



## Limited Subsurface Investigation Scope and Procedure

PWGC performed a limited subsurface investigation in January 2022 to investigate the on-site subsurface soil conditions. Two (2) geotechnical soil borings (B-1 & B-2) were conducted, and three (3) temporary groundwater monitoring wells (MW-1, MW-2 & MW-3) were installed. A data logger was installed for a 1-month period in MW-1 to continuously record groundwater fluctuations from tidal patterns and precipitation. The boring and well locations were coordinated with the site plan to correspond to the locations of the proposed pool, drainage structures and Sewage Treatment Plant (STP).

The borings were conducted using a Geoprobe drill rig equipped with an automatic hammer and split-spoon sampling unit. The drill rig was contracted from Land Air Water Environmental Services (LAWES) based in Center Moriches, New York. Standard Penetration Testing (SPT) was conducted in the geotechnical soil borings per ASTM 1586 with a 2" diameter, 2'0" long split spoon sampler. SPT blow counts and soil samples were taken continuously from the surface down to 16' below grade surface (bgs).

The borehole and well locations can be found in the attached Boring Location Plan. Field test results and soil descriptions can be found in the attached boring logs and well logs. Soil was classified based on the Unified Soil Classification System (USCS) per ASTM D2488. Boring surface elevations were determined from the site survey.

## Findings – Geotechnical Borings

The two (2) geotechnical borings encountered tan and light brown, fine to coarse grained sands with trace amounts of gravel. The tan sands were classified as SP and SW in accordance with USCS. The sands transitioned in color from tan & light brown to grey at approximately 8 ft bgs.

The sands were mostly loose in terms of relative density as found from the SPT blow counts. The allowable bearing capacity from borings B-1 and B-2 was found to vary between 0.5 to 1.0 tons per square foot at foundation bearing levels. Loose sands ( $N < 10$ ) provide poor bearing conditions for foundations, which indicates that pile supported foundations may likely be required. The decision to support structures on piles will ultimately result from the findings of the future Geotechnical Report and proposed structure(s) loading conditions from the project Structural Engineer.

