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Transmittal

TO:

Delaney Peterson

Anchor QEA, LLC

1605 Cornwall Ave

Bellingham, WA 98225

DATE: 4/22/2021	GTX NO: 313361
RE: GascoSiltronic: US Moorings 03192021	

COPIES	DATE	DESCRIPTION
	4/22/2021	**March and April 2021 Laboratory Test Report**

REMARKS:

SIGNED: Sarah Delaney

Sarah Delaney, Assistant Laboratory Manager

APPROVED BY: Jon Campbell

Jonathan Campbell, Laboratory Manager

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April 22, 2021

Delaney Peterson
Anchor QEA, LLC
1605 Cornwall Ave
Bellingham, WA 98225

RE: GascoSiltronic: US Moorings 03192021, (GTX-313361)

Dear Delaney Peterson:

Enclosed are the test results you requested for the above referenced project. GeoTesting Express, Inc. (GTX) received six samples from you on 3/19/2021. These samples were labeled as follows:

Boring Number	Sample Number
USMPDI-	058RAB-10-20-210317
USMPDI-	062RAB-20-25-210309
USMPDI-	066RAB-10-20-210315
USMPDI-	068RAB-10-20-210311
USMPDI-	068RAB-20-32.1-210312
USMPDI-	069RAB-20-36.3-210312

GTX performed the following tests on each of these samples:

ASTM D2216 - Moisture Content
ASTM D4318 - Atterberg Limits
ASTM D6913/D7928 - Grain Size Analysis - Sieve and Hydrometer
ASTM D854 - Specific Gravity

A copy of your test request is attached.

The results presented in this report apply only to the items tested. This report shall not be reproduced except in full, without written approval from GeoTesting Express. The remainder of these samples will be retained for a period of sixty (60) days and will then be discarded unless otherwise notified by you. Please call me if you have any questions or require additional information. Thank you for allowing GeoTesting Express the opportunity of providing you with testing services. We look forward to working with you again in the future.

Respectfully yours,

Sarah Delaney
Assistant Laboratory Manager

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Geotechnical Test Report **4/22/2021**

GTX-313361
GascoSiltronic: US Moorings 03192021

Prepared for:

Anchor QEA, LLC

GeoTesting EXPRESS

Client:	Anchor QEA, LLC				
Project:	GascoSiltronic: US Moorings 03192021				
Location:				Project No:	GTX-313361
Boring ID:	---	Sample Type:	---	Tested By:	GA
Sample ID:	---	Test Date:	03/29/21	Checked By:	bfs
Depth :	---	Test Id:	613636		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
USMPDI-	058RAB-10-20-210317	---	Moist, very dark grayish brown sandy silt	11.3
USMPDI-	062RAB-20-25-210309	---	Moist, very dark grayish brown silty sand	35.9
USMPDI-	066RAB-10-20-210315	---	Moist, dark brown clayey sand	33.9
USMPDI-	068RAB-10-20-210311	---	Moist, very dark brown sand with silt	20.3
USMPDI-	068RAB-20-32.1-210312	---	Moist, very dark grayish brown sandy silt	45.9
USMPDI-	069RAB-20-36.3-210312	---	Moist, dark grayish brown sandy silt	47.4

Notes: Temperature of Drying : 110º Celsius

Client:	Anchor QEA, LLC				
Project:	GascoSiltronic: US Moorings 03192021				
Location:				Project No:	GTX-313361
Boring ID:	---	Sample Type:	---	Tested By:	GA
Sample ID:	---	Test Date:	04/07/21	Checked By:	n/a
Depth :	---	Test Id:	613642		

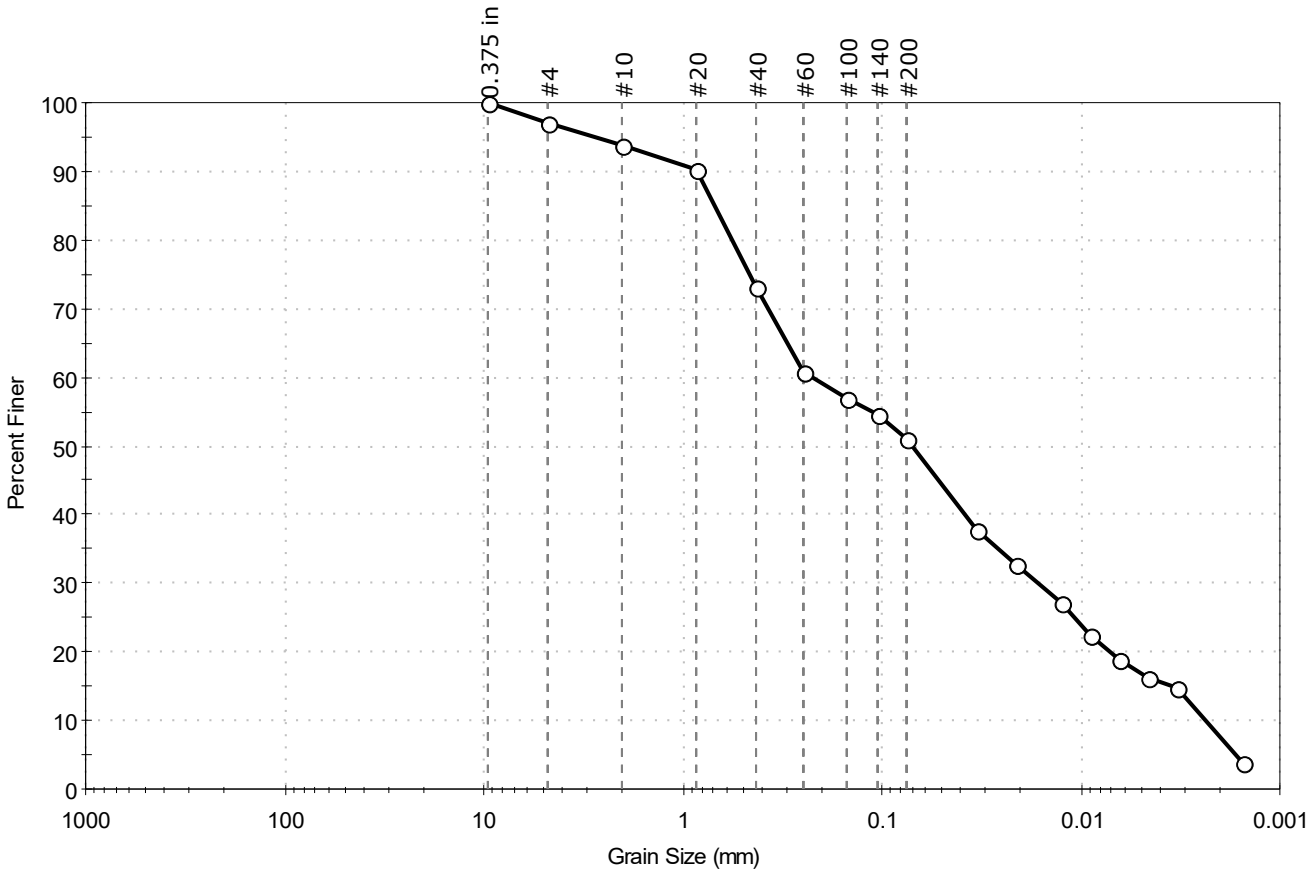
Specific Gravity of Soils by ASTM D854

Boring ID	Sample ID	Depth	Visual Description	Specific Gravity	Comment
USMPDI-	058RAB-10-20-210317	---	Moist, very dark grayish brown sandy silt	2.64	
USMPDI-	062RAB-20-25-210309	---	Moist, very dark grayish brown silty sand	2.65	
USMPDI-	066RAB-10-20-210315	---	Moist, dark brown clayey sand	2.68	
USMPDI-	068RAB-10-20-210311	---	Moist, very dark brown sand with silt	2.68	
USMPDI-	068RAB-20-32.1-210312	---	Moist, very dark grayish brown sandy silt	2.64	
USMPDI-	069RAB-20-36.3-210312	---	Moist, dark grayish brown sandy silt	2.63	

Notes: Specific Gravity performed by using method B (oven dried specimens) of ASTM D854
Moisture Content determined by ASTM D2216.

