

Sieve Analysis

ASTM C136

Project Number : 022-15055
Project Name : Guzman
Date : 7/15/2016
Sample Location : B17 @ 45-46'
Soil Classification : SM

Wet Weight	:	300.00
Dry Weight	:	265.80
Moisture Content	:	13%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	2.4	0.9	0.9	99.1
#8	2.36	9.2	3.5	4.4	95.6
#16	1.18	21.7	8.2	12.5	87.5
#30	0.60	23.9	9.0	21.5	78.5
#50	0.30	28.4	10.7	32.2	67.8
#100	0.15	34.5	13.0	45.2	54.8
#200	0.08	31.5	11.9	57.0	43.0

Hydrometer Analysis

ASTM D422

Project Number : 022-15055
Project Name : Guzman
Date : 7/15/2016
Sample Location : B17 @ 45-46'
Soil Classification : SM

Dry Weight Used	81.0 g
Temperature	20.0 C
Soil Specific Gravity	2.65
Solution Spec. Grav.	1.003
K Value	0.01365
Correction Factor	0.00000

Elapsed Time (min)	Hydro. Reading	Hydro. Corrected	% Passing	Particle Diameter
2	1.022	1.022	37.7	0.0313
5	1.02	1.02	33.8	0.0202
15	1.017	1.017	27.8	0.0121
30	1.016	1.016	25.8	0.0087
60	1.015	1.015	23.8	0.0062
250	1.012	1.012	17.9	0.0031
1440	1.01	1.01	13.9	0.0013

Particle Diameter	Percent Passing
0.005	21.5
0.002	15.4
0	NA

Grain Size Analysis



Project Name: Guzman
 Project Number: 022-15055
 Soil Classification: SM
 Sample Number: B17 @ 45-46'

ASTM C136 /
 D422

Krazan Testing Laboratory

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

Project: **Guzman Reservoirs**

Project Number: **022-15055**

Date Sampled: 5/31/2016

Sampled By: DA

Sample Number:

Sample Location: B17 @ 45-46'

Sample Description: SM

Date Tested: 7/14/2016

Tested By: J Dyer

Verified By: J Gruszczynski

Trial Number	Plastic Limit			Liquid Limit		
	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)						
Weight of Dry Soil & Tare (g)						
Weight of Tare (g)						
Weight of water (g)						
Weight of Dry Soil (g)						
Water Content (% of dry wt.)						
Number of Blows						

Plastic Limit : N/D

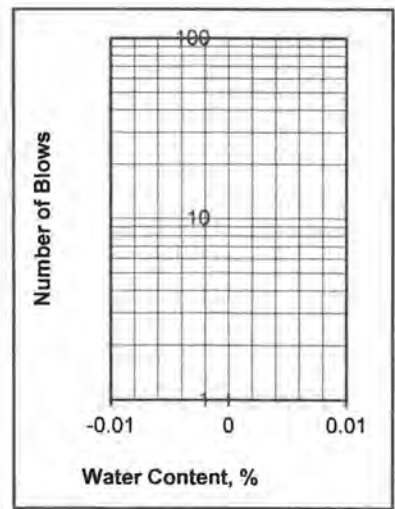
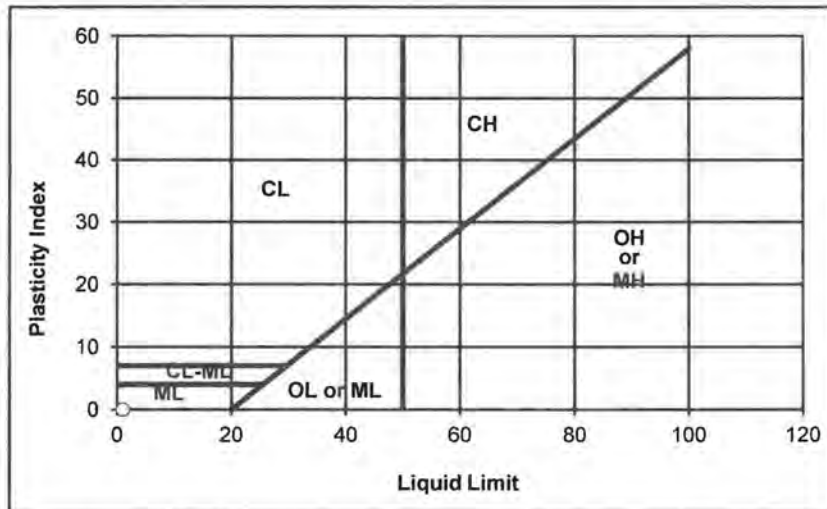
Liquid Limit : N/D

Plasticity Index : NON-PLASTIC

Unified Soil Classification : NON-PLASTIC

Requirement:

Approx. % of Material Retained on # 40 Sieve:



Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

Sieve Analysis

ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 7/15/2016
Sample Location : B17 @ 50-51'
Soil Classification : SP-SM

Wet Weight	:	300.00
Dry Weight	:	294.70
Moisture Content	:	2%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	10.9	3.7	3.7	96.3
#8	2.36	39.7	13.5	17.2	82.8
#16	1.18	56.6	19.2	36.4	63.6
#30	0.60	54.6	18.5	54.9	45.1
#50	0.30	49.5	16.8	71.7	28.3
#100	0.15	34.7	11.8	83.5	16.5
#200	0.08	17.7	6.0	89.5	10.5

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
SP-SM
B17 @ 50-51'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

ASTM C136

Project Number : 022-15055
Project Name : Guzman
Date : 7/15/2016
Sample Location : B17 @ 75-76'
Soil Classification : ML

Wet Weight	:	200.00
Dry Weight	:	168.60
Moisture Content	:	19%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75				100.0
#8	2.36	0.8	0.5	0.5	99.5
#16	1.18	2.6	1.5	2.0	98.0
#30	0.60	3.6	2.1	4.2	95.8
#50	0.30	6.8	4.0	8.2	91.8
#100	0.15	16.8	10.0	18.1	81.9
#200	0.08	29.3	17.4	35.5	64.5

Hydrometer Analysis

ASTM D422

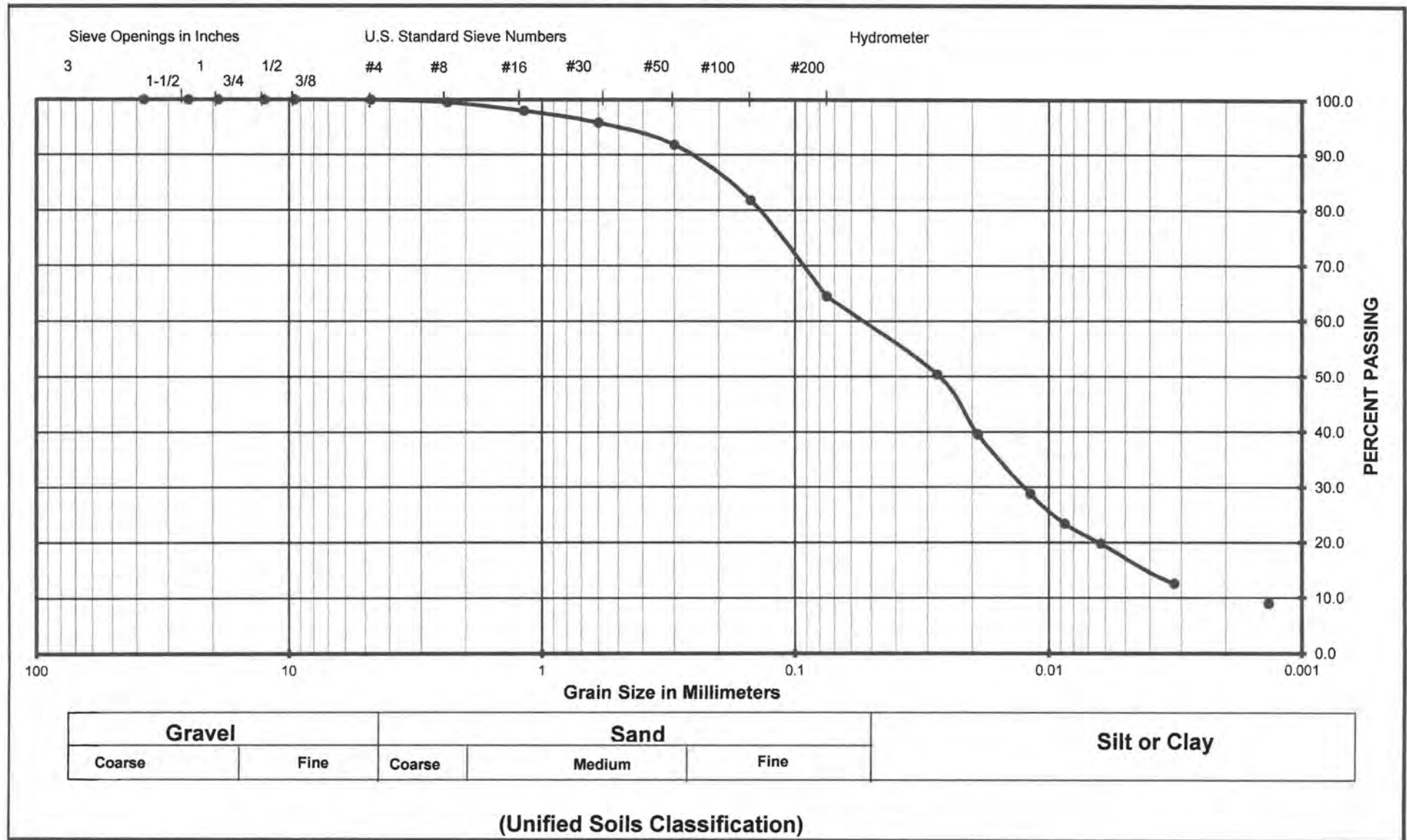
Project Number : 022-15055
Project Name : Guzman
Date : 7/15/2016
Sample Location : B17 @ 75-76'
Soil Classification : ML

Dry Weight Used	89.4 g
Temperature	20.0 C
Soil Specific Gravity	2.65
Solution Spec. Grav	1.003
K Value	0.01365
Correction Factor	0.00000

Elapsed Time (min)	Hydro. Reading	Hydro. Corrected	% Passing	Particle Diameter
2	1.031	1.031	50.4	0.0275
5	1.025	1.025	39.6	0.0190
15	1.019	1.019	28.8	0.0118
30	1.016	1.016	23.4	0.0087
60	1.014	1.014	19.8	0.0063
250	1.01	1.01	12.6	0.0032
1440	1.008	1.008	9.0	0.0014

Particle Diameter	Percent Passing
0.005	16.8
0.002	10.3
0	NA

Grain Size Analysis



Project Name: Guzman
 Project Number: 022-15055
 Soil Classification: ML
 Sample Number: B17 @ 75-76'

ASTM C136 /
D422

Krazan Testing Laboratory

Plasticity Index of Soils

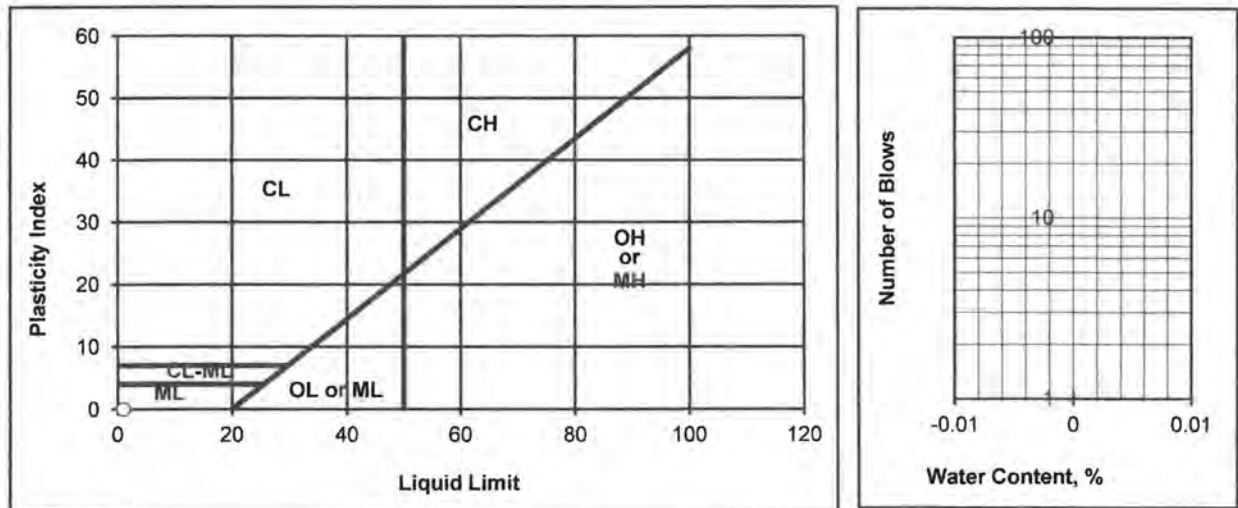
ASTM D4318/AASHTO T89 T90/CT 204

Project: **Guzman Reservoirs**
 Project Number: **022-15055**
 Date Sampled: 5/31/2016
 Sampled By: DA
 Sample Number:
 Sample Location: B17 @ 75-76'
 Sample Description: ML

Date Tested: 7/14/2016
 Tested By: J Dyer
 Verified By: J Gruszczynski

Trial Number	Plastic Limit			Liquid Limit		
	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)						
Weight of Dry Soil & Tare (g)						
Weight of Tare (g)						
Weight of water (g)						
Weight of Dry Soil (g)						
Water Content (% of dry wt.)						
Number of Blows						
Plastic Limit : N/D			Liquid Limit : N/D			

Plasticity Index : NON-PLASTIC
Unified Soil Classification : NON-PLASTIC
Requirement:
Approx. % of Material Retained on # 40 Sieve:



Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

Sieve Analysis

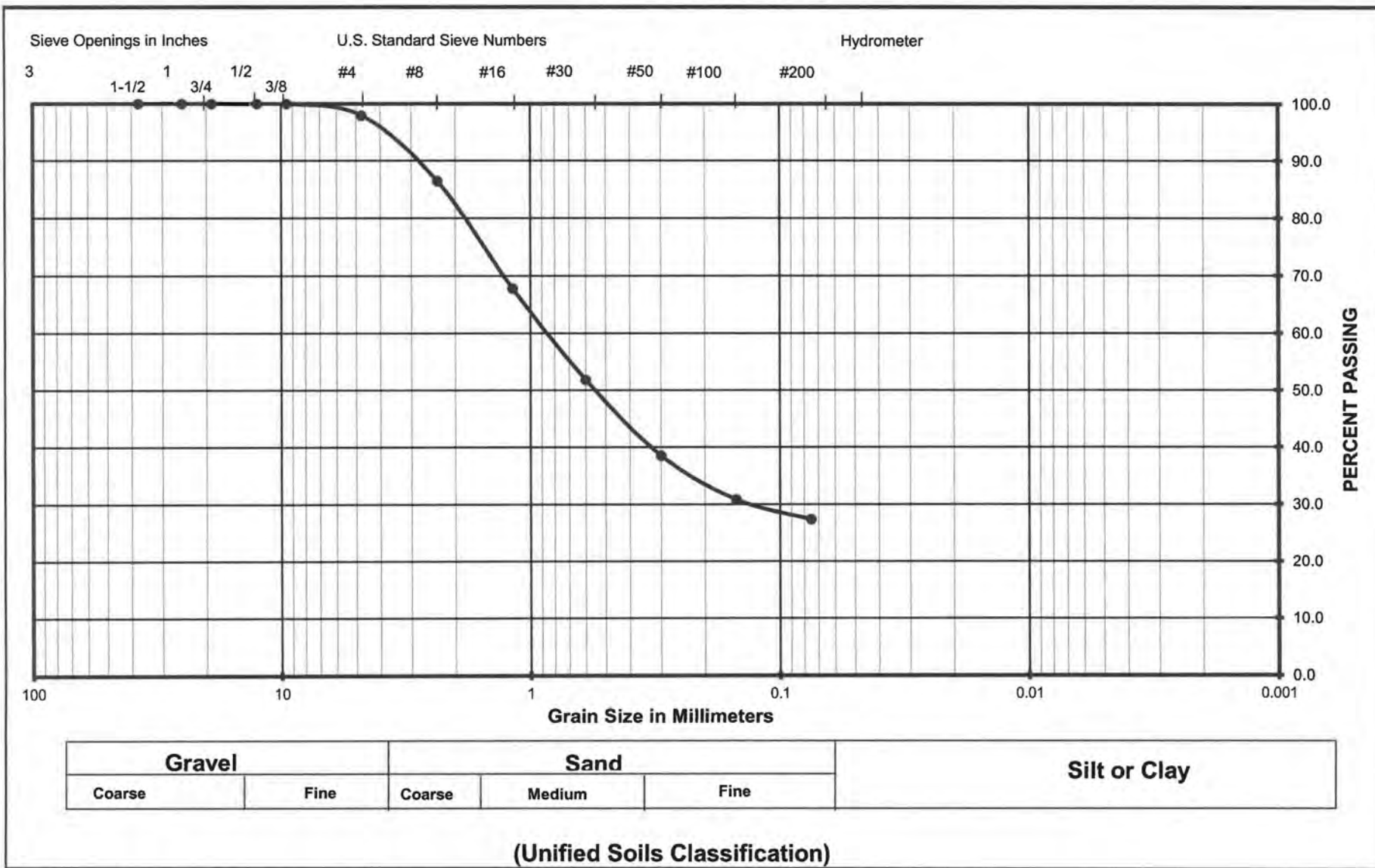
ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 12/6/2016
Sample Location : B18 @ 5-8'
Soil Classification : SC

Wet Weight	:	300.00
Dry Weight	:	255.80
Moisture Content	:	17%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	5.2	2.0	2.0	98.0
#8	2.36	29.4	11.5	13.5	86.5
#16	1.18	47.7	18.6	32.2	67.8
#30	0.60	40.9	16.0	48.2	51.8
#50	0.30	34.0	13.3	61.5	38.5
#100	0.15	19.7	7.7	69.2	30.8
#200	0.08	8.9	3.5	72.6	27.4

Grain Size Analysis



Project Name	Guzman
Project Number	022-15055
Soil Classification	SC
Sample Number	B18 @ 5-8'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

ASTM C136

Project Number : 022-15055
Project Name : Guzman
Date : 7/19/2016
Sample Location : B18 @ 10-11'
Soil Classification : CL

Wet Weight	:	250.00
Dry Weight	:	211.20
Moisture Content	:	18%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75				100.0
#8	2.36	3.1	1.5	1.5	98.5
#16	1.18	9.2	4.4	5.8	94.2
#30	0.60	12.3	5.8	11.6	88.4
#50	0.30	14.6	6.9	18.6	81.4
#100	0.15	17.6	8.3	26.9	73.1
#200	0.08	18.9	8.9	35.8	64.2

Hydrometer Analysis

ASTM D422

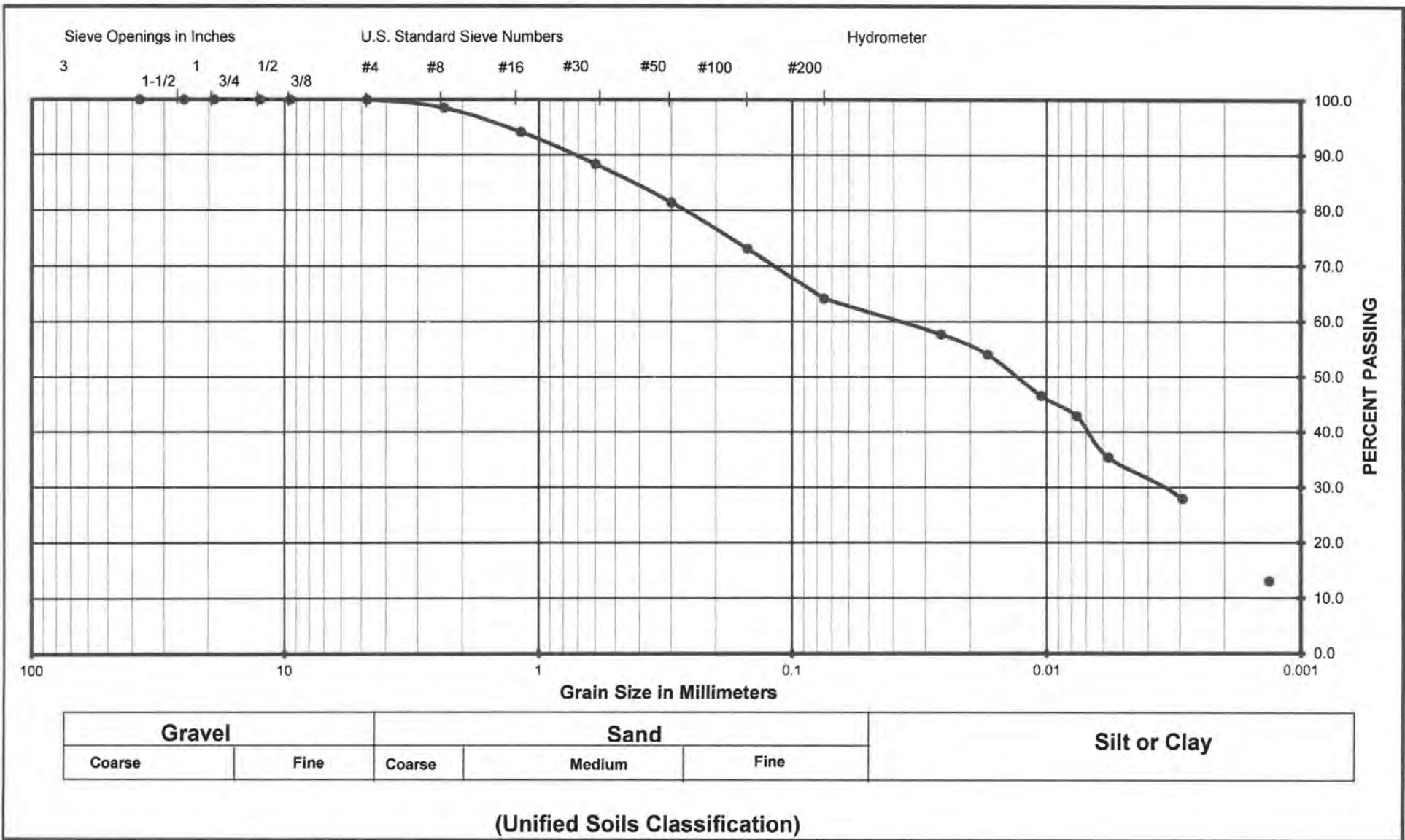
Project Number : 022-15055
Project Name : Guzman
Date : 7/19/2016
Sample Location : B18 @ 10-11'
Soil Classification : CL

Dry Weight Used	86.4 g
Temperature	20.0 C
Soil Specific Gravity	2.65
Solution Spec. Grav.	1.003
K Value	0.01365
Correction Factor	0.00000

Elapsed Time (min)	Hydro. Reading	Hydro. Corrected	% Passing	Particle Diameter
2	1.034	1.034	57.7	0.0261
5	1.032	1.032	54.0	0.0170
15	1.028	1.028	46.6	0.0105
30	1.026	1.026	42.8	0.0076
60	1.022	1.022	35.4	0.0057
250	1.018	1.018	27.9	0.0029
1440	1.01	1.01	13.0	0.0013

Particle Diameter	Percent Passing
0.005	33.5
0.002	19.3
0	NA

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
CL
B18 @ 10-11'

ASTM C136 /
D422

Krazan Testing Laboratory

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

Project: **Guzman Reservoirs**

Project Number: **022-15055**

Date Sampled: 5/31/2016

Sampled By: DA

Sample Number:

Sample Location: B18 @ 10-11'

Sample Description: CL

Date Tested: 7/18/2016

Tested By: J Dyer

Verified By: J Gruszczynski

Trial Number	Plastic Limit			Liquid Limit		
	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)	17.49	18.24		24.76		
Weight of Dry Soil & Tare (g)	16.84	17.50		21.81		
Weight of Tare (g)	13.90	14.18		14.49		
Weight of water (g)	0.66	0.73		2.95		
Weight of Dry Soil (g)	2.94	3.32		7.32		
Water Content (% of dry wt.)	22.4%	22.1%		40.3%		
Number of Blows				25		

Plastic Limit : 22

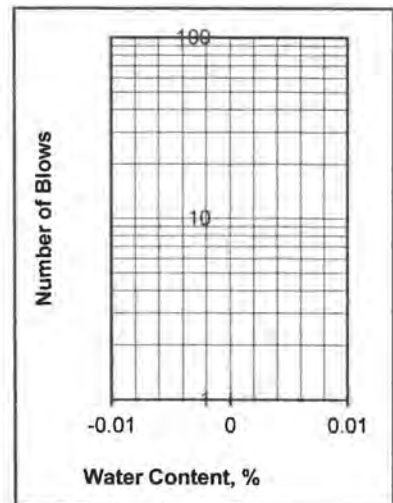
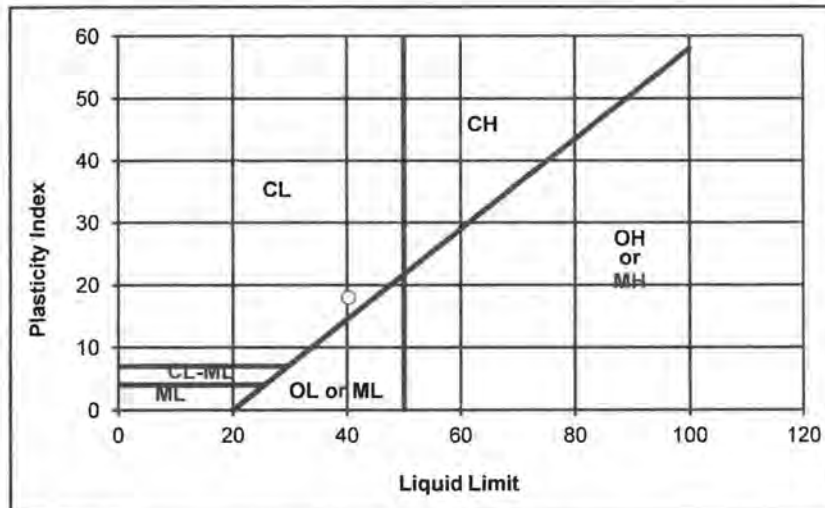
Liquid Limit : 40

Plasticity Index : 18

Unified Soil Classification : CL

Requirement:

Approx. % of Material Retained on # 40 Sieve:



Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

Sieve Analysis

ASTM C136

Project Number : 022-15055
Project Name : Guzman
Date : 12/22/2016
Sample Location : B18 @ 12-13'
Soil Classification : SC

Wet Weight	:	200.00
Dry Weight	:	191.40
Moisture Content	:	4%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	0.6	0.3	0.3	99.7
#8	2.36	7.2	3.8	4.1	95.9
#16	1.18	19.9	10.4	14.5	85.5
#30	0.60	25.0	13.1	27.5	72.5
#50	0.30	27.4	14.3	41.8	58.2
#100	0.15	22.5	11.8	53.6	46.4
#200	0.08	14.1	7.4	61.0	39.0

Hydrometer Analysis

ASTM D422

Project Number : 022-15055
Project Name : Guzman
Date : 12/22/2016
Sample Location : B18 @ 12-13'
Soil Classification : SC

Dry Weight Used	117.7 g
Temperature	20.0 C
Soil Specific Gravity	2.65
Solution Spec. Grav.	1.003
K Value	0.01365
Correction Factor	0.00000

Elapsed Time (min)	Hydro. Reading	Hydro. Corrected	% Passing	Particle Diameter
2	1.029	1.029	35.5	0.0283
5	1.027	1.027	32.8	0.0185
15	1.024	1.024	28.7	0.0111
30	1.022	1.022	26.0	0.0081
60	1.02	1.02	23.2	0.0058
250	1.018	1.018	20.5	0.0029
1440	1.014	1.014	15.0	0.0013

Particle Diameter	Percent Passing
0.005	22.4
0.002	17.4
0	NA

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
SC
B18 @ 12-13'

ASTM C136 /
D422

Krazan Testing Laboratory

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

Project: **Guzman Reservoirs**
 Project Number: **022-15055**
 Date Sampled: 11/2/2016
 Sampled By: DA
 Sample Number:
 Sample Location: B18 @ 12-13'
 Sample Description: SC

Date Tested: 12/27/2016
 Tested By: J Dyer
 Verified By: J Gruszczynski

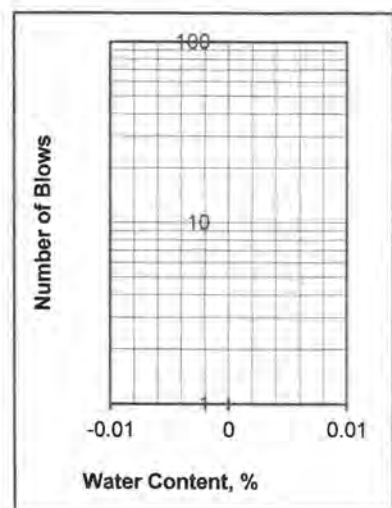
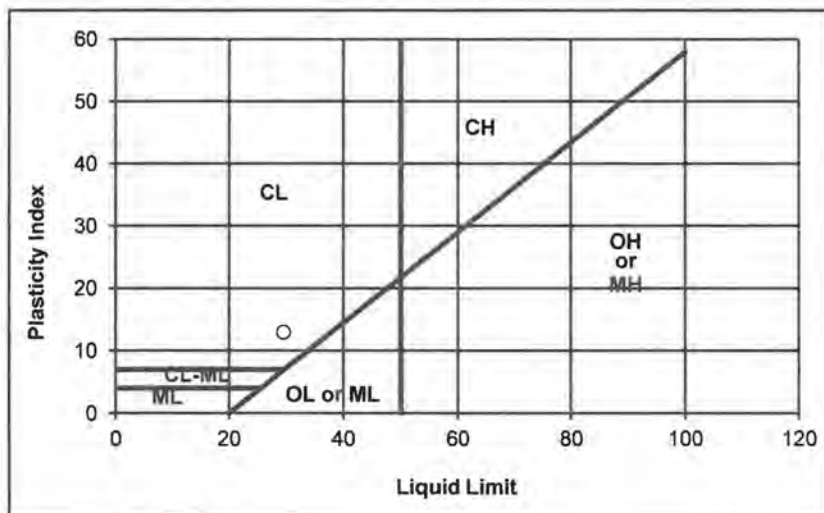
Trial Number	Plastic Limit			Liquid Limit		
	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)	19.75	21.05		24.22		
Weight of Dry Soil & Tare (g)	18.83	20.04		21.87		
Weight of Tare (g)	13.58	14.17		13.93		
Weight of water (g)	0.91	1.01		2.35		
Weight of Dry Soil (g)	5.25	5.87		7.94		
Water Content (% of dry wt.)	17.4%	17.2%		29.5%		
Number of Blows				25		

Plastic Limit : 17

Liquid Limit : 30

Plasticity Index : 13
Unified Soil Classification : CL

Requirement:
Approx. % of Material Retained on # 40 Sieve:



Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

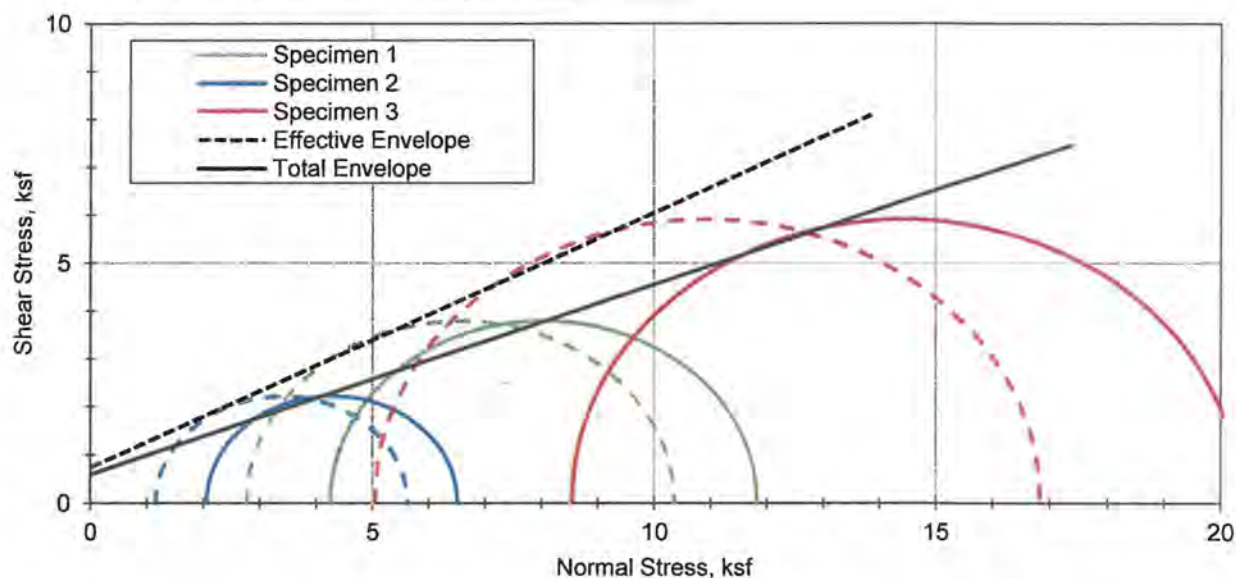


Consolidated-Undrained Triaxial Test

ASTM D4767

Project: Guzman Reservoir
 Project Number: 022-15055
 Sampling Date: 1/25/2017
 Location: B18 @ 11.5-13'
 Client Name: Kern Tulare Water District

Sample Number: B18 @ 11.5-13'
 Sample Type: Intact
 Sample Description: Clayey Sand
 Sample Depth (ft): 11.5-13



	Total	Effective
Friction Angle, ϕ	21.6	27.9
Cohesion, c (ksf)	0.60	0.75

Failure Criteria: Specified Strain %
 Plastic Limit: 17
 Liquid Limit: 30
 Specific Gravity: 2.72
 ASSUMED

Initial Parameters			
	Specimen 1	Specimen 2	Specimen 3
Moisture Content (%)	11.9	11.9	11.9
Dry Density (psf)	116.1	114.2	116.2
Void Ratio	0.462	0.487	0.461
Saturation (%)	70.0	66.4	70.2
Height (in)	5.89	5.74	5.80
Diameter (in)	2.85	2.85	2.85

Saturation Parameters			
B-Value	0.96	0.95	0.98

Consolidation Parameters			
Back Pressure (psi)	19.4	18.7	23.9
Effective Pressure (psi)	30.0	15.0	60.0
Height (in)	5.83	5.72	5.72
Area (in ²)	6.18	6.21	6.09
Void Ratio	0.404	0.446	0.378
Saturation (%)	100	100.0	100.0

Final Parameters at Failure			
Deviator Stress (ksf)	7.6	4.5	11.8
σ'_1 (ksf)	10.4	5.6	16.8
σ'_3 (ksf)	2.8	1.1	5.0
Excess PP (ksf)	1.48	0.9	3.5
Axial Strain (%)	4.9	5.1	5.0
Rate of Strain (%/min)	0.099	0.103	0.100

Remarks:

Krazan and Associates

215 W. Dakota • Clovis, CA 93612 • (559) 348-2200 • FAX (559) 348-2201

With Offices Serving The Western United States

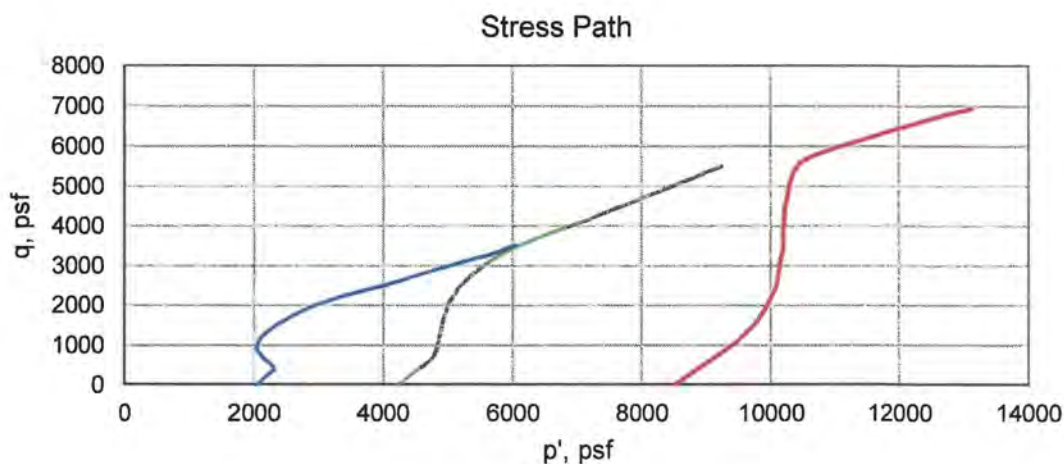
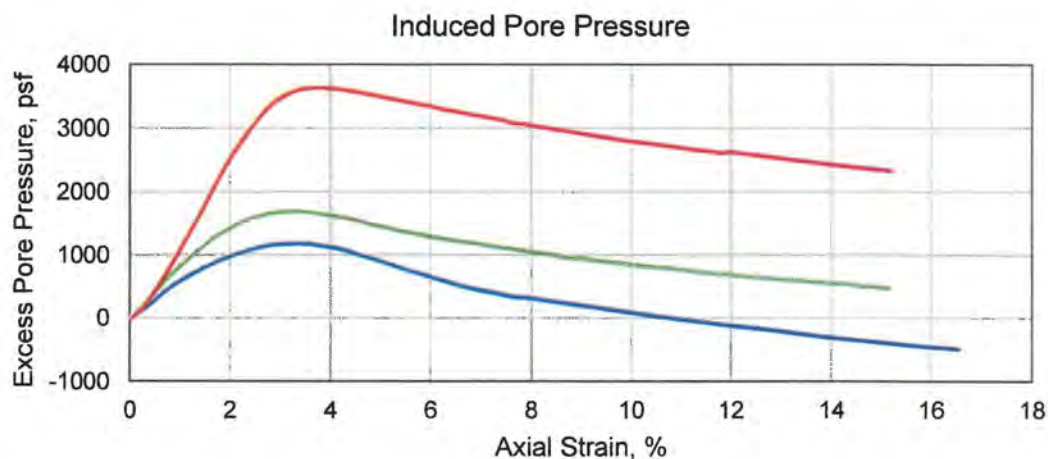
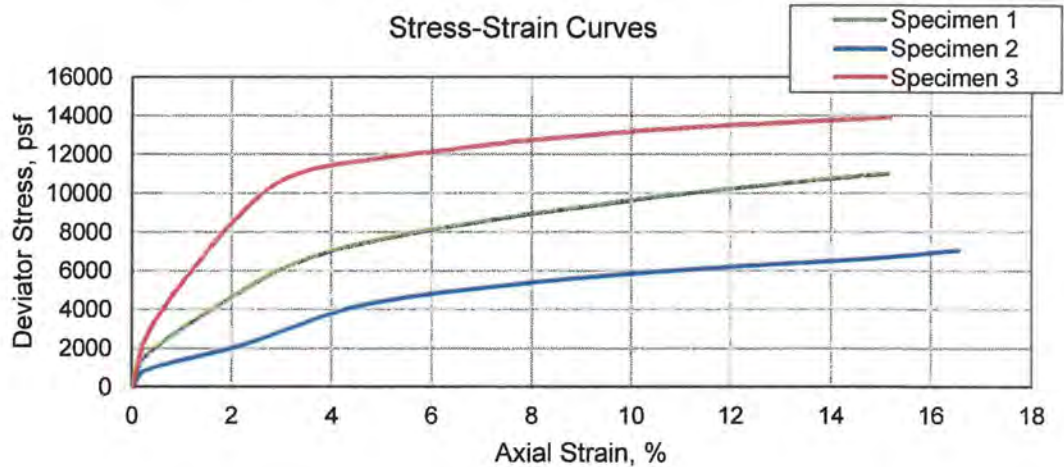


Consolidated-Undrained Triaxial Test

ASTM D4767

Project: Guzman Reservoir
Project Number: 022-15055
Sampling Date: 1/25/2017
Location: B18 @ 11.5-13'
Client Name: Kern Tulare Water District

