Horsley Witten Group
Sustainable Environmental Solutions
90 Route 6A • Unit 1 • Sandwich, MA 02563
508-833-6600 • horsleywitten.com

MEMORANDUM

To: Mr. Kenneth Buckland (Town of Wareham)

From: Neal Price

Date: March 25th, 2022

Re: Field Work Progress Report – Proposed Fearing Hill Solar Facility

cc: Richard Tabacynski (Atlantic Design Engineers), Joseph Shanahan (Wareham MA 3, LLC)

The Horsley Witten Group, Inc. (HW) is pleased to submit this memorandum summarizing field work recently completed at the site of the proposed solar facility on Fearing Hill in Wareham, Massachusetts. Field work was primarily conducted by Atlantic Design Engineers, Inc. (Atlantic) and its subcontractors, with frequent site observations made by HW. The completed field work includes:

- Digging of eight test pits;
- Conduction of three percolation tests;
- Drilling of six monitoring wells;
- Survey of monitoring well locations and elevations; and
- Collection of water level data manually and using automated water level data loggers.

Maps detailing the locations of the test pits, percolation tests, and monitoring wells are attached, along with the pertinent Title 5 Forms, well boring logs, and well completion reports.

Following completion of the test pits and monitoring wells, HW collected three rounds of water level measurements from the monitoring wells to date, installed data loggers in three of the monitoring wells, and (using survey information provided by Atlantic) produced water table maps for the site for two different dates (attached). HW is currently conducting preliminary hydrogeologic and hydrologic analyses to model groundwater flow at the site, understand runoff effects under existing and proposed conditions, and anticipate groundwater mounding beneath the proposed stormwater management facilities.

Test Pits and Percolation Tests

Test pits (TPs) were dug by Zenith Consulting Engineers, LLC. (ZCE) with HW personnel observing. The first test pit was dug on December 8th, 2021, but due to access limitations, the other test pits and percolation tests were delayed until paths were cleared a few weeks later. The remaining test pits were completed January 5th and 6th, 2022. Please see Attachment A for locations of the TPs and percolation tests, and Attachment B for the TP soil logs and results of the percolation tests.

The following summarizes observed test pit conditions:

- TP-1 is the southernmost test pit at the proposed Fearing Hill Solar Facility site and is located on the bottom of the southwestern slope of Fearing Hill. It was excavated to a depth of 9.5 feet (114 inches). The topsoil extended to seven inches below grade, followed by primarily Loamy Sand. Estimated depth to seasonal high groundwater (ESHGW) was indicated by soil mottling at 26 inches below ground surface. Groundwater was observed weeping at 58 inches below ground surface. A percolation test conducted in TP1 yielded a percolation rate of 13 minutes per inch.
- TP-2 is the westernmost test pit and is located approximately 400 feet northwest of TP-1 near the bottom of the southwestern downslope of Fearing Hill. It was excavated to a depth of eight feet (96 inches). The topsoil extended down to 12 inches below grade, followed primarily by Sandy Loam. ESHGW was indicated by soil mottling at 20 inches below ground surface, which was also the depth where the Sandy Loam transitioned to medium sand. The soil texture changed from medium sand to medium to coarse sand and gravel at a depth of 58 inches. Groundwater was observed weeping at 44 inches below ground surface, and standing water was encountered at a depth of 68 inches. A percolation test at TP-2 yielded a percolation rate of less than two minutes per inch.
- TP-3 is located roughly 150 feet northeast of TP-2, directly upgradient towards the crest on the southwest slope of Fearing Hill. It was excavated to a depth of 100 inches (8.33 feet). Topsoil extended to six inches below ground surface, followed by Loamy Sand between 6-18 inches below grade, medium sand between 18-56 inches, and Loamy sand from 56 inches to the bottom. ESHGW was indicated by mottling at 20 inches below grade, and groundwater was observed weeping at 52 inches below grade. No standing water was present.
- TP-4 is located approximately 300 feet northeast of TP-3, at the top of Fearing Hill. It was dug to a depth of eight feet (96 inches). Topsoil was present to eight inches below ground surface, before transitioning to Sandy Loam. ESHGW was indicated by mottling at 42 inches below grade. No weeping or standing groundwater were observed.
- TP-5 is located about 200 feet northeast of TP-4, on the northeastern downslope of Fearing Hill. It was excavated to a depth of 92 inches (7.66 feet), with topsoil extending to eight inches in depth. Sandy Loam subsoil was then encountered between 8 inches in depth to the bottom of the pit. ESHGW was indicated by mottling at 28 inches below grade. No weeping or standing groundwater were observed at the time of excavation. The soils at TP-5 were deemed too compact to perform a percolation test.
- TP-6 was located about 200 feet northwest of TP-5, and almost 250 feet due north from TP-4, on the northeastern downslope of Fearing Hill. Topsoil extended to a depth of eight inches, followed by Sandy Loam subsoil down to the excavated depth of 118 inches (~9.8 feet). ESHGW was indicated by soil mottling at 38 inches below grade. No weeping or standing groundwater was observed.
- TP-7 is the southeasternmost test pit at the site, located roughly 500 feet east of TP-1. Topsoil extended to a depth of eight inches, followed by Sandy Loam subsoil down to

the excavated depth of eight feet (96 inches). ESHGW was indicated by soil mottling at 26 inches below grade. No weeping or standing groundwater was observed.

- TP-8 is located about 200 feet southeast of TP-5, and about 300 feet due east of TP-4, on the northeastern slope of Fearing Hill. Topsoil extended to a depth of eight inches, followed by Sandy Loam subsoil down to the excavated depth of 110 inches (~9.16 feet). ESHGW was indicated by soil mottling at a depth of 36 inches. No weeping or standing groundwater was observed.

Monitoring Well Installation

Monitoring well (MW) installations were overseen by Atlantic Design Engineers, Inc. (ADE) with observation by HW personnel. The boreholes were drilled by Northern Drill Service between January 10th and January 13th, 2022 using drive and wash methodology with 2-foot long split spoon samples collected at every 5-foot depth interval below the advancement of drilling in order to characterize the subsurface materials encountered. The locations of each monitoring well are shown on Attachment C. Drill rig access to the forested site was difficult. To minimize the amount of tree-clearing disturbance monitoring wells were located along the site perimeter and at or near the network of existing cart paths in the site interior. Due to tree blowdowns during storm events in the fall of 2021, significant clearing of down trees was required to obtain access even along the existing cart paths. Despite access limitations, monitoring wells were able to be placed in suitable locations to identify groundwater variations across the site.