Client:	Anchor QEA, LLC				
Project:	GascoSiltronic: US Moorings 03192021				
Location:				Project No:	GTX-313361
Boring ID:	USMPDI-	Sample Type:	bag	Tested By:	GA
Sample ID:	058RAB-10-20-210317	Test Date:	04/01/21	Checked By:	bfs
Depth :	---	Test Id:	613625		
Test Comment:	---				
Visual Description:	Moist, very dark grayish brown sandy silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	3.0	45.9	51.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	97		
#10	2.00	94		
#20	0.85	90		
#40	0.42	73		
#60	0.25	61		
#100	0.15	57		
#140	0.11	55		
#200	0.075	51		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0334	38		
---	0.0211	33		
---	0.0125	27		
---	0.0090	22		
---	0.0064	19		
---	0.0046	16		
---	0.0033	15		
---	0.0015	4		

Coefficients

D_{85} =0.6860 mm	D_{30} =0.0161 mm
D_{60} =0.2234 mm	D_{15} =0.0035 mm
D_{50} =0.0703 mm	D_{10} =0.0024 mm
C_u =93.083	C_c =0.483

Classification

ASTM Sandy SILT (ML)

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

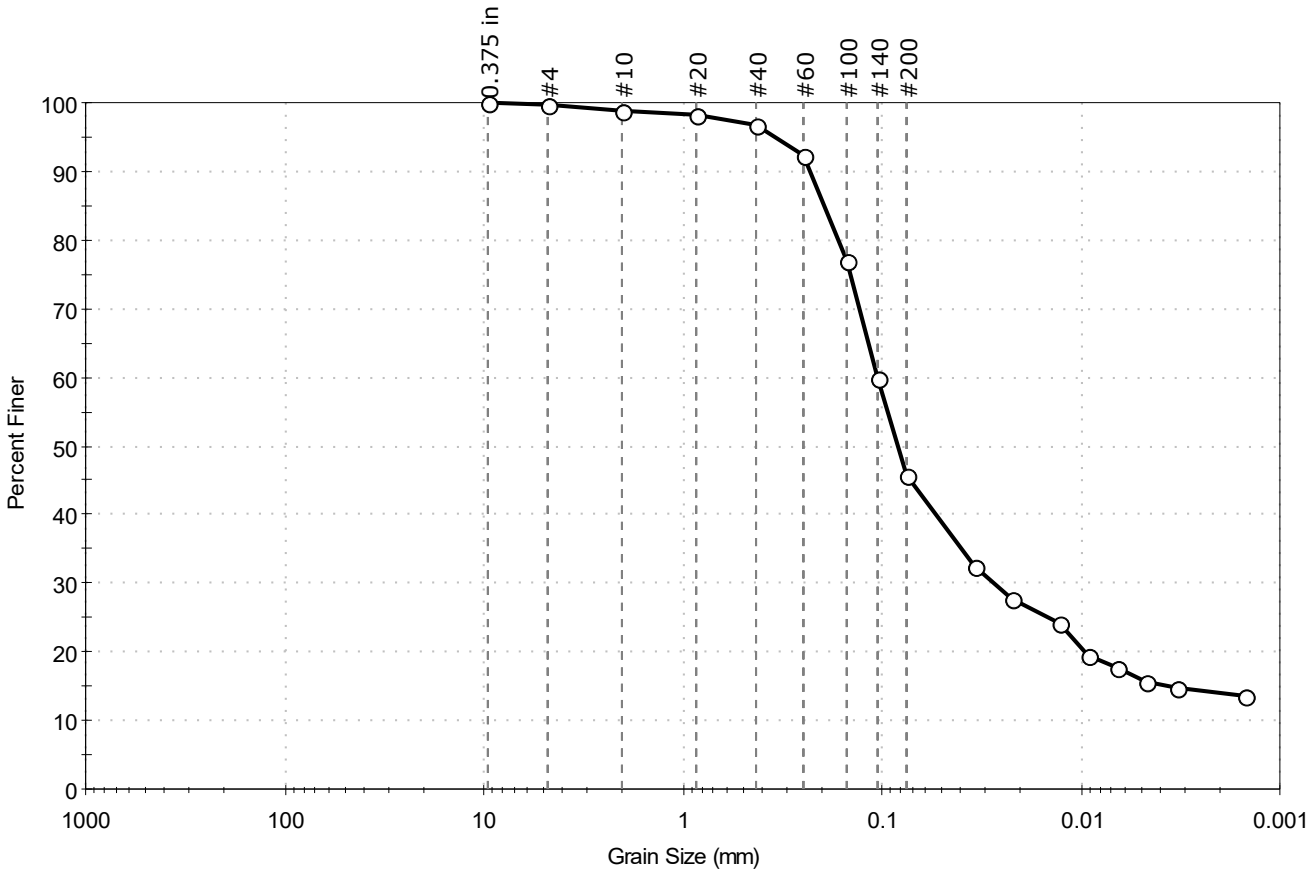
Est. Specific Gravity : 2.64

Separation of Sample: #200 Sieve

GeoTesting EXPRESS

Client:	Anchor QEA, LLC				
Project:	GascoSiltronic: US Moorings 03192021				
Location:				Project No:	GTX-313361
Boring ID:	USMPDI-	Sample Type:	bag	Tested By:	GA
Sample ID:	062RAB-20-25-210309	Test Date:	04/01/21	Checked By:	bfs
Depth :	---	Test Id:	613626		
Test Comment:	---				
Visual Description:	Moist, very dark grayish brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.4	54.0	45.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	99		
#20	0.85	98		
#40	0.42	97		
#60	0.25	92		
#100	0.15	77		
#140	0.11	60		
#200	0.075	46		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0345	32		
---	0.0221	28		
---	0.0129	24		
---	0.0092	19		
---	0.0066	18		
---	0.0047	16		
---	0.0033	15		
---	0.0015	13		

Coefficients

D_{85} =0.1959 mm	D_{30} =0.0272 mm
D_{60} =0.1062 mm	D_{15} =0.0035 mm
D_{50} =0.0834 mm	D_{10} =N/A
C_u =N/A	C_c =N/A

Classification

ASTM Silty SAND (SM)