Sample Number: B18 @ 11.5-13'
Sample Type: Intact
Sample Description: Clayey Sand
Sample Depth (ft): 11.5-13



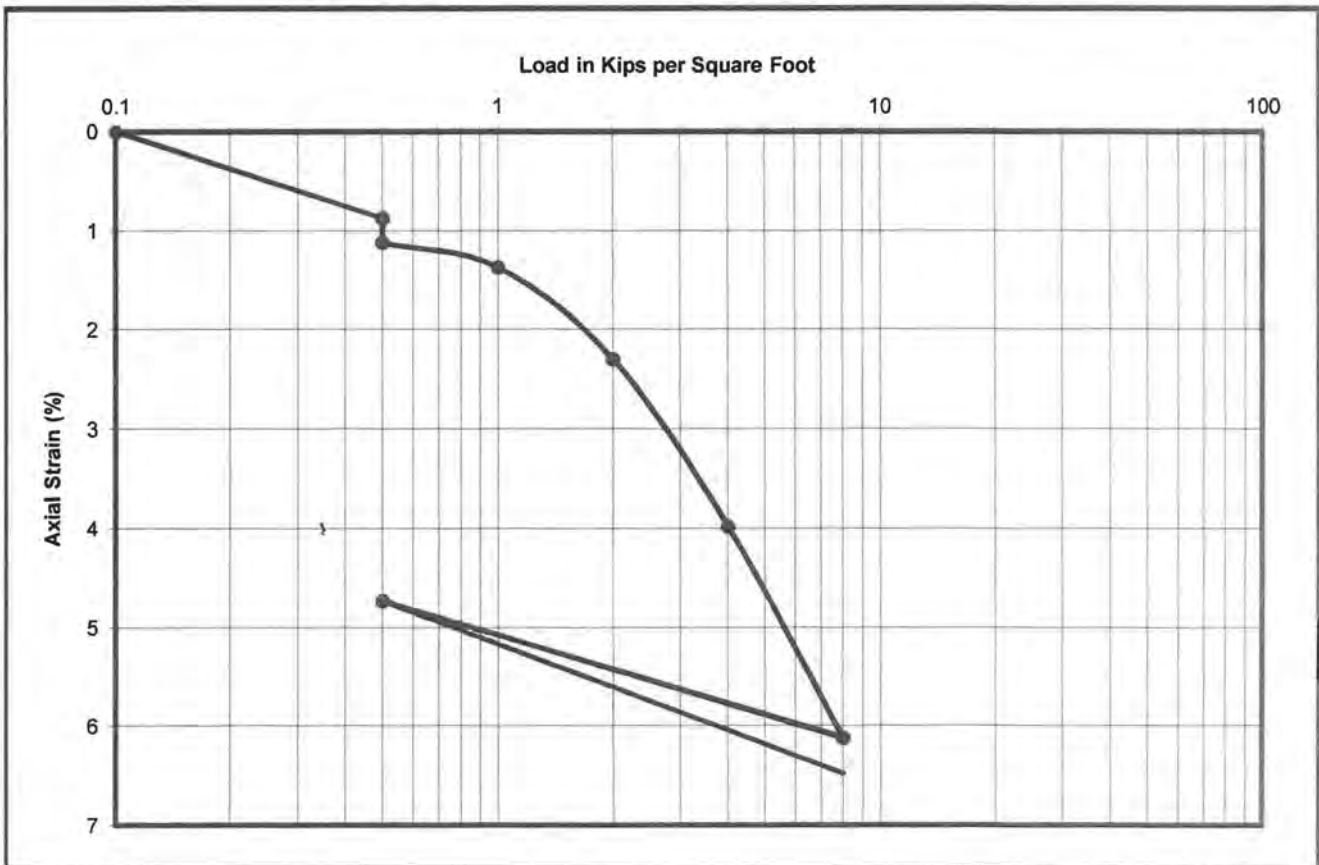
One Dimensional Consolidation Properties of Soil

ASTM D - 2435 / AASHTO T - 216

Project Number : 022-15055
 Project Name : Guzman
 Date : 1/26/2017
 Sample Location : B18 @ 11.5-13'
 Soil Classification : SC
 Sample Condition : Undisturbed

Load (ksf)	Axial Strain (%)	Void Ratio, e
0.1	0	0.494
0.5	0.87	0.481
Satur.	1.12	0.477
1	1.37	0.474
2	2.3	0.460
4	3.98	0.435
8	6.12	0.403
0.5	4.73	0.423
8	6.48	0.397

	Initial	Final
Water Content (%)	10.4	15.5
Dry Unit Weight (pcf)	116.9	123.2
Void Ratio	0.494	0.397
Saturation (%)	58.9	104.0
Preconsolidation Pressure (psf)	1200	
Specific Gravity (assumed)	2.8	



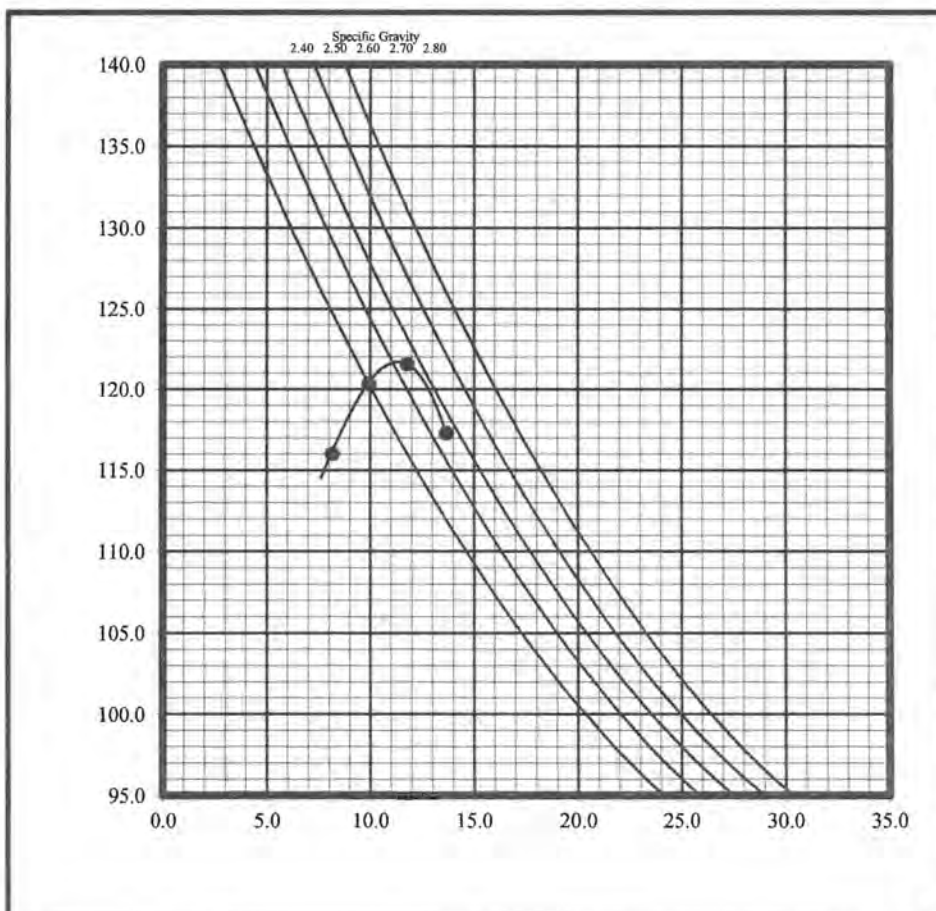
**& ASSOCIATES, INC.**

GEOTECHNICAL ENGINEERING ENVIRONMENTAL ENGINEERING CONSTRUCTION TESTING & INSPECTION

**Laboratory Compaction Characteristics
of Soil using Modified Effort (56,000 ft. - lbf/ft³)
ASTM D1557**

Project Number	022-15055	Sample Number	Bulk D
Project Name	Guzman Reservoir	Soil Classification	SC
Technician	DJ 12075	Soil Description	Brown Clayey Sand
Date	11/23/2016	Method	D1557a
Sample Location	B18 @ 11.5-13'		

	1	2	3	4
Mass of Moist Specimen & Mold, gm	3982.0	4036.0	3998.0	3879.0
Mass of Compaction Mold, gm	1984.0	1984.0	1984.0	1984.0
Mass of Moist Specimen, gm	1998.0	2052.0	2014.0	1895.0
Volume of Mold, cu./ft.	0.0333	0.0333	0.0333	0.0333
Wet Density, lbs./cu.ft.	132.3	135.9	133.3	125.5
Mass of Moisture (Wet), gm	200.0	200.0	200.0	200.0
Mass of Moisture (Dry), gm	182.0	179.0	176.0	185.0
Moisture Content (%)	9.9	11.7	13.6	8.1
Dry Density, lbs/cu.ft.	120.4	121.6	117.3	116.0



**Maximum Dry Density,
lbs.cu.ft.**

121.7

Optimum Moisture Content

11.3%

SDS#: _____

Sieve Analysis

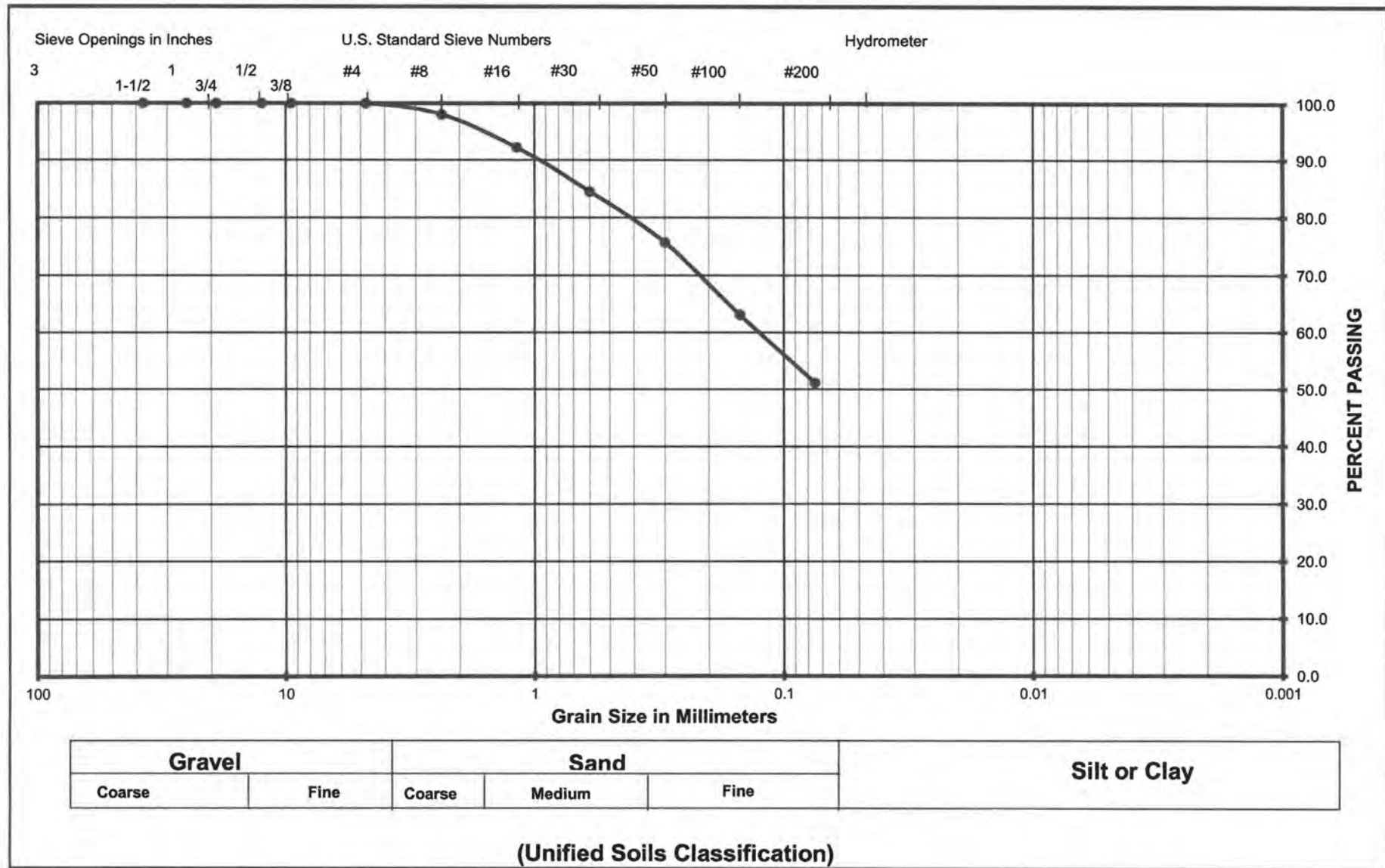
ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 12/13/2016
Sample Location : B18 @ 13-16'
Soil Classification : SC-CL

Wet Weight	:	200.00
Dry Weight	:	177.80
Moisture Content	:	12%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75				100.0
#8	2.36	3.5	2.0	2.0	98.0
#16	1.18	10.3	5.8	7.8	92.2
#30	0.60	13.7	7.7	15.5	84.5
#50	0.30	15.7	8.8	24.3	75.7
#100	0.15	22.4	12.6	36.9	63.1
#200	0.08	21.2	11.9	48.8	51.2

Grain Size Analysis



Project Name: Guzman
 Project Number: 022-15055
 Soil Classification: SC-CL
 Sample Number: B18 @ 13-16'

ASTM C136

Krazan Testing Laboratory

Soil Permeability

Flexible Wall, Falling Head (Rising Tail)

ASTM D - 5084 / CAL 220

Project Number : 022-15055
 Project Name : Guzman Reservoir
 Date : 12/12/2016
 Sample Number : --
 Sample Location : B18 @ 13-16'
 Soil Classification : SC-CL

Max Dry Density, lbs/cu.ft	--	Degree of Sat. %	-	Max. Particle Size	--
Optimum Moisture, %	--	%Over Optimum	12.5	% Passing 3/8"	--
Initial Dry Density, lbs/cu.ft	82.1	Initial Diameter, cm	3.63	% Passing # 10	--
Initial Moisture, %	12.5	Initial Length, cm	6.99	% Passing # 200	--
Sample Compaction, %	-	Initial Area sq.cm	10.36	Temperature	20.0
Final Dry Density, lbs/cu.ft	--	Final Diameter, cm	--	Type of Permeant	Tap Water
Final Moisture, %	--	Final Length, cm	--		
Specific Gravity (Assumed)	2.7	Final Area, sq.cm	--		
Comp. Procedure	Remolded				

Test	Start Time	Finish Time	H in Start	H in Final	H out Start	H out Final	Back Press	Tail Press.	Cell Press
1	14:28	15:31	1.10	2.18	8.70	7.72	15.0	12.5	16.0
2	15:32	15:50	2.18	2.48	7.72	7.42	15.0	12.5	16.0
3	15:51	16:07	2.48	2.76	7.42	7.18	15.0	12.5	16.0
4									
5									
6									

Test	Time sec	h1/h2 Ratio	K cm/sec	k20 cm/sec
1	3780	0.99310	1.6E-07	1.62513E-07
2	1080	0.99799	1.6E-07	1.6493E-07
3	960	0.99826	1.6E-07	1.60506E-07
4				
5				
6				

Permeability
1.63E-07 cm/sec
1.63E-09 m/sec

One Dimensional Consolidation Properties of Soil

ASTM D - 2435 / AASHTO T - 216

Project Number : 022-15055
 Project Name : Guzman
 Date : 1/30/2017
 Sample Location : B18 @ 13-16'
 Soil Classification : SC-CL
 Sample Condition : Undisturbed

Load (ksf)	Axial Strain (%)	Void Ratio, e
0.1	0	0.539
0.5	0.69	0.528
Satur.	0.73	0.528
1	0.81	0.527
2	1.56	0.515
4	2.74	0.497
8	4.77	0.466
0.5	3.03	0.492
8	4.98	0.462

	Initial	Final
Water Content (%)	12.3	17.5
Dry Unit Weight (pcf)	113.1	116.9
Void Ratio	0.539	0.462
Saturation (%)	63.7	99.8
Preconsolidation Pressure (psf)	1520	
Specific Gravity (assumed)	2.79	



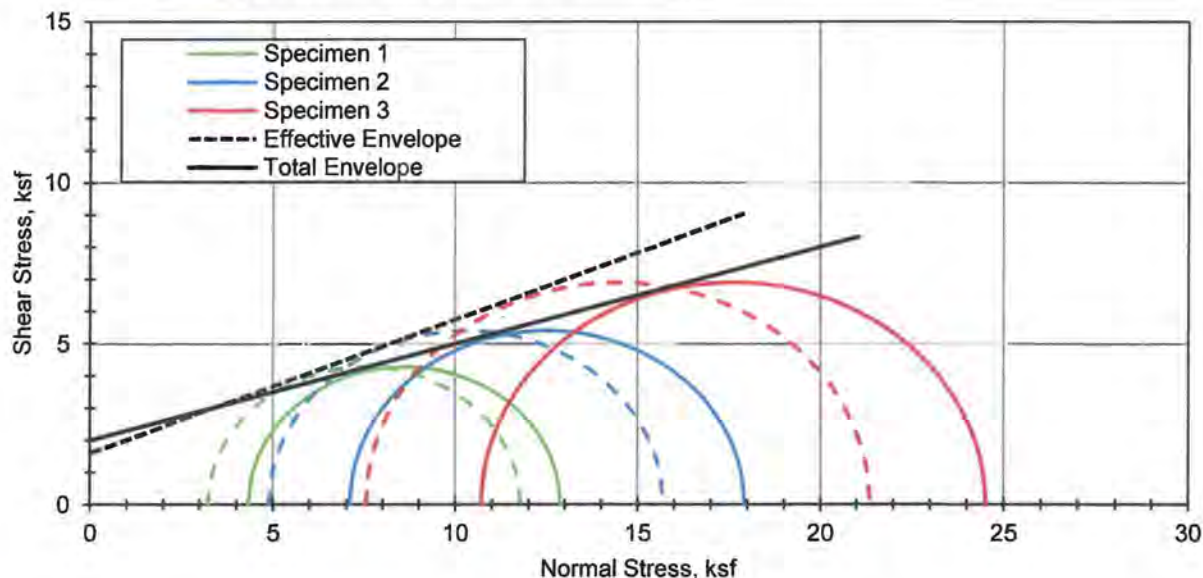


Consolidated-Undrained Triaxial Test

ASTM D4767

Project: Guzman Reservoir
 Project Number: 022-15055
 Sampling Date: 1/31/2017
 Location: B18 @ 13-16'
 Client Name: Kern Tulare Water District

Sample Number: B18 @ 13-16'
 Sample Type: Intact
 Sample Description: Clayey Sand/Sandy Clay
 Sample Depth (ft): 13-16



	Total	Effective
Friction Angle, ϕ	16.7	22.5
Cohesion, c (ksf)	2.00	1.60

Failure Criteria: Specified Strain %
 Plastic Limit: --
 Liquid Limit: --
 Specific Gravity: 2.72
 ASSUMED

Initial Parameters			
	Specimen 1	Specimen 2	Specimen 3
Moisture Content (%)	10.9	11.6	12.3
Dry Density (psf)	117.6	117.3	116.1
Void Ratio	0.444	0.447	0.462
Saturation (%)	66.8	70.7	72.4
Height (in)	5.73	5.77	5.77
Diameter (in)	2.86	2.85	2.89

Saturation Parameters			
B-Value	0.98	0.98	0.98

Consolidation Parameters			
Back Pressure (psi)	23.1	23.3	22.4
Effective Pressure (psi)	30.0	50.0	75.0
Height (in)	5.69	5.70	4.83
Area (in ²)	6.20	6.30	7.39
Void Ratio	0.386	0.407	0.381
Saturation (%)	100	100.0	100.0

Final Parameters at Failure			
Deviator Stress (ksf)	8.6	10.8	13.8
σ'_1 (ksf)	11.8	15.7	21.4
σ'_3 (ksf)	3.2	4.9	7.6
Excess PP (ksf)	1.10	2.2	3.2
Axial Strain (%)	5.1	5.0	5.0
Rate of Strain (%/min)	0.100	0.098	0.098

Remarks:

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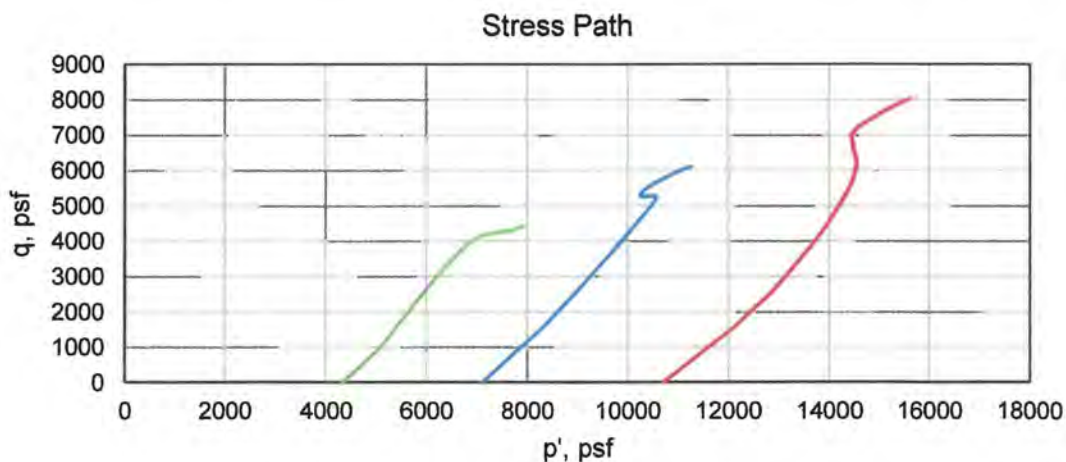
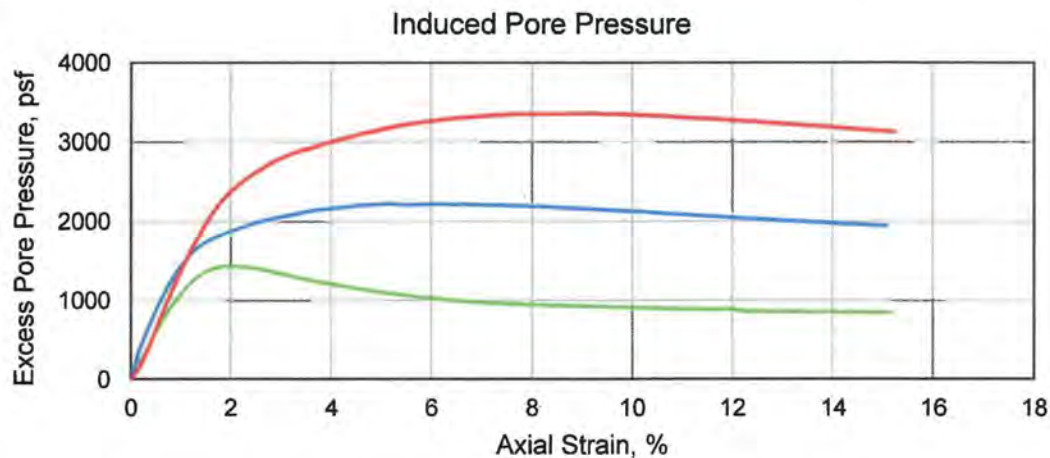
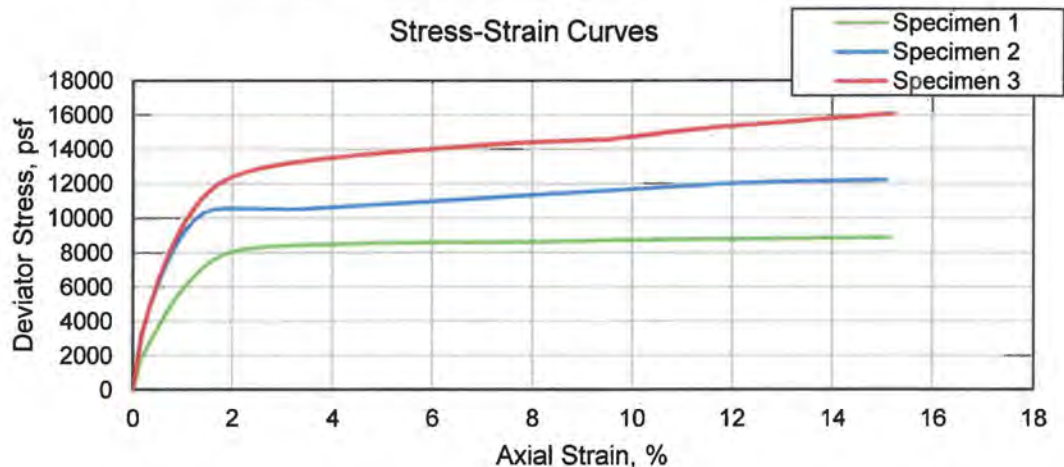


Consolidated-Undrained Triaxial Test

ASTM D4767

Project: Guzman Reservoir
Project Number: 022-15055
Sampling Date: 1/31/2017
Location: B18 @ 13-16'
Client Name: Kern Tulare Water District

Sample Number: B18 @ 13-16'
Sample Type: Intact
Sample Description: Clayey Sand/Sandy Clay
Sample Depth (ft): 13-16



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Sieve Analysis

ASTM C136

Project Number : 022-15055
Project Name : Guzman
Date : 12/28/2016
Sample Location : B18 @ 19-22'
Soil Classification : SC-CL

Wet Weight	:	200.00
Dry Weight	:	182.30
Moisture Content	:	10%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	0.2	0.1	0.1	99.9
#8	2.36	4.2	2.3	2.4	97.6
#16	1.18	13.6	7.5	9.9	90.1
#30	0.60	17.6	9.7	19.5	80.5
#50	0.30	19.5	10.7	30.2	69.8
#100	0.15	21.6	11.8	42.1	57.9
#200	0.08	18.2	10.0	52.1	47.9

Hydrometer Analysis

ASTM D422

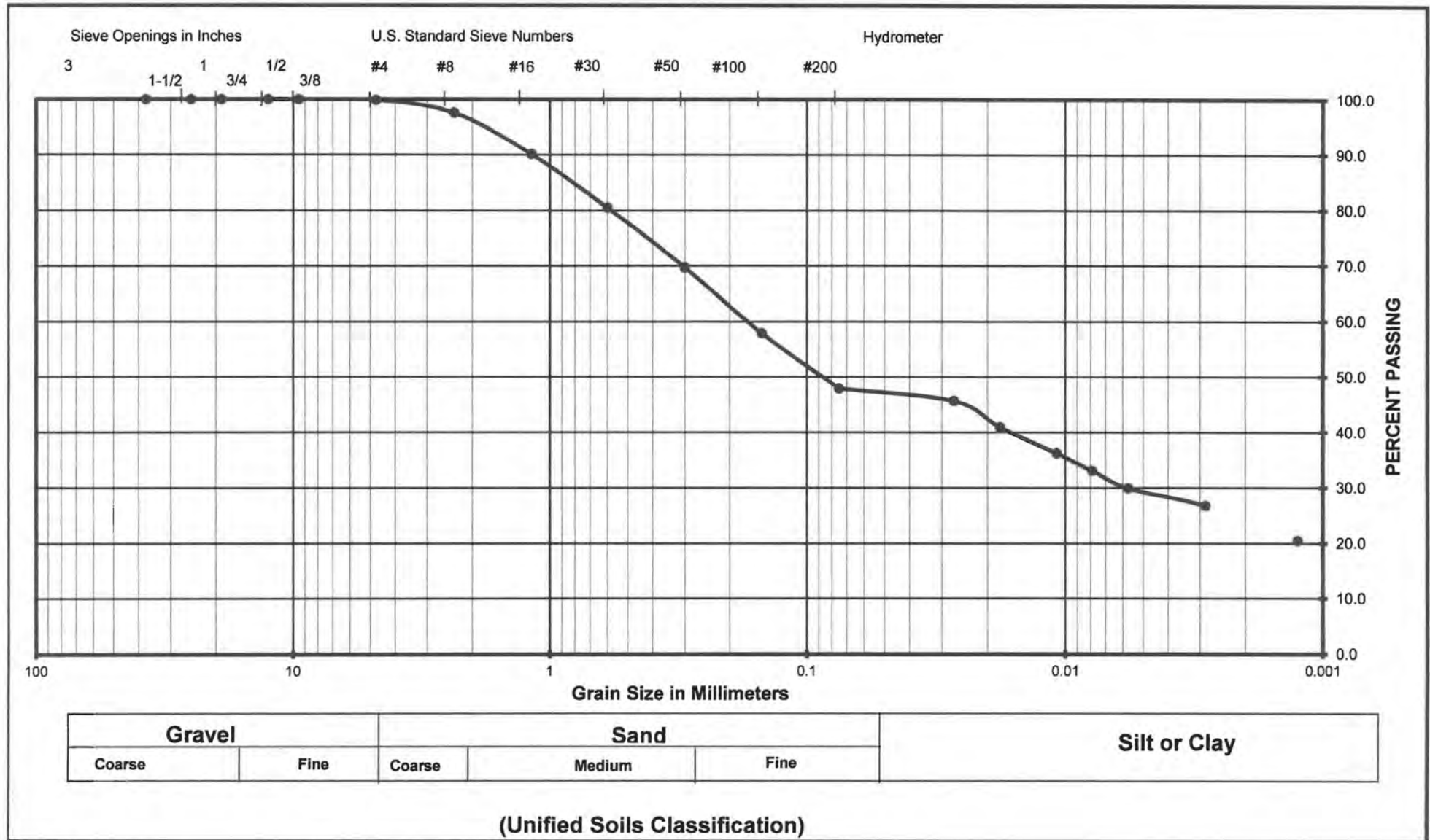
Project Number : 022-15055
Project Name : Guzman
Date : 12/28/2016
Sample Location : B18 @ 19-22'
Soil Classification : SC-CL

Dry Weight Used	102.1 g
Temperature	20.0 C
Soil Specific Gravity	2.65
Solution Spec. Grav.	1.003
K Value	0.01365
Correction Factor	0.00000

Elapsed Time (min)	Hydro. Reading	Hydro. Corrected	% Passing	Particle Diameter
2	1.032	1.032	45.7	0.0270
5	1.029	1.029	41.0	0.0179
15	1.026	1.026	36.2	0.0108
30	1.024	1.024	33.1	0.0079
60	1.022	1.022	29.9	0.0057
250	1.02	1.02	26.8	0.0029
1440	1.016	1.016	20.5	0.0013

Particle Diameter	Percent Passing
0.005	29.2
0.002	23.4
0	NA

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
SC-CL
B18 @ 19-22'

ASTM C136 /
D422

Krazan Testing Laboratory

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

Project: **Guzman Reservoirs**
 Project Number: **022-15055**
 Date Sampled: 11/2/2016
 Sampled By: DA
 Sample Number:
 Sample Location: B18 @ 19-22'
 Sample Description: SC-CL

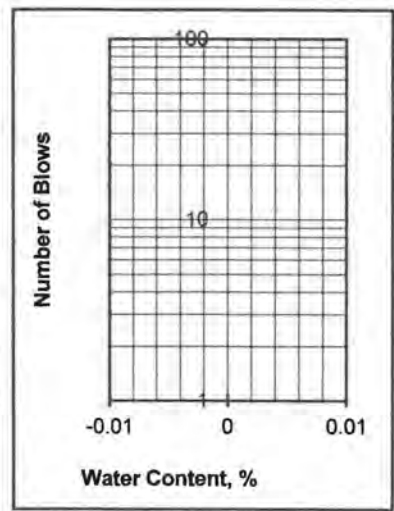
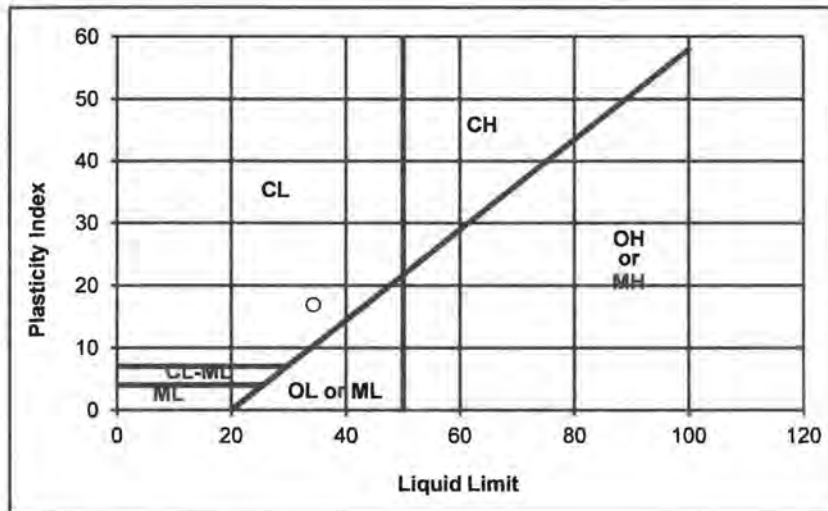
Date Tested: 12/30/2016
 Tested By: J Dyer
 Verified By: J Gruszczynski

Trial Number	Plastic Limit			Liquid Limit		
	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)	18.68	25.91		26.97	25.89	
Weight of Dry Soil & Tare (g)	18.04	25.24		23.71	22.94	
Weight of Tare (g)	14.10	21.51		14.44	14.20	
Weight of water (g)	0.65	0.67		3.26	2.95	
Weight of Dry Soil (g)	3.93	3.73		9.27	8.74	
Water Content (% of dry wt.)	16.4%	17.9%		35.2%	33.7%	
Number of Blows				20	29	

Plastic Limit : 17

Liquid Limit : 34

Plasticity Index : 17
Unified Soil Classification : CL
Requirement:
Approx. % of Material Retained on # 40 Sieve:



Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

Sieve Analysis

ASTM C136

Project Number : 022-15055
Project Name : Guzman
Date : 7/19/2016
Sample Location : B18 @ 20-21'
Soil Classification : ML

Wet Weight	:	250.00
Dry Weight	:	218.80
Moisture Content	:	14%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75				100.0
#8	2.36	1.9	0.9	0.9	99.1
#16	1.18	5.2	2.4	3.2	96.8
#30	0.60	7.8	3.6	6.8	93.2
#50	0.30	11.5	5.3	12.1	87.9
#100	0.15	26.9	12.3	24.4	75.6
#200	0.08	47.7	21.8	46.2	53.8

Hydrometer Analysis

ASTM D422

Project Number : 022-15055
Project Name : Guzman
Date : 7/19/2016
Sample Location : B18 @ 20-21'
Soil Classification : ML

Dry Weight Used	82.5 g
Temperature	20.0 C
Soil Specific Gravity	2.65
Solution Spec. Grav.	1.003
K Value	0.01365
Correction Factor	0.00000

Elapsed Time (min)	Hydro. Reading	Hydro. Corrected	% Passing	Particle Diameter
2	1.022	1.022	37.1	0.0313
5	1.019	1.019	31.2	0.0205
15	1.016	1.016	25.4	0.0123
30	1.015	1.015	23.4	0.0087
60	1.014	1.014	21.5	0.0063
250	1.011	1.011	15.6	0.0032
1440	1.008	1.008	9.8	0.0014

Particle Diameter	Percent Passing
0.005	19.1
0.002	11.8
0	NA

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
ML
B18 @ 20-21'

ASTM C136 /
D422

Krazan Testing Laboratory

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

Project: **Guzman Reservoirs**

Project Number: **022-15055**

Date Sampled: 5/31/2016

Sampled By: DA

Sample Number:

Sample Location: B18 @ 20-21'

Sample Description: ML

Date Tested: 7/18/2016

Tested By: J Dyer

Verified By: J Gruszczynski

Trial Number	Plastic Limit			Liquid Limit		
	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)						
Weight of Dry Soil & Tare (g)						
Weight of Tare (g)						
Weight of water (g)						
Weight of Dry Soil (g)						
Water Content (% of dry wt.)						
Number of Blows						

Plastic Limit : N/D

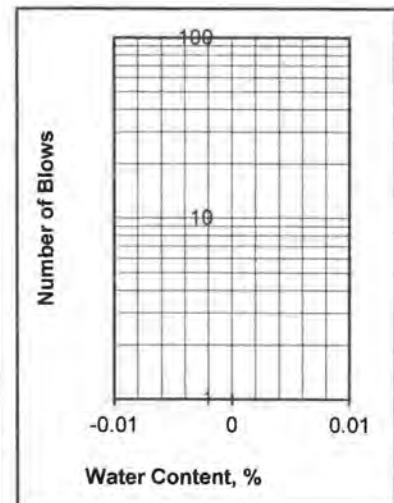
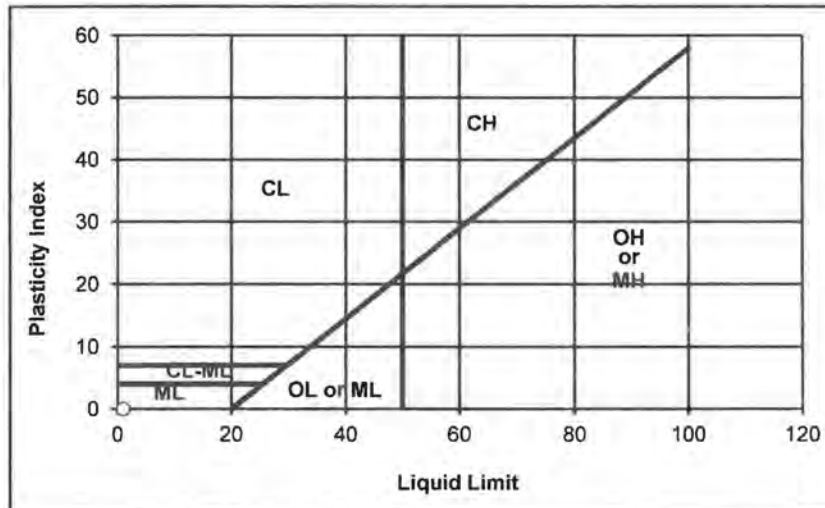
Liquid Limit : N/D

Plasticity Index : NON-PLASTIC

Unified Soil Classification : NON-PLASTIC

Requirement:

Approx. % of Material Retained on # 40 Sieve:



Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

Sieve Analysis

ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 7/15/2016
Sample Location : B18 @ 25-26'
Soil Classification : SM

Wet Weight	:	300.00
Dry Weight	:	274.60
Moisture Content	:	9%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75				100.0
#8	2.36	8.8	3.2	3.2	96.8
#16	1.18	20.1	7.3	10.5	89.5
#30	0.60	27.8	10.1	20.6	79.4
#50	0.30	38.2	13.9	34.6	65.4
#100	0.15	49.3	18.0	52.5	47.5
#200	0.08	39.4	14.3	66.9	33.1

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
SM
B18 @ 25-26'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 7/15/2016
Sample Location : B18 @ 40-41'
Soil Classification : SM

Wet Weight	:	300.00
Dry Weight	:	276.60
Moisture Content	:	8%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	4.2	1.5	1.5	98.5
#8	2.36	18.3	6.6	8.1	91.9
#16	1.18	34.4	12.4	20.6	79.4
#30	0.60	35.0	12.7	33.2	66.8
#50	0.30	39.1	14.1	47.4	52.6
#100	0.15	40.9	14.8	62.1	37.9
#200	0.08	31.2	11.3	73.4	26.6

Grain Size Analysis



Project Name: Guzman
 Project Number: 022-15055
 Soil Classification: SM
 Sample Number: B18 @ 40-41'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

ASTM C136

Project Number : 022-15055
Project Name : Guzman
Date : 7/15/2016
Sample Location : B18 @ 50-51'
Soil Classification : ML

Wet Weight	:	250.00
Dry Weight	:	208.50
Moisture Content	:	20%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	0.4	0.2	0.2	99.8
#8	2.36	2.3	1.1	1.3	98.7
#16	1.18	6.3	3.0	4.3	95.7
#30	0.60	10.2	4.9	9.2	90.8
#50	0.30	17.1	8.2	17.4	82.6
#100	0.15	23.8	11.4	28.8	71.2
#200	0.08	24.8	11.9	40.7	59.3