With the exception of MW-1, all monitoring wells were completed with 10 feet of slotted PVC screen spanning from approximately 2 feet above the water table to 8 feet below the water table. Well screens were backfilled with bagged medium to coarse sand to ensure good communication between the well and the surrounding formation. At the MW-1 location, adjacent shallow and deep monitoring wells were installed in order to observe the presence of any potential vertical gradients. The shallow well has 2 feet of screen at and immediately below the water table while the deep well has 10 feet of screen with the bottom immediately above bedrock. Monitoring wells were completed with bagged sand to 2 feet above the screen, followed by 2 feet of bentonite chips, then sand to just below ground surface (BGS), concrete at the ground surface, PVC casing sticking up above the ground surface by approximately 2 to 3 feet, and a steel protective casing with a locking cap. Well Completion Reports are included herein as Attachment D. HW-produced boring logs for the wells can be seen in Attachment E with more detailed soil descriptions than shown on the Driller's logs.

The following summarizes the observed MW installations:

- MW-1 was drilled and completed on January 10th, 2022. Due to access constraints, MW-1 was drilled approximately 120 feet east of the original intended location. It is the southernmost monitoring well and is closest to Fearing Hill Road. When MW-1 was first being drilled, a boulder halted drilling operations approximately 13 feet BGS. MW-1 was then re-drilled several feet adjacent to the first borehole. The final MW-1 borehole was drilled to a refusal depth of 36 feet. Bedrock was encountered at 34 feet. Groundwater

was encountered approximately 3 feet BGS. Subsurface materials were observed to become somewhat coarser with depth.

A monitoring well was constructed in this boring with the bottom 10 feet of the hole above bedrock screened with slotted PVC. A second adjacent monitoring well with 2-feet of slotted PVC screen was placed at the water table from 3 to 5 feet BGS. The shallow well is depicted on the Attachment C map as Monitoring Well SC-1. Going forward, HW will be referring to these two wells as MW-1S and MW-1D, indicating shallow and deep well screens. The adjacent wells, screened at different depths, will help to identify the potential presence of any vertical groundwater gradients.

- MW-2 was completed on January 11th, 2022. It is located about 450 feet northwest of MW-1 and is the westernmost monitoring well at the site. Bedrock was encountered at 31 feet BGS, with refusal at 34 feet. Groundwater was encountered approximately 3.5 feet BGS. The subsurface materials encountered were primarily medium to coarse Sand with minimal gradation with depth.
- MW-3 was completed on January 12th, 2022 and is the northernmost monitoring well at the Fearing Hill site. Groundwater was encountered at approximately 10 feet BGS, and bedrock was encountered at 33 feet BGS. The subsurface materials encountered were primarily fine to medium Sand with some fining with depth.
- MW-4 was drilled on January 13th, 2022, near the crest of Fearing Hill. It is approximately 350 feet to the south of MW-3. Groundwater was encountered at approximately 13.5 feet BGS, and bedrock at 16.5 feet BGS. The subsurface materials encountered were primarily fine to medium Sand with some fining with depth.
- MW-5 was also completed on January 13th, 2022, about 560 feet to the southeast of MW-4. The subsurface materials encountered were primarily fine to medium Sand with minimal coarsening with depth. Groundwater was encountered at approximately 7 feet BGS during drilling, and bedrock was encountered at 19 feet BGS. Note that the groundwater level observation during drilling appears to have been artificially influenced by the drilling process as the well was observed to be dry at subsequent water level measurement rounds on January 26th and February 9th, 2022, despite the well being screened as deep as possible, immediately above bedrock.

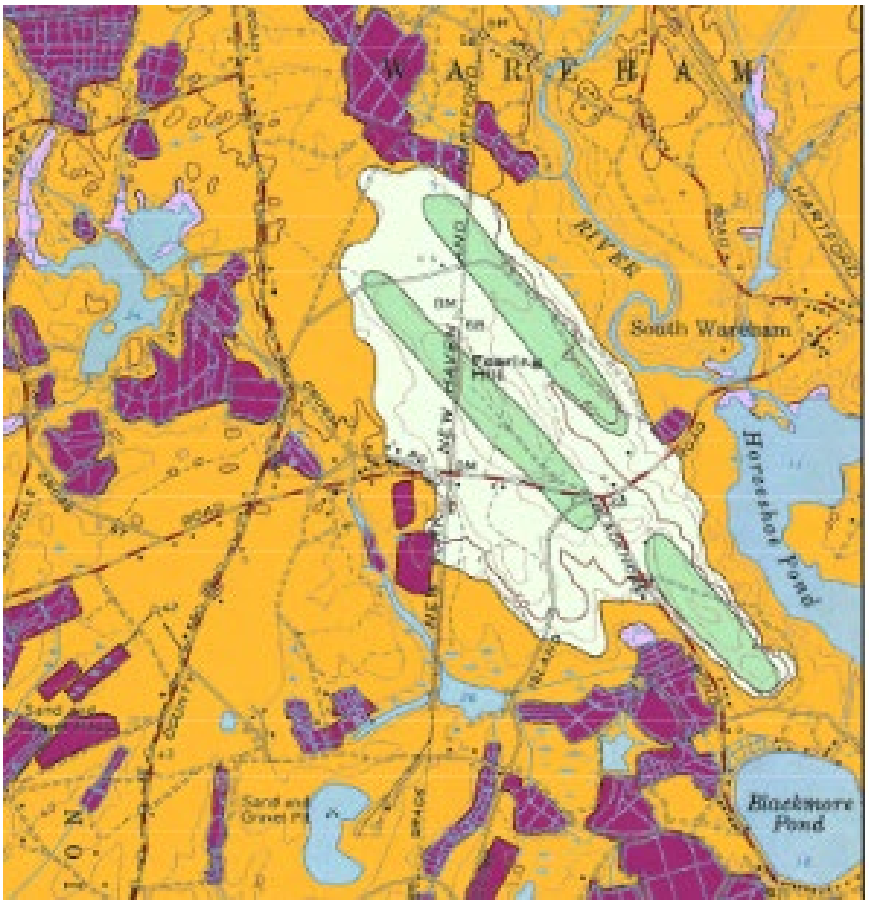
The subsurface drilling program revealed geologic materials generally, though not fully, consistent with USGS surficial geologic mapping of the area. Figure 1 shows the USGS surficial geologic mapping for the site area as shown on the Snipatuit Pond Quadrangle Map. The darker green color covering the crest of Fearing Hill is defined by USGS as Thick Till and described as a non-sorted, non-stratified matrix of sand, some silt, and little clay containing some cobbles and boulders that becomes very compact at depth. This unit is described as being mostly associated with drumlin landforms where till thickness commonly exceeds 100 feet. While the subsurface materials encountered at Fearing Hill are compact, as described by the USGS for Thick Till drumlin landforms, and the northwest to southeast orientation of Fearing Hill matches that of other drumlins in the nearby area and broader region of eastern Massachusetts, the depths to bedrock observed at Fearing Hill (as shallow as 16.5 feet at MW-4 at the crest of the

hill) are far less than the 100-foot or greater thicknesses described for this drumlin-type unit by USGS. In addition, the subsurface materials encountered at Fearing Hill are in general somewhat coarser grained than the USGS description for Thick Till associated with drumlins.