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

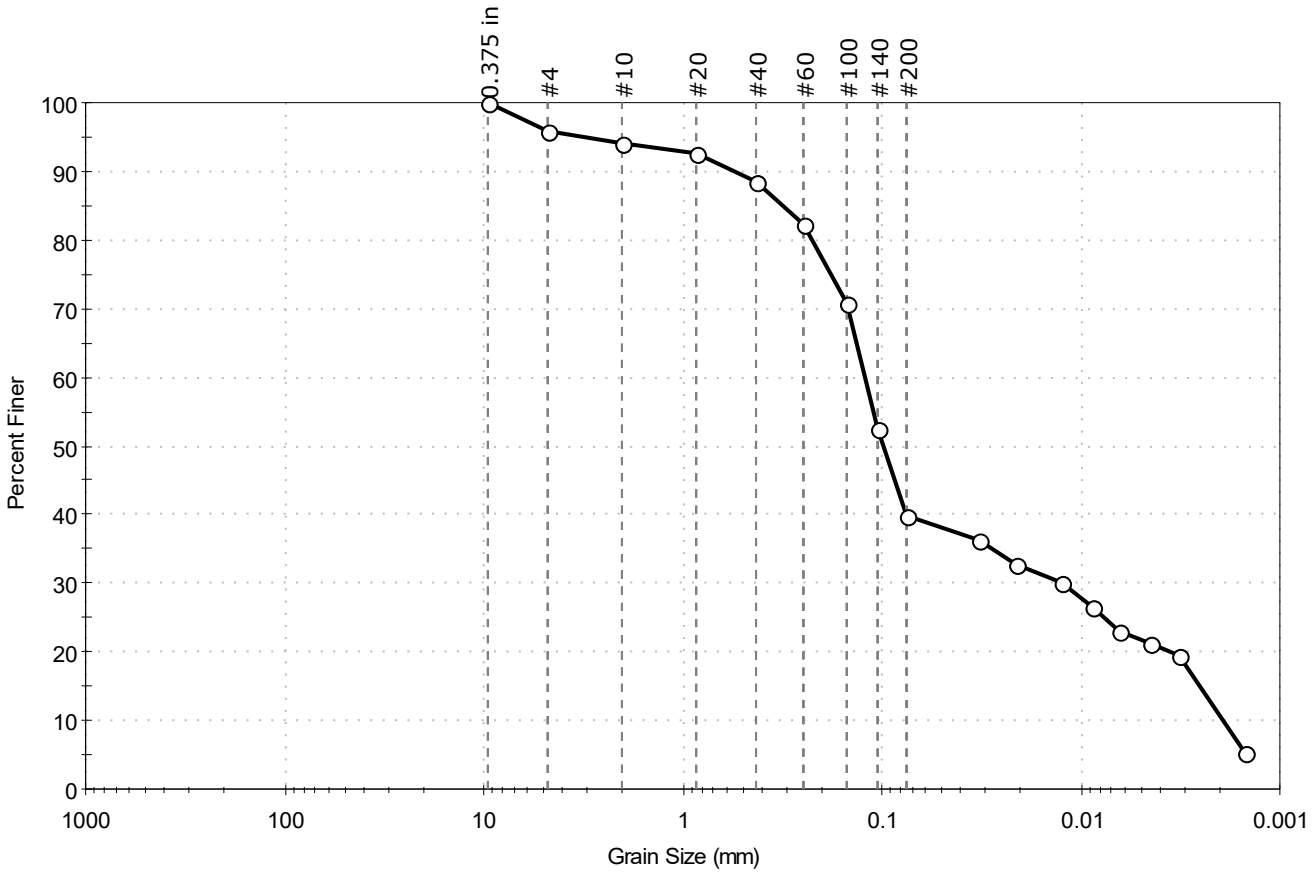
Separation of Sample: #200 Sieve

GeoTesting EXPRESS

Client:	Anchor QEA, LLC				
Project:	GascoSiltronic: US Moorings 03192021				
Location:				Project No:	GTX-313361
Boring ID:	USMPDI-	Sample Type:	bag	Tested By:	GA
Sample ID:	066RAB-10-20-210315	Test Date:	04/01/21	Checked By:	bfs
Depth :	---	Test Id:	613627		

Test Comment: ---
Visual Description: Moist, dark brown clayey sand
Sample Comment: ---

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	4.0	56.3	39.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	96		
#10	2.00	94		
#20	0.85	93		
#40	0.42	88		
#60	0.25	82		
#100	0.15	71		
#140	0.11	52		
#200	0.075	40		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0324	36		
---	0.0212	33		
---	0.0125	30		
---	0.0089	27		
---	0.0064	23		
---	0.0045	21		
---	0.0032	19		
---	0.0015	5		

Coefficients

D_{85} =0.3159 mm	D_{30} =0.0124 mm
D_{60} =0.1222 mm	D_{15} =0.0025 mm
D_{50} =0.0992 mm	D_{10} =0.0019 mm
C_u =64.316	C_c =0.662

Classification

ASTM Clayey SAND (SC)

AASHTO Clayey Soils (A-6 (1))

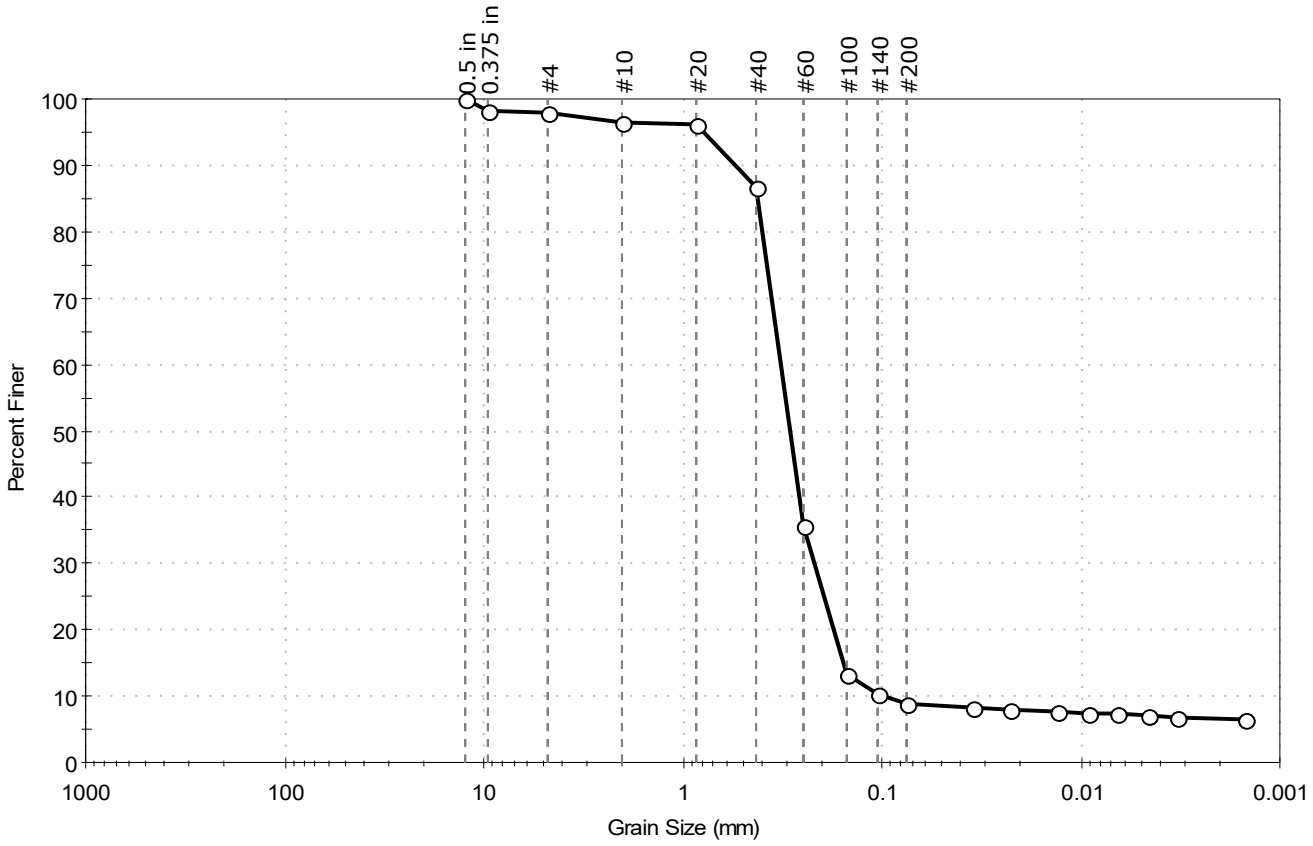
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD
Dispersion Device : Apparatus A - Mech Mixer
Dispersion Period : 1 minute
Est. Specific Gravity : 2.68
Separation of Sample: #200 Sieve