Hydrometer Analysis

ASTM D422

Project Number : 022-15055
Project Name : Guzman
Date : 7/15/2016
Sample Location : B18 @ 50-51'
Soil Classification : ML

Dry Weight Used	93.8 g
Temperature	20.0 C
Soil Specific Gravity	2.65
Solution Spec. Grav.	1.003
K Value	0.01365
Correction Factor	0.00000

Elapsed Time (min)	Hydro. Reading	Hydro. Corrected	% Passing	Particle Diameter
2	1.032	1.032	49.7	0.0270
5	1.026	1.026	39.5	0.0187
15	1.021	1.021	30.9	0.0115
30	1.018	1.018	25.7	0.0085
60	1.016	1.016	22.3	0.0061
250	1.012	1.012	15.4	0.0031
1440	1.01	1.01	12.0	0.0013

Particle Diameter	Percent Passing
0.005	19.7
0.002	13.3
0	NA

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
ML
B18 @ 50-51'

ASTM C136 /
D422

Krazan Testing Laboratory

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

Project: **Guzman Reservoirs**

Project Number: **022-15055**

Date Sampled: 5/31/2016

Sampled By: DA

Sample Number:

Sample Location: B18 @ 50-51'

Sample Description: ML

Date Tested: 7/14/2016

Tested By: J Dyer

Verified By: J Gruszczynski

Trial Number	Plastic Limit			Liquid Limit		
	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)						
Weight of Dry Soil & Tare (g)						
Weight of Tare (g)						
Weight of water (g)						
Weight of Dry Soil (g)						
Water Content (% of dry wt.)						
Number of Blows						

Plastic Limit : N/D

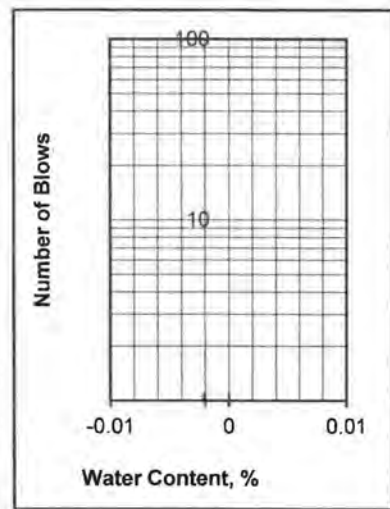
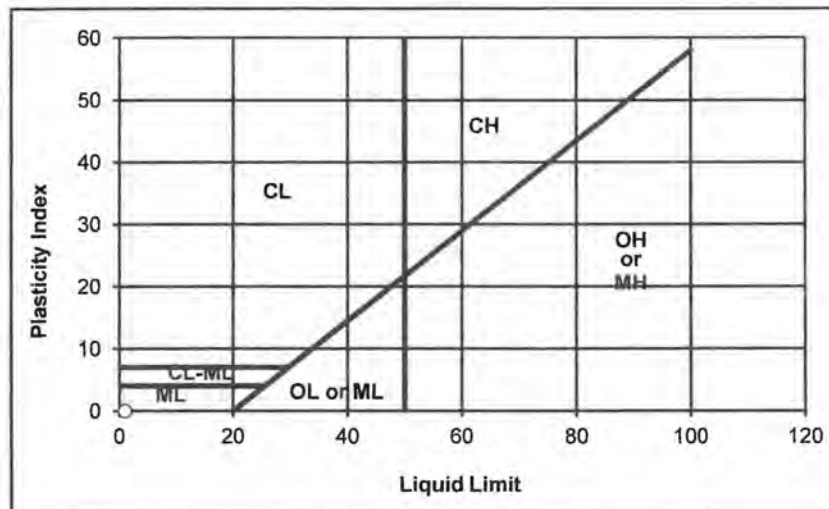
Liquid Limit : N/D

Plasticity Index : **NON-PLASTIC**

Unified Soil Classification : **NON-PLASTIC**

Requirement:

Approx. % of Material Retained on # 40 Sieve:



Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

Sieve Analysis

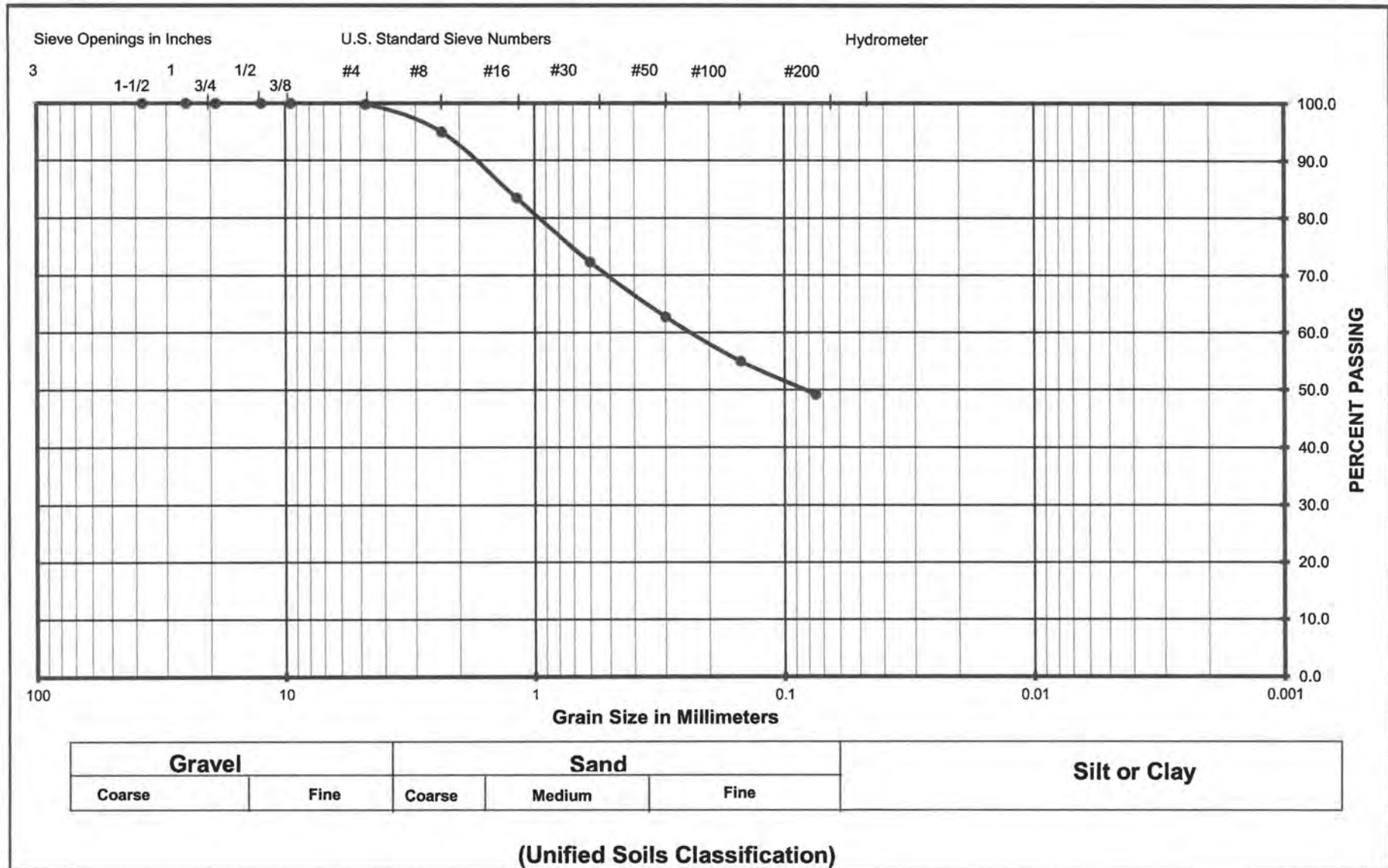
ASTM C136 / CT 202

Project Number : 022-15055
 Project Name : Guzman
 Date : 9/6/2017
 Sample Location : TP18A @ 2-4'
 Soil Classification : SC-CL

Wet Weight	:	300.00
Dry Weight	:	291.10
Moisture Content	:	3%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	0.6	0.2	0.2	99.8
#8	2.36	14.1	4.8	5.0	95.0
#16	1.18	33.5	11.5	16.6	83.4
#30	0.60	32.4	11.1	27.7	72.3
#50	0.30	27.8	9.5	37.2	62.8
#100	0.15	22.7	7.8	45.0	55.0
#200	0.08	16.7	5.7	50.8	49.2

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
SC-CL
TP18A @ 2-4'

ASTM C136

Krazan Testing Laboratory

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

Project: **Guzman Reservoirs**

Project Number: **022-15055**

Date Sampled: 8/28/2017

Sampled By: DA

Sample Number:

Sample Location: TP18A @ 2-4'

Sample Description: SC-CL

Date Tested: 9/13/2017

Tested By: J Mitchell

Verified By: J Gruszczynski

Trial Number	Plastic Limit			Liquid Limit		
	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)	21.34	19.48		32.71		
Weight of Dry Soil & Tare (g)	20.65	18.84		28.89		
Weight of Tare (g)	15.58	14.47		17.05		
Weight of water (g)	0.69	0.63		3.83		
Weight of Dry Soil (g)	5.07	4.37		11.84		
Water Content (% of dry wt.)	13.7%	14.4%		32.3%		
Number of Blows				25		

Plastic Limit : 14

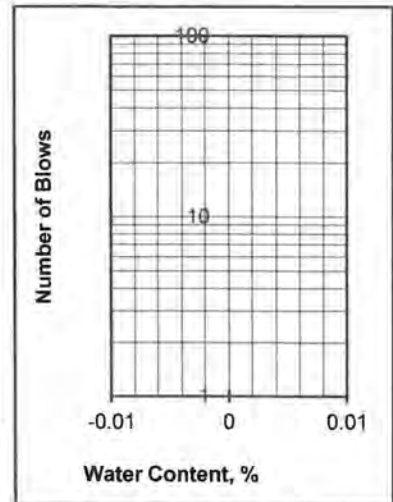
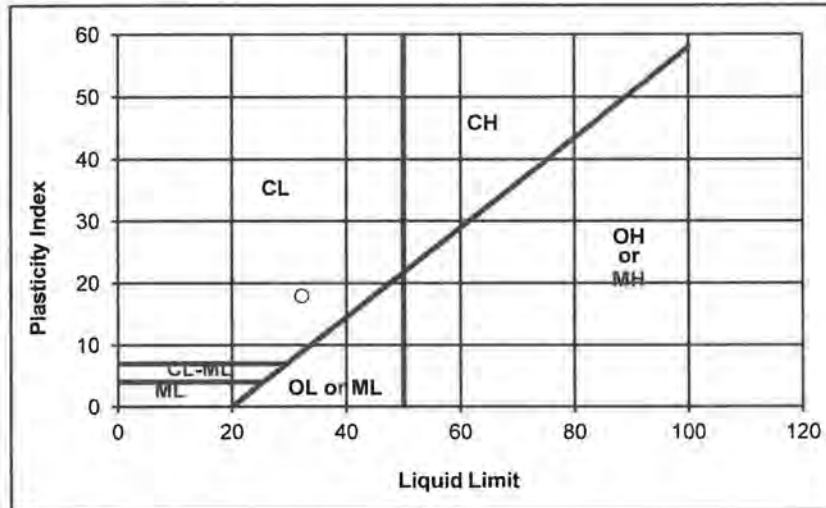
Liquid Limit : 32

Plasticity Index : 18

Unified Soil Classification : CL

Requirement:

Approx. % of Material Retained on # 40 Sieve:



Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

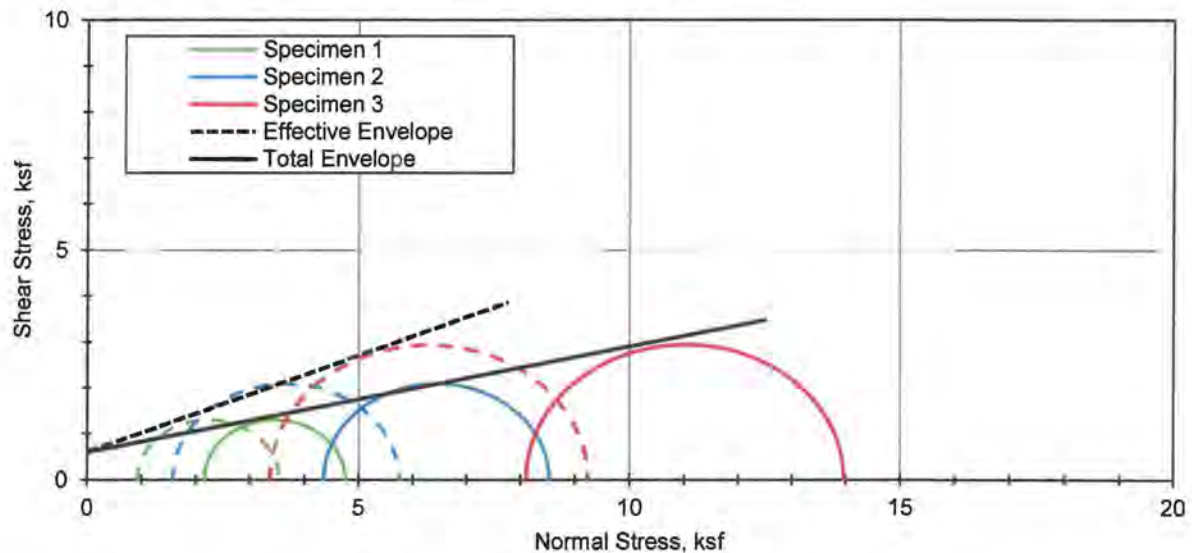


Consolidated-Undrained Triaxial Test

ASTM D4767

Project: Gruszczynski
 Project Number: 022-15055
 Sampling Date: 8/28/2017
 Location: TP18a @ 2-4'
 Client Name:

Sample Number:
 Sample Type: Reconstituted
 Sample Description: Brn Clayey Sand
 Sample Depth (ft): 2-4



Initial Parameters			
	Total	Effective	Specimen
Friction Angle, ϕ	13.0	22.7	1
Cohesion, c (ksf)	0.60	0.61	2
			3
Moisture Content (%)	11.3	11.6	11.6
Dry Density (psf)	122.4	119.3	119.1
Void Ratio	0.388	0.424	0.426
Saturation (%)	79.4	74.6	74.2
Height (in)	5.77	5.70	5.70
Diameter (in)	2.85	2.85	2.85
Saturation Parameters			
B-Value	0.97	0.97	0.97
Consolidation Parameters			
Back Pressure (psi)	28.5	28.6	28.7
Effective Pressure (psi)	15.0	30.0	56.0
Height (in)	5.74	5.65	5.65
Area (in ²)	6.22	5.96	6.06
Void Ratio	0.345	0.319	0.343
Saturation (%)	100	100.0	100.0
Final Parameters at Failure			
Deviator Stress (ksf)	2.6	4.2	5.9
σ'_1 (ksf)	3.5	5.8	9.2
σ'_3 (ksf)	0.9	1.6	3.4
Excess PP (ksf)	1.22	2.8	4.7
Axial Strain (%)	5.0	5.0	5.0
Rate of Strain (in/min)	0.0005	0.0005	0.0005

Remarks:

Remolded to approx. 95% relative density of 124.7 pcf, 10.9%, at or above optimum moisture content

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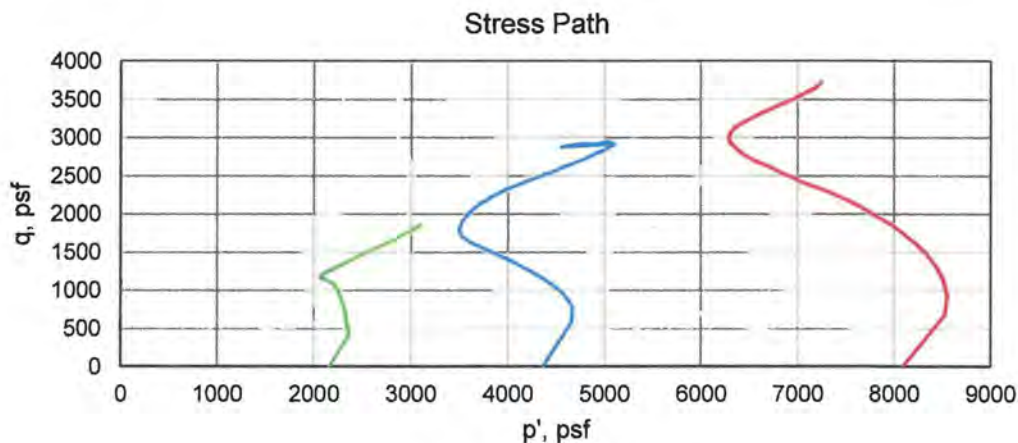
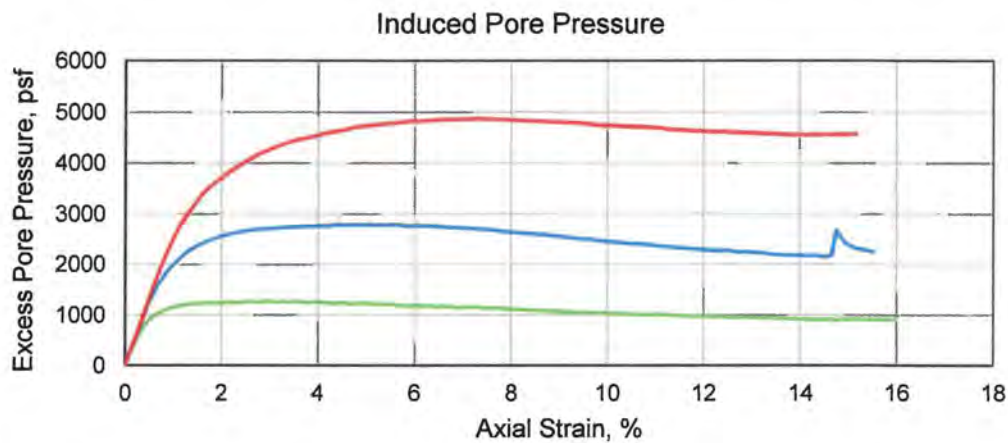
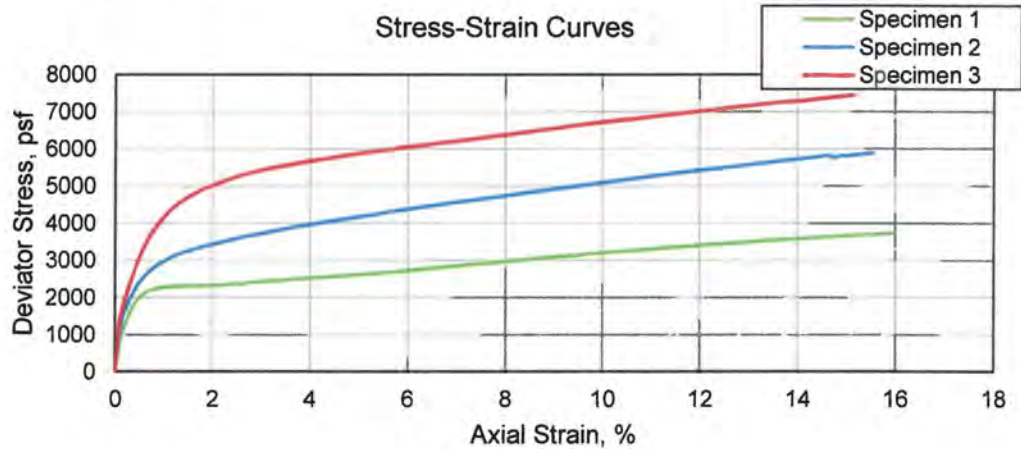


Consolidated-Undrained Triaxial Test

ASTM D4767

Project: Gruszczynski
Project Number: 022-15055
Sampling Date: 8/28/2017
Location: TP18a @ 2-4'
Client Name: _____

Sample Number: _____
Sample Type: Reconstituted
Sample Description: Brn Clayey Sand
Sample Depth (ft): 2-4





Krazan

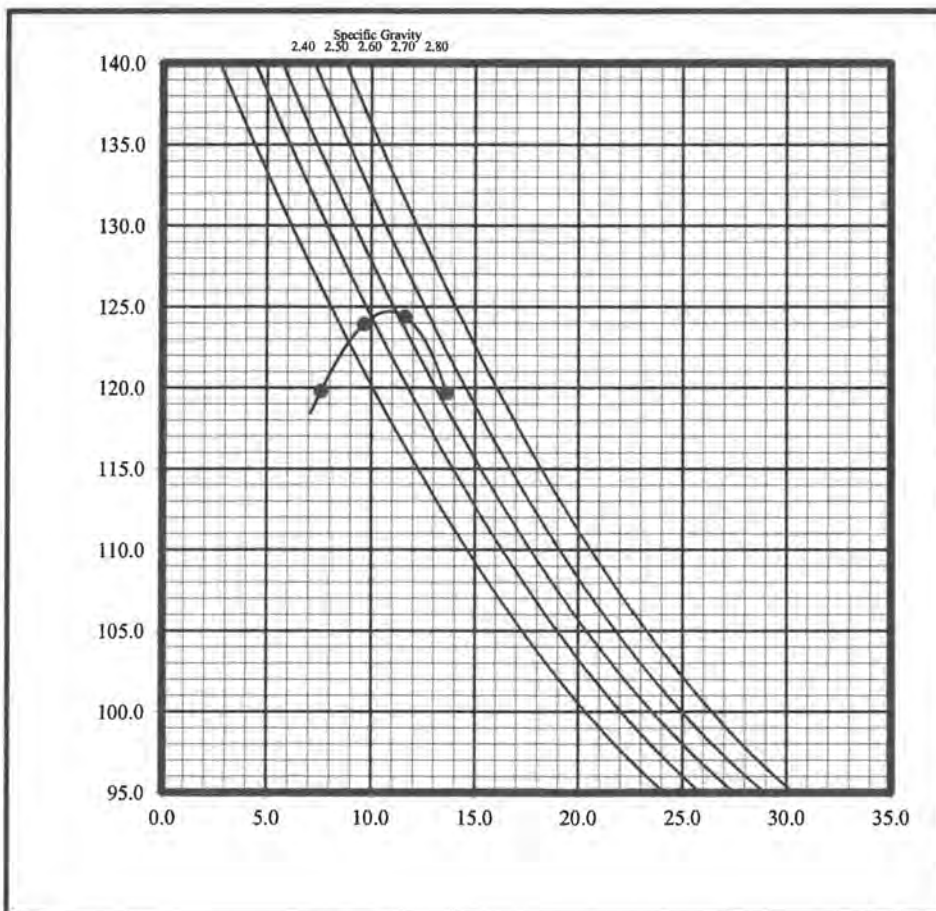
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GEOTECHNICAL ENGINEERING ENVIRONMENTAL ENGINEERING CONSTRUCTION TESTING & INSPECTION

**Laboratory Compaction Characteristics
of Soil using Modified Effort (56,000 ft. - lbf/ft³)
ASTM D1557**

Project Number	022-15055	Sample Number	-
Project Name	Guzman	Soil Classification	SC
Technician	SH	Soil Description	Brn Clayey Sand
Date	9/11/2017	Method	D1557b
Sample Location	TP18A @ 2-4'		

	1	2	3	4
Mass of Moist Specimen & Mold, gm	4076.6	4032.6	4034.2	3926.7
Mass of Compaction Mold, gm	1980.0	1980.0	1980.0	1980.0
Mass of Moist Specimen, gm	2096.6	2052.6	2054.2	1946.7
Volume of Mold, cu./ft.	0.0333	0.0333	0.0333	0.0333
Wet Density, lbs./cu.ft.	138.8	135.9	136.0	128.9
Mass of Moisture (Wet), gm	200.0	200.0	200.0	200.0
Mass of Moisture (Dry), gm	179.2	182.4	176.0	185.9
Moisture Content (%)	11.6	9.6	13.6	7.6
Dry Density, lbs/cu.ft.	124.4	123.9	119.7	119.8



**Maximum Dry Density,
lbs.cu.ft.**

124.7

Optimum Moisture Content

10.9%

SDS#: _____

Sieve Analysis

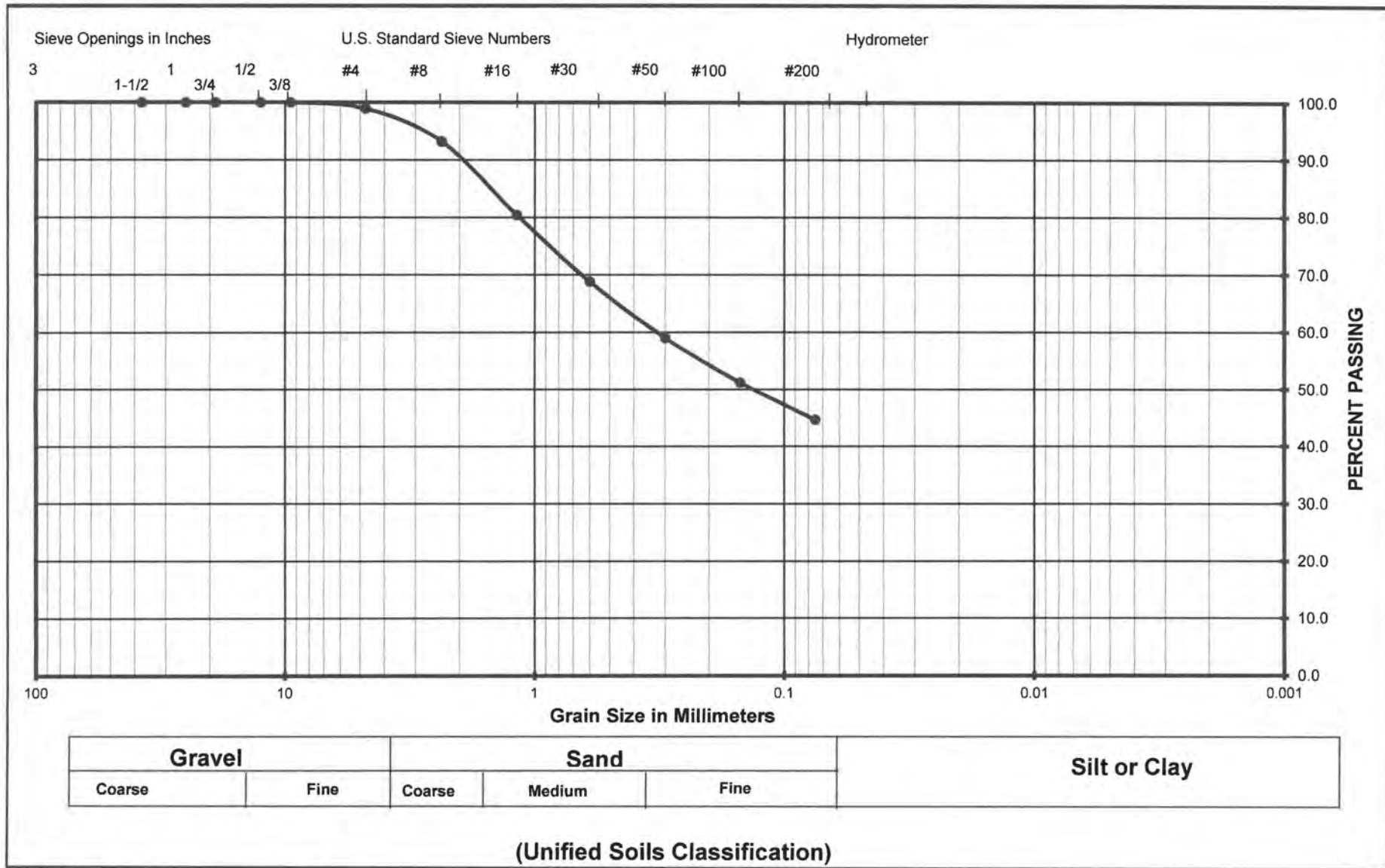
ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 9/6/2017
Sample Location : TP18A @ 2-3'
Soil Classification : SC

Wet Weight	:	300.00
Dry Weight	:	287.40
Moisture Content	:	4%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	3.0	1.0	1.0	99.0
#8	2.36	16.5	5.7	6.8	93.2
#16	1.18	36.8	12.8	19.6	80.4
#30	0.60	33.3	11.6	31.2	68.8
#50	0.30	28.1	9.8	41.0	59.0
#100	0.15	22.5	7.8	48.8	51.2
#200	0.08	18.8	6.5	55.3	44.7

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
SC
TP18A @ 2-3'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

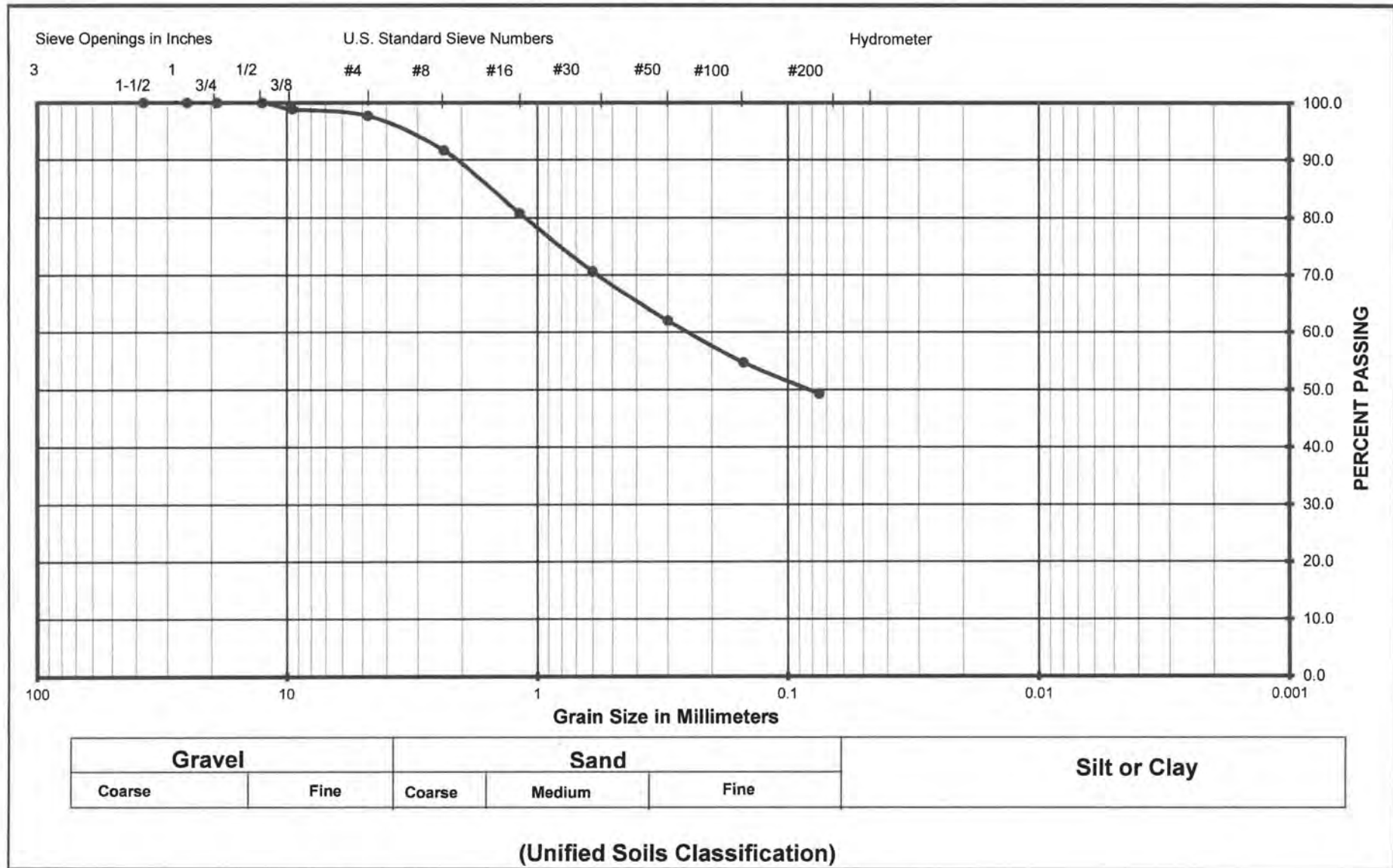
ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 9/6/2017
Sample Location : TP18A @ 3-4'
Soil Classification : SC-CL

Wet Weight	:	300.00
Dry Weight	:	286.70
Moisture Content	:	5%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50	3.2	1.1	1.1	98.9
#4	4.75	3.4	1.2	2.3	97.7
#8	2.36	17.2	6.0	8.3	91.7
#16	1.18	31.3	10.9	19.2	80.8
#30	0.60	29.1	10.1	29.4	70.6
#50	0.30	24.7	8.6	38.0	62.0
#100	0.15	20.8	7.3	45.2	54.8
#200	0.08	15.6	5.4	50.7	49.3

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
SC-CL
TP18A @ 3-4'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

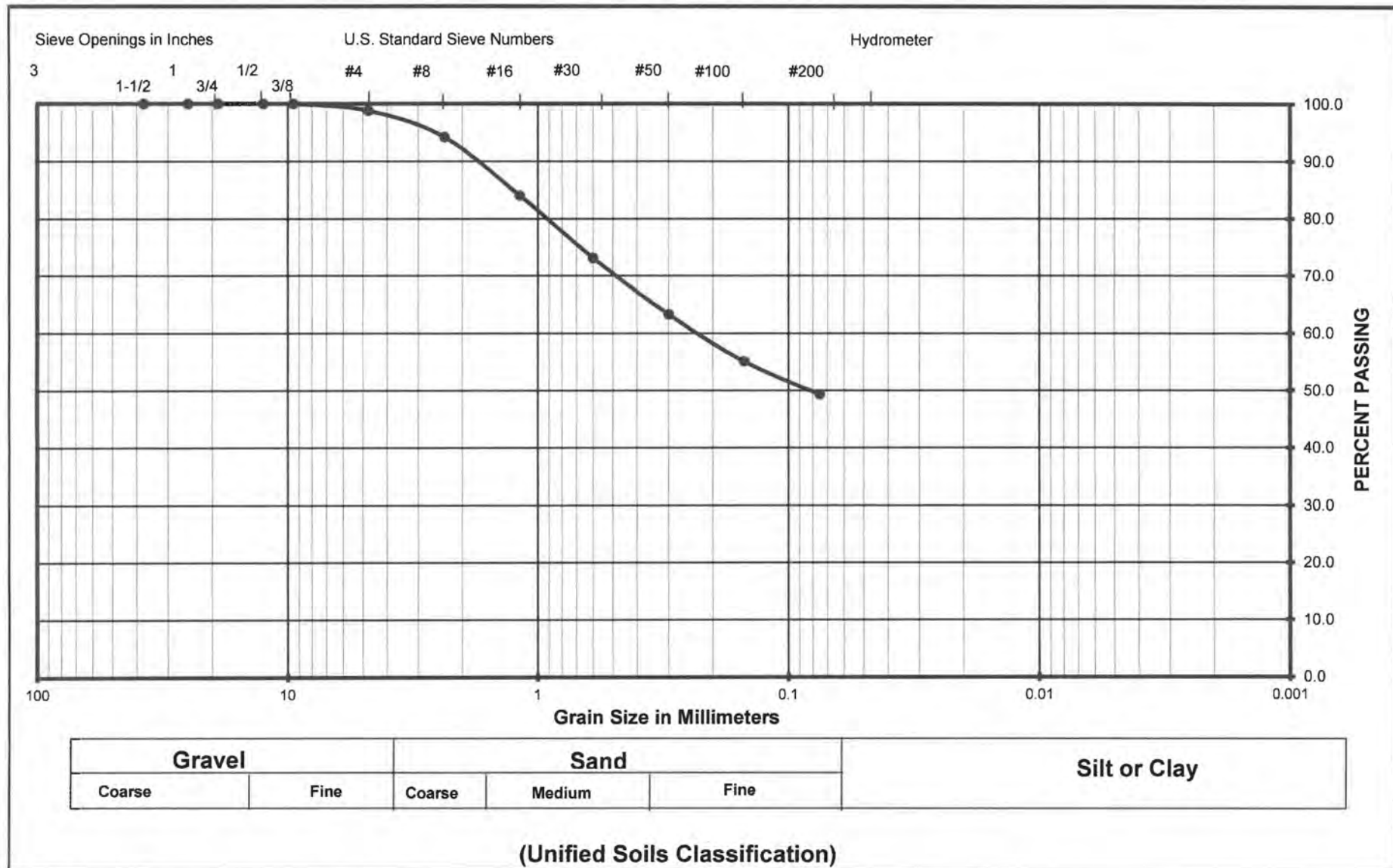
ASTM C136 / CT 202

Project Number : 022-15055
 Project Name : Guzman
 Date : 9/6/2017
 Sample Location : TP18A @ 4-5'
 Soil Classification : SC-CL

Wet Weight	:	300.00
Dry Weight	:	285.10
Moisture Content	:	5%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	3.4	1.2	1.2	98.8
#8	2.36	13.1	4.6	5.8	94.2
#16	1.18	28.9	10.1	15.9	84.1
#30	0.60	31.1	10.9	26.8	73.2
#50	0.30	28.1	9.9	36.7	63.3
#100	0.15	23.4	8.2	44.9	55.1
#200	0.08	16.5	5.8	50.7	49.3

Grain Size Analysis



Project Name
 Project Number
 Soil Classification
 Sample Number

Guzman
 022-15055
 SC-CL
 TP18A @ 4-5'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

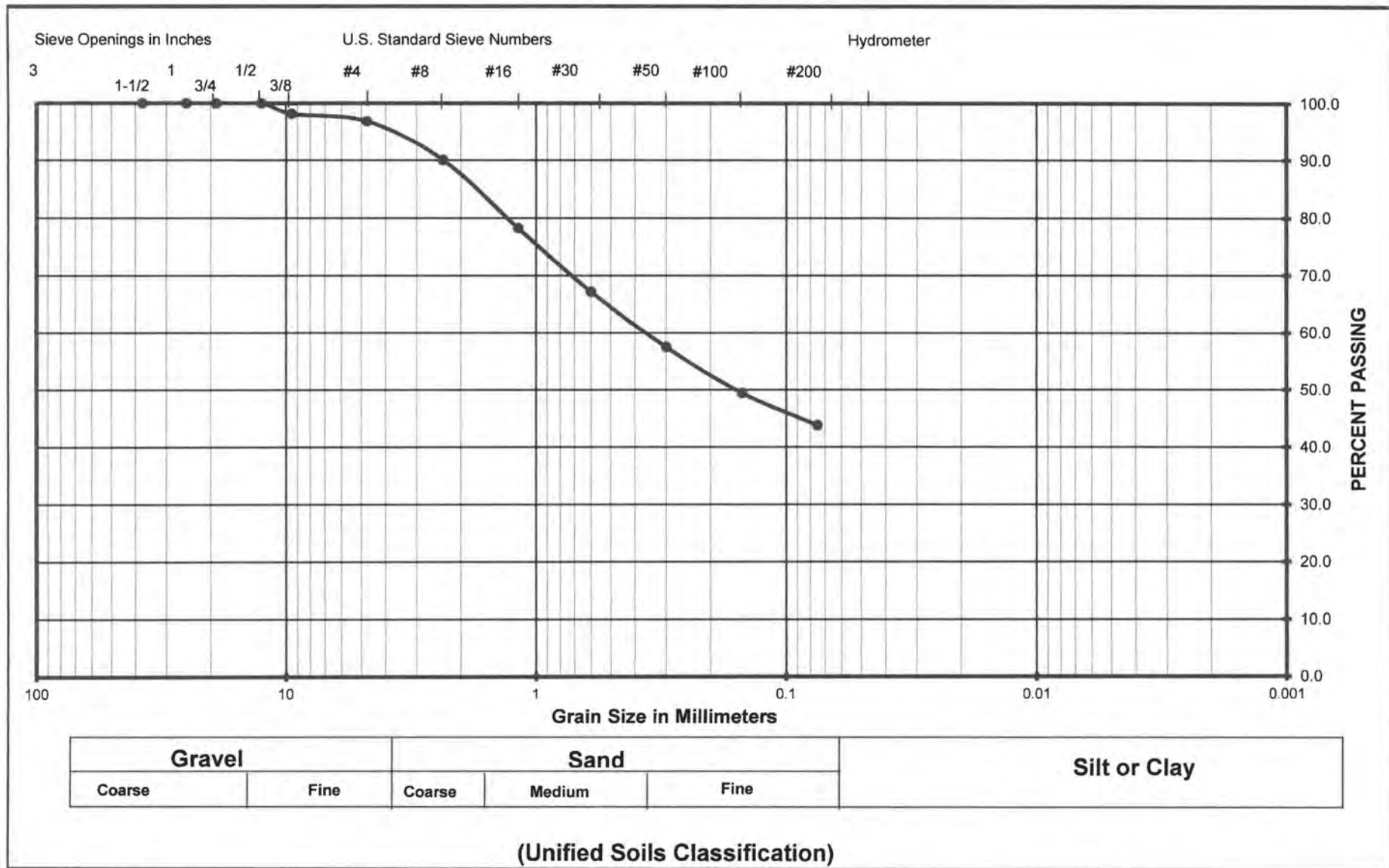
ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 9/6/2017
Sample Location : TP18A @ 5-6'
Soil Classification : SC