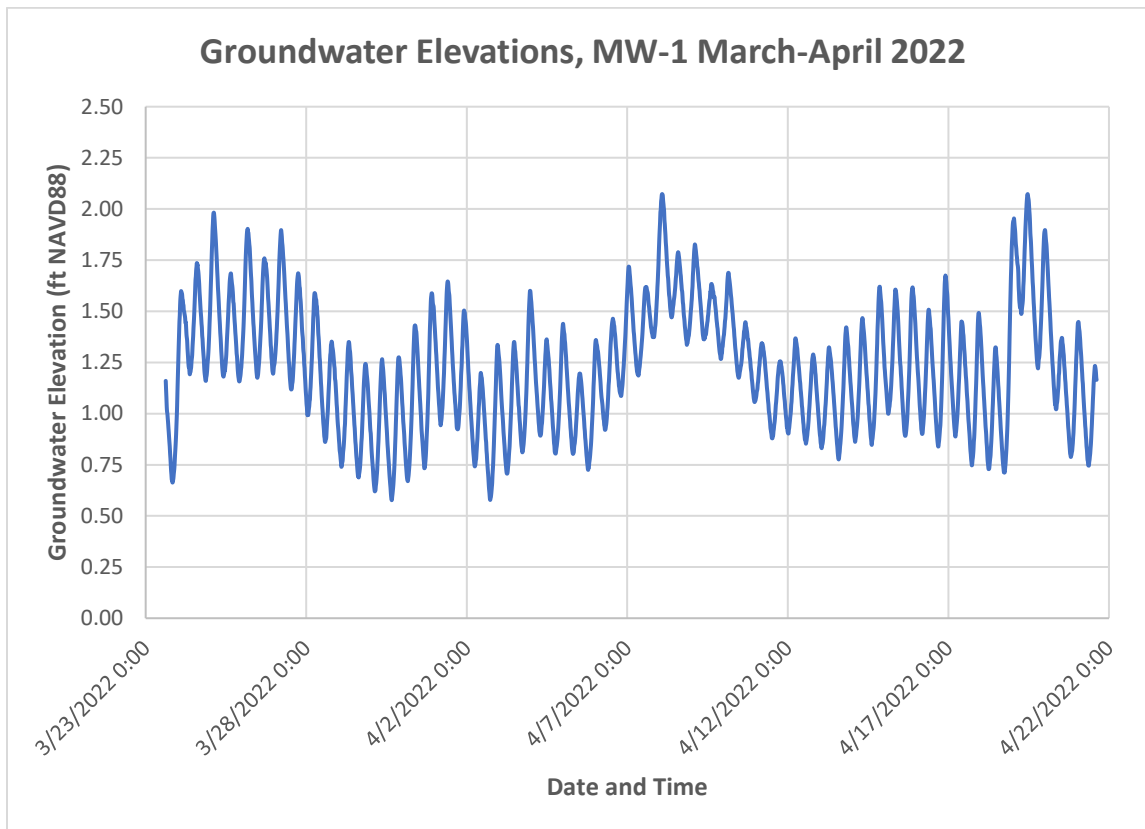
## Findings – Groundwater

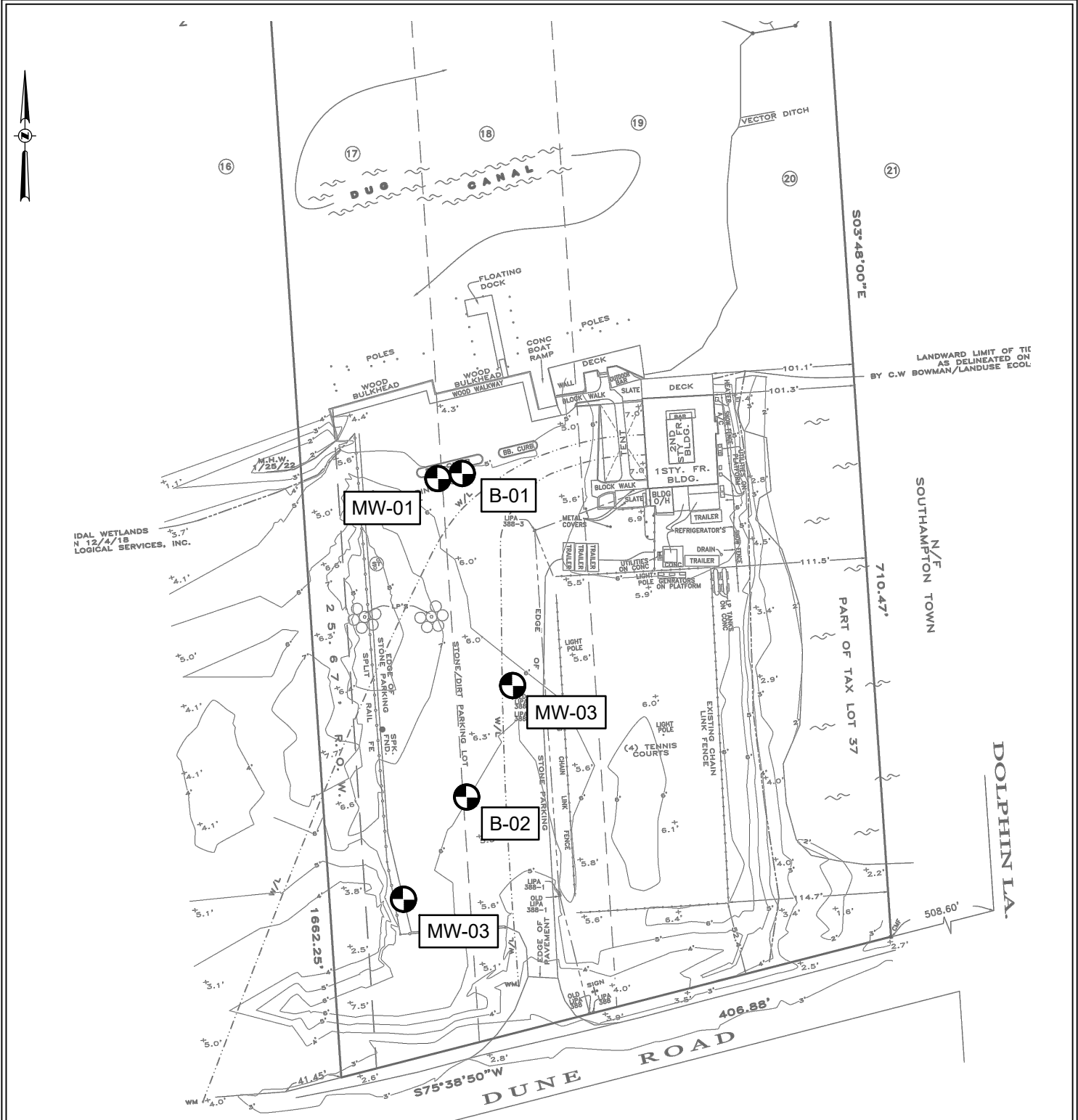
Three (3) monitoring wells were installed on-site. MW-1 was located furthest north in the location of the proposed pool. MW-2 and MW-3 were located in the existing parking lot, with MW-3 being near the southwest corner and MW-2 located between MW-1 and MW-3. Depth to water readings were measured in each monitoring well on the installation day. The table below lists the manual depth-to-water readings measured on January 14<sup>th</sup>, 2022 at 1pm.