GeoTesting EXPRESS

Client:	Anchor QEA, LLC				
Project:	GascoSiltronic: US Moorings 03192021				
Location:				Project No:	GTX-313361
Boring ID:	USMPDI-	Sample Type:	bag	Tested By:	GA
Sample ID:	068RAB-10-20-210311	Test Date:	04/01/21	Checked By:	bfs
Depth :	---	Test Id:	613628		
Test Comment:	---				
Visual Description:	Moist, very dark brown sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	2.2	88.9	8.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	98		
#4	4.75	98		
#10	2.00	97		
#20	0.85	96		
#40	0.42	87		
#60	0.25	36		
#100	0.15	13		
#140	0.11	10		
#200	0.075	8.9		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0348	8		
---	0.0226	8		
---	0.0131	8		
---	0.0093	8		
---	0.0066	7		
---	0.0047	7		
---	0.0033	7		
---	0.0015	7		

Coefficients

D_{85} = 0.4169 mm	D_{30} = 0.2193 mm
D_{60} = 0.3215 mm	D_{15} = 0.1564 mm
D_{50} = 0.2897 mm	D_{10} = 0.0969 mm
C_u = 3.318	C_c = 1.544

Classification

ASTM Poorly graded SAND with Silt (SP-SM)

AASHTO Fine Sand (A-3 (1))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.68

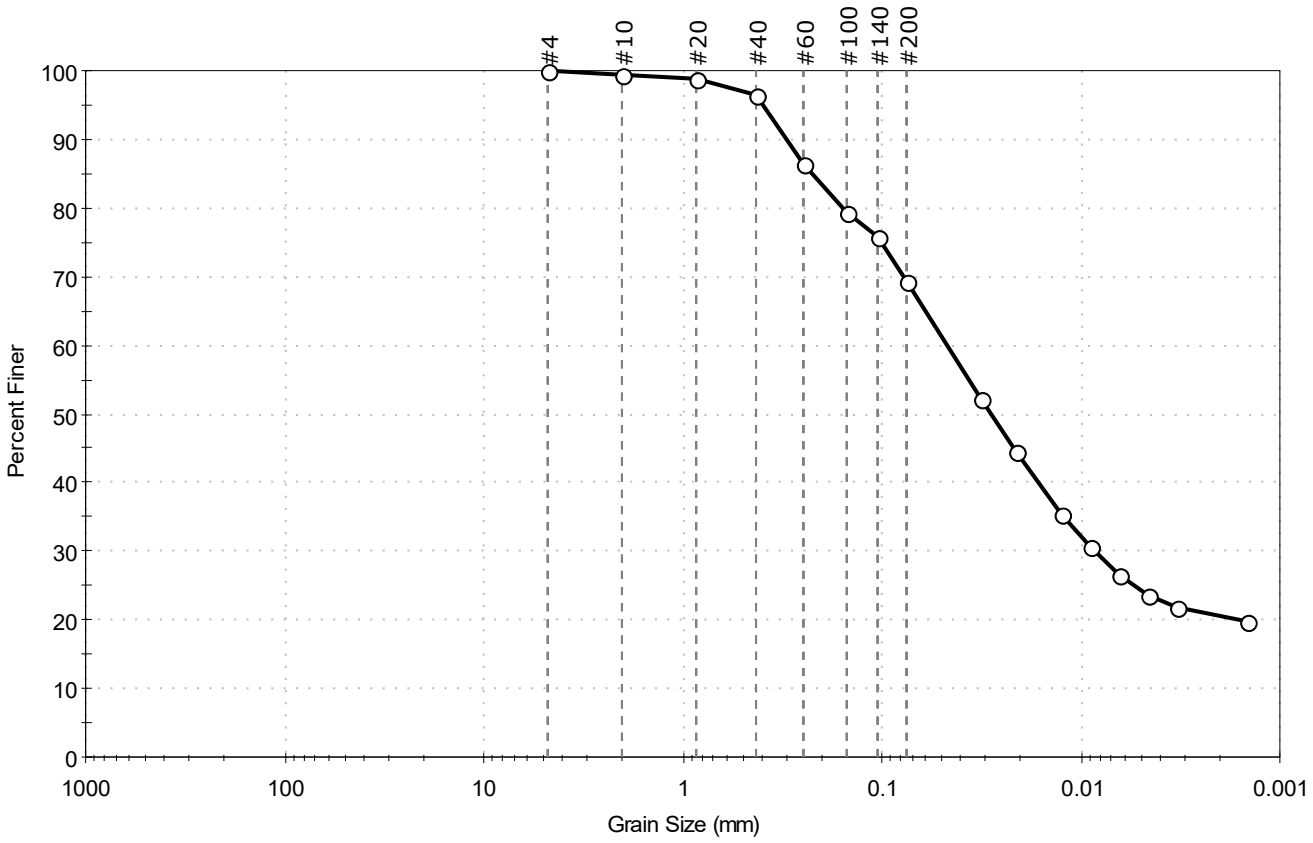
Separation of Sample: #200 Sieve

GeoTesting EXPRESS

Client:	Anchor QEA, LLC				
Project:	GascoSiltronic: US Moorings 03192021				
Location:				Project No:	GTX-313361
Boring ID:	USMPDI-	Sample Type:	bag	Tested By:	GA
Sample ID:	068RAB-20-32.1-210312	Test Date:	04/01/21	Checked By:	bfs
Depth :	---	Test Id:	613629		

Test Comment: ---
Visual Description: Moist, very dark grayish brown sandy silt
Sample Comment: ---

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	30.8	69.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	99		
#20	0.85	99		
#40	0.42	96		
#60	0.25	86		
#100	0.15	79		
#140	0.11	76		
#200	0.075	69		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0319	52		
---	0.0212	44		
---	0.0126	36		
---	0.0090	31		
---	0.0064	27		
---	0.0046	24		
---	0.0033	22		
---	0.0015	20		

Coefficients

D_{85} = 0.2251 mm D_{30} = 0.0086 mm
D_{60} = 0.0471 mm D_{15} = N/A
D_{50} = 0.0283 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM Sandy SILT (ML)

AASHTO Clayey Soils (A-7-5 (10))

