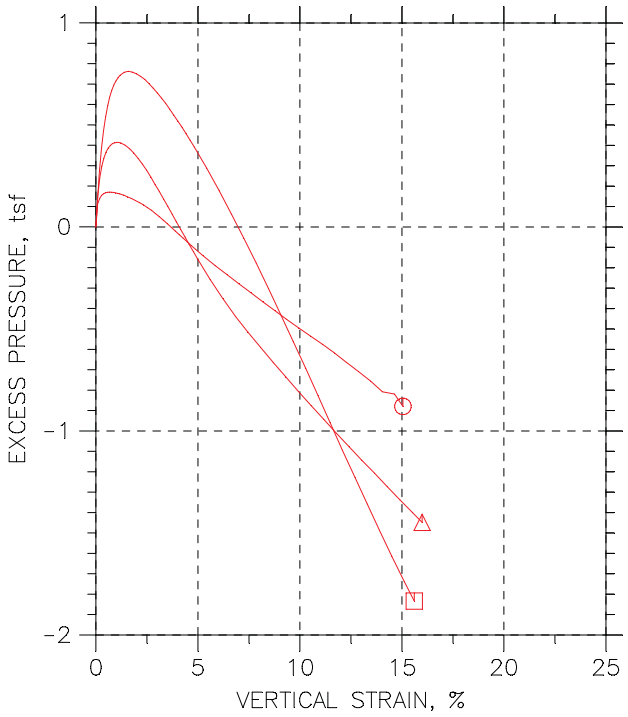
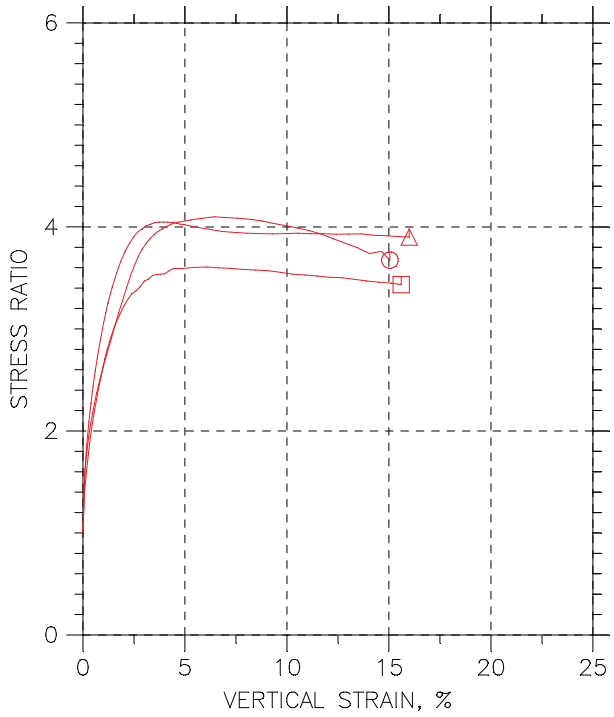
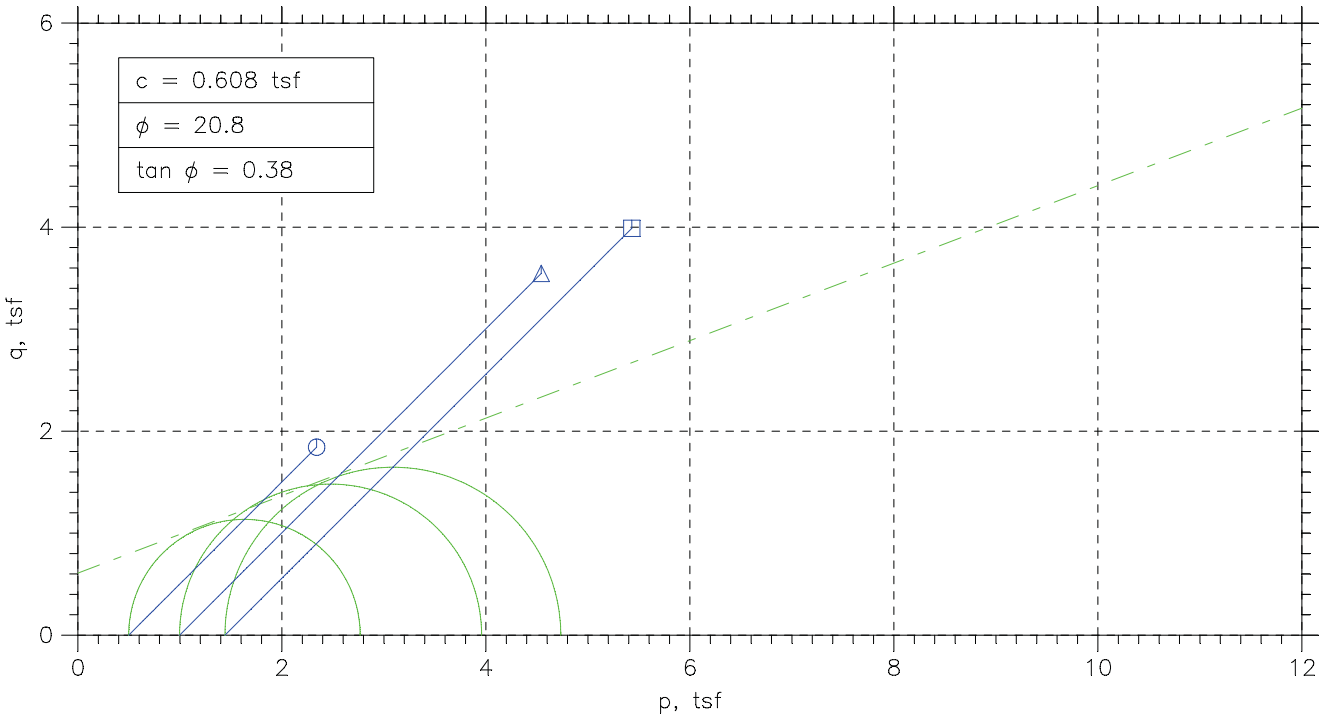
TRIAXIAL COMPRESSION TEST REPORT







Project: COLETO CREEK FACILITY	Location: IPR-GDF SUEZ	Project No.: 60225561
Boring No.: B-4-1 S-7	Tested By: BCM	Checked By: WPQ
Sample No.: S-7	Test Date: 12/1/11	Depth: 12.0'-14.0'
Test No.: B-4-1 S-7	Sample Type: 3" ST	Elevation: ----
Description: F-M SAND LITTLE CLAY TRACE SILT - BROWNISH GRAY SC		
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D 4767		

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TRIAXIAL TEST

Project: COLETO CREEK FACILITY
Location: IPR-GDF SUEZ
Project No.: 60225561
Boring No.: B-4-1 S-7
Tested By: BCM
Checked By: WPQ
Sample No.: S-7
Test Date: 12/1/11
Depth: 12.0'-14.0'
Test No.: 7 PSI
Sample Type: 3" ST
Elevation: ----

Soil Description: F-M SAND LITTLE CLAY TRACE SILT - BROWNISH GRAY SC
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D 4767

Specimen Height: 5.98 in
Piston Area: 0.00 in^2
Filter Strip Correction: 0.00 tsf
Specimen Area: 6.36 in^2
Piston Friction: 0.00 lb
Membrane Correction: 0.00 lb/in
Specimen Volume: 38.06 in^3
Piston Weight: 0.00 lb
Correction Type: Uniform

Liquid Limit: 27
Plastic Limit: 11
Measured Specific Gravity: 2.65

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.36	0	0	5.046	5.544	5.544
2	5	0.086461	6.3655	19.795	0.2239	5.1593	5.544	5.7679
3	10	0.18589	6.3719	24.744	0.2796	5.1856	5.544	5.8236
4	15	0.28388	6.3781	28.64	0.3233	5.2008	5.544	5.8673
5	20	0.38187	6.3844	31.851	0.3592	5.209	5.544	5.9032
6	25	0.47842	6.3906	34.536	0.38911	5.2137	5.544	5.9331
7	30.001	0.57785	6.397	37.116	0.41775	5.216	5.544	5.9618
8	35.001	0.6744	6.4032	40.064	0.4505	5.2166	5.544	5.9945
9	40.001	0.77094	6.4094	42.433	0.47667	5.216	5.544	6.0207
10	45.001	0.86893	6.4158	44.961	0.50456	5.2148	5.544	6.0486
11	50.001	0.96692	6.4221	47.488	0.5324	5.2125	5.544	6.0764
12	55.001	1.0649	6.4285	50.015	0.56017	5.2102	5.544	6.1042
13	60.001	1.1629	6.4349	52.436	0.58671	5.2078	5.544	6.1307
14	70.001	1.3589	6.4476	57.701	0.64434	5.2014	5.544	6.1883
15	80.001	1.5549	6.4605	63.545	0.70819	5.1932	5.544	6.2522
16	90.002	1.7494	6.4733	69.652	0.77472	5.1851	5.544	6.3187
17	100	1.9454	6.4862	75.812	0.84155	5.1751	5.544	6.3855
18	110	2.1399	6.4991	82.287	0.91162	5.1652	5.544	6.4556
19	120	2.333	6.5119	89.026	0.98433	5.1535	5.544	6.5283
20	130	2.5261	6.5248	95.87	1.0579	5.1407	5.544	6.6019
21	140	2.7178	6.5377	102.5	1.1289	5.1278	5.544	6.6729
22	150	2.9109	6.5507	109.3	1.2013	5.1126	5.544	6.7453
23	160	3.1054	6.5639	115.93	1.2716	5.0963	5.544	6.8156
24	170	3.2999	6.5771	122.56	1.3417	5.0793	5.544	6.8857
25	180	3.4959	6.5904	129.2	1.4115	5.0618	5.544	6.9555
26	190	3.6904	6.6037	135.46	1.4769	5.0443	5.544	7.0209
27	200	3.8879	6.6173	141.83	1.5432	5.0262	5.544	7.0872
28	210	4.0838	6.6308	148.15	1.6087	5.0081	5.544	7.1527
29	220	4.2798	6.6444	154.31	1.6721	4.9905	5.544	7.2161
30	230	4.4744	6.6579	160.52	1.7359	4.973	5.544	7.2799
31	240	4.6675	6.6714	166.1	1.7926	4.9555	5.544	7.3366
32	270	5.2482	6.7123	182.69	1.9596	4.9052	5.544	7.5036
33	300	5.839	6.7544	198.8	2.1191	4.8568	5.544	7.6631
34	330	6.4298	6.7971	214.22	2.2692	4.8118	5.544	7.8132
35	360	7.012	6.8396	228.12	2.4014	4.7674	5.544	7.9454
36	390	7.597	6.8829	242.18	2.5333	4.723	5.544	8.0773
37	420	8.1879	6.9272	255.97	2.6605	4.6786	5.544	8.2045
38	450	8.7758	6.9719	269.13	2.7794	4.6354	5.544	8.3234
39	480	9.3565	7.0165	281.45	2.8881	4.5921	5.544	8.4321
40	510	9.943	7.0622	293.66	2.9939	4.5506	5.544	8.5379
41	540	10.532	7.1087	305.19	3.0911	4.5098	5.544	8.6351
42	570	11.116	7.1554	316.25	3.1822	4.47	5.544	8.7262
43	600	11.698	7.2026	326.89	3.2677	4.428	5.544	8.8117
44	630	12.285	7.2508	337.63	3.3526	4.3812	5.544	8.8966
45	660	12.874	7.2998	347.58	3.4282	4.3368	5.544	8.9722
46	690	13.463	7.3495	357.84	3.5056	4.2901	5.544	9.0496
47	720	14.047	7.3994	367.48	3.5757	4.2381	5.544	9.1197
48	750	14.632	7.4501	376.32	3.6369	4.2264	5.544	9.1809
49	770.98	15.049	7.4867	383.16	3.6849	4.1663	5.544	9.2289

TRIAXIAL TEST

Project: COLETO CREEK FACILITY | Location: IPR-GDF SUEZ | Project No.: 60225561
Boring No.: B-4-1 S-7 | Tested By: BCM | Checked By: WPQ
Sample No.: S-7 | Test Date: 12/1/11 | Depth: 12.0'-14.0'
Test No.: 7 PSI | Sample Type: 3" ST | Elevation: ----

Soil Description: F-M SAND LITTLE CLAY TRACE SILT - BROWNISH GRAY SC
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D 4767

Specimen Height: 5.98 in | Piston Area: 0.00 in^2 | Filter Strip Correction: 0.00 tsf
Specimen Area: 6.36 in^2 | Piston Friction: 0.00 lb | Membrane Correction: 0.00 lb/in
Specimen Volume: 38.06 in^3 | Piston Weight: 0.00 lb | Correction Type: Uniform

Liquid Limit: 27 | Plastic Limit: 11 | Measured Specific Gravity: 2.65

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	5.544	5.544	0	0.000	0.49798	0.49798	1.000	0.49798	0
2	0.09	5.7679	5.544	0.11333	0.506	0.60855	0.38465	1.582	0.4966	0.11195
3	0.19	5.8236	5.544	0.13962	0.499	0.63796	0.35836	1.780	0.49816	0.1398
4	0.28	5.8673	5.544	0.1548	0.479	0.66648	0.34317	1.942	0.50483	0.16165
5	0.38	5.9032	5.544	0.16298	0.454	0.6942	0.335	2.072	0.5146	0.1796
6	0.48	5.9331	5.544	0.16766	0.431	0.71943	0.33032	2.178	0.52488	0.19455
7	0.58	5.9618	5.544	0.16999	0.407	0.74574	0.32799	2.274	0.53686	0.20888
8	0.67	5.9945	5.544	0.17058	0.379	0.7779	0.3274	2.376	0.55265	0.22525
9	0.77	6.0207	5.544	0.16999	0.357	0.80466	0.32799	2.453	0.56632	0.23834
10	0.87	6.0486	5.544	0.16882	0.335	0.83372	0.32915	2.533	0.58144	0.25228
11	0.97	6.0764	5.544	0.16649	0.313	0.86389	0.33149	2.606	0.59769	0.2662
12	1.06	6.1042	5.544	0.16415	0.293	0.894	0.33383	2.678	0.61391	0.28009
13	1.16	6.1307	5.544	0.16181	0.276	0.92288	0.33616	2.745	0.62952	0.29336
14	1.36	6.1883	5.544	0.15539	0.241	0.98693	0.34259	2.881	0.66476	0.32217
15	1.55	6.2522	5.544	0.14721	0.208	1.059	0.35077	3.019	0.70486	0.35409
16	1.75	6.3187	5.544	0.13903	0.179	1.1337	0.35895	3.158	0.7463	0.38736
17	1.95	6.3855	5.544	0.1291	0.153	1.2104	0.36888	3.281	0.78965	0.42077
18	2.14	6.4556	5.544	0.11917	0.131	1.2904	0.37881	3.407	0.83462	0.45581
19	2.33	6.5283	5.544	0.10749	0.109	1.3748	0.39049	3.521	0.88265	0.49216
20	2.53	6.6019	5.544	0.094635	0.089	1.4612	0.40334	3.623	0.93229	0.52895
21	2.72	6.6729	5.544	0.081783	0.072	1.5451	0.4162	3.712	0.98063	0.56444
22	2.91	6.7453	5.544	0.066595	0.055	1.6327	0.43138	3.785	1.032	0.60064
23	3.11	6.8156	5.544	0.050238	0.040	1.7194	0.44774	3.840	1.0836	0.63582
24	3.30	6.8857	5.544	0.033297	0.025	1.8064	0.46468	3.887	1.1355	0.67085
25	3.50	6.9555	5.544	0.015772	0.011	1.8937	0.48221	3.927	1.1879	0.70573
26	3.69	7.0209	5.544	-0.0017525	-0.001	1.9766	0.49973	3.955	1.2382	0.73846
27	3.89	7.0872	5.544	-0.019862	-0.013	2.061	0.51784	3.980	1.2894	0.7716
28	4.08	7.1527	5.544	-0.037971	-0.024	2.1446	0.53595	4.002	1.3403	0.80433
29	4.28	7.2161	5.544	-0.055496	-0.033	2.2256	0.55347	4.021	1.3895	0.83606
30	4.47	7.2799	5.544	-0.073021	-0.042	2.3069	0.571	4.040	1.4389	0.86795
31	4.67	7.3366	5.544	-0.090546	-0.051	2.3811	0.58852	4.046	1.4848	0.89631
32	5.25	7.5036	5.544	-0.14078	-0.072	2.5983	0.63876	4.068	1.6186	0.97979
33	5.84	7.6631	5.544	-0.18927	-0.089	2.8063	0.68725	4.083	1.7468	1.0595
34	6.43	7.8132	5.544	-0.23425	-0.103	3.0014	0.73223	4.099	1.8668	1.1346
35	7.01	7.9454	5.544	-0.27865	-0.116	3.178	0.77663	4.092	1.9773	1.2007
36	7.60	8.0773	5.544	-0.32304	-0.128	3.3543	0.82102	4.086	2.0877	1.2667
37	8.19	8.2045	5.544	-0.36744	-0.138	3.5259	0.86542	4.074	2.1957	1.3302
38	8.78	8.3234	5.544	-0.41067	-0.148	3.688	0.90865	4.059	2.2983	1.3897
39	9.36	8.4321	5.544	-0.4539	-0.157	3.84	0.95187	4.034	2.3959	1.4441
40	9.94	8.5379	5.544	-0.49537	-0.165	3.9873	0.99335	4.014	2.4903	1.497
41	10.53	8.6351	5.544	-0.53626	-0.173	4.1254	1.0342	3.989	2.5798	1.5456
42	11.12	8.7262	5.544	-0.57599	-0.181	4.2562	1.074	3.963	2.6651	1.5911
43	11.70	8.8117	5.544	-0.61805	-0.189	4.3837	1.116	3.928	2.7499	1.6338
44	12.28	8.8966	5.544	-0.66478	-0.198	4.5154	1.1628	3.883	2.8391	1.6763
45	12.87	8.9722	5.544	-0.70918	-0.207	4.6354	1.2072	3.840	2.9213	1.7141
46	13.46	9.0496	5.544	-0.75591	-0.216	4.7595	1.2539	3.796	3.0067	1.7528
47	14.05	9.1197	5.544	-0.8079	-0.226	4.8816	1.3059	3.738	3.0937	1.7879
48	14.63	9.1809	5.544	-0.81958	-0.225	4.9544	1.3176	3.760	3.136	1.8184
49	15.05	9.2289	5.544	-0.87975	-0.239	5.0627	1.3777	3.675	3.2202	1.8425

TRIAXIAL TEST

Project: COLETO CREEK FACILITY | Location: IPR-GDF SUEZ | Project No.: 60225561
Boring No.: B-4-1 S-7 | Tested By: BCM | Checked By: WPQ
Sample No.: S-7 | Test Date: 12/1/11 | Depth: 12.0'-14.0'
Test No.: 13.9 PSI | Sample Type: 3" ST | Elevation: ----

Soil Description: F-M SAND LITTLE CLAY TRACE SILT - BROWNISH GRAY SC
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D 4767

Specimen Height: 5.96 in | Piston Area: 0.00 in^2 | Filter Strip Correction: 0.00 tsf
Specimen Area: 6.33 in^2 | Piston Friction: 0.00 lb | Membrane Correction: 0.00 lb/in
Specimen Volume: 37.74 in^3 | Piston Weight: 0.00 lb | Correction Type: Uniform

Liquid Limit: 27 | Plastic Limit: 11 | Measured Specific Gravity: 2.65

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.3266	0	0	5.0443	6.0408	6.0408
2	5.0001	0.088226	6.3322	42.594	0.48432	5.1902	6.0408	6.5251
3	10	0.18929	6.3386	57.838	0.65698	5.2828	6.0408	6.6978
4	15	0.29035	6.3451	67.028	0.76059	5.3416	6.0408	6.8014
5	20	0.39301	6.3516	74.03	0.83918	5.381	6.0408	6.88
6	25	0.49407	6.358	79.864	0.9044	5.4104	6.0408	6.9452
7	30.001	0.59834	6.3647	85.335	0.96534	5.4304	6.0408	7.0061
8	35.001	0.7026	6.3714	90.44	1.022	5.4431	6.0408	7.0628
9	40.001	0.80687	6.3781	95.837	1.0819	5.4526	6.0408	7.1227
10	45.001	0.91274	6.3849	101.02	1.1391	5.4565	6.0408	7.1799
11	50.001	1.0154	6.3915	106.41	1.1987	5.4587	6.0408	7.2395
12	55.001	1.1213	6.3984	111.81	1.2582	5.4581	6.0408	7.299
13	60.001	1.2223	6.4049	117.43	1.32	5.4554	6.0408	7.3608
14	70.001	1.4357	6.4188	128	1.4358	5.4448	6.0408	7.4766
15	80.002	1.649	6.4327	139.67	1.5633	5.4271	6.0408	7.6041
16	90.002	1.8576	6.4464	151.49	1.692	5.406	6.0408	7.7328
17	100	2.0661	6.4601	163.52	1.8225	5.3805	6.0408	7.8633
18	110	2.273	6.4738	175.56	1.9525	5.3527	6.0408	7.9933
19	120	2.4816	6.4876	187.81	2.0843	5.3222	6.0408	8.1251
20	130	2.6885	6.5014	200.21	2.2172	5.2895	6.0408	8.258
21	140	2.8954	6.5153	212.32	2.3463	5.2534	6.0408	8.3871
22	150	3.1056	6.5294	224.42	2.4747	5.219	6.0408	8.5155
23	160	3.3157	6.5436	236.46	2.6018	5.1813	6.0408	8.6426
24	170	3.5242	6.5577	248.35	2.7267	5.1441	6.0408	8.7675
25	180	3.736	6.5722	259.8	2.8461	5.107	6.0408	8.8869
26	190	3.9461	6.5865	270.88	2.9611	5.0693	6.0408	9.0019
27	200	4.1563	6.601	281.75	3.0732	5.0321	6.0408	9.114
28	210	4.3648	6.6154	292.4	3.1824	4.9949	6.0408	9.2232
29	220	4.5717	6.6297	302.54	3.2856	4.9583	6.0408	9.3264
30	230	4.7787	6.6441	312.53	3.3868	4.9222	6.0408	9.4276
31	240	4.984	6.6585	322.3	3.4851	4.8873	6.0408	9.5259
32	270	5.6016	6.7021	349.8	3.7579	4.7863	6.0408	9.7987
33	300	6.224	6.7465	375.84	4.011	4.6926	6.0408	10.052
34	330	6.8335	6.7907	399.69	4.2378	4.6066	6.0408	10.279
35	360	7.4495	6.8359	422.95	4.4548	4.5289	6.0408	10.496
36	390	8.0687	6.8819	445.56	4.6616	4.454	6.0408	10.702
37	420	8.6911	6.9288	468.98	4.8733	4.3803	6.0408	10.914
38	450	9.3087	6.976	492.1	5.079	4.3087	6.0408	11.12
39	480	9.9279	7.024	516.31	5.2925	4.2377	6.0408	11.333
40	510	10.552	7.073	540.67	5.5038	4.1678	6.0408	11.545
41	540	11.176	7.1226	563.06	5.6918	4.1007	6.0408	11.733
42	570	11.797	7.1728	587.2	5.8943	4.0319	6.0408	11.935
43	600	12.416	7.2235	609.6	6.0761	3.9659	6.0408	12.117
44	630	13.033	7.2748	633.59	6.2708	3.9004	6.0408	12.312
45	660	13.659	7.3275	657.66	6.4622	3.8366	6.0408	12.503
46	690	14.283	7.3808	679.18	6.6254	3.7706	6.0408	12.666
47	720	14.902	7.4345	701.93	6.7979	3.7068	6.0408	12.839
48	750	15.525	7.4893	724.47	6.9648	3.643	6.0408	13.006
49	772.22	15.991	7.5309	741.68	7.0909	3.5959	6.0408	13.132

TRIAXIAL TEST

Project: COLETO CREEK FACILITY
Boring No.: B-4-1 S-7
Sample No.: S-7
Test No.: 13.9 PSI

Location: IPR-GDF SUEZ
Tested By: BCM
Test Date: 12/1/11
Sample Type: 3" ST

Project No.: 60225561
Checked By: WPQ
Depth: 12.0'-14.0'
Elevation: ----

Soil Description: F-M SAND LITTLE CLAY TRACE SILT - BROWNISH GRAY SC
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D 4767

Specimen Height: 5.96 in
Specimen Area: 6.33 in^2
Specimen Volume: 37.74 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 27

Plastic Limit: 11

Measured Specific Gravity: 2.65

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	6.0408	6.0408	0	0.000	0.99651	0.99651	1.000	0.99651	0
2	0.09	6.5251	6.0408	0.1459	0.301	1.3349	0.85061	1.569	1.0928	0.24216
3	0.19	6.6978	6.0408	0.23854	0.363	1.4149	0.75797	1.867	1.0865	0.32849
4	0.29	6.8014	6.0408	0.29734	0.391	1.4598	0.69917	2.088	1.0795	0.3803
5	0.39	6.88	6.0408	0.33673	0.401	1.499	0.65978	2.272	1.0794	0.41959
6	0.49	6.9452	6.0408	0.36613	0.405	1.5348	0.63038	2.435	1.0826	0.4522
7	0.60	7.0061	6.0408	0.3861	0.400	1.5757	0.61041	2.581	1.0931	0.48267
8	0.70	7.0628	6.0408	0.39886	0.390	1.6197	0.59765	2.710	1.1087	0.51101
9	0.81	7.1227	6.0408	0.40829	0.377	1.6701	0.58822	2.839	1.1292	0.54094
10	0.91	7.1799	6.0408	0.41217	0.362	1.7235	0.58434	2.949	1.1539	0.56956
11	1.02	7.2395	6.0408	0.41439	0.346	1.7809	0.58212	3.059	1.1815	0.59937
12	1.12	7.299	6.0408	0.41384	0.329	1.8409	0.58267	3.159	1.2118	0.62909
13	1.22	7.3608	6.0408	0.41107	0.311	1.9055	0.58545	3.255	1.2455	0.66002
14	1.44	7.4766	6.0408	0.40053	0.279	2.0318	0.59599	3.409	1.3139	0.7179
15	1.65	7.6041	6.0408	0.38277	0.245	2.1771	0.61374	3.547	1.3954	0.78166
16	1.86	7.7328	6.0408	0.36169	0.214	2.3268	0.63482	3.665	1.4808	0.84599
17	2.07	7.8633	6.0408	0.33617	0.184	2.4828	0.66034	3.760	1.5716	0.91125
18	2.27	7.9933	6.0408	0.30844	0.158	2.6406	0.68807	3.838	1.6643	0.97625
19	2.48	8.1251	6.0408	0.27793	0.133	2.8029	0.71858	3.901	1.7607	1.0422
20	2.69	8.258	6.0408	0.2452	0.111	2.9685	0.75131	3.951	1.8599	1.1086
21	2.90	8.3871	6.0408	0.20914	0.089	3.1337	0.78737	3.980	1.9605	1.1731
22	3.11	8.5155	6.0408	0.17474	0.071	3.2965	0.82177	4.011	2.0591	1.2374
23	3.32	8.6426	6.0408	0.13702	0.053	3.4613	0.85949	4.027	2.1604	1.3009
24	3.52	8.7675	6.0408	0.099854	0.037	3.6233	0.89666	4.041	2.26	1.3633
25	3.74	8.8869	6.0408	0.062686	0.022	3.78	0.93383	4.048	2.3569	1.4231
26	3.95	9.0019	6.0408	0.024963	0.008	3.9327	0.97155	4.048	2.4521	1.4806
27	4.16	9.114	6.0408	-0.012204	-0.004	4.0819	1.0087	4.047	2.5453	1.5366
28	4.36	9.2232	6.0408	-0.049372	-0.016	4.2283	1.0459	4.043	2.6371	1.5912
29	4.57	9.3264	6.0408	-0.085985	-0.026	4.3681	1.0825	4.035	2.7253	1.6428
30	4.78	9.4276	6.0408	-0.12204	-0.036	4.5053	1.1186	4.028	2.8119	1.6934
31	4.98	9.5259	6.0408	-0.15699	-0.045	4.6386	1.1535	4.021	2.8961	1.7426
32	5.60	9.7987	6.0408	-0.25796	-0.069	5.0124	1.2545	3.996	3.1334	1.8789
33	6.22	10.052	6.0408	-0.35171	-0.088	5.3592	1.3482	3.975	3.3537	2.0055
34	6.83	10.279	6.0408	-0.43769	-0.103	5.672	1.4342	3.955	3.5531	2.1189
35	7.45	10.496	6.0408	-0.51536	-0.116	5.9667	1.5119	3.947	3.7393	2.2274
36	8.07	10.702	6.0408	-0.59025	-0.127	6.2483	1.5868	3.938	3.9175	2.3308
37	8.69	10.914	6.0408	-0.66403	-0.136	6.5338	1.6605	3.935	4.0972	2.4367
38	9.31	11.12	6.0408	-0.73559	-0.145	6.8111	1.7321	3.932	4.2716	2.5395
39	9.93	11.333	6.0408	-0.8066	-0.152	7.0956	1.8031	3.935	4.4494	2.6463
40	10.55	11.545	6.0408	-0.8765	-0.159	7.3768	1.873	3.938	4.6249	2.7519
41	11.18	11.733	6.0408	-0.94362	-0.166	7.6319	1.9401	3.934	4.786	2.8459
42	11.80	11.935	6.0408	-1.0124	-0.172	7.9032	2.0089	3.934	4.9561	2.9472
43	12.42	12.117	6.0408	-1.0784	-0.177	8.1511	2.0749	3.928	5.113	3.0381
44	13.03	12.312	6.0408	-1.1439	-0.182	8.4112	2.1404	3.930	5.2758	3.1354
45	13.66	12.503	6.0408	-1.2077	-0.187	8.6664	2.2042	3.932	5.4353	3.2311
46	14.28	12.666	6.0408	-1.2737	-0.192	8.8956	2.2702	3.918	5.5829	3.3127
47	14.90	12.839	6.0408	-1.3375	-0.197	9.1319	2.334	3.913	5.7329	3.3989
48	15.52	13.006	6.0408	-1.4013	-0.201	9.3626	2.3978	3.905	5.8802	3.4824
49	15.99	13.132	6.0408	-1.4484	-0.204	9.5358	2.4449	3.900	5.9904	3.5454

TRIAXIAL TEST

Project: COLETO CREEK FACILITY
Boring No.: B-4-1 S-7
Sample No.: S-7
Test No.: 20.8 PSI

Location: IPR-GDF SUEZ
Tested By: BCM
Test Date: 12/1/11
Sample Type: 3" ST

Project No.: 60225561
Checked By: WPQ
Depth: 12.0'-14.0'
Elevation: ----

Soil Description: F-M SAND LITTLE CLAY TRACE SILT - BROWNISH GRAY SC
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D 4767

Specimen Height: 5.71 in
Specimen Area: 6.32 in^2
Specimen Volume: 36.08 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 27

Plastic Limit: 11

Measured Specific Gravity: 2.65

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.3214	0	0	5.0958	6.5376	6.5376
2	5.0038	0.074905	6.3261	45.054	0.51278	5.2246	6.5376	7.0504
3	10.004	0.17378	6.3324	62.257	0.70787	5.3665	6.5376	7.2455
4	15.004	0.27265	6.3386	72.957	0.82871	5.4806	6.5376	7.3663
5	20.004	0.37303	6.345	80.614	0.91477	5.5686	6.5376	7.4524
6	25.004	0.4749	6.3515	86.279	0.97804	5.636	6.5376	7.5156
7	30	0.57677	6.358	90.422	1.024	5.6898	6.5376	7.5616
8	35	0.67415	6.3643	93.779	1.0609	5.7316	6.5376	7.5985
9	40	0.77752	6.3709	97.975	1.1073	5.7648	6.5376	7.6449
10	45.002	0.87939	6.3774	100.65	1.1363	5.7909	6.5376	7.6739
11	50.003	0.97976	6.3839	104.95	1.1837	5.8104	6.5376	7.7213
12	55.003	1.0801	6.3904	107.84	1.215	5.8262	6.5376	7.7526
13	60.003	1.1835	6.3971	111.51	1.255	5.8387	6.5376	7.7926
14	70.003	1.3842	6.4101	117.22	1.3167	5.8539	6.5376	7.8543
15	80.004	1.5895	6.4235	123.99	1.3898	5.8583	6.5376	7.9274
16	90.004	1.7887	6.4365	130.13	1.4556	5.855	6.5376	7.9932
17	100	1.9925	6.4499	137.42	1.534	5.8463	6.5376	8.0716
18	110	2.1962	6.4633	144.6	1.6108	5.8338	6.5376	8.1484
19	120	2.3955	6.4765	151.58	1.6851	5.8186	6.5376	8.2227
20	130	2.5992	6.4901	158.24	1.7555	5.7979	6.5376	8.2931
21	140	2.8059	6.5039	165.9	1.8365	5.7762	6.5376	8.3741
22	150	3.0097	6.5175	175.55	1.9393	5.7523	6.5376	8.4769
23	160	3.2119	6.5311	182.73	2.0145	5.7278	6.5376	8.5521
24	170	3.4142	6.5448	191.81	2.1101	5.7018	6.5376	8.6477
25	180	3.6119	6.5582	199.36	2.1887	5.6735	6.5376	8.7263
26	190	3.8127	6.5719	206.81	2.2657	5.6442	6.5376	8.8033
27	200	4.0164	6.5859	214.52	2.3452	5.6148	6.5376	8.8828
28	210	4.2187	6.5998	224.32	2.4473	5.5849	6.5376	8.9849
29	220	4.4164	6.6134	234.24	2.5501	5.5534	6.5376	9.0877
30	230	4.6187	6.6275	242.73	2.637	5.5208	6.5376	9.1746
31	240	4.8209	6.6415	250.97	2.7207	5.4876	6.5376	9.2583
32	270	5.4291	6.6843	278.4	2.9988	5.3849	6.5376	9.5364
33	300	6.0389	6.7276	307.61	3.2921	5.2746	6.5376	9.8297
34	330	6.6411	6.771	336.99	3.5833	5.1589	6.5376	10.121
35	360	7.2433	6.815	367.41	3.8816	5.0409	6.5376	10.419
36	390	7.8605	6.8607	398.56	4.1827	4.9187	6.5376	10.72
37	420	8.4643	6.9059	431.13	4.4949	4.7937	6.5376	11.033
38	450	9.0605	6.9512	464.49	4.8112	4.6665	6.5376	11.349
39	480	9.6658	6.9978	497.43	5.118	4.535	6.5376	11.656
40	510	10.283	7.0459	529.79	5.4138	4.4035	6.5376	11.951
41	540	10.887	7.0936	564.88	5.7335	4.2698	6.5376	12.271
42	570	11.48	7.1412	599.97	6.0491	4.1361	6.5376	12.587
43	600	12.084	7.1902	634.95	6.3581	4.0008	6.5376	12.896
44	630	12.699	7.2409	671.35	6.6755	3.8687	6.5376	13.213
45	660	13.303	7.2913	704.92	6.9608	3.7378	6.5376	13.498
46	690	13.902	7.3421	738.01	7.2373	3.6073	6.5376	13.775
47	720	14.505	7.3938	771.63	7.514	3.4807	6.5376	14.052
48	750	15.119	7.4473	805.72	7.7897	3.3563	6.5376	14.327
49	773.86	15.606	7.4903	829.85	7.9769	3.2617	6.5376	14.514

TRIAXIAL TEST

Project: COLETO CREEK FACILITY | Location: IPR-GDF SUEZ | Project No.: 60225561
Boring No.: B-4-1 S-7 | Tested By: BCM | Checked By: WPQ
Sample No.: S-7 | Test Date: 12/1/11 | Depth: 12.0'-14.0'
Test No.: 20.8 PSI | Sample Type: 3" ST | Elevation: ----