Wet Weight	:	300.00
Dry Weight	:	287.60
Moisture Content	:	4%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50	5.3	1.8	1.8	98.2
#4	4.75	3.8	1.3	3.2	96.8
#8	2.36	19.5	6.8	9.9	90.1
#16	1.18	34.0	11.8	21.8	78.2
#30	0.60	31.7	11.0	32.8	67.2
#50	0.30	27.9	9.7	42.5	57.5
#100	0.15	23.2	8.1	50.6	49.4
#200	0.08	16.1	5.6	56.2	43.8

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
SC
TP18A @ 5-6'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

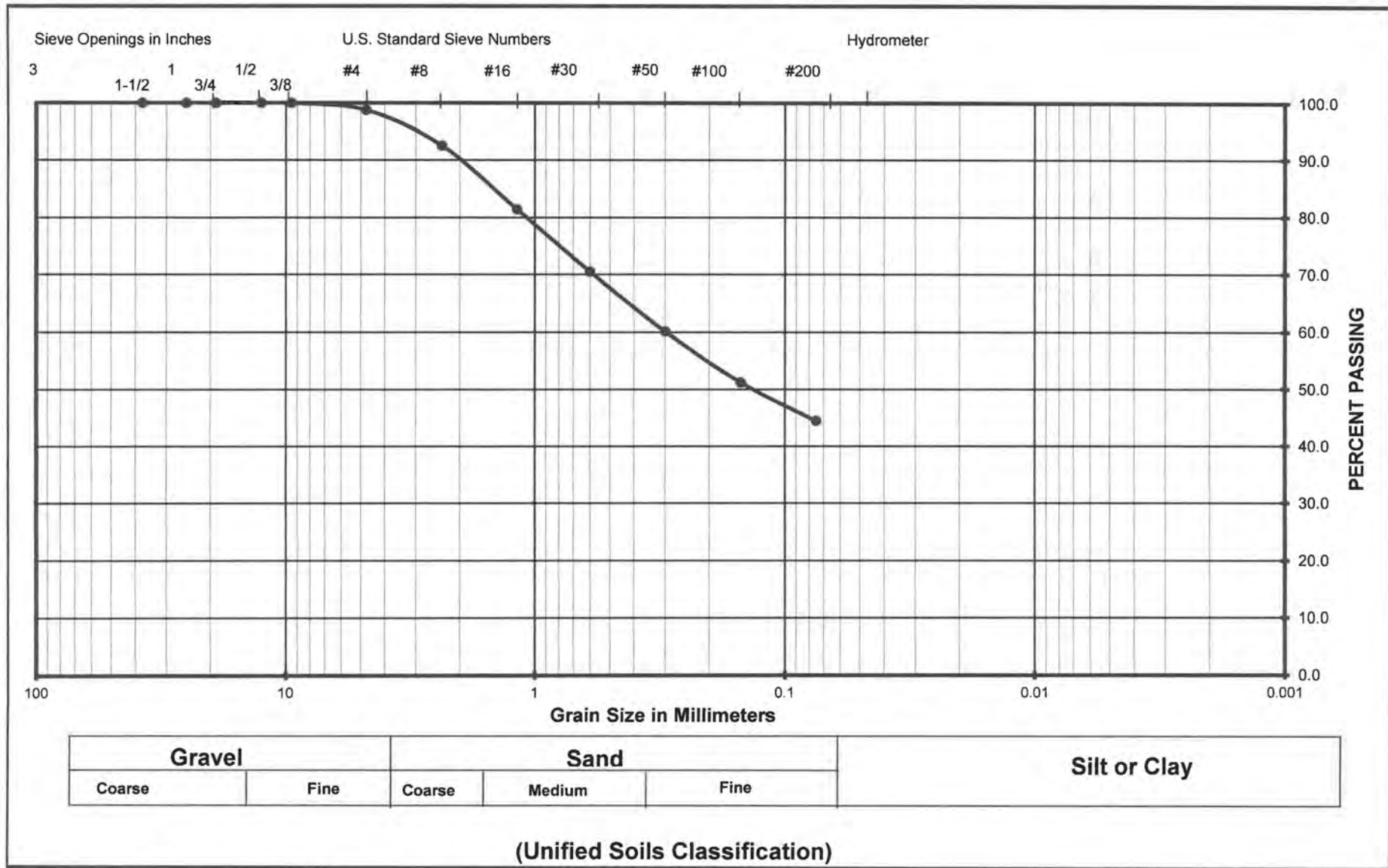
ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 9/6/2017
Sample Location : TP18A @ 6-7'
Soil Classification : SC

Wet Weight	:	300.00
Dry Weight	:	286.10
Moisture Content	:	5%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	3.5	1.2	1.2	98.8
#8	2.36	17.8	6.2	7.4	92.6
#16	1.18	31.8	11.1	18.6	81.4
#30	0.60	31.2	10.9	29.5	70.5
#50	0.30	29.7	10.4	39.8	60.2
#100	0.15	25.5	8.9	48.8	51.2
#200	0.08	19.4	6.8	55.5	44.5

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
SC
TP18A @ 6-7'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 9/6/2017
Sample Location : TP18A @ 7-9'
Soil Classification : SC

Wet Weight	:	300.00
Dry Weight	:	292.60
Moisture Content	:	3%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	6.3	2.2	2.2	97.8
#8	2.36	19.7	6.7	8.9	91.1
#16	1.18	40.1	13.7	22.6	77.4
#30	0.60	44.9	15.3	37.9	62.1
#50	0.30	41.1	14.0	52.0	48.0
#100	0.15	28.3	9.7	61.7	38.3
#200	0.08	14.7	5.0	66.7	33.3

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
SC
TP18A @ 7-9'

ASTM C136

Krazan Testing Laboratory

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

Project: **Guzman Reservoirs**
 Project Number: **022-15055**
 Date Sampled: 8/28/2017
 Sampled By: DA
 Sample Number:
 Sample Location: TP18A @ 7-9'
 Sample Description: SC

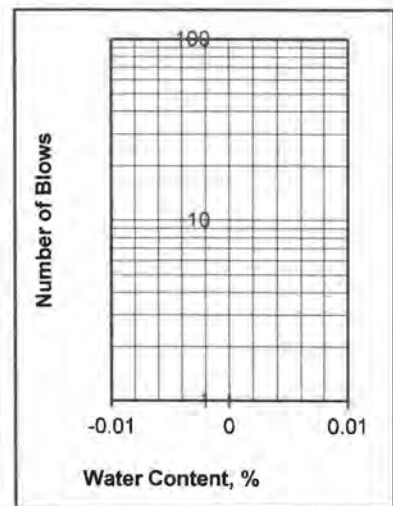
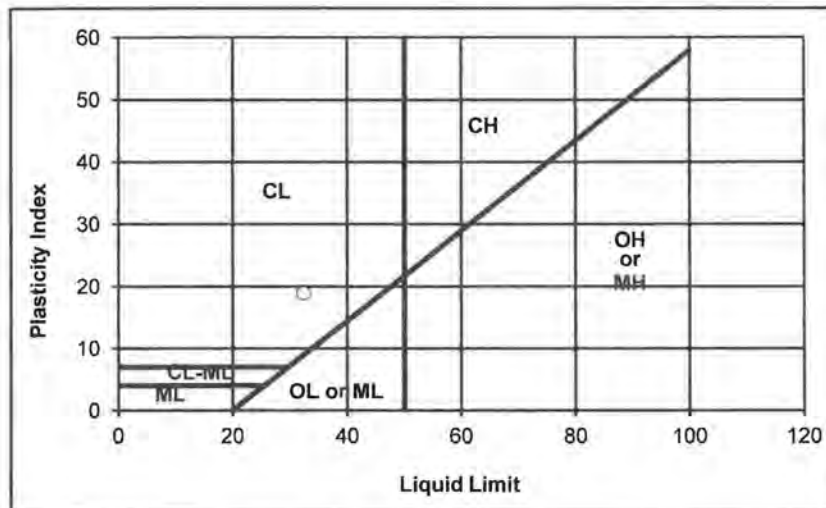
Date Tested: 9/13/2017
 Tested By: J Mitchell
 Verified By: J Gruszczynski

Trial Number	Plastic Limit			Liquid Limit		
	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)	23.17	24.23		31.32		
Weight of Dry Soil & Tare (g)	22.10	23.04		27.78		
Weight of Tare (g)	14.09	13.45		16.87		
Weight of water (g)	1.07	1.19		3.54		
Weight of Dry Soil (g)	8.00	9.60		10.91		
Water Content (% of dry wt.)	13.4%	12.4%		32.4%		
Number of Blows				25		

Plastic Limit : 13

Liquid Limit : 32

Plasticity Index : 19
 Unified Soil Classification : CL
 Requirement:
 Approx. % of Material Retained on # 40 Sieve:



Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

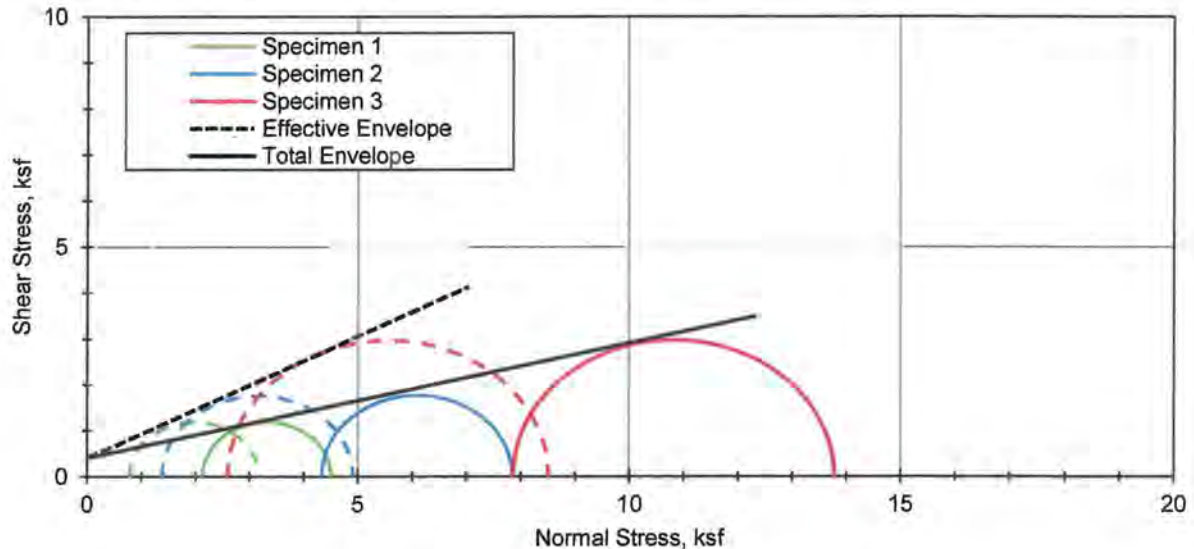


Consolidated-Undrained Triaxial Test

ASTM D4767

Project: Guzman
 Project Number: 022-15055
 Sampling Date: 8/28/2017
 Location: TP18a @ 7-9'
 Client Name:

Sample Number:
 Sample Type: Reconstituted
 Sample Description: Brn Clayey Sand
 Sample Depth (ft): 7-9



Initial Parameters			
	Total	Effective	Specimen
Friction Angle, ϕ	14.0	27.9	1 2 3
Cohesion, c (ksf)	0.40	0.40	
Failure Criteria: Specified Strain %			
Plastic Limit:	13		
Liquid Limit:	32		
Specific Gravity:	2.72		
	ASSUMED		
Saturation Parameters			
B-Value	0.98	0.98	0.98
Consolidation Parameters			
Back Pressure (psi)	28.9	28.4	28.9
Effective Pressure (psi)	15.0	30.0	55.0
Height (in)	5.70	5.71	5.74
Area (in ²)	6.14	6.09	6.00
Void Ratio	0.361	0.348	0.329
Saturation (%)	100	100.0	100.0
Final Parameters at Failure			
Deviator Stress (ksf)	2.4	3.5	5.9
σ'_1 (ksf)	3.2	4.9	8.5
σ'_3 (ksf)	0.8	1.4	2.6
Excess PP (ksf)	1.34	2.9	5.3
Axial Strain (%)	5.0	5.0	5.0
Rate of Strain (in/min)	0.0005	0.0005	0.0005

Remarks:

Remolded to approx. 95% relative density of 125.5 pcf, 11.0%, at or above optimum moisture content

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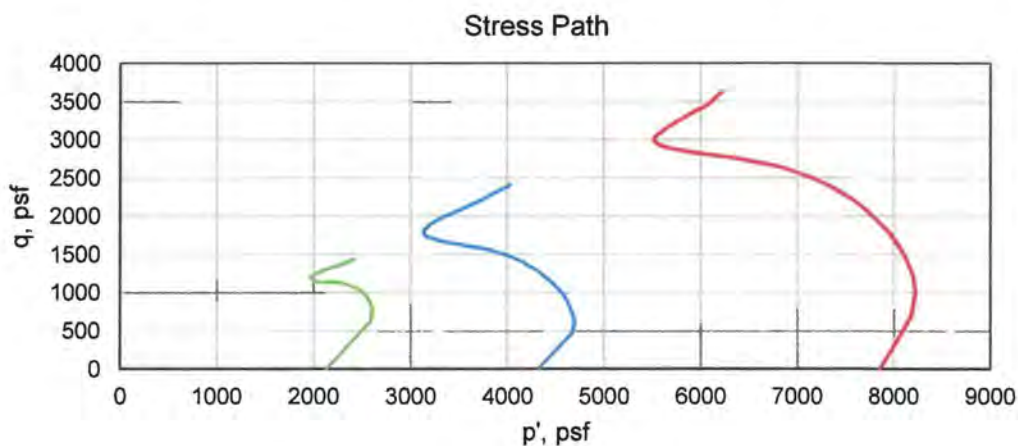
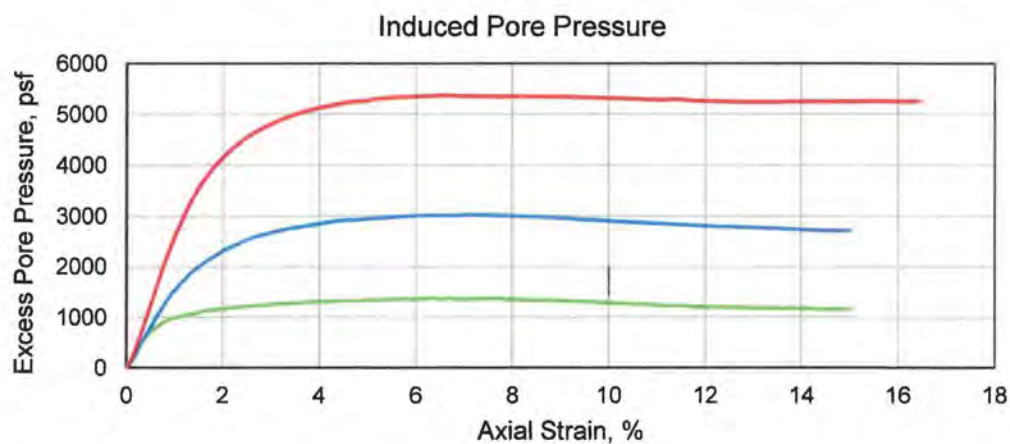
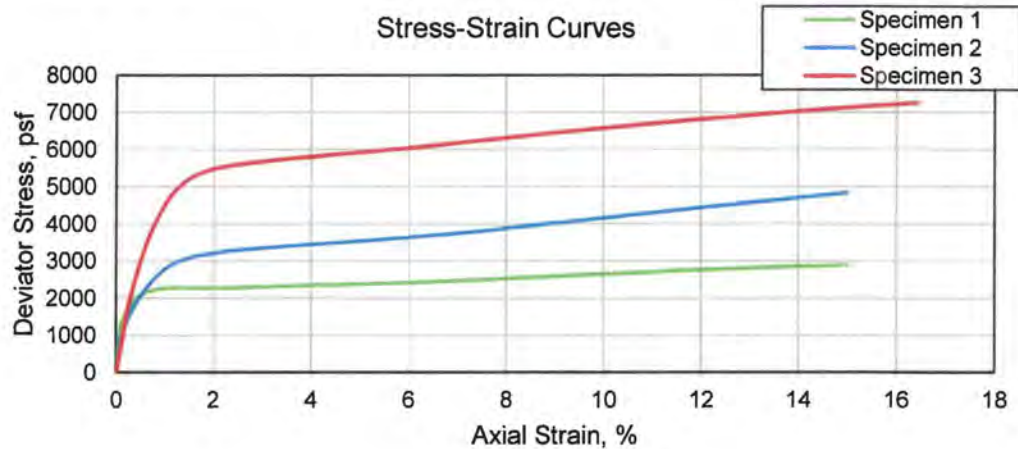


Consolidated-Undrained Triaxial Test

ASTM D4767

Project: Guzman
Project Number: 022-15055
Sampling Date: 8/28/2017
Location: TP18a @ 7-9'
Client Name:

Sample Number:
Sample Type: Reconstituted
Sample Description: Brn Clayey Sand
Sample Depth (ft): 7-9



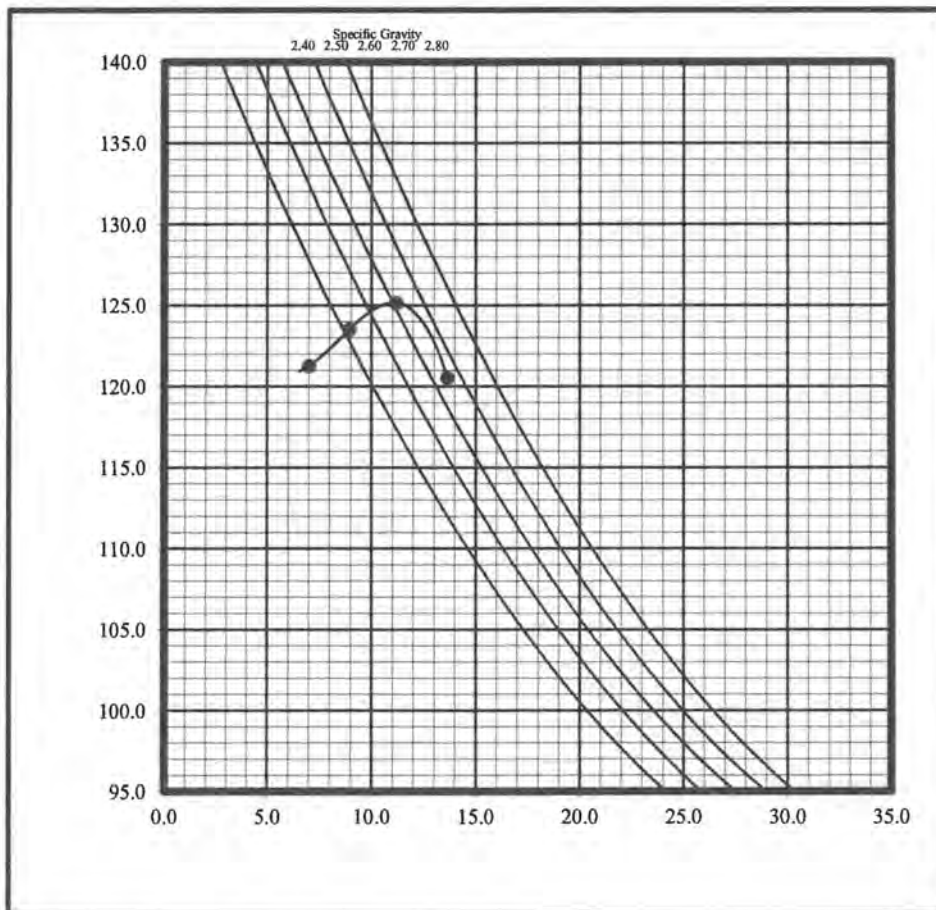
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GEOTECHNICAL ENGINEERING ENVIRONMENTAL ENGINEERING CONSTRUCTION TESTING & INSPECTION

**Laboratory Compaction Characteristics
of Soil using Modified Effort (56,000 ft. - lbf/ft³)
ASTM D1557**

Project Number	022-15055	Sample Number	-
Project Name	Guzman	Soil Classification	SC
Technician	JJ	Soil Description	Brn Clayey Sand
Date	9/11/2017	Method	D1557b
Sample Location	TP18A @ 7-9'		

	1	2	3	4
Mass of Moist Specimen & Mold, gm	4016.2	4085.6	4053.2	3944.1
Mass of Compaction Mold, gm	1984.0	1984.0	1984.0	1984.0
Mass of Moist Specimen, gm	2032.2	2101.6	2069.2	1960.1
Volume of Mold, cu./ft.	0.0333	0.0333	0.0333	0.0333
Wet Density, lbs./cu.ft.	134.5	139.1	137.0	129.8
Mass of Moisture (Wet), gm	200.0	200.0	200.0	200.0
Mass of Moisture (Dry), gm	183.6	179.9	176.0	186.9
Moisture Content (%)	8.9	11.2	13.6	7.0
Dry Density, lbs/cu.ft.	123.5	125.2	120.6	121.3



**Maximum Dry Density,
lbs.cu.ft.**

125.2

Optimum Moisture Content

11.0%

SDS#: -

Sieve Analysis

ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 9/6/2017
Sample Location : TP18A @ 7-8'
Soil Classification : SC

Wet Weight	:	300.00
Dry Weight	:	286.40
Moisture Content	:	5%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	4.2	1.5	1.5	98.5
#8	2.36	19.8	6.9	8.4	91.6
#16	1.18	31.7	11.1	19.4	80.6
#30	0.60	32.1	11.2	30.7	69.3
#50	0.30	29.9	10.4	41.1	58.9
#100	0.15	25.8	9.0	50.1	49.9
#200	0.08	17.6	6.1	56.3	43.8

Grain Size Analysis



Project Name: Guzman
 Project Number: 022-15055
 Soil Classification: SC
 Sample Number: TP18A @ 7-8'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 9/6/2017
Sample Location : TP18A @ 8-9'
Soil Classification : SM

Wet Weight	:	300.00
Dry Weight	:	286.50
Moisture Content	:	5%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	2.1	0.7	0.7	99.3
#8	2.36	23.0	8.0	8.8	91.2
#16	1.18	49.9	17.4	26.2	73.8
#30	0.60	51.3	17.9	44.1	55.9
#50	0.30	41.5	14.5	58.6	41.4
#100	0.15	24.9	8.7	67.3	32.7
#200	0.08	11.5	4.0	71.3	28.7

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
SM
TP18A @ 8-9'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 7/15/2016
Sample Location : B19 @ 10-11'
Soil Classification : SW-SM

Wet Weight	:	300.00
Dry Weight	:	261.30
Moisture Content	:	15%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	1.9	0.7	0.7	99.3
#8	2.36	16.2	6.2	6.9	93.1
#16	1.18	45.3	17.3	24.3	75.7
#30	0.60	71.9	27.5	51.8	48.2
#50	0.30	63.4	24.3	76.0	24.0
#100	0.15	29.0	11.1	87.1	12.9
#200	0.08	10.0	3.8	91.0	9.0

Grain Size Analysis



Sieve Analysis

ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 7/15/2016
Sample Location : B19 @ 20-21'
Soil Classification : SC

Wet Weight	:	300.00
Dry Weight	:	274.10
Moisture Content	:	9%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	6.1	2.2	2.2	97.8
#8	2.36	23.8	8.7	10.9	89.1
#16	1.18	34.2	12.5	23.4	76.6
#30	0.60	38.1	13.9	37.3	62.7
#50	0.30	48.1	17.5	54.8	45.2
#100	0.15	43.8	16.0	70.8	29.2
#200	0.08	22.7	8.3	79.1	20.9

Grain Size Analysis



Project Name	Guzman
Project Number	022-15055
Soil Classification	SC
Sample Number	B19 @ 20-21'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

ASTM C136

Project Number : 022-15055
Project Name : Guzman
Date : 7/19/2016
Sample Location : B19 @ 35-36'
Soil Classification : SC-CL

Wet Weight	:	275.00
Dry Weight	:	241.40
Moisture Content	:	14%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	0.7	0.3	0.3	99.7
#8	2.36	2.9	1.2	1.5	98.5
#16	1.18	12.0	5.0	6.5	93.5
#30	0.60	22.1	9.2	15.6	84.4
#50	0.30	29.3	12.1	27.8	72.2
#100	0.15	31.9	13.2	41.0	59.0
#200	0.08	23.6	9.8	50.7	49.3

Hydrometer Analysis

ASTM D422

Project Number : 022-15055
Project Name : Guzman
Date : 7/19/2016
Sample Location : B19 @ 35-36'
Soil Classification : SC-CL

Dry Weight Used	88.2 g
Temperature	20.0 C
Soil Specific Gravity	2.65
Solution Spec. Grav.	1.003
K Value	0.01365
Correction Factor	0.00000

Elapsed Time (min)	Hydro. Reading	Hydro. Corrected	% Passing	Particle Diameter
2	1.027	1.027	43.8	0.0293
5	1.025	1.025	40.1	0.0190
15	1.022	1.022	34.7	0.0114
30	1.021	1.021	32.8	0.0082
60	1.02	1.02	31.0	0.0058
250	1.016	1.016	23.7	0.0030
1440	1.013	1.013	18.2	0.0013

Particle Diameter	Percent Passing
0.005	28.8
0.002	20.5
0	NA

Grain Size Analysis



Project Name: Guzman
 Project Number: 022-15055
 Soil Classification: SC-CL
 Sample Number: B19 @ 35-36'

ASTM C136 /
D422

Krazan Testing Laboratory

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

Project: **Guzman Reservoirs**
 Project Number: **022-15055**
 Date Sampled: 5/31/2016
 Sampled By: DA
 Sample Number:
 Sample Location: B19 @ 35-36'
 Sample Description: SC-CL

Date Tested: 7/18/2016
 Tested By: J Dyer
 Verified By: J Gruszczynski

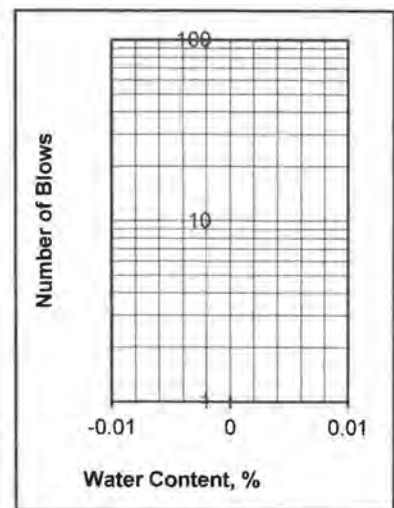
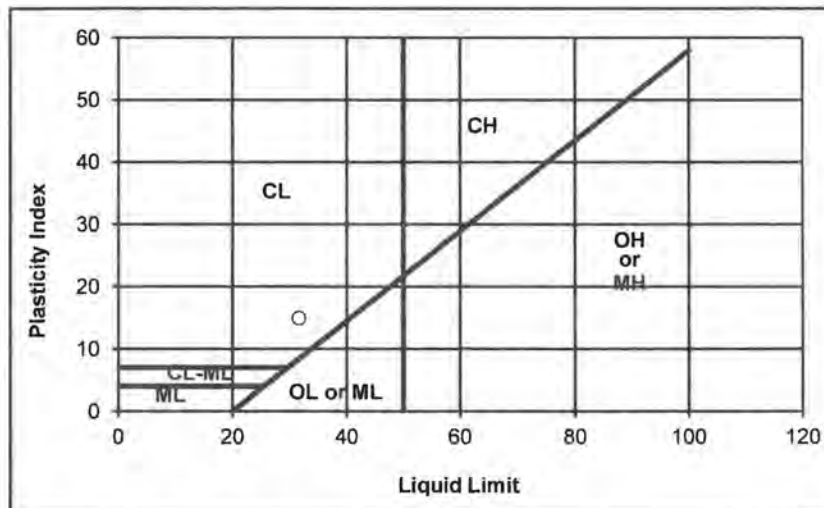
Trial Number	Plastic Limit			Liquid Limit		
	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)	19.50	19.93		26.06		
Weight of Dry Soil & Tare (g)	18.78	19.15		23.27		
Weight of Tare (g)	14.39	14.52		14.45		
Weight of water (g)	0.73	0.78		2.79		
Weight of Dry Soil (g)	4.39	4.63		8.83		
Water Content (% of dry wt.)	16.6%	16.9%		31.6%		
Number of Blows				25		

Plastic Limit : 17

Liquid Limit : 32

Plasticity Index : 15
 Unified Soil Classification : CL

Requirement:
 Approx. % of Material Retained on # 40 Sieve:



Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

Sieve Analysis

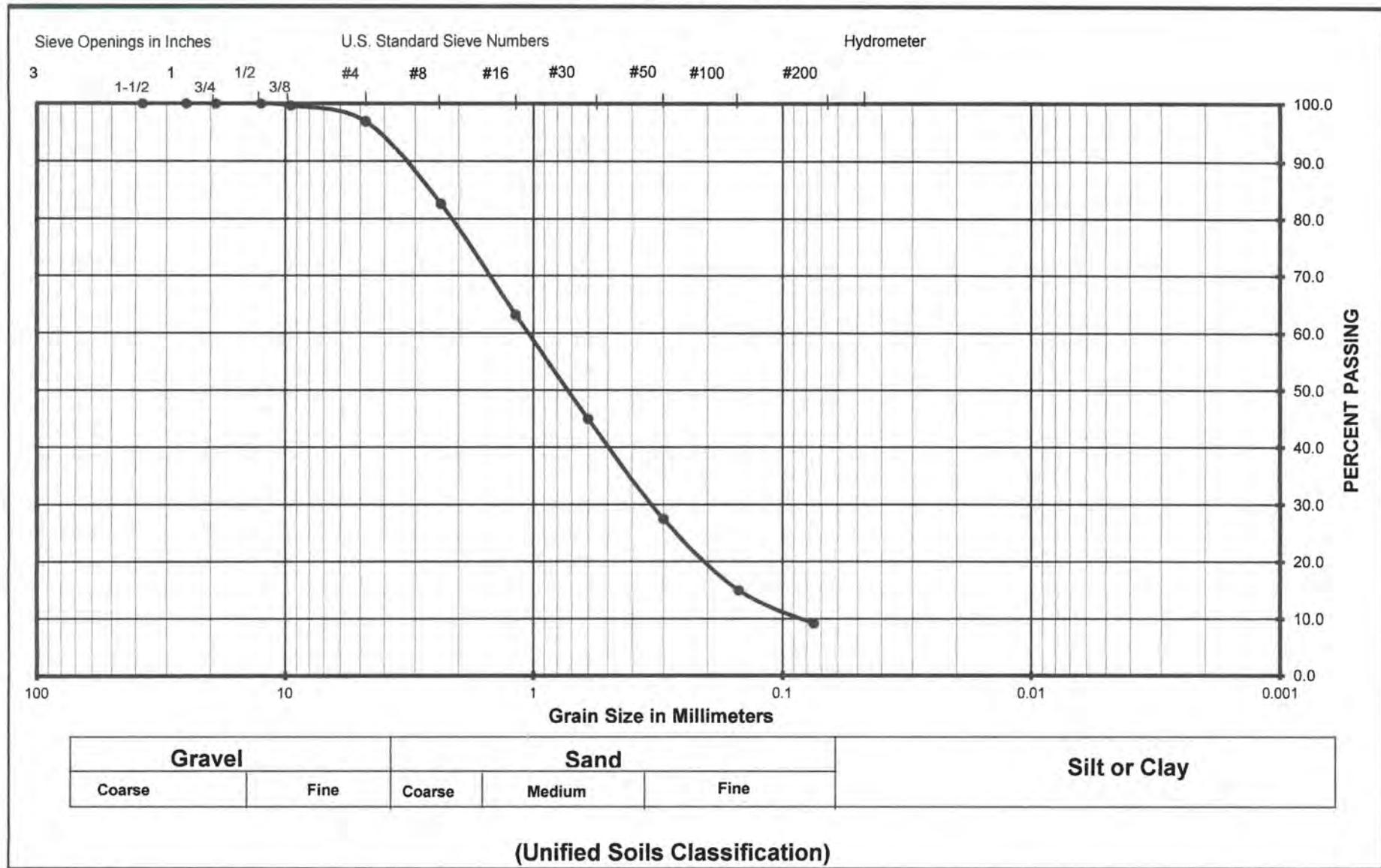
ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 7/15/2016
Sample Location : B19 @ 45-46'
Soil Classification : SP-SM

Wet Weight	:	300.00
Dry Weight	:	292.60
Moisture Content	:	3%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50	1.1	0.4	0.4	99.6
#4	4.75	8.1	2.8	3.1	96.9
#8	2.36	41.8	14.3	17.4	82.6
#16	1.18	56.6	19.3	36.8	63.2
#30	0.60	53.4	18.3	55.0	45.0
#50	0.30	51.2	17.5	72.5	27.5
#100	0.15	36.5	12.5	85.0	15.0
#200	0.08	17.0	5.8	90.8	9.2

Grain Size Analysis



Project Name
 Project Number
 Soil Classification
 Sample Number

Guzman
 022-15055
 SP-SM
 B19 @ 45-46'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

ASTM C136

Project Number : 022-15055
Project Name : Guzman
Date : 10/5/2015
Sample Location : TP1 @ 5-10'
Soil Classification : SM w/ trace of clay

Wet Weight	:	200.00
Dry Weight	:	196.00
Moisture Content	:	2%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	2.0	1.0	1.0	99.0
#8	2.36	8.3	4.2	5.3	94.7
#16	1.18	17.1	8.7	14.0	86.0
#30	0.60	19.5	9.9	23.9	76.1
#50	0.30	24.8	12.7	36.6	63.4
#100	0.15	36.9	18.8	55.4	44.6
#200	0.08	25.9	13.2	68.6	31.4

Hydrometer Analysis

ASTM D422

Project Number : 022-15055
Project Name : Guzman
Date : 10/5/2015
Sample Location : TP1 @ 5-10'
Soil Classification : SM w/ trace of clay

Dry Weight Used	97.1 g
Temperature	20.0 C
Soil Specific Gravity	2.65
Solution Spec. Grav	1.003
K Value	0.01365
Correction Factor	0.00000

Elapsed Time (min)	Hydro. Reading	Hydro. Corrected	% Passing	Particle Diameter
2	1.021	1.021	29.8	0.0316
5	1.019	1.019	26.5	0.0205
15	1.016	1.016	21.5	0.0123
30	1.015	1.015	19.9	0.0087
60	1.013	1.013	16.6	0.0063
250	1.01	1.01	11.6	0.0032
1440	1.008	1.008	8.3	0.0014

Particle Diameter	Percent Passing
0.005	14.5
0.002	9.4
0	NA

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

Project: **Guzman**

Project Number: **022-15055**

Date Sampled: -

Sampled By: DA

Sample Number:

Sample Location: TP1 @ 5-10'

Sample Description: SM w/ trace of clay

Date Tested: 10/2/2015

Tested By: J Dyer

Verified By: J Gruszczynski

Trial Number	Plastic Limit			Liquid Limit		
	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)						
Weight of Dry Soil & Tare (g)						
Weight of Tare (g)						
Weight of water (g)						
Weight of Dry Soil (g)						
Water Content (% of dry wt.)						
Number of Blows						

Plastic Limit : N/D

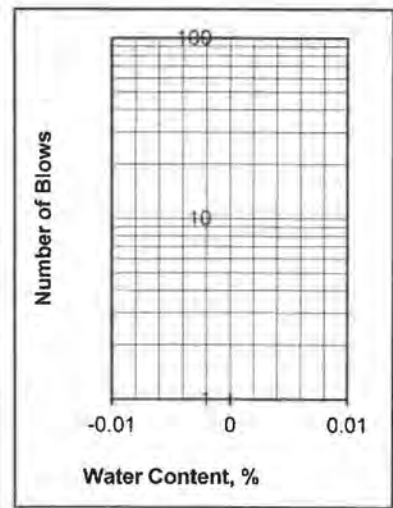
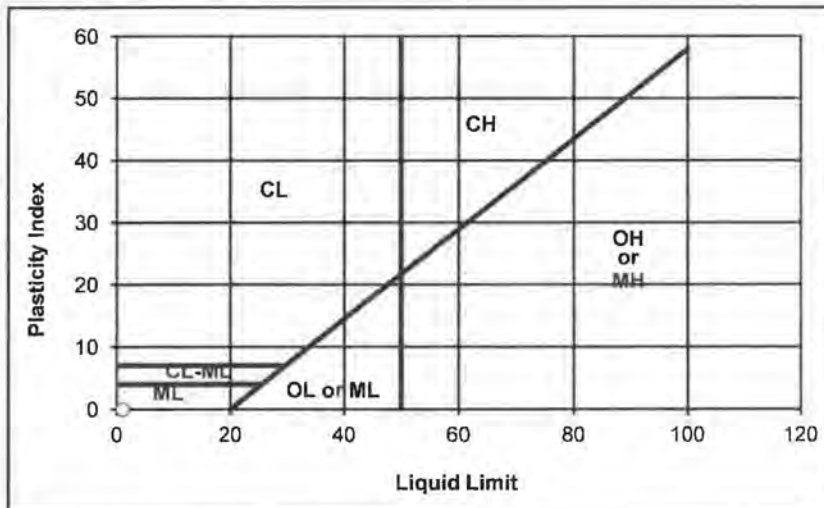
Liquid Limit : N/D

Plasticity Index : NON-PLASTIC

Unified Soil Classification : NON-PLASTIC

Requirement:

Approx. % of Material Retained on # 40 Sieve:



Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

ASTM D4647-06

Date:	10/16/2015
Project Name	Guzman
Project Number	022-15055
Sample Location	TP1 @ 5-10'
Water Content	n/a
Compaction Characteristics	n/a
Curing Time	n/a

[illegible]

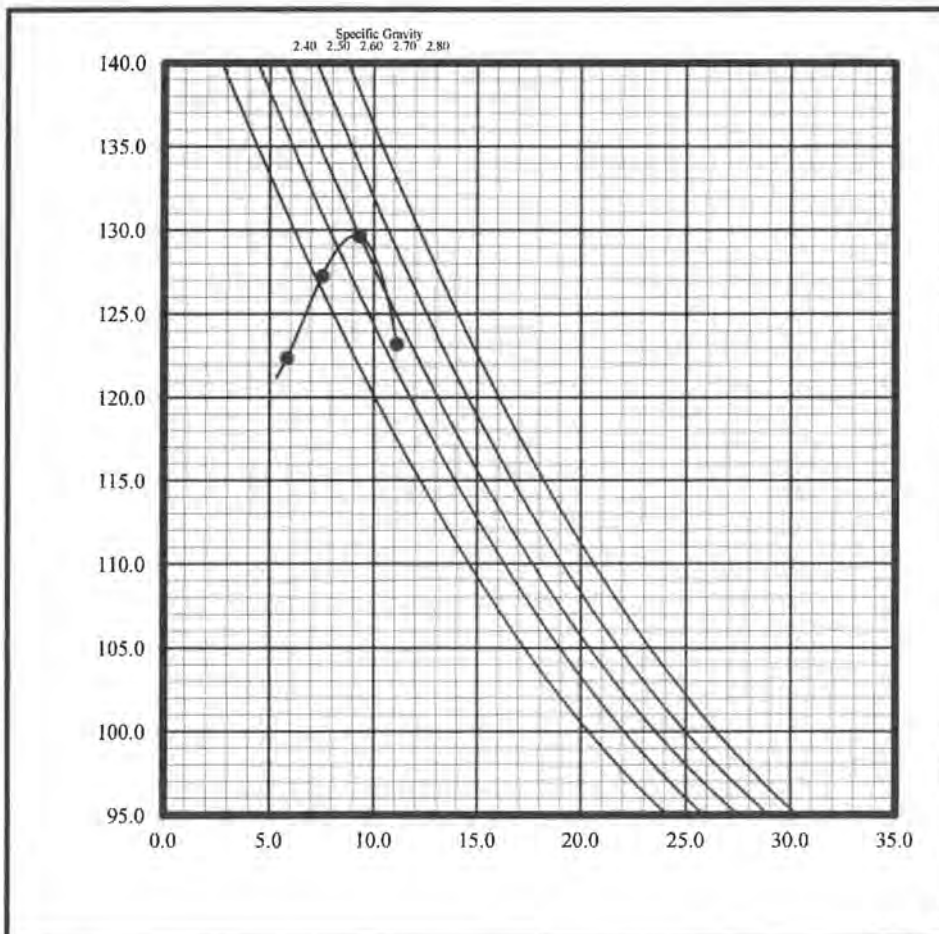
Final Hole Diameter _____

Technician **J Gruszczynski**

Laboratory Compaction Characteristics of Soil using Modified Effort (56,000 ft. - lbf/ft³) ASTM D1557