Sample/Test Description

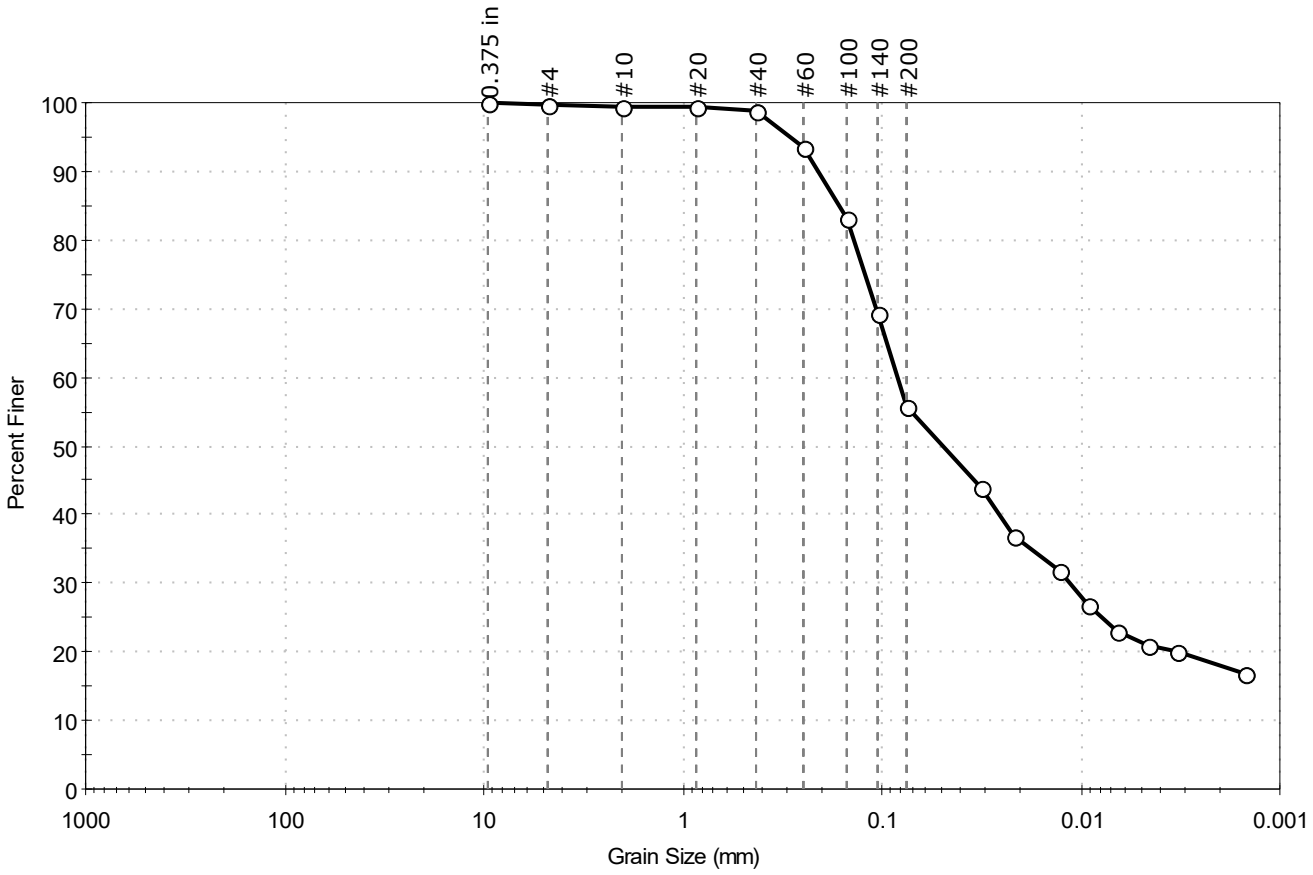
Sand/Gravel Particle Shape : ---
Sand/Gravel Hardness : ---
Dispersion Device : Apparatus A - Mech Mixer
Dispersion Period : 1 minute
Est. Specific Gravity : 2.64
Separation of Sample: #200 Sieve

GeoTesting EXPRESS

Client:	Anchor QEA, LLC				
Project:	GascoSiltronic: US Moorings 03192021				
Location:				Project No:	GTX-313361
Boring ID:	USMPDI-	Sample Type:	bag	Tested By:	GA
Sample ID:	069RAB-20-36.3-210312	Test Date:	04/01/21	Checked By:	bfs
Depth :	---	Test Id:	613630		

Test Comment: ---
Visual Description: Moist, dark grayish brown sandy silt
Sample Comment: ---

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.2	44.0	55.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	100		
#20	0.85	99		
#40	0.42	99		
#60	0.25	93		
#100	0.15	83		
#140	0.11	69		
#200	0.075	56		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0321	44		
---	0.0217	37		
---	0.0127	32		
---	0.0091	27		
---	0.0065	23		
---	0.0046	21		
---	0.0033	20		
---	0.0015	17		

Coefficients

D_{85} = 0.1642 mm	D_{30} = 0.0112 mm
D_{60} = 0.0834 mm	D_{15} = N/A
D_{50} = 0.0497 mm	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM Sandy SILT (ML)

AASHTO Clayey Soils (A-7-5 (5))

Sample/Test Description

Sand/Gravel Particle Shape : ---
Sand/Gravel Hardness : ---
Dispersion Device : Apparatus A - Mech Mixer
Dispersion Period : 1 minute
Est. Specific Gravity : 2.63
Separation of Sample: #200 Sieve

GeoTesting EXPRESS

Client:	Anchor QEA, LLC				
Project:	GascoSiltronic: US Moorings 03192021				
Location:				Project No:	GTX-313361
Boring ID:	USMPDI-	Sample Type:	bag	Tested By:	GA
Sample ID:	058RAB-10-20-210317	Test Date:	03/30/21	Checked By:	bfs
Depth :	---	Test Id:	613619		
Test Comment:	---				
Visual Description:	Moist, very dark grayish brown sandy silt				
Sample Comment:	---				

Atterberg Limits - ASTM D4318

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	8RAB-10-20-2103	USMPDI-	---	11	n/a	n/a	n/a	n/a	Sandy SILT (ML)

27% Retained on #40 Sieve
Dry Strength: NONE
Dilatancy: RAPID
Toughness: n/a
The sample was determined to be Non-Plastic

GeoTesting EXPRESS

Client:	Anchor QEA, LLC				
Project:	GascoSiltronic: US Moorings 03192021				
Location:				Project No:	GTX-313361
Boring ID:	USMPDI-	Sample Type:	bag	Tested By:	GA
Sample ID:	062RAB-20-25-210309	Test Date:	03/29/21	Checked By:	bfs
Depth :	---	Test Id:	613620		
Test Comment:	---				
Visual Description:	Moist, very dark grayish brown silty sand				
Sample Comment:	---				

Atterberg Limits - ASTM D4318

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	2RAB-20-25-2103	USMPDI-	---	36	n/a	n/a	n/a	n/a	Silty SAND (SM)