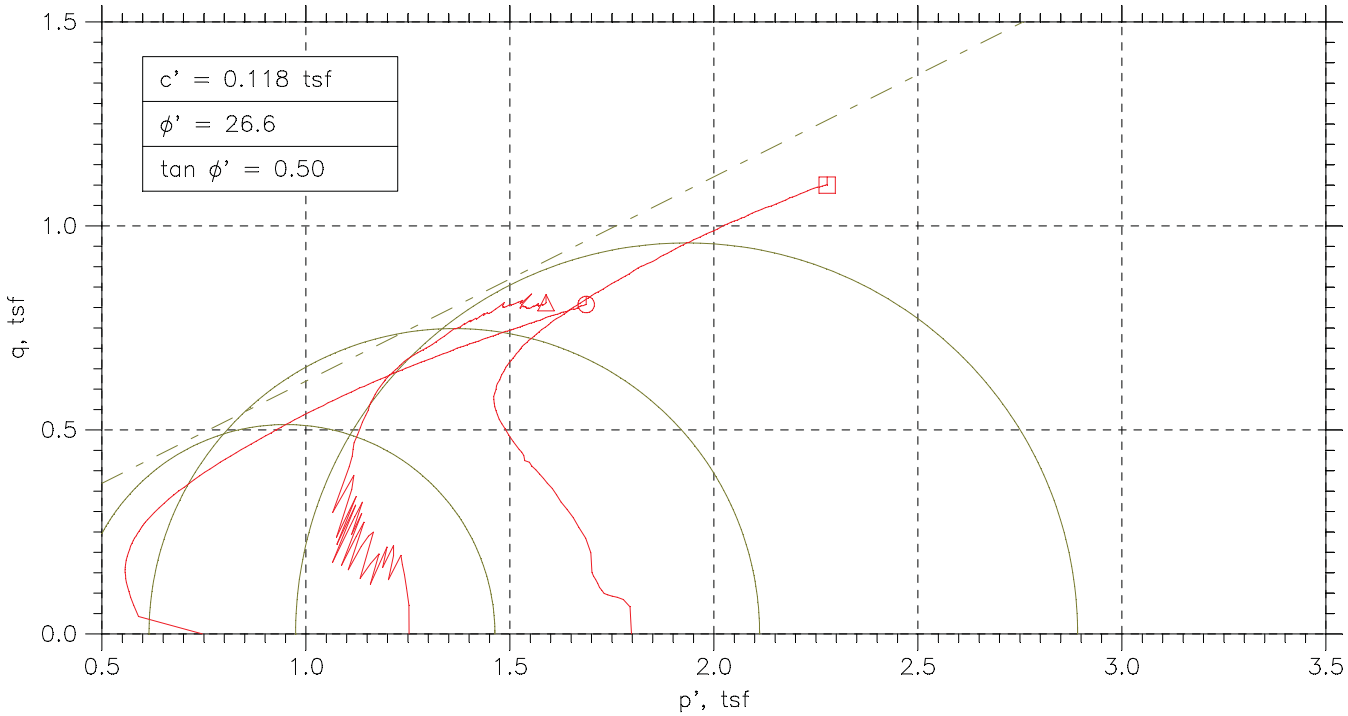
Soil Description: F-M SAND LITTLE CLAY TRACE SILT - BROWNISH GRAY SC
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D 4767

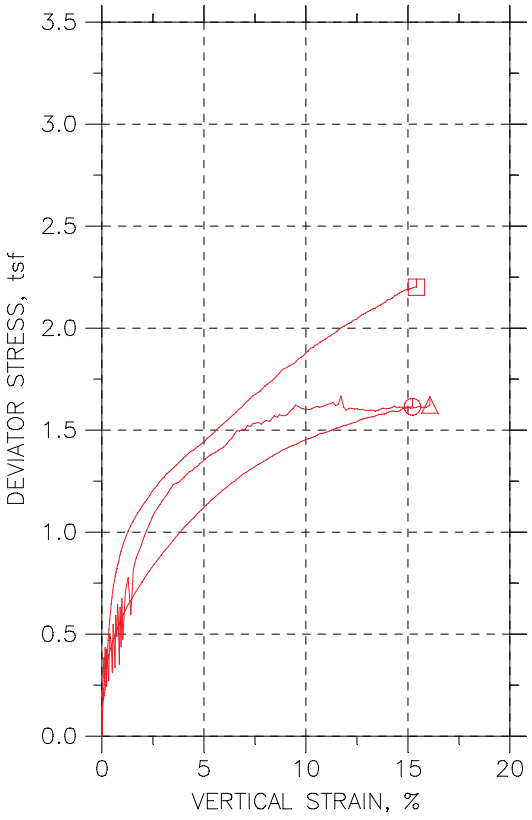
Specimen Height: 5.71 in | Piston Area: 0.00 in^2 | Filter Strip Correction: 0.00 tsf
Specimen Area: 6.32 in^2 | Piston Friction: 0.00 lb | Membrane Correction: 0.00 lb/in
Specimen Volume: 36.08 in^3 | Piston Weight: 0.00 lb | Correction Type: Uniform

Liquid Limit: 27 | Plastic Limit: 11 | Measured Specific Gravity: 2.65

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	6.5376	6.5376	0	0.000	1.4418	1.4418	1.000	1.4418	0
2	0.07	7.0504	6.5376	0.12879	0.251	1.8258	1.313	1.391	1.5694	0.25639
3	0.17	7.2455	6.5376	0.27063	0.382	1.879	1.1711	1.604	1.5251	0.35394
4	0.27	7.3663	6.5376	0.38475	0.464	1.8857	1.057	1.784	1.4714	0.41435
5	0.37	7.4524	6.5376	0.47279	0.517	1.8838	0.96898	1.944	1.4264	0.45738
6	0.47	7.5156	6.5376	0.54018	0.552	1.8796	0.9016	2.085	1.3906	0.48902
7	0.58	7.5616	6.5376	0.59398	0.580	1.8718	0.8478	2.208	1.3598	0.51198
8	0.67	7.5985	6.5376	0.63582	0.599	1.8669	0.80595	2.316	1.3364	0.53047
9	0.78	7.6449	6.5376	0.66897	0.604	1.8801	0.7728	2.433	1.3264	0.55363
10	0.88	7.6739	6.5376	0.69506	0.612	1.883	0.74672	2.522	1.3149	0.56816
11	0.98	7.7213	6.5376	0.71462	0.604	1.9108	0.72715	2.628	1.319	0.59183
12	1.08	7.7526	6.5376	0.73038	0.601	1.9264	0.71139	2.708	1.3189	0.60749
13	1.18	7.7926	6.5376	0.74288	0.592	1.9539	0.69889	2.796	1.3264	0.62751
14	1.38	7.8543	6.5376	0.7581	0.576	2.0004	0.68368	2.926	1.342	0.65834
15	1.59	7.9274	6.5376	0.76244	0.549	2.0691	0.67933	3.046	1.3742	0.69489
16	1.79	7.9932	6.5376	0.75918	0.522	2.1382	0.68259	3.132	1.4104	0.72781
17	1.99	8.0716	6.5376	0.75049	0.489	2.2253	0.69129	3.219	1.4583	0.76699
18	2.20	8.1484	6.5376	0.73799	0.458	2.3146	0.70379	3.289	1.5092	0.80542
19	2.40	8.2227	6.5376	0.72277	0.429	2.4041	0.719	3.344	1.5616	0.84255
20	2.60	8.2931	6.5376	0.70212	0.400	2.4951	0.73965	3.373	1.6174	0.87774
21	2.81	8.3741	6.5376	0.68039	0.370	2.5979	0.76139	3.412	1.6797	0.91827
22	3.01	8.4769	6.5376	0.65647	0.339	2.7246	0.7853	3.469	1.7549	0.96965
23	3.21	8.5521	6.5376	0.63202	0.314	2.8242	0.80976	3.488	1.817	1.0072
24	3.41	8.6477	6.5376	0.60593	0.287	2.9459	0.83584	3.524	1.8909	1.055
25	3.61	8.7263	6.5376	0.57768	0.264	3.0528	0.8641	3.533	1.9584	1.0943
26	3.81	8.8033	6.5376	0.54833	0.242	3.1592	0.89345	3.536	2.0263	1.1329
27	4.02	8.8828	6.5376	0.51898	0.221	3.268	0.92279	3.541	2.0954	1.1726
28	4.22	8.9849	6.5376	0.48909	0.200	3.3999	0.95268	3.569	2.1763	1.2236
29	4.42	9.0877	6.5376	0.45758	0.179	3.5343	0.9842	3.591	2.2593	1.2751
30	4.62	9.1746	6.5376	0.42497	0.161	3.6538	1.0168	3.593	2.3353	1.3185
31	4.82	9.2583	6.5376	0.39182	0.144	3.7707	1.05	3.591	2.4103	1.3604
32	5.43	9.5364	6.5376	0.28911	0.096	4.1515	1.1527	3.602	2.6521	1.4994
33	6.04	9.8297	6.5376	0.17879	0.054	4.5551	1.263	3.607	2.909	1.6461
34	6.64	10.121	6.5376	0.063039	0.018	4.9621	1.3787	3.599	3.1704	1.7917
35	7.24	10.419	6.5376	-0.054887	-0.014	5.3783	1.4967	3.594	3.4375	1.9408
36	7.86	10.72	6.5376	-0.17716	-0.042	5.8017	1.6189	3.584	3.7103	2.0914
37	8.46	11.033	6.5376	-0.30215	-0.067	6.2388	1.7439	3.577	3.9914	2.2475
38	9.06	11.349	6.5376	-0.42932	-0.089	6.6822	1.8711	3.571	4.2767	2.4056
39	9.67	11.656	6.5376	-0.56083	-0.110	7.1206	2.0026	3.556	4.5616	2.559
40	10.28	11.951	6.5376	-0.69234	-0.128	7.5479	2.1341	3.537	4.841	2.7069
41	10.89	12.271	6.5376	-0.82603	-0.144	8.0013	2.2678	3.528	5.1345	2.8667
42	11.48	12.587	6.5376	-0.95971	-0.159	8.4506	2.4015	3.519	5.426	3.0245
43	12.08	12.896	6.5376	-1.095	-0.172	8.8949	2.5368	3.506	5.7159	3.1791
44	12.70	13.213	6.5376	-1.2271	-0.184	9.3444	2.6689	3.501	6.0066	3.3378
45	13.30	13.498	6.5376	-1.3581	-0.195	9.7607	2.7998	3.486	6.2803	3.4804
46	13.90	13.775	6.5376	-1.4885	-0.206	10.168	2.9303	3.470	6.5489	3.6186
47	14.50	14.052	6.5376	-1.6151	-0.215	10.571	3.0569	3.458	6.8139	3.757
48	15.12	14.327	6.5376	-1.7395	-0.223	10.971	3.1813	3.449	7.0762	3.8948
49	15.61	14.514	6.5376	-1.8341	-0.230	11.253	3.2759	3.435	7.2643	3.9884

TRIAXIAL COMPRESSION TEST REPORT





Symbol		⏲	△	⊡	
Test No.		10.4 PSI	17.4 PSI	24.3 PSI	
Initial	Diameter, in	2.722	2.8299	2.6157	
	Height, in	6.0571	5.4106	5.9323	
	Water Content, %	5.02	7.46	5.91	
	Dry Density, pcf	121.2	121.3	120.9	
	Saturation, %	36.18	53.82	42.11	
	Void Ratio	0.36923	0.3684	0.37292	
Before Shear	Water Content, %	13.55	13.79	12.58	
	Dry Density, pcf	122.	121.5	124.4	
	Saturation, %	100.00	100.00	100.00	
	Void Ratio	0.36021	0.36668	0.33456	
	Back Press., tsf	5.0425	5.0399	5.042	
Minor Prin. Stress, tsf		0.74626	1.2529	1.798	
Max. Dev. Stress, tsf		1.6147	1.6669	2.202	
Time to Failure, min		3930	2700	3930	
Strain Rate, %/min		0.006	0.006	0.006	
B-Value		.95	.95	.97	
Measured Specific Gravity		2.66	2.66	2.66	
Liquid Limit		40	40	40	
Plastic Limit		24	24	24	
Plasticity Index		16	16	16	

Project: COLETO CREEK FACILITY

Location: IPR-GDF SUEZ

Project No.: 60225561

Boring No.: B-4-1 S-13

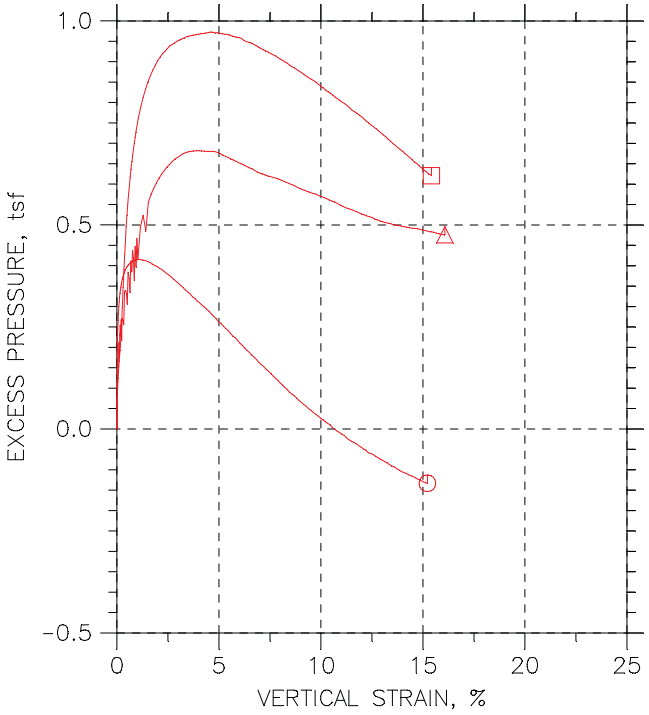
Sample Type: 3" ST

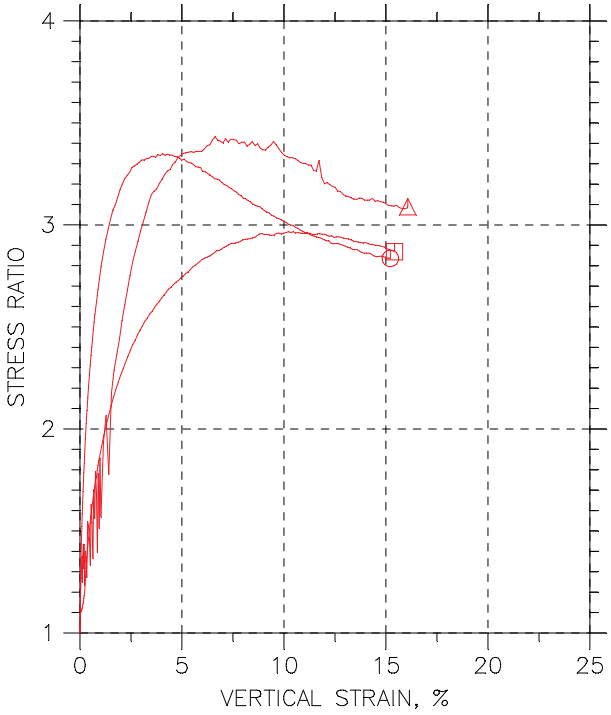
Failure Sketch

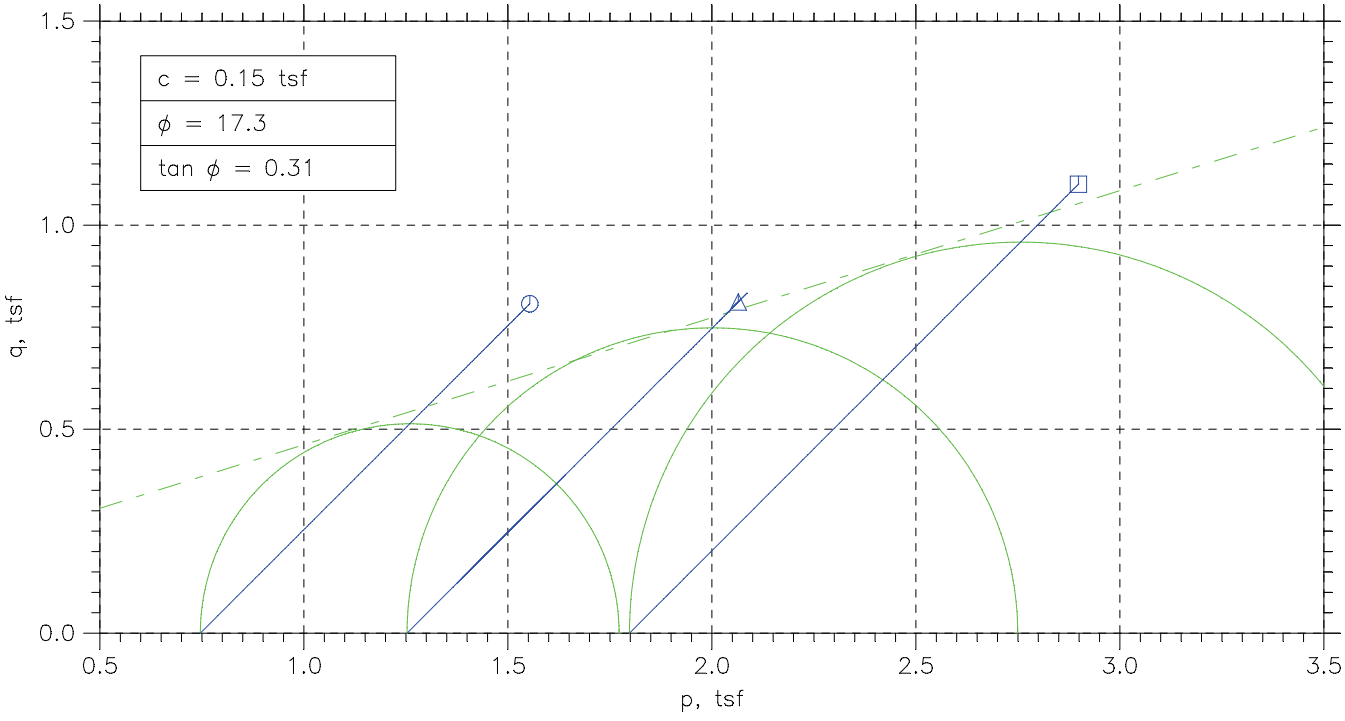
Description: CLAYEY F-C SAND LITTLE SILT - BROWNISH GRAY SC

Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

TRIAXIAL COMPRESSION TEST REPORT







Project: COLETO CREEK FACILITY	Location: IPR-GDF SUEZ	Project No.: 60225561
Boring No.: B-4-1 S-13	Tested By: BCM	Checked By: WPQ
Sample No.: S-13	Test Date: 12/2/11	Depth: 24.0'-26.0'
Test No.: B-4-1 S-13	Sample Type: 3" ST	Elevation: -----
Description: CLAYEY F-C SAND LITTLE SILT - BROWNISH GRAY SC		
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767		

TRIAXIAL TEST

Project: COLETO CREEK FACILITY | Location: IPR-GDF SUEZ | Project No.: 60225561
Boring No.: B-4-1 S-13 | Tested By: BCM | Checked By: WPQ
Sample No.: S-13 | Test Date: 12/2/11 | Depth: 24.0'-26.0'
Test No.: 10.4 PSI | Sample Type: 3" ST | Elevation: -----

Soil Description: CLAYEY F-C SAND LITTLE SILT - BROWNISH GRAY SC
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

Specimen Height: 6.06 in | Piston Area: 0.00 in^2 | Filter Strip Correction: 0.00 tsf
Specimen Area: 5.82 in^2 | Piston Friction: 0.00 lb | Membrane Correction: 0.00 lb/in
Specimen Volume: 35.25 in^3 | Piston Weight: 0.00 lb | Correction Type: Uniform

Liquid Limit: 40 | Plastic Limit: 24 | Measured Specific Gravity: 2.66

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	5.8194	0	0	5.0425	5.7888	5.7888
2	5.0041	0.017083	5.8204	6.8968	0.085314	5.2419	5.7888	5.8741
3	10	0.037013	5.8216	11.372	0.14064	5.2811	5.7888	5.9294
4	15	0.056944	5.8228	14.478	0.17902	5.308	5.7888	5.9678
5	20	0.075451	5.8238	16.9	0.20893	5.3273	5.7888	5.9977
6	25	0.093957	5.8249	18.795	0.23232	5.3425	5.7888	6.0211
7	30	0.11389	5.8261	20.48	0.25309	5.3553	5.7888	6.0419
8	35.001	0.13239	5.8272	21.901	0.27061	5.3658	5.7888	6.0594
9	40.001	0.1509	5.8282	23.27	0.28747	5.3746	5.7888	6.0763
10	45.001	0.17083	5.8294	24.428	0.30172	5.3828	5.7888	6.0905
11	50.001	0.19076	5.8306	25.481	0.31466	5.3892	5.7888	6.1035
12	55.001	0.21069	5.8317	26.481	0.32695	5.3951	5.7888	6.1157
13	60.001	0.2292	5.8328	27.482	0.33923	5.4003	5.7888	6.128
14	70.001	0.26764	5.8351	29.272	0.36119	5.4097	5.7888	6.15
15	80.001	0.3075	5.8374	30.904	0.38118	5.4173	5.7888	6.17
16	90.002	0.34593	5.8396	32.325	0.39856	5.4231	5.7888	6.1874
17	100	0.38579	5.842	33.694	0.41527	5.4284	5.7888	6.2041
18	110	0.42281	5.8441	34.905	0.43003	5.4337	5.7888	6.2188
19	120	0.46124	5.8464	36.063	0.44413	5.4372	5.7888	6.2329
20	130	0.50111	5.8487	37.116	0.45691	5.4407	5.7888	6.2457
21	140	0.54097	5.8511	38.169	0.46969	5.4436	5.7888	6.2585
22	150	0.5794	5.8534	39.117	0.48116	5.4454	5.7888	6.27
23	160	0.61784	5.8556	40.012	0.49198	5.4477	5.7888	6.2808
24	170	0.65628	5.8579	40.907	0.50279	5.4494	5.7888	6.2916
25	180	0.69471	5.8602	41.802	0.51359	5.4512	5.7888	6.3024
26	190	0.73457	5.8625	42.644	0.52373	5.453	5.7888	6.3125
27	200	0.77159	5.8647	43.276	0.53129	5.4541	5.7888	6.3201
28	210	0.81145	5.867	44.013	0.54012	5.4553	5.7888	6.3289
29	220	0.84846	5.8692	44.75	0.54896	5.4565	5.7888	6.3378
30	230	0.8869	5.8715	45.645	0.55973	5.4565	5.7888	6.3485
31	270	1.0406	5.8806	48.593	0.59495	5.4576	5.7888	6.3838
32	300	1.156	5.8875	50.541	0.61808	5.4576	5.7888	6.4069
33	330	1.2713	5.8944	52.489	0.64116	5.4565	5.7888	6.43
34	360	1.3866	5.9013	54.174	0.66096	5.4553	5.7888	6.4498
35	390	1.5005	5.9081	55.911	0.68137	5.453	5.7888	6.4702
36	420	1.6172	5.9151	57.596	0.70107	5.4506	5.7888	6.4899
37	450	1.7325	5.922	59.07	0.71817	5.4465	5.7888	6.507
38	480	1.8492	5.9291	60.702	0.73714	5.4436	5.7888	6.5259
39	510	1.966	5.9361	62.334	0.75606	5.4407	5.7888	6.5449
40	540	2.0841	5.9433	63.966	0.77492	5.4366	5.7888	6.5637
41	570	2.2009	5.9504	65.44	0.79183	5.4331	5.7888	6.5806
42	600	2.3176	5.9575	66.862	0.80806	5.4284	5.7888	6.5969
43	630	2.4358	5.9647	68.388	0.82551	5.4231	5.7888	6.6143
44	660	2.5539	5.972	69.863	0.84229	5.4196	5.7888	6.6311
45	690	2.6721	5.9792	71.179	0.85711	5.4144	5.7888	6.6459
46	720	2.7902	5.9865	72.548	0.87254	5.4091	5.7888	6.6613
47	750	2.9056	5.9936	73.916	0.88795	5.4038	5.7888	6.6767
48	780	3.0223	6.0008	75.285	0.9033	5.3992	5.7888	6.6921
49	810	3.1376	6.0079	76.391	0.91548	5.3939	5.7888	6.7043
50	840	3.2515	6.015	77.707	0.93016	5.3886	5.7888	6.719
51	870	3.3654	6.0221	78.971	0.94417	5.3828	5.7888	6.733
52	900	3.4807	6.0293	80.287	0.95876	5.3781	5.7888	6.7476
53	930	3.5946	6.0364	81.498	0.97207	5.3729	5.7888	6.7609
54	960	3.7085	6.0436	82.656	0.98472	5.3664	5.7888	6.7735
55	990	3.8238	6.0508	84.025	0.99983	5.3623	5.7888	6.7886
56	1020	3.9377	6.058	85.235	1.013	5.3559	5.7888	6.8018
57	1050	4.053	6.0653	86.446	1.0262	5.3518	5.7888	6.815
58	1080	4.1683	6.0726	87.447	1.0368	5.346	5.7888	6.8256
59	1110	4.285	6.08	88.658	1.0499	5.3413	5.7888	6.8387
60	1140	4.4018	6.0874	89.658	1.0604	5.336	5.7888	6.8492
61	1170	4.5185	6.0948	90.816	1.0728	5.3308	5.7888	6.8616
62	1200	4.6352	6.1023	91.974	1.0852	5.3243	5.7888	6.874
63	1230	4.752	6.1098	93.133	1.0975	5.3185	5.7888	6.8863
64	1260	4.8701	6.1174	94.185	1.1085	5.3126	5.7888	6.8973
65	1290	4.9883	6.125	95.238	1.1195	5.3056	5.7888	6.9083
66	1320	5.1064	6.1326	96.502	1.133	5.301	5.7888	6.9218
67	1350	5.2232	6.1402	97.45	1.1427	5.2945	5.7888	6.9315
68	1380	5.3385	6.1476	98.555	1.1543	5.2881	5.7888	6.9431
69	1410	5.4552	6.1552	99.555	1.1645	5.2834	5.7888	6.9533
70	1440	5.5705	6.1627	100.56	1.1748	5.277	5.7888	6.9636
71	1470	5.683	6.1701	101.61	1.1857	5.27	5.7888	6.9745
72	1500	5.7983	6.1776	102.45	1.1941	5.2659	5.7888	6.9829
73	1530	5.9136	6.1852	103.61	1.2061	5.26	5.7888	6.9949
74	1560	6.0275	6.1927	104.35	1.2132	5.2524	5.7888	7.002
75	1590	6.1428	6.2003	105.29	1.2227	5.2477	5.7888	7.0115
76	1620	6.2581	6.2079	106.35	1.2334	5.2413	5.7888	7.0222
77	1650	6.372	6.2155	107.24	1.2423	5.2355	5.7888	7.0311
78	1680	6.4887	6.2233	107.98	1.2493	5.2302	5.7888	7.0381
79	1710	6.6041	6.2309	108.87	1.2581	5.2238	5.7888	7.0469

80	1740	6.7236	6.2389	109.93	1.2686	5.2185	5.7888	7.0574
81	1770	6.8418	6.2468	110.98	1.2791	5.2127	5.7888	7.0679
82	1800	6.9585	6.2547	111.82	1.2872	5.2057	5.7888	7.076
83	1830	7.0767	6.2626	112.56	1.2941	5.1998	5.7888	7.0829
84	1860	7.1948	6.2706	113.45	1.3027	5.1951	5.7888	7.0915
85	1890	7.3144	6.2787	114.24	1.3101	5.1887	5.7888	7.0989
86	1920	7.4326	6.2867	114.98	1.3168	5.184	5.7888	7.1056
87	1950	7.5493	6.2946	115.82	1.3248	5.1776	5.7888	7.1136
88	1980	7.6646	6.3025	116.61	1.3322	5.1723	5.7888	7.121
89	2010	7.7814	6.3105	117.24	1.3377	5.1665	5.7888	7.1265
90	2040	7.8953	6.3183	118.03	1.3451	5.1612	5.7888	7.1339
91	2070	8.0077	6.326	118.72	1.3512	5.1548	5.7888	7.14
92	2100	8.1216	6.3339	119.56	1.3591	5.1501	5.7888	7.1479
93	2130	8.2369	6.3418	120.35	1.3664	5.1443	5.7888	7.1552
94	2160	8.3522	6.3498	121.09	1.373	5.139	5.7888	7.1618
95	2190	8.4647	6.3576	121.77	1.3791	5.1326	5.7888	7.1679
96	2220	8.58	6.3656	122.56	1.3863	5.1279	5.7888	7.1751
97	2250	8.6939	6.3735	123.14	1.3911	5.1238	5.7888	7.1799
98	2280	8.8092	6.3816	124.14	1.4006	5.1185	5.7888	7.1894
99	2310	8.9259	6.3898	124.77	1.4059	5.1127	5.7888	7.1947
100	2340	9.0441	6.3981	125.3	1.41	5.1074	5.7888	7.1988
101	2370	9.1608	6.4063	126.04	1.4165	5.1022	5.7888	7.2053
102	2400	9.279	6.4147	126.67	1.4218	5.0981	5.7888	7.2106
103	2430	9.3957	6.4229	127.25	1.4264	5.0922	5.7888	7.2152
104	2460	9.5139	6.4313	127.83	1.4311	5.0881	5.7888	7.2199
105	2490	9.632	6.4397	128.41	1.4357	5.0829	5.7888	7.2245
106	2520	9.7516	6.4482	129.25	1.4432	5.0782	5.7888	7.232
107	2550	9.8698	6.4567	129.88	1.4483	5.0735	5.7888	7.2371
108	2580	9.9837	6.4649	130.35	1.4518	5.0688	5.7888	7.2406
109	2610	10.102	6.4734	131.04	1.4575	5.0648	5.7888	7.2463
110	2640	10.219	6.4818	131.46	1.4603	5.0601	5.7888	7.2491
111	2670	10.332	6.49	132.09	1.4654	5.056	5.7888	7.2542
112	2700	10.448	6.4984	132.72	1.4705	5.0525	5.7888	7.2593
113	2730	10.562	6.5066	133.46	1.4768	5.046	5.7888	7.2656
114	2760	10.677	6.515	134.2	1.4831	5.0414	5.7888	7.2719
115	2790	10.792	6.5235	134.46	1.484	5.0373	5.7888	7.2728
116	2820	10.909	6.532	134.88	1.4867	5.0338	5.7888	7.2755
117	2850	11.024	6.5405	135.41	1.4906	5.0297	5.7888	7.2794
118	2880	11.14	6.549	135.99	1.4951	5.0268	5.7888	7.2839
119	2910	11.256	6.5576	136.67	1.5006	5.0209	5.7888	7.2894
120	2940	11.373	6.5662	137.2	1.5044	5.0162	5.7888	7.2932
121	2970	11.491	6.575	137.88	1.5099	5.0127	5.7888	7.2987
122	3000	11.609	6.5838	138.25	1.5119	5.0098	5.7888	7.3007
123	3030	11.73	6.5928	138.83	1.5162	5.0063	5.7888	7.305
124	3060	11.847	6.6015	139.57	1.5222	5.0016	5.7888	7.311
125	3090	11.965	6.6104	139.94	1.5242	4.9981	5.7888	7.313
126	3120	12.083	6.6193	140.51	1.5284	4.9934	5.7888	7.3172
127	3150	12.2	6.6281	141.15	1.5333	4.9911	5.7888	7.3221
128	3180	12.317	6.6369	141.62	1.5364	4.9841	5.7888	7.3252
129	3210	12.432	6.6456	141.94	1.5378	4.9829	5.7888	7.3266
130	3240	12.55	6.6546	142.67	1.5437	4.98	5.7888	7.3325
131	3270	12.666	6.6634	143.52	1.5507	4.9759	5.7888	7.3395
132	3300	12.78	6.6721	144.09	1.555	4.9724	5.7888	7.3438
133	3330	12.893	6.6808	144.57	1.558	4.9689	5.7888	7.3468
134	3360	13.009	6.6897	144.99	1.5605	4.966	5.7888	7.3493
135	3390	13.124	6.6986	145.36	1.5624	4.9624	5.7888	7.3512
136	3420	13.238	6.7074	145.83	1.5654	4.9595	5.7888	7.3542
137	3450	13.355	6.7164	146.2	1.5673	4.9554	5.7888	7.3561
138	3480	13.471	6.7255	146.89	1.5725	4.9519	5.7888	7.3613
139	3510	13.588	6.7345	147.46	1.5766	4.9496	5.7888	7.3654
140	3540	13.706	6.7438	147.78	1.5778	4.9455	5.7888	7.3666
141	3570	13.823	6.7529	148.1	1.579	4.942	5.7888	7.3678
142	3600	13.938	6.7619	148.68	1.5831	4.9385	5.7888	7.3719
143	3630	14.058	6.7714	149.41	1.5887	4.9355	5.7888	7.3775
144	3660	14.175	6.7806	149.89	1.5916	4.9338	5.7888	7.3804
145	3690	14.291	6.7898	150.25	1.5933	4.9303	5.7888	7.3821
146	3720	14.411	6.7993	150.25	1.5911	4.9279	5.7888	7.3799
147	3750	14.529	6.8087	150.52	1.5917	4.9256	5.7888	7.3805
148	3780	14.645	6.8179	151.31	1.5979	4.9227	5.7888	7.3867
149	3810	14.76	6.8271	152.36	1.6068	4.9192	5.7888	7.3956
150	3840	14.875	6.8364	152.73	1.6085	4.9168	5.7888	7.3973
151	3870	14.99	6.8456	153.04	1.6097	4.9133	5.7888	7.3985
152	3900	15.104	6.8548	153.57	1.613	4.911	5.7888	7.4018
153	3930	15.218	6.864	153.94	1.6147	4.9092	5.7888	7.4035

TRIAXIAL TEST

Project: COLETO CREEK FACILITY | Location: IPR-GDF SUEZ | Project No.: 60225561
Boring No.: B-4-1 S-13 | Tested By: BCM | Checked By: WPQ
Sample No.: S-13 | Test Date: 12/2/11 | Depth: 24.0'-26.0'
Test No.: 10.4 PSI | Sample Type: 3" ST | Elevation: -----

Soil Description: CLAYEY F-C SAND LITTLE SILT - BROWNISH GRAY SC
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

Specimen Height: 6.06 in | Piston Area: 0.00 in^2 | Filter Strip Correction: 0.00 tsf
Specimen Area: 5.82 in^2 | Piston Friction: 0.00 lb | Membrane Correction: 0.00 lb/in
Specimen Volume: 35.25 in^3 | Piston Weight: 0.00 lb | Correction Type: Uniform