Project Number	022-15055	Sample Number	Bulk #38
Project Name	Guzman	Soil Classification	SM
Technician	DH 12044	Soil Description	Bm Silty Sand w/ trace of clay
Date	9/29/2015	Method	D1557b
Sample Location	TP1 @ 6-10'		

	1	2	3	4
Mass of Moist Specimen & Mold, gm	4067.0	4140.0	4068.0	3956.0
Mass of Compaction Mold, gm	2000.0	2000.0	2000.0	2000.0
Mass of Moist Specimen, gm	2067.0	2140.0	2068.0	1956.0
Volume of Mold, cu./ft.	0.0333	0.0333	0.0333	0.0333
Wet Density, lbs./cu.ft.	136.8	141.7	136.9	129.5
Mass of Moisture (Wet), gm	200.0	200.0	200.0	200.0
Mass of Moisture (Dry), gm	186.0	183.0	180.0	189.0
Moisture Content (%)	7.5	9.3	11.1	5.8
Dry Density, lbs/cu.ft.	127.3	129.6	123.2	122.4



**Maximum Dry Density,
lbs.cu.ft.**

129.7

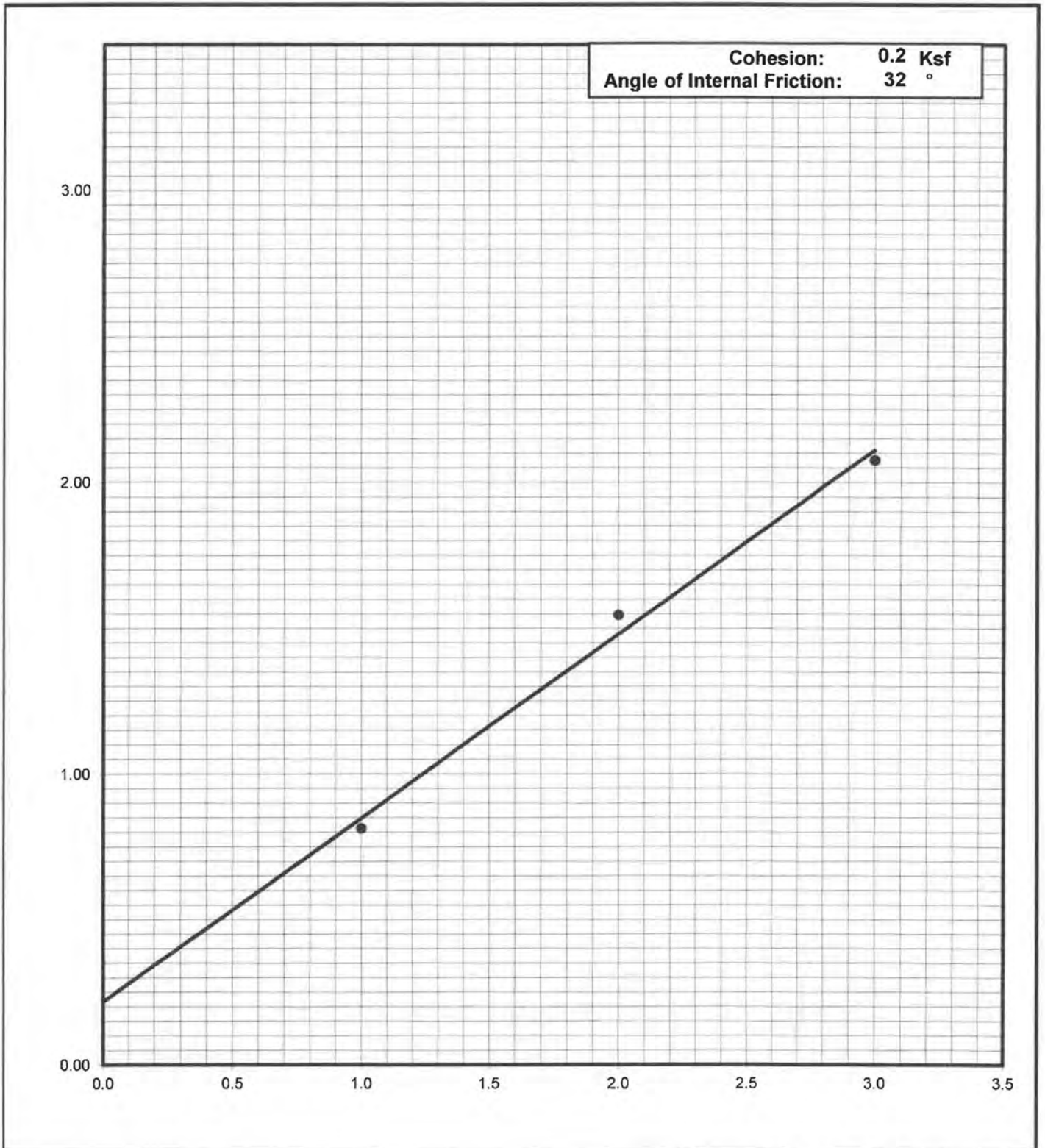
Optimum Moisture Content

9.1%

SDS#: _____

Shear Strength Diagram (Direct Shear)
ASTM D - 3080 / AASHTO T - 236

Project Number	Boring No. & Depth	Soil Type	Date
022-15055	TP1 @ 5-10'	SM w/ trace of clay	10/6/2015



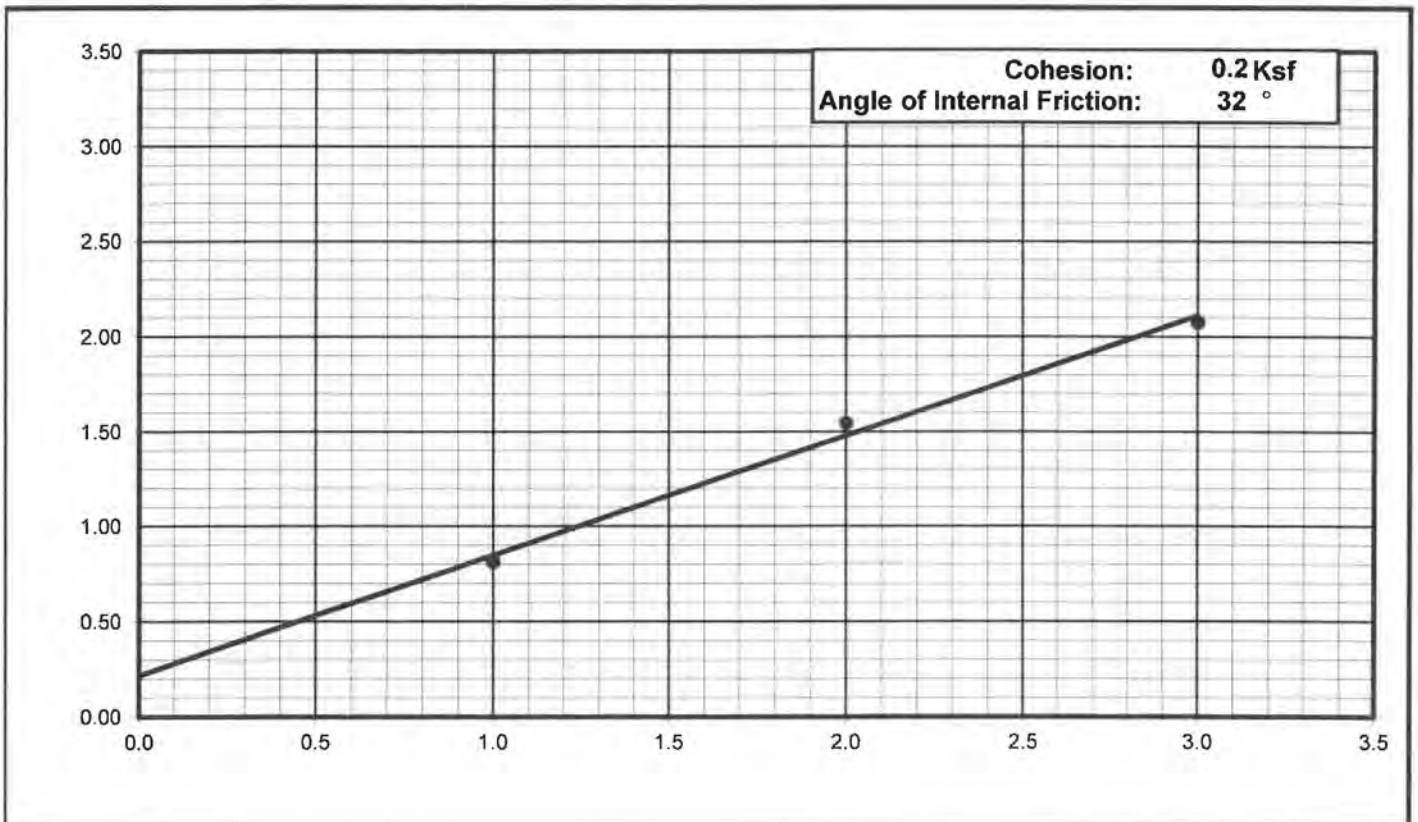
Direct Shear of Consolidated, Drained Soils ASTM D - 3080 / AASHTO T - 236

Project Number : 022-15055
 Project Name : Guzman
 Date : 10/6/2015
 Sample Location : TP1 @ 5-10'
 Soil Classification : SM w/ trace of clay
 Sample Surface Area : 0.03168

STRESS DISPLACEMENT DATA

Lat. Disp. (in.)	Normal Load		
	1000	2000	3000
0	0	0	0
0.030	14	37	57
0.060	26	48	68
0.090	32	53	78
0.120	34	58	83
0.150	34	61	87
0.180	34	63	90
0.210	34	64	93
0.240	34	65	93
0.270	34	65	94
0.300	34	65	95
0.330	34	66	96
0.360	34	66	96

Normal Load psf	Shear force lbs	Shear Stress psf
1000	25.8	814
2000	49.0	1547
3000	65.8	2077



Soil Permeability

Flexible Wall, Falling Head (Rising Tail)

ASTM D - 5084 / CAL 220

Project Number : 022-15055
 Project Name : Guzman
 Date : 10/11/2015
 Sample Number : TP1
 Sample Location : 5-10'
 Soil Classification : SM w/ trace of clay

Max Dry Density, lbs/cu.ft	129.7	Degree of Sat. %		Max. Particle Size	0.0
Optimum Moisture, %	9.1	% Over Optimum		% Passing 3/8"	--
Initial Dry Density, lbs/cu.ft	119.8	Initial Diameter, cm	3.55	% Passing # 10	--
Initial Moisture, %	9.3	Initial Length, cm	7.36	% Passing # 200	--
Sample Compaction, %	92.4	Initial Area sq.cm	9.90	Temperature	22.0
Final Dry Density, lbs/cu.ft	--	Final Diameter, cm	3.55	Type of Permeant	Tap Water
Final Moisture, %	--	Final Length, cm	7.36	$\Delta\mu$ (Pore Pressure)	10.0
Specific Gravity (Assumed)	2.7	Final Area, sq.cm	9.90	$\Delta\sigma$ (Cell Pressure)	10.0
Comp. Procedure	Undisturbed			$\Delta\mu/\Delta\sigma$ (B Value)	1.00

Test	Start Time	Finish Time	H in Start	H in Final	H out Start	H out Final	Back Press	Tail Press.	Cell Press
1	7:25	7:57	1.1	5.2	28.7	24.5	30.0	28.7	31.0
2	7:58	8:43	5.2	10.4	24.5	19.3	30.0	28.7	31.0
3									
4									
5									
6									

Test	Time sec	h1/h2 Ratio	K cm/sec	k20 cm/sec
1	1920	0.92826	1.3E-05	1.24E-05
2	2700	0.90311	1.3E-05	1.21E-05
3				
4				
5				
6				

Permeability
1.23E-05 cm/sec
1.23E-07 m/sec

Sieve Analysis

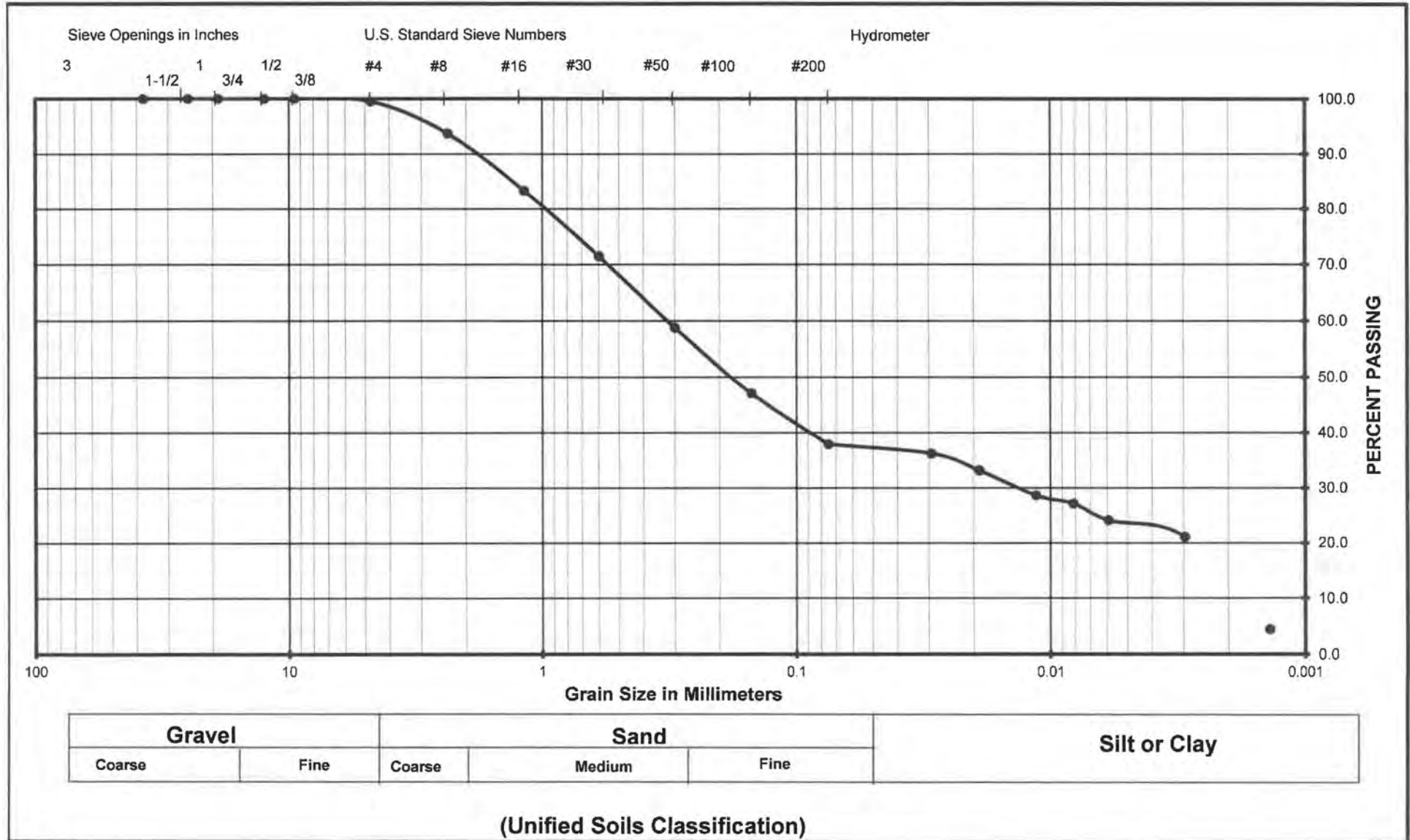
ASTM C136

Project Number : 022-15055
Project Name : Guzman
Date : 10/6/2015
Sample Location : TP7 @ 0-5'
Soil Classification : SC

Wet Weight	:	200.00
Dry Weight	:	198.80
Moisture Content	:	1%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	1.0	0.5	0.5	99.5
#8	2.36	11.4	5.7	6.2	93.8
#16	1.18	20.7	10.4	16.6	83.4
#30	0.60	23.6	11.9	28.5	71.5
#50	0.30	25.2	12.7	41.2	58.8
#100	0.15	23.4	11.8	53.0	47.0
#200	0.08	18.1	9.1	62.1	37.9

Grain Size Analysis



Project Name: Guzman
 Project Number: 022-15055
 Soil Classification: SC
 Sample Number: TP7 @ 0-5'

ASTM C136 /
 D422

Krazan Testing Laboratory

Hydrometer Analysis

ASTM D422

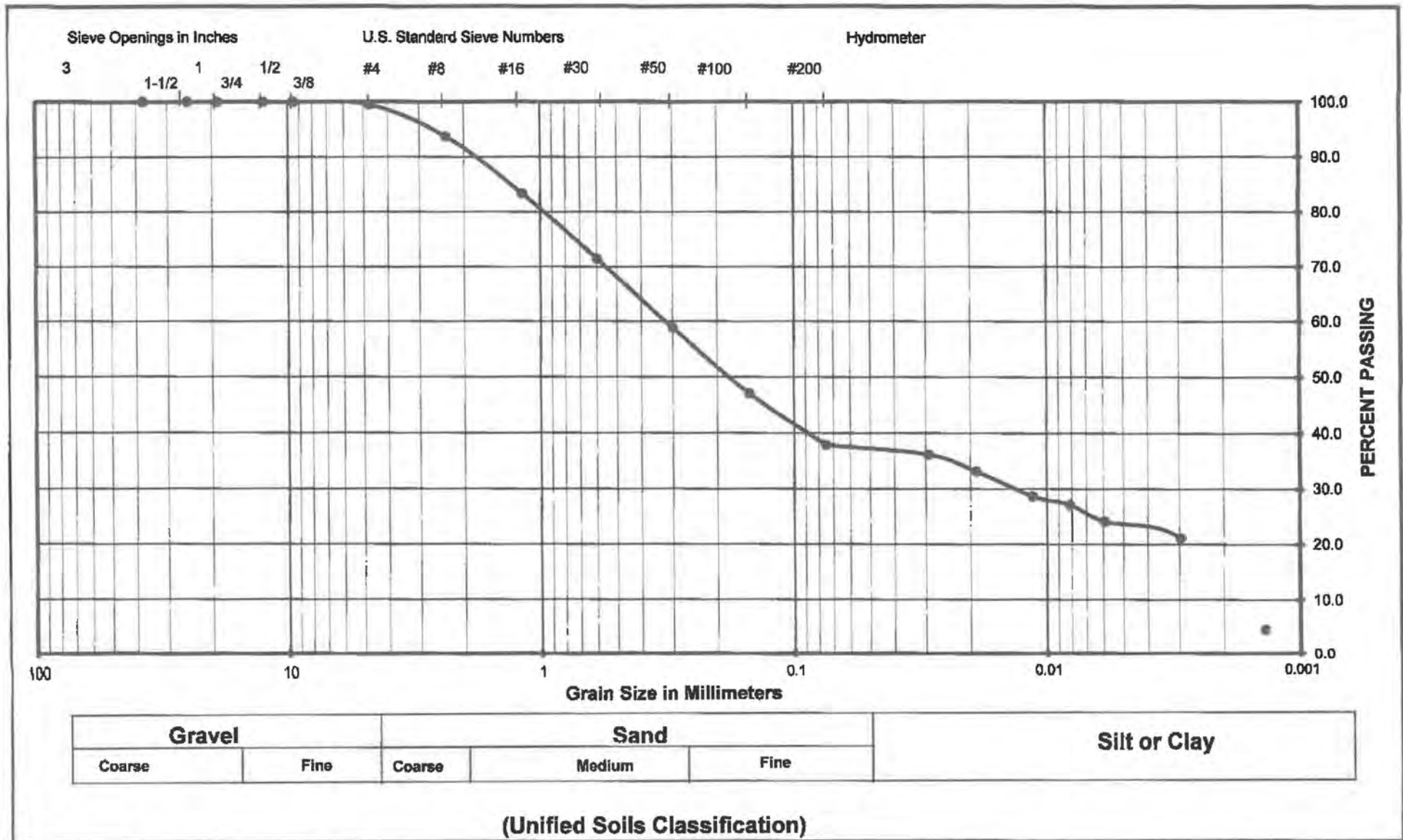
Project Number : 022-15055
Project Name : Guzman
Date : 10/6/2015
Sample Location : TP7 @ 0-5'
Soil Classification : SC

Dry Weight Used	106.6 g
Temperature	20.0 C
Soil Specific Gravity	2.65
Solution Spec. Grav.	1.003
K Value	0.01365
Correction Factor	0.00000

Elapsed Time (min)	Hydro. Reading	Hydro. Corrected	% Passing	Particle Diameter
2	1.027	1.027	36.2	0.0293
5	1.025	1.025	33.2	0.0190
15	1.022	1.022	28.7	0.0114
30	1.021	1.021	27.2	0.0082
60	1.019	1.019	24.1	0.0059
250	1.017	1.017	21.1	0.0030
1440	1.006	1.006	4.5	0.0014

Particle Diameter	Percent Passing
0.005	23.2
0.002	11.0
0	NA

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
SC
TP7 @ 0-5'

ASTM C136 /
D422

Krazan Testing Laboratory

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

Project: **Guzman**
 Project Number: **022-15055**
 Date Sampled: -
 Sampled By: DA
 Sample Number: TP7
 Sample Location: 0-5'
 Sample Description: SC

Date Tested: 10/12/2015
 Tested By: J Dyer
 Verified By: J Gruszczynski

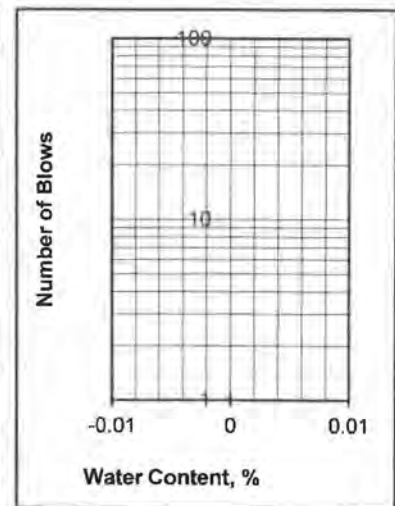
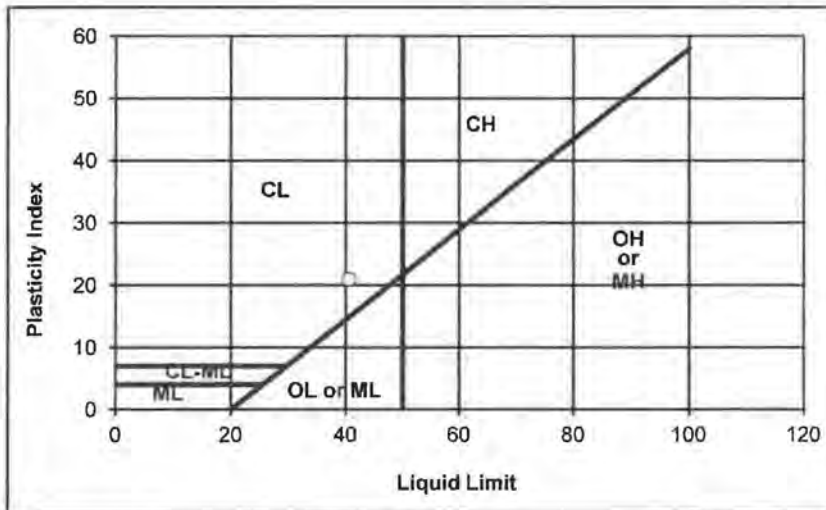
Trial Number	Plastic Limit			Liquid Limit		
	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)	17.15	17.65		23.58		
Weight of Dry Soil & Tare (g)	16.67	17.08		20.85		
Weight of Tare (g)	14.26	14.12		14.14		
Weight of water (g)	0.48	0.57		2.72		
Weight of Dry Soil (g)	2.42	2.95		6.72		
Water Content (% of dry wt.)	19.7%	19.3%		40.6%		
Number of Blows				25		

Plastic Limit : 20

Liquid Limit : 41

Plasticity Index : 21
 Unified Soil Classification : CL

Requirement:
 Approx. % of Material Retained on # 40 Sieve:



Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

ASTM D4647-06

Date:	10/16/2015
Project Name	Guzman
Project Number	022-15055
Sample Location	TP 7 @ 0-5' Bulk 46
Water Content	14.20%
Compaction Characteristics	D698
Curing Time	24 Hrs

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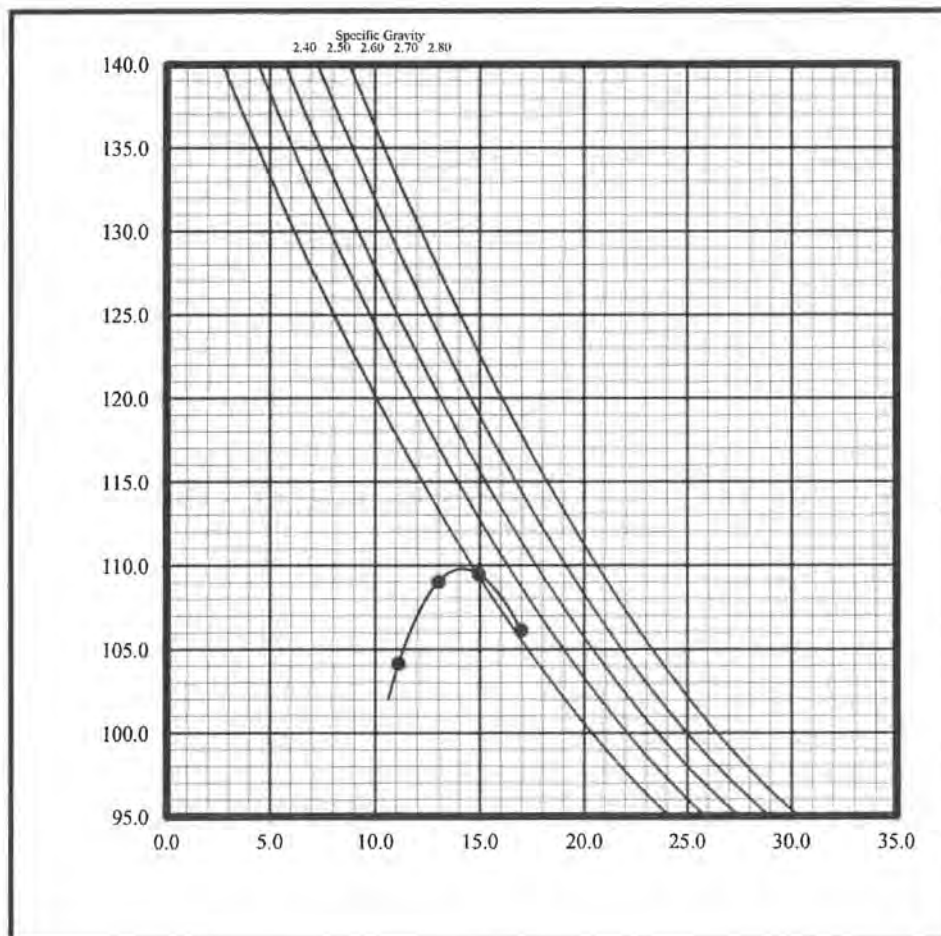
Final Hole Diameter 1.0mm

Technician **J Jensen**

Laboratory Compaction Characteristics of Soil using Modified Effort (56,000 ft. - lbf/ft³) ASTM D1557

Project Number	022-15055	Sample Number	Bulk #46
Project Name	Guzman	Soil Classification	SC
Technician	DH 12044	Soil Description	Brn Clayey Sand
Date	10/12/2015	Method	D698b
Sample Location	TP7 @ 0-5'		

	1	2	3	4
Mass of Moist Specimen & Mold, gm	3747.0	3860.0	3900.0	3874.0
Mass of Compaction Mold, gm	1999.0	1999.0	1999.0	1999.0
Mass of Moist Specimen, gm	1748.0	1861.0	1901.0	1875.0
Volume of Mold, cu./ft.	0.0333	0.0333	0.0333	0.0333
Wet Density, lbs./cu.ft.	115.7	123.2	125.9	124.1
Mass of Moisture (Wet), gm	200.0	200.0	200.0	200.0
Mass of Moisture (Dry), gm	180.0	177.0	174.0	171.0
Moisture Content (%)	11.1	13.0	14.9	17.0
Dry Density, lbs/cu.ft.	104.2	109.0	109.5	106.1



**Maximum Dry Density,
lbs.cu.ft.**

109.8

Optimum Moisture Content

14.2%

SDS#: -

Soil Permeability

Flexible Wall, Falling Head (Rising Tail)

ASTM D - 5084 / CAL 220

Project Number : 022-15055
 Project Name : Guzman
 Date : 10/13/2015
 Sample Number : TP7
 Sample Location : 0-5'
 Soil Classification : SC

Max Dry Density, lbs/cu.ft	109.8	Degree of Sat. %		Max. Particle Size	0.0
Optimum Moisture, %	13.2	%Over Optimum		% Passing 3/8"	--
Initial Dry Density, lbs/cu.ft	108.6	Initial Diameter, cm	3.55	% Passing # 10	--
Initial Moisture, %	13.5	Initial Length, cm	7.36	% Passing # 200	--
Sample Compaction, %	98.9	Initial Area sq.cm	9.90	Temperature	22.0
Final Dry Density, lbs/cu.ft	--	Final Diameter, cm	3.55	Type of Permeant	Tap Water
Final Moisture, %	--	Final Length, cm	7.36	$\Delta\mu$ (Pore Pressure)	10.0
Specific Gravity (Assumed)	2.7	Final Area, sq.cm	9.90	$\Delta\sigma$ (Cell Pressure)	10.0
Comp. Procedure	Undisturbed			$\Delta\mu/\Delta\sigma$ (B Value)	1.00

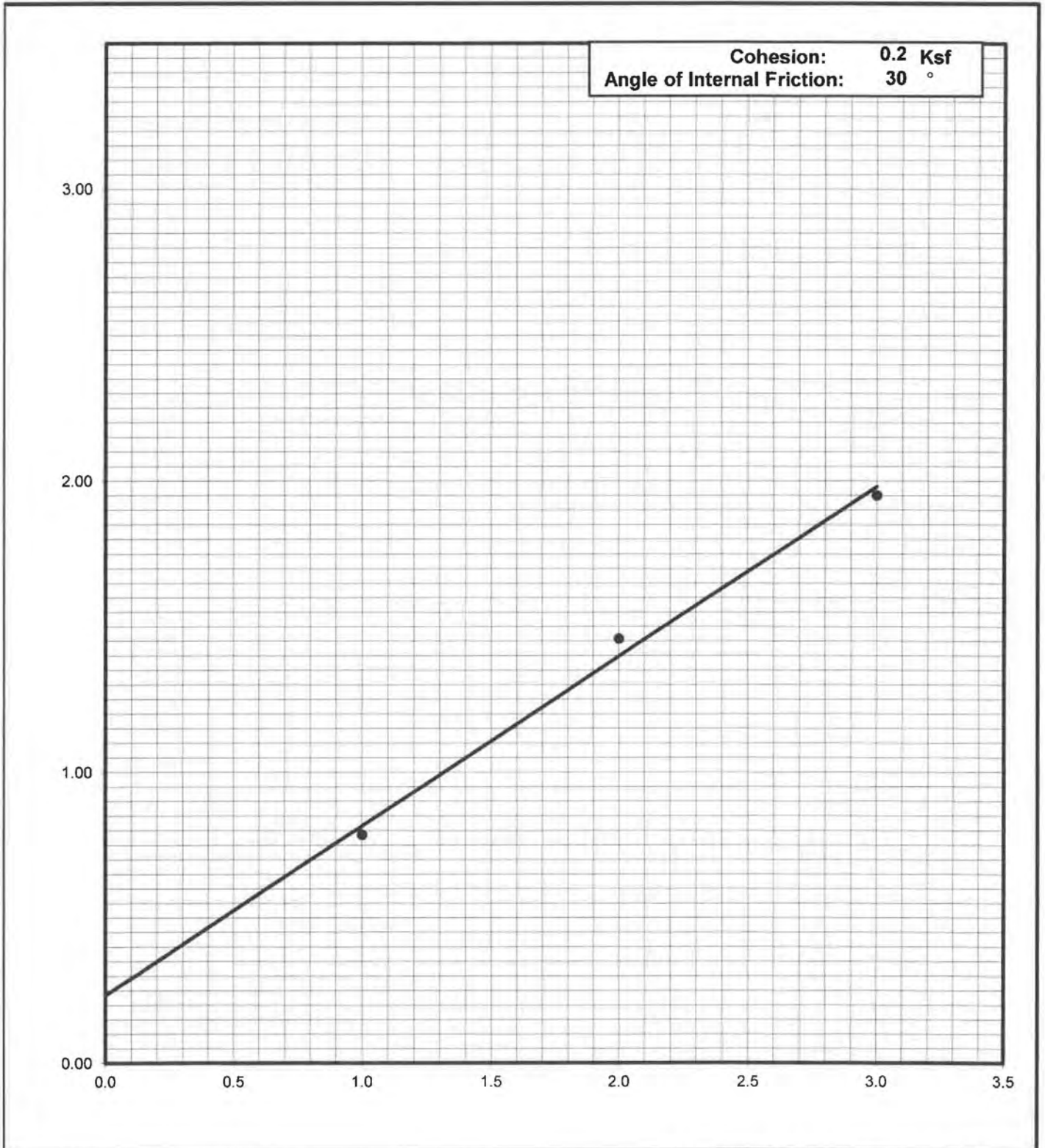
Test	Start Time	Finish Time	H in Start	H in Final	H out Start	H out Final	Back Press	Tail Press.	Cell Press
1	4:45	5:27	0.7	1.9	28.6	27.4	35.1	33.8	36.1
2	5:28	6:41	1.9	4.0	27.4	25.4	35.1	33.8	36.1
3	6:42	7:30	4.0	5.3	25.4	24.1	35.1	33.8	36.1
4									
5									
6									

Test	Time sec	h1/h2 Ratio	K cm/sec	k20 cm/sec
1	2520	0.97930	2.8E-06	2.66E-06
2	4380	0.96385	2.8E-06	2.69E-06
3	2880	0.97625	2.8E-06	2.68E-06
4				
5				
6				

Permeability
2.68E-06 cm/sec
2.68E-08 m/sec

Shear Strength Diagram (Direct Shear)
ASTM D - 3080 / AASHTO T - 236

Project Number	Boring No. & Depth	Soil Type	Date
022-15055	TP7 @ 0-5'	SC	10/15/2015



Krazan Testing Laboratory

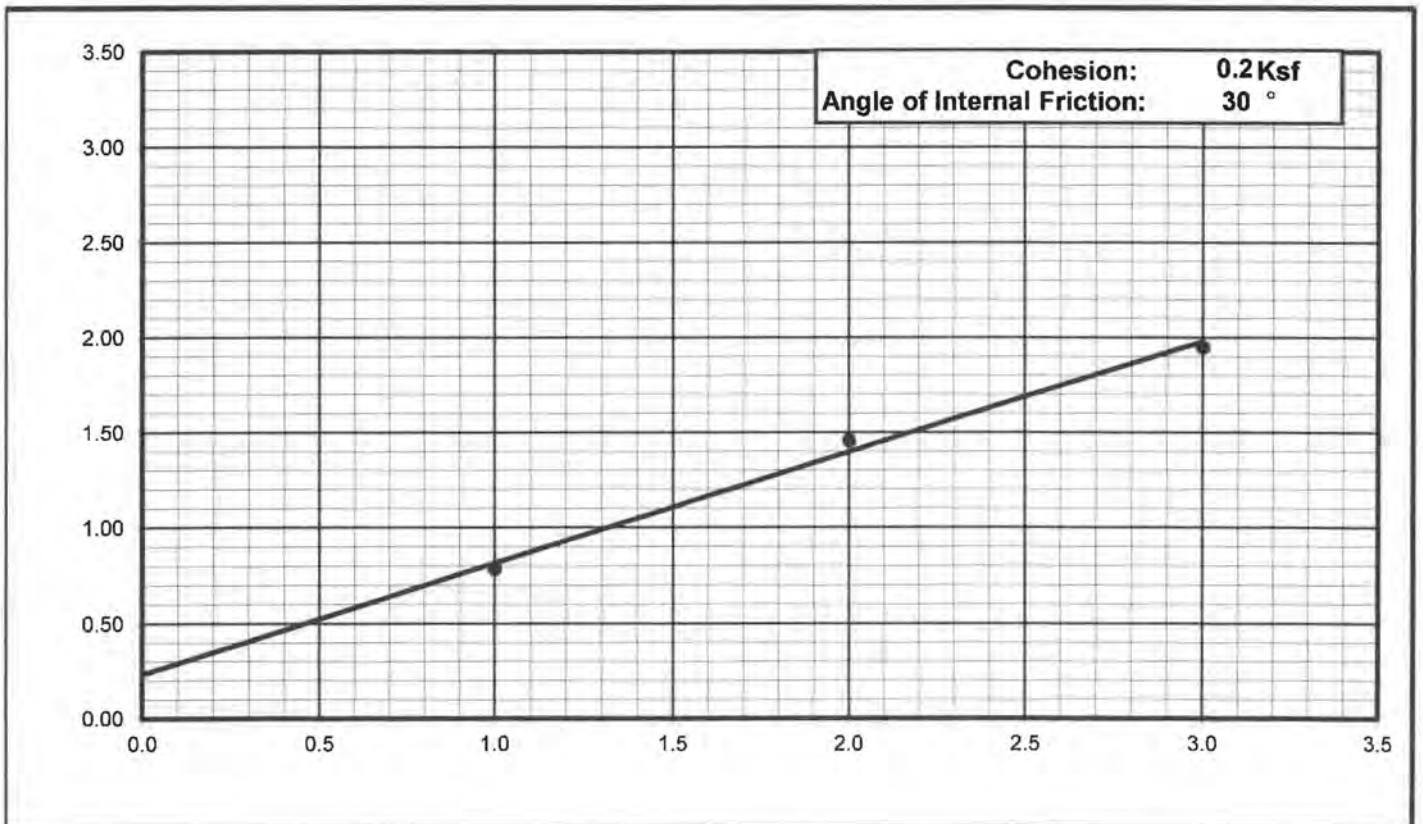
Direct Shear of Consolidated, Drained Soils ASTM D - 3080 / AASHTO T - 236

Project Number : 022-15055
 Project Name : Guzman
 Date : 10/15/2015
 Sample Location : TP7 @ 0-5'
 Soil Classification : SC
 Sample Surface Area : 0.03168

STRESS DISPLACEMENT DATA

Lat. Disp. (in.)	Normal Load		
	1000	2000	3000
0	0	0	0
0.030	25	43	57
0.060	30	47	68
0.090	33	51	74
0.120	33	55	78
0.150	33	57	80
0.180	33	58	83
0.210	33	59	85
0.240	33	60	86
0.270	33	61	87
0.300	33	61	88
0.330	33	61	89
0.360	33	61	89