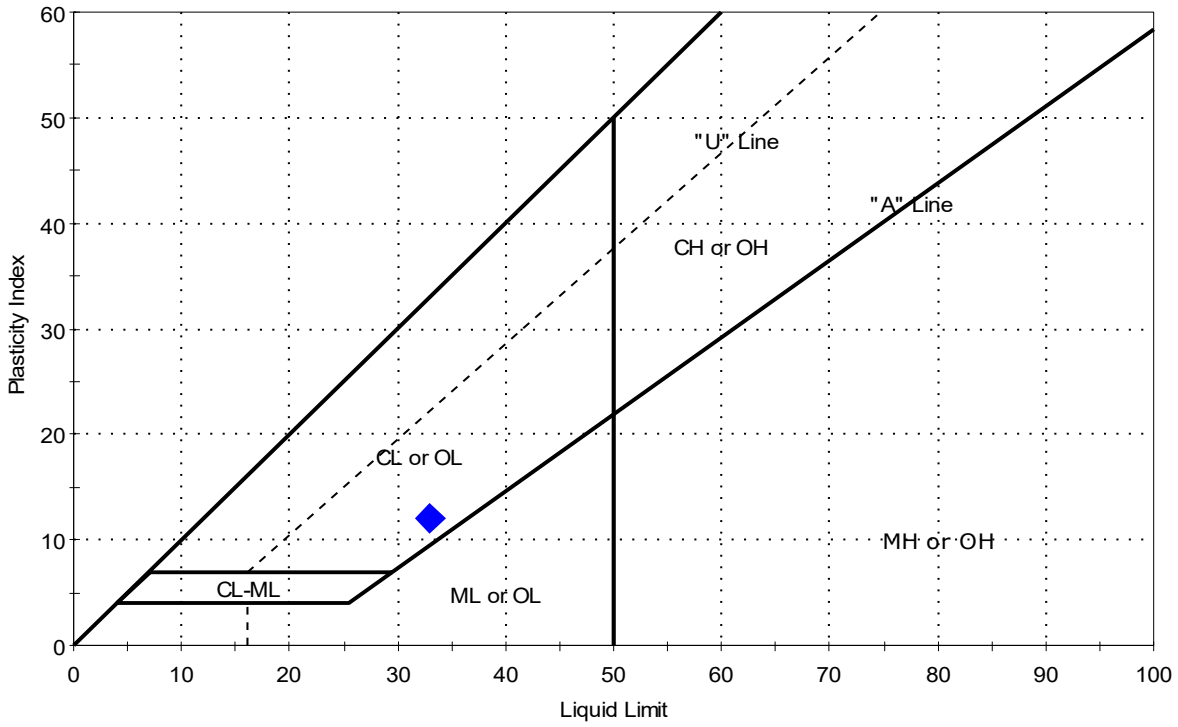
3% Retained on #40 Sieve
Dry Strength: NONE
Dilatancy: RAPID
Toughness: n/a
The sample was determined to be Non-Plastic

GeoTesting EXPRESS

Client:	Anchor QEA, LLC				
Project:	GascoSiltronic: US Moorings 03192021				
Location:				Project No:	GTX-313361
Boring ID:	USMPDI-	Sample Type:	bag	Tested By:	GA
Sample ID:	066RAB-10-20-210315	Test Date:	03/30/21	Checked By:	bfs
Depth :	---	Test Id:	613621		

Test Comment: ---
Visual Description: Moist, dark brown clayey sand
Sample Comment: ---

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	6RAB-10-20-2103	USMPDI-	---	34	33	21	12	1.1	Clayey SAND (SC)

Sample Prepared using the WET method
12% Retained on #40 Sieve
Dry Strength: VERY HIGH
Dilatancy: SLOW
Toughness: MEDIUM

Client:	Anchor QEA, LLC				
Project:	GascoSiltronic: US Moorings 03192021				
Location:				Project No:	GTX-313361
Boring ID:	USMPDI-	Sample Type:	bag	Tested By:	GA
Sample ID:	068RAB-10-20-210311	Test Date:	03/29/21	Checked By:	bfs
Depth :	---	Test Id:	613622		
Test Comment:	---				
Visual Description:	Moist, very dark brown sand with silt				
Sample Comment:	---				

Atterberg Limits - ASTM D4318

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	8RAB-10-20-2103	USMPDI-	---	20	n/a	n/a	n/a	n/a	Poorly graded SAND with Silt (SP-SM)

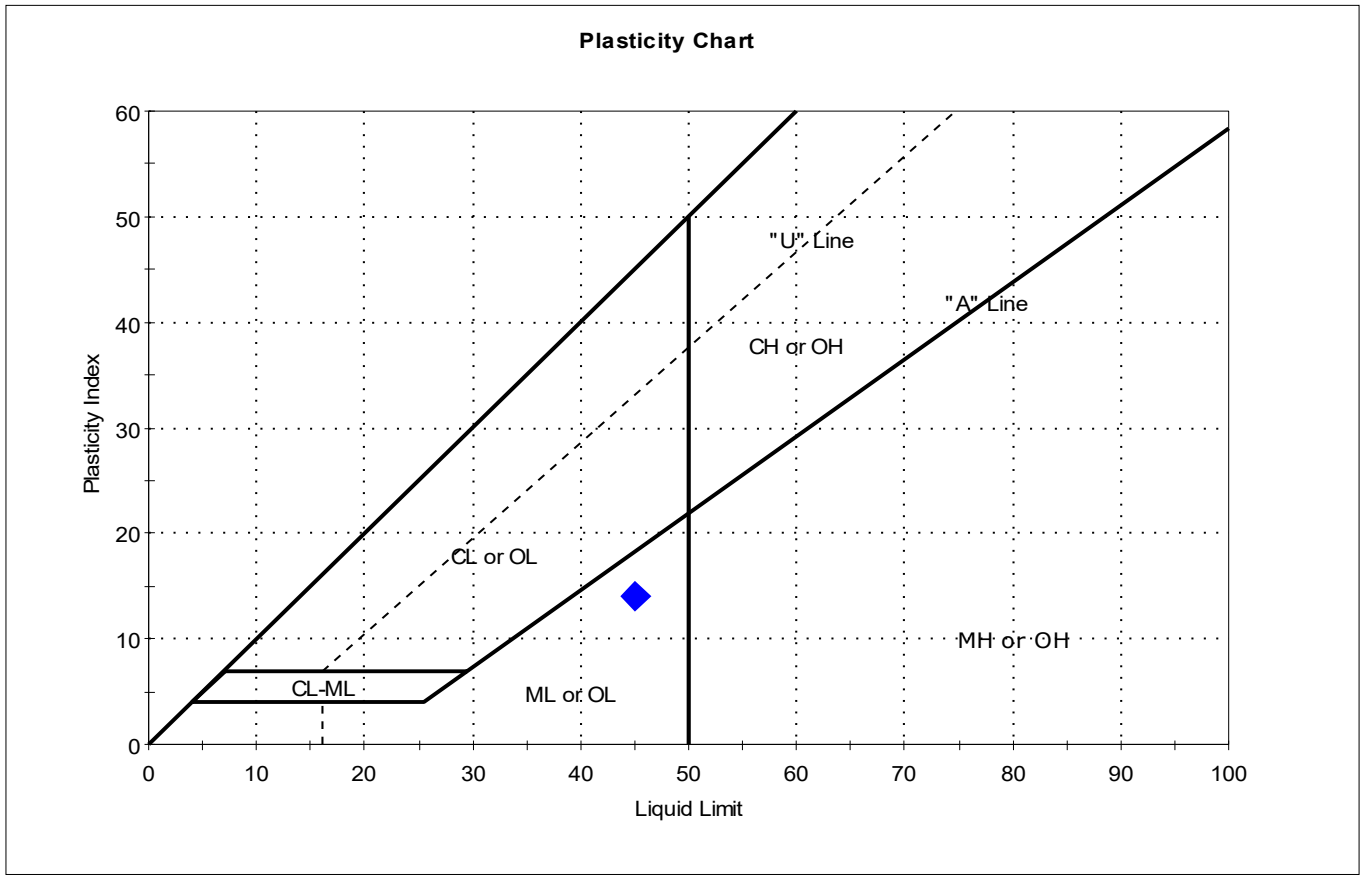
13% Retained on #40 Sieve
Dry Strength: NONE
Dilatancy: RAPID
Toughness: n/a
The sample was determined to be Non-Plastic