Liquid Limit: 40 | Plastic Limit: 24 | Measured Specific Gravity: 2.66

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	5.7888	5.7888	0	0.000	0.74626	0.74626	1.000	0.74626	0
2	0.02	5.8741	5.7888	0.19936	2.337	0.63221	0.5469	1.156	0.58956	0.042657
3	0.04	5.9294	5.7888	0.23853	1.696	0.64837	0.50773	1.277	0.57805	0.070321
4	0.06	5.9678	5.7888	0.26543	1.483	0.65986	0.48083	1.372	0.57035	0.089512
5	0.08	5.9977	5.7888	0.28472	1.363	0.67047	0.46154	1.453	0.56601	0.10447
6	0.09	6.0211	5.7888	0.29992	1.291	0.67866	0.44634	1.520	0.5625	0.11616
7	0.11	6.0419	5.7888	0.31278	1.236	0.68657	0.43348	1.584	0.56002	0.12655
8	0.13	6.0594	5.7888	0.32331	1.195	0.69356	0.42295	1.640	0.55826	0.1353
9	0.15	6.0763	5.7888	0.33208	1.155	0.70165	0.41418	1.694	0.55792	0.14373
10	0.17	6.0905	5.7888	0.34026	1.128	0.70772	0.406	1.743	0.55686	0.15086
11	0.19	6.1035	5.7888	0.34669	1.102	0.71423	0.39957	1.787	0.5569	0.15733
12	0.21	6.1157	5.7888	0.35254	1.078	0.72067	0.39372	1.830	0.5572	0.16347
13	0.23	6.128	5.7888	0.3578	1.055	0.72769	0.38846	1.873	0.55808	0.16962
14	0.27	6.15	5.7888	0.36716	1.017	0.7403	0.37911	1.953	0.5597	0.1806
15	0.31	6.17	5.7888	0.37476	0.983	0.75268	0.37151	2.026	0.56209	0.19059
16	0.35	6.1874	5.7888	0.3806	0.955	0.76421	0.36566	2.090	0.56494	0.19928
17	0.39	6.2041	5.7888	0.38586	0.929	0.77566	0.3604	2.152	0.56803	0.20763
18	0.42	6.2188	5.7888	0.39113	0.910	0.78517	0.35514	2.211	0.57015	0.21501
19	0.46	6.2329	5.7888	0.39463	0.889	0.79576	0.35163	2.263	0.57369	0.22206
20	0.50	6.2457	5.7888	0.39814	0.871	0.80503	0.34812	2.313	0.57658	0.22846
21	0.54	6.2585	5.7888	0.40106	0.854	0.81488	0.3452	2.361	0.58004	0.23484
22	0.58	6.27	5.7888	0.40282	0.837	0.8246	0.34344	2.401	0.58402	0.24058
23	0.62	6.2808	5.7888	0.40516	0.824	0.83308	0.3411	2.442	0.58709	0.24599
24	0.66	6.2916	5.7888	0.40691	0.809	0.84214	0.33935	2.482	0.59075	0.25139
25	0.69	6.3024	5.7888	0.40866	0.796	0.85119	0.3376	2.521	0.59439	0.2568
26	0.73	6.3125	5.7888	0.41042	0.784	0.85957	0.33584	2.559	0.59771	0.26187
27	0.77	6.3201	5.7888	0.41159	0.775	0.86596	0.33467	2.587	0.60032	0.26565
28	0.81	6.3289	5.7888	0.41276	0.764	0.87363	0.3335	2.620	0.60357	0.27006
29	0.85	6.3378	5.7888	0.41393	0.754	0.8813	0.33233	2.652	0.60682	0.27448
30	0.89	6.3485	5.7888	0.41393	0.740	0.89206	0.33233	2.684	0.6122	0.27986
31	1.04	6.3838	5.7888	0.4151	0.698	0.92612	0.33117	2.797	0.62864	0.29748
32	1.16	6.4069	5.7888	0.4151	0.672	0.94925	0.33117	2.866	0.64021	0.30904
33	1.27	6.43	5.7888	0.41393	0.646	0.97349	0.33233	2.929	0.65291	0.32058
34	1.39	6.4498	5.7888	0.41276	0.624	0.99447	0.3335	2.982	0.66398	0.33048
35	1.50	6.4702	5.7888	0.41042	0.602	1.0172	0.33584	3.029	0.67653	0.34069
36	1.62	6.4899	5.7888	0.40808	0.582	1.0393	0.33818	3.073	0.68872	0.35054
37	1.73	6.507	5.7888	0.40399	0.563	1.0604	0.34227	3.098	0.70136	0.35909
38	1.85	6.5259	5.7888	0.40106	0.544	1.0823	0.3452	3.135	0.71377	0.36857
39	1.97	6.5449	5.7888	0.39814	0.527	1.1042	0.34812	3.172	0.72615	0.37803
40	2.08	6.5637	5.7888	0.39405	0.509	1.1271	0.35221	3.200	0.73967	0.38746
41	2.20	6.5806	5.7888	0.39054	0.493	1.1475	0.35572	3.226	0.75163	0.39591
42	2.32	6.5969	5.7888	0.38586	0.478	1.1685	0.3604	3.242	0.76443	0.40403
43	2.44	6.6143	5.7888	0.3806	0.461	1.1912	0.36566	3.258	0.77842	0.41276
44	2.55	6.6311	5.7888	0.37709	0.448	1.2115	0.36917	3.282	0.79031	0.42114
45	2.67	6.6459	5.7888	0.37183	0.434	1.2315	0.37443	3.289	0.80299	0.42856
46	2.79	6.6613	5.7888	0.36657	0.420	1.2522	0.37969	3.298	0.81596	0.43627
47	2.91	6.6767	5.7888	0.36131	0.407	1.2729	0.38495	3.307	0.82893	0.44397
48	3.02	6.6921	5.7888	0.35663	0.395	1.2929	0.38963	3.318	0.84128	0.45165
49	3.14	6.7043	5.7888	0.35137	0.384	1.3104	0.39489	3.318	0.85263	0.45774
50	3.25	6.719	5.7888	0.34611	0.372	1.3303	0.40015	3.324	0.86523	0.46508
51	3.37	6.733	5.7888	0.34026	0.360	1.3502	0.406	3.326	0.87808	0.47208
52	3.48	6.7476	5.7888	0.33558	0.350	1.3694	0.41068	3.335	0.89006	0.47938
53	3.59	6.7609	5.7888	0.33032	0.340	1.388	0.41594	3.337	0.90197	0.48603
54	3.71	6.7735	5.7888	0.32389	0.329	1.4071	0.42237	3.331	0.91473	0.49236
55	3.82	6.7886	5.7888	0.3198	0.320	1.4263	0.42646	3.344	0.92638	0.49991
56	3.94	6.8018	5.7888	0.31337	0.309	1.4459	0.43289	3.340	0.93941	0.50652
57	4.05	6.815	5.7888	0.30928	0.301	1.4632	0.43699	3.348	0.95008	0.5131
58	4.17	6.8256	5.7888	0.30343	0.293	1.4797	0.44283	3.341	0.96124	0.51841
59	4.29	6.8387	5.7888	0.29875	0.285	1.4974	0.44751	3.346	0.97246	0.52495
60	4.40	6.8492	5.7888	0.29349	0.277	1.5132	0.45277	3.342	0.983	0.53022
61	4.52	6.8616	5.7888	0.28823	0.269	1.5309	0.45803	3.342	0.99445	0.53642
62	4.64	6.874	5.7888	0.2818	0.260	1.5497	0.46446	3.336	1.0071	0.5426
63	4.75	6.8863	5.7888	0.27595	0.251	1.5678	0.47031	3.334	1.0191	0.54876
64	4.87	6.8973	5.7888	0.2701	0.244	1.5847	0.47616	3.328	1.0304	0.55427
65	4.99	6.9083	5.7888	0.26309	0.235	1.6027	0.48317	3.317	1.0429	0.55977
66	5.11	6.9218	5.7888	0.25841	0.228	1.6208	0.48785	3.322	1.0543	0.56649
67	5.22	6.9315	5.7888	0.25198	0.221	1.637	0.49428	3.312	1.0656	0.57135
68	5.34	6.9431	5.7888	0.24555	0.213	1.655	0.50071	3.305	1.0778	0.57713
69	5.46	6.9533	5.7888	0.24087	0.207	1.6699	0.50539	3.304	1.0877	0.58227
70	5.57	6.9636	5.7888	0.23444	0.200	1.6866	0.51182	3.295	1.0992	0.5874
71	5.68	6.9745	5.7888	0.22743	0.192	1.7045	0.51884	3.285	1.1117	0.59285
72	5.80	6.9829	5.7888	0.22333	0.187	1.717	0.52293	3.283	1.12	0.59703
73	5.91	6.9949	5.7888	0.21749	0.180	1.7349	0.52877	3.281	1.1318	0.60304
74	6.03	7.002	5.7888	0.20989	0.173	1.7496	0.53637	3.262	1.143	0.6066
75	6.14	7.0115	5.7888	0.20521	0.168	1.7638	0.54105	3.260	1.1524	0.61135
76	6.26	7.0222	5.7888	0.19878	0.161	1.7809	0.54748	3.253	1.1642	0.61671
77	6.37	7.0311	5.7888	0.19293	0.155	1.7956	0.55333	3.245	1.1745	0.62114
78	6.49	7.0381	5.7888	0.18767	0.150	1.8079	0.55859	3.236	1.1832	0.62463

79	6.60	7.0469	5.7888	0.18124	0.144	1.8231	0.56502	3.227	1.1941	0.62903
80	6.72	7.0574	5.7888	0.17598	0.139	1.8389	0.57028	3.225	1.2046	0.6343
81	6.84	7.0679	5.7888	0.17013	0.133	1.8553	0.57613	3.220	1.2157	0.63957
82	6.96	7.076	5.7888	0.16312	0.127	1.8704	0.58315	3.207	1.2268	0.64361
83	7.08	7.0829	5.7888	0.15727	0.122	1.8831	0.58899	3.197	1.236	0.64703
84	7.19	7.0915	5.7888	0.15259	0.117	1.8964	0.59367	3.194	1.245	0.65135
85	7.31	7.0989	5.7888	0.14616	0.112	1.9102	0.6001	3.183	1.2551	0.65504
86	7.43	7.1056	5.7888	0.14148	0.107	1.9216	0.60478	3.177	1.2632	0.65842
87	7.55	7.1136	5.7888	0.13505	0.102	1.936	0.61121	3.168	1.2736	0.66241
88	7.66	7.121	5.7888	0.12979	0.097	1.9487	0.61647	3.161	1.2826	0.6661
89	7.78	7.1265	5.7888	0.12394	0.093	1.96	0.62232	3.150	1.2912	0.66886
90	7.90	7.1339	5.7888	0.11868	0.088	1.9726	0.62758	3.143	1.3001	0.67253
91	8.01	7.14	5.7888	0.11225	0.083	1.9852	0.63401	3.131	1.3096	0.67561
92	8.12	7.1479	5.7888	0.10757	0.079	1.9978	0.63869	3.128	1.3182	0.67956
93	8.24	7.1552	5.7888	0.10173	0.074	2.0109	0.64453	3.120	1.3277	0.68319
94	8.35	7.1618	5.7888	0.096466	0.070	2.0228	0.6498	3.113	1.3363	0.68651
95	8.46	7.1679	5.7888	0.090035	0.065	2.0353	0.65623	3.102	1.3458	0.68954
96	8.58	7.1751	5.7888	0.085358	0.062	2.0472	0.6609	3.098	1.354	0.69314
97	8.69	7.1799	5.7888	0.081265	0.058	2.0561	0.665	3.092	1.3605	0.69554
98	8.81	7.1894	5.7888	0.076003	0.054	2.0709	0.67026	3.090	1.3706	0.70031
99	8.93	7.1947	5.7888	0.070157	0.050	2.082	0.6761	3.079	1.3791	0.70297
100	9.04	7.1988	5.7888	0.064895	0.046	2.0914	0.68137	3.069	1.3864	0.70502
101	9.16	7.2053	5.7888	0.059634	0.042	2.1031	0.68663	3.063	1.3949	0.70826
102	9.28	7.2106	5.7888	0.055541	0.039	2.1125	0.69072	3.058	1.4016	0.71088
103	9.40	7.2152	5.7888	0.049695	0.035	2.123	0.69657	3.048	1.4098	0.71321
104	9.51	7.2199	5.7888	0.045602	0.032	2.1317	0.70066	3.042	1.4162	0.71553
105	9.63	7.2245	5.7888	0.04034	0.028	2.1416	0.70592	3.034	1.4238	0.71783
106	9.75	7.232	5.7888	0.035663	0.025	2.1538	0.7106	3.031	1.4322	0.72158
107	9.87	7.2371	5.7888	0.030986	0.021	2.1636	0.71528	3.025	1.4394	0.72416
108	9.98	7.2406	5.7888	0.026309	0.018	2.1717	0.71995	3.016	1.4458	0.72588
109	10.10	7.2463	5.7888	0.022216	0.015	2.1815	0.72404	3.013	1.4528	0.72874
110	10.22	7.2491	5.7888	0.017539	0.012	2.189	0.72872	3.004	1.4589	0.73013
111	10.33	7.2542	5.7888	0.013447	0.009	2.1982	0.73281	3.000	1.4655	0.73271
112	10.45	7.2593	5.7888	0.0099389	0.007	2.2069	0.73632	2.997	1.4716	0.73527
113	10.56	7.2656	5.7888	0.0035079	0.002	2.2196	0.74275	2.988	1.4812	0.73841
114	10.68	7.2719	5.7888	-0.0011693	-0.001	2.2305	0.74743	2.984	1.489	0.74153
115	10.79	7.2728	5.7888	-0.0052618	-0.004	2.2356	0.75152	2.975	1.4935	0.74202
116	10.91	7.2755	5.7888	-0.0087696	-0.006	2.2418	0.75503	2.969	1.4984	0.74337
117	11.02	7.2794	5.7888	-0.012862	-0.009	2.2497	0.75912	2.964	1.5044	0.74531
118	11.14	7.2839	5.7888	-0.015785	-0.011	2.2571	0.76205	2.962	1.5096	0.74753
119	11.26	7.2894	5.7888	-0.021632	-0.014	2.2685	0.76789	2.954	1.5182	0.7503
120	11.37	7.2932	5.7888	-0.026309	-0.017	2.277	0.77257	2.947	1.5248	0.7522
121	11.49	7.2987	5.7888	-0.029817	-0.020	2.286	0.77608	2.946	1.531	0.75495
122	11.61	7.3007	5.7888	-0.03274	-0.022	2.2909	0.779	2.941	1.535	0.75595
123	11.73	7.305	5.7888	-0.036248	-0.024	2.2987	0.78251	2.938	1.5406	0.75808
124	11.85	7.311	5.7888	-0.040925	-0.027	2.3094	0.78719	2.934	1.5483	0.7611
125	11.97	7.313	5.7888	-0.044433	-0.029	2.3149	0.79069	2.928	1.5528	0.76209
126	12.08	7.3172	5.7888	-0.04911	-0.032	2.3238	0.79537	2.922	1.5596	0.76421
127	12.20	7.3221	5.7888	-0.051449	-0.034	2.331	0.79771	2.922	1.5643	0.76663
128	12.32	7.3252	5.7888	-0.058464	-0.038	2.3411	0.80473	2.909	1.5729	0.76818
129	12.43	7.3266	5.7888	-0.059634	-0.039	2.3437	0.80589	2.908	1.5748	0.76888
130	12.55	7.3325	5.7888	-0.062557	-0.041	2.3525	0.80882	2.909	1.5806	0.77183
131	12.67	7.3395	5.7888	-0.066649	-0.043	2.3636	0.81291	2.908	1.5883	0.77536
132	12.78	7.3438	5.7888	-0.070157	-0.045	2.3714	0.81642	2.905	1.5939	0.77748
133	12.89	7.3468	5.7888	-0.073665	-0.047	2.378	0.81993	2.900	1.5989	0.77902
134	13.01	7.3493	5.7888	-0.076588	-0.049	2.3834	0.82285	2.896	1.6031	0.78025
135	13.12	7.3512	5.7888	-0.080096	-0.051	2.3888	0.82636	2.891	1.6076	0.7812
136	13.24	7.3542	5.7888	-0.083019	-0.053	2.3947	0.82928	2.888	1.612	0.78272
137	13.35	7.3561	5.7888	-0.087112	-0.056	2.4006	0.83337	2.881	1.617	0.78364
138	13.47	7.3613	5.7888	-0.09062	-0.058	2.4094	0.83688	2.879	1.6231	0.78625
139	13.59	7.3654	5.7888	-0.092958	-0.059	2.4158	0.83922	2.879	1.6275	0.78828
140	13.71	7.3666	5.7888	-0.097051	-0.062	2.4211	0.84331	2.871	1.6322	0.78889
141	13.82	7.3678	5.7888	-0.10056	-0.064	2.4258	0.84682	2.865	1.6363	0.78951
142	13.94	7.3719	5.7888	-0.10407	-0.066	2.4334	0.85033	2.862	1.6419	0.79153
143	14.06	7.3775	5.7888	-0.10699	-0.067	2.442	0.85325	2.862	1.6476	0.79435
144	14.17	7.3804	5.7888	-0.10874	-0.068	2.4466	0.855	2.861	1.6508	0.79579
145	14.29	7.3821	5.7888	-0.11225	-0.070	2.4518	0.85851	2.856	1.6552	0.79666
146	14.41	7.3799	5.7888	-0.11459	-0.072	2.4519	0.86085	2.848	1.6564	0.79555
147	14.53	7.3805	5.7888	-0.11693	-0.073	2.4549	0.86319	2.844	1.659	0.79584
148	14.64	7.3867	5.7888	-0.11985	-0.075	2.464	0.86611	2.845	1.6651	0.79894
149	14.76	7.3956	5.7888	-0.12336	-0.077	2.4764	0.86962	2.848	1.673	0.80341
150	14.88	7.3973	5.7888	-0.1257	-0.078	2.4805	0.87196	2.845	1.6762	0.80426
151	14.99	7.3985	5.7888	-0.12921	-0.080	2.4851	0.87547	2.839	1.6803	0.80484
152	15.10	7.4018	5.7888	-0.13154	-0.082	2.4909	0.87781	2.838	1.6843	0.80652
153	15.22	7.4035	5.7888	-0.1333	-0.083	2.4943	0.87956	2.836	1.6869	0.80737

TRIAXIAL TEST

Project: COLETO CREEK FACILITY | Location: IPR-GDF SUEZ | Project No.: 60225561
Boring No.: B-4-1 S-13 | Tested By: BCM | Checked By: WPQ
Sample No.: S-13 | Test Date: 12/2/11 | Depth: 24.0'-26.0'
Test No.: 17.4 PSI | Sample Type: 3 " ST | Elevation: ----

Soil Description: CLAYEY F-C SAND LITTLE SILT - BROWNISH GRAY SC
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

Specimen Height: 5.41 in | Piston Area: 0.00 in^2 | Filter Strip Correction: 0.00 tsf
Specimen Area: 6.29 in^2 | Piston Friction: 0.00 lb | Membrane Correction: 0.00 lb/in
Specimen Volume: 34.03 in^3 | Piston Weight: 0.00 lb | Correction Type: Uniform

Liquid Limit: 40 | Plastic Limit: 24 | Measured Specific Gravity: 2.66

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.2898	0	0	5.0399	6.2928	6.2928
2	5.0042	0.0151	6.2908	12.364	0.14151	5.111	6.2928	6.4343
3	10	0.035234	6.292	19.701	0.22544	5.1588	6.2928	6.5182
4	15	0.057045	6.2934	25.408	0.29068	5.1965	6.2928	6.5835
5	20	0.078856	6.2948	29.756	0.34035	5.2265	6.2928	6.6331
6	25	0.10067	6.2962	33.696	0.38533	5.2526	6.2928	6.6781
7	30	0.12248	6.2975	23.234	0.26563	5.2232	6.2928	6.5584
8	35.001	0.14261	6.2988	33.628	0.38439	5.2704	6.2928	6.6772
9	40.001	0.16442	6.3002	37.976	0.434	5.2948	6.2928	6.7268
10	45.001	0.18623	6.3016	28.533	0.32601	5.2676	6.2928	6.6188
11	50.001	0.20637	6.3028	37.297	0.42606	5.307	6.2928	6.7189
12	55.001	0.23154	6.3044	21.332	0.24362	5.2565	6.2928	6.5364
13	60.001	0.24999	6.3056	34.375	0.39251	5.3098	6.2928	6.6853
14	70.001	0.29529	6.3085	30.163	0.34426	5.3065	6.2928	6.6371
15	80.001	0.33724	6.3111	23.845	0.27204	5.2959	6.2928	6.5648
16	90.002	0.37583	6.3136	43.751	0.49893	5.377	6.2928	6.7917
17	100	0.42113	6.3164	42.12	0.48012	5.3792	6.2928	6.7729
18	110	0.46475	6.3192	37.636	0.42882	5.3715	6.2928	6.7216
19	120	0.51005	6.3221	27.582	0.31412	5.3459	6.2928	6.6069
20	130	0.55032	6.3246	48.098	0.54756	5.4242	6.2928	6.8404
21	140	0.59394	6.3274	42.052	0.47851	5.4087	6.2928	6.7713
22	150	0.64092	6.3304	29.552	0.33612	5.3737	6.2928	6.6289
23	160	0.67951	6.3329	51.971	0.59087	5.4514	6.2928	6.8837
24	170	0.72481	6.3357	42.935	0.48792	5.4248	6.2928	6.7807
25	180	0.76507	6.3383	56.794	0.64515	5.477	6.2928	6.938
26	190	0.8087	6.3411	50.612	0.57467	5.4603	6.2928	6.8675
27	200	0.85567	6.3441	30.979	0.35158	5.4031	6.2928	6.6444
28	210	0.89594	6.3467	55.639	0.6312	5.4864	6.2928	6.924
29	220	0.94124	6.3496	38.723	0.4391	5.4364	6.2928	6.7319
30	230	0.98151	6.3522	59.376	0.67301	5.5064	6.2928	6.9658
31	240	1.0268	6.3551	41.984	0.47566	5.4553	6.2928	6.7685
32	270	1.1543	6.3633	62.637	0.70873	5.5347	6.2928	7.0015
33	300	1.2835	6.3716	68.751	0.77689	5.5636	6.2928	7.0697
34	330	1.4161	6.3802	52.854	0.59645	5.5253	6.2928	6.8893
35	360	1.5436	6.3884	72.691	0.81926	5.5963	6.2928	7.1121
36	390	1.6728	6.3968	77.515	0.87247	5.6152	6.2928	7.1653
37	420	1.8053	6.4055	80.504	0.90489	5.6297	6.2928	7.1977
38	450	1.9362	6.414	83.425	0.93648	5.643	6.2928	7.2293
39	480	2.0654	6.4225	87.229	0.9779	5.6547	6.2928	7.2707
40	510	2.1962	6.4311	90.218	1.0101	5.6647	6.2928	7.3029
41	540	2.3254	6.4396	92.936	1.0391	5.6735	6.2928	7.3319
42	570	2.4563	6.4482	95.925	1.0711	5.6819	6.2928	7.3639
43	600	2.5855	6.4568	98.439	1.0977	5.6885	6.2928	7.3905
44	630	2.7163	6.4654	100.27	1.1167	5.6957	6.2928	7.4095
45	660	2.8489	6.4743	102.18	1.1363	5.7013	6.2928	7.4291
46	690	2.9781	6.4829	104.15	1.1567	5.7057	6.2928	7.4495
47	720	3.1089	6.4916	105.84	1.1739	5.7102	6.2928	7.4667
48	750	3.2381	6.5003	107.75	1.1934	5.7141	6.2928	7.4862
49	780	3.369	6.5091	109.72	1.2136	5.7169	6.2928	7.5064
50	810	3.4982	6.5178	111.55	1.2323	5.7191	6.2928	7.5251
51	840	3.6307	6.5268	112.37	1.2396	5.7202	6.2928	7.5324
52	870	3.7616	6.5357	112.91	1.2439	5.7213	6.2928	7.5367
53	900	3.8925	6.5446	114.34	1.2579	5.7218	6.2928	7.5507
54	930	4.0233	6.5535	115.56	1.2696	5.7218	6.2928	7.5624
55	960	4.1525	6.5623	116.99	1.2835	5.7213	6.2928	7.5763
56	990	4.2817	6.5712	118.21	1.2952	5.7207	6.2928	7.588
57	1020	4.4143	6.5803	118.96	1.3016	5.7196	6.2928	7.5944
58	1050	4.5418	6.5891	120.31	1.3147	5.7202	6.2928	7.6075
59	1080	4.6726	6.5981	121.13	1.3218	5.7202	6.2928	7.6146
60	1110	4.8018	6.6071	122.56	1.3355	5.7196	6.2928	7.6283
61	1140	4.931	6.6161	123.71	1.3463	5.7174	6.2928	7.6391
62	1170	5.0619	6.6252	125	1.3585	5.7146	6.2928	7.6513
63	1200	5.1928	6.6343	126.09	1.3684	5.7113	6.2928	7.6612
64	1230	5.322	6.6434	127.18	1.3783	5.708	6.2928	7.6711
65	1260	5.4545	6.6527	128.06	1.3859	5.7052	6.2928	7.6787
66	1290	5.5837	6.6618	128.81	1.3921	5.7019	6.2928	7.6849
67	1320	5.7129	6.6709	129.89	1.4019	5.6991	6.2928	7.6947
68	1350	5.8437	6.6802	130.71	1.4088	5.6957	6.2928	7.7016
69	1380	5.9746	6.6895	131.73	1.4178	5.6924	6.2928	7.7106
70	1410	6.1055	6.6988	133.15	1.4312	5.6896	6.2928	7.724
71	1440	6.2363	6.7082	134.85	1.4474	5.6869	6.2928	7.7402
72	1470	6.3655	6.7174	136.14	1.4592	5.683	6.2928	7.752
73	1500	6.4947	6.7267	138.38	1.4812	5.6796	6.2928	7.774
74	1530	6.6239	6.736	140.02	1.4966	5.6774	6.2928	7.7894
75	1560	6.7531	6.7453	140.15	1.496	5.6735	6.2928	7.7888
76	1590	6.884	6.7548	140.9	1.5018	5.6696	6.2928	7.7946
77	1620	7.0132	6.7642	141.24	1.5034	5.6669	6.2928	7.7962
78	1650	7.1407	6.7735	143.21	1.5223	5.6647	6.2928	7.8151
79	1680	7.2682	6.7828	142.94	1.5173	5.6624	6.2928	7.8101

80	1710	7.3991	6.7924	144.57	1.5324	5.6597	6.2928	7.8252
81	1740	7.5299	6.802	144.91	1.5339	5.6585	6.2928	7.8267
82	1770	7.6641	6.8119	145.45	1.5374	5.6563	6.2928	7.8302
83	1800	7.7984	6.8218	144.97	1.5301	5.6547	6.2928	7.8229
84	1830	7.9292	6.8315	146.13	1.5401	5.6524	6.2928	7.8329
85	1860	8.0618	6.8414	147.01	1.5472	5.6497	6.2928	7.84
86	1890	8.1927	6.8511	146.81	1.5428	5.6463	6.2928	7.8356
87	1920	8.3235	6.8609	148.1	1.5542	5.6441	6.2928	7.847
88	1950	8.4527	6.8706	149.8	1.5698	5.6408	6.2928	7.8626
89	1980	8.5836	6.8804	149.39	1.5633	5.6386	6.2928	7.8561
90	2010	8.7128	6.8901	150.75	1.5753	5.6358	6.2928	7.8681
91	2040	8.842	6.8999	150.48	1.5702	5.6319	6.2928	7.863
92	2070	8.9695	6.9096	150.82	1.5716	5.6291	6.2928	7.8644
93	2100	9.0987	6.9194	151.63	1.5778	5.6263	6.2928	7.8706
94	2130	9.2295	6.9294	153.33	1.5932	5.6241	6.2928	7.886
95	2160	9.3604	6.9394	154.76	1.6057	5.6213	6.2928	7.8985
96	2190	9.4913	6.9494	156.66	1.6231	5.6191	6.2928	7.9159
97	2220	9.6238	6.9596	156.32	1.6172	5.6169	6.2928	7.91
98	2250	9.7547	6.9697	155.71	1.6085	5.6152	6.2928	7.9013
99	2280	9.8872	6.9799	155.5	1.6041	5.6119	6.2928	7.8969
100	2310	10.02	6.9902	155.3	1.5996	5.6097	6.2928	7.8924
101	2340	10.151	7.0004	155.71	1.6015	5.6069	6.2928	7.8943
102	2370	10.285	7.0109	156.18	1.604	5.6041	6.2928	7.8968
103	2400	10.417	7.0213	157.2	1.612	5.6008	6.2928	7.9048
104	2430	10.548	7.0315	157.75	1.6153	5.598	6.2928	7.9081
105	2460	10.681	7.042	157.75	1.6129	5.5963	6.2928	7.9057
106	2490	10.81	7.0522	158.22	1.6154	5.5925	6.2928	7.9082
107	2520	10.939	7.0624	158.97	1.6207	5.5886	6.2928	7.9135
108	2550	11.07	7.0728	159.78	1.6266	5.5858	6.2928	7.9194
109	2580	11.199	7.0831	160.26	1.6291	5.5825	6.2928	7.9219
110	2610	11.328	7.0934	161.14	1.6356	5.5797	6.2928	7.9284
111	2640	11.459	7.1039	159.85	1.6202	5.578	6.2928	7.913
112	2670	11.59	7.1144	160.6	1.6253	5.5752	6.2928	7.9181
113	2700	11.718	7.1247	164.95	1.6669	5.573	6.2928	7.9597
114	2730	11.852	7.1355	159.92	1.6137	5.5703	6.2928	7.9065
115	2760	11.983	7.1461	158.56	1.5976	5.5669	6.2928	7.8904
116	2790	12.112	7.1566	159.78	1.6075	5.5647	6.2928	7.9003
117	2820	12.243	7.1673	159.92	1.6065	5.5619	6.2928	7.8993
118	2850	12.375	7.1781	159.85	1.6034	5.5603	6.2928	7.8962
119	2880	12.506	7.1889	160.26	1.6051	5.558	6.2928	7.8979
120	2910	12.639	7.1998	160.06	1.6006	5.5541	6.2928	7.8934
121	2940	12.771	7.2107	160.4	1.6016	5.5525	6.2928	7.8944
122	2970	12.904	7.2217	160.19	1.5971	5.5497	6.2928	7.8899
123	3000	13.035	7.2326	160.33	1.5961	5.5475	6.2928	7.8889
124	3030	13.169	7.2438	160.74	1.5976	5.5458	6.2928	7.8904
125	3060	13.298	7.2545	160.87	1.5966	5.5442	6.2928	7.8894
126	3090	13.427	7.2654	160.87	1.5942	5.543	6.2928	7.887
127	3120	13.56	7.2765	161.62	1.5992	5.5403	6.2928	7.892
128	3150	13.689	7.2874	162.43	1.6049	5.5397	6.2928	7.8977
129	3180	13.818	7.2983	162.98	1.6078	5.538	6.2928	7.9006
130	3210	13.947	7.3093	162.84	1.6041	5.5369	6.2928	7.8969
131	3240	14.078	7.3204	163.39	1.607	5.5353	6.2928	7.8998
132	3270	14.208	7.3314	163.93	1.6099	5.5342	6.2928	7.9027
133	3300	14.338	7.3426	165.02	1.6181	5.533	6.2928	7.9109
134	3330	14.468	7.3537	164.4	1.6097	5.5319	6.2928	7.9025
135	3360	14.598	7.365	165.02	1.6132	5.5314	6.2928	7.906
136	3390	14.731	7.3765	165.15	1.612	5.5303	6.2928	7.9048
137	3420	14.864	7.3879	165.49	1.6128	5.5292	6.2928	7.9056
138	3450	14.994	7.3993	165.56	1.611	5.5275	6.2928	7.9038
139	3480	15.127	7.4109	165.42	1.6072	5.5258	6.2928	7.9
140	3510	15.261	7.4226	165.9	1.6092	5.5242	6.2928	7.902
141	3540	15.394	7.4342	166.31	1.6107	5.523	6.2928	7.9035
142	3570	15.525	7.4457	167.12	1.6161	5.5219	6.2928	7.9089
143	3600	15.655	7.4573	166.99	1.6122	5.5197	6.2928	7.905
144	3630	15.788	7.469	167.19	1.6117	5.5181	6.2928	7.9045
145	3660	15.916	7.4804	167.6	1.6132	5.5169	6.2928	7.906
146	3690	16.048	7.4922	168.55	1.6198	5.5153	6.2928	7.9126
147	3695.9	16.073	7.4944	168.96	1.6232	5.5158	6.2928	7.916

TRIAXIAL TEST

Project: COLETO CREEK FACILITY | Location: IPR-GDF SUEZ | Project No.: 60225561
Boring No.: B-4-1 S-13 | Tested By: BCM | Checked By: WPQ
Sample No.: S-13 | Test Date: 12/2/11 | Depth: 24.0'-26.0'
Test No.: 17.4 PSI | Sample Type: 3 " ST | Elevation: ----

Soil Description: CLAYEY F-C SAND LITTLE SILT - BROWNISH GRAY SC
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

Specimen Height: 5.41 in | Piston Area: 0.00 in^2 | Filter Strip Correction: 0.00 tsf
Specimen Area: 6.29 in^2 | Piston Friction: 0.00 lb | Membrane Correction: 0.00 lb/in
Specimen Volume: 34.03 in^3 | Piston Weight: 0.00 lb | Correction Type: Uniform

Liquid Limit: 40 | Plastic Limit: 24 | Measured Specific Gravity: 2.66

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	6.2928	6.2928	0	0.000	1.2529	1.2529	1.000	1.2529	0
2	0.02	6.4343	6.2928	0.071079	0.502	1.3233	1.1818	1.120	1.2525	0.070757
3	0.04	6.5182	6.2928	0.11883	0.527	1.3595	1.134	1.199	1.2468	0.11272
4	0.06	6.5835	6.2928	0.1566	0.539	1.3869	1.0963	1.265	1.2416	0.14534
5	0.08	6.6331	6.2928	0.18658	0.548	1.4066	1.0663	1.319	1.2365	0.17017
6	0.10	6.6781	6.2928	0.21268	0.552	1.4255	1.0402	1.370	1.2328	0.19267
7	0.12	6.5584	6.2928	0.18325	0.690	1.3352	1.0696	1.248	1.2024	0.13282
8	0.14	6.6772	6.2928	0.23045	0.600	1.4068	1.0224	1.376	1.2146	0.1922
9	0.16	6.7268	6.2928	0.25488	0.587	1.432	0.99798	1.435	1.215	0.217
10	0.19	6.6188	6.2928	0.22767	0.698	1.3512	1.0252	1.318	1.1882	0.16301
11	0.21	6.7189	6.2928	0.2671	0.627	1.4118	0.98576	1.432	1.1988	0.21303
12	0.23	6.5364	6.2928	0.21657	0.889	1.2799	1.0363	1.235	1.1581	0.12181
13	0.25	6.6853	6.2928	0.26988	0.688	1.3755	0.98299	1.399	1.1792	0.19626
14	0.30	6.6371	6.2928	0.26655	0.774	1.3306	0.98632	1.349	1.1585	0.17213
15	0.34	6.5648	6.2928	0.25599	0.941	1.2689	0.99687	1.273	1.1329	0.13602
16	0.38	6.7917	6.2928	0.33707	0.676	1.4147	0.9158	1.545	1.1653	0.24947
17	0.42	6.7729	6.2928	0.33929	0.707	1.3937	0.91357	1.526	1.1536	0.24006
18	0.46	6.7216	6.2928	0.33152	0.773	1.3502	0.92135	1.465	1.1358	0.21441
19	0.51	6.6069	6.2928	0.30597	0.974	1.261	0.94689	1.332	1.104	0.15706
20	0.55	6.8404	6.2928	0.38427	0.702	1.4161	0.86859	1.630	1.1424	0.27378
21	0.59	6.7713	6.2928	0.36872	0.771	1.3627	0.88414	1.541	1.1234	0.23926
22	0.64	6.6289	6.2928	0.33374	0.993	1.2552	0.91913	1.366	1.0872	0.16806
23	0.68	6.8837	6.2928	0.41148	0.696	1.4323	0.84138	1.702	1.1368	0.29543
24	0.72	6.7807	6.2928	0.38483	0.789	1.356	0.86804	1.562	1.112	0.24396
25	0.77	6.938	6.2928	0.43702	0.677	1.461	0.81584	1.791	1.1384	0.32258
26	0.81	6.8675	6.2928	0.42036	0.731	1.4072	0.8325	1.690	1.1198	0.28734
27	0.86	6.6444	6.2928	0.36317	1.033	1.2413	0.8897	1.395	1.0655	0.17579
28	0.90	6.924	6.2928	0.44646	0.707	1.4376	0.8064	1.783	1.122	0.3156
29	0.94	6.7319	6.2928	0.39649	0.903	1.2955	0.85638	1.513	1.0759	0.21955
30	0.98	6.9658	6.2928	0.46646	0.693	1.4594	0.78641	1.856	1.1229	0.3365
31	1.03	6.7685	6.2928	0.41537	0.873	1.3132	0.8375	1.568	1.0753	0.23783
32	1.15	7.0015	6.2928	0.49478	0.698	1.4668	0.75809	1.935	1.1125	0.35436
33	1.28	7.0697	6.2928	0.52365	0.674	1.5061	0.72921	2.065	1.1177	0.38845
34	1.42	6.8893	6.2928	0.48534	0.814	1.364	0.76753	1.777	1.0658	0.29823
35	1.54	7.1121	6.2928	0.55641	0.679	1.5157	0.69645	2.176	1.1061	0.40963
36	1.67	7.1653	6.2928	0.57529	0.659	1.55	0.67757	2.288	1.1138	0.43624
37	1.81	7.1977	6.2928	0.58973	0.652	1.568	0.66313	2.365	1.1156	0.45245
38	1.94	7.2293	6.2928	0.60306	0.644	1.5863	0.6498	2.441	1.118	0.46824
39	2.07	7.2707	6.2928	0.61472	0.629	1.616	0.63814	2.532	1.1271	0.48895
40	2.20	7.3029	6.2928	0.62472	0.618	1.6382	0.62815	2.608	1.1332	0.50503
41	2.33	7.3319	6.2928	0.6336	0.610	1.6584	0.61926	2.678	1.1388	0.51955
42	2.46	7.3639	6.2928	0.64193	0.599	1.682	0.61093	2.753	1.1465	0.53554
43	2.59	7.3905	6.2928	0.64859	0.591	1.702	0.60427	2.817	1.1531	0.54885
44	2.72	7.4095	6.2928	0.65581	0.587	1.7137	0.59705	2.870	1.1554	0.55833
45	2.85	7.4291	6.2928	0.66137	0.582	1.7278	0.5915	2.921	1.1596	0.56814
46	2.98	7.4495	6.2928	0.66581	0.576	1.7437	0.58706	2.970	1.1654	0.57833
47	3.11	7.4667	6.2928	0.67025	0.571	1.7565	0.58261	3.015	1.1696	0.58697
48	3.24	7.4862	6.2928	0.67414	0.565	1.7722	0.57873	3.062	1.1754	0.59672
49	3.37	7.5064	6.2928	0.67692	0.558	1.7896	0.57595	3.107	1.1828	0.60681
50	3.50	7.5251	6.2928	0.67914	0.551	1.806	0.57373	3.148	1.1899	0.61613
51	3.63	7.5324	6.2928	0.68025	0.549	1.8122	0.57262	3.165	1.1924	0.61978
52	3.76	7.5367	6.2928	0.68136	0.548	1.8154	0.57151	3.176	1.1934	0.62193
53	3.89	7.5507	6.2928	0.68191	0.542	1.8288	0.57095	3.203	1.1999	0.62893
54	4.02	7.5624	6.2928	0.68191	0.537	1.8405	0.57095	3.224	1.2057	0.63479
55	4.15	7.5763	6.2928	0.68136	0.531	1.855	0.57151	3.246	1.2133	0.64176
56	4.28	7.588	6.2928	0.6808	0.526	1.8673	0.57206	3.264	1.2197	0.6476
57	4.41	7.5944	6.2928	0.67969	0.522	1.8748	0.57317	3.271	1.224	0.65079
58	4.54	7.6075	6.2928	0.68025	0.517	1.8873	0.57262	3.296	1.23	0.65734
59	4.67	7.6146	6.2928	0.68025	0.515	1.8944	0.57262	3.308	1.2335	0.66089
60	4.80	7.6283	6.2928	0.67969	0.509	1.9087	0.57317	3.330	1.2409	0.66777
61	4.93	7.6391	6.2928	0.67747	0.503	1.9217	0.57539	3.340	1.2485	0.67315
62	5.06	7.6513	6.2928	0.67469	0.497	1.9366	0.57817	3.350	1.2574	0.67923
63	5.19	7.6612	6.2928	0.67136	0.491	1.9499	0.5815	3.353	1.2657	0.6842
64	5.32	7.6711	6.2928	0.66803	0.485	1.9631	0.58483	3.357	1.274	0.68915
65	5.45	7.6787	6.2928	0.66525	0.480	1.9735	0.58761	3.359	1.2806	0.69297
66	5.58	7.6849	6.2928	0.66192	0.475	1.9831	0.59094	3.356	1.287	0.69606
67	5.71	7.6947	6.2928	0.65915	0.470	1.9957	0.59372	3.361	1.2947	0.70097
68	5.84	7.7016	6.2928	0.65581	0.466	2.0058	0.59705	3.360	1.3014	0.70439
69	5.97	7.7106	6.2928	0.65248	0.460	2.0182	0.60038	3.361	1.3093	0.7089
70	6.11	7.724	6.2928	0.64971	0.454	2.0343	0.60316	3.373	1.3187	0.71558
71	6.24	7.7402	6.2928	0.64693	0.447	2.0533	0.60594	3.389	1.3296	0.7237
72	6.37	7.752	6.2928	0.64304	0.441	2.0691	0.60982	3.393	1.3394	0.72962
73	6.49	7.774	6.2928	0.63971	0.432	2.0944	0.61315	3.416	1.3538	0.74061
74	6.62	7.7894	6.2928	0.63749	0.426	2.112	0.61538	3.432	1.3637	0.7483
75	6.75	7.7888	6.2928	0.6336	0.424	2.1152	0.61926	3.416	1.3673	0.74799
76	6.88	7.7946	6.2928	0.62971	0.419	2.125	0.62315	3.410	1.3741	0.75092
77	7.01	7.7962	6.2928	0.62694	0.417	2.1293	0.62593	3.402	1.3776	0.75169
78	7.14	7.8151	6.2928	0.62472	0.410	2.1504	0.62815	3.423	1.3893	0.76113