MW Number	Surface Elevation (ft NAVD88)	Depth to Water Below Existing Grade (ft)	Groundwater Elevation (ft NAVD88)	Date
MW-1	+5.30	4.23	+1.07	1/14/22
MW-1	+5.30	4.14	+1.16	3/23/22
MW-2	+6.00	5.23	+0.77	1/14/22
MW-3	+6.35	4.80	+1.55	1/14/22

A data logger was installed on March 23, 2022 in MW-1 for a period of 28-days. The data logger continuously recorded fluctuations in groundwater levels due to tidal patterns and precipitation. The data logger recorded a high groundwater elevation of El. +2.07' NAVD88 on 4/8/2022. Regular, 12-hr tidal patterns caused groundwater to fluctuate by approximately 0.75'.





SITE SURVEY  
 SOURCE: RAYNOR, MARCKS & CARRINGTON  
 DATED: 4/14/22

BOREHOLE DEPTHS: B-01 = 16'  
 B-02 = 16'




# BORING LOCATION PLAN

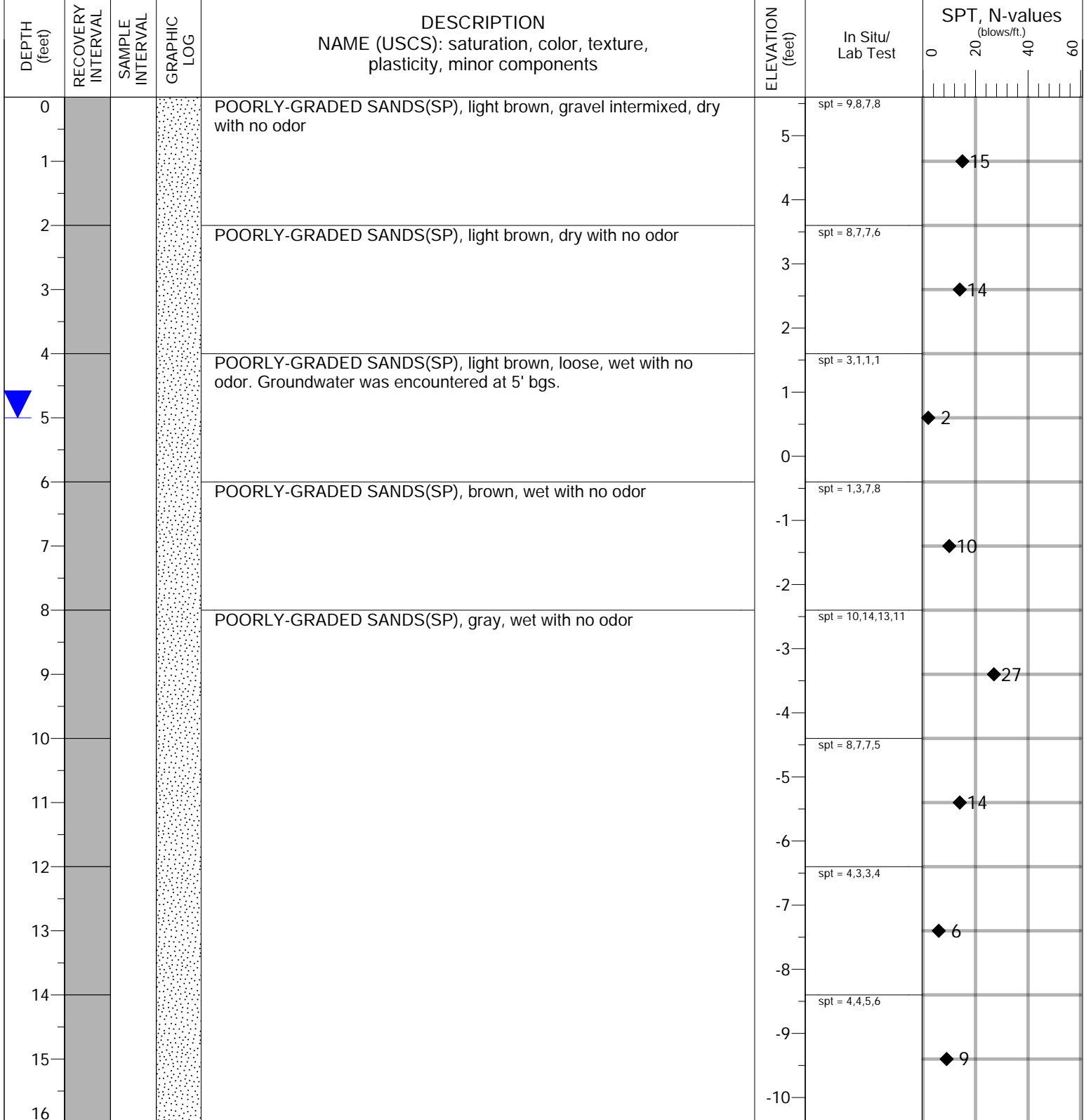
SCALE - 1:100


94 DUNE ROAD  
 QUOGUE, NY 11942

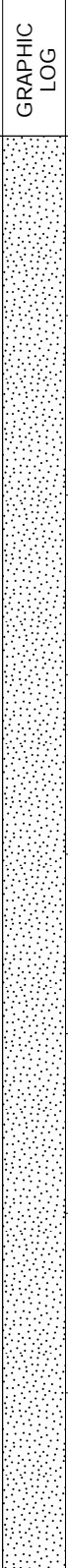
Project:	DRH
Designed by:	
Approved by:	
Drawn by:	BH
Date:	3/31/2021
Figure No:	-

Unauthorized alteration or addition to this drawing and related documents is a violation of Sect. 7209 of the New York State Education Law

PROJECT #:	DRH2102		
SITE ADDRESS:	96 Dune Road, East Quogue, NY		
BORING ID:	B-1	BORING DEPTH (FT): 16	BORING DIAMETER (IN): 2
DRILLING CONTRACTOR:	Land Air Water	DATE STARTED: 01/14/2022	DATE FINISHED: 01/14/2022
DRILLING METHOD:	Automtic Hammer	TIME STARTED: 07:30	TIME FINISHED: 08:10
DRILLING EQUIPMENT:	Geoprobe 7822 DT	LATITUDE: N/A	LONGITUDE: N/A
SAMPLING METHOD:	Split spoon	PROJECT MANAGER: Brian Heflich	LOGGED BY: Will Hamilton