The lighter colored green comprising the lower elevations of the site and immediate surrounding area are defined by USGS as Thin Till and described as a non-sorted, non-stratified matrix of sand, some silt, and little clay containing some cobbles and boulders that is loose to moderately compact, and where till thickness is generally less than 10 to 15 feet. In some regard, the USGS description for Thin Till is a better match for observed subsurface conditions on site than is Thick Till. On the other hand, the northwest to southeast orientation of Fearing Hill is consistent with drumlin orientation. Whether the Fearing Hill site is actually Thin Till, as opposed to a Thick Till drumlin landform is not significant for the overall hydrogeologic assessment purposes of this project. Subsurface materials encountered on site have generally low permeability and high runoff characteristics, regardless of the mapped landform type.

Other geologic materials mapped by USGS for the site area and shown on Figure 1 are coarse-grained glacial outwash deposits in orange and cranberry bogs in purple.

Figure 1. USGS Surficial Geologic Mapping of Site Area



Survey

Atlantic surveyed the Fearing Hill site on January 25th, 2022 and collected location and elevation data for each monitoring well. The spatial data is in reference to the North American Datum of 1983 (NAD 83), feet, and the elevation data is in reference to the North American Vertical Datum of 1988 (NAVD 88), feet. Survey data are displayed below in Table 1.

Table 1. Elevation and location data for Fearing Hill monitoring wells.

Monitoring Well	Northing (ft)	Easting (ft)	Ground Elevation (ft)	Top of PVC Elevation (ft)
MW-1	2741042	856272.4	62.26	65.13
MW-2	2741452	856079.4	64.55	67.44
MW-3	2741903	856664.6	80.90	83.44
MW-4	2741556	856675.9	89.92	92.27
MW-5	2741177	857095.0	83.24	85.99
MW-1S (SC-1)	2741050	856276.4	61.89	64.55

Water Table Measurements

Depth-to-water (DTW) and total-well-depth (TWD) measurements were taken by HW as drilling was completed on January 12th and13th, and then twice after on January 26th and February 9th, 2022. Measurements were taken in feet from the top of the PVC casing using a Heron Dipper-T water-level meter. Using the top of PVC monitoring well elevations surveyed by Atlantic, the depth-to-water measurements were then converted to water table elevation data and are listed below in Tables 2-4.

Table 2. DTW and TWD measurements: January 12th and January 13th, 2022

Well	Date	Depth to Water (ft)	Water Table Elevation (ft)	Total Well Depth (ft)
MW-1D	1/12/22	5.43	59.7	36.74
MW-1S	1/12/22	3.53	61.02	6.72
MW-2	1/12/22	5.92	61.52	14.90
MW-3	1/12/22	12.46	70.98	19.90
MW-4	1/13/22	15.42	76.85	18.32
MW-5	Did not measure. Well not yet completed	N/A	N/A	N/A

Table 3. DTW and TWD measurements: January 26th, 2022

Well	Depth to Water (ft)	Water Elevation (ft)	Total Well Depth (ft)
MW-1D	5.84	59.29	N/A
MW-1S	3.85	60.70	N/A
MW-2	6.39	61.05	N/A
MW-3	12.65	70.79	N/A
MW-4	16.11	76.16	N/A
MW-5	Dry	<66.41	19.58

Table 4. DTW measurements: February 9th, 2022

Well	Depth to Water (ft)	Water Elevation (ft)
MW-1D	3.91	61.22
MW-1S	2.09	62.46
MW-2	4.54	62.90
MW-3	11.13	72.31
MW-4	15.42	76.85
MW-5	Dry	<66.41

Water Table Mapping

HW made two water table elevation maps using the data from the January 26th and February 9th site visits (Attachment F, Figures 2 and 3). Initial water level measurements from January 12th and 13th, 2022 were not used because the MW-5 well was not yet complete at those times and because measurements taken immediately after drilling are frequently inaccurate due to the artificial influences of the drilling process. Water table mapping from the MW-1 location used data from the MW-1S shallow well in order to use consistent data from only wells screened at the water table.

Water table conditions at the site changed between the two visits. On January 26th, there was little to no snow on the ground, and according to a local weather station approximately half a mile from the site (station ID KMAWESTW35), the last significant precipitation event occurred 11 days prior on January 17th with 0.42 inches of rain. A total of 2.29 inches of precipitation occurred between the January 26th and February 9th site visits. At the time of the February 9th site visit there was a noticeable amount of snow and standing water at the lower elevations at the site. These wetter conditions are reflected in the water level data as water elevations rose between 0.69 and 1.93 feet in the various monitoring wells between January 26th to February 9th, 2022. As expected, there was a greater increase in water table elevation on the sides of the hill, and a lesser increase at the top, as groundwater flowed downhill away from the topographic high. MW-5 remained dry during both site visits.

Other than the overall wetter conditions observed at the February 9th site visit relative to the January 26th visit, both water table maps show a consistent pattern of groundwater flow radiating outward from the top of Fearing Hill towards the perimeter of the hill to the west, southwest, south, southeast, and east. No data are available to assess groundwater flow to the north.

Water level data from the shallow and deep well cluster at location MW-1 revealed a strong downward gradient (0.41 and 0.24 feet, respectively for January 26th and February 9th) during both measurement rounds. This downward gradient is indicative of prevailing groundwater recharge conditions with groundward traveling downward at the site before moving laterally away from the hill.

Water Level Logger Installation

On February 9th, 2022, Van Essen Diver brand automated water level loggers were placed in wells MW-1, MW-3, and MW-4. A separate logger to record barometric pressure was placed on site. The loggers were programmed to take readings every two hours starting at 11:00 on February 9th and will collect data over the next several months. The longer-term data recorded by these loggers will be evaluated for seasonal trends.

Next Steps

HW is currently evaluating the hydrology and hydrogeology of the Fearing Hill site, which includes:

- HydroCAD analyses of rainfall and runoff under existing and proposed conditions
- Groundwater mounding analysis beneath proposed stormwater management facilities
- MODFLOW groundwater modeling of groundwater flow conditions at and around the site.

The methods and results of these analyses will be compiled with the data and findings presented in this fieldwork report into a summary letter for the Town of Wareham.