GeoTesting EXPRESS

Client:	Anchor QEA, LLC				
Project:	GascoSiltronic: US Moorings 03192021				
Location:				Project No:	GTX-313361
Boring ID:	USMPDI-	Sample Type:	bag	Tested By:	GA
Sample ID:	068RAB-20-32.1-210312	Test Date:	03/30/21	Checked By:	bfs
Depth :	---	Test Id:	613623		

Test Comment: ---
Visual Description: Moist, very dark grayish brown sandy silt
Sample Comment: ---

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	8RAB-20-32.1-210	USMPDI-	---	46	45	31	14	1.1	Sandy SILT (ML)

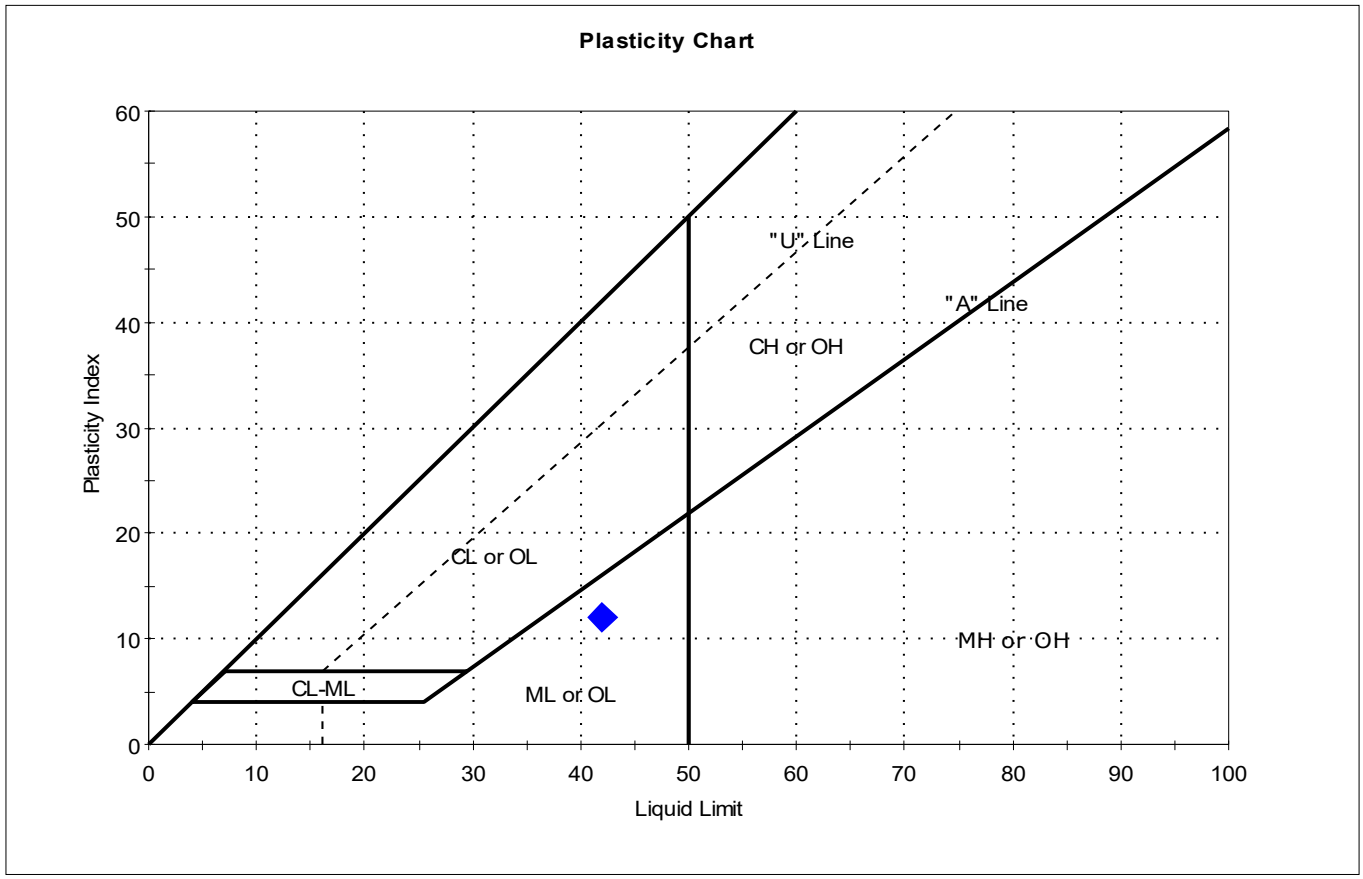
Sample Prepared using the WET method
4% Retained on #40 Sieve
Dry Strength: HIGH
Dilatancy: RAPID
Toughness: MEDIUM

GeoTesting EXPRESS

Client:	Anchor QEA, LLC				
Project:	GascoSiltronic: US Moorings 03192021				
Location:				Project No:	GTX-313361
Boring ID:	USMPDI-	Sample Type:	bag	Tested By:	GA
Sample ID:	069RAB-20-36.3-210312	Test Date:	03/30/21	Checked By:	bfs
Depth :	---	Test Id:	613624		

Test Comment: ---
Visual Description: Moist, dark grayish brown sandy silt
Sample Comment: ---

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	)RAB-20-36.3-210	USMPDI-	---	47	42	30	12	1.5	Sandy SILT (ML)

Sample Prepared using the WET method
1% Retained on #40 Sieve
Dry Strength: HIGH
Dilatancy: RAPID
Toughness: LOW

ANCHOR QEA
1201 3rd Avenue, Suite 2600, Seattle, WA 98101

ENVIRONMENTAL SAMPLE CHAIN OF CUSTODY

COC ID: GEO-20210309-182926

POC: # Delaney Peterson (360-715-2707)
1605 Cornwall Avenue, Bellingham, WA 98225