Normal Load psf	Shear force lbs	Shear Stress psf
1000	24.9	786
2000	46.2	1458
3000	61.8	1951



Sieve Analysis

ASTM C136

Project Number : 022-15055
Project Name : Guzman
Date : 10/15/2015
Sample Location : TP11 @ 0-5'
Soil Classification : SC-CL

Wet Weight	:	200.00
Dry Weight	:	194.20
Moisture Content	:	3%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	1.6	0.8	0.8	99.2
#8	2.36	4.4	2.3	3.1	96.9
#16	1.18	12.5	6.4	9.5	90.5
#30	0.60	16.8	8.7	18.2	81.8
#50	0.30	19.9	10.2	28.4	71.6
#100	0.15	25.3	13.0	41.5	58.5
#200	0.08	19.5	10.0	51.5	48.5

Hydrometer Analysis

ASTM D422

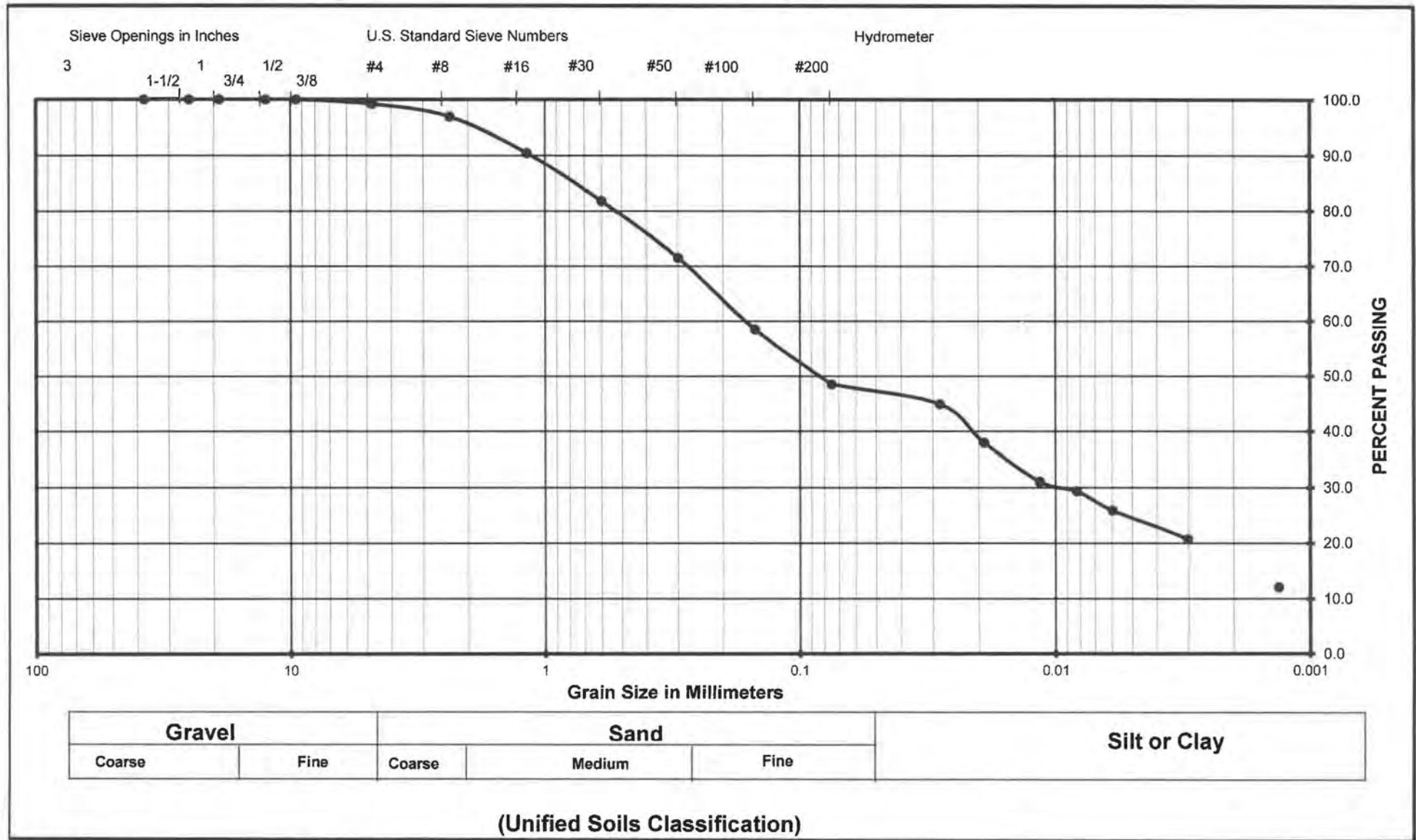
Project Number : 022-15055
Project Name : Guzman
Date : 10/15/2015
Sample Location : TP11 @ 0-5'
Soil Classification : SC-CL

Dry Weight Used	93.2 g
Temperature	20.0 C
Soil Specific Gravity	2.65
Solution Spec. Grav.	1.003
K Value	0.01365
Correction Factor	0.00000

Elapsed Time (min)	Hydro. Reading	Hydro. Corrected	% Passing	Particle Diameter
2	1.029	1.029	44.9	0.0283
5	1.025	1.025	38.0	0.0190
15	1.021	1.021	31.1	0.0115
30	1.02	1.02	29.3	0.0083
60	1.018	1.018	25.9	0.0060
250	1.015	1.015	20.7	0.0030
1440	1.01	1.01	12.1	0.0013

Particle Diameter	Percent Passing
0.005	24.2
0.002	15.5
0	NA

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
SC-CL
TP11 @ 0-5'

ASTM C136 /
D422

Krazan Testing Laboratory

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

Project: **Guzman**
 Project Number: **022-15055**
 Date Sampled: -
 Sampled By: DA
 Sample Number: TP11
 Sample Location: 0-5'
 Sample Description: SC-CL

Date Tested: 10/15/2015
 Tested By: J Dyer
 Verified By: J Gruszczynski

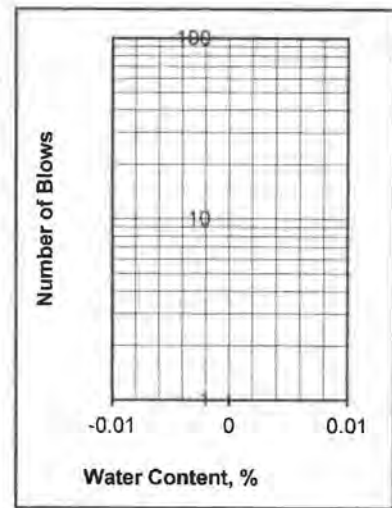
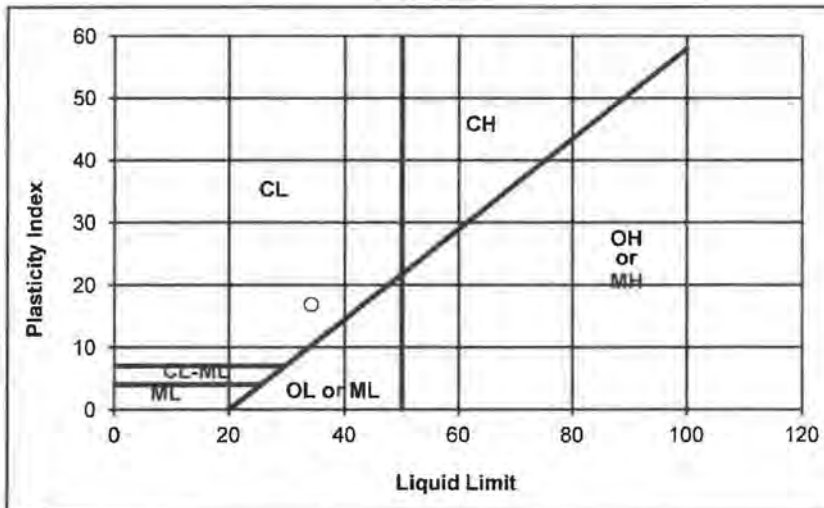
Trial Number	Plastic Limit			Liquid Limit		
	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)	17.96	17.35		25.80	25.56	
Weight of Dry Soil & Tare (g)	17.34	16.83		22.86	22.64	
Weight of Tare (g)	13.77	13.79		14.70	14.02	
Weight of water (g)	0.61	0.52		2.94	2.91	
Weight of Dry Soil (g)	3.57	3.04		8.16	8.62	
Water Content (% of dry wt.)	17.2%	17.1%		36.1%	33.8%	
Number of Blows				18	25	

Plastic Limit : 17

Liquid Limit : 34

Plasticity Index : 17
 Unified Soil Classification : CL

Requirement:
 Approx. % of Material Retained on # 40 Sieve:



Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

ASTM D4647-06

Date:	10/30/2015
Project Name	Guzman
Project Number	022-15055
Sample Location	TP11 @ 0-6'
Water Content	14.70%
Compaction Characteristics	D698
Curing Time	24 Hrs +

[illegible]

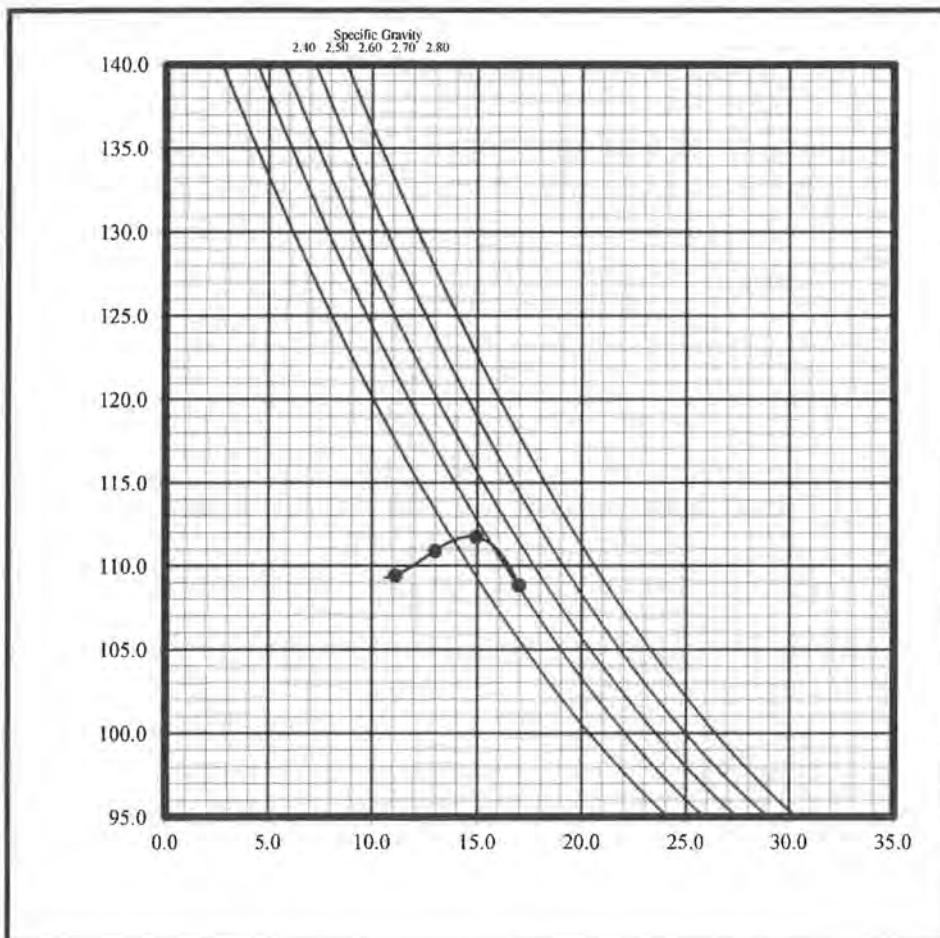
Final Hole Diameter 3.2 mm

Technician J Jensen

Laboratory Compaction Characteristics of Soil using Modified Effort (56,000 ft. - lbf/ft³) ASTM D1557

Project Number	022-15055	Sample Number	Bulk #52
Project Name	Guzman	Soil Classification	SC
Technician	DH 12044	Soil Description	Brn Clayey Sand
Date	10/15/2016	Method	D698b
Sample Location	TP 11 @ 0-6'		

	1	2	3	4
Mass of Moist Specimen & Mold, gm	3892.0	3939.0	3922.0	3836.0
Mass of Compaction Mold, gm	1999.0	1999.0	1999.0	1999.0
Mass of Moist Specimen, gm	1893.0	1940.0	1923.0	1837.0
Volume of Mold, cu./ft.	0.0333	0.0333	0.0333	0.0333
Wet Density, lbs./cu.ft.	125.3	128.4	127.3	121.6
Mass of Moisture (Wet), gm	200.0	200.0	200.0	200.0
Mass of Moisture (Dry), gm	177.0	174.0	171.0	180.0
Moisture Content (%)	13.0	14.9	17.0	11.1
Dry Density, lbs/cu.ft.	110.9	111.7	108.8	109.5



**Maximum Dry Density,
lbs.cu.ft.**

111.8

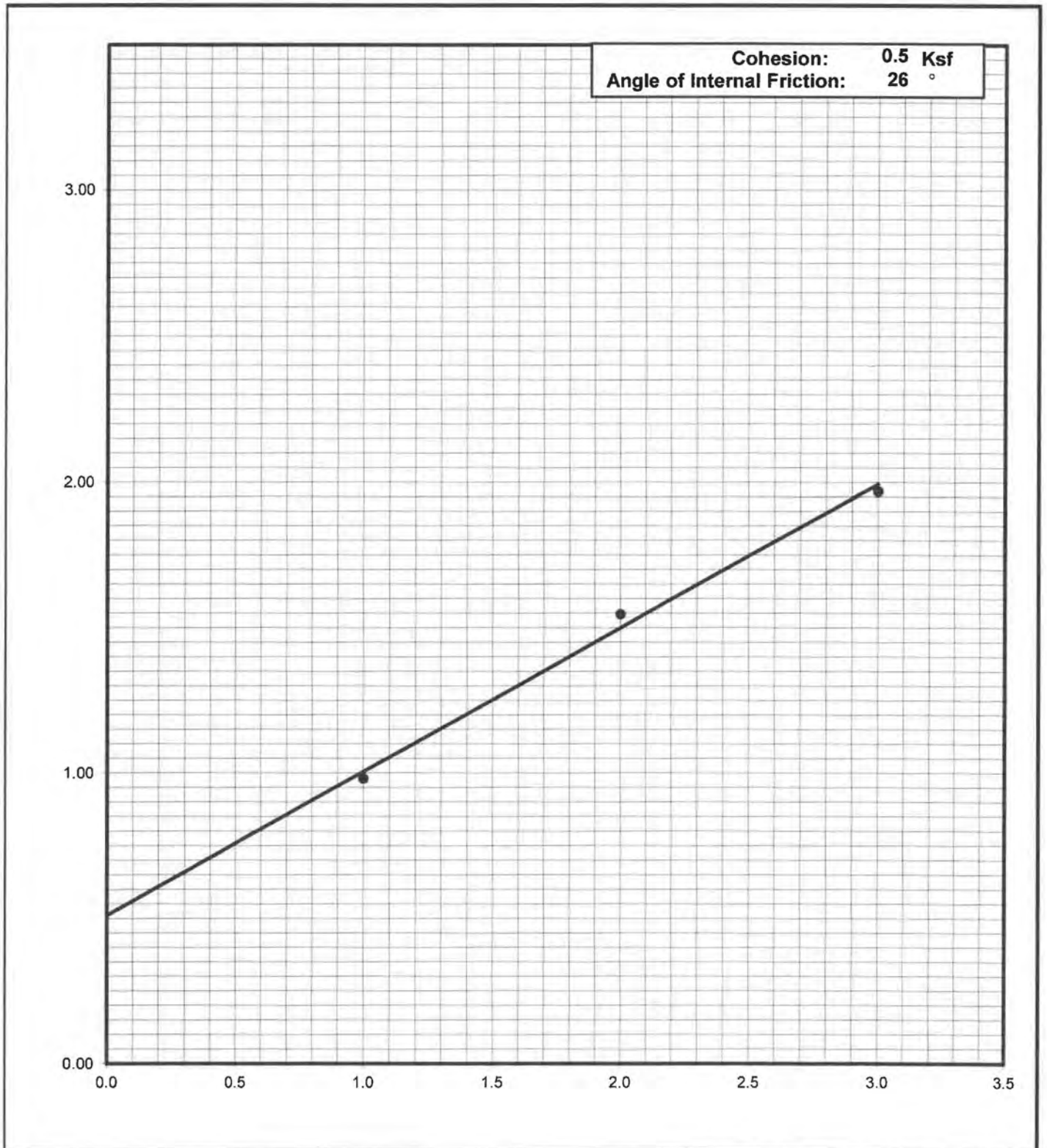
Optimum Moisture Content

14.7%

SDS#: _____

Shear Strength Diagram (Direct Shear)
ASTM D - 3080 / AASHTO T - 236

Project Number	Boring No. & Depth	Soil Type	Date
022-15055	TP11 @ 0-5'	SC-CL	10/21/2015



Krazan Testing Laboratory

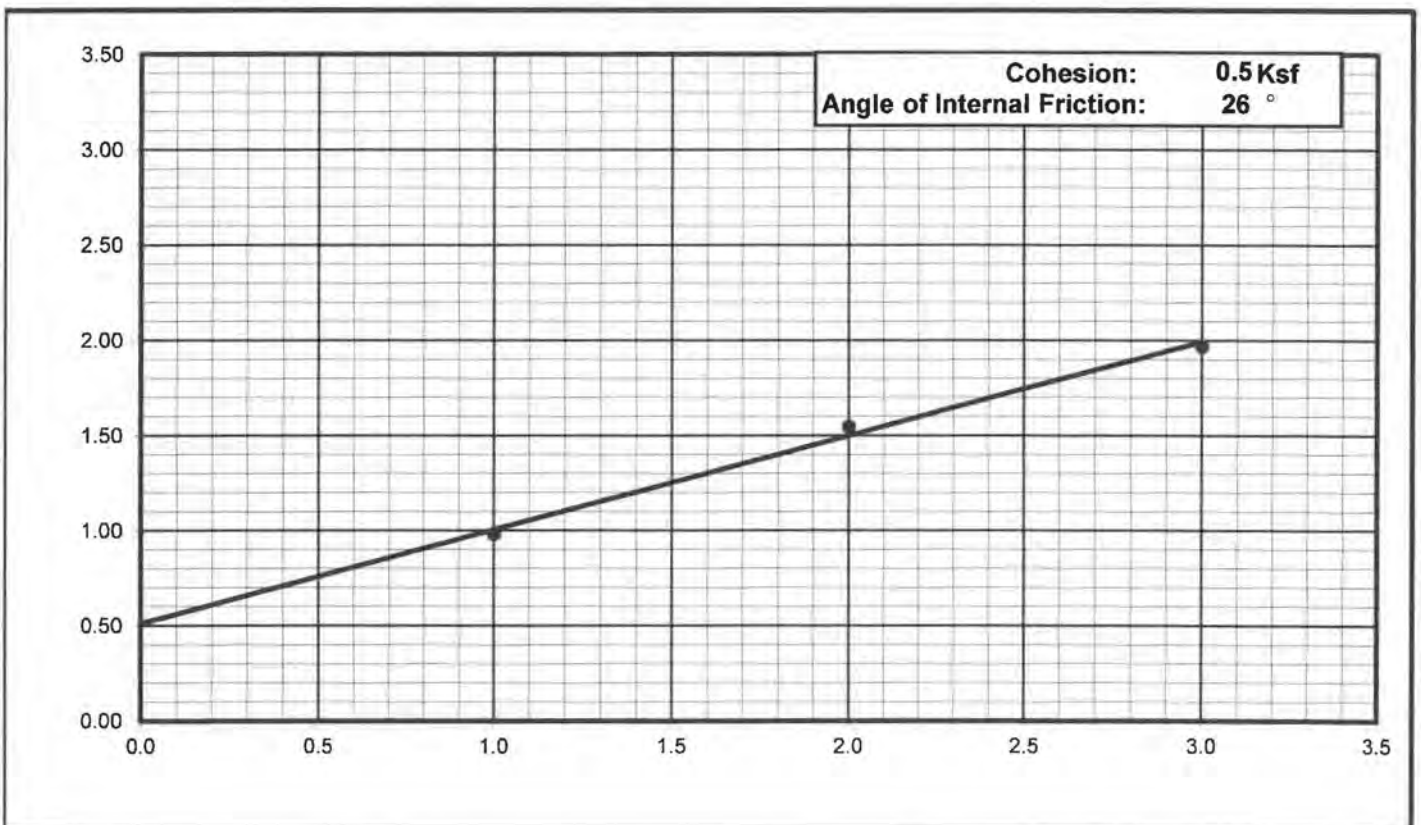
Direct Shear of Consolidated, Drained Soils **ASTM D - 3080 / AASHTO T - 236**

Project Number : 022-15055
 Project Name : Guzman
 Date : 10/21/2015
 Sample Location : TP11 @ 0-5'
 Soil Classification : SC-CL
 Sample Surface Area : 0.03168

STRESS DISPLACEMENT DATA

Lat. Disp. (in.)	Normal Load		
	1000	2000	3000
0	0	0	0
0.030	30	39	58
0.060	34	48	68
0.090	37	55	73
0.120	38	59	78
0.150	39	61	81
0.180	40	63	84
0.210	40	64	86
0.240	40	65	86
0.270	40	66	88
0.300	40	66	89
0.330	40	66	90
0.360	40	66	90

Normal Load psf	Shear force lbs	Shear Stress psf
1000	31.1	982
2000	49.0	1547
3000	62.4	1970



Soil Permeability

Flexible Wall, Falling Head (Rising Tail)

ASTM D - 5084 / CAL 220

Project Number : 022-15055
 Project Name : Guzman
 Date : 10/21/2015
 Sample Number : TP11
 Sample Location : 0-6'
 Soil Classification : SC-CL

Max Dry Density, lbs/cu.ft	111.8	Degree of Sat. %		Max. Particle Size	0.0
Optimum Moisture, %	14.7	%Over Optimum		% Passing 3/8"	--
Initial Dry Density, lbs/cu.ft	109.7	Initial Diameter, cm	3.55	% Passing # 10	--
Initial Moisture, %	15.0	Initial Length, cm	7.36	% Passing # 200	--
Sample Compaction, %	98.1	Initial Area sq.cm	9.90	Temperature	22.0
Final Dry Density, lbs/cu.ft	--	Final Diameter, cm	3.55	Type of Permeant	Tap Water
Final Moisture, %	--	Final Length, cm	7.36	$\Delta\mu$ (Pore Pressure)	10.0
Specific Gravity (Assumed)	2.7	Final Area, sq.cm	9.90	$\Delta\sigma$ (Cell Pressure)	10.0
Comp. Procedure	Undisturbed			$\Delta\mu/\Delta\sigma$ (B Value)	1.00

Test	Start Time	Finish Time	H in Start	H in Final	H out Start	H out Final	Back Press	Tail Press.	Cell Press
1	4:36	5:01	1.7	3.1	27.9	26.4	34.4	32.9	35.4
2	5:02	5:36	3.1	5.0	26.4	24.5	34.4	32.9	35.4
3	5:40	6:24	5.0	7.4	24.4	22.0	34.4	32.9	35.4
4									
5									
6									

Test	Time sec	h1/h2 Ratio	K cm/sec	k20 cm/sec
1	1500	0.97732	5.1E-06	4.9E-06
2	2040	0.96954	5.1E-06	4.86E-06
3	2640	0.96028	5.2E-06	4.92E-06
4				
5				
6				

Permeability
4.90E-06 cm/sec
4.9E-08 m/sec

Sieve Analysis

ASTM C136

Project Number : 022-15055
Project Name : Guzman
Date : 10/31/2016
Sample Location : TP21 @ 3-3.5'
Soil Classification : SC

Wet Weight	:	400.00
Dry Weight	:	383.90
Moisture Content	:	4%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	2.2	0.6	0.6	99.4
#8	2.36	16.4	4.3	4.8	95.2
#16	1.18	34.8	9.1	13.9	86.1
#30	0.60	39.6	10.3	24.2	75.8
#50	0.30	44.2	11.5	35.7	64.3
#100	0.15	43.6	11.4	47.1	52.9
#200	0.08	31.4	8.2	55.3	44.7

Hydrometer Analysis

ASTM D422

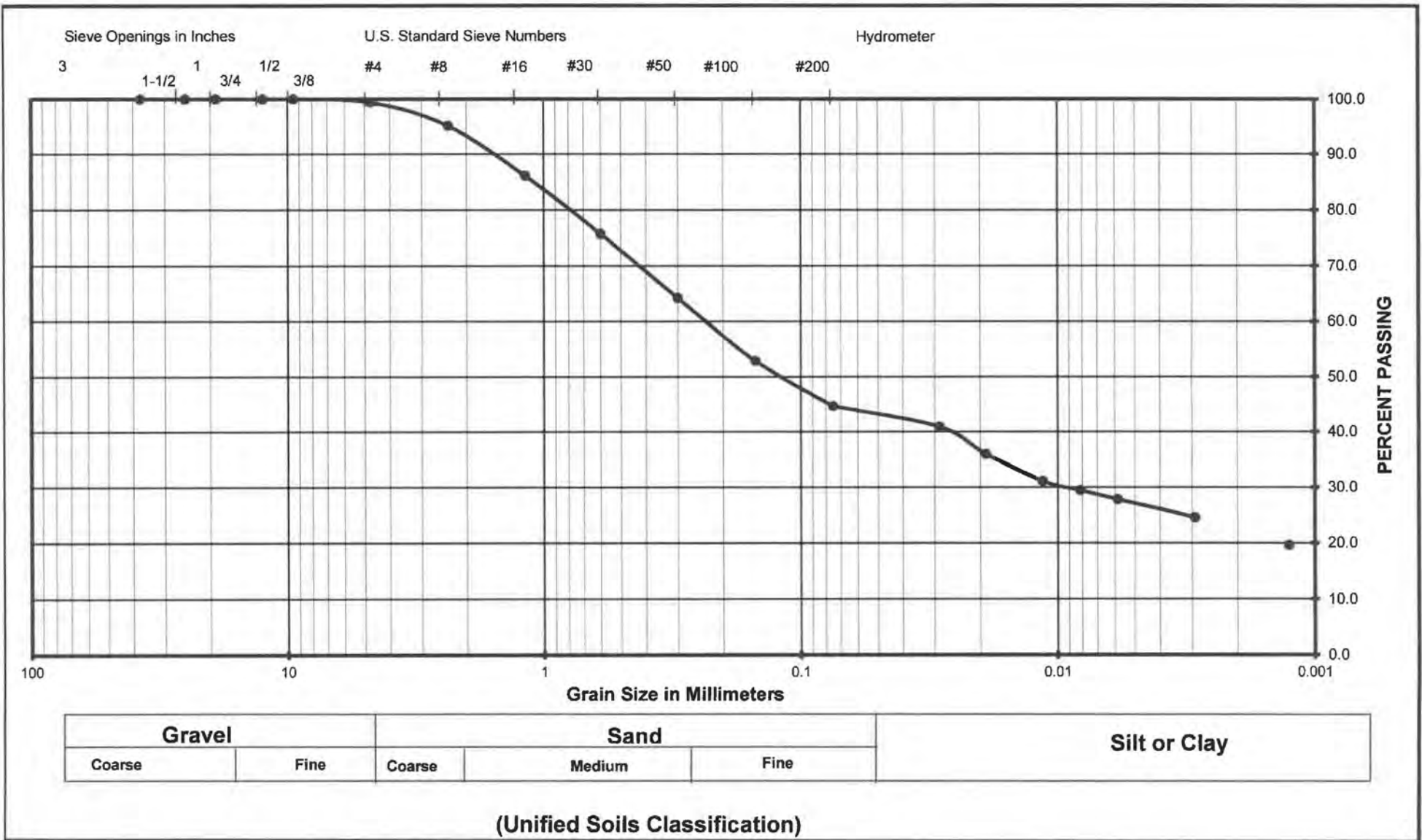
Project Number : 022-15055
Project Name : Guzman
Date : 10/31/2016
Sample Location : TP21 @ 3-3.5'
Soil Classification : SC

Dry Weight Used	98.3 g
Temperature	20.0 C
Soil Specific Gravity	2.65
Solution Spec. Grav.	1.003
K Value	0.01365
Correction Factor	0.00000

Elapsed Time (min)	Hydro. Reading	Hydro. Corrected	% Passing	Particle Diameter
2	1.028	1.028	40.9	0.0288
5	1.025	1.025	36.0	0.0190
15	1.022	1.022	31.1	0.0114
30	1.021	1.021	29.5	0.0082
60	1.02	1.02	27.8	0.0058
250	1.018	1.018	24.6	0.0029
1440	1.015	1.015	19.6	0.0013

Particle Diameter	Percent Passing
0.005	26.9
0.002	21.8
0	NA

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
SC
TP21 @ 3-3.5'

ASTM C136 /
D422

Krazan Testing Laboratory

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

Project: **Guzman Reservoirs**
 Project Number: **022-15055**
 Date Sampled: 5/31/2016
 Sampled By: DA
 Sample Number:
 Sample Location: TP21 @ 3-3.5'
 Sample Description: SC

Date Tested: 10/31/2016
 Tested By: J Dyer
 Verified By: J Gruszczynski

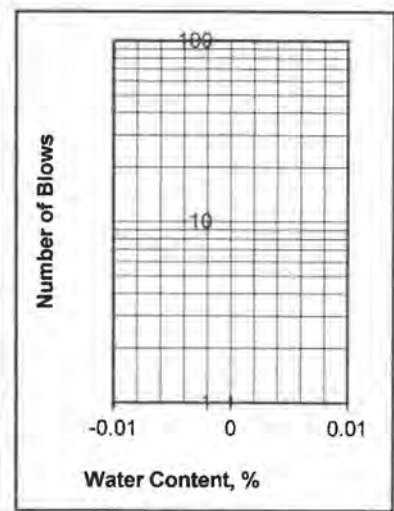
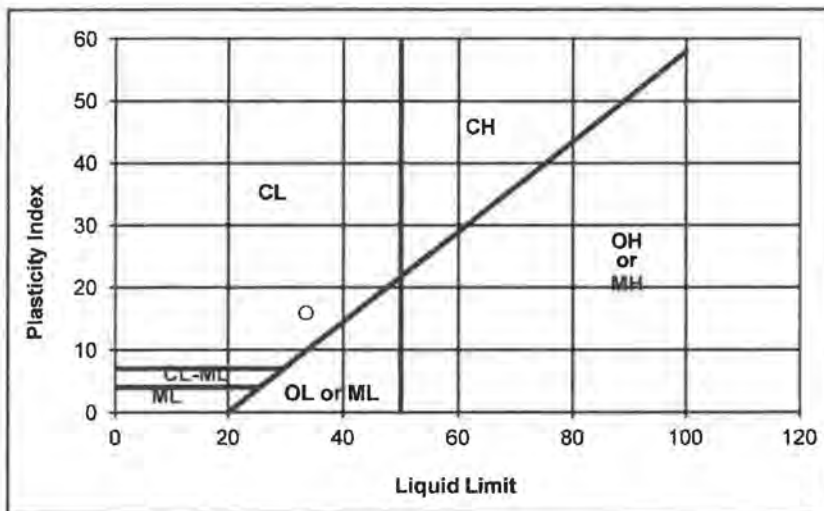
Trial Number	Plastic Limit			Liquid Limit		
	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)	18.22	17.59		26.88		
Weight of Dry Soil & Tare (g)	17.65	17.09		23.62		
Weight of Tare (g)	14.58	14.07		13.93		
Weight of water (g)	0.58	0.50		3.26		
Weight of Dry Soil (g)	3.07	3.02		9.69		
Water Content (% of dry wt.)	18.8%	16.4%		33.6%		
Number of Blows				25		

Plastic Limit : 18

Liquid Limit : 34

Plasticity Index : 16
Unified Soil Classification : CL

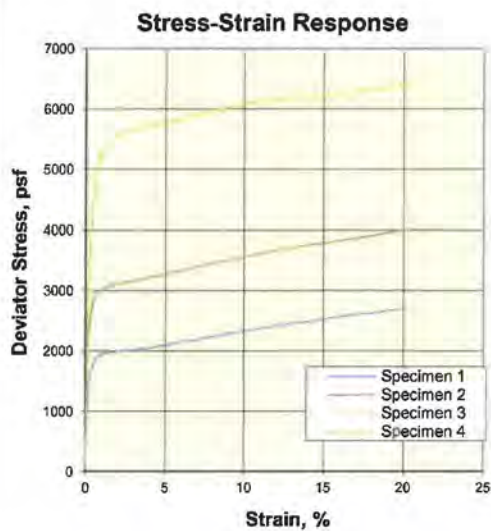
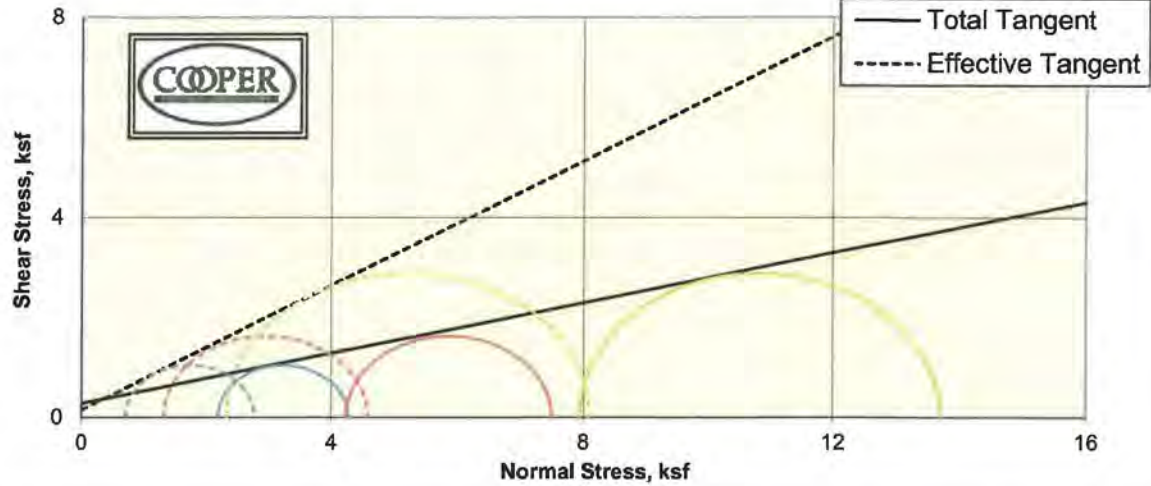
Requirement:
Approx. % of Material Retained on # 40 Sieve:



Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

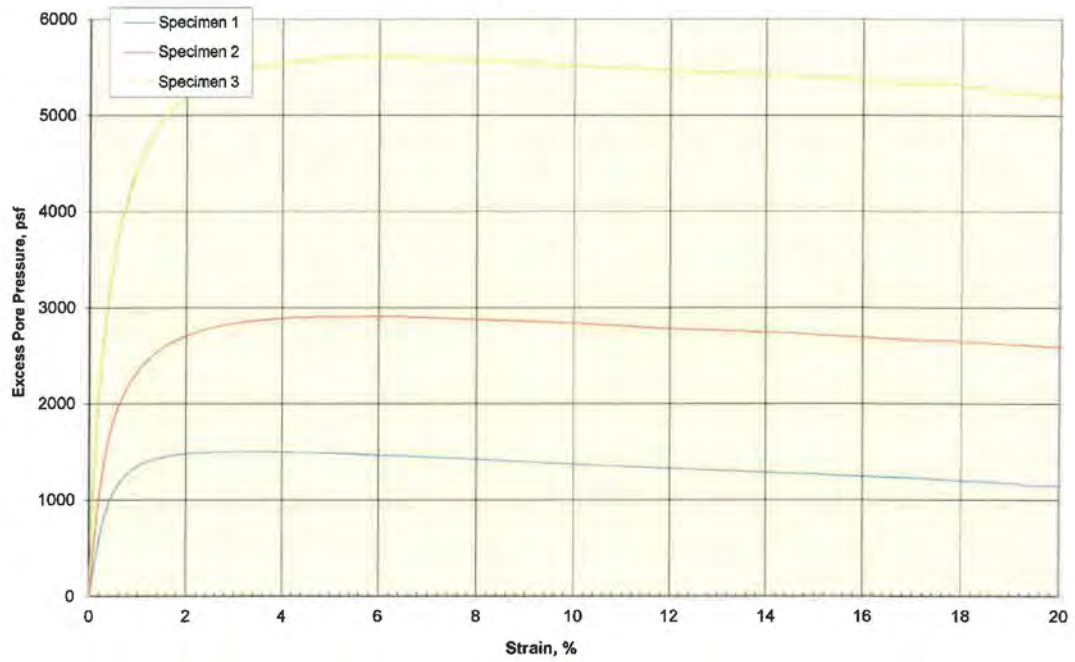
**Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767**



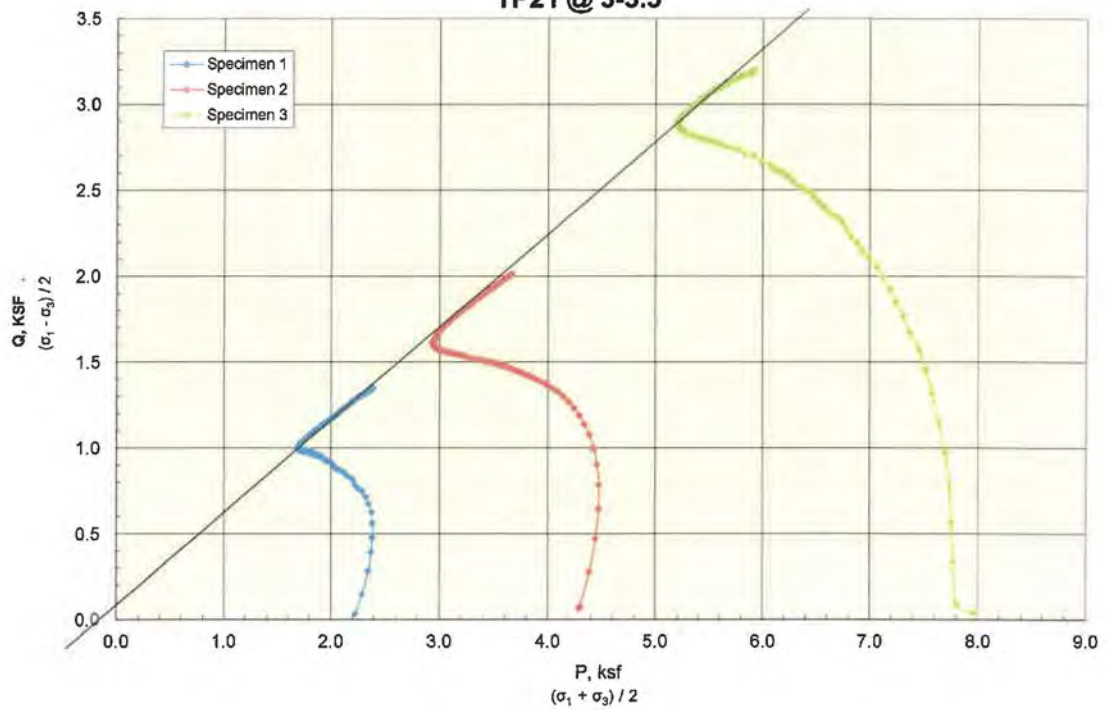
CTL Number:	504-005		
Client Name:	Krazan & Associates		
Project Name:	Guzman Reservoir		
Project Number:	022-15055		
Date:	2/9/2017	By:	MD/DC
Total C	0.280	ksf	
Total phi	14.1	degrees	
Eff. C	0.150	ksf	
Eff. Phi	31.9	degrees	©