Attachments:

Test Pit Locations for Fearing Hill Road Solar Project
Soil Logs and Percolation Test Results
Monitoring Well Locations for Fearing Hill Road Solar Project
Well Completion Reports
Boring Logs for Fearing Hill Road Solar Project Monitoring Wells
Water Table Elevation Maps for January 26th and February 9th, 2022

Attachment A

Test Pit and Percolation Test Locations

SEE INSET MATCH LINE

TP-6
MOTTLES @ 38"

TP-5
COMPACTED SOILS - NO PERC
TEST PERFORMED
MOTTLES @ 28"

TP-4
MOTTLES @ 42"

TP-8
MOTTLES @ 36"

TP-3
MOTTLES @ 20"

TP-2
PERC RATE=<2 MPI
MOTTLES @ 20"

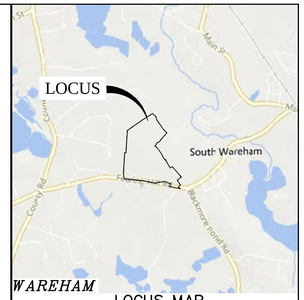
TP-1
PERC RATE=13 MPI
MOTTLES @ 26"

TP-7
MOTTLES @ 26"

TEST PIT LOCATION
MONITORING WELL LOCATION
PERC & TEST PIT LOCATION

N/F BAY BANK MERCHANTS TR ER ALS MAP 91 LOT 1001
N/F RUTH HAMER C/O ALFRED HAMER MAP 91 LOT 1002
N/F DAVID T MORETTI C/O BARBARA J MORETTI MAP 93 LOT W4
N/F CHRISTOPHER J HOGAN C/O JANET L HOGAN MAP 93 LOT W5
N/F CRISTA LYN CAMPBELL MAP 93 LOT W6
N/F CRAIG T FONTAINE MAP 93 LOT W7
N/F DARREN NAULT MAP 93 LOT W8
N/F COMM OF MASS C/O EXEC OFFICE OF TRANS & CONST MAP 91 LOT 1009
N/F RICHARD B JOHNSON C/O LOUISE A JOHNSON MAP 93 LOT W8
N/F MICHAEL S DOWNING MAP 93 LOT W10
N/F PAUL F KASPAR C/O JUDITH M KASPAR MAP 93 LOT 1012B
N/F ANNE K HAYES MAP 91 LOT 1003
N/F 101 FEARING HILL ROAD MAP 91
N/F FEARING HILL CONSERVATION AREA MAP 86 LOT 1000
N/F TIMOTHY R CURLEY MAP 91 LOT 1008
N/F 91 FEARING HILL ROAD MAP 74 LOT 1007
N/F LEWIS A DEMELLO MAP 74 LOT 1006
N/F COMM OF MASS C/O EXEC OFFICE OF TRANS & CONST MAP 74 LOT 1010
N/F SHILEY HERBERT W TRUSTEE MAP 62 LOT 1010
N/F MELANIE F RODERICK MAP 74 LOT 1
N/F DANIEL S. MALONE C/O MARGERAT E MALONE MAP 74 LOT 2
N/F MELANIE F RODERICK MAP 74 LOT 1
N/F ALICE DUFFY MAP 74 LOT 3
N/F THERESA R BROWN C/O MICHAEL P BROWN MAP 74 LOT 1002
N/F THERESA R BROWN C/O MICHAEL P BROWN MAP 74 LOT 1003A
N/F MAXINE A CONNELL C/O HAROLD R CONNELL JR MAP 74 LOT 1003B
N/F PHILIP R JACKSON C/O JULIA E JACKSON MAP 74 LOT 1005
N/F NINETY SIX REALTY LLC MAP 74 LOT 1009A
N/F RYAN COMES MAP 74 LOT 1009-1

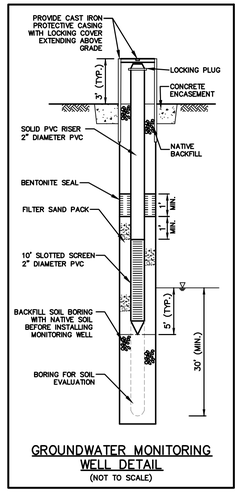
FEARING HILL ROAD (PUBLIC-60' WIDE)
HOWLETT DRIVE
BLACKMORE POND ROAD
S38°00'45"W 332.42'
S77°24'41"E 68.94'
50' SOLAR SETBACK
100' SOLAR SETBACK
100.0' WETLAND BUFFER
50.0' NO ACTIVITY ZONE (typ)
STORMWATER BASIN 1
MAGNETIC



LOCUS MAP
1" = 2,000'

LEGEND

- EXISTING CONTOUR LINE
- EXISTING WATER LINE (APPROX. LOCATION)
- EXISTING OVERHEAD WIRE
- EXISTING STONE RETAINING WALL
- EXISTING HYDRANT
- EXISTING WATER GATE VALVE
- EXISTING LIGHT POST
- EXISTING SIGN
- EXISTING EDGE OF PAVEMENT
- GC64 WETLAND FLAG
- EXISTING WETLAND LINE
- EXISTING 100' WETLAND BUFFER
- EXISTING TREE LINE
- EXISTING TREE
- EXISTING MAILBOX
- EXISTING UTILITY POLE
- EXISTING SURVEY MONUMENT
- EXISTING FENCE



GROUNDWATER MONITORING WELL DETAIL
(NOT TO SCALE)

FILE: 3055.02-SITE-STAKEOUT

Atlantic® DESIGN ENGINEERS, INC.
P.O. Box 1051, Sandwich, MA 02563 (508) 888 – 9282

Designed by :
Drawn by :
Checked by :
Survey chk. by :
Approved by :

SCALE
SCALE 1" = 100'
0 25 50 100 200

DATE

NO.	BY	DATE	REVISION

APPLICANT:
WAREHAM MA 3, LLC
100 SUMMIT LAKE DRIVE, SUITE 210
VALHALLA, NY 10595

ONSITE SOIL TESTING LOCATION WORKSHEET
FOR
FEARING HILL ROAD SOLAR PROJECT
WAREHAM MA 02576
NOVEMBER 16, 2021

Sheet 1 of 1
JOB NUMBER 3055.02

Attachment B

Soil Logs and Percolation Test Results

On-Site Review
Form 11 & 12
Wareham, Massachusetts

Site Address/Parcel ID **101 Fearing Hill Rd / Map 91 Lot 1000** Owner Name Ninety-Six Realty, LLC

New Construction ☒ Upgrade ☐ Repair ☐

Soil Survey Available? Yes ☒ No ☐ Source NRCS Web Soil Survey Soil Map Unit 320A

Soil Name Birchwood Sand Parent Material Sandy eolian deposits Landform Till plains