79	7.27	7.8101	6.2928	0.6225	0.410	2.1476	0.63037	3.407	1.389	0.75864
80	7.40	7.8252	6.2928	0.61972	0.404	2.1656	0.63315	3.420	1.3994	0.76621
81	7.53	7.8267	6.2928	0.61861	0.403	2.1681	0.63426	3.418	1.4012	0.76693
82	7.66	7.8302	6.2928	0.61639	0.401	2.1738	0.63648	3.415	1.4052	0.76868
83	7.80	7.8229	6.2928	0.61472	0.402	2.1683	0.63814	3.398	1.4032	0.76506
84	7.93	7.8329	6.2928	0.6125	0.398	2.1805	0.64036	3.405	1.4104	0.77006
85	8.06	7.84	6.2928	0.60972	0.394	2.1903	0.64314	3.406	1.4167	0.7736
86	8.19	7.8356	6.2928	0.60639	0.393	2.1893	0.64647	3.387	1.4179	0.77142
87	8.32	7.847	6.2928	0.60417	0.389	2.2029	0.64869	3.396	1.4258	0.7771
88	8.45	7.8626	6.2928	0.60084	0.383	2.2218	0.65203	3.408	1.4369	0.7849
89	8.58	7.8561	6.2928	0.59862	0.383	2.2175	0.65425	3.389	1.4359	0.78165
90	8.71	7.8681	6.2928	0.59584	0.378	2.2323	0.65702	3.398	1.4447	0.78764
91	8.84	7.863	6.2928	0.59195	0.377	2.2311	0.66091	3.376	1.446	0.78511
92	8.97	7.8644	6.2928	0.58918	0.375	2.2352	0.66369	3.368	1.4495	0.78578
93	9.10	7.8706	6.2928	0.5864	0.372	2.2443	0.66646	3.367	1.4554	0.78891
94	9.23	7.886	6.2928	0.58418	0.367	2.2619	0.66869	3.383	1.4653	0.79659
95	9.36	7.8985	6.2928	0.5814	0.362	2.2772	0.67146	3.391	1.4743	0.80285
96	9.49	7.9159	6.2928	0.57918	0.357	2.2968	0.67368	3.409	1.4852	0.81154
97	9.62	7.91	6.2928	0.57696	0.357	2.2931	0.6759	3.393	1.4845	0.8086
98	9.75	7.9013	6.2928	0.57529	0.358	2.2861	0.67757	3.374	1.4818	0.80427
99	9.89	7.8969	6.2928	0.57196	0.357	2.285	0.6809	3.356	1.4829	0.80204
100	10.02	7.8924	6.2928	0.56974	0.356	2.2827	0.68312	3.342	1.4829	0.79981
101	10.15	7.8943	6.2928	0.56696	0.354	2.2874	0.6859	3.335	1.4866	0.80074
102	10.28	7.8968	6.2928	0.56419	0.352	2.2926	0.68868	3.329	1.4907	0.80198
103	10.42	7.9048	6.2928	0.56086	0.348	2.3041	0.69201	3.330	1.498	0.80602
104	10.55	7.9081	6.2928	0.55808	0.346	2.31	0.69478	3.325	1.5024	0.80763
105	10.68	7.9057	6.2928	0.55641	0.345	2.3093	0.69645	3.316	1.5029	0.80643
106	10.81	7.9082	6.2928	0.55253	0.342	2.3157	0.70034	3.307	1.508	0.80769
107	10.94	7.9135	6.2928	0.54864	0.339	2.3249	0.70422	3.301	1.5146	0.81033
108	11.07	7.9194	6.2928	0.54586	0.336	2.3336	0.707	3.301	1.5203	0.81329
109	11.20	7.9219	6.2928	0.54253	0.333	2.3394	0.71033	3.293	1.5249	0.81453
110	11.33	7.9284	6.2928	0.53976	0.330	2.3488	0.71311	3.294	1.5309	0.81782
111	11.46	7.913	6.2928	0.53809	0.332	2.3349	0.71478	3.267	1.5249	0.81008
112	11.59	7.9181	6.2928	0.53531	0.329	2.3429	0.71755	3.265	1.5302	0.81266
113	11.72	7.9597	6.2928	0.53309	0.320	2.3867	0.71977	3.316	1.5532	0.83346
114	11.85	7.9065	6.2928	0.53031	0.329	2.3362	0.72255	3.233	1.5294	0.80683
115	11.98	7.8904	6.2928	0.52698	0.330	2.3235	0.72588	3.201	1.5247	0.79878
116	12.11	7.9003	6.2928	0.52476	0.326	2.3356	0.7281	3.208	1.5319	0.80376
117	12.24	7.8993	6.2928	0.52199	0.325	2.3374	0.73088	3.198	1.5341	0.80325
118	12.38	7.8962	6.2928	0.52032	0.325	2.3359	0.73255	3.189	1.5342	0.8017
119	12.51	7.8979	6.2928	0.5181	0.323	2.3398	0.73477	3.184	1.5373	0.80254
120	12.64	7.8934	6.2928	0.51421	0.321	2.3393	0.73865	3.167	1.539	0.8003
121	12.77	7.8944	6.2928	0.51255	0.320	2.3419	0.74032	3.163	1.5411	0.80079
122	12.90	7.8899	6.2928	0.50977	0.319	2.3402	0.7431	3.149	1.5416	0.79855
123	13.03	7.8889	6.2928	0.50755	0.318	2.3414	0.74532	3.141	1.5433	0.79803
124	13.17	7.8904	6.2928	0.50588	0.317	2.3446	0.74698	3.139	1.5458	0.79882
125	13.30	7.8894	6.2928	0.50422	0.316	2.3453	0.74865	3.133	1.547	0.79831
126	13.43	7.887	6.2928	0.50311	0.316	2.344	0.74976	3.126	1.5469	0.79712
127	13.56	7.892	6.2928	0.50033	0.313	2.3517	0.75254	3.125	1.5521	0.7996
128	13.69	7.8977	6.2928	0.49977	0.311	2.3579	0.75309	3.131	1.5555	0.80243
129	13.82	7.9006	6.2928	0.49811	0.310	2.3626	0.75476	3.130	1.5587	0.80391
130	13.95	7.8969	6.2928	0.497	0.310	2.3599	0.75587	3.122	1.5579	0.80203
131	14.08	7.8998	6.2928	0.49533	0.308	2.3645	0.75753	3.121	1.561	0.80349
132	14.21	7.9027	6.2928	0.49422	0.307	2.3685	0.75864	3.122	1.5636	0.80495
133	14.34	7.9109	6.2928	0.49311	0.305	2.3779	0.75975	3.130	1.5688	0.80905
134	14.47	7.9025	6.2928	0.492	0.306	2.3705	0.76087	3.116	1.5657	0.80484
135	14.60	7.906	6.2928	0.49144	0.305	2.3746	0.76142	3.119	1.568	0.80659
136	14.73	7.9048	6.2928	0.49033	0.304	2.3745	0.76253	3.114	1.5685	0.806
137	14.86	7.9056	6.2928	0.48922	0.303	2.3765	0.76364	3.112	1.57	0.80641
138	14.99	7.9038	6.2928	0.48756	0.303	2.3763	0.76531	3.105	1.5708	0.8055
139	15.13	7.9	6.2928	0.48589	0.302	2.3741	0.76697	3.095	1.5706	0.80358
140	15.26	7.902	6.2928	0.48422	0.301	2.3779	0.76864	3.094	1.5733	0.80462
141	15.39	7.9035	6.2928	0.48311	0.300	2.3804	0.76975	3.092	1.5751	0.80533
142	15.52	7.9089	6.2928	0.482	0.298	2.3869	0.77086	3.096	1.5789	0.80803
143	15.66	7.905	6.2928	0.47978	0.298	2.3853	0.77308	3.085	1.5792	0.80612
144	15.79	7.9045	6.2928	0.47812	0.297	2.3864	0.77475	3.080	1.5806	0.80584
145	15.92	7.906	6.2928	0.47701	0.296	2.389	0.77586	3.079	1.5824	0.80658
146	16.05	7.9126	6.2928	0.47534	0.293	2.3973	0.77752	3.083	1.5874	0.80988
147	16.07	7.916	6.2928	0.4759	0.293	2.4002	0.77697	3.089	1.5886	0.81159

TRIAXIAL TEST

Project: COLETO CREEK FACILITY | Location: IPR-GDF SUEZ | Project No.: 60225561
Boring No.: B-4-1 S-13 | Tested By: BCM | Checked By: WPQ
Sample No.: S-13 | Test Date: 12/2/11 | Depth: 24.0'-26.0'
Test No.: 24.3 PSI | Sample Type: 3" ST | Elevation: ----

Soil Description: CLAYEY F-C SAND LITTLE SILT - BROWNISH GRAY SC
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

Specimen Height: 5.93 in | Piston Area: 0.00 in^2 | Filter Strip Correction: 0.00 tsf
Specimen Area: 5.37 in^2 | Piston Friction: 0.00 lb | Membrane Correction: 0.00 lb/in
Specimen Volume: 31.88 in^3 | Piston Weight: 0.00 lb | Correction Type: Uniform

Liquid Limit: 40 | Plastic Limit: 24 | Measured Specific Gravity: 2.66

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	5.3738	0	0	5.042	6.84	6.84
2	5	0.017296	5.3747	9.9129	0.13279	5.1121	6.84	6.9728
3	10	0.036033	5.3757	12.588	0.16859	5.1464	6.84	7.0086
4	15	0.054771	5.3767	13.427	0.1798	5.167	6.84	7.0198
5	20	0.073508	5.3778	13.847	0.18538	5.1822	6.84	7.0254
6	25	0.092245	5.3788	14.319	0.19167	5.1958	6.84	7.0317
7	30.001	0.11242	5.3799	14.843	0.19865	5.2083	6.84	7.0386
8	35.001	0.13116	5.3809	15.945	0.21335	5.2214	6.84	7.0533
9	40.001	0.15134	5.3819	17.046	0.22804	5.2344	6.84	7.068
10	45.001	0.17152	5.383	18.515	0.24764	5.2485	6.84	7.0876
11	50.001	0.19026	5.384	19.931	0.26653	5.2632	6.84	7.1065
12	55.001	0.20899	5.3851	21.189	0.28331	5.2768	6.84	7.1233
13	60.001	0.22773	5.3861	22.553	0.30149	5.2898	6.84	7.1415
14	70.001	0.26521	5.3881	29.739	0.39739	5.3404	6.84	7.2374
15	80.001	0.30124	5.39	35.088	0.46871	5.3887	6.84	7.3087
16	90.002	0.34015	5.3921	39.127	0.52245	5.4322	6.84	7.3625
17	100	0.37907	5.3943	42.746	0.57055	5.4703	6.84	7.4106
18	110	0.41799	5.3964	45.788	0.61092	5.5056	6.84	7.4509
19	120	0.45546	5.3984	48.463	0.64637	5.5376	6.84	7.4864
20	130	0.49582	5.4006	51.138	0.68177	5.5664	6.84	7.5218
21	140	0.53473	5.4027	53.498	0.71295	5.5925	6.84	7.553
22	150	0.57365	5.4048	55.439	0.73853	5.6175	6.84	7.5785
23	160	0.61401	5.407	57.274	0.76267	5.6393	6.84	7.6027
24	170	0.65292	5.4091	58.9	0.78401	5.6594	6.84	7.624
25	180	0.69184	5.4112	60.474	0.80464	5.6789	6.84	7.6446
26	190	0.7322	5.4134	61.837	0.82245	5.6974	6.84	7.6625
27	200	0.77111	5.4156	63.306	0.84166	5.7132	6.84	7.6817
28	210	0.81147	5.4178	63.935	0.84968	5.7284	6.84	7.6897
29	220	0.85039	5.4199	65.824	0.87443	5.7431	6.84	7.7144
30	230	0.8893	5.422	67.082	0.8908	5.7566	6.84	7.7308
31	240	0.92966	5.4242	68.131	0.90436	5.7697	6.84	7.7444
32	270	1.0493	5.4308	71.121	0.9429	5.8034	6.84	7.7829
33	300	1.1689	5.4374	73.639	0.9751	5.8306	6.84	7.8151
34	330	1.2871	5.4439	75.999	1.0052	5.8545	6.84	7.8452
35	360	1.4053	5.4504	77.939	1.0296	5.8746	6.84	7.8696
36	390	1.5235	5.4569	79.775	1.0526	5.8925	6.84	7.8926
37	420	1.6417	5.4635	81.611	1.0755	5.9083	6.84	7.9155
38	450	1.7599	5.4701	83.184	1.0949	5.9219	6.84	7.9349
39	480	1.8781	5.4767	84.653	1.1129	5.9333	6.84	7.9529
40	510	1.9977	5.4833	86.174	1.1315	5.9441	6.84	7.9715
41	540	2.1159	5.49	87.538	1.148	5.9534	6.84	7.988
42	570	2.2326	5.4965	88.849	1.1638	5.9615	6.84	8.0038
43	600	2.3494	5.5031	90.265	1.181	5.9675	6.84	8.021
44	630	2.4704	5.5099	91.838	1.2001	5.974	6.84	8.0401
45	660	2.5872	5.5165	93.097	1.2151	5.9805	6.84	8.0551
46	690	2.7068	5.5233	94.146	1.2273	5.9843	6.84	8.0673
47	720	2.8236	5.5299	95.667	1.2456	5.9876	6.84	8.0856
48	750	2.9418	5.5367	96.821	1.2591	5.992	6.84	8.0991
49	780	3.0599	5.5434	97.818	1.2705	5.9952	6.84	8.1105
50	810	3.1781	5.5502	99.129	1.2859	5.9979	6.84	8.1259
51	840	3.2934	5.5568	99.968	1.2953	6.0001	6.84	8.1353
52	870	3.4102	5.5635	101.02	1.3073	6.0034	6.84	8.1473
53	900	3.5284	5.5703	101.86	1.3166	6.0045	6.84	8.1566
54	930	3.6451	5.5771	102.96	1.3292	6.0061	6.84	8.1692
55	960	3.7633	5.5839	104.01	1.3411	6.0072	6.84	8.1811
56	990	3.883	5.5909	104.95	1.3516	6.0083	6.84	8.1916
57	1020	3.9997	5.5977	105.95	1.3627	6.0093	6.84	8.2027
58	1050	4.1179	5.6046	106.89	1.3732	6.011	6.84	8.2132
59	1080	4.2346	5.6114	107.99	1.3857	6.011	6.84	8.2257
60	1110	4.3514	5.6183	108.83	1.3947	6.0126	6.84	8.2347
61	1140	4.4681	5.6251	109.46	1.4011	6.0131	6.84	8.2411
62	1170	4.5849	5.632	110.25	1.4094	6.0148	6.84	8.2494
63	1200	4.7045	5.6391	111.14	1.419	6.0142	6.84	8.259
64	1230	4.8213	5.646	112.03	1.4287	6.0126	6.84	8.2687
65	1260	4.9438	5.6533	112.98	1.4388	6.0131	6.84	8.2788
66	1290	5.0576	5.6601	113.81	1.4478	6.0115	6.84	8.2878
67	1320	5.1744	5.667	114.97	1.4607	6.0104	6.84	8.3007
68	1350	5.294	5.6742	115.81	1.4695	6.0093	6.84	8.3095
69	1380	5.4093	5.6811	116.8	1.4803	6.0088	6.84	8.3203
70	1410	5.5261	5.6881	117.91	1.4924	6.0077	6.84	8.3324
71	1440	5.6443	5.6953	118.95	1.5038	6.005	6.84	8.3438
72	1470	5.7596	5.7022	120.06	1.5159	6.0028	6.84	8.3559
73	1500	5.8763	5.7093	120.95	1.5253	6.0023	6.84	8.3653
74	1530	5.9945	5.7165	121.94	1.5359	6.0012	6.84	8.3759
75	1560	6.1141	5.7238	122.84	1.5452	5.999	6.84	8.3852
76	1590	6.2309	5.7309	123.94	1.5571	5.9941	6.84	8.3971
77	1620	6.3491	5.7381	124.93	1.5676	5.9914	6.84	8.4076
78	1650	6.4673	5.7454	125.83	1.5768	5.9892	6.84	8.4168
79	1680	6.5854	5.7526	126.87	1.588	5.9882	6.84	8.428

80	1710	6.7036	5.7599	128.13	1.6017	5.9849	6.84	8.4417
81	1740	6.8204	5.7671	128.92	1.6095	5.9816	6.84	8.4495
82	1770	6.9386	5.7745	130.02	1.6212	5.9784	6.84	8.4612
83	1800	7.0582	5.7819	131.33	1.6354	5.9746	6.84	8.4754
84	1830	7.1793	5.7894	132.43	1.647	5.9713	6.84	8.487
85	1860	7.2946	5.7966	133.48	1.658	5.9686	6.84	8.498
86	1890	7.4099	5.8039	134.58	1.6696	5.9659	6.84	8.5096
87	1920	7.5252	5.8111	135.27	1.676	5.9621	6.84	8.516
88	1950	7.6405	5.8184	136.05	1.6836	5.9593	6.84	8.5236
89	1980	7.7558	5.8256	136.84	1.6912	5.9566	6.84	8.5312
90	2010	7.8726	5.833	138.05	1.704	5.9528	6.84	8.544
91	2040	7.9893	5.8404	139.25	1.7167	5.949	6.84	8.5567
92	2070	8.1075	5.8479	140.14	1.7255	5.9458	6.84	8.5655
93	2100	8.2228	5.8553	140.98	1.7336	5.942	6.84	8.5736
94	2130	8.3396	5.8627	141.87	1.7424	5.9387	6.84	8.5824
95	2160	8.4577	5.8703	143.03	1.7543	5.9338	6.84	8.5943
96	2190	8.5745	5.8778	144.08	1.7649	5.93	6.84	8.6049
97	2220	8.6956	5.8856	145.44	1.7792	5.9267	6.84	8.6192
98	2250	8.8123	5.8931	146.81	1.7936	5.9229	6.84	8.6336
99	2280	8.9305	5.9008	147.7	1.8022	5.9191	6.84	8.6422
100	2310	9.0516	5.9086	148.17	1.8055	5.9153	6.84	8.6455
101	2340	9.1683	5.9162	149.11	1.8147	5.911	6.84	8.6547
102	2370	9.2865	5.9239	149.79	1.8206	5.9066	6.84	8.6606
103	2400	9.4033	5.9316	150.42	1.8259	5.9028	6.84	8.6659
104	2430	9.5214	5.9393	151.42	1.8356	5.899	6.84	8.6756
105	2460	9.6382	5.947	152.78	1.8498	5.8958	6.84	8.6898
106	2490	9.7549	5.9547	153.62	1.8575	5.892	6.84	8.6975
107	2520	9.8731	5.9625	154.36	1.8639	5.8871	6.84	8.7039
108	2550	9.9884	5.9701	155.56	1.8761	5.8827	6.84	8.7161
109	2580	10.107	5.978	156.77	1.8882	5.8778	6.84	8.7282
110	2610	10.222	5.9857	158.08	1.9015	5.8729	6.84	8.7415
111	2640	10.343	5.9937	158.71	1.9065	5.8686	6.84	8.7465
112	2670	10.46	6.0015	159.76	1.9166	5.8653	6.84	8.7566
113	2700	10.578	6.0095	160.28	1.9204	5.8604	6.84	8.7604
114	2730	10.695	6.0173	161.49	1.9323	5.8556	6.84	8.7723
115	2760	10.813	6.0253	162.17	1.9379	5.8512	6.84	8.7779
116	2790	10.931	6.0333	163.01	1.9453	5.8469	6.84	8.7853
117	2820	11.049	6.0413	163.9	1.9534	5.8425	6.84	8.7934
118	2850	11.167	6.0494	164.74	1.9608	5.8392	6.84	8.8008
119	2880	11.284	6.0573	165.58	1.9682	5.8349	6.84	8.8082
120	2910	11.404	6.0655	166.37	1.9749	5.8289	6.84	8.8149
121	2940	11.519	6.0734	167.47	1.9854	5.8235	6.84	8.8254
122	2970	11.637	6.0815	168.57	1.9957	5.8197	6.84	8.8357
123	3000	11.754	6.0896	169.46	2.0036	5.8159	6.84	8.8436
124	3030	11.872	6.0977	170.2	2.0096	5.8115	6.84	8.8496
125	3060	11.992	6.106	171.14	2.018	5.8072	6.84	8.858
126	3090	12.107	6.114	171.88	2.024	5.8018	6.84	8.864
127	3120	12.224	6.1222	172.56	2.0294	5.7963	6.84	8.8694
128	3150	12.344	6.1305	173.66	2.0395	5.792	6.84	8.8795
129	3180	12.46	6.1387	174.13	2.0424	5.7865	6.84	8.8824
130	3210	12.577	6.1469	175.23	2.0525	5.7827	6.84	8.8925
131	3240	12.694	6.1551	176.28	2.0621	5.7778	6.84	8.9021
132	3270	12.813	6.1636	177.17	2.0697	5.7729	6.84	8.9097
133	3300	12.932	6.1719	177.8	2.0742	5.7681	6.84	8.9142
134	3330	13.05	6.1803	178.69	2.0818	5.7632	6.84	8.9218
135	3360	13.172	6.189	179.59	2.0892	5.7583	6.84	8.9292
136	3390	13.288	6.1973	180.27	2.0944	5.7528	6.84	8.9344
137	3420	13.412	6.2061	180.84	2.098	5.7474	6.84	8.938
138	3450	13.527	6.2144	181.89	2.1074	5.7414	6.84	8.9474
139	3480	13.644	6.2228	182.68	2.1137	5.7371	6.84	8.9537
140	3510	13.763	6.2315	183.52	2.1204	5.7316	6.84	8.9604
141	3540	13.88	6.2399	184.36	2.1272	5.7273	6.84	8.9672
142	3570	13.998	6.2485	185.56	2.1382	5.723	6.84	8.9782
143	3600	14.118	6.2572	186.14	2.1419	5.7175	6.84	8.9819
144	3630	14.237	6.2659	186.93	2.1479	5.7121	6.84	8.9879
145	3660	14.348	6.274	188.03	2.1578	5.7072	6.84	8.9978
146	3690	14.465	6.2826	188.82	2.1639	5.7018	6.84	9.0039
147	3720	14.581	6.2911	189.76	2.1718	5.6963	6.84	9.0118
148	3750	14.702	6.3	190.55	2.1777	5.6925	6.84	9.0177
149	3780	14.814	6.3083	191.39	2.1844	5.6871	6.84	9.0244
150	3810	14.934	6.3172	192.12	2.1897	5.6817	6.84	9.0297
151	3840	15.046	6.3255	192.49	2.191	5.6768	6.84	9.031
152	3870	15.164	6.3344	193.12	2.1951	5.6719	6.84	9.0351
153	3900	15.281	6.3431	193.75	2.1992	5.667	6.84	9.0392
154	3930	15.402	6.3522	194.27	2.202	5.6637	6.84	9.042
155	3934.9	15.419	6.3535	194.17	2.2004	5.6626	6.84	9.0404

TRIAXIAL TEST

Project: COLETO CREEK FACILITY | Location: IPR-GDF SUEZ | Project No.: 60225561
Boring No.: B-4-1 S-13 | Tested By: BCM | Checked By: WPQ
Sample No.: S-13 | Test Date: 12/2/11 | Depth: 24.0'-26.0'
Test No.: 24.3 PSI | Sample Type: 3" ST | Elevation: ----

Soil Description: CLAYEY F-C SAND LITTLE SILT - BROWNISH GRAY SC
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

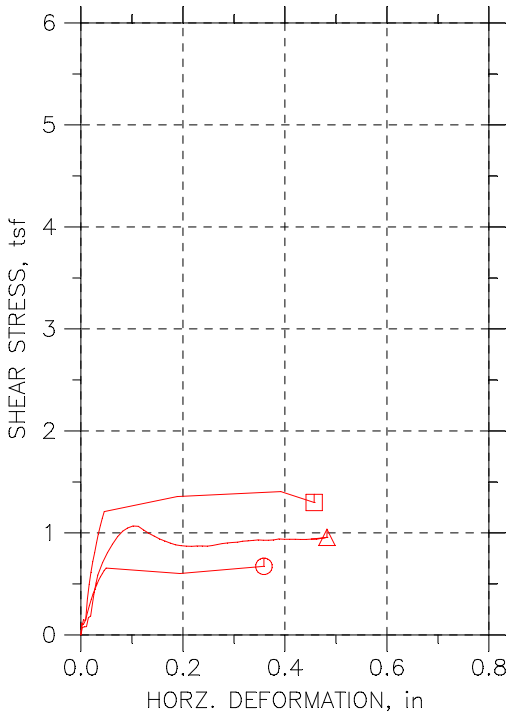
Specimen Height: 5.93 in | Piston Area: 0.00 in^2 | Filter Strip Correction: 0.00 tsf
Specimen Area: 5.37 in^2 | Piston Friction: 0.00 lb | Membrane Correction: 0.00 lb/in
Specimen Volume: 31.88 in^3 | Piston Weight: 0.00 lb | Correction Type: Uniform

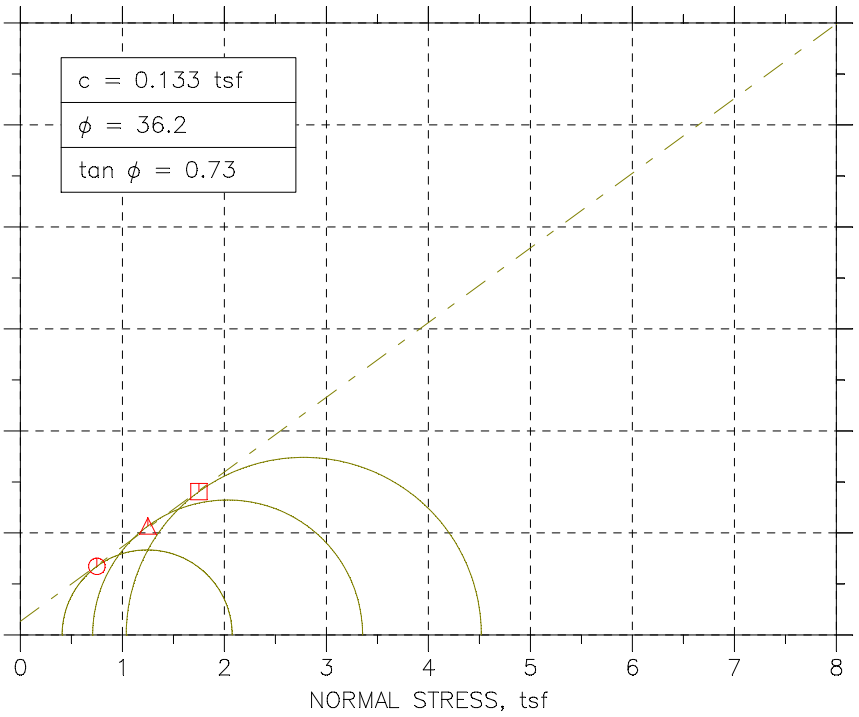
Liquid Limit: 40 | Plastic Limit: 24 | Measured Specific Gravity: 2.66

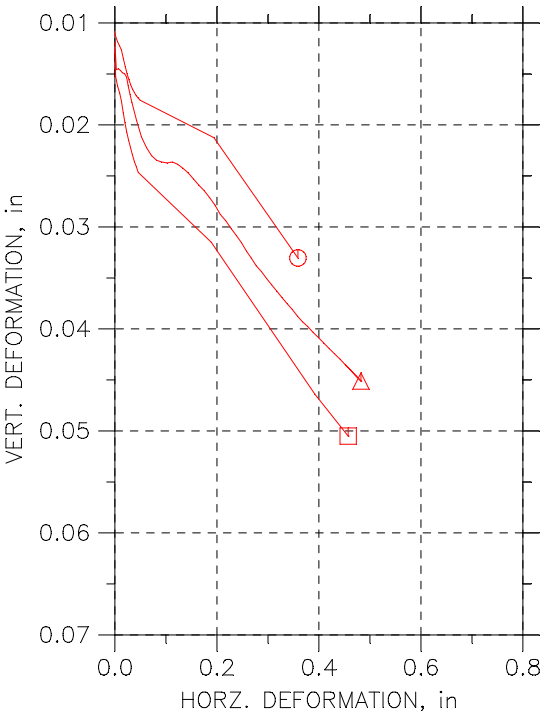
	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	6.84	6.84	0	0.000	1.798	1.798	1.000	1.798	0
2	0.02	6.9728	6.84	0.070104	0.528	1.8607	1.7279	1.077	1.7943	0.066397
3	0.04	7.0086	6.84	0.10434	0.619	1.8622	1.6936	1.100	1.7779	0.084297
4	0.05	7.0198	6.84	0.12499	0.695	1.8528	1.673	1.107	1.7629	0.0899
5	0.07	7.0254	6.84	0.14021	0.756	1.8432	1.6578	1.112	1.7505	0.092692
6	0.09	7.0317	6.84	0.15379	0.802	1.8359	1.6442	1.117	1.74	0.095834
7	0.11	7.0386	6.84	0.16629	0.837	1.8303	1.6317	1.122	1.731	0.099325
8	0.13	7.0533	6.84	0.17933	0.841	1.832	1.6186	1.132	1.7253	0.10667
9	0.15	7.068	6.84	0.19238	0.844	1.8336	1.6056	1.142	1.7196	0.11402
10	0.17	7.0876	6.84	0.20651	0.834	1.8391	1.5915	1.156	1.7153	0.12382
11	0.19	7.1065	6.84	0.22118	0.830	1.8433	1.5768	1.169	1.7101	0.13326
12	0.21	7.1233	6.84	0.23477	0.829	1.8465	1.5632	1.181	1.7049	0.14165
13	0.23	7.1415	6.84	0.24781	0.822	1.8517	1.5502	1.194	1.7009	0.15074
14	0.27	7.2374	6.84	0.29835	0.751	1.897	1.4996	1.265	1.6983	0.1987
15	0.30	7.3087	6.84	0.34671	0.740	1.92	1.4513	1.323	1.6856	0.23436
16	0.34	7.3625	6.84	0.39019	0.747	1.9302	1.4078	1.371	1.669	0.26123
17	0.38	7.4106	6.84	0.42823	0.751	1.9403	1.3697	1.417	1.655	0.28528
18	0.42	7.4509	6.84	0.46355	0.759	1.9453	1.3344	1.458	1.6399	0.30546
19	0.46	7.4864	6.84	0.49562	0.767	1.9487	1.3024	1.496	1.6255	0.32318
20	0.50	7.5218	6.84	0.52442	0.769	1.9553	1.2736	1.535	1.6144	0.34088
21	0.53	7.553	6.84	0.5505	0.772	1.9604	1.2475	1.572	1.6039	0.35648
22	0.57	7.5785	6.84	0.5755	0.779	1.961	1.2225	1.604	1.5917	0.36926
23	0.61	7.6027	6.84	0.59724	0.783	1.9634	1.2007	1.635	1.5821	0.38133
24	0.65	7.624	6.84	0.61735	0.787	1.9646	1.1806	1.664	1.5726	0.39201
25	0.69	7.6446	6.84	0.63691	0.792	1.9657	1.1611	1.693	1.5634	0.40232
26	0.73	7.6625	6.84	0.65539	0.797	1.965	1.1426	1.720	1.5538	0.41123
27	0.77	7.6817	6.84	0.67115	0.797	1.9685	1.1268	1.747	1.5477	0.42083
28	0.81	7.6897	6.84	0.68636	0.808	1.9613	1.1116	1.764	1.5365	0.42484
29	0.85	7.7144	6.84	0.70104	0.802	1.9714	1.0969	1.797	1.5342	0.43721
30	0.89	7.7308	6.84	0.71462	0.802	1.9742	1.0834	1.822	1.5288	0.4454
31	0.93	7.7444	6.84	0.72766	0.805	1.9747	1.0703	1.845	1.5225	0.45218
32	1.05	7.7829	6.84	0.76136	0.807	1.9795	1.0366	1.910	1.5081	0.47145
33	1.17	7.8151	6.84	0.78853	0.809	1.9845	1.0094	1.966	1.497	0.48755
34	1.29	7.8452	6.84	0.81244	0.808	1.9907	0.98553	2.020	1.4881	0.50258
35	1.41	7.8696	6.84	0.83255	0.809	1.995	0.96543	2.066	1.4802	0.51479
36	1.52	7.8926	6.84	0.85048	0.808	2.0001	0.94749	2.111	1.4738	0.52628
37	1.64	7.9155	6.84	0.86624	0.805	2.0072	0.93173	2.154	1.4695	0.53775
38	1.76	7.9349	6.84	0.87983	0.804	2.0131	0.91815	2.193	1.4656	0.54746
39	1.88	7.9529	6.84	0.89124	0.801	2.0196	0.90674	2.227	1.4632	0.55645
40	2.00	7.9715	6.84	0.90211	0.797	2.0274	0.89587	2.263	1.4616	0.56576
41	2.12	7.988	6.84	0.91135	0.794	2.0347	0.88663	2.295	1.4606	0.57402
42	2.23	8.0038	6.84	0.9195	0.790	2.0423	0.87848	2.325	1.4604	0.58192
43	2.35	8.021	6.84	0.92548	0.784	2.0535	0.8725	2.354	1.463	0.59049
44	2.47	8.0401	6.84	0.932	0.777	2.0661	0.86598	2.386	1.466	0.60004
45	2.59	8.0551	6.84	0.93852	0.772	2.0745	0.85946	2.414	1.467	0.60754
46	2.71	8.0673	6.84	0.94232	0.768	2.0829	0.85565	2.434	1.4693	0.61363
47	2.82	8.0856	6.84	0.94558	0.759	2.098	0.85239	2.461	1.4752	0.62279
48	2.94	8.0991	6.84	0.94993	0.754	2.1071	0.84804	2.485	1.4776	0.62954
49	3.06	8.1105	6.84	0.95319	0.750	2.1153	0.84478	2.504	1.48	0.63524
50	3.18	8.1259	6.84	0.95591	0.743	2.128	0.84207	2.527	1.485	0.64297
51	3.29	8.1353	6.84	0.95808	0.740	2.1352	0.83989	2.542	1.4875	0.64765
52	3.41	8.1473	6.84	0.96134	0.735	2.1439	0.83663	2.563	1.4903	0.65365
53	3.53	8.1566	6.84	0.96243	0.731	2.1521	0.83555	2.576	1.4938	0.65828
54	3.65	8.1692	6.84	0.96406	0.725	2.1631	0.83392	2.594	1.4985	0.66459
55	3.76	8.1811	6.84	0.96515	0.720	2.1739	0.83283	2.610	1.5034	0.67054
56	3.88	8.1916	6.84	0.96623	0.715	2.1833	0.83174	2.625	1.5075	0.67578
57	4.00	8.2027	6.84	0.96732	0.710	2.1934	0.83065	2.641	1.512	0.68137
58	4.12	8.2132	6.84	0.96895	0.706	2.2022	0.82902	2.656	1.5156	0.68659
59	4.23	8.2257	6.84	0.96895	0.699	2.2147	0.82902	2.671	1.5218	0.69283
60	4.35	8.2347	6.84	0.97058	0.696	2.2221	0.82739	2.686	1.5248	0.69736
61	4.47	8.2411	6.84	0.97112	0.693	2.2279	0.82685	2.694	1.5274	0.70053
62	4.58	8.2494	6.84	0.97276	0.690	2.2346	0.82522	2.708	1.5299	0.70471
63	4.70	8.259	6.84	0.97221	0.685	2.2448	0.82576	2.718	1.5353	0.70952
64	4.82	8.2687	6.84	0.97058	0.679	2.2561	0.82739	2.727	1.5417	0.71433
65	4.94	8.2788	6.84	0.97112	0.675	2.2657	0.82685	2.740	1.5463	0.71942
66	5.06	8.2878	6.84	0.96949	0.670	2.2763	0.82848	2.748	1.5524	0.7239
67	5.17	8.3007	6.84	0.96841	0.663	2.2902	0.82957	2.761	1.5599	0.73034
68	5.29	8.3095	6.84	0.96732	0.658	2.3001	0.83065	2.769	1.5654	0.73474
69	5.41	8.3203	6.84	0.96678	0.653	2.3115	0.8312	2.781	1.5714	0.74016
70	5.53	8.3324	6.84	0.96569	0.647	2.3247	0.83228	2.793	1.5785	0.74622
71	5.64	8.3438	6.84	0.96297	0.640	2.3388	0.835	2.801	1.5869	0.75192
72	5.76	8.3559	6.84	0.9608	0.634	2.3531	0.83718	2.811	1.5951	0.75795
73	5.88	8.3653	6.84	0.96026	0.630	2.363	0.83772	2.821	1.6004	0.76264
74	5.99	8.3759	6.84	0.95917	0.624	2.3747	0.83881	2.831	1.6068	0.76795
75	6.11	8.3852	6.84	0.957	0.619	2.3861	0.84098	2.837	1.6136	0.77258
76	6.23	8.3971	6.84	0.9521	0.611	2.403	0.84587	2.841	1.6244	0.77854
77	6.35	8.4076	6.84	0.94939	0.606	2.4162	0.84859	2.847	1.6324	0.78381
78	6.47	8.4168	6.84	0.94721	0.601	2.4276	0.85076	2.853	1.6392	0.78841