Project: GascoSiltronic: US Moorings
Client: NW Natural

Sample Custodian: SN
Lab: Geotesting Express

COC Sample Number	Field Sample ID	Sample Type	Matrix	Collected Date	Collected Time	Containers #	Lab QC*	Test Request	Method	TAT**	Preservative
001	USMPDI-058RAB-10-20-210317	N	SO	03/17/2021	14:25	1	☐				
								Atterberg Limits	D4318	30	4°C
								Grain Size	D6913/D7928	30	4°C
								Moisture Content	D2216	30	4°C
								Specific gravity	D854	30	4°C
002	USMPDI-062RAB-20-25-210309	N	SO	03/09/2021	12:55	1	☐				
								Atterberg Limits	D4318	30	4°C
								Grain Size	D6913/D7928	30	4°C
								Moisture Content	D2216	30	4°C
								Specific gravity	D854	30	4°C
003	USMPDI-066RAB-10-20-210315	N	SO	03/15/2021	11:40	1	☐				
								Atterberg Limits	D4318	30	4°C
								Grain Size	D6913/D7928	30	4°C
								Moisture Content	D2216	30	4°C
								Specific gravity	D854	30	4°C
004	USMPDI-068RAB-10-20-210311	N	SO	03/11/2021	14:40	1	☒				
								Atterberg Limits	D4318	30	4°C
								Grain Size	D6913/D7928	30	4°C
								Moisture Content	D2216	30	4°C
								Specific gravity	D854	30	4°C
005	USMPDI-068RAB-20-32.1-210312	N	SO	03/12/2021	8:20	1	☐				

Comment:

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature	Signature	Signature	Signature	Signature	Signature
Print Name: Sisha Norwood	Print Name: Shannon Pleuss	Print Name	Print Name	Print Name	Print Name
Company: Anchor QEA	Company: GTX	Company	Company	Company	Company
Date/Time: 3/18/21 @1435	Date/Time: 3/19/21 10:45	Date/Time	Date/Time	Date/Time	Date/Time

* Lab QC Requested for sample when box is checked ** TAT = Turn Around Time in DAYS # POC = Project Point of Contact

Date Printed: 3/18/2021

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POC: # Delaney Peterson (360-715-2707)
1605 Cornwall Avenue, Bellingham, WA 98225

Project: GascoSiltronic: US Moorings
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Sample Custodian: SN
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COC Sample Number	Field Sample ID	Sample Type	Matrix	Collected Date	Collected Time	Containers #	Lab QC*	Test Request	Method	TAT**	Preservative
005	USMPDI-068RAB-20-32.1-210312	N	SO	03/12/2021	8:20	1	☐				
								Atterberg Limits	D4318	30	4°C
								Grain Size	D6913/D7928	30	4°C
								Moisture Content	D2216	30	4°C
								Specific gravity	D854	30	4°C
006	USMPDI-069RAB-20-36.3-210312	N	SO	03/12/2021	13:20	1	☐				
								Atterberg Limits	D4318	30	4°C
								Grain Size	D6913/D7928	30	4°C
								Moisture Content	D2216	30	4°C
								Specific gravity	D854	30	4°C

Comment:

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature	Signature	Signature	Signature	Signature	Signature
Print Name: Jessica Norwood	Print Name: Shannon Pietsch	Print Name	Print Name	Print Name	Print Name
Company: Anchor QEA	Company: GTX	Company	Company	Company	Company
Date/Time: 3/18/21 1435	Date/Time: 3/19/21 10:45	Date/Time	Date/Time	Date/Time	Date/Time

Date Printed: 3/18/2021

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GeoTesting EXPRESS

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GTX may report engineering parameters that require us to interpret the test data. Such parameters are determined using accepted engineering procedures. However, GTX does not warrant that these parameters accurately reflect the true engineering properties of the *in situ* material. Responsibility for interpretation and use of the test data and these parameters for engineering and/or construction purposes rests solely with the user and not with GTX or any of its employees.

GTX's liability will be limited to correcting or repeating a test which fails our warranty. GTX's liability for damages to the Purchaser of testing services for any cause whatsoever shall be limited to the amount GTX received for the testing services. GTX will not be liable for any damages, or for any lost benefits or other consequential damages resulting from the use of these test results, even if GTX has been advised of the possibility of such damages. GTX will not be responsible for any liability of the Purchaser to any third party.

Commonly Used Symbols

A	pore pressure parameter for $\Delta\sigma_1 - \Delta\sigma_3$
B	pore pressure parameter for $\Delta\sigma_3$
CAI	CERCHAR Abrasiveness Index
CIU	isotropically consolidated undrained triaxial shear test
CR	compression ratio for one dimensional consolidation
CSR	cyclic stress ratio
C_c	coefficient of curvature, $(D_{30})^2 / (D_{10} \times D_{60})$
C_u	coefficient of uniformity, D_{60}/D_{10}
C_c	compression index for one dimensional consolidation
C_α	coefficient of secondary compression
c_v	coefficient of consolidation
c	cohesion intercept for total stresses
c'	cohesion intercept for effective stresses
D	diameter of specimen
D	damping ratio
D_{10}	diameter at which 10% of soil is finer
D_{15}	diameter at which 15% of soil is finer
D_{30}	diameter at which 30% of soil is finer
D_{50}	diameter at which 50% of soil is finer
D_{60}	diameter at which 60% of soil is finer
D_{85}	diameter at which 85% of soil is finer
d_{50}	displacement for 50% consolidation
d_{90}	displacement for 90% consolidation
d_{100}	displacement for 100% consolidation
E	Young's modulus
e	void ratio
e_c	void ratio after consolidation
e_o	initial void ratio
G	shear modulus
G_s	specific gravity of soil particles
H	height of specimen
H_R	Rebound Hardness number
i	gradient
I_S	Uncorrected point load strength
$I_{S(50)}$	Size corrected point load strength index
H_A	Modified Taber Abrasion
H_T	Total hardness
K_o	lateral stress ratio for one dimensional strain
k	permeability
LI	Liquidity Index
m_v	coefficient of volume change
n	porosity
PI	plasticity index
P_c	preconsolidation pressure
p	$(\sigma_1 + \sigma_3) / 2$, $(\sigma_v + \sigma_h) / 2$
p'	$(\sigma'_1 + \sigma'_3) / 2$, $(\sigma'_v + \sigma'_h) / 2$
p'_c	p' at consolidation
Q	quantity of flow
q	$(\sigma_1 - \sigma_3) / 2$
q_f	q at failure
q_o, q_i	initial q
q_c	q at consolidation
S_r	Post cyclic undrained shear strength
T	temperature
t	time
U, UC	unconfined compression test
UU, Q	unconsolidated undrained triaxial test
u_a	pore gas pressure
u_e	excess pore water pressure
u, u_w	pore water pressure
V	total volume
V_g	volume of gas
V_s	volume of solids
V_s	shear wave velocity
V_v	volume of voids
V_w	volume of water
V_o	initial volume
v	velocity
W	total weight
W_s	weight of solids
W_w	weight of water
w	water content
w_c	water content at consolidation
w_f	final water content
w_l	liquid limit
w_n	natural water content
w_p	plastic limit
w_s	shrinkage limit
w_o, w_i	initial water content
α	slope of q_f versus p_f
α'	slope of q_f versus p_f'
γ_t	total unit weight
γ_d	dry unit weight
γ_s	unit weight of solids
γ_w	unit weight of water
ε	strain
ε_{vol}	volume strain
ε_h, ε_v	horizontal strain, vertical strain
μ	Poisson's ratio, also viscosity
σ	normal stress
σ'	effective normal stress
σ_c, σ'_c	consolidation stress in isotropic stress system
σ_h, σ'_h	horizontal normal stress
σ_v, σ'_v	vertical normal stress
σ'_{vc}	Effective vertical consolidation stress
σ_1	major principal stress
σ_2	intermediate principal stress
σ_3	minor principal stress
τ	shear stress
φ	friction angle based on total stresses
φ'	friction angle based on effective stresses
φ'_r	residual friction angle
φ_{ult}	φ for ultimate strength