Land Use Woodland Slope (%) 0-8% Surface Stones Some Vegetation Trees

Current Water Resource Conditions (USGS): Date: 11/17/21 Range: Above Normal

Deep Hole Number **TP-1** Date 12/8/2021 Time 10 am Weather cloudy 35°

Distance From: Open Water Body 400'+ Drainage Way 100'+ Wetlands 100'+

Property Line 10'+ Drinking Water Well 100'+ Other None

Unsuitable Material Present? Yes☐ No ☒ If Yes: Disturbed Soil ☐ Fill Material ☐ Bedrock ☐

Groundwater Observed? Yes ☒ No ☐ If Yes: Depth to Weeping 58" Depth to Standing None

Estimated Depth to High Groundwater Mottles @ 26"

SOIL LOG

Depth (in)	Soil Horizon/ Layer	Soil Texture	Soil Color (Munsell)	Mottles	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0-7	O/A	Sandy Loam	10YR 2/2		Friable
7-28	B	Loamy Sand	10YR 5/6	@26"	Friable
28-114	C	Loamy Sand	2.5Y 5/3		Firm in place

PERCOLATION TEST

Date: 12/8/2021	Time: 10:14 am	
Deep Hole Number	TP-1	
Depth of Perc.	34"-52"	
Start Pre-Soak	10:14	
End Pre-Soak	10:29	
Time at 12"	10:29	
Time at 9"	10:46	
Time at 6"	11:25	
Time (9"-6")	39 Min.	
Rate (Min./Inch)	13 MPI	

Witnessed By: Neal Price (Horsley Witten Group)

Performed By: Nyles Zager SE2781 Exp. 6/20/2022

Signature _____ Date 1-7-22

ZCE Zenith Consulting Engineers, LLC

3 Main St Lakeville, MA Tel# 508-947-4208

On-Site Review
Form 11 & 12
Wareham, Massachusetts

Site Address/Parcel ID **101 Fearing Hill Rd / Map 91 Lot 1000** Owner Name Ninety-Six Realty, LLC
New Construction ☒ Upgrade ☐ Repair ☐
Soil Survey Available? Yes ☒ No ☐ Source NRCS Web Soil Survey Soil Map Unit 321B
Soil Name Birchwood Sand Parent Material Sandy eolian deposits Landform Till plains
Land Use Woodland Slope (%) 8-15% Surface Stones Some Vegetation Trees
Current Water Resource Conditions (USGS): Date: 12/15/21 Range: Normal

Deep Hole Number **TP-2** Date 1/5/2022 Time 9 am Weather clear 35°
Distance From: Open Water Body 400'+ Drainage Way 100'+ Wetlands 100'+
Property Line 10'+ Drinking Water Well 100'+ Other None
Unsuitable Material Present? Yes☐ No ☒ If Yes: Disturbed Soil ☐ Fill Material ☐ Bedrock ☐
Groundwater Observed? Yes ☒ No ☐ If Yes: Depth to Weeping 44" Depth to Standing 68"
Estimated Depth to High Groundwater Mottles @ 20"

SOIL LOG					
Depth (in)	Soil Horizon/ Layer	Soil Texture	Soil Color (Munsell)	Mottles	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0-12	O/A	Sandy Loam	10YR 3/2		Friable
12-20	B	Sandy Loam	10YR 5/6		Friable
20-58	C1	MS	2.5Y 5/3	@20"	Loose
58-96	C2	MCSG	2.5Y 7/2		Loose

Deep Hole Number **TP-3** Date 1/5/2022 Time 9 am Weather clear 35 °
Distance From: Open Water Body 400'+ Drainage Way 100'+ Wetlands 100'+
Property Line 10'+ Drinking Water Well 100'+ Other None
Unsuitable Material Present? Yes☐ No ☒ If Yes: Disturbed Soil ☐ Fill Material ☐ Bedrock ☐
Groundwater Observed? Yes ☒ No ☐ If Yes: Depth to Weeping 52" Depth to Standing None
Estimated Depth to High Groundwater Mottles @ 20"

SOIL LOG					
Depth (in)	Soil Horizon/ Layer	Soil Texture	Soil Color (Munsell)	Mottles	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0-6	O/A	Sandy Loam	10YR 3/2		Friable
6-18	B	Loamy Sand	10YR 5/6		Friable
18-56	C1	MS	2.5Y 5/3	@20"	Loose
56-100	C2d	Loamy Sand	2.5Y 7/2		Compact

PERCOLATION TEST		
Date: 1/5/2022	Time: 9:33 am	
Deep Hole Number	TP-2	
Depth of Perc.	20"-38"	
Start Pre-Soak	9:33	
End Pre-Soak	9:48	
Time at 12"	9:48	
Time at 9"	9:52	
Time at 6"	9:57	
Time (9"-6")	5 min	
Rate (Min./Inch)	<2 MPI	

ZCE Zenith Consulting Engineers, LLC
3 Main St Lakeville, MA Tel# 508-947-4208

On-Site Review
Form 11 & 12

Wareham, Massachusetts

Site Address/Parcel ID **101 Fearing Hill Rd / Map 91 Lot 1000** Owner Name Ninety-Six Realty, LLC
New Construction ☒ Upgrade ☐ Repair ☐
Soil Survey Available? Yes ☒ No ☐ Source NRCS Web Soil Survey Soil Map Unit 301B
Soil Name Montauk fine sandy loam Parent Material Sandy lodgment till Landform Drumlins
Land Use Woodland Slope (%) 3-8% Surface Stones Some Vegetation Trees
Current Water Resource Conditions (USGS): Date: 12/15/21 Range: Normal

Deep Hole Number **TP-4** Date 1/5/2022 Time 10 am Weather clear 35 °
Distance From: Open Water Body 400'+ Drainage Way 100'+ Wetlands 100'+
Property Line 10'+ Drinking Water Well 100'+ Other None
Unsuitable Material Present? Yes☐ No ☒ If Yes: Disturbed Soil ☐ Fill Material ☐ Bedrock ☐
Groundwater Observed? Yes ☐ No ☒ If Yes: Depth to Weeping None Depth to Standing None
Estimated Depth to High Groundwater Mottles @ 42"

SOIL LOG					
Depth (in)	Soil Horizon/ Layer	Soil Texture	Soil Color (Munsell)	Mottles	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0-8	O/A	Sandy Loam	10YR 3/2		Friable
8-26	B	Sandy Loam	10YR 5/6		Friable
26-42	C1	Sandy Loam	2.5Y 5/2		Firm
42-96	C2d	Sandy Loam	2.5Y 5/2	@42"	Compact