79	6.59	8.428	6.84	0.94613	0.596	2.4398	0.85185	2.864	1.6458	0.79398
80	6.70	8.4417	6.84	0.94287	0.589	2.4568	0.85511	2.873	1.656	0.80084
81	6.82	8.4495	6.84	0.93961	0.584	2.4679	0.85837	2.875	1.6631	0.80475
82	6.94	8.4612	6.84	0.93634	0.578	2.4828	0.86163	2.882	1.6722	0.8106
83	7.06	8.4754	6.84	0.93254	0.570	2.5009	0.86543	2.890	1.6832	0.81772
84	7.18	8.487	6.84	0.92928	0.564	2.5157	0.8687	2.896	1.6922	0.8235
85	7.29	8.498	6.84	0.92656	0.559	2.5294	0.87141	2.903	1.7004	0.82899
86	7.41	8.5096	6.84	0.92385	0.553	2.5437	0.87413	2.910	1.7089	0.8348
87	7.53	8.516	6.84	0.92004	0.549	2.5539	0.87793	2.909	1.7159	0.83798
88	7.64	8.5236	6.84	0.91732	0.545	2.5643	0.88065	2.912	1.7225	0.8418
89	7.76	8.5312	6.84	0.91461	0.541	2.5746	0.88337	2.915	1.729	0.84561
90	7.87	8.544	6.84	0.9108	0.535	2.5911	0.88717	2.921	1.7392	0.85199
91	7.99	8.5567	6.84	0.907	0.528	2.6077	0.89098	2.927	1.7493	0.85834
92	8.11	8.5655	6.84	0.90374	0.524	2.6197	0.89424	2.930	1.757	0.86273
93	8.22	8.5736	6.84	0.89993	0.519	2.6317	0.89804	2.930	1.7648	0.86681
94	8.34	8.5824	6.84	0.89667	0.515	2.6437	0.9013	2.933	1.7725	0.87118
95	8.46	8.5943	6.84	0.89178	0.508	2.6605	0.90619	2.936	1.7833	0.87713
96	8.57	8.6049	6.84	0.88798	0.503	2.6749	0.91	2.939	1.7924	0.88244
97	8.70	8.6192	6.84	0.88472	0.497	2.6925	0.91326	2.948	1.8029	0.88961
98	8.81	8.6336	6.84	0.88091	0.491	2.7107	0.91706	2.956	1.8139	0.8968
99	8.93	8.6422	6.84	0.87711	0.487	2.723	0.92087	2.957	1.8219	0.90108
100	9.05	8.6455	6.84	0.87331	0.484	2.7302	0.92467	2.953	1.8274	0.90276
101	9.17	8.6547	6.84	0.86896	0.479	2.7437	0.92902	2.953	1.8364	0.90735
102	9.29	8.6606	6.84	0.86461	0.475	2.754	0.93336	2.951	1.8437	0.91031
103	9.40	8.6659	6.84	0.86081	0.471	2.7631	0.93717	2.948	1.8501	0.91296
104	9.52	8.6756	6.84	0.857	0.467	2.7766	0.94097	2.951	1.8588	0.91781
105	9.64	8.6898	6.84	0.85374	0.462	2.794	0.94423	2.959	1.8691	0.92488
106	9.75	8.6975	6.84	0.84994	0.458	2.8055	0.94804	2.959	1.8768	0.92876
107	9.87	8.7039	6.84	0.84505	0.453	2.8169	0.95293	2.956	1.8849	0.93197
108	9.99	8.7161	6.84	0.8407	0.448	2.8334	0.95728	2.960	1.8953	0.93806
109	10.11	8.7282	6.84	0.83581	0.443	2.8503	0.96217	2.962	1.9063	0.94409
110	10.22	8.7415	6.84	0.83092	0.437	2.8686	0.96706	2.966	1.9178	0.95076
111	10.34	8.7465	6.84	0.82657	0.434	2.8779	0.97141	2.963	1.9247	0.95326
112	10.46	8.7566	6.84	0.82331	0.430	2.8913	0.97467	2.966	1.933	0.95831
113	10.58	8.7604	6.84	0.81842	0.426	2.8999	0.97956	2.960	1.9397	0.96019
114	10.69	8.7723	6.84	0.81353	0.421	2.9168	0.98445	2.963	1.9506	0.96615
115	10.81	8.7779	6.84	0.80918	0.418	2.9267	0.9888	2.960	1.9577	0.96895
116	10.93	8.7853	6.84	0.80483	0.414	2.9385	0.99314	2.959	1.9658	0.97267
117	11.05	8.7934	6.84	0.80049	0.410	2.9509	0.99749	2.958	1.9742	0.97669
118	11.17	8.8008	6.84	0.79722	0.407	2.9615	1.0008	2.959	1.9811	0.98039
119	11.28	8.8082	6.84	0.79288	0.403	2.9733	1.0051	2.958	1.9892	0.98409
120	11.40	8.8149	6.84	0.7869	0.398	2.9859	1.0111	2.953	1.9985	0.98743
121	11.52	8.8254	6.84	0.78146	0.394	3.0019	1.0165	2.953	2.0092	0.99268
122	11.64	8.8357	6.84	0.77766	0.390	3.0161	1.0203	2.956	2.0182	0.99787
123	11.75	8.8436	6.84	0.77386	0.386	3.0278	1.0241	2.956	2.0259	1.0018
124	11.87	8.8496	6.84	0.76951	0.383	3.0381	1.0285	2.954	2.0333	1.0048
125	11.99	8.858	6.84	0.76516	0.379	3.0508	1.0328	2.954	2.0418	1.009
126	12.11	8.864	6.84	0.75973	0.375	3.0623	1.0382	2.949	2.0503	1.012
127	12.22	8.8694	6.84	0.75429	0.372	3.0731	1.0437	2.944	2.0584	1.0147
128	12.34	8.8795	6.84	0.74995	0.368	3.0876	1.048	2.946	2.0678	1.0198
129	12.46	8.8824	6.84	0.74451	0.365	3.0958	1.0535	2.939	2.0746	1.0212
130	12.58	8.8925	6.84	0.74071	0.361	3.1098	1.0573	2.941	2.0835	1.0263
131	12.69	8.9021	6.84	0.73582	0.357	3.1242	1.0622	2.941	2.0932	1.031
132	12.81	8.9097	6.84	0.73093	0.353	3.1367	1.0671	2.940	2.1019	1.0348
133	12.93	8.9142	6.84	0.72603	0.350	3.1461	1.0719	2.935	2.109	1.0371
134	13.05	8.9218	6.84	0.72114	0.346	3.1586	1.0768	2.933	2.1177	1.0409
135	13.17	8.9292	6.84	0.71625	0.343	3.1709	1.0817	2.931	2.1263	1.0446
136	13.29	8.9344	6.84	0.71082	0.339	3.1815	1.0872	2.926	2.1343	1.0472
137	13.41	8.938	6.84	0.70538	0.336	3.1906	1.0926	2.920	2.1416	1.049
138	13.53	8.9474	6.84	0.69941	0.332	3.206	1.0986	2.918	2.1523	1.0537
139	13.64	8.9537	6.84	0.69506	0.329	3.2166	1.1029	2.916	2.1598	1.0568
140	13.76	8.9604	6.84	0.68962	0.325	3.2288	1.1084	2.913	2.1686	1.0602
141	13.88	8.9672	6.84	0.68528	0.322	3.2399	1.1127	2.912	2.1763	1.0636
142	14.00	8.9782	6.84	0.68093	0.318	3.2553	1.117	2.914	2.1862	1.0691
143	14.12	8.9819	6.84	0.67549	0.315	3.2644	1.1225	2.908	2.1934	1.0709
144	14.24	8.9879	6.84	0.67006	0.312	3.2759	1.1279	2.904	2.2019	1.074
145	14.35	8.9978	6.84	0.66517	0.308	3.2906	1.1328	2.905	2.2117	1.0789
146	14.47	9.0039	6.84	0.65973	0.305	3.3021	1.1382	2.901	2.2202	1.0819
147	14.58	9.0118	6.84	0.6543	0.301	3.3154	1.1437	2.899	2.2296	1.0859
148	14.70	9.0177	6.84	0.6505	0.299	3.3252	1.1475	2.898	2.2363	1.0888
149	14.81	9.0244	6.84	0.64506	0.295	3.3373	1.1529	2.895	2.2451	1.0922
150	14.93	9.0297	6.84	0.63963	0.292	3.348	1.1583	2.890	2.2532	1.0948
151	15.05	9.031	6.84	0.63474	0.290	3.3542	1.1632	2.884	2.2587	1.0955
152	15.16	9.0351	6.84	0.62985	0.287	3.3632	1.1681	2.879	2.2657	1.0975
153	15.28	9.0392	6.84	0.62495	0.284	3.3722	1.173	2.875	2.2726	1.0996
154	15.40	9.042	6.84	0.62169	0.282	3.3783	1.1763	2.872	2.2773	1.101
155	15.42	9.0404	6.84	0.62061	0.282	3.3777	1.1774	2.869	2.2776	1.1002

DIRECT SHEAR TEST REPORT







Symbol		⏲	△	⊡	
Test No.		.75 TSF	1.25 TSF	1.75 TSF	
Sample No.		S-16-18	S-16-18	S-16-18	
Shape		Circular	Circular	Circular	
Initial	Dimension, in	2.3504	2.3504	2.3504	
	Area, in^2	4.3388	4.3388	4.3388	
	Height, in	1	1	1	
	Water Content, %	16.12	16.62	16.15	
	Dry Density, pcf	117.9	117.1	117.9	
	Saturation, %	99.55	100.36	99.77	
	Void Ratio	0.44047	0.45053	0.44026	
Consol. Height, in		0.98989	0.9897	0.98947	
Consol. Void Ratio		0.42591	0.43558	0.4251	
Final	Water Content, %	14.02	14.02	12.51	
	Dry Density, pcf	121.9	122.6	124.2	
	Saturation, %	97.07	99.04	92.56	
	Void Ratio	0.39288	0.38509	0.36752	
Normal Stress, tsf		0.75	1.25	1.75	
Max. Shear Stress, tsf		0.67243	1.0674	1.4045	
Ult. Shear Stress, tsf		0.67243	0.95657	1.2984	
Time to Failure, min		180.15	62.996	198	
Disp. Rate, in/min		0.001417	0.001417	0.001417	
Estimated Specific Gravity		2.72	2.72	2.72	
Liquid Limit		---	---	---	
Plastic Limit		---	---	---	
Plasticity Index		---	---	---	

Project: COLETO CREEK FACILITY
Location: IPR-GDF SUEZ
Project No.: 60225561
Boring No.: B-1-1
Sample Type: TRIMMED
Description: CALICHE SOIL (CALSIUM CARBONATE) SOME F-C SAND TRACE F GRAVEL - WHITE
Remarks: TEST PERFORMED AS PER ASTM D 3080. SPECIMEN REMOLDED TO 117.0 PCF@ 16.5 WC

DIRECT SHEAR TEST DATA

Project: COLETO CREEK FACILITY | Location: IPR-GDF SUEZ | Project No.: 60225561
Boring No.: B-1-1 | Tested By: BCM | Checked By: WPQ
Sample No.: S-16-18 | Test Date: 12/17/11 | Depth: ----
Test No.: .75 TSF | Sample Type: TRIMMED | Elevation: ----

Soil Description: CALICHE SOIL (CALSIUM CARBONATE) SOME F-C SAND TRACE F GRAVEL - WHITE
Remarks: TEST PERFORMED AS PER ASTM D 3080. SPECIMEN REMOLDED TO 117.0 PCF@ 16.5 WC

Step: 1 of 1

	Elapsed Time min	Vertical Stress tsf	Vertical Displacement in	Horizontal Stress tsf	Horizontal Displacement in	Cumulative Displacement in
1	0.00	0.75	0.01082	0	0	0
2	2.00	0.75	0.01127	0.06009	0.001129	0.001129
3	4.00	0.75	0.01182	0.1469	0.004796	0.004796
4	6.00	0.75	0.01225	0.143	0.008888	0.008888
5	8.00	0.75	0.01266	0.2189	0.0127	0.0127
6	10.00	0.75	0.0135	0.2873	0.01651	0.01651
7	12.00	0.75	0.01429	0.3483	0.02031	0.02031
8	14.00	0.75	0.01498	0.4009	0.02384	0.02384
9	16.00	0.75	0.01557	0.4496	0.02751	0.02751
10	18.00	0.75	0.01607	0.4908	0.03104	0.03104
11	20.00	0.75	0.01648	0.5329	0.03456	0.03456
12	22.00	0.75	0.01683	0.5689	0.03809	0.03809
13	24.00	0.75	0.01715	0.6005	0.0419	0.0419
14	26.00	0.75	0.01735	0.6294	0.04543	0.04543
15	28.00	0.75	0.01757	0.6558	0.04938	0.04938
16	98.00	0.75	0.02125	0.6014	0.1943	0.1943
17	180.15	0.75	0.03304	0.6724	0.3589	0.3589

DIRECT SHEAR TEST DATA

Project: COLETO CREEK FACILITY | Location: IPR-GDF SUEZ | Project No.: 60225561
Boring No.: B-1-1 | Tested By: BCM | Checked By: WPQ
Sample No.: S-16-18 | Test Date: 12/17/11 | Depth: ----
Test No.: 1.25 TSF | Sample Type: TRIMMED | Elevation: ----

Soil Description: CALICHE SOIL (CALSIUM CARBONATE) SOME F-C SAND TRACE F GRAVEL - WHITE
Remarks: TEST PERFORMED AS PER ASTM D 3080. SPECIMEN REMOLDED TO 117.0 PCF@ 16.5 WC

Step: 1 of 1

	Elapsed Time min	Vertical Stress tsf	Vertical Displacement in	Horizontal Stress tsf	Horizontal Displacement in	Cumulative Displacement in
1	0.00	1.25	0.01189	0	0	0
2	12.00	1.25	0.01458	0.07233	0.002821	0.002821
3	14.00	1.25	0.01451	0.07971	0.006913	0.006913
4	16.00	1.25	0.01467	0.08127	0.011	0.011
5	18.00	1.25	0.01488	0.1684	0.01481	0.01481
6	20.00	1.25	0.01499	0.1843	0.0189	0.0189
7	22.00	1.25	0.0153	0.313	0.02271	0.02271
8	24.00	1.25	0.01616	0.413	0.0261	0.0261
9	26.00	1.25	0.01703	0.5094	0.02963	0.02963
10	28.00	1.25	0.01777	0.5879	0.03315	0.03315
11	33.00	1.25	0.01959	0.7097	0.04246	0.04246
12	38.00	1.25	0.02117	0.8061	0.05206	0.05206
13	43.00	1.25	0.02223	0.8912	0.06193	0.06193
14	48.00	1.25	0.02302	0.9647	0.07209	0.07209
15	53.00	1.25	0.02348	1.018	0.08196	0.08196
16	58.00	1.25	0.02364	1.05	0.09198	0.09198
17	63.00	1.25	0.02373	1.067	0.1021	0.1021
18	68.00	1.25	0.02364	1.064	0.1126	0.1126
19	73.00	1.25	0.02385	1.029	0.123	0.123
20	78.00	1.25	0.02424	0.9962	0.1333	0.1333
21	83.00	1.25	0.0247	0.969	0.1436	0.1436
22	88.00	1.25	0.02532	0.941	0.1542	0.1542
23	93.00	1.25	0.02591	0.9196	0.1648	0.1648
24	98.00	1.25	0.02646	0.9006	0.1754	0.1754
25	103.00	1.25	0.02715	0.8831	0.1859	0.1859
26	108.00	1.25	0.02788	0.8749	0.1964	0.1964
27	113.00	1.25	0.02879	0.8695	0.2068	0.2068
28	118.00	1.25	0.02939	0.8679	0.2174	0.2174
29	123.00	1.25	0.03015	0.871	0.2277	0.2277
30	128.00	1.25	0.03082	0.8718	0.2378	0.2378
31	133.00	1.25	0.03154	0.8706	0.248	0.248
32	138.00	1.25	0.03235	0.8772	0.2577	0.2577
33	143.00	1.25	0.03304	0.8858	0.2673	0.2673
34	148.00	1.25	0.0338	0.8955	0.2769	0.2769
35	153.00	1.25	0.03439	0.9017	0.2872	0.2872
36	158.00	1.25	0.03505	0.9064	0.2972	0.2972
37	163.00	1.25	0.03568	0.9091	0.3074	0.3074
38	168.00	1.25	0.0363	0.9185	0.3176	0.3176
39	173.00	1.25	0.03691	0.922	0.3276	0.3276
40	178.00	1.25	0.03753	0.9262	0.3377	0.3377
41	183.00	1.25	0.03808	0.9321	0.3476	0.3476
42	188.00	1.25	0.03874	0.9282	0.3578	0.3578
43	193.00	1.25	0.0393	0.929	0.3678	0.3678
44	198.00	1.25	0.03976	0.9309	0.3779	0.3779
45	203.00	1.25	0.04033	0.941	0.3884	0.3884
46	208.00	1.25	0.04084	0.9383	0.399	0.399
47	213.00	1.25	0.04139	0.9371	0.4095	0.4095
48	218.00	1.25	0.04193	0.9379	0.42	0.42
49	223.00	1.25	0.04244	0.9356	0.4307	0.4307
50	228.00	1.25	0.04296	0.936	0.4413	0.4413
51	233.00	1.25	0.04351	0.9391	0.4517	0.4517
52	238.00	1.25	0.04403	0.9406	0.462	0.462
53	243.00	1.25	0.04459	0.9476	0.4723	0.4723
54	248.00	1.25	0.04511	0.9566	0.4823	0.4823

DIRECT SHEAR TEST DATA

Project: COLETO CREEK FACILITY | Location: IPR-GDF SUEZ | Project No.: 60225561
Boring No.: B-1-1 | Tested By: BCM | Checked By: WPQ
Sample No.: S-16-18 | Test Date: 12/17/11 | Depth: ----
Test No.: 1.75 TSF | Sample Type: TRIMMED | Elevation: ----

Soil Description: CALICHE SOIL (CALSIUM CARBONATE) SOME F-C SAND TRACE F GRAVEL - WHITE
Remarks: TEST PERFORMED AS PER ASTM D 3080. SPECIMEN REMOLDED TO 117.0 PCF@ 16.5 WC

Step: 1 of 1

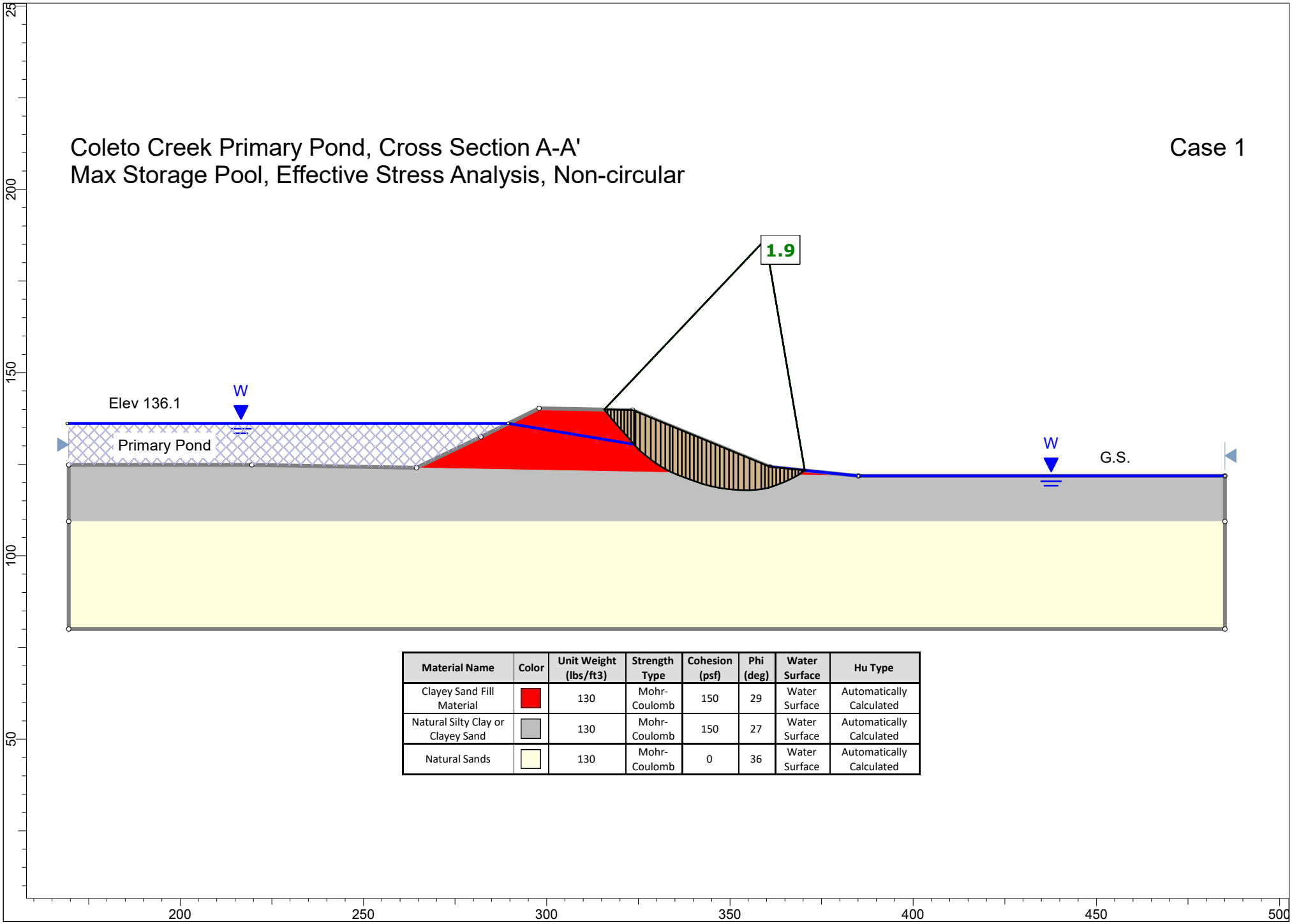
	Elapsed Time min	Vertical Stress tsf	Vertical Displacement in	Horizontal Stress tsf	Horizontal Displacement in	Cumulative Displacement in
1	0.00	1.75	0.01256	0	0	0
2	4.00	1.75	0.01529	0.1083	0.001552	0.001552
3	6.00	1.75	0.0162	0.107	0.00522	0.00522
4	8.00	1.75	0.01687	0.1474	0.009311	0.009311
5	10.00	1.75	0.01767	0.3553	0.0127	0.0127
6	12.00	1.75	0.01877	0.497	0.01622	0.01622
7	14.00	1.75	0.01979	0.615	0.01961	0.01961
8	16.00	1.75	0.0207	0.7159	0.02328	0.02328
9	18.00	1.75	0.02152	0.8062	0.02694	0.02694
10	20.00	1.75	0.02223	0.904	0.03061	0.03061
11	22.00	1.75	0.02289	0.9887	0.03414	0.03414
12	24.00	1.75	0.02361	1.072	0.03809	0.03809
13	26.00	1.75	0.02409	1.144	0.0419	0.0419
14	28.00	1.75	0.02466	1.209	0.04585	0.04585
15	98.00	1.75	0.0315	1.356	0.1888	0.1888
16	198.00	1.75	0.04639	1.405	0.392	0.392
17	243.36	1.75	0.0505	1.298	0.4572	0.4572

APPENDIX C

Slide 7.0 Stability Analysis Models

Coleto Creek Primary Pond, Cross Section A-A'
Max Storage Pool, Effective Stress Analysis, Non-circular

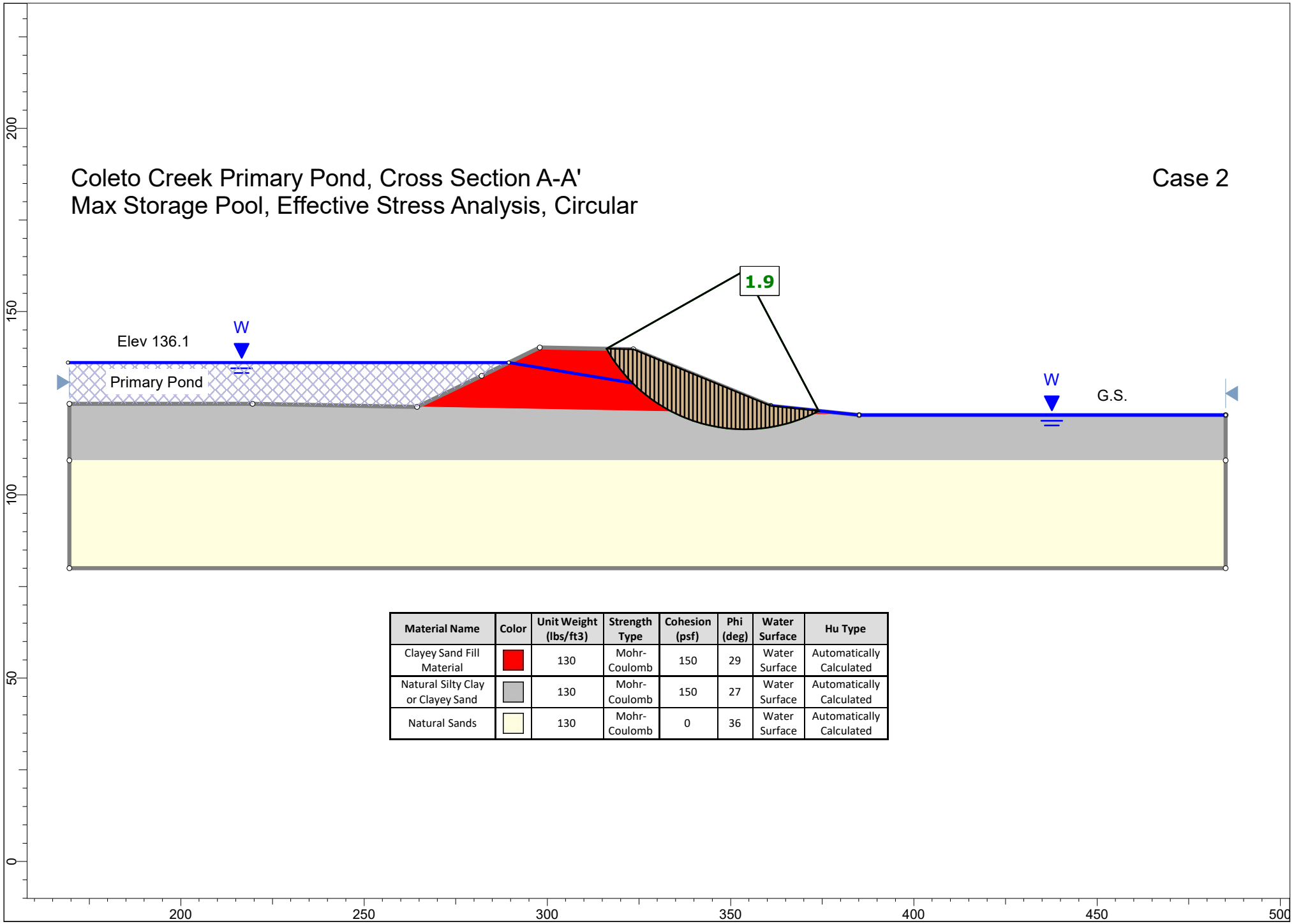
Case 1



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Clayey Sand Fill Material		130	Mohr-Coulomb	150	29	Water Surface	Automatically Calculated
Natural Silty Clay or Clayey Sand		130	Mohr-Coulomb	150	27	Water Surface	Automatically Calculated
Natural Sands		130	Mohr-Coulomb	0	36	Water Surface	Automatically Calculated

Coleto Creek Primary Pond, Cross Section A-A'
Max Storage Pool, Effective Stress Analysis, Circular

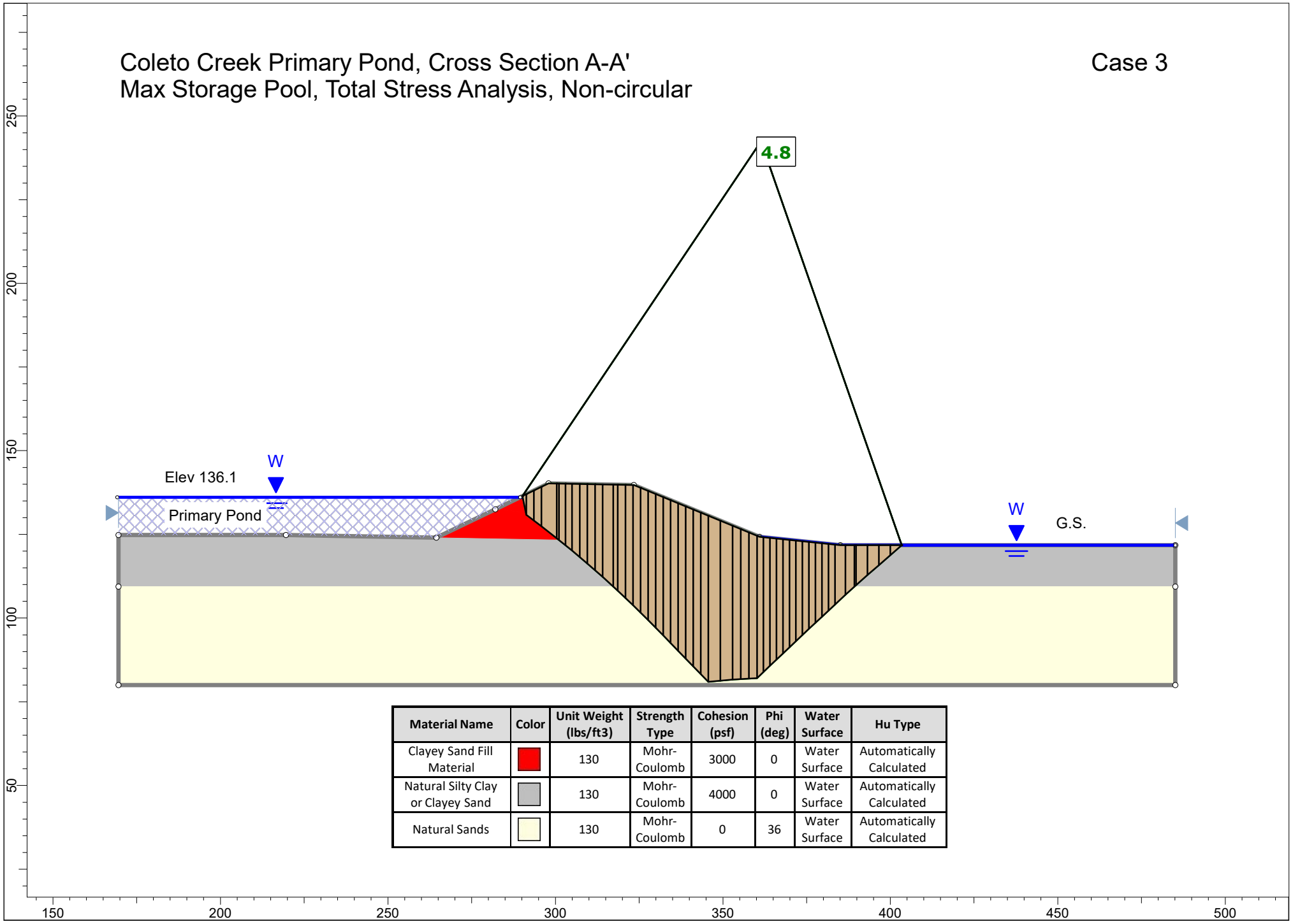
Case 2



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Clayey Sand Fill Material		130	Mohr-Coulomb	150	29	Water Surface	Automatically Calculated
Natural Silty Clay or Clayey Sand		130	Mohr-Coulomb	150	27	Water Surface	Automatically Calculated
Natural Sands		130	Mohr-Coulomb	0	36	Water Surface	Automatically Calculated