Specimen	1	2	3	4
Boring	TP21	TP21	TP-21	
Sample	1	2	3	
Depth	3-3.5	3-3.5	3-3.5	
Visual Description	Dark Brown Clayey SAND	Dark Brown Clayey SAND	Dark Brown Clayey SAND	
MC (%)	11.1	11.3	11.4	
Dry Density (pcf)	113.7	111.7	114.6	
Saturation (%)	60.0	57.9	63.1	
Void Ratio	0.510	0.538	0.498	
Diameter (in)	2.88	2.88	2.88	
Height (in)	5.76	5.79	5.78	
	Final			
MC (%)	17.5	16.6	15.6	
Dry Density (pcf)	115.9	117.9	120.1	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	0.481	0.457	0.429	
Diameter (in)	2.86	2.85	2.85	
Height (in)	5.73	5.60	5.63	
Cell Pressure (psf)	104.8	119.7	145.7	
Back Pressure (psf)	89.5	90.3	90.6	
	Effective Stresses At:			
Strain (%)	5.0	5.0	5.0	
Deviator (ksf)	2.089	3.261	5.775	
Excess PP (psi)	10.4	20.2	38.9	
Sigma 1 (ksf)	2.792	4.583	8.101	
Sigma 3 (ksf)	0.703	1.321	2.326	
P (ksf)	1.747	2.952	5.214	
Q (ksf)	1.045	1.631	2.888	
Stress Ratio	3.973	3.468	3.483	
Rate (in/min)	0.0005	0.0005	0.0005	

Pore Pressure Response TP21 @ 3-3.5'



P vs. Q TP21 @ 3-3.5'



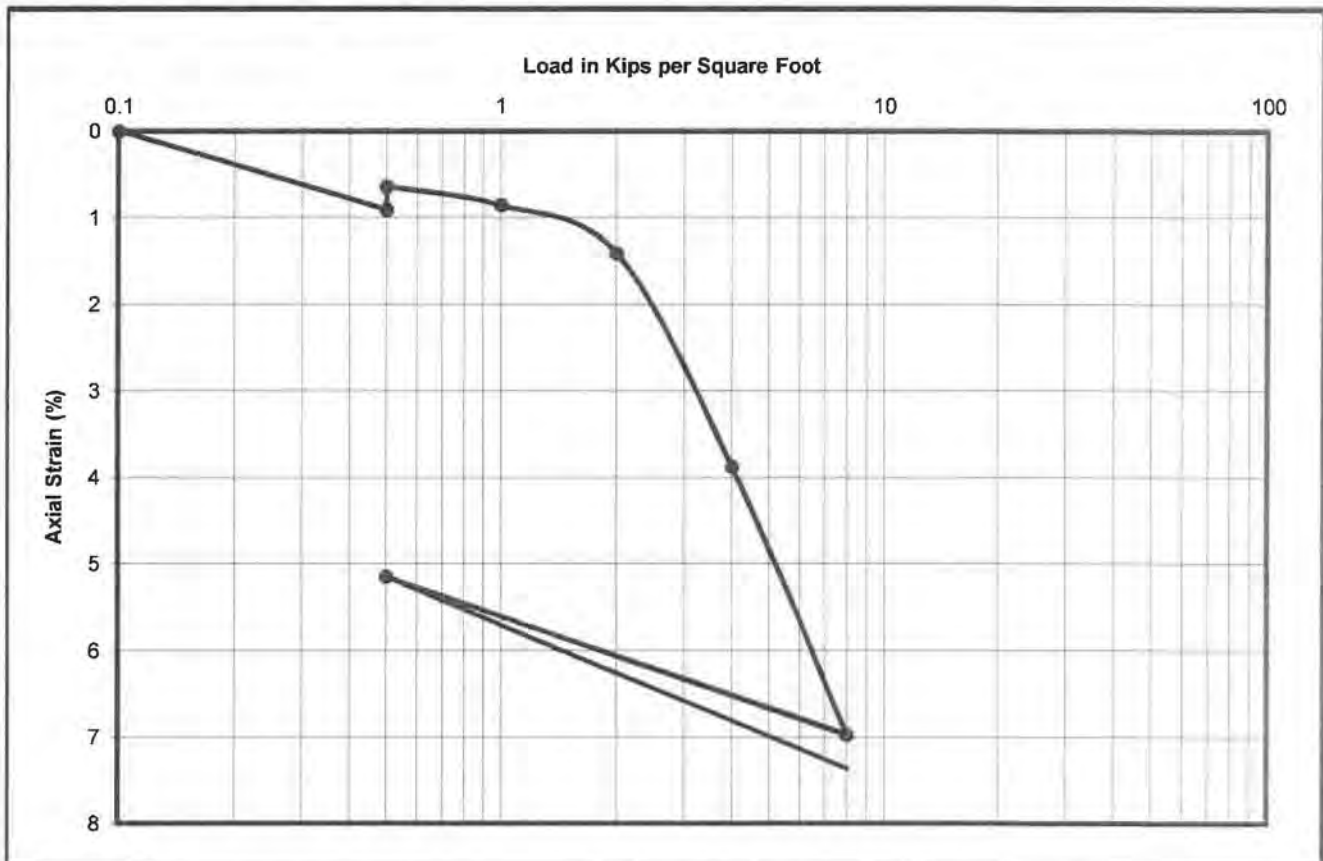
One Dimensional Consolidation Properties of Soil

ASTM D - 2435 / AASHTO T - 216

Project Number : 022-15055
 Project Name : Guzman
 Date : 2/27/2017
 Sample Location : TP21 @ 3-3.5'
 Soil Classification : SC
 Sample Condition : Remolded to 95%

Load (ksf)	Axial Strain (%)	Void Ratio, e
0.1	0.00	0.482
0.5	0.43	0.476
Satur.	0.30	0.478
1	0.40	0.476
2	0.66	0.473
4	1.82	0.455
8	3.28	0.434
0.5	2.42	0.446
8	3.46	0.431

	Initial	Final
Water Content (%)	10.9	15.8
Dry Unit Weight (pcf)	117.9	122.8
Void Ratio	0.482	3.460
Saturation (%)	63.3	100.0
Preconsolidation Pressure (psf)	2100	
Specific Gravity (assumed)	2.8	



ASTM D4647-06

Date:	11/17/2016
Project Name	Guzman Reservoir
Project Number	022-15055
Sample Location	TP21 @ 3-3.5'
Water Content	10.90%
Compaction Characteristics	D1557
Curing Time	24 Hrs +

[illegible]

Final Hole Diameter	1.0 mm
---------------------	--------

Technician **J Jensen**

Soil Permeability

Flexible Wall, Falling Head (Rising Tail)

ASTM D - 5084 / CAL 220

Project Number : 022-15055
 Project Name : Guzman
 Date : 11/14/2016
 Sample Number : --
 Sample Location : TP21 @ 3-3.5'
 Soil Classification : SC

Max Dry Density, lbs/cu.ft	124.1	Degree of Sat. %		Max. Particle Size	0.0
Optimum Moisture, %	10.9	%Over Optimum		% Passing 3/8"	--
Initial Dry Density, lbs/cu.ft	117.9	Initial Diameter, cm	3.56	% Passing # 10	--
Initial Moisture, %	10.9	Initial Length, cm	7.11	% Passing # 200	--
Sample Compaction, %	--	Initial Area sq.cm	9.95	Temperature	20.0
Final Dry Density, lbs/cu.ft	--	Final Diameter, cm	3.56	Type of Permeant	Tap Water
Final Moisture, %	--	Final Length, cm	7.11	$\Delta\mu$ (Pore Pressure)	5.0
Specific Gravity (Assumed)	2.7	Final Area, sq.cm	9.95	$\Delta\sigma$ (Cell Pressure)	5.0
Comp. Procedure	Undisturbed			$\Delta\mu/\Delta\sigma$ (B Value)	1.00

Test	Start Time	Finish Time	H in Start	H in Final	H out Start	H out Final	Back Press	Tail Press.	Cell Press
1	10:01	10:18	0.64	0.94	9.06	8.78	29.0	21.0	30.0
2	10:20	10:37	0.94	1.22	8.78	8.50	29.0	21.0	30.0
3	10:38	10:51	1.22	1.42	8.50	8.28	29.0	21.0	30.0
4									
5									
6									

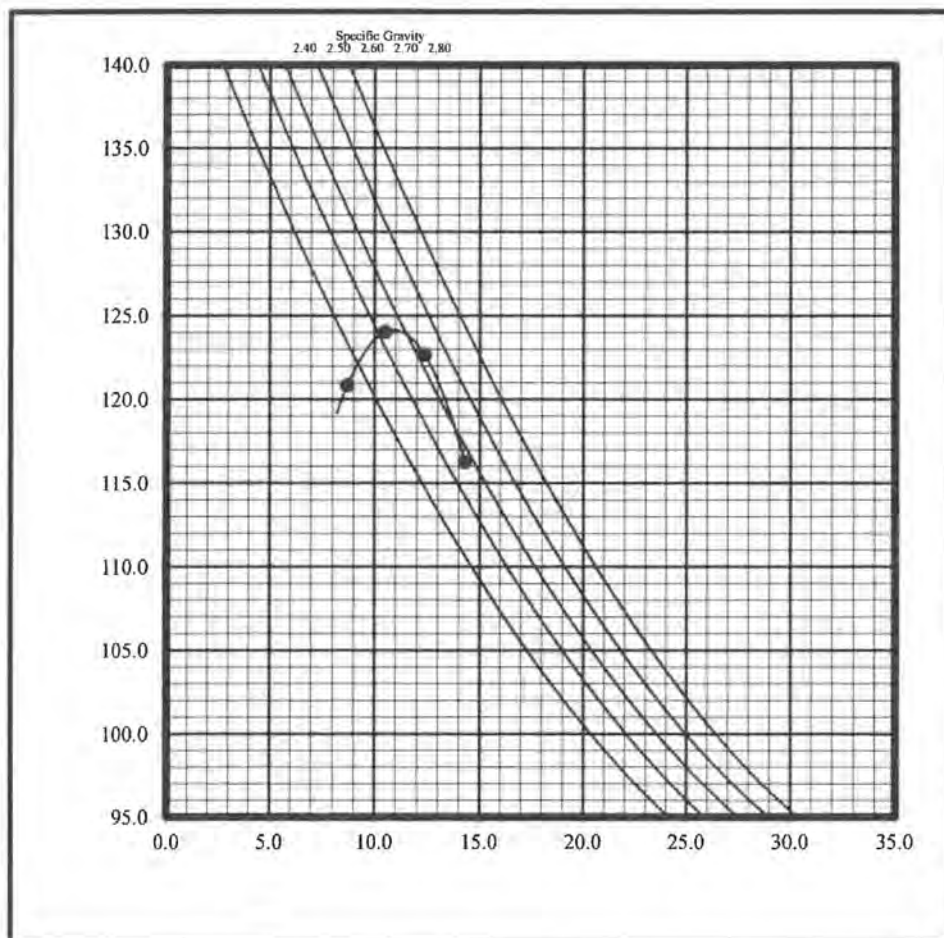
Test	Time sec	h1/h2	K cm/sec	k20 cm/sec
1	1020	0.99367	5.8E-07	5.848E-07
2	1020	0.99373	5.8E-07	5.798E-07
3	780	0.99513	5.9E-07	5.878E-07
4				
5				
6				

Permeability
5.84E-07 cm/sec
5.84E-09 m/sec

Laboratory Compaction Characteristics of Soil using Modified Effort (56,000 ft. - lbf/ft³) ASTM D1557

Project Number	022-15055	Sample Number	-
Project Name	Guzman Reservoir	Soil Classification	SC
Technician	DJ 12075	Soil Description	Brn Clayey Sand
Date	11/1/2016	Method	D1557a
Sample Location	TP21 @ 3-3.5'		

	1	2	3	4
Mass of Moist Specimen & Mold, gm	4060.0	4072.0	3974.0	3997.0
Mass of Compaction Mold, gm	1990.0	1990.0	1990.0	1990.0
Mass of Moist Specimen, gm	2070.0	2082.0	1984.0	2007.0
Volume of Mold, cu./ft.	0.0333	0.0333	0.0333	0.0333
Wet Density, lbs./cu.ft.	137.0	137.8	131.3	132.9
Mass of Moisture (Wet), gm	200.0	200.0	200.0	200.0
Mass of Moisture (Dry), gm	181.0	178.0	184.0	175.0
Moisture Content (%)	10.5	12.4	8.7	14.3
Dry Density, lbs/cu.ft.	124.0	122.7	120.8	116.3



**Maximum Dry Density,
lbs.cu.ft.**

124.1

Optimum Moisture Content

10.9%

SDS#: -

Sieve Analysis

ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 6/27/2016
Sample Location : TP21 @ 4-4.5'
Soil Classification : SC

Wet Weight	:	400.00
Dry Weight	:	382.00
Moisture Content	:	5%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	2.3	0.6	0.6	99.4
#8	2.36	21.0	5.5	6.1	93.9
#16	1.18	38.4	10.1	16.2	83.8
#30	0.60	40.7	10.7	26.8	73.2
#50	0.30	44.3	11.6	38.4	61.6
#100	0.15	43.0	11.3	49.7	50.3
#200	0.08	30.1	7.9	57.5	42.5

Grain Size Analysis



Project Name: Guzman
 Project Number: 022-15055
 Soil Classification: SC
 Sample Number: TP21 @ 4-4.5'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

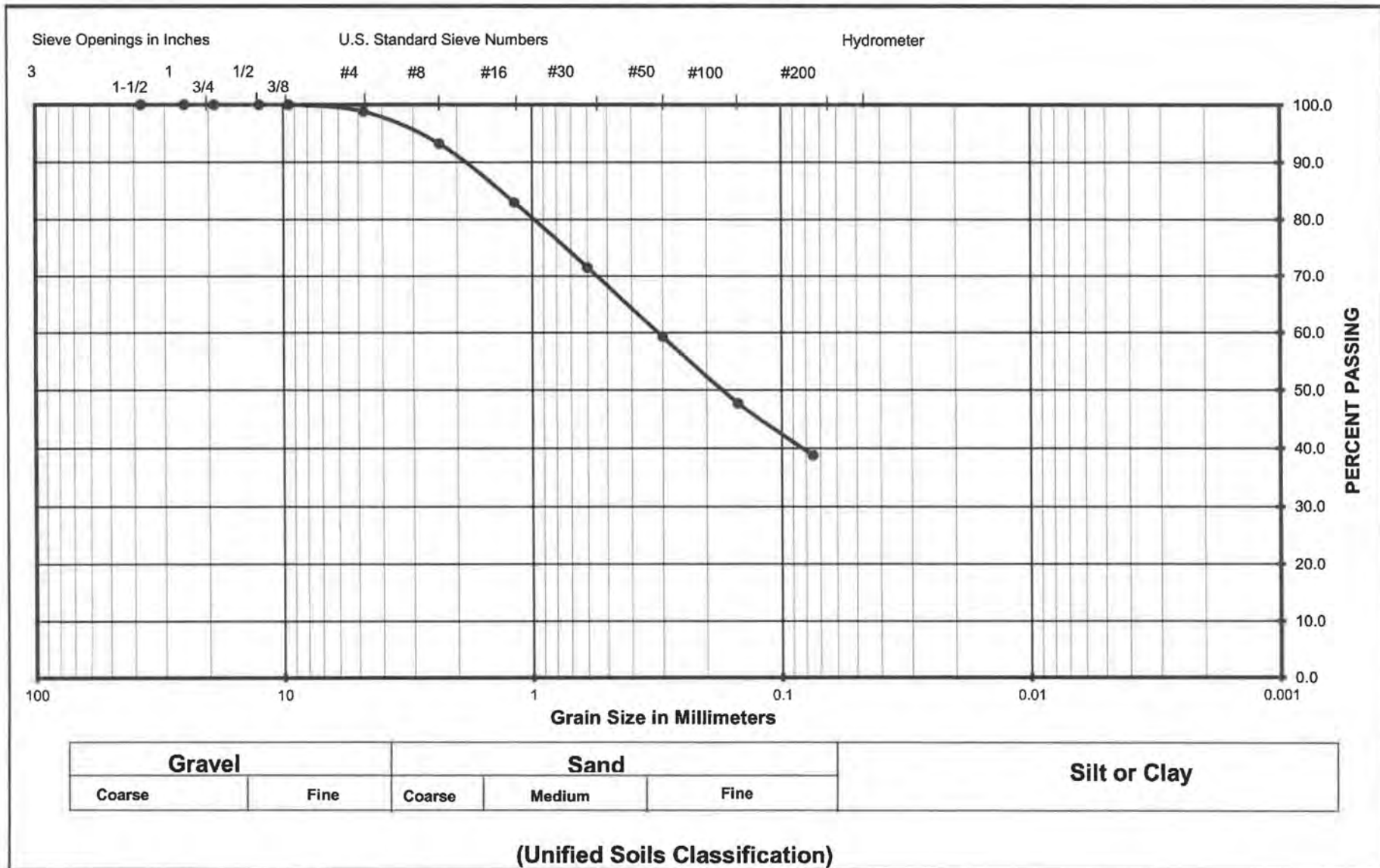
ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 9/14/2017
Sample Location : TP21A @ 2-4'
Soil Classification : SC

Wet Weight	:	300.00
Dry Weight	:	290.40
Moisture Content	:	3%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	3.5	1.2	1.2	98.8
#8	2.36	16.1	5.5	6.7	93.3
#16	1.18	29.7	10.2	17.0	83.0
#30	0.60	33.4	11.5	28.5	71.5
#50	0.30	35.5	12.2	40.7	59.3
#100	0.15	33.4	11.5	52.2	47.8
#200	0.08	26.1	9.0	61.2	38.8

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
SC
TP21A @ 2-4'

ASTM C136

Krazan Testing Laboratory

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

Project: **Guzman Reservoirs**
 Project Number: **022-15055**
 Date Sampled: 8/28/2017
 Sampled By: DA
 Sample Number:
 Sample Location: TP21a @ 2-4'
 Sample Description: SC

Date Tested: 9/13/2017
 Tested By: J Mitchell
 Verified By: J Gruszczynski

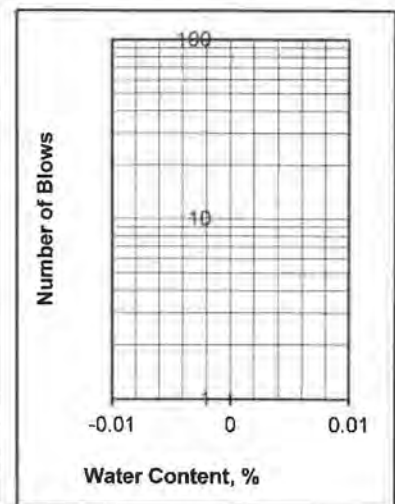
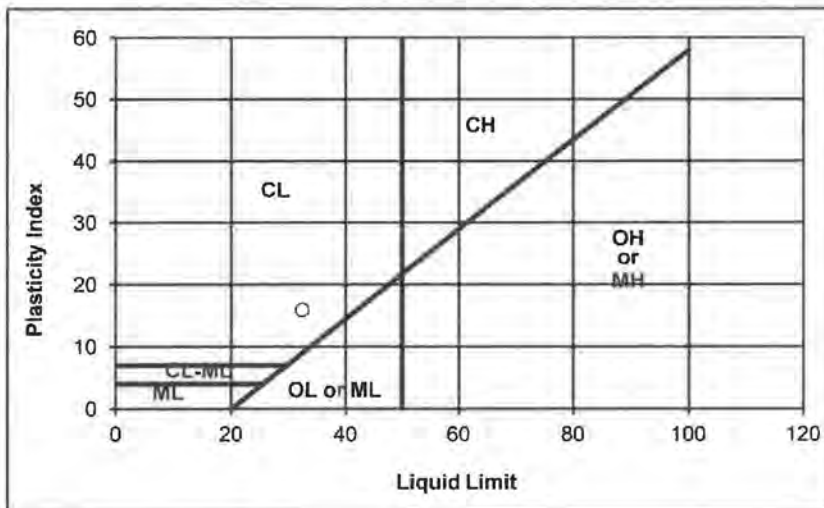
Trial Number	Plastic Limit			Liquid Limit		
	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)	19.92	23.31		28.94		
Weight of Dry Soil & Tare (g)	19.13	22.12		25.29		
Weight of Tare (g)	14.05	14.40		14.03		
Weight of water (g)	0.79	1.19		3.65		
Weight of Dry Soil (g)	5.08	7.72		11.26		
Water Content (% of dry wt.)	15.6%	15.4%		32.4%		
Number of Blows				25		

Plastic Limit : 16

Liquid Limit : 32

Plasticity Index : 16
Unified Soil Classification : CL

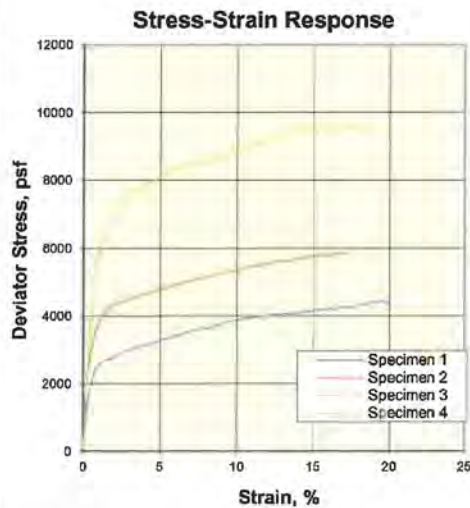
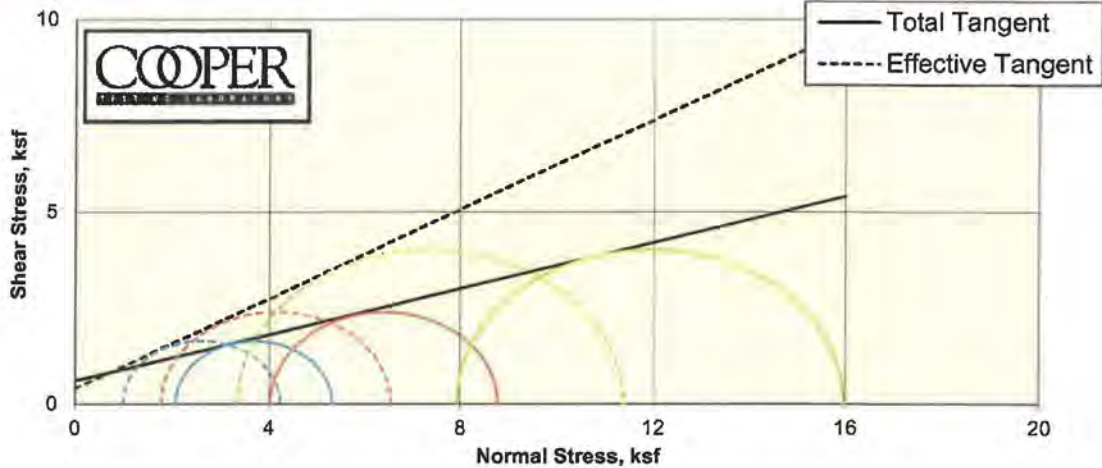
Requirement:
Approx. % of Material Retained on # 40 Sieve:



Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

**Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767**



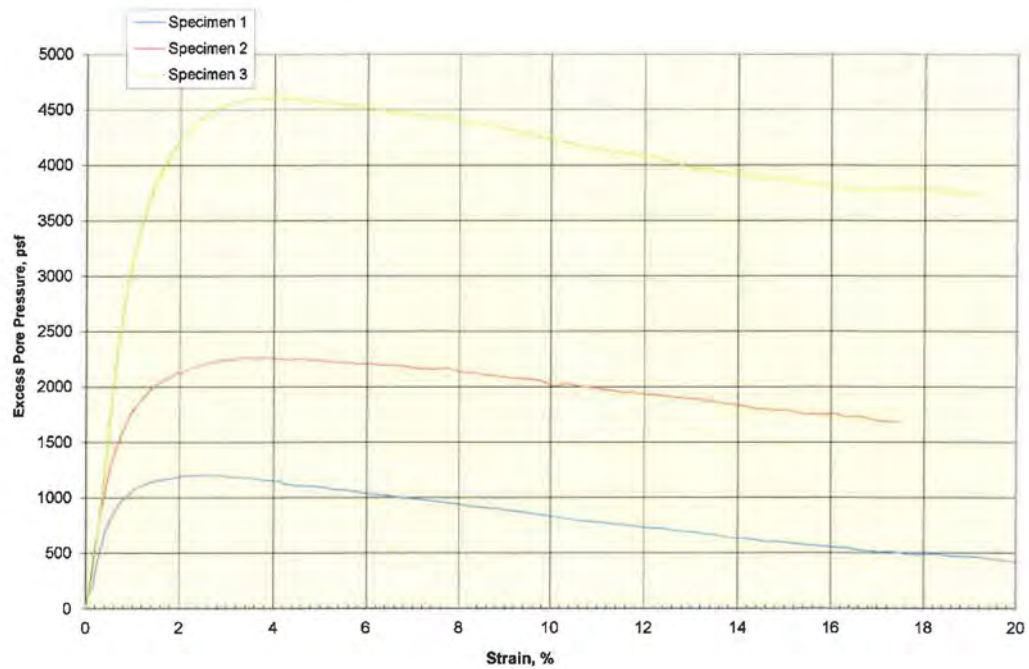
CTL Number:	504-006		
Client Name:	Krazan Associates		
Project Name:	Guzman Reservoir		
Project Number:	022-15055		
Date:	10/24/2017	By:	MD/DC
Total C	0.600	ksf	
Total phi	16.7	degrees	
Eff. C	0.400	ksf	
Eff. Phi	30.2	degrees	©

Remarks: Remolded to 95% of 123.9 pcf @ 12.1%(OPT+/-2%)

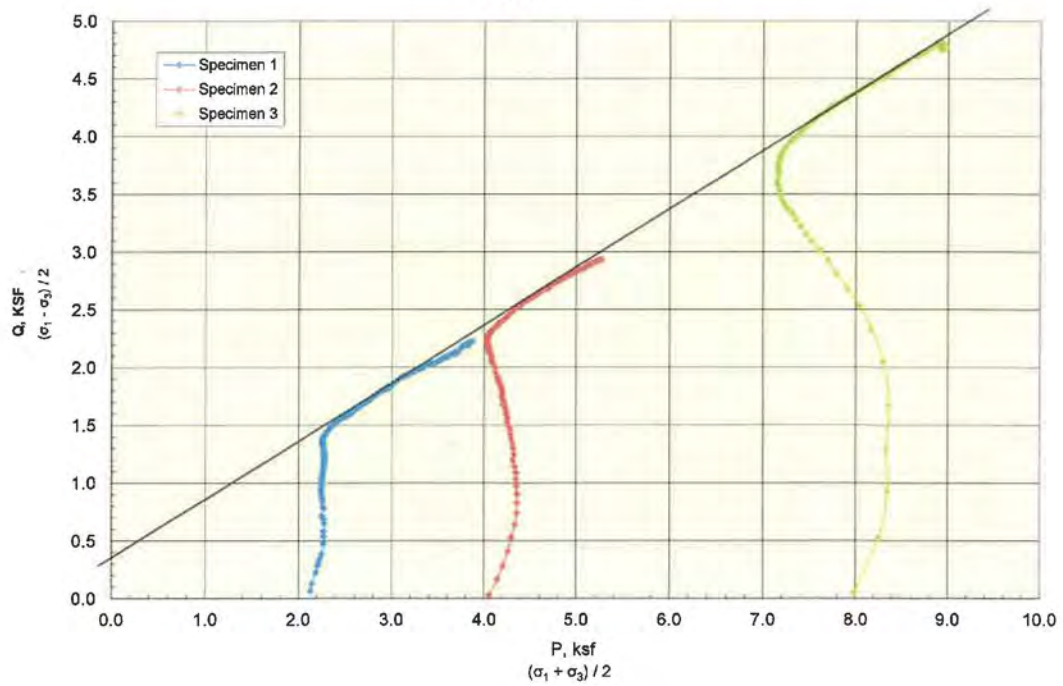
Specimen	1	2	3	4
Boring	TP-21a	TP-21a	TP-21a	
Sample				
Depth	2-4	2-4	2-4	
Visual Description	Brown Clayey SAND	Brown Clayey SAND	Brown Clayey SAND	
MC (%)	12.0	12.2	11.9	
Dry Density (pcf)	117.7	117.3	117.7	
Saturation (%)	69.0	69.7	68.6	
Void Ratio	0.486	0.490	0.486	
Diameter (in)	2.38	2.38	2.38	
Height (in)	5.00	5.00	5.00	
	Final			
MC (%)	16.3	16.2	15.5	
Dry Density (pcf)	120.0	120.2	121.9	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	0.456	0.454	0.434	
Diameter (in)	2.35	2.35	2.35	
Height (in)	4.99	4.98	4.94	
Cell Pressure (psi)	84.9	98.6	124.9	
Back Pressure (psi)	70.5	70.6	69.8	
	Effective Stresses At:			
Strain (%)	5.0	5.0	5.0	
Deviator (ksf)	3.267	4.779	8.033	
Excess PP (psi)	7.6	15.6	31.8	
Sigma 1 (ksf)	4.239	6.556	11.392	
Sigma 3 (ksf)	0.972	1.777	3.358	
P (ksf)	2.606	4.166	7.375	
Q (ksf)	1.633	2.390	4.017	
Stress Ratio	4.360	3.690	3.392	
Rate (in/min)	0.0004	0.0004	0.0004	

TP-21a, 2-4 ft

Pore Pressure Response



P vs. Q





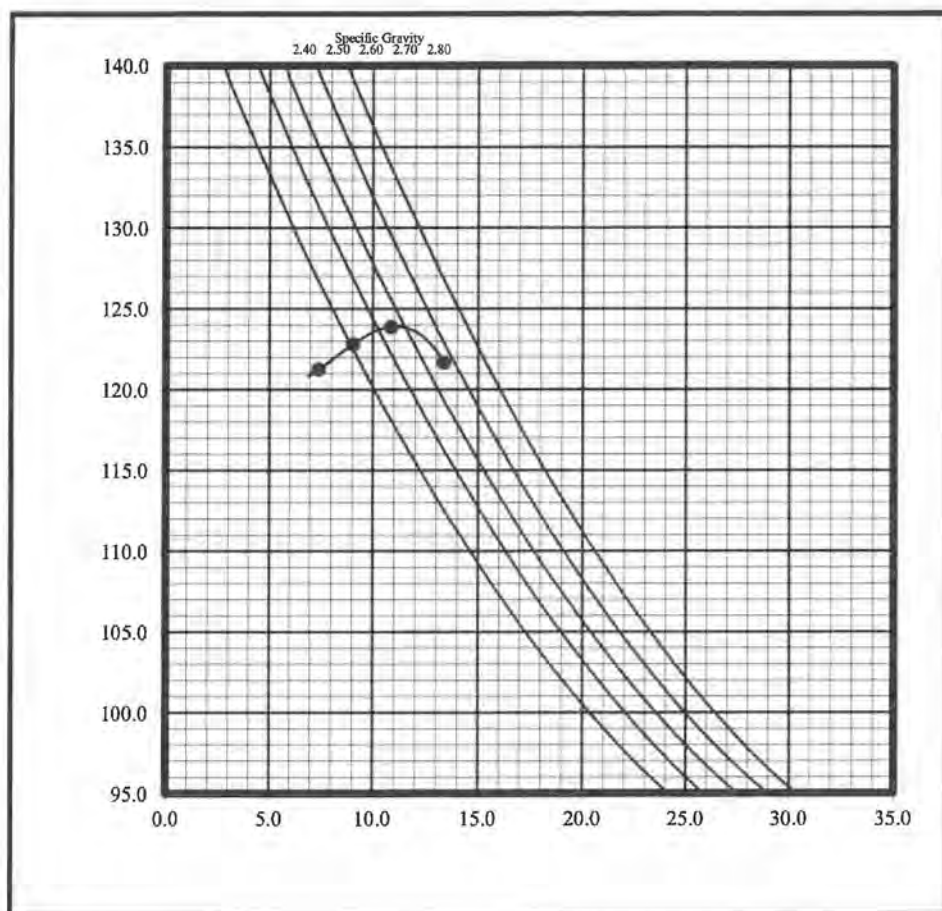
& ASSOCIATES, INC.

GEOTECHNICAL ENGINEERING ENVIRONMENTAL ENGINEERING CONSTRUCTION TESTING & INSPECTION

**Laboratory Compaction Characteristics
of Soil using Modified Effort (56,000 ft. - lbf/ft³)
ASTM D1557**

Project Number	022-15055	Sample Number	-
Project Name	Guzman	Soil Classification	SC
Technician	JJ	Soil Description	Brn Clayey Sand
Date	9/11/2017	Method	D1557b
Sample Location	TP21A @ 2-4'		

	1	2	3	4
Mass of Moist Specimen & Mold, gm	4007.2	4058.6	4067.8	3951.2
Mass of Compaction Mold, gm	1984.0	1984.0	1984.0	1984.0
Mass of Moist Specimen, gm	2023.2	2074.6	2083.8	1967.2
Volume of Mold, cu./ft.	0.0333	0.0333	0.0333	0.0333
Wet Density, lbs./cu.ft.	133.9	137.3	138.0	130.2
Mass of Moisture (Wet), gm	200.0	200.0	200.0	200.0
Mass of Moisture (Dry), gm	183.4	180.4	176.4	186.2
Moisture Content (%)	9.1	10.9	13.4	7.4
Dry Density, lbs/cu.ft.	122.8	123.9	121.7	121.2



**Maximum Dry Density,
lbs.cu.ft.**

123.9

Optimum Moisture Content

11.1%

SDS#: -

Sieve Analysis

ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 9/6/2017
Sample Location : TP21A @ 2-3'
Soil Classification : SM w/ clay

Wet Weight	:	300.00
Dry Weight	:	283.20
Moisture Content	:	6%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	4.6	1.6	1.6	98.4
#8	2.36	15.8	5.6	7.2	92.8
#16	1.18	29.7	10.5	17.7	82.3
#30	0.60	33.2	11.7	29.4	70.6
#50	0.30	34.4	12.1	41.6	58.4
#100	0.15	32.1	11.3	52.9	47.1
#200	0.08	25.2	8.9	61.8	38.2

Grain Size Analysis



Project Name: Guzman
 Project Number: 022-15055
 Soil Classification: SM w/ clay
 Sample Number: TP21A @ 2-3'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

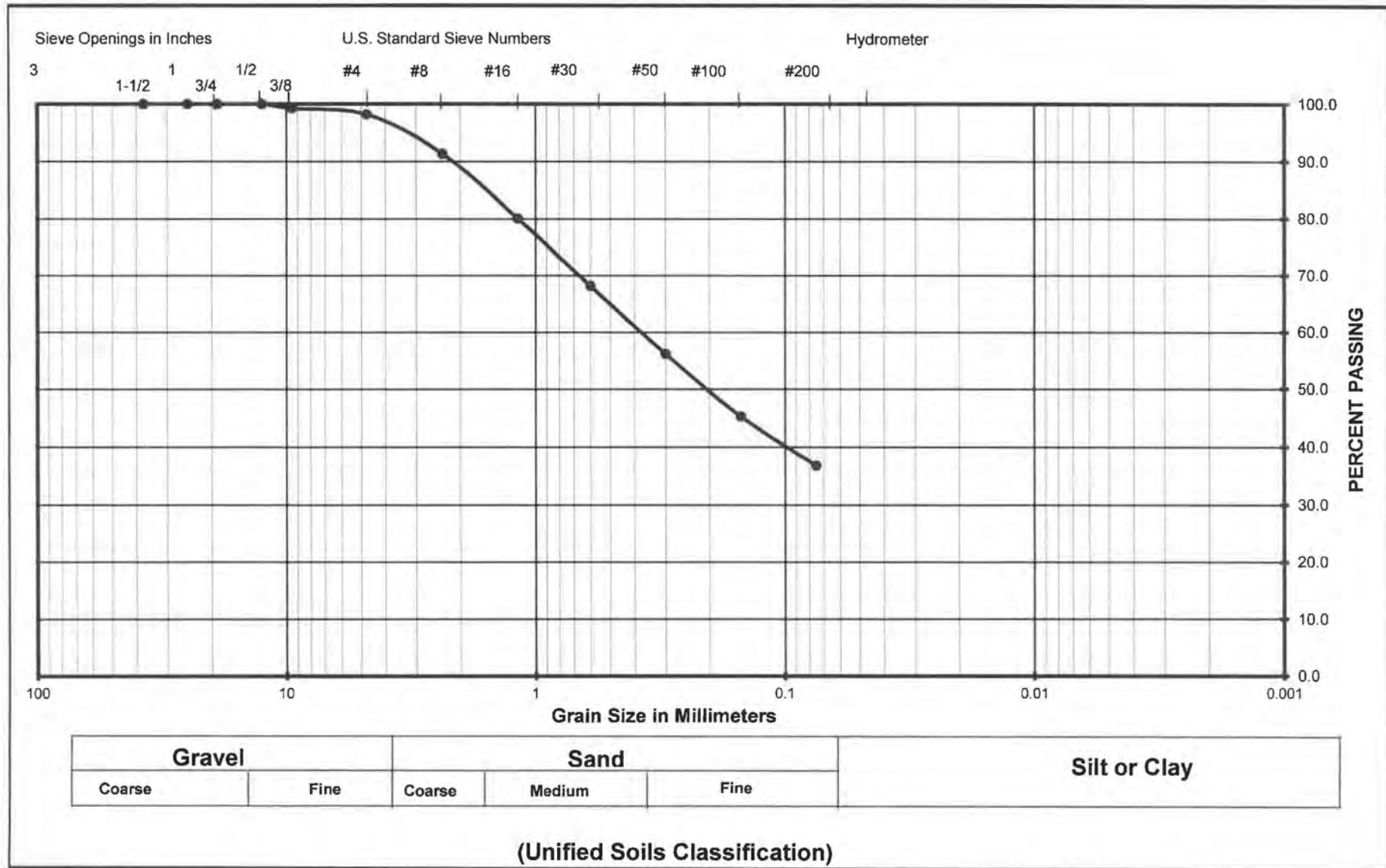
ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 9/6/2017
Sample Location : TP21A @ 3-4'
Soil Classification : SC

Wet Weight	:	300.00
Dry Weight	:	284.70
Moisture Content	:	5%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50	2.1	0.7	0.7	99.3
#4	4.75	3.1	1.1	1.8	98.2
#8	2.36	19.4	6.8	8.6	91.4
#16	1.18	32.1	11.3	19.9	80.1
#30	0.60	33.8	11.9	31.8	68.2
#50	0.30	34.2	12.0	43.8	56.2
#100	0.15	31.0	10.9	54.7	45.3
#200	0.08	24.2	8.5	63.2	36.8

Grain Size Analysis



Project Name: Guzman
 Project Number: 022-15055
 Soil Classification: SC
 Sample Number: TP21A @ 3-4'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 9/6/2017
Sample Location : TP21A @ 4-5'
Soil Classification : SM w/ clay

Wet Weight	:	300.00
Dry Weight	:	287.20
Moisture Content	:	4%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	4.0	1.4	1.4	98.6
#8	2.36	24.9	8.7	10.1	89.9
#16	1.18	38.3	13.3	23.4	76.6
#30	0.60	37.4	13.0	36.4	63.6
#50	0.30	36.4	12.7	49.1	50.9
#100	0.15	33.5	11.7	60.8	39.2
#200	0.08	24.7	8.6	69.4	30.6

Grain Size Analysis



Project Name: Guzman
 Project Number: 022-15055
 Soil Classification: SM w/ clay
 Sample Number: TP21A @ 4-5'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 9/6/2017
Sample Location : TP21A @ 5-6'
Soil Classification : SM

Wet Weight	:	300.00
Dry Weight	:	287.30
Moisture Content	:	4%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	5.1	1.8	1.8	98.2
#8	2.36	19.3	6.7	8.5	91.5
#16	1.18	35.7	12.4	20.9	79.1
#30	0.60	36.0	12.5	33.4	66.6
#50	0.30	41.0	14.3	47.7	52.3
#100	0.15	44.0	15.3	63.0	37.0
#200	0.08	33.2	11.6	74.6	25.4

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
SM
TP21A @ 5-6'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