Deep Hole Number **TP-5** Date 1/5/2022 Time 12 pm Weather clear 35 °
Distance From: Open Water Body 400'+ Drainage Way 100'+ Wetlands 100'+
Property Line 10'+ Drinking Water Well 100'+ Other None
Unsuitable Material Present? Yes☐ No ☒ If Yes: Disturbed Soil ☐ Fill Material ☐ Bedrock ☐
Groundwater Observed? Yes ☐ No ☒ If Yes: Depth to Weeping None Depth to Standing None
Estimated Depth to High Groundwater Mottles @ 28"

SOIL LOG					
Depth (in)	Soil Horizon/ Layer	Soil Texture	Soil Color (Munsell)	Mottles	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0-8	O/A	Sandy Loam	10YR 3/2		Friable
8-18	B	Sandy Loam	10YR 5/6		Friable
18-92	C1d	Sandy Loam	2.5Y 5/2	@ 28"	Compact

ZCE
Zenith Consulting Engineers, LLC
3 Main St Lakeville, MA Tel# 508-947-4208

Wareham, Massachusetts

Site Address/Parcel ID **101 Fearing Hill Rd / Map 91 Lot 1000** Owner Name Ninety-Six Realty, LLC
New Construction ☒ Upgrade ☐ Repair ☐
Soil Survey Available? Yes ☒ No ☐ Source NRCS Web Soil Survey Soil Map Unit 301C
Soil Name Montauk fine sandy loam Parent Material Sandy lodgment till Landform Drumlins
Land Use Woodland Slope (%) 8-15% Surface Stones Some Vegetation Trees
Current Water Resource Conditions (USGS): Date: 12/15/21 Range: Normal

Deep Hole Number **TP-6** Date 1/5/2022 Time 1 pm Weather clear 35 °
Distance From: Open Water Body 400'+ Drainage Way 100'+ Wetlands 100'+
Property Line 10'+ Drinking Water Well 100'+ Other None
Unsuitable Material Present? Yes☐ No ☒ If Yes: Disturbed Soil ☐ Fill Material ☐ Bedrock ☐
Groundwater Observed? Yes ☐ No ☒ If Yes: Depth to Weeping None Depth to Standing None
Estimated Depth to High Groundwater Mottles @ 38"

SOIL LOG					
Depth (in)	Soil Horizon/ Layer	Soil Texture	Soil Color (Munsell)	Mottles	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0-8	O/A	Sandy Loam	10YR 3/2		Friable
8-24	B	Sandy Loam	10YR 5/6		Friable
24-118	C1d	Sandy Loam	2.5Y 5/2	@38"	Compact

Deep Hole Number **TP-7** Date 1/5/2022 Time 2 pm Weather clear 35 °
Distance From: Open Water Body 400'+ Drainage Way 100'+ Wetlands 100'+
Property Line 10'+ Drinking Water Well 100'+ Other None
Unsuitable Material Present? Yes☐ No ☒ If Yes: Disturbed Soil ☐ Fill Material ☐ Bedrock ☐
Groundwater Observed? Yes ☐ No ☒ If Yes: Depth to Weeping None Depth to Standing None
Estimated Depth to High Groundwater Mottles @ 26"

SOIL LOG					
Depth (in)	Soil Horizon/ Layer	Soil Texture	Soil Color (Munsell)	Mottles	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0-8	O/A	Sandy Loam	10YR 3/2		Friable
8-26	B	Sandy Loam	10YR 5/6		Friable
26-96	C1d	Sandy Loam	2.5Y 5/2	@26"	Compact

ZCE
Zenith Consulting Engineers, LLC
3 Main St Lakeville, MA Tel# 508-947-4208

On-Site Review
Form 11 & 12

Site Address/Parcel ID **101 Fearing Hill Rd / Map 91 Lot 1000** Owner Name Ninety-Six Realty, LLC

New Construction ☒ Upgrade ☐ Repair ☐

Soil Survey Available? Yes ☒ No ☐ Source NRCS Web Soil Survey Soil Map Unit 301C

Soil Name Montauk fine sandy loam Parent Material Sandy lodgment till Landform Drumlins

Land Use Woodland Slope (%) 8-15% Surface Stones Some Vegetation Trees

Current Water Resource Conditions (USGS): Date: 12/15/21 Range: Normal

Deep Hole Number **TP-8** Date 1/6/2022 Time 9 am Weather clear 40 °

Distance From: Open Water Body 400'+ Drainage Way 100'+ Wetlands 100'+

Property Line 10'+ Drinking Water Well 100'+ Other None

Unsuitable Material Present? Yes☐ No ☒ If Yes: Disturbed Soil ☐ Fill Material ☐ Bedrock ☐

Groundwater Observed? Yes ☐ No ☒ If Yes: Depth to Weeping None Depth to Standing None

Estimated Depth to High Groundwater Mottles @ 36"

SOIL LOG					
Depth (in)	Soil Horizon/ Layer	Soil Texture	Soil Color (Munsell)	Mottles	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0-8	O/A	Sandy Loam	10YR 3/2		Friable
8-22	B	Sandy Loam	10YR 5/6		Friable
22-110	Cd	Sandy Loam	2.5Y 5/2	@36"	Compact, 20% Stones

Witnessed By: Manny Guerzon (Horsley Witten Group)