PROJECT #:	DRH2102		
SITE ADDRESS:	96 Dune Road, East Quogue, NY		
BORING ID:	B-2	BORING DEPTH (FT): 16	BORING DIAMETER (IN): 2
DRILLING CONTRACTOR:	Land Air Water	DATE STARTED: 01/14/2022	DATE FINISHED: 01/14/2022
DRILLING METHOD:	Automtic Hammer	TIME STARTED: 09:45	TIME FINISHED: 10:45
DRILLING EQUIPMENT:	Geoprobe 7822 DT	LATITUDE: N/A	LONGITUDE: N/A
SAMPLING METHOD:	Split spoon	PROJECT MANAGER: Brian Heflich	LOGGED BY: Will Hamilton

DEPTH (feet)	RECOVERY INTERVAL	SAMPLE INTERVAL	GRAPHIC LOG	DESCRIPTION NAME (USCS): saturation, color, texture, plasticity, minor components	ELEVATION (feet)	In Situ/ Lab Test	SPT, N-values (blows/ft.)			
							0	20	40	60
0				POORLY-GRADED SANDS(SP), brown, gravel with trace sand, loose, dry with no odor	5	spt = 4,4,5,4				
1						4		◆ 9		
2				POORLY-GRADED SANDS(SP), light brown, loose, dry with no odor	3	spt = 4,3,3,2				
3					2		◆ 6			
4				POORLY-GRADED SANDS(SP), brown, loose, wet with no odor. Groundwater was encountered at 5' bgs.	1	spt = 2,3,3,4				
5					0		◆ 6			
6				POORLY-GRADED SANDS(SP), brown, loose, wet with no odor	-1	spt = 2,2,1,2				
7					-2		◆ 3			
8				POORLY-GRADED SANDS(SP), gray, loose, wet with no odor	-3	spt = 2,1,5,5				
9					-4		◆ 6			
10			POORLY-GRADED SANDS(SP), gray, wet with no odor	-5	spt = 4,5,6,6					
11				-6		◆ 11				
12			POORLY-GRADED SANDS(SP), gray, loose, wet with no odor	-7	spt = 3,3,4,5					
13				-8		◆ 7				
14			POORLY-GRADED SANDS(SP), gray, wet with no odor	-9	spt = 4,8,10,11					
15				-10		◆ 18				