Coleto Creek Primary Pond, Cross Section A-A'
Max Storage Pool, Total Stress Analysis, Non-circular

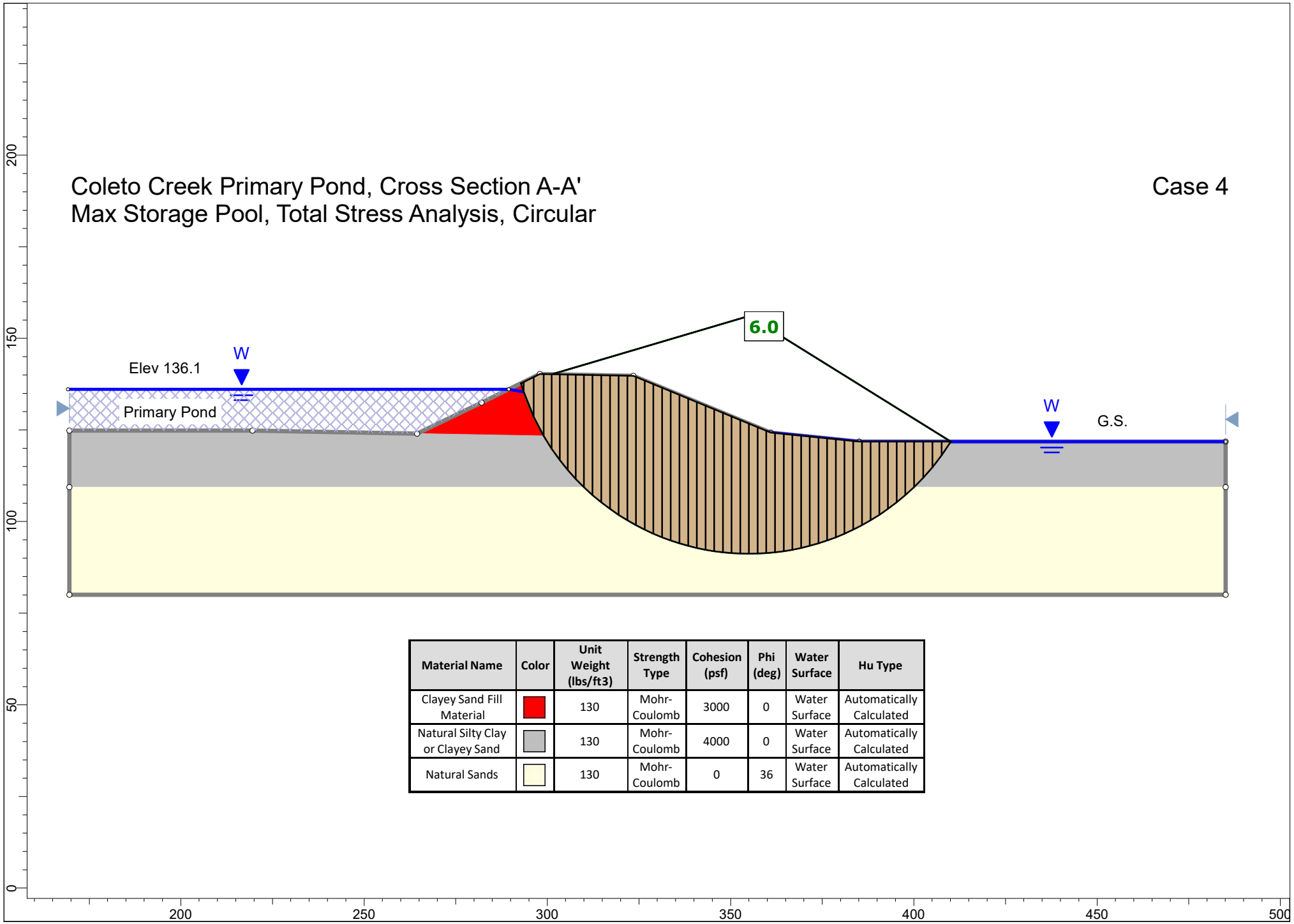
Case 3



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Clayey Sand Fill Material		130	Mohr-Coulomb	3000	0	Water Surface	Automatically Calculated
Natural Silty Clay or Clayey Sand		130	Mohr-Coulomb	4000	0	Water Surface	Automatically Calculated
Natural Sands		130	Mohr-Coulomb	0	36	Water Surface	Automatically Calculated

Coleto Creek Primary Pond, Cross Section A-A'
Max Storage Pool, Total Stress Analysis, Circular

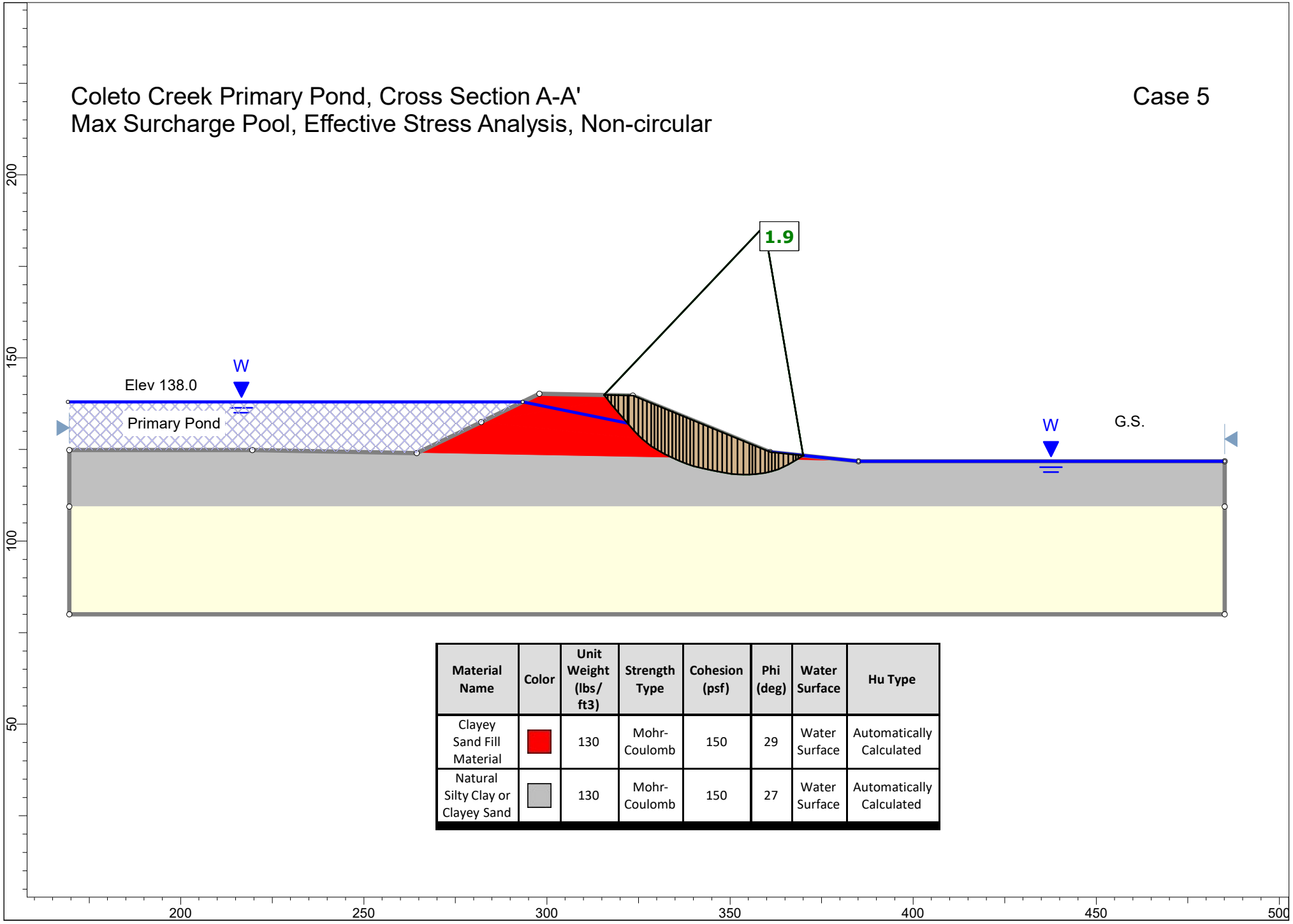
Case 4



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Clayey Sand Fill Material		130	Mohr-Coulomb	3000	0	Water Surface	Automatically Calculated
Natural Silty Clay or Clayey Sand		130	Mohr-Coulomb	4000	0	Water Surface	Automatically Calculated
Natural Sands		130	Mohr-Coulomb	0	36	Water Surface	Automatically Calculated

Coleto Creek Primary Pond, Cross Section A-A'
Max Surcharge Pool, Effective Stress Analysis, Non-circular

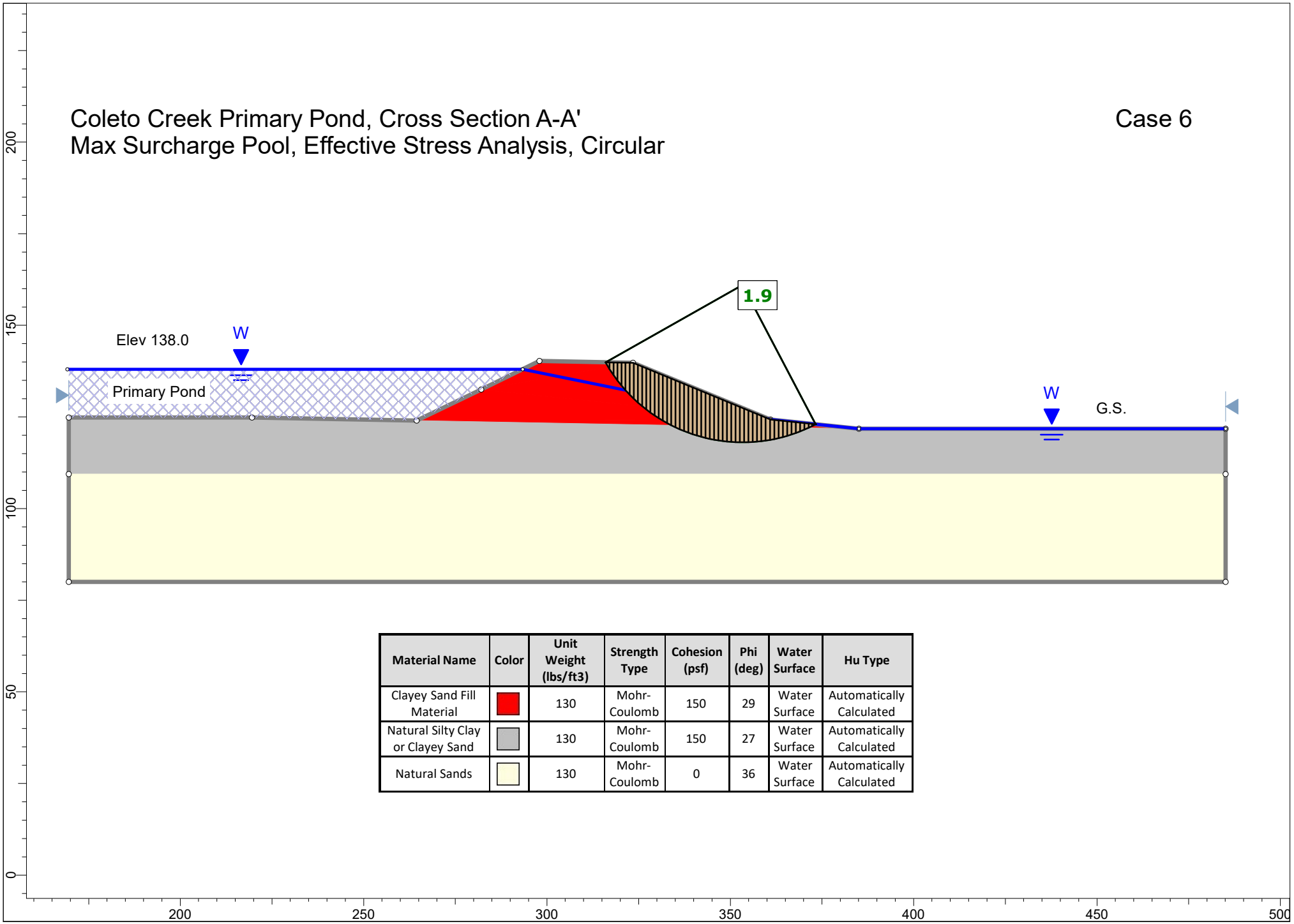
Case 5



Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Clayey Sand Fill Material		130	Mohr-Coulomb	150	29	Water Surface	Automatically Calculated
Natural Silty Clay or Clayey Sand		130	Mohr-Coulomb	150	27	Water Surface	Automatically Calculated

Coleto Creek Primary Pond, Cross Section A-A'
Max Surcharge Pool, Effective Stress Analysis, Circular

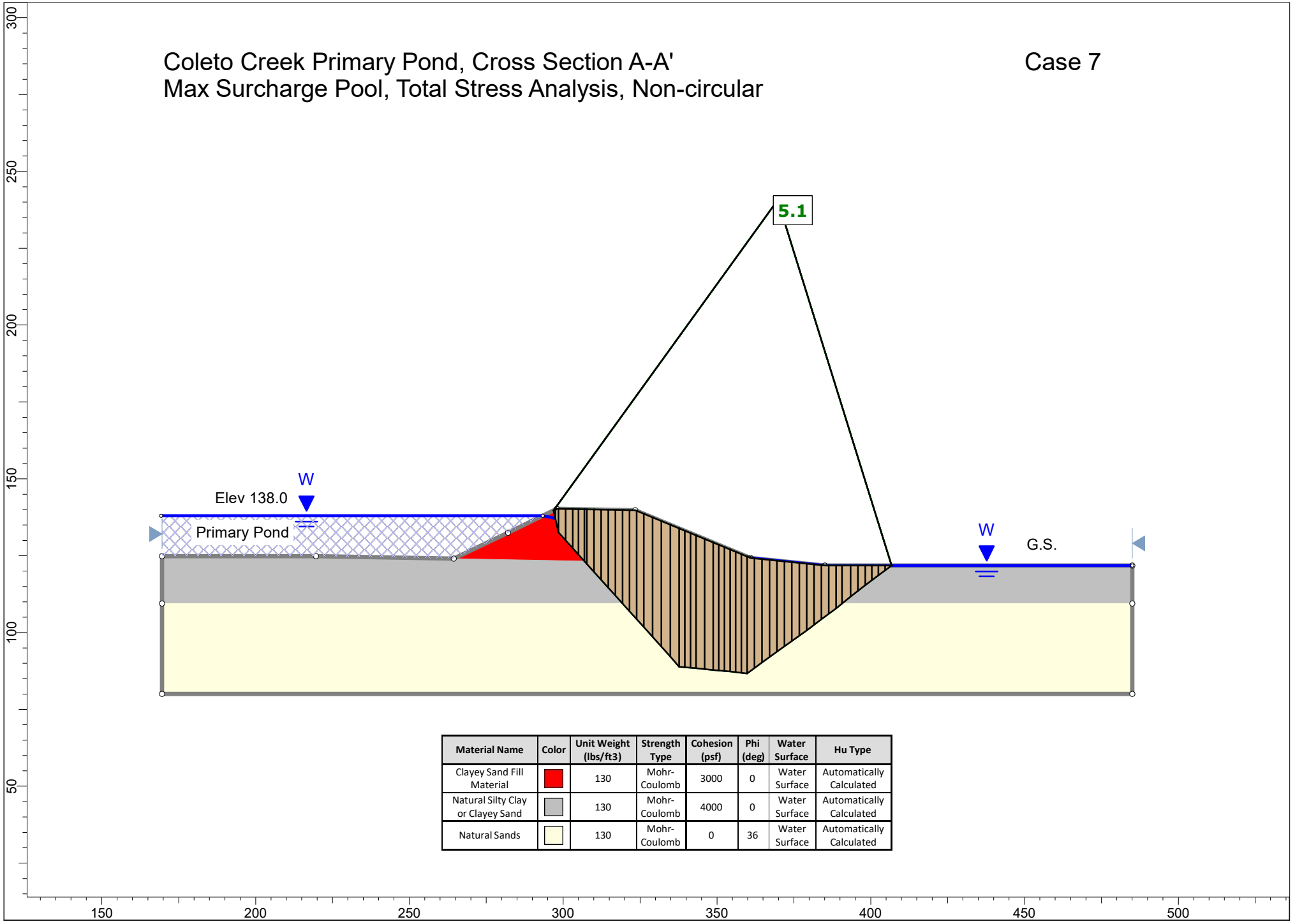
Case 6



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Clayey Sand Fill Material		130	Mohr-Coulomb	150	29	Water Surface	Automatically Calculated
Natural Silty Clay or Clayey Sand		130	Mohr-Coulomb	150	27	Water Surface	Automatically Calculated
Natural Sands		130	Mohr-Coulomb	0	36	Water Surface	Automatically Calculated

Coleto Creek Primary Pond, Cross Section A-A'
Max Surcharge Pool, Total Stress Analysis, Non-circular

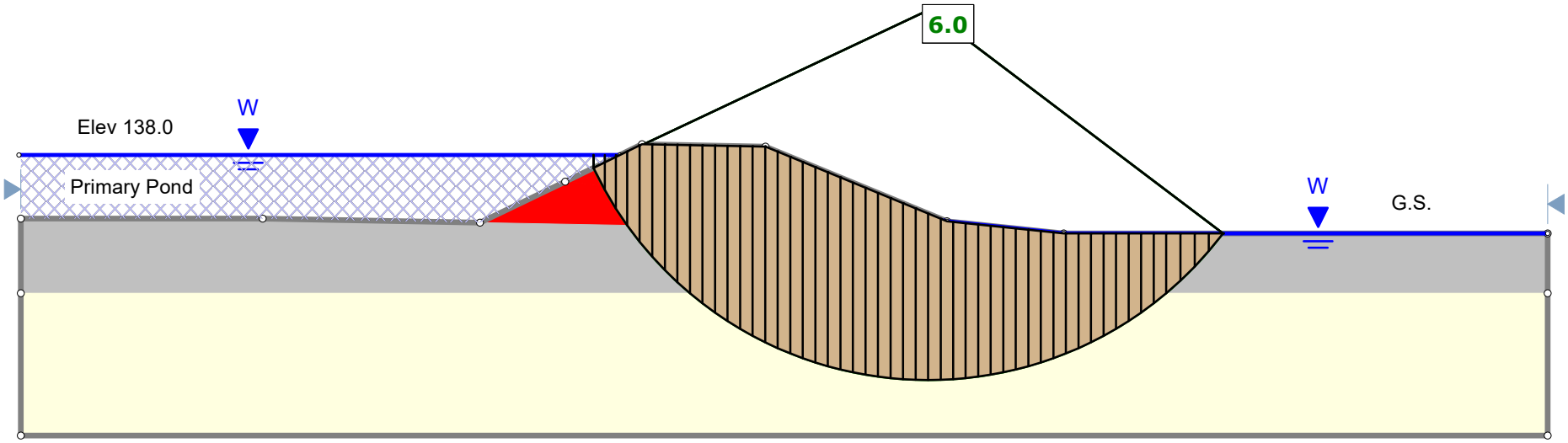
Case 7



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Clayey Sand Fill Material		130	Mohr-Coulomb	3000	0	Water Surface	Automatically Calculated
Natural Silty Clay or Clayey Sand		130	Mohr-Coulomb	4000	0	Water Surface	Automatically Calculated
Natural Sands		130	Mohr-Coulomb	0	36	Water Surface	Automatically Calculated

Coleto Creek Primary Pond, Cross Section A-A'
Max Surcharge Pool, Total Stress Analysis, Circular

Case 8

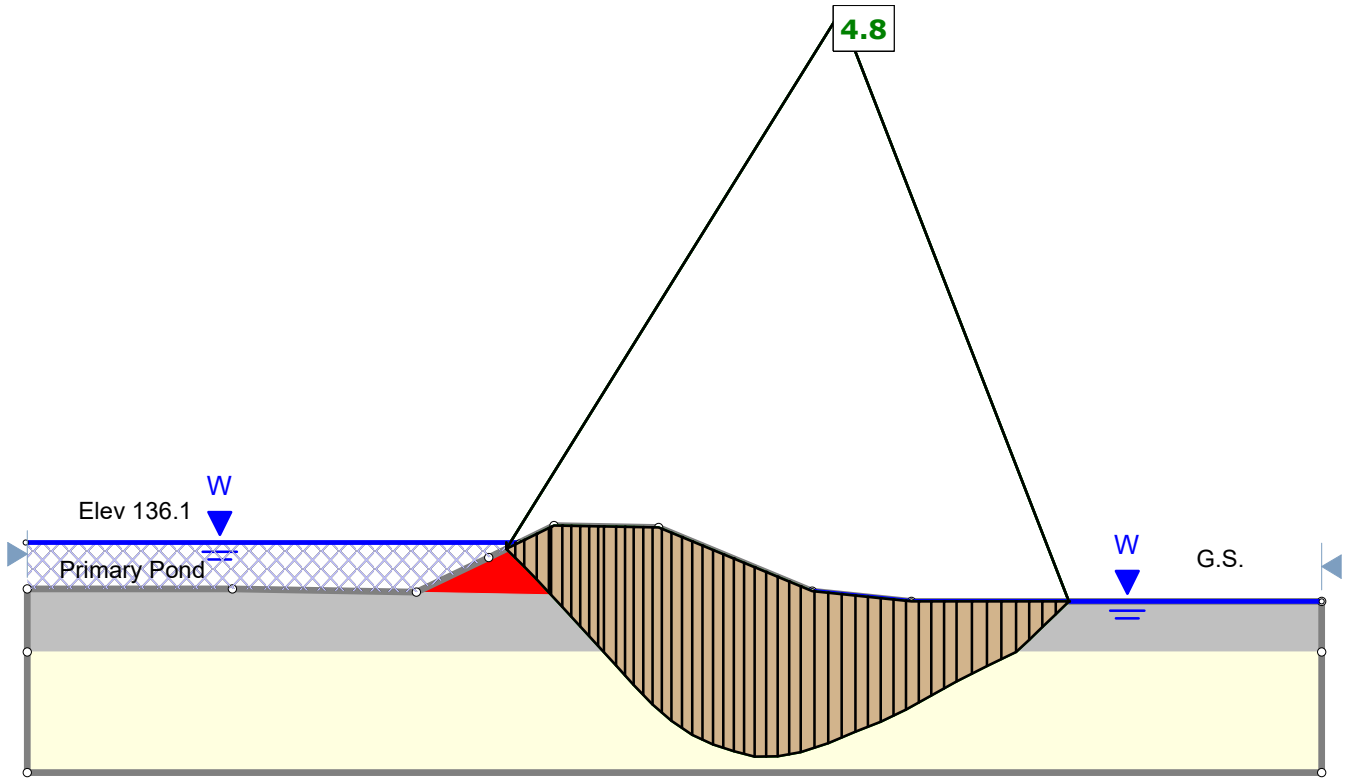


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Clayey Sand Fill Material		130	Mohr-Coulomb	3000	0	Water Surface	Automatically Calculated
Natural Silty Clay or Clayey Sand		130	Mohr-Coulomb	4000	0	Water Surface	Automatically Calculated
Natural Sands		130	Mohr-Coulomb	0	36	Water Surface	Automatically Calculated

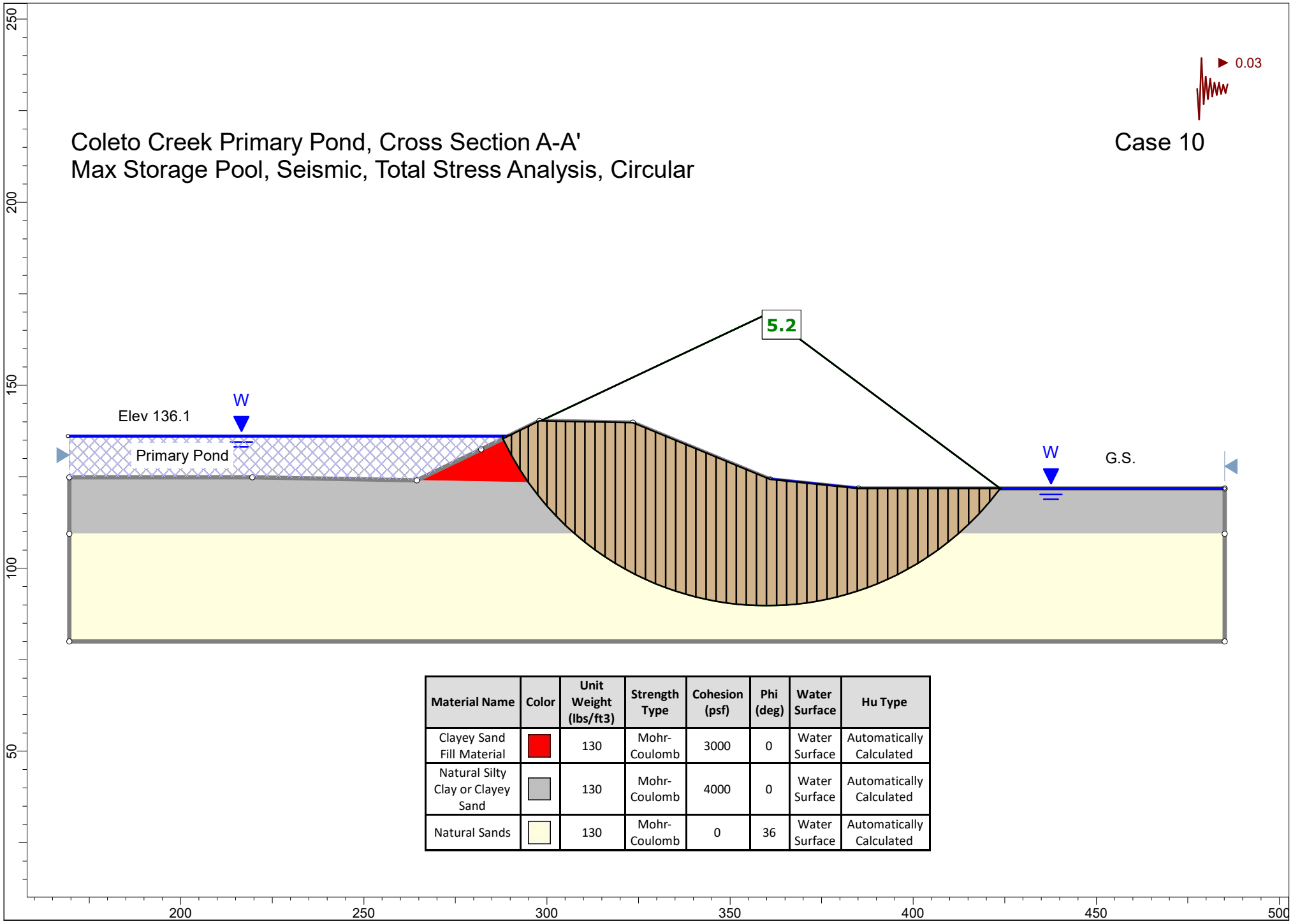
Coleto Creek Primary Pond, Cross Section A-A'

Case 9

Max Storage Pool, Seismic, Total Stress Analysis, Non-circular



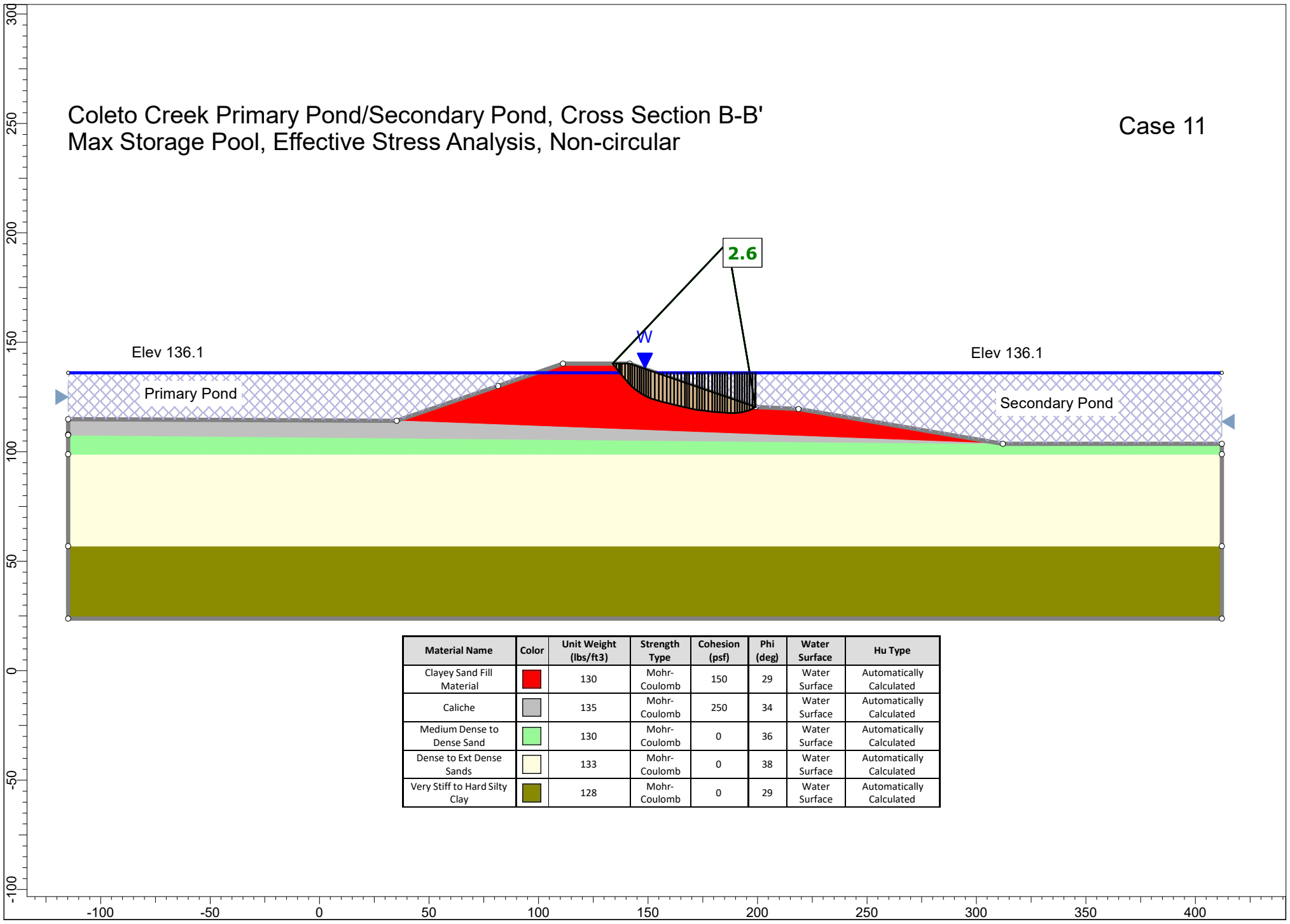
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Clayey Sand Fill Material		130	Mohr-Coulomb	3000	0	Water Surface	Automatically Calculated
Natural Silty Clay or Clayey Sand		130	Mohr-Coulomb	4000	0	Water Surface	Automatically Calculated
Natural Sands		130	Mohr-Coulomb	0	36	Water Surface	Automatically Calculated



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Clayey Sand Fill Material		130	Mohr-Coulomb	3000	0	Water Surface	Automatically Calculated
Natural Silty Clay or Clayey Sand		130	Mohr-Coulomb	4000	0	Water Surface	Automatically Calculated
Natural Sands		130	Mohr-Coulomb	0	36	Water Surface	Automatically Calculated

Coleto Creek Primary Pond/Secondary Pond, Cross Section B-B'
Max Storage Pool, Effective Stress Analysis, Non-circular

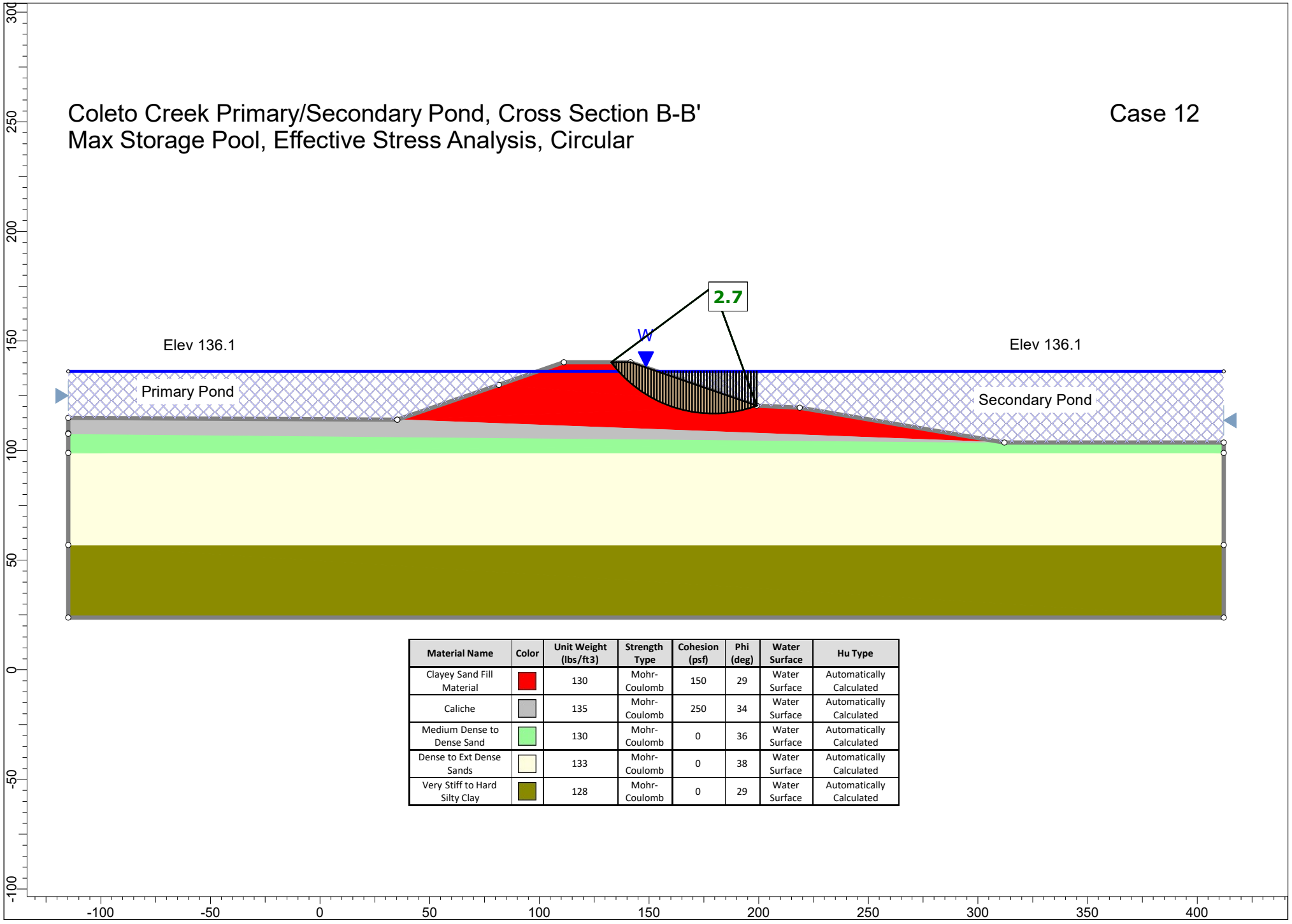
Case 11



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Clayey Sand Fill Material		130	Mohr-Coulomb	150	29	Water Surface	Automatically Calculated
Caliche		135	Mohr-Coulomb	250	34	Water Surface	Automatically Calculated
Medium Dense to Dense Sand		130	Mohr-Coulomb	0	36	Water Surface	Automatically Calculated
Dense to Ext Dense Sands		133	Mohr-Coulomb	0	38	Water Surface	Automatically Calculated
Very Stiff to Hard Silty Clay		128	Mohr-Coulomb	0	29	Water Surface	Automatically Calculated

Coleto Creek Primary/Secondary Pond, Cross Section B-B'
Max Storage Pool, Effective Stress Analysis, Circular