Performed By: Will Connelly SE14360 Exp. 7/1/2022

Signature _____ Date 1/7/22

ZCE Zenith Consulting Engineers, LLC

3 Main St Lakeville, MA Tel# 508-947-4208

Attachment C

Monitoring Well Locations

SEE INSET MATCH LINE

N/F BAY BANK MERCHANTS TR ER ALS MAP 91 LOT 1001

N/F DAVID T MORETTI C/O BARBARA J MORETTI MAP 93 LOT W4

N/F CHRISTOPHER J HOGAN C/O JANET L HOGAN MAP 93 LOT W5

N/F CRISTA LYN CAMPBELL MAP 93 LOT W6

N/F CRAIG T FONTAINE MAP 93 LOT W7

N/F DARREN NAULT MAP 93 LOT W8

N/F COMM OF MASS C/O EXEC OFFICE OF TRANS & CONST MAP 91 LOT 1009

N/F RICHARD B JOHNSON C/O LOUISE A JOHNSON MAP 93 LOT W8

N/F MICHAEL S DOWNING MAP 93 LOT W10

N/F PAUL F KASPAR C/O JUDITH M KASPAR MAP 93 LOT 1012B

N/F RUTH HAMER C/O ALFRED HAMER MAP 91 LOT 1002

N/F ANNE K HAYES MAP 91 LOT 1003

N/F 101 FEARING HILL ROAD MAP 91 LOT 1000

FEARING HILL CONSERVATION AREA MAP 86 LOT 1000

N/F TIMOTHY R CURLEY MAP 91 LOT 1008

N/F 91 FEARING HILL ROAD MAP 74 LOT 1007

N/F LEWIS A DEMELLO MAP 74 LOT 1006

N/F COMM OF MASS C/O EXEC OFFICE OF TRANS & CONST MAP 74 LOT 1010

N/F SHILEY HERBERT W TRUSTEE MAP 62 LOT 1010

N/F MELANIE F RODERICK MAP 74 LOT 1

N/F DANIEL S. MALONE C/O MARGETAT E MALONE MAP 74 LOT 2

HOWLETT DRIVE

N/F ALICE DUFFY MAP 74 LOT 3

N/F MELANIE F RODERICK MAP 74 LOT 1

N/F THERESA R BROWN C/O MICHAEL P BROWN MAP 74 LOT 1002

N/F MICHAEL P BROWN C/O MICHAEL P BROWN MAP 74 LOT 1003A

N/F MAXINE A CONNELL C/O HAROLD R CONNELL JR MAP 74 LOT 1003B

N/F PHILIP R JACKSON C/O JULIA E JACKSON MAP 74 LOT 1005

N/F NINETY SIX REALTY LLC MAP 74 LOT 1009A

N/F RYAN GOMES MAP 74 LOT 1009-1

BLACKMORE POND ROAD

FEARING HILL ROAD (PUBLIC-60' WIDE)

MONITORING WELL #3
TOP OF PVC: 83.44
GROUND ELEVATION: 80.90

MONITORING WELL #4
TOP OF PVC: 92.27
GROUND ELEVATION: 89.92

MONITORING WELL #2
TOP OF PVC: 67.44
GROUND ELEVATION: 64.55

MONITORING WELL #5
TOP OF PVC: 85.99
GROUND ELEVATION: 83.24

MONITORING WELL #1
TOP OF PVC: 65.13
GROUND ELEVATION: 62.26

MONITORING WELL SC-1
TOP OF PVC: 64.55
GROUND ELEVATION: 61.89

100.0' WETLAND BUFFER (typ)

50.0' NO ACTIVITY ZONE (typ)

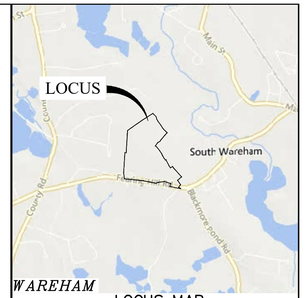
50' SOLAR SETBACK

150' SOLAR SETBACK

S38°00'45"W 332.42'

S77°24'41"E 68.94'

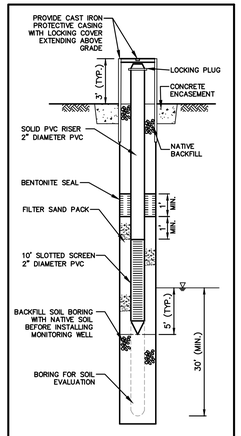
MAGNETIC



LOCUS MAP
1" = 2,000'

LEGEND

- EXISTING CONTOUR LINE
- EXISTING WATER LINE (APPROX. LOCATION)
- EXISTING OVERHEAD WIRE
- EXISTING STONE RETAINING WALL
- EXISTING HYDRANT
- EXISTING WATER GATE VALVE
- EXISTING LIGHT POST
- EXISTING SIGN
- EXISTING EDGE OF PAVEMENT
- GC64 WETLAND FLAG
- EXISTING WETLAND LINE
- EXISTING 100' WETLAND BUFFER
- EXISTING TREE LINE
- EXISTING TREE
- EXISTING MAILBOX
- EXISTING UTILITY POLE
- EXISTING SURVEY MONUMENT
- EXISTING FENCE



GROUNDWATER MONITORING WELL DETAIL
(NOT TO SCALE)

FILE:3055.02-SITE-MW LOCATION PLAN

Atlantic® DESIGN ENGINEERS, INC.
P.O. Box 1051, Sandwich, MA 02563 (508) 888 – 9282

Designed by :
Drawn by :
Checked by :
Survey chk. by :
Approved by :

SCALE
SCALE 1" = 100'
0 25 50 100 200

DATE

NO.	BY	DATE	REVISION

APPLICANT:
WAREHAM MA 3, LLC
100 SUMMIT LAKE DRIVE, SUITE 210
VALHALLA, NY 10595

MONITORING WELL LOCATION PLAN
FOR
FEARING HILL ROAD SOLAR PROJECT
WAREHAM MA 02576
FEBRUARY 15, 2022

Sheet 1 of 1

JOB NUMBER 3055.02

Attachment D

Well Completion Reports

Massachusetts Department of Environmental Protection
Bureau of Resource Protection
Well Completion Reports

Well Driller

Please specify work performed:
New Well

Please specify well type:
Monitoring

Number Of Wells:
6

Well Location

In public right-of-way:
○ Yes ◉ No

Subdivision/Property/Description:
WOODED PROPERTY

Property Owner:
WAREHAM MA, LLC

Engineering Firm:
ATLANTIC DESIGN ENGINEERS, INC.

Address at well location:

Street Number:	Street Name:
101	FEARING HILL RD
Building Lot#:	Assessor's Map #:
Assessor's Lot#:	ZIP Code:
	02576

City/Town:
WAREHAM

GPS (GPS for the deepest well)

North:	West:
41.76718	70.76576

Mailing Address:
☐ click here if same as well location address

Street Number:	Street Name:
101	SUMMIT LAKE DRIVE
City/Town:	State:
VALHALLA	NEW YORK
ZIP Code:	
10595	

Board of health permit obtained:
○ Yes ◉ Not Required

Permit Number:	Date Issued:

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Well Driller Program
Well Completion Reports(Monitoring)

Well Driller - Monitoring Form

DRILLING METHOD

Overburden Dirve and Wash **Bedrock** -- Choose Bedrock --

WELL LOG OVERBURDEN LITHOLOGY

From(ft)	To(ft)	Code	Color	Comment	Drop in drill stem	Extra fast or slow drill rate	Loss or addition of fluid
0	5	Silty Sand And Gra	Brown		YES NO	Fast Slow	Loss Addition
5	25	Sand And Gravel	Brown		YES NO	Fast Slow	Loss Addition
25	36	Till	Light Gray		YES NO	Fast Slow	Loss Addition

PERMIT INFORMATION

DEP 21E RTN # DEP Groundwater Discharge #

ADDITIONAL WELL INFORMATION

Developed	Yes No	Are these wells nested?	Yes No
Surface Seal Type	Concrete	Area of group (sq. ft)	10000
Total Well Depth	36	Depth to Bedrock	