## USCS SOIL CLASSIFICATION GUIDE

MAJOR DIVISIONS		LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE)	GRAVEL AND GRAVELLY SOILS (MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE)	CLEAN GRAVELS (LITTLE OR NO FINES)	<b>GW</b> WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			<b>GP</b> POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	<b>GM</b> SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			<b>GC</b> CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS (MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE)	CLEAN SAND (LITTLE OR NO FINES)	<b>SW</b> WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			<b>SP</b> POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	<b>SM</b> SILTY SANDS, SAND-SILT MIXTURES
			<b>SC</b> CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE)	SILTS AND CLAYS (LIQUID LIMITS LESS THAN 50)	<b>ML</b> INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
		<b>CL</b> INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
		<b>OL</b> ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
	SILTS AND CLAYS (LIQUID LIMITS GREATER THAN 50)	<b>MH</b> INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS	
		<b>CH</b> INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
		<b>OH</b> ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
HIGHLY ORGANIC SOILS		<b>PT</b> PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS	



## RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

For Sands, Gravels:

Non-Cohesive Soils	N Value (Blows/ft)
Very Loose	0 – 4
Loose	4 – 10
Medium Dense	10 – 30
Dense	30 – 50
Very Dense	50+

For Clays, Silts, Organics:

Cohesive Soils	N Value (Blows/ft)
Very Soft	0 – 2
Soft	2 – 4
Medium (Firm)	4 – 8
Stiff	8 – 15
Very Stiff	15 – 30
Hard	30+

### DEFINITIONS OF IDENTIFICATION TERMS FOR GRANULAR SOILS

#### Principal Component (All Capitalized)

- GRAVEL More than 50% of the sample by weight is Gravel
- SAND More than 50% of the sample by weight is Sand
- SILT More than 50% of the sample by weight is Silt

#### Minor Component (Proper Case)

- Gravel Less than 50% of the sample by weight is Gravel
- Sand Less than 50% of the sample by weight is Sand
- Silt Less than 50% of the sample by weight is Silt

#### Proportion terms, for Minor Components

- and Component ranges from 35% to 50% of the sample by weight
- Some Component ranges from 20% to 35% of the sample by weight
- Little Component ranges from 10% to 20% of the sample by weight
- trace Component ranges from 0% to 10% of the sample by weight

#### Size of Soil Components


- Gravel
  - Coarse gravel ranges from 3 inches to 1 inch
  - Medium gravel ranges from 1 inch to 3 / 8 inch
  - Fine gravel ranges from 3 / 8 inch to No. 10 sieve
- Sand
  - Coarse sand ranges from No. 10 sieve to No. 30 sieve
  - Medium sand ranges from No. 30 sieve to No. 60 sieve
  - Fine sand ranges from No. 60 sieve to No. 200 sieve
- Silt
  - Material which passes the No. 200 sieve
- Clay
  - Material which passes the No. 200 sieve
  - Exhibits varying degrees of plasticity

#### Laboratory Test Abbreviation

Laboratory Tests	Abbreviation
Atterberg	ATG
Moisture Content	MC
Sieve Analysis	SA


#### Gradation Designations

- Coarse to fine (c-f) All fractions greater than 10% of the component
- Coarse to medium (c-m) Less than 10% of the component is fine
- Medium to fine (m-f) Less than 10% of the component is coarse
- Coarse (c) Less than 10% of the component is medium and fine
- Medium (m) Less than 10% of the component is coarse and fine
- Fine (f) Less than 10% of the component is coarse and medium