Case 12

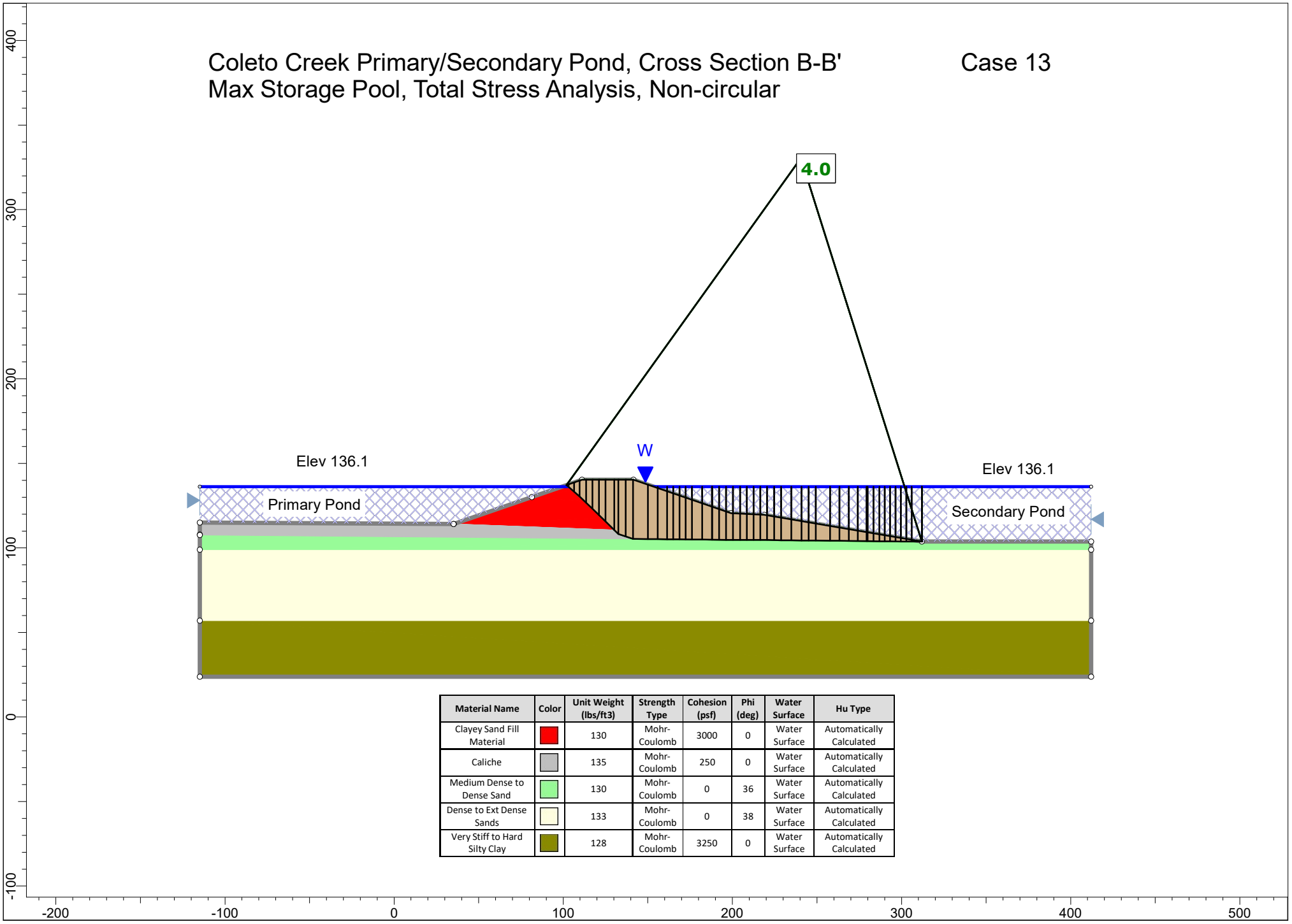


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Clayey Sand Fill Material		130	Mohr-Coulomb	150	29	Water Surface	Automatically Calculated
Caliche		135	Mohr-Coulomb	250	34	Water Surface	Automatically Calculated
Medium Dense to Dense Sand		130	Mohr-Coulomb	0	36	Water Surface	Automatically Calculated
Dense to Ext Dense Sands		133	Mohr-Coulomb	0	38	Water Surface	Automatically Calculated
Very Stiff to Hard Silty Clay		128	Mohr-Coulomb	0	29	Water Surface	Automatically Calculated

Coleto Creek Primary/Secondary Pond, Cross Section B-B'

Case 13

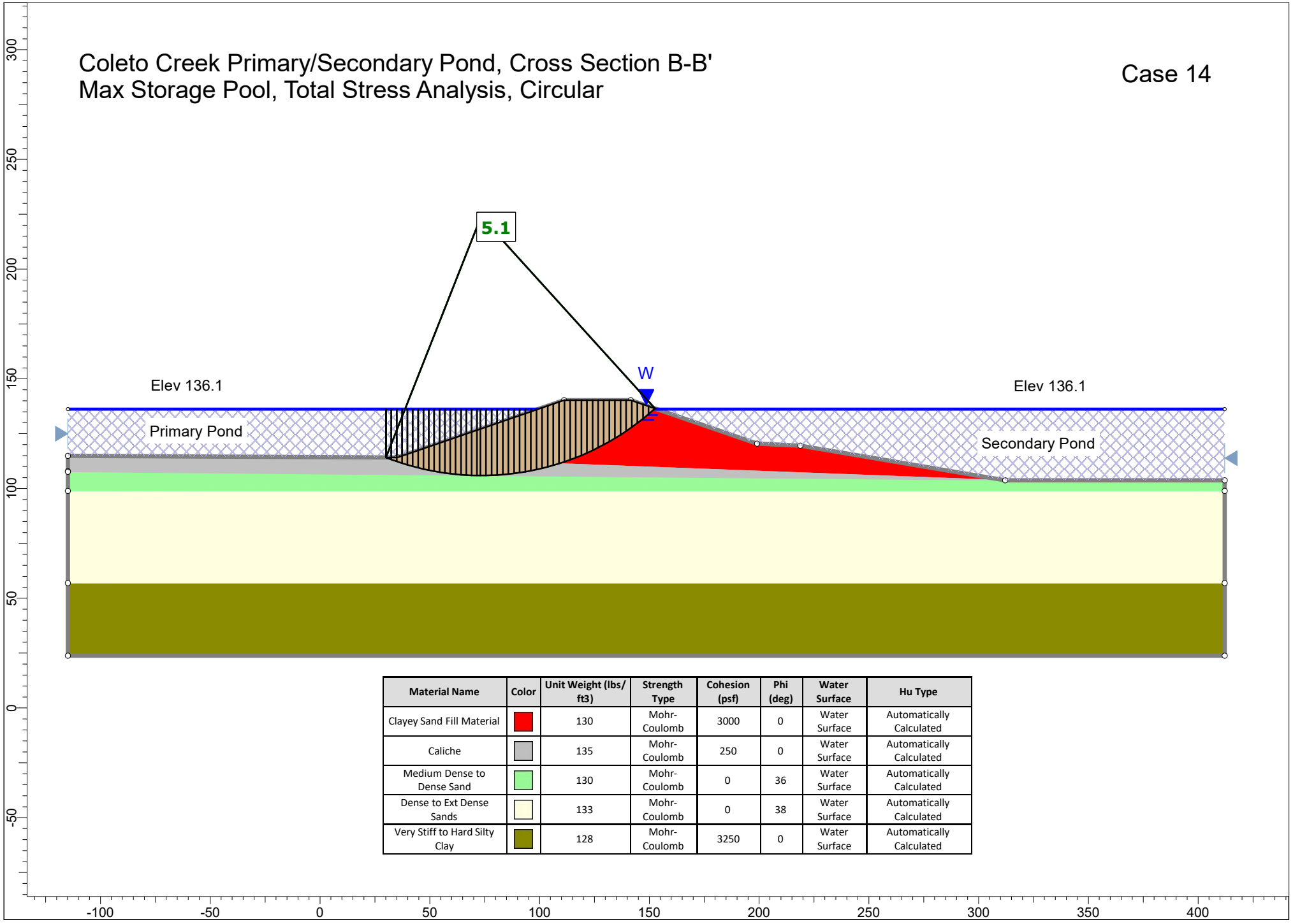
Max Storage Pool, Total Stress Analysis, Non-circular



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Clayey Sand Fill Material		130	Mohr-Coulomb	3000	0	Water Surface	Automatically Calculated
Caliche		135	Mohr-Coulomb	250	0	Water Surface	Automatically Calculated
Medium Dense to Dense Sand		130	Mohr-Coulomb	0	36	Water Surface	Automatically Calculated
Dense to Ext Dense Sands		133	Mohr-Coulomb	0	38	Water Surface	Automatically Calculated
Very Stiff to Hard Silty Clay		128	Mohr-Coulomb	3250	0	Water Surface	Automatically Calculated

Coleto Creek Primary/Secondary Pond, Cross Section B-B'
Max Storage Pool, Total Stress Analysis, Circular

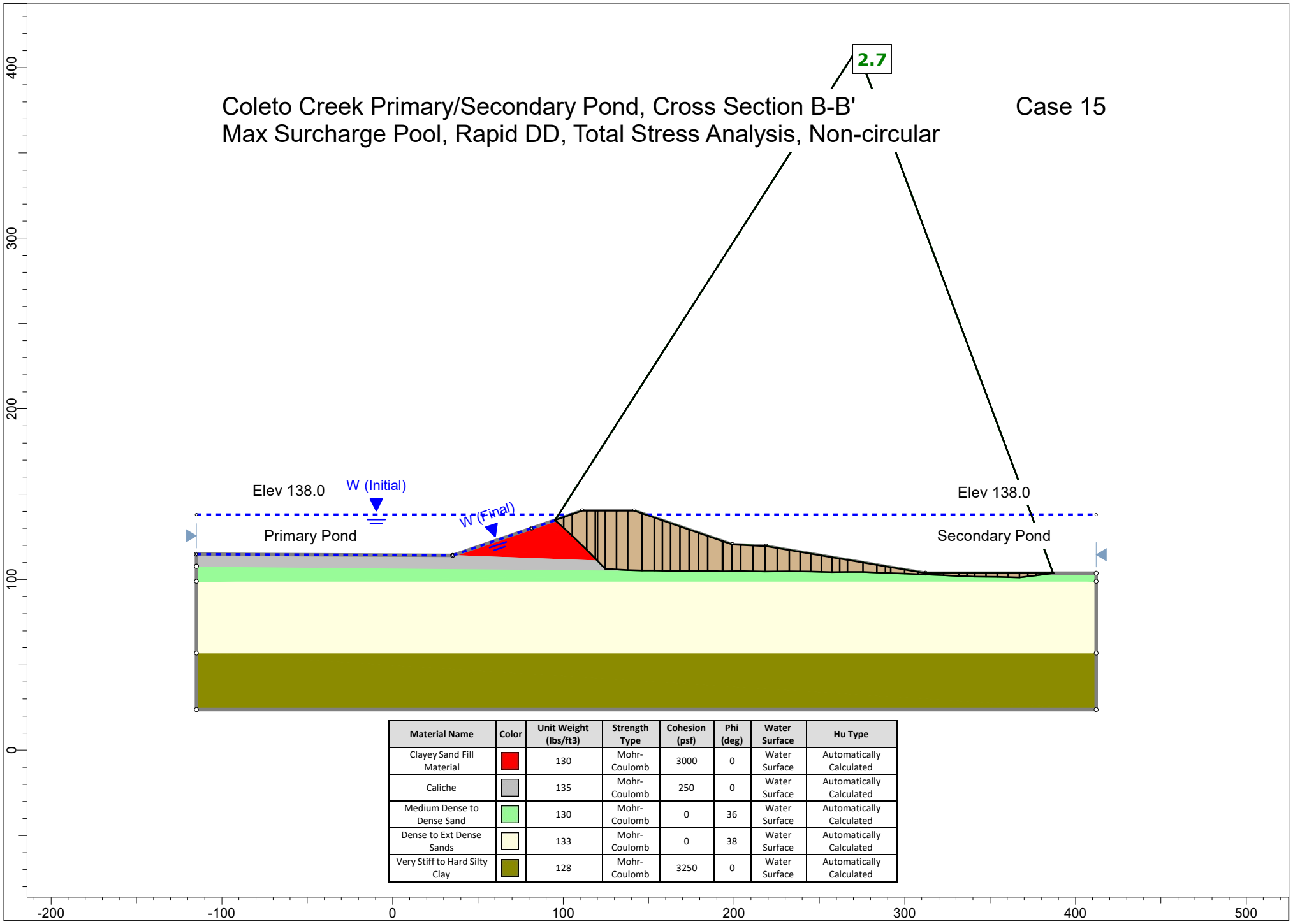
Case 14



Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Clayey Sand Fill Material		130	Mohr-Coulomb	3000	0	Water Surface	Automatically Calculated
Caliche		135	Mohr-Coulomb	250	0	Water Surface	Automatically Calculated
Medium Dense to Dense Sand		130	Mohr-Coulomb	0	36	Water Surface	Automatically Calculated
Dense to Ext Dense Sands		133	Mohr-Coulomb	0	38	Water Surface	Automatically Calculated
Very Stiff to Hard Silty Clay		128	Mohr-Coulomb	3250	0	Water Surface	Automatically Calculated

Coleto Creek Primary/Secondary Pond, Cross Section B-B'
Max Surcharge Pool, Rapid DD, Total Stress Analysis, Non-circular

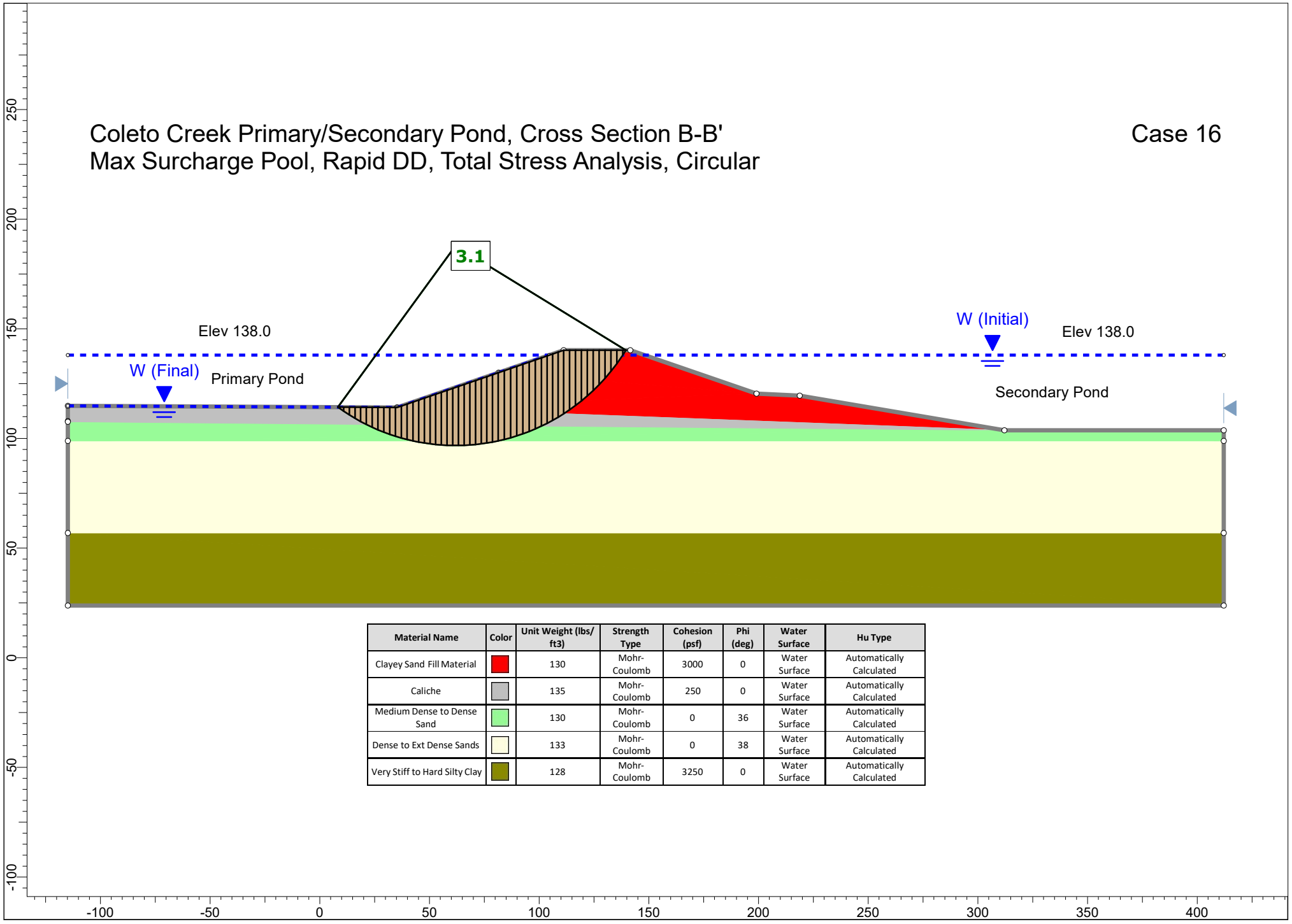
Case 15



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Clayey Sand Fill Material		130	Mohr-Coulomb	3000	0	Water Surface	Automatically Calculated
Caliche		135	Mohr-Coulomb	250	0	Water Surface	Automatically Calculated
Medium Dense to Dense Sand		130	Mohr-Coulomb	0	36	Water Surface	Automatically Calculated
Dense to Ext Dense Sands		133	Mohr-Coulomb	0	38	Water Surface	Automatically Calculated
Very Stiff to Hard Silty Clay		128	Mohr-Coulomb	3250	0	Water Surface	Automatically Calculated

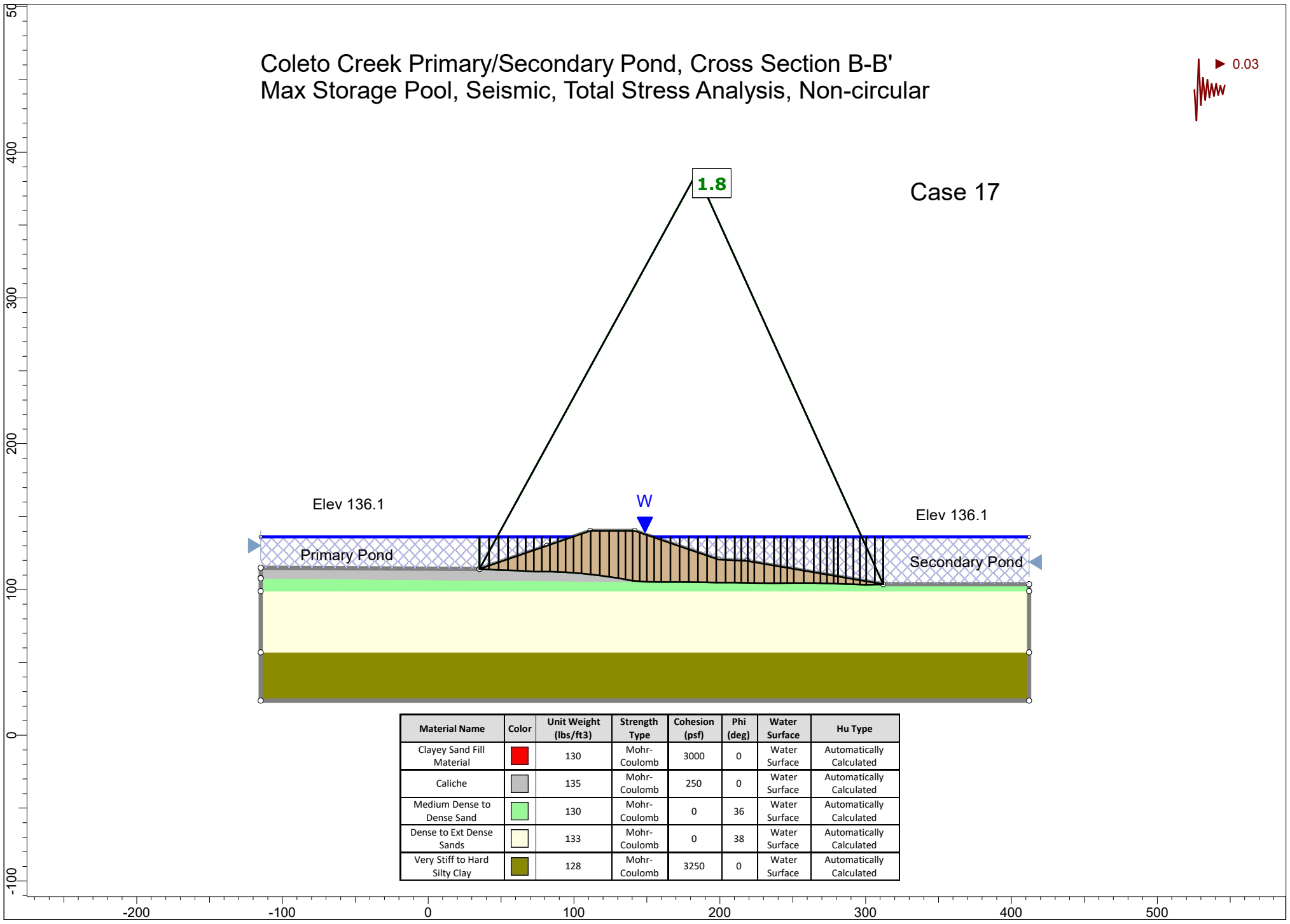
Coleto Creek Primary/Secondary Pond, Cross Section B-B'
Max Surcharge Pool, Rapid DD, Total Stress Analysis, Circular

Case 16



Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Clayey Sand Fill Material		130	Mohr-Coulomb	3000	0	Water Surface	Automatically Calculated
Caliche		135	Mohr-Coulomb	250	0	Water Surface	Automatically Calculated
Medium Dense to Dense Sand		130	Mohr-Coulomb	0	36	Water Surface	Automatically Calculated
Dense to Ext Dense Sands		133	Mohr-Coulomb	0	38	Water Surface	Automatically Calculated
Very Stiff to Hard Silty Clay		128	Mohr-Coulomb	3250	0	Water Surface	Automatically Calculated

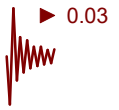
Coleto Creek Primary/Secondary Pond, Cross Section B-B'
Max Storage Pool, Seismic, Total Stress Analysis, Non-circular



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Clayey Sand Fill Material		130	Mohr-Coulomb	3000	0	Water Surface	Automatically Calculated
Caliche		135	Mohr-Coulomb	250	0	Water Surface	Automatically Calculated
Medium Dense to Dense Sand		130	Mohr-Coulomb	0	36	Water Surface	Automatically Calculated
Dense to Ext Dense Sands		133	Mohr-Coulomb	0	38	Water Surface	Automatically Calculated
Very Stiff to Hard Silty Clay		128	Mohr-Coulomb	3250	0	Water Surface	Automatically Calculated

Coleto Creek Primary/Secondary Pond, Cross Section B-B'
Max Storage Pool, Seismic, Total Stress Analysis, Circular

Case 18



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Clayey Sand Fill Material		130	Mohr-Coulomb	3000	0	Water Surface	Automatically Calculated
Caliche		135	Mohr-Coulomb	250	0	Water Surface	Automatically Calculated
Medium Dense to Dense Sand		130	Mohr-Coulomb	0	36	Water Surface	Automatically Calculated
Dense to Ext Dense Sands		133	Mohr-Coulomb	0	38	Water Surface	Automatically Calculated
Very Stiff to Hard Silty Clay		128	Mohr-Coulomb	3250	0	Water Surface	Automatically Calculated

APPENDIX D

Liquefaction Assessment Calculations

APPENDIX D
LIQUEFACTION FACTOR OF SAFETY
ASSESSMENT METHODOLOGY
Coleto Creek Power Station

Sources: Coduto, Donald P., Geotechnical Engineering Principles and Practices. Prentice-Hall.

Rauch, Alan F., May 1997. EPOLLS: *An Empiracle Method for Predicting Surface Displacements Due to Liquefaction-Induced Lateral Spreading in Earthquakes.* Dissertation Submitted to Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for degree of Doctor of Philosophy in Civil Engineering.

United States Environmental Protection Agency (USEPA), April 1995. RCRA Subtitle D (258) Seismic Design Guidance for Municipal Solid Waste Landfill Facilities. Office of Research and Development. Washington, DC. EPA/600/R-95/051

Methodology: Standard Penetration Test (SPT)

Step 1: Compute the standardized value of number of blow counts per foot normalized for overburden stress at the depth of the test

$$(N_1)_{60} = NSPT \cdot C_N \cdot CE \cdot CB \cdot CS \cdot C_R$$

where:
$(N_1)_{60}$ = Measured blowcount normalized for overburden stress at the depth of the test
C_N = Correction factor to normalize the measured blowcount to an equivalent value under one atmosphere of effective overburden stress

$$C_N = \sqrt{\frac{Pa}{\sigma'_{vo}}} \leq 2.0$$

where:
Pa = one atmosphere of pressure (101.325kPa) in the same units as σ'_{vo}
σ'_{vo} = vertical efffective stress at depth of N_{SPT}

C_E =Correction factor of the measured SPT blowcount for level of energy delivered by the SPT hammer, 1.0 for safety hammer type with rope and pulley hammer release
C_B = Correction factor for borehole diameters outside the recommended range of 2.5 to 4.5 inch, 1.0 for borehole inside range
C_S = Correction factor for SPT samplers used without a sample liner, 1.0 for standard sampler
C_R = Correction factor for loss of energy through reflection in short lengths of drill rod:

where:
For $z < 3$ m; $C_R = 0.75$
For $3 < z < 9$ m; $C_R = (15+z)/24$
For $z > 9$ m; $C_R = 1.0$
where: z = length of drill rod in meters (approximately equal to depth of N_{SPT})

Step 2: Compute a clean-sand equivalent value of $(N_1)_{60}$

$$(N_1)_{60} - cs = (N_1)_{60} + \Delta(N_1)$$

where:

$\Delta(N_1)_{60}$ = correction factor computed as follows:

For FC < 5%, $\Delta(N_1)_{60} = 0.0$

For 5 < FC < 35%, $\Delta(N_1)_{60} = 7*(FC - 5)/30$

For FC > 35%, $\Delta(N_1)_{60} = 7.0$

where:

FC = Fines content (percent finer than 0.075 mm)

Note: Where data was available, those FC were used. Otherwise, representative values from the USGS standard soil classification were used for the soil type observed during drilling.

Step 3: Compute the cyclic resistance ratio for a standardized magnitude 7.5 earthquake ($CRR_{M7.5}$)

$$100 \cdot CRR_{M7.5} = \frac{95}{34 - (N_1)_{60} - cs} + \frac{(N_1)_{60} - cs}{1.3} - \frac{1}{2}$$

Note: A value of $(N_1)_{60}$-cs > 30 indicates an unliquefiable soil with an infinite CRR. Designated as UL in the calculation tables.

Step 4: Adjust the standardized cyclic resistance ratio for the worst-case magnitude of earthquake for the area

$$CRR = CRRM_{7.5} \cdot MSF \cdot K\sigma \cdot K\alpha$$

where:

MSF = magnitude scaling factor computed as follows:

For $M_w < 7.0$; $MSF = 10^{3.00} * M_w^{-3.46}$

where:

M_w = estimated worst-case magnitude eartquake, 6.1 taken from Figure 3.3 Seismic Source Zones in the Contiguous United States (USGS, 1982) and Table 3.1 Parameters for Seismic Source Zones (USGS, 2982) (USEPA, 1995)

Note: Two additional correction factors are potentially applicable for liquefiable soil deposits subject to significant overburden with a stress factor greater than 1 tsf (2000 psf) (Kσ) or static shear stresses such as significant slopes (Kα). Kσ values were interpolated using Figure 5.7 Curves for Estimation of Correction Factor (Harder 1988, and Hynes 1988, as Quoted in Marcuson, et.al., 1990) (USEPA, 1998). No Kα factor was applied due to the relatively flat ground surface in the area.

Step 5: Estimate the average cyclic shear stress (CSR)

$$CSR = 0.65 \cdot \frac{a_{max}}{g} \cdot \frac{\sigma_{vo}}{\sigma'_{vo}} \cdot rd$$

where:

a_{max}/g = peak horizonal acceleration that would occur at the ground surface in the absence of excess pore pressures or liquefaction, 0.03 g taken from the 2014 United States Geological Survey National Seismic Hazard Maps found at http://earthquake.usgs.gov/hazards/products/conterminous/2014/2014pga2pct.pdf).

σ_{vo} = total vertical overburden stress

g = acceleration due to gravity, 9.81 m/s^2

r_d = stress reduction factor calculated as follows for depths up to 30 m:

$$r_d = 1.0 + 1.6*10^{-6}(z^4 - 42z^3 + 105z^2 - 4200z)$$

Step 6: Calculate the Factor of Safety against liquefaction (FS_{liq})

$$FS_{liq} = \frac{CRR}{CSR}$$

LIQUEFACTION FACTOR OF SAFETY ASSESSMENT
TEST BORING B-1-1[1]
Coleto Creek Power Plant

Depth to Water =	12	ft
Average Unsaturated Soil Unit Weight, γ_d =	125	pcf
Average Saturated Soil Unit Weight, γ_s =	130	pcf
Average Water Unit Weight, γ_w =	62.3	pcf
Earthquake Magnitude, M_W =	6.1	
Borehole Diameter =	4", to 50' bgs	
	3", 50' to end of boring	

Sample Number	Depth (ft)	Depth (m)	Note	N_{SPT}	Soil Type	σ'_{vo} (psf)	C_N	C_E	C_B	C_S	C_R	$(N_1)_{60}$	FC	$\Delta(N_1)_{60}$	$(N_1)_{60}$-cs	$CRR_{M7.5}$	MSF	$K\sigma$	CRR	a_{max}/g	σ_{vo}	r_d	CSR	FS_{liq}
1	2	0.61	Unsaturated	40	SC	250	2.00	1.0	1.00	1.0	0.75	60.0	35	7.0	67.0	UL	1.92	NA	UL	0.03	250	1.00	UL	UL
2	4	1.22	Unsaturated	13	SC	500	2.00	1.0	1.00	1.0	0.75	19.5	35	7.0	26.5	0.33	1.92	NA	0.62	0.03	500	0.99	0.019	32
3	6	1.83	Unsaturated	14	SC	750	1.68	1.0	1.00	1.0	0.75	17.6	35	7.0	24.6	0.29	1.92	NA	0.55	0.03	750	0.99	0.019	28
4	8	2.44	Unsaturated	15	SC	1000	1.45	1.0	1.00	1.0	0.75	16.4	90.6	7.0	23.4	0.26	1.92	NA	0.51	0.03	1000	0.98	0.019	26
7	14	4.27	Saturated	10	SC	1635.4	1.14	1.0	1.00	1.0	0.80	9.1	35	7.0	16.1	0.17	1.92	NA	0.33	0.03	1760	0.97	0.020	16
8	16	4.88	Saturated	13	SC	1770.8	1.09	1.0	1.00	1.0	0.83	11.8	35	7.0	18.8	0.20	1.92	NA	0.39	0.03	2020	0.96	0.021	18
9	18	5.49	Saturated	9	SC	1906.2	1.05	1.0	1.00	1.0	0.85	8.1	35	7.0	15.1	0.16	1.92	NA	0.31	0.03	2280	0.96	0.022	14
10	20	6.10	Saturated	15	SC	2041.6	1.02	1.0	1.00	1.0	0.88	13.4	39.5	7.0	20.4	0.22	1.92	0.93	0.40	0.03	2540	0.95	0.023	17
12	24	7.32	Saturated	13	SC	2312.4	0.96	1.0	1.00	1.0	0.93	11.6	35	7.0	18.6	0.20	1.92	0.92	0.35	0.03	3060	0.94	0.024	15
13	26	7.92	Saturated	21	SC	2447.8	0.93	1.0	1.00	1.0	0.96	18.7	35	7.0	25.7	0.31	1.92	0.92	0.54	0.03	3320	0.93	0.025	22
14	28	8.53	Saturated	15	SC	2583.2	0.91	1.0	1.00	1.0	0.98	13.3	35	7.0	20.3	0.22	1.92	0.91	0.39	0.03	3580	0.92	0.025	16
15	30	9.14	Saturated	28	SC	2718.6	0.88	1.0	1.00	1.0	1.0	24.7	35	7.0	31.7	UL	1.92	0.91	UL	0.03	3840	0.91	UL	UL
16	32	9.75	Saturated	12	SC	2854	0.86	1.0	1.00	1.0	1.0	10.3	35	7.0	17.3	0.19	1.92	0.90	0.32	0.03	4100	0.90	0.025	13
18	34.7	10.58	Saturated	6	SM	3036.79	0.83	1.0	1.00	1.0	1.0	5.0	15	2.3	7.3	0.09	1.92	0.90	0.15	0.03	4451	0.89	0.025	6
18A	36	10.97	Saturated	15	SM	3124.8	0.82	1.0	1.00	1.0	1.0	12.3	15	2.3	14.7	0.16	1.92	0.90	0.27	0.03	4620	0.88	0.025	11
19	36.7	11.19	Saturated	24	SP	3172.19	0.82	1.0	1.00	1.0	1.0	19.6	1	0.0	19.6	0.21	1.92	0.89	0.36	0.03	4711	0.88	0.025	14
19A	38	11.58	Saturated	26	SP	3260.2	0.81	1.0	1.00	1.0	1.0	20.9	1	0.0	20.9	0.23	1.92	0.89	0.39	0.03	4880	0.87	0.025	15
20	40	12.19	Saturated	39	SP	3395.6	0.79	1.0	1.00	1.0	1.0	30.8	1	0.0	30.8	UL	1.92	0.89	UL	0.03	5140	0.86	UL	UL
21	42	12.80	Saturated	27	SP	3531	0.77	1.0	1.00	1.0	1.0	20.9	1	0.0	20.9	0.23	1.92	0.88	0.39	0.03	5400	0.84	0.025	15
22	44	13.41	Saturated	35	SM	3666.4	0.76	1.0	1.00	1.0	1.0	26.6	15	2.3	28.9	0.40	1.92	0.88	0.68	0.03	5660	0.83	UL	UL
23	46	14.02	Saturated	34	SP	3801.8	0.75	1.0	1.00	1.0	1.0	25.4	1	0.0	25.4	0.30	1.92	0.87	0.50	0.03	5920	0.82	UL	UL
24	48	14.63	Saturated	66	SP	3937.2	0.73	1.0	1.00	1.0	1.0	48.4	1	0.0	48.4	UL	1.92	0.87	UL	0.03	6180	0.80	UL	UL
25	50	15.24	Saturated	56	SP	4072.6	0.72	1.0	1.00	1.0	1.0	40.4	1	0.0	40.4	UL	1.92	0.86	UL	0.03	6440	0.79	UL	UL
26	52	15.85	Saturated	50	SP	4208	0.71	1.0	1.00	1.0	1.0	35.5	1	0.0	35.5	UL	1.92	0.86	UL	0.03	6700	0.77	UL	UL
27	57	17.37	Saturated	50	SP	4546.5	0.68	1.0	1.00	1.0	1.0	34.1	1	0.0	34.1	UL	1.92	0.85	UL	0.03	7350	0.73	UL	UL
28	62	18.90	Saturated	66	SP	4885	0.66	1.0	1.00	1.0	1.0	43.4	1	0.0	43.4	UL	1.92	0.84	UL	0.03	8000	0.68	UL	UL
29	67	20.42	Saturated	50	SC	5223.5	0.64	1.0	1.00	1.0	1.0	31.8	35	7.0	38.8	UL	1.92	0.83	UL	0.03	8650	0.64	UL	UL
30	72	21.95	Saturated	92	SC	5562	0.62	1.0	1.00	1.0	1.0	56.7	35	7.0	63.7	UL	1.92	0.81	UL	0.03	9300	0.59	UL	UL
31	75	22.86	Saturated	50	SC	5765.1	0.61	1.0	1.00	1.0	1.0	30.3	35	7.0	37.3	UL	1.92	0.81	UL	0.03	9690	0.57	UL	UL
32	81	24.69	Saturated	50	SP	6171.3	0.59	1.0	1.00	1.0	1.0	29.3	1	0.0	29.3	UL	1.92	0.79	UL	0.03	10470	0.52	UL	UL
33	86	26.21	Saturated	50	SM	6509.8	0.57	1.0	1.00	1.0	1.0	28.5	15	2.3	30.8	UL	1.92	0.78	UL	0.03	11120	0.48	UL	UL
34	91	27.74	Saturated	50	CL	6848.3	0.56	1.0	1.00	1.0	1.0	27.8	77.9	7.0	34.8	UL	1.92	0.77	UL	0.03	11770	0.46	UL	UL
35	96	29.26	Saturated	50	CL	7186.8	0.54	1.0	1.00	1.0	1.0	27.1	90	7.0	34.1	UL	1.92	0.76	UL	0.03	12420	0.44	UL	UL
36	100	30.48	Saturated	50	SC	7457.6	0.53	1.0	1.00	1.0	1.0	26.6	35	7.0	33.6	UL	1.92	0.75	UL	0.03	12940	0.43	UL	UL
37	107	32.61	Saturated	93	CH	7931.5	0.52	1.0	1.00	1.0	1.0	48.0	90	7.0	55.0	UL	1.92	0.74	UL	0.03	13850	0.44	UL	UL
38	112	34.14	Saturated	51	CH	9516	0.47	1.0	1.00	1.0	1.0	24.1	90	7.0	31.1	UL	1.92	0.68	UL	0.03	14500	0.47	UL	UL
39	117	35.66	Saturated	38	CH	9854.5	0.46	1.0	1.00	1.0	1.0	17.6	90	7.0	24.6	0.29	1.92	0.67	0.37	0.03	15150	0.51	0.015	24