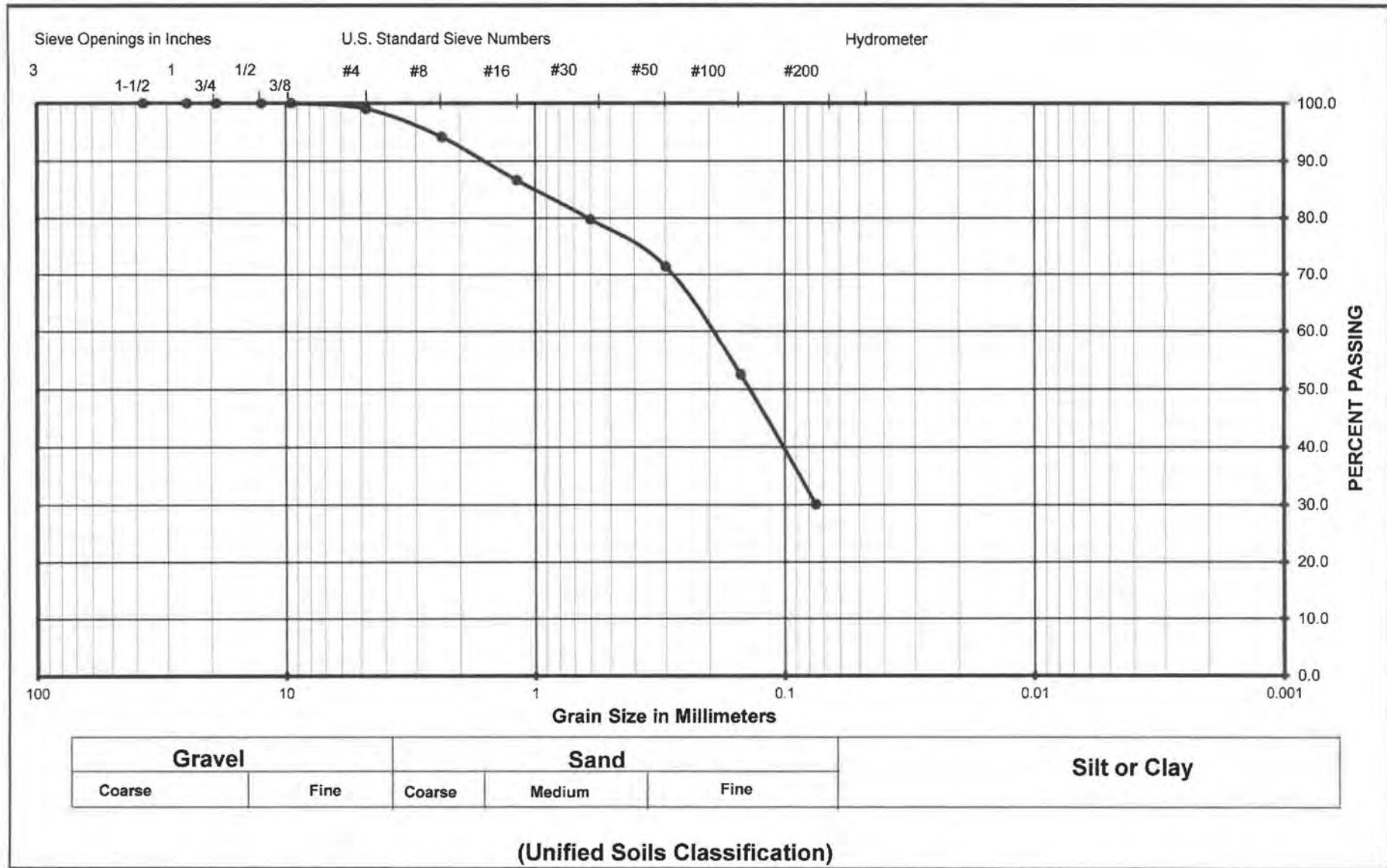
ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 9/6/2017
Sample Location : TP21A @ 6-7'
Soil Classification : SM

Wet Weight	:	300.00
Dry Weight	:	283.30
Moisture Content	:	6%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	2.8	1.0	1.0	99.0
#8	2.36	13.7	4.8	5.8	94.2
#16	1.18	21.4	7.6	13.4	86.6
#30	0.60	19.4	6.8	20.2	79.8
#50	0.30	23.6	8.3	28.6	71.4
#100	0.15	53.4	18.8	47.4	52.6
#200	0.08	63.7	22.5	69.9	30.1

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
SM
TP21A @ 6-7'

ASTM C136

Krazan Testing Laboratory

Plasticity Index of Soils

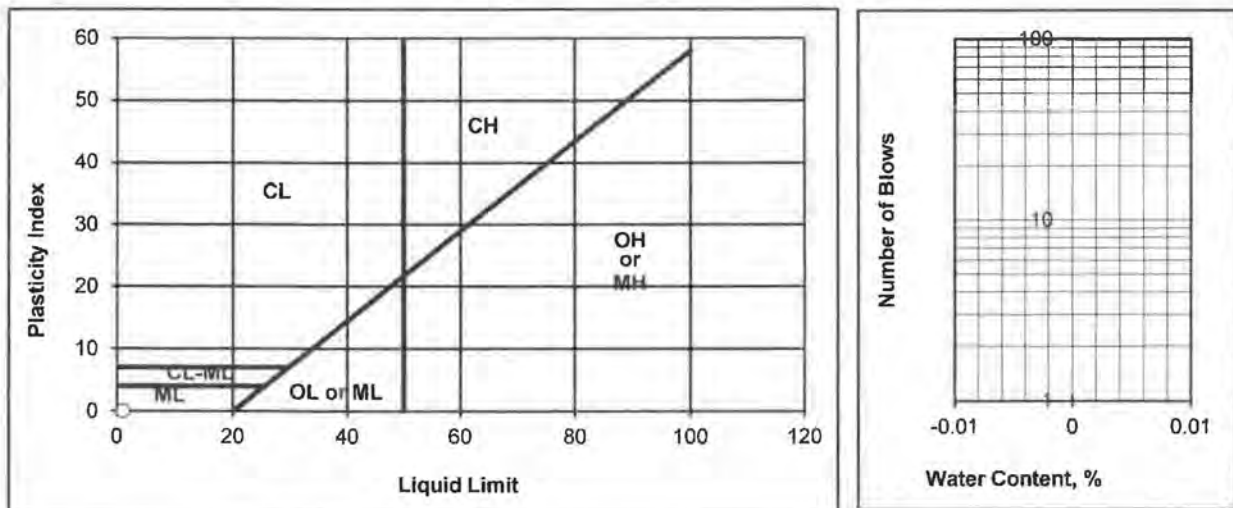
ASTM D4318/AASHTO T89 T90/CT 204

Project: **Guzman Reservoirs**
 Project Number: **022-15055**
 Date Sampled: 8/28/2017
 Sampled By: DA
 Sample Number:
 Sample Location: TP21a @ 6-7'
 Sample Description: SM

Date Tested: 9/13/2017
 Tested By: J Mitchell
 Verified By: J Gruszczynski

Trial Number	Plastic Limit			Liquid Limit		
	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)						
Weight of Dry Soil & Tare (g)						
Weight of Tare (g)						
Weight of water (g)						
Weight of Dry Soil (g)						
Water Content (% of dry wt.)						
Number of Blows						
Plastic Limit : N/D			Liquid Limit : N/D			

Plasticity Index : **NON-PLASTIC**
 Unified Soil Classification : **NON-PLASTIC**
 Requirement:
 Approx. % of Material Retained on # 40 Sieve:



Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

**Krazan****& ASSOCIATES, INC.**

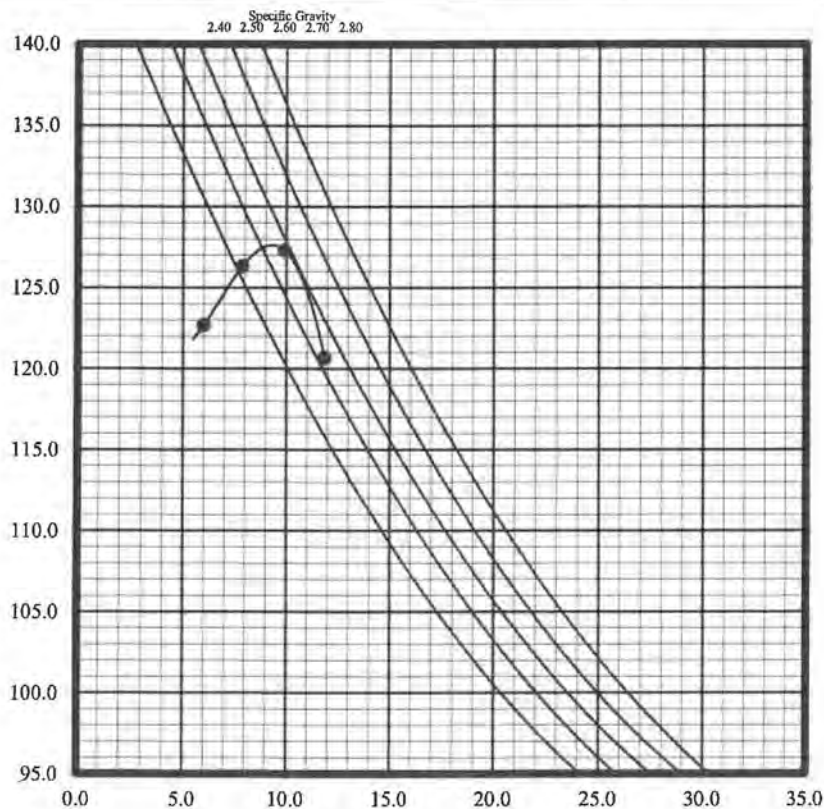
GEOTECHNICAL ENGINEERING ENVIRONMENTAL ENGINEERING CONSTRUCTION TESTING & INSPECTION

**Laboratory Compaction Characteristics
of Soil using Modified Effort (56,000 ft. - lbf/ft³)**

ASTM D1557

Project Number	022-15055	Sample Number	-
Project Name	Guzman	Soil Classification	SM
Technician	SH	Soil Description	Bm Silty Sand w/ clay
Date	9/11/2017	Method	D1557b
Sample Location	TP21A @ 6-7'		

	1	2	3	4
Mass of Moist Specimen & Mold, gm	4038.4	4093.4	4019.0	3944.2
Mass of Compaction Mold, gm	1980.0	1980.0	1980.0	1980.0
Mass of Moist Specimen, gm	2058.4	2113.4	2039.0	1964.2
Volume of Mold, cu./ft.	0.0333	0.0333	0.0333	0.0333
Wet Density, lbs./cu.ft.	136.3	139.9	135.0	130.0
Mass of Moisture (Wet), gm	200.0	200.0	200.0	200.0
Mass of Moisture (Dry), gm	185.4	182.0	178.8	188.7
Moisture Content (%)	7.9	9.9	11.9	6.0
Dry Density, lbs/cu.ft.	126.3	127.3	120.7	122.7

**Maximum Dry Density,
lbs.cu.ft.****127.6****Optimum Moisture Content****9.3%**

SDS#: -

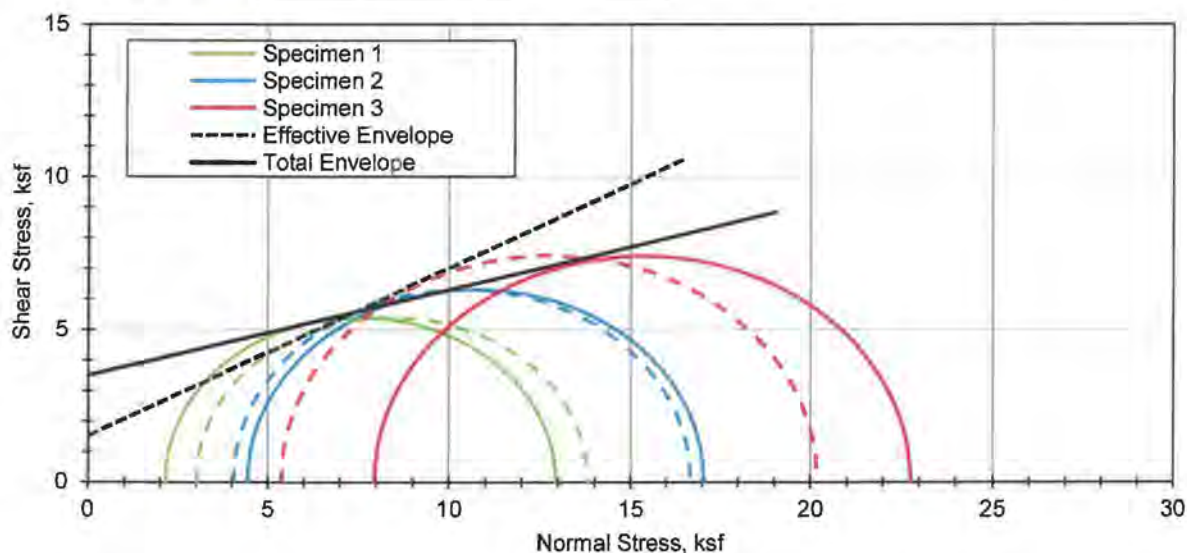


Consolidated-Undrained Triaxial Test

ASTM D4767

Project: Guzman
Project Number: 022-15055
Sampling Date: 8/29/2017
Location: TP21a @ 6-7'
Client Name:

Sample Number: TP21a
Sample Type: Reconstituted
Sample Description: Brn Silty Sand
Sample Depth (ft): 6-7



	Total	Effective
Friction Angle, ϕ	15.6	28.8
Cohesion, c (ksf)	3.50	1.50

Failure Criteria: Specified Strain %
Plastic Limit: Non-Plastic
Liquid Limit: N/A
Specific Gravity: 2.72
ASSUMED

Initial Parameters			
	Specimen 1	Specimen 2	Specimen 3
Moisture Content (%)	9.3	9.3	9.3
Dry Density (pcf)	122.4	122.2	122.5
Void Ratio	0.388	0.390	0.387
Saturation (%)	65.5	64.8	65.4
Height (in)	5.77	5.77	5.77
Diameter (in)	2.85	2.85	2.85

Saturation Parameters			
B-Value	0.98	0.98	0.98

Consolidation Parameters			
Back Pressure (psi)	28.8	29.9	28.7
Effective Pressure (psi)	15.0	30.0	55.0
Height (in)	5.76	5.75	5.75
Area (in ²)	6.24	6.24	6.23
Void Ratio	0.354	0.355	0.348
Saturation (%)	100	100.0	100.0

Final Parameters at Failure			
Deviator Stress (ksf)	10.8	12.6	14.8
σ'_1 (ksf)	13.8	16.7	20.2
σ'_3 (ksf)	3.0	4.1	5.4
Excess PP (ksf)	-0.87	0.4	2.6
Axial Strain (%)	5.0	5.0	5.0
Rate of Strain (in/min)	0.0005	0.0005	0.0005

Remarks:

Remolded to approx. 95% relative density of 127.6 pcf, 9.3%, at or above optimum moisture content

Krazan and Associates

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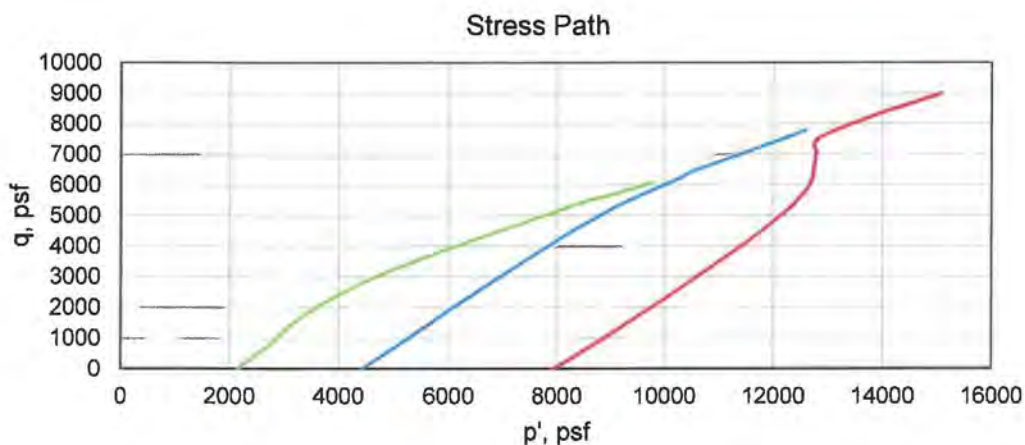
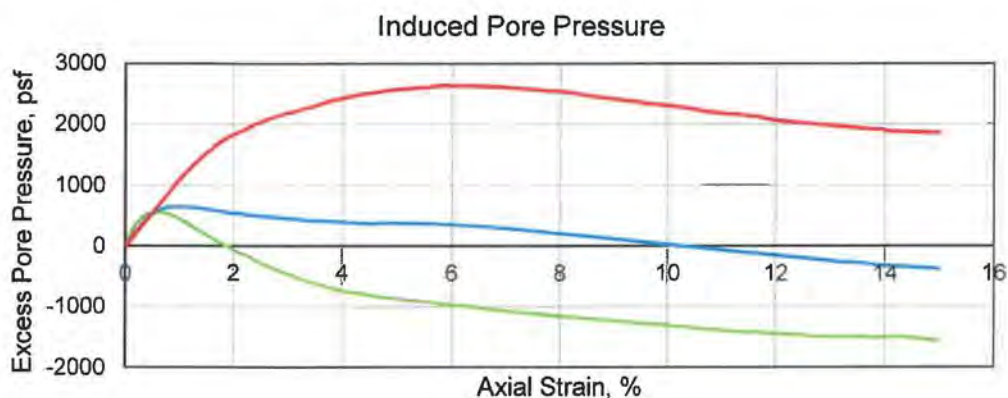
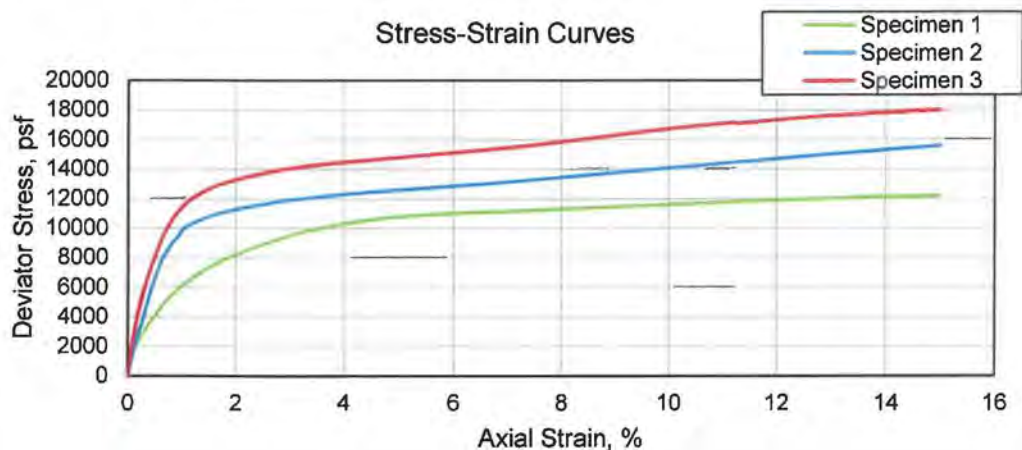


Consolidated-Undrained Triaxial Test

ASTM D4767

Project: Guzman
Project Number: 022-15055
Sampling Date: 8/29/2017
Location: TP21a @ 6-7'
Client Name: _____

Sample Number: TP21a
Sample Type: Reconstituted
Sample Description: Brn Silty Sand
Sample Depth (ft): 6-7



Sieve Analysis

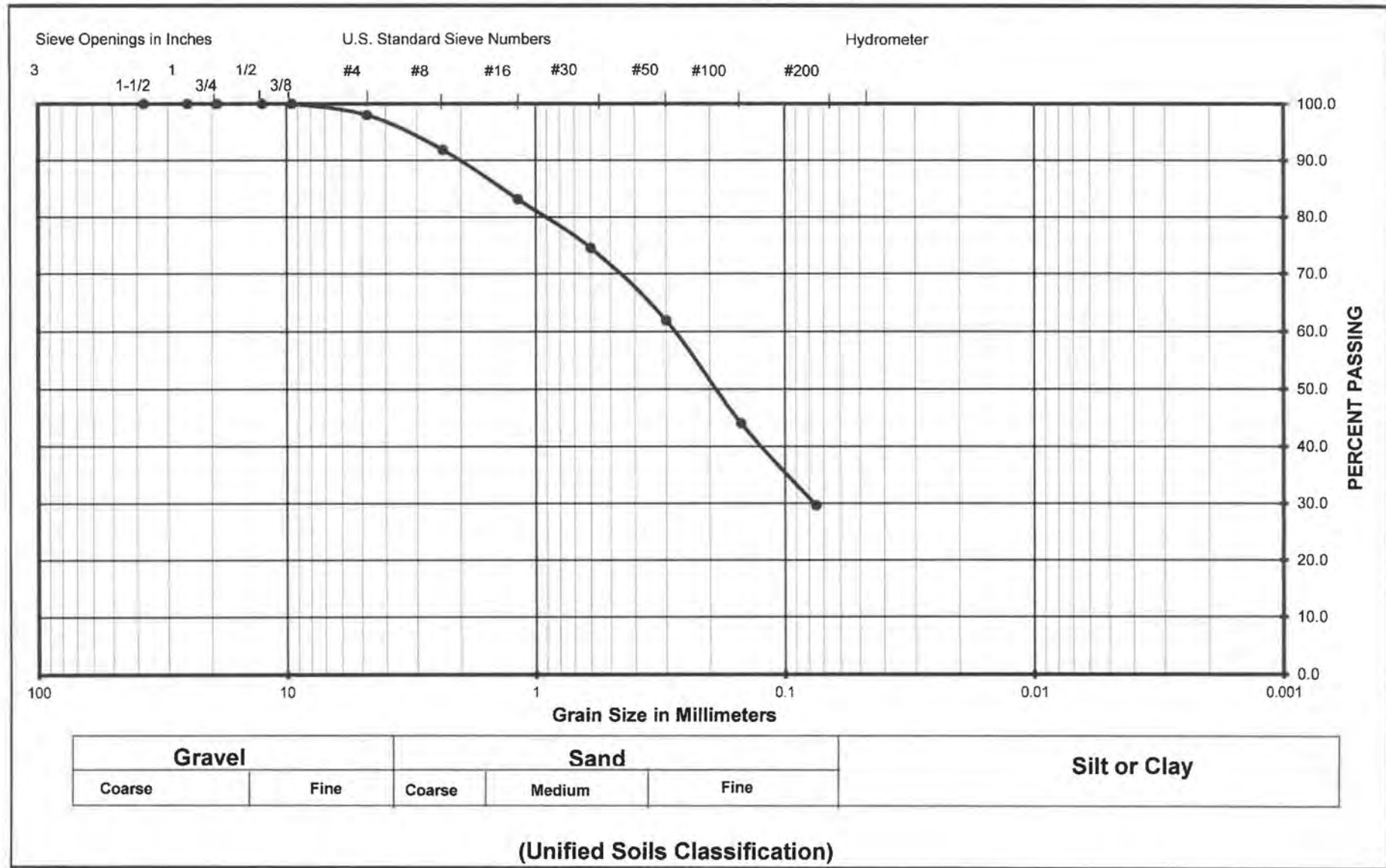
ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 9/6/2017
Sample Location : TP21A @ 7-8'
Soil Classification : SM

Wet Weight	:	300.00
Dry Weight	:	284.80
Moisture Content	:	5%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	5.8	2.0	2.0	98.0
#8	2.36	17.4	6.1	8.1	91.9
#16	1.18	24.8	8.7	16.9	83.1
#30	0.60	24.6	8.6	25.5	74.5
#50	0.30	35.8	12.6	38.1	61.9
#100	0.15	50.9	17.9	55.9	44.1
#200	0.08	41.0	14.4	70.3	29.7

Grain Size Analysis



Project Name
 Project Number
 Soil Classification
 Sample Number

Guzman
 022-15055
 SM
 TP21A @ 7-8'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

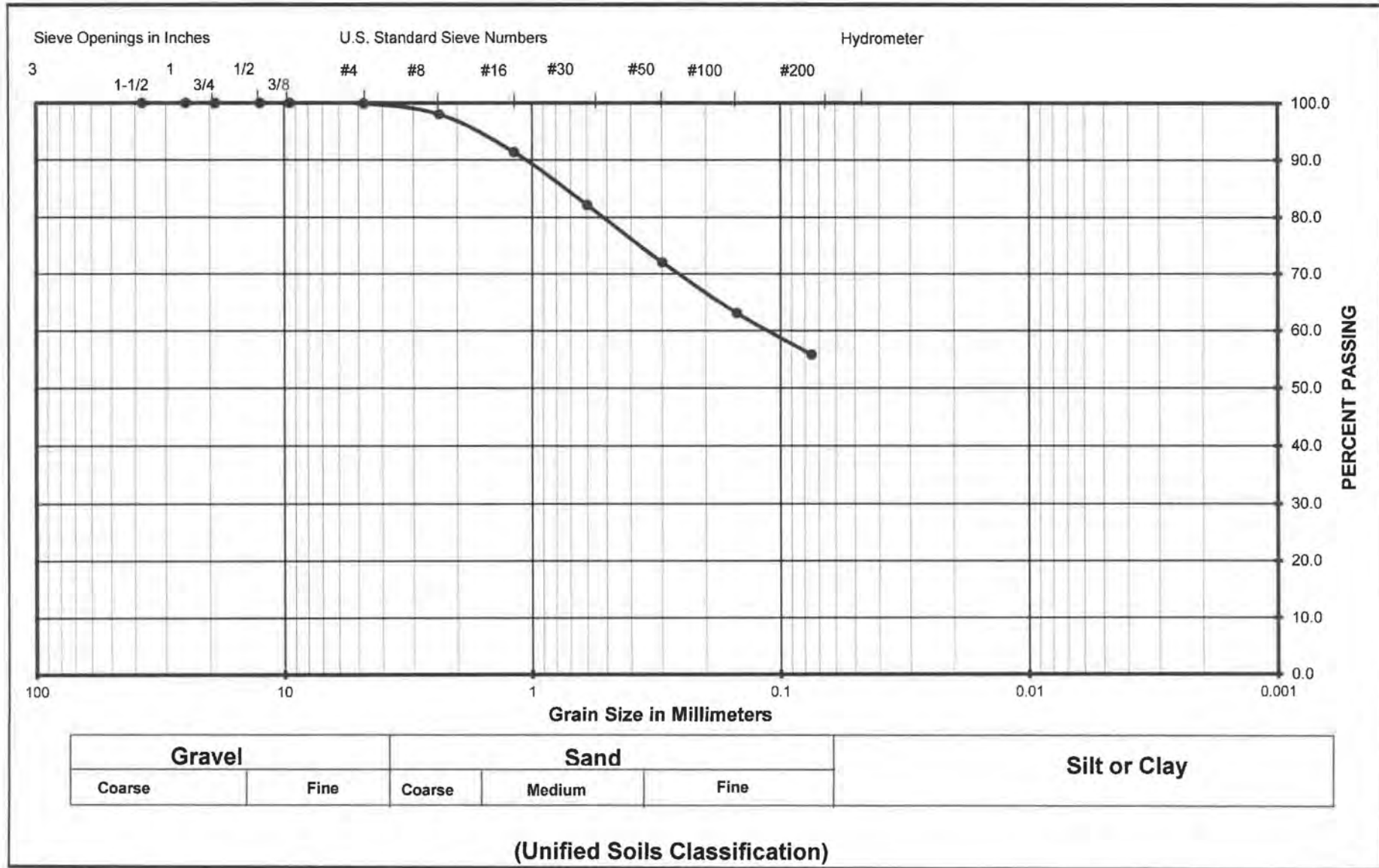
ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 6/21/2016
Sample Location : TP24 @ 4-4.5'
Soil Classification : CL

Wet Weight	:	380.00
Dry Weight	:	356.70
Moisture Content	:	7%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	0.3	0.1	0.1	99.9
#8	2.36	6.8	1.9	2.0	98.0
#16	1.18	23.6	6.6	8.6	91.4
#30	0.60	33.0	9.3	17.9	82.1
#50	0.30	35.8	10.0	27.9	72.1
#100	0.15	32.0	9.0	36.9	63.1
#200	0.08	26.1	7.3	44.2	55.8

Grain Size Analysis



Project Name: Guzman
 Project Number: 022-15055
 Soil Classification: CL
 Sample Number: TP24 @ 4-4.5'

ASTM C136

Krazan Testing Laboratory

ASTM D4647-06

Date:	11/17/2016
Project Name	Guzman Reservoir
Project Number	022-15055
Sample Location	TP24 @ 4-4.5'
Water Content	13.80%
Compaction Characteristics	D1557
Curing Time	24 Hrs +

[illegible]

Final Hole Diameter 1.0 mm

Technician **J Jensen**

Sieve Analysis

ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 6/27/2016
Sample Location : TP24 @ 6-6.5'
Soil Classification : SC

Wet Weight	:	400.00
Dry Weight	:	379.40
Moisture Content	:	5%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50	3.7	1.0	1.0	99.0
#4	4.75	4.7	1.2	2.2	97.8
#8	2.36	9.0	2.4	4.6	95.4
#16	1.18	23.4	6.2	10.8	89.2
#30	0.60	31.7	8.4	19.1	80.9
#50	0.30	39.9	10.5	29.6	70.4
#100	0.15	47.1	12.4	42.0	58.0
#200	0.08	56.6	14.9	57.0	43.0

Grain Size Analysis



Project Name: Guzman
 Project Number: 022-15055
 Soil Classification: SC
 Sample Number: TP24 @ 6-6.5'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

ASTM C136 / CT 202

Project Number : 022-15055
Project Name : Guzman
Date : 6/27/2016
Sample Location : TP25 @ 3-3.5'
Soil Classification : CL

Wet Weight	:	400.00
Dry Weight	:	382.70
Moisture Content	:	5%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	1.3	0.3	0.3	99.7
#8	2.36	11.4	3.0	3.3	96.7
#16	1.18	27.8	7.3	10.6	89.4
#30	0.60	33.1	8.6	19.2	80.8
#50	0.30	36.3	9.5	28.7	71.3
#100	0.15	32.6	8.5	37.2	62.8
#200	0.08	23.1	6.0	43.3	56.7

Grain Size Analysis



Project Name: Guzman
 Project Number: 022-15055
 Soil Classification: CL
 Sample Number: TP25 @ 3-3.5'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

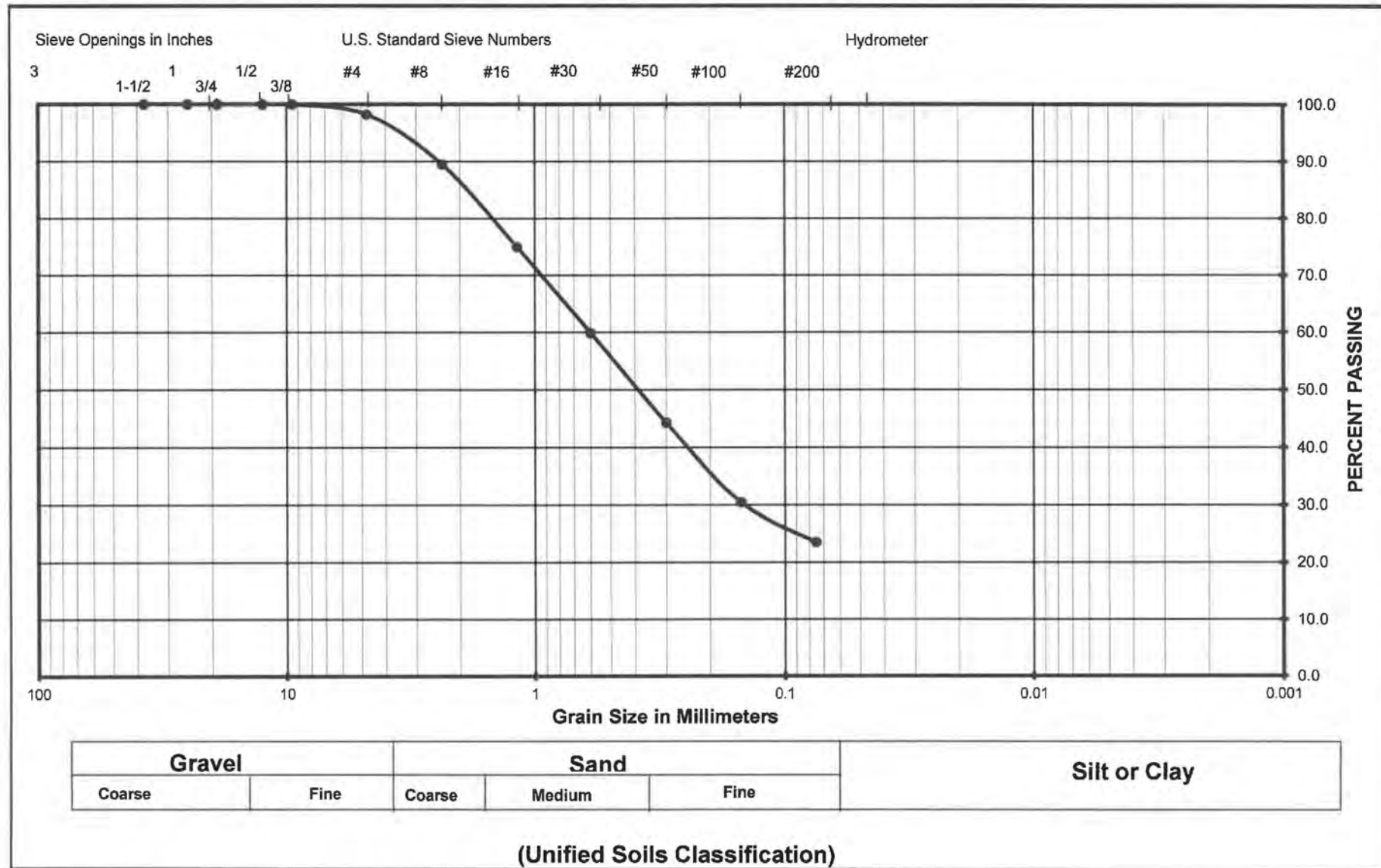
ASTM C136 / CT 202

Project Number : 022-15055
 Project Name : Guzman
 Date : 6/22/2016
 Sample Location : TP25 @ 5-5.5'
 Soil Classification : SM

Wet Weight	:	400.00
Dry Weight	:	391.80
Moisture Content	:	2%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75	7.0	1.8	1.8	98.2
#8	2.36	34.1	8.7	10.5	89.5
#16	1.18	56.7	14.5	25.0	75.0
#30	0.60	59.3	15.1	40.1	59.9
#50	0.30	60.8	15.5	55.6	44.4
#100	0.15	54.6	13.9	69.6	30.4
#200	0.08	27.1	6.9	76.5	23.5

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
SM
TP25 @ 5-5.5'

ASTM C136

Krazan Testing Laboratory

Sieve Analysis

ASTM C136

Project Number : 022-15055
Project Name : Guzman
Date : 10/31/2016
Sample Location : TP26 @ 6-6.5'
Soil Classification : SC

Wet Weight	:	300.00
Dry Weight	:	290.30
Moisture Content	:	3%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50				100.0
#4	4.75				100.0
#8	2.36	10.9	3.8	3.8	96.2
#16	1.18	40.7	14.0	17.8	82.2
#30	0.60	52.4	18.1	35.8	64.2
#50	0.30	51.2	17.6	53.5	46.5
#100	0.15	25.3	8.7	62.2	37.8
#200	0.08	11.7	4.0	66.2	33.8

Hydrometer Analysis

ASTM D422

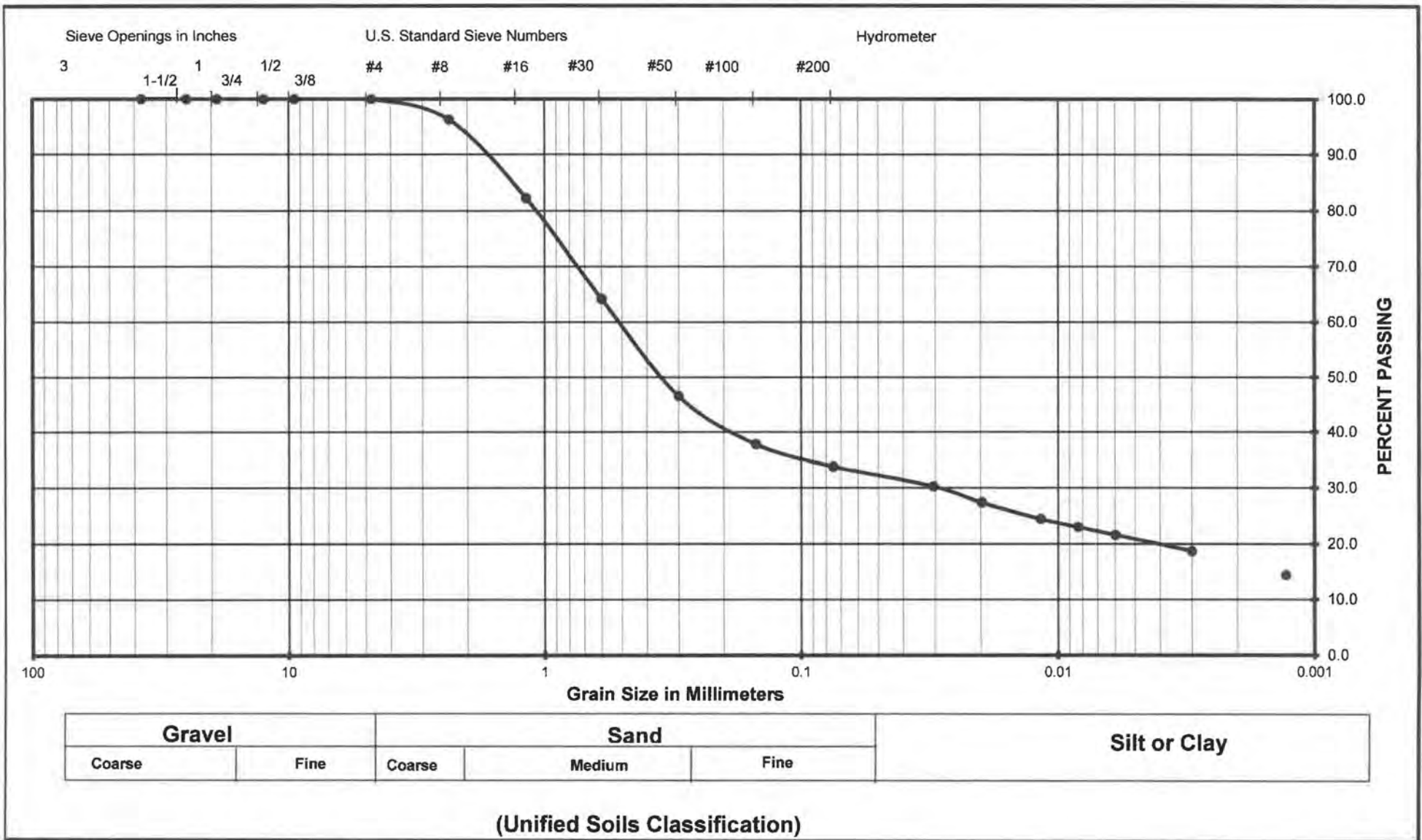
Project Number : 022-15055
Project Name : Guzman
Date : 10/31/2016
Sample Location : TP26 @ 6-6.5'
Soil Classification : SC

Dry Weight Used	111.6 g
Temperature	20.0 C
Soil Specific Gravity	2.65
Solution Spec. Grav.	1.003
K Value	0.01365
Correction Factor	0.00000

Elapsed Time (min)	Hydro. Reading	Hydro. Corrected	% Passing	Particle Diameter
2	1.024	1.024	30.3	0.0305
5	1.022	1.022	27.4	0.0198
15	1.02	1.02	24.5	0.0117
30	1.019	1.019	23.1	0.0084
60	1.018	1.018	21.6	0.0060
250	1.016	1.016	18.7	0.0030
1440	1.013	1.013	14.4	0.0013

Particle Diameter	Percent Passing
0.005	20.7
0.002	16.2
0	NA

Grain Size Analysis



Project Name
Project Number
Soil Classification
Sample Number

Guzman
022-15055
SC
TP26 @ 6-6.5'

ASTM C136 /
D422

Krazan Testing Laboratory