PROJECT #:	DRH2101		
SITE ADDRESS:	96 Dune Rd, East Quogue, NY		
BORING ID:	MW-1	BORING DEPTH (FT): 10	CORE LENGTH (FT): NA
WELL ID:	MW-1	BORING DIAMETER (IN): 2	WELL DIAMETER (IN): NA
DRILLING CONTRACTOR:	Land Air Water	DATE STARTED: 01/14/2022	DATE FINISHED: 01/14/2022
DRILLING METHOD:		TIME STARTED: 07:30	TIME FINISHED: 08:10
DRILLING EQUIPMENT:	Geoprobe 7822 DT	LATITUDE: NA	LONGITUDE: NA
SAMPLING METHOD:		PROJECT MANAGER: Brian Heflich	LOGGED BY: Will Hamilton

DEPTH (feet)	SAMPLE INTERVAL	USCS KEY	RECOVERY (feet)	DESCRIPTION NAME (USCS): color, moist, plasticity, gravel, odor	PID Reading (ppm)	DEPTH (feet)	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
0.0						0.0	Well cap
0.5						0.5	
1.0						1.0	
1.5						1.5	
2.0						2.0	4" diameter borehole
2.5						2.5	
3.0						3.0	
3.5						3.5	Bentonite chip seal
4.0						4.0	2" diameter Schedule 40 PVC casing
4.5						4.5	
5.0						5.0	2" diameter, 0.010" slot, Schedule 40 Pre-Pack PVC screen
5.5						5.5	
6.0						6.0	#2/16 filter pack sand
6.5						6.5	
7.0						7.0	
7.5						7.5	
8.0						8.0	
8.5						8.5	
9.0						9.0	
9.5						9.5	
10.0						10.0	2" diameter Schedule 40 PVC end cap

Surface Elevation = 5.30' NAVD88  
 Groundwater Readings:  
 01/14/2022, 13:00 - 4.23' bgs (Approx. EL +1.07')  
 03/23/2022, 14:45 - 4.14' bgs (Approx. EL +1.16')

PROJECT #:	DRH2101		
SITE ADDRESS:	96 Dune Rd, East Quogue, NY		
BORING ID:	MW-2	BORING DEPTH (FT): 10	CORE LENGTH (FT): NA
WELL ID:	MW-2	BORING DIAMETER (IN): 2	WELL DIAMETER (IN): NA
DRILLING CONTRACTOR:	Land Air Water	DATE STARTED: 01/14/2022	DATE FINISHED: 01/14/2022
DRILLING METHOD:		TIME STARTED: 09:45	TIME FINISHED: 10:45
DRILLING EQUIPMENT:	Geoprobe 7822 DT	LATITUDE: NA	LONGITUDE: NA
SAMPLING METHOD:		PROJECT MANAGER: Brian Heflich	LOGGED BY: Will Hamilton

DEPTH (feet)	SAMPLE INTERVAL	USCS KEY	RECOVERY (feet)	DESCRIPTION NAME (USCS): color, moist, plasticity, gravel, odor	PID Reading (ppm)	DEPTH (feet)	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
0.0						0.0	Well cap
0.5						0.5	
1.0						1.0	
1.5						1.5	
2.0						2.0	4" diameter borehole
2.5						2.5	
3.0						3.0	
3.5						3.5	Bentonite chip seal
4.0						4.0	2" diameter Schedule 40 PVC casing
4.5						4.5	
5.0				Surface Elevation = 6.00' NAVD88 Groundwater Readings: 01/14/2022, 13:00 - 5.23' bgs (Approx. EL +0.77')		5.0	2" diameter, 0.010" slot, Schedule 40 Pre-Pack PVC screen
5.5						5.5	
6.0						6.0	
6.5						6.5	
7.0						7.0	#2/16 filter pack sand
7.5						7.5	
8.0						8.0	
8.5						8.5	
9.0						9.0	
9.5						9.5	
10.0						10.0	2" diameter Schedule 40 PVC end cap

PROJECT #:	DRH2101		
SITE ADDRESS:	96 Dune Rd, East Quogue, NY		
BORING ID:	MW-3	BORING DEPTH (FT): 10	CORE LENGTH (FT): NA
WELL ID:	MW-3	BORING DIAMETER (IN): 2	WELL DIAMETER (IN): NA
DRILLING CONTRACTOR:	Land Air Water	DATE STARTED: 01/14/2022	DATE FINISHED: 01/14/2022
DRILLING METHOD:		TIME STARTED: 11:20	TIME FINISHED: 11:55
DRILLING EQUIPMENT:	Geoprobe 7822 DT	LATITUDE: NA	LONGITUDE: NA
SAMPLING METHOD:		PROJECT MANAGER: Brian Heflich	LOGGED BY: Will Hamilton