Source: AECOM, 2012. (See Appendices A and B for boring logs and laboratory testing results)

LIQUEFACTION FACTOR OF SAFETY ASSESSMENT
TEST BORING B-2-1[1]
Coleto Creek Power Plant

Depth to Water =	32	ft
Average Unsaturated Soil Unit Weight, γ_d =	125	pcf
Average Saturated Soil Unit Weight, γ_s =	130	pcf
Average Water Unit Weight, γ_w =	62.3	pcf
Earthquake Magnitude, M_W =	6.1	
Borehole Diameter =	4", to 50' bgs	
	3", 50' to end of boring	

Sample Number	Depth (ft)	Depth (m)	Note	N_{SPT}	Soil Type	σ'_{vo} (psf)	C_N	C_E	C_B	C_S	C_R	$(N_1)_{60}$	FC	$\Delta(N_1)_{60}$	$(N_1)_{60}$-cs	$CRR_{M7.5}$	MSF	$K\sigma$	CRR	a_{max}/g	σ_{vo}	r_d	CSR	FS_{liq}
1	2	0.61	Unsaturated	17	SC	250	2.00	1.0	1.00	1.0	0.75	25.5	35	7.0	32.5	UL	1.92	NA	UL	0.03	250	1.00	UL	UL
2	4	1.22	Unsaturated	21	SC	500	2.00	1.0	1.00	1.0	0.75	31.5	35	7.0	38.5	UL	1.92	NA	UL	0.03	500	0.99	UL	UL
3	6	1.83	Unsaturated	15	SC	750	1.68	1.0	1.00	1.0	0.75	18.9	35	7.0	25.9	0.31	1.92	NA	0.60	0.03	750	0.99	0.019	31
4	8	2.44	Unsaturated	13	SC	1000	1.45	1.0	1.00	1.0	0.75	14.2	35	7.0	21.2	0.23	1.92	NA	0.45	0.03	1000	0.98	0.019	23
5	10	3.05	Unsaturated	15	SC	1250	1.30	1.0	1.00	1.0	0.75	14.6	37.3	7.0	21.6	0.24	1.92	NA	0.46	0.03	1250	0.98	0.019	24
7	14	4.27	Unsaturated	12	SC	1750	1.10	1.0	1.00	1.0	0.80	10.6	35	7.0	17.6	0.19	1.92	NA	0.36	0.03	1750	0.97	0.019	19
8	16	4.88	Unsaturated	21	SC	2000	1.03	1.0	1.00	1.0	0.83	17.9	35	7.0	24.9	0.29	1.92	NA	0.56	0.03	2000	0.96	0.019	30
9	18	5.49	Unsaturated	9	SC	2250	0.97	1.0	1.00	1.0	0.85	7.4	42.3	7.0	14.4	0.15	1.92	NA	0.30	0.03	2250	0.96	0.019	16
11	22	6.71	Unsaturated	14	SC	2750	0.88	1.0	1.00	1.0	0.90	11.1	35	7.0	18.1	0.19	1.92	0.91	0.34	0.03	2750	0.95	0.018	18
12	24	7.32	Unsaturated	17	SC	3000	0.84	1.0	1.00	1.0	0.93	13.3	35	7.0	20.3	0.22	1.92	0.90	0.38	0.03	3000	0.94	0.018	21
13	26	7.92	Unsaturated	18	SC	3250	0.81	1.0	1.00	1.0	0.96	13.9	35.2	7.0	20.9	0.23	1.92	0.89	0.39	0.03	3250	0.93	0.018	22
15	30	9.14	Unsaturated	16	SC	3750	0.75	1.0	1.00	1.0	1.0	12.0	35	7.0	19.0	0.20	1.92	0.88	0.34	0.03	3750	0.91	0.018	19
16	32	9.75	Saturated	22	SC	4000	0.73	1.0	1.00	1.0	1.0	16.0	38.4	7.0	23.0	0.26	1.92	0.87	0.43	0.03	4000	0.90	0.018	24
18	36	10.97	Saturated	15	SC	4270.8	0.70	1.0	1.00	1.0	1.0	10.6	35	7.0	17.6	0.19	1.92	0.86	0.31	0.03	4520	0.88	0.018	17
19	38	11.58	Saturated	8	SC	4406.2	0.69	1.0	1.00	1.0	1.0	5.5	35	7.0	12.5	0.14	1.92	0.85	0.22	0.03	4780	0.87	0.018	12
20	40	12.19	Saturated	16	SC	4541.6	0.68	1.0	1.00	1.0	1.0	10.9	35	7.0	17.9	0.19	1.92	0.85	0.31	0.03	5040	0.86	0.019	17
21A	42	12.80	Saturated	14	SP	4677	0.67	1.0	1.00	1.0	1.0	9.4	1	0.0	9.4	0.11	1.92	0.84	0.17	0.03	5300	0.84	0.019	9
22	44	13.41	Saturated	27	SP	4812.4	0.66	1.0	1.00	1.0	1.0	17.9	1	0.0	17.9	0.19	1.92	0.84	0.31	0.03	5560	0.83	0.019	17
23	46	14.02	Saturated	25	SP	4947.8	0.65	1.0	1.00	1.0	1.0	5.0	1	0.0	5.0	0.07	1.92	0.84	0.11	0.03	5820	0.82	0.019	6
24	48	14.63	Saturated	37	SP	5083.2	0.65	1.0	1.00	1.0	1.0	23.9	1	0.0	23.9	0.27	1.92	0.83	0.43	0.03	6080	0.80	0.019	23
25	50	15.24	Saturated	35	SP	5218.6	0.64	1.0	1.00	1.0	1.0	22.3	1	0.0	22.3	0.25	1.92	0.83	0.39	0.03	6340	0.79	0.019	21
26	52	15.85	Saturated	33	SM	5354	0.63	1.0	1.00	1.0	1.0	20.7	35	7.0	27.7	0.36	1.92	0.82	0.57	0.03	6600	0.77	0.018	31
27	56	17.07	Saturated	39	SC	5624.8	0.61	1.0	1.00	1.0	1.0	23.9	45.7	7.0	30.9	UL	1.92	0.81	UL	0.03	7120	0.74	UL	UL
28	61	18.59	Saturated	43	SC	5963.3	0.60	1.0	1.00	1.0	1.0	25.6	35	7.0	32.6	UL	1.92	0.80	UL	0.03	7770	0.69	UL	UL
29	66	20.12	Saturated	40	SP-SM	6301.8	0.58	1.0	1.00	1.0	1.0	23.2	10	1.2	24.3	0.28	1.92	0.79	0.43	0.03	8420	0.65	0.017	25
30	71	21.64	Saturated	39	SP	6640.3	0.56	1.0	1.00	1.0	1.0	22.0	1	0.0	22.0	0.24	1.92	0.78	0.36	0.03	9070	0.60	0.016	23
31	76	23.16	Saturated	50	SM	6978.8	0.55	1.0	1.00	1.0	1.0	27.5	35	7.0	34.5	UL	1.92	0.77	UL	0.03	9720	0.56	UL	UL
32	81	24.69	Saturated	60	CL-ML-S	7317.3	0.54	1.0	1.00	1.0	1.0	32.3	50	0.0	32.3	UL	1.92	0.76	UL	0.03	10370	0.52	UL	UL
33	86	26.21	Saturated	34	CH	7655.8	0.53	1.0	1.00	1.0	1.0	17.9	92.4	7.0	24.9	0.29	1.92	0.74	0.41	0.03	11020	0.48	0.014	31
34	91	27.74	Saturated	41	CH	7994.3	0.51	1.0	1.00	1.0	1.0	21.1	90	7.0	28.1	0.37	1.92	0.73	0.52	0.03	11670	0.46	0.013	40
36	101	30.78	Saturated	50	SC	8671.3	0.49	1.0	1.00	1.0	1.0	24.7	35	7.0	31.7	UL	1.92	0.71	UL	0.03	12970	0.43	UL	UL
37	107	32.61	Saturated	70	CH	9077.5	0.48	1.0	1.00	1.0	1.0	33.8	90	7.0	40.8	UL	1.92	0.70	UL	0.03	13750	0.44	UL	UL
38	111	33.83	Saturated	68	CH	9348.3	0.48	1.0	1.00	1.0	1.0	32.4	90	7.0	39.4	UL	1.92	0.69	UL	0.03	14270	0.46	UL	UL
39	116	35.36	Saturated	58	CH	9686.8	0.47	1.0	1.00	1.0	1.0	27.1	90	7.0	34.1	UL	1.92	0.68	UL	0.03	14920	0.50	UL	UL
40	119	36.27	Saturated	77	CH	9889.9	0.46	1.0	1.00	1.0	1.0	35.6	90	7.0	42.6	UL	1.92	0.67	UL	0.03	15310	0.54	UL	UL

Source: AECOM, 2012. (See Appendices A and B for boring logs and laboratory testing results)

LIQUEFACTION FACTOR OF SAFETY ASSESSMENT
TEST BORING B-2-2[1]
Coleto Creek Power Plant

Depth to Water =	3.5	ft
Average Unsaturated Soil Unit Weight, γ_d =	125	pcf
Average Saturated Soil Unit Weight, γ_s =	130	pcf
Average Water Unit Weight, γ_w =	62.3	pcf
Earthquake Magnitude, M_W =	6.1	
Borehole Diameter =	3", to end of boring	

Sample Number	Depth (ft)	Depth (m)	Note	N_{SPT}	Soil Type	σ'_{vo} (psf)	C_N	C_E	C_B	C_S	C_R	$(N_1)_{60}$	FC	$\Delta(N_1)_{60}$	$(N_1)_{60}$-cs	$CRR_{M7.5}$	MSF	$K\sigma$	CRR	a_{max}/g	σ_{vo}	r_d	CSR	FS_{liq}
1	1	0.30	Unsaturated	5	OL	125	2.00	1.0	1.00	1.0	0.75	7.5	50	7.0	14.5	0.16	1.92	NA	0.30	0.03	125	1.00	0.019	UL
2	3	0.91	Unsaturated	16	OL	375	2.00	1.0	1.00	1.0	0.75	24.0	50	7.0	31.0	0.55	1.92	NA	1.05	0.03	375	0.99	0.019	UL
3	5	1.52	Saturated	15	SC	510.4	2.04	1.0	1.00	1.0	0.75	22.9	35	7.0	29.9	0.46	1.92	NA	0.88	0.03	635	0.99	0.024	37
4	7	2.13	Saturated	16	SP	645.8	1.81	1.0	1.00	1.0	0.75	21.7	1	0.0	21.7	0.24	1.92	NA	0.46	0.03	895	0.99	0.027	17
5	9	2.74	Saturated	15	SP	781.2	1.65	1.0	1.00	1.0	0.75	18.5	1	0.0	18.5	0.20	1.92	NA	0.38	0.03	1155	0.98	0.028	13
6	10	3.05	Saturated	18	SP	848.9	1.58	1.0	1.00	1.0	0.75	21.3	1	0.0	21.3	0.23	1.92	NA	0.45	0.03	1285	0.98	0.029	16
6A	11	3.35	Saturated	15	SP	916.6	1.52	1.0	1.00	1.0	0.75	17.1	1	0.0	17.1	0.18	1.92	NA	0.35	0.03	1415	0.98	0.029	12
7	14	4.27	Saturated	26	ML	1119.7	1.37	1.0	1.00	1.0	0.80	28.6	50	7.0	35.6	UL	1.92	NA	UL	0.03	1805	0.97	UL	UL
7A	15	4.57	Saturated	32	CL	1187.4	1.34	1.0	1.00	1.0	0.75	32.0	50	7.0	39.0	UL	1.92	NA	UL	0.03	1935	0.97	UL	UL
8	20	6.10	Saturated	21	ML	1525.9	1.18	1.0	1.00	1.0	0.88	21.8	50	7.0	28.8	0.40	1.92	NA	0.76	0.03	2585	0.95	0.031	24
9	25	7.62	Saturated	35	SP	1864.4	1.07	1.0	1.00	1.0	0.94	35.1	1	0.0	35.1	UL	1.92	NA	UL	0.03	3235	0.93	UL	UL
10	31	9.45	Saturated	41	SP	2270.6	0.97	1.0	1.00	1.0	1.02	40.4	1	0.0	40.4	UL	1.92	0.92	UL	0.03	4015	0.91	UL	UL
11	35	10.67	Saturated	45	SC	2541.4	0.91	1.0	1.00	1.0	1.07	43.9	35	7.0	50.9	UL	1.92	0.92	UL	0.03	4535	0.89	UL	UL
12	39	11.89	Saturated	50	SC	2812.2	0.87	1.0	1.00	1.0	1.12	48.6	35	7.0	55.6	UL	1.92	0.91	UL	0.03	5055	0.86	UL	UL
13	45	13.72	Saturated	42	SP	3218.4	0.81	1.0	1.00	1.0	1.20	40.9	1	0.0	40.9	UL	1.92	0.89	UL	0.03	5835	0.82	UL	UL
14	50	15.24	Saturated	26	CL	3556.9	0.77	1.0	1.00	1.0	1.0	20.1	50	7.0	27.1	0.34	1.92	0.88	0.57	0.03	6485	0.79	0.028	21
15	54	16.46	Saturated	56	SP	3827.7	0.74	1.0	1.00	1.0	1.0	41.6	1	0.0	41.6	UL	1.92	0.87	UL	0.03	7005	0.75	UL	UL
15A	55	16.76	Saturated	120	SP	3895.4	0.74	1.0	1.00	1.0	1.0	88.4	1	0.0	88.4	UL	1.92	0.87	UL	0.03	7135	0.74	UL	UL
16	59	17.98	Saturated	83	CL	4166.2	0.71	1.0	1.00	1.0	1.0	59.2	50	7.0	66.2	UL	1.92	0.86	UL	0.03	7655	0.71	UL	UL
17	65	19.81	Saturated	50	SM	4572.4	0.68	1.0	1.00	1.0	1.0	34.0	35	7.0	41.0	UL	1.92	0.85	UL	0.03	8435	0.66	UL	UL
18	70	21.34	Saturated	56	CH	4910.9	0.66	1.0	1.00	1.0	1.0	36.8	90	7.0	43.8	UL	1.92	0.84	UL	0.03	9085	0.61	UL	UL

Source: AECOM, 2012. (See Appendices A and B for boring logs and laboratory testing results)

LIQUEFACTION FACTOR OF SAFETY ASSESSMENT
TEST BORING B-3-1[1]
Coleto Creek Power Plant

Depth to Water =	28	ft (Only saturated strata was found between 28.0 and 28.5 ft bgs)
Average Unsaturated Soil Unit Weight, γ_d =	125	pcf
Average Saturated Soil Unit Weight, γ_s =	130	pcf
Average Water Unit Weight, γ_w =	62.3	pcf
Earthquake Magnitude, M_W =	6.1	
Borehole Diameter =	4", to 30'	
	3", to end of boring	

Sample Number	Depth (ft)	Depth (m)	Note	N_{SPT}	Soil Type	σ'_{vo} (psf)	C_N	C_E	C_B	C_S	C_R	$(N_1)_{60}$	FC	$\Delta(N_1)_{60}$	$(N_1)_{60}$-cs	$CRR_{M7.5}$	MSF	$K\sigma$	CRR	a_{max}/g	σ_{vo}	r_d	CSR	FS_{liq}
1	1	0.30	Unsaturated	19	SC	125	2.00	1.0	1.00	1.0	0.75	28.5	35	7.0	35.5	UL	1.92	NA	UL	0.03	125	1.00	UL	UL
2	3	0.91	Unsaturated	17	SC	375	2.00	1.0	1.00	1.0	0.75	25.5	35	7.0	32.5	UL	1.92	NA	UL	0.03	375	0.99	UL	UL
3	5	1.52	Unsaturated	26	SC	625	1.84	1.0	1.00	1.0	0.75	35.9	35	7.0	42.9	UL	1.92	NA	UL	0.03	625	0.99	UL	UL
4	7	2.13	Unsaturated	26	SC	875	1.56	1.0	1.00	1.0	0.75	30.3	35	7.0	37.3	UL	1.92	NA	UL	0.03	875	0.99	UL	UL
5	9	2.74	Unsaturated	9	SC	1125	1.37	1.0	1.00	1.0	0.75	9.3	35	7.0	16.3	0.17	1.92	NA	0.33	0.03	1125	0.98	0.019	17
6	11	3.35	Unsaturated	15	SC	1375	1.24	1.0	1.00	1.0	0.75	14.0	35	7.0	21.0	0.23	1.92	NA	0.44	0.03	1375	0.98	0.019	23
7	13	3.96	Unsaturated	12	SC	1625	1.14	1.0	1.00	1.0	0.79	10.8	35	7.0	17.8	0.19	1.92	NA	0.37	0.03	1625	0.97	0.019	19
8	15	4.57	Unsaturated	11	SC	1875	1.06	1.0	1.00	1.0	0.75	8.8	35	7.0	15.8	0.17	1.92	NA	0.32	0.03	1875	0.97	0.019	17
8A	16	4.88	Unsaturated	24	SC	2000	1.03	1.0	1.00	1.0	0.83	20.5	40	7.0	27.5	0.35	1.92	NA	0.68	0.03	2000	0.96	0.019	36
11	21	6.40	Unsaturated	18	SC	2625	0.90	1.0	1.00	1.0	0.89	14.4	34.8	7.0	21.4	0.23	1.92	0.91	0.41	0.03	2625	0.95	0.019	22
12	23	7.01	Unsaturated	21	CL	2875	0.86	1.0	1.00	1.0	0.92	16.6	50	7.0	23.6	0.27	1.92	0.90	0.46	0.03	2875	0.94	0.018	25
14	27	8.23	Unsaturated	19	SC	3375	0.79	1.0	1.00	1.0	1.0	15.0	35	7.0	22.0	0.24	1.92	0.89	0.42	0.03	3375	0.93	0.018	23
15	28.5	8.69	Saturated	16	SC	3533.85	0.77	1.0	1.00	1.0	1.0	12.4	35	7.0	19.4	0.21	1.92	0.88	0.35	0.03	3565	0.92	0.018	20
15A	29	8.84	Unsaturated	20	SM	3627.5	0.76	1.0	1.00	1.0	1.0	15.3	35	7.0	22.3	0.25	1.92	0.88	0.42	0.03	3627.5	0.92	0.018	23
16	31	9.45	Unsaturated	17	SM	3877.5	0.74	1.0	1.00	1.0	1.0	12.6	35	7.0	19.6	0.21	1.92	0.87	0.35	0.03	3877.5	0.91	0.018	20
17	36	10.97	Unsaturated	65	SM	4502.5	0.69	1.0	1.00	1.0	1.0	44.6	35	7.0	51.6	UL	1.92	0.85	UL	0.03	4502.5	0.88	UL	UL

Source: AECOM, 2012. (See Appendices A and B for boring logs and laboratory testing results)

LIQUEFACTION FACTOR OF SAFETY ASSESSMENT
TEST BORING B-3-2[1]
Coleto Creek Power Plant

Depth to Water =	14	ft
Average Unsaturated Soil Unit Weight, γ_d =	125	pcf
Average Saturated Soil Unit Weight, γ_s =	130	pcf
Average Water Unit Weight, γ_w =	62.3	pcf
Earthquake Magnitude, M_W =	6.1	
Borehole Diameter =	3", to end of boring	

Sample Number	Depth (ft)	Depth (m)	Note	N_{SPT}	Soil Type	σ'_{vo} (psf)	C_N	C_E	C_B	C_S	C_R	$(N_1)_{60}$	FC	$\Delta(N_1)_{60}$	$(N_1)_{60}$-cs	$CRR_{M7.5}$	MSF	$K\sigma$	CRR	a_{max}/g	σ_{vo}	r_d	CSR	FS_{liq}
1	1	0.30	Unsaturated	12	SM	125	2.00	1.0	1.00	1.0	0.75	18.0	35	7.0	25.0	0.29	1.92	NA	0.56	0.03	125	1.00	0.019	29
2	3	0.91	Unsaturated	14	CL	375	2.00	1.0	1.00	1.0	0.75	21.0	50	7.0	28.0	0.37	1.92	NA	0.71	0.03	375	0.99	0.019	36
2A	4	1.22	Unsaturated	18	CL	500	2.00	1.0	1.00	1.0	0.75	27.0	50	7.0	34.0	UL	1.92	NA	UL	0.03	500	0.99	UL	UL
3	5	1.52	Unsaturated	18	CL	625	1.84	1.0	1.00	1.0	0.75	24.8	50	7.0	31.8	UL	1.92	NA	UL	0.03	625	0.99	UL	UL
4	7	2.13	Unsaturated	18	CL	875	1.56	1.0	1.00	1.0	0.75	21.0	50	7.0	28.0	0.37	1.92	NA	0.71	0.03	875	0.99	0.019	37
5	9	2.74	Unsaturated	19	CL	1125	1.37	1.0	1.00	1.0	0.75	19.5	50	7.0	26.5	0.33	1.92	NA	0.63	0.03	1125	0.98	0.019	33
6	11	3.35	Unsaturated	47	SM	1375	1.24	1.0	1.00	1.0	0.76	44.3	35	7.0	51.3	UL	1.92	NA	UL	0.03	1375	0.98	UL	UL
7	15	4.57	Saturated	23	SP	1817.7	1.08	1.0	1.00	1.0	0.82	20.3	1	0.0	20.3	0.22	1.92	NA	0.42	0.03	1880	0.97	0.020	22
8	20	6.10	Saturated	42	SM	2156.2	0.99	1.0	1.00	1.0	0.75	31.2	35	7.0	38.2	UL	1.92	NA	UL	0.03	2530	0.95	UL	UL
9	24	7.32	Saturated	50	SP	2427	0.93	1.0	1.00	1.0	0.93	43.4	1	0.0	43.4	UL	1.92	0.92	UL	0.03	3050	0.94	UL	UL
10	29	8.84	Saturated	52	SP	2765.5	0.87	1.0	1.00	1.0	0.99	45.0	1	0.0	45.0	UL	1.92	0.91	UL	0.03	3700	0.92	UL	UL

Source: AECOM, 2012. (See Appendices A and B for boring logs and laboratory testing results)

LIQUEFACTION FACTOR OF SAFETY ASSESSMENT
TEST BORING B-4-1[1]
Coleto Creek Power Plant

Depth to Water =	35.6	ft
Average Unsaturated Soil Unit Weight, γ_d =	125	pcf
Average Saturated Soil Unit Weight, γ_s =	130	pcf
Average Water Unit Weight, γ_w =	62.3	pcf
Earthquake Magnitude, M_W =	6.1	
Borehole Diameter =	3", to end of boring	

Sample Number	Depth (ft)	Depth (m)	Note	N_{SPT}	Soil Type	σ'_{vo} (psf)	C_N	C_E	C_B	C_S	C_R	$(N_1)_{60}$	FC	$\Delta(N_1)_{60}$	$(N_1)_{60}$-cs	$CRR_{M7.5}$	MSF	$K\sigma$	CRR	a_{max}/g	σ_{vo}	r_d	CSR	FS_{liq}
1	1	0.30	Unsaturated	17	SC	125	2.00	1.0	1.00	1.0	0.75	25.5	12.8	1.8	27.3	0.35	1.92	NA	0.67	0.03	125	1.00	0.019	34
2	3	0.91	Unsaturated	12	SC	375	2.00	1.0	1.00	1.0	0.75	18.0	12.8	1.8	19.8	0.21	1.92	NA	0.41	0.03	375	0.99	0.019	21
3	5	1.52	Unsaturated	12	SC	625	1.84	1.0	1.00	1.0	0.75	16.6	12.8	1.8	18.4	0.20	1.92	NA	0.38	0.03	625	0.99	0.019	20
6	11	3.35	Unsaturated	14	SC	1375	1.24	1.0	1.00	1.0	0.76	13.2	12.8	1.8	15.0	0.16	1.92	NA	0.31	0.03	1375	0.98	0.019	16
8	14	4.27	Unsaturated	21	SC	1750	1.10	1.0	1.00	1.0	0.80	18.5	12.8	1.8	20.3	0.22	1.92	NA	0.42	0.03	1750	0.97	0.019	22
9	17	5.18	Unsaturated	20	SC	2125	1.00	1.0	1.00	1.0	0.84	16.8	12.8	1.8	18.6	0.20	1.92	0.93	0.38	0.03	2125	0.96	0.019	20
10	19	5.79	Unsaturated	29	SC	2375	0.94	1.0	1.00	1.0	0.87	23.8	12.8	1.8	25.6	0.31	1.92	0.92	0.59	0.03	2375	0.96	0.019	31
11	20	6.10	Unsaturated	16	CL	2500	0.92	1.0	1.00	1.0	0.88	13.0	50	7.0	20.0	0.22	1.92	0.92	0.41	0.03	2500	0.95	0.019	22
11A	21	6.40	Unsaturated	23	CL	2625	0.90	1.0	1.00	1.0	0.89	18.4	50	7.0	25.4	0.30	1.92	0.91	0.58	0.03	2625	0.95	0.019	31
12	22	6.71	Unsaturated	24	CL	2750	0.88	1.0	1.00	1.0	0.90	18.9	50	7.0	25.9	0.31	1.92	0.91	0.60	0.03	2750	0.95	0.018	33
12A	23	7.01	Unsaturated	22	CL	2875	0.86	1.0	1.00	1.0	0.92	17.4	50	7.0	24.4	0.28	1.92	0.90	0.54	0.03	2875	0.94	0.018	29
14	27	8.23	Unsaturated	25	SC	3375	0.79	1.0	1.00	1.0	0.97	19.2	35	7.0	26.2	0.32	1.92	0.89	0.61	0.03	3375	0.93	0.018	34
15	29	8.84	Unsaturated	23	SC	3625	0.76	1.0	1.00	1.0	0.99	17.4	35	7.0	24.4	0.28	1.92	0.88	0.54	0.03	3625	0.92	0.018	30
16	31	9.45	Unsaturated	26	SM	3875	0.74	1.0	1.00	1.0	1.0	19.2	35	7.0	26.2	0.32	1.92	0.87	0.61	0.03	3875	0.91	0.018	35
17	34	10.36	Unsaturated	22	CL	4242	0.71	1.0	1.00	1.0	1.0	15.5	50	7.0	22.5	0.25	1.92	0.86	0.48	0.03	4242	0.89	0.017	28
17A	36	10.97	Saturated	28	SP	4477.08	0.69	1.0	1.00	1.0	1.0	19.3	1	0.0	19.3	0.21	1.92	0.85	0.40	0.03	4502	0.88	0.017	23
18	41	12.50	Saturated	35	SP	4815.58	0.66	1.0	1.00	1.0	1.0	23.2	1	0.0	23.2	0.26	1.92	0.84	0.50	0.03	5152	0.85	0.018	28
19	46	14.02	Saturated	35	SP	5154.08	0.64	1.0	1.00	1.0	1.0	22.4	1	0.0	22.4	0.25	1.92	0.83	0.48	0.03	5802	0.82	0.018	27
20	51	15.54	Unsaturated	60	SP	6427	0.57	1.0	1.00	1.0	1.0	34.4	1	0.0	34.4	UL	1.92	0.79	UL	0.03	6427	0.78	UL	UL

Source: AECOM, 2012. (See Appendices A and B for boring logs and laboratory testing results)

LIQUEFACTION FACTOR OF SAFETY ASSESSMENT
TEST BORING B-4-2[1]
Coleto Creek Power Plant

Depth to Water =	14	ft
Average Unsaturated Soil Unit Weight, γ_d =	125	pcf
Average Saturated Soil Unit Weight, γ_s =	130	pcf
Average Water Unit Weight, γ_w =	62.3	pcf
Earthquake Magnitude, M_W =	6.1	
Borehole Diameter =	3", to end of boring	

Sample Number	Depth (ft)	Depth (m)	Note	N_{SPT}	Soil Type	σ'_{vo} (psf)	C_N	C_E	C_B	C_S	C_R	$(N_1)_{60}$	FC	$\Delta(N_1)_{60}$	$(N_1)_{60}$-cs	$CRR_{M7.5}$	MSF	$K\sigma$	CRR	a_{max}/g	σ_{vo}	r_d	CSR	FS_{liq}
1	1	0.30	Unsaturated	23	SM	125	2.00	1.0	1.00	1.0	0.75	34.5	35	7.0	41.5	UL	1.92	NA	UL	0.03	125	1.00	UL	UL
2	3	0.91	Unsaturated	33	SM	375	2.00	1.0	1.00	1.0	0.75	49.5	35	7.0	56.5	UL	1.92	NA	UL	0.03	375	0.99	UL	UL
3	5	1.52	Unsaturated	28	OL	625	1.84	1.0	1.00	1.0	0.75	38.6	50	7.0	45.6	UL	1.92	NA	UL	0.03	625	0.99	UL	UL
4	7	2.13	Unsaturated	22	SC	875	1.56	1.0	1.00	1.0	0.75	25.7	35	7.0	32.7	UL	1.92	NA	UL	0.03	875	0.99	UL	UL
6	11	3.35	Unsaturated	12	SM	1375	1.24	1.0	1.00	1.0	0.76	11.3	35	7.0	18.3	0.20	1.92	NA	0.38	0.03	1375	0.98	0.019	20
7	15	4.57	Saturated	13	SP	1817.7	1.08	1.0	1.00	1.0	0.82	11.5	1	0.0	11.5	0.13	1.92	NA	0.24	0.03	1880	0.97	0.020	12
8	20	6.10	Saturated	16	SP	2156.2	0.99	1.0	1.00	1.0	0.75	11.9	1	0.0	11.9	0.13	1.92	0.93	0.25	0.03	2530	0.95	0.022	11
9	25	7.62	Saturated	29	SP	2494.7	0.92	1.0	1.00	1.0	0.94	25.1	1	0.0	25.1	0.29	1.92	0.92	0.57	0.03	3180	0.93	0.023	24
10	29	8.84	Saturated	12	SM	2765.5	0.87	1.0	1.00	1.0	0.99	10.4	35	7.0	17.4	0.19	1.92	0.91	0.36	0.03	3700	0.92	0.024	15
10A	29.5	8.99	Saturated	43	SP	2799.35	0.87	1.0	1.00	1.0	1.00	37.4	1	0.0	37.4	UL	1.92	0.91	UL	0.03	3765	0.91	UL	UL

Source: AECOM, 2012. (See Appendices A and B for boring logs and laboratory testing results)

LIQUEFACTION FACTOR OF SAFETY ASSESSMENT
TEST BORING B-5-1[1]
Coleto Creek Power Plant

Depth to Water =	32	ft
Average Unsaturated Soil Unit Weight, γ_d =	125	pcf
Average Saturated Soil Unit Weight, γ_s =	130	pcf
Average Water Unit Weight, γ_w =	62.3	pcf
Earthquake Magnitude, M_W =	6.1	
Borehole Diameter =	3", to end of boring	

Sample Number	Depth (ft)	Depth (m)	Note	N_{SPT}	Soil Type	σ'_{vo} (psf)	C_N	C_E	C_B	C_S	C_R	$(N_1)_{60}$	FC	$\Delta(N_1)_{60}$	$(N_1)_{60}$-cs	$CRR_{M7.5}$	MSF	$K\sigma$	CRR	a_{max}/g	σ_{vo}	r_d	CSR	FS_{liq}
1	1	0.30	Unsaturated	34	SC	125	2.00	1.0	1.00	1.0	0.75	51.0	35	7.0	58.0	UL	1.92	NA	UL	0.03	125	1.00	UL	UL
2	3	0.91	Unsaturated	26	SC	375	2.00	1.0	1.00	1.0	0.75	39.0	35	7.0	46.0	UL	1.92	NA	UL	0.03	375	0.99	UL	UL
3	5	1.52	Unsaturated	23	SC	625	1.84	1.0	1.00	1.0	0.75	31.7	35	7.0	38.7	UL	1.92	NA	UL	0.03	625	0.99	UL	UL
4	7	2.13	Unsaturated	17	SC	875	1.56	1.0	1.00	1.0	0.75	19.8	35	7.0	26.8	0.33	1.92	NA	0.64	0.03	875	0.99	0.019	33
5	9	2.74	Unsaturated	11	SC	1125	1.37	1.0	1.00	1.0	0.75	11.3	35	7.0	18.3	0.20	1.92	NA	0.38	0.03	1125	0.98	0.019	20
6	11	3.35	Unsaturated	17	SC	1375	1.24	1.0	1.00	1.0	0.75	15.8	35	7.0	22.8	0.26	1.92	NA	0.49	0.03	1375	0.98	0.019	26
7	12	3.66	Unsaturated	12	SC	1500	1.19	1.0	1.00	1.0	0.75	10.7	35	7.0	17.7	0.19	1.92	NA	0.36	0.03	1500	0.97	0.019	19
7A	13	3.96	Unsaturated	18	SC	1625	1.14	1.0	1.00	1.0	0.75	15.4	35	7.0	22.4	0.25	1.92	NA	0.48	0.03	1625	0.97	0.019	25
8	15	4.57	Unsaturated	10	SC	1875	1.06	1.0	1.00	1.0	0.75	8.0	35	7.0	15.0	0.16	1.92	NA	0.31	0.03	1875	0.97	0.019	16
9	17	5.18	Unsaturated	15	SC	2125	1.00	1.0	1.00	1.0	0.75	11.2	35	7.0	18.2	0.20	1.92	0.93	0.37	0.03	2125	0.96	0.019	20
10	19	5.79	Unsaturated	32	SC	2375	0.94	1.0	1.00	1.0	0.75	22.7	35	7.0	29.7	0.44	1.92	0.92	0.85	0.03	2375	0.96	0.019	45
11	20	6.10	Unsaturated	20	SC	2500	0.92	1.0	1.00	1.0	0.75	13.8	35	7.0	20.8	0.23	1.92	0.92	0.44	0.03	2500	0.95	0.019	23
11A	21	6.40	Unsaturated	28	CL	2625	0.90	1.0	1.00	1.0	0.75	18.9	83.9	7.0	25.9	0.31	1.92	0.91	0.60	0.03	2625	0.95	0.019	32
16	31	9.45	Unsaturated	35	CL	3875	0.74	1.0	1.00	1.0	0.75	19.4	50	7.0	26.4	0.32	1.92	0.87	0.62	0.03	3875	0.91	0.018	35
17	33	10.06	Saturated	33	SM	4067.7	0.72	1.0	1.00	1.0	0.75	17.9	35	7.0	24.9	0.29	1.92	0.86	0.56	0.03	4130	0.90	0.018	31
18	36	10.97	Saturated	80	SP	4270.8	0.70	1.0	1.00	1.0	0.75	42.2	1	0.0	42.2	UL	1.92	0.86	UL	0.03	4520	0.88	UL	UL
19	41	12.50	Saturated	77	SP	4609.3	0.68	1.0	1.00	1.0	0.75	39.1	1	0.0	39.1	UL	1.92	0.85	UL	0.03	5170	0.85	UL	UL
20	46	14.02	Saturated	42	SM	4947.8	0.65	1.0	1.00	1.0	0.75	20.6	35	7.0	27.6	0.36	1.92	0.84	0.68	0.03	5820	0.82	0.019	36
21	50	15.24	Saturated	50	SM	5218.6	0.64	1.0	1.00	1.0	0.75	23.9	35	7.0	30.9	UL	1.92	0.83	UL	0.03	6340	0.79	UL	UL

Source: AECOM, 2012. (See Appendices A and B for boring logs and laboratory testing results)