CASING

Is Casing above ground? From:3To:3

From	To	Type	Thickness	Diameter
3	26	Polyvinyl Chloride	Schedule 40	2
3	4	Polyvinyl Chloride	Schedule 40	2
3	6.5	Polyvinyl Chloride	Schedule 40	2
3	7	Polyvinyl Chloride	Schedule 40	2
3	7	Polyvinyl Chloride	Schedule 40	2

SCREEN No Screen

From">	To	Type	Slot Size	Diameter
26	36	Slotted PVC	0.010	2
4	14	Slotted PVC	0.010	2
6.5	16.5	Slotted PVC	0.010	2
7	17	Slotted PVC	0.010	2
7	17	Slotted PVC	0.010	2
3	5	Slotted PVC	0.010	2

WATER-BEARING ZONES

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Well Driller Program
Well Completion Reports(Monitoring)

From	To	Yield (gpm)
5.8	36	1
6.1	14	1
12.7	16.5	1
16.4	17	1
16.9	17	1
3.3	5	1

ANNULAR SEAL / FILTER PACK

From	To	Material 1">	Weight	Material 2	Weight	Water (gal)	Batches	Method Of Placement
24	36	Sand		Bentonite Chips/Pellets				Gravity
2	14	Sand		Bentonite Chips/Pellets				Gravity
4.5	16.5	Sand		Bentonite Chips/Pellets				Gravity
5	17	Sand		Bentonite Chips/Pellets				Gravity
5	17	Sand		Bentonite Chips/Pellets				Gravity
1	5	Sand		Bentonite Chips/Pellets				Gravity

WATER LEVEL

Date Measured	Static Depth BGS (ft)	Flowing Rate (gpm)
01/13/2022	5.8	1

COMMENTS

WELL DRILLERS STATEMENT

This well was drilled or altered under my direct supervision, according to the applicable rules and regulations, and this report is complete and accurate to the best of my knowledge.

Driller JON BEIRHOLM Registration # 942 Monitoring [M] Supervising Driller Signature DEVILLERS, CHRISTOPHER,

Firm NORTHERN DRILL SEVICE, INC. Rig Permit # 0501 Date Job Complete 01/13/2022

NOTE: Well Completion Reports must be filed by the registered well driller within 30 days of well completion.

Well Driller - Addendum Form

WELL COMPLETION ADDENDUM FORM MONITORING WELLS

Well ID	Well Depth	Screen Interval FROM	Screen Interval TO	GPS Coordinates (WGS 1984) Degree Decimals	
MW1	36	26	36	North: 41.76732	West: 70.76585
MW2	14	4	14	North: 41.76799	West: 70.76710
MW3	16.5	6.5	16.5	North: 41.76863	West: 70.76519
MW4	17	7	17	North: 41.76812	West: 70.76522
MW5	17	7	17	North: 41.76762	West: 70.76407
SC1	5	0	5	North: 41.76736	West: 70.76583

NOTE: Well Completion Reports must be filed by the registered well driller within 30 days of well completion.

Attachment E

Soil Boring Logs

BORING LOG

MW-1

Horsley Witten Group
Sustainable Environmental Solutions
90 Route 6A • Sandwich, MA • 02563
Tel: 508-833-6600 • Fax: 508-833-3150 • www.horsleywitten.com

Project: Proposed Fearing Hill Solar Facility
Client: Town of Wareham
Boring Contractor: Northern Drill Service, Inc.
Boring Equipment:

Date: 1/10/2022
Completion Depth: 36'
Elevation:
Inspector:

Depth Feet	Description	Sample Interval	Penetra./ Recovery	Blow Count	USCS Code	USCS Color	USGS Angularity	Comments	Well Details	Depth Feet
0								stick up protective casing with locking cap Concrete Seal Water Table ~ 3'		0
5	f SAND, so silt	5-7	2/2			Gy-Br				5
10	m-c SAND, tr gravel	10-12	2/2			Gy-Br				10
15	f-m SAND, tr gravel	14-16	2/2			Gy-Br				15
20	f-m SAND, tr gravel	19-21	2/2			Gy-Br		Bagged sand to concrete @ ground surface 2' Bentonite seal		20
25	f-m SAND	24-26	2/2			Gy-Br		Bagged sand Slotted 2" PVC 26-36'		25
30	GRAVEL (GW), so m sand, tr c sand, tr silt	29-30	1/1			Yl-Br		Bedrock @ 34' Well set @ 36'		30 35

Proportions Used:

trace (tr)	0 - 10%
little (li)	10 - 20%
some (so)	20 - 35%
and	35 - 50%

Abbreviations:

Color: Blue (Bl), Tan (T), Red (R), Gray (Gy), Light (lt), Brown (Br), Dark (dk), Yellow (Yl)

Angular: Round (rnd.), Angular (ang.)

Misc.: Fragments (frag.), Cement (cem.), Well-Graded Sand (SW), Poorly-Graded Sand (SP), Well-Graded Gravel (GW), Poorly-Graded Gravel (GP), Below Land Surface (BLS), Not Available (N/A)

Size: Fine = (f), Medium = (m), Coarse = (c), Dark = (dk), Fine to Coarse = (f-c), Very = (v), More/Less = (+/-)

BORING LOG

MW-2

Horsley Witten Group
Sustainable Environmental Solutions
90 Route 6A • Sandwich, MA • 02563
Tel: 508-833-6600 • Fax: 508-833-3150 • www.horsleywitten.com

Project: Proposed Fearing Hill Solar Facility
Client: Town of Wareham
Boring Contractor: Northern Drill Service, Inc.
Boring Equipment:

Date: 1/11/2022
Completion Depth: 14'
Elevation:
Inspector:

Depth Feet	Description	Sample Interval	Penetra./ Recovery	Blow Count	USCS Code	USCS Color	USGS Angularity	Comments	Well Details	Depth Feet
0								stick up protective casing with locking cap Concrete Seal Water Table ~ 3.5'		0
5	f-m SAND, li silt, tr gravel	4-6	2/2			Gy-Br		2' Bentonite Seal Slotted 2" PVC 4-14'		5
10	m-c SAND, and gravel, so f sand	9-11	2/2			Gy-Br				10
15	f-m SAND, so c sand	14-16	2/2			Gy-Br		Well set @ 14' Backfilled bagged sand to 14'		15
20	f-m SAND, so c sand, tr gravel	19-21	2/2			Gy-Br				20
25	f-m SAND, so c sand, tr gravel	24-25	1/1			Gy-Br				25
29	f-m SAND, so c sand, so GW	29-29.5	0.5/0.5			Yl-Br				30
								Bedrock @ 31'		35

Proportions Used:

trace (tr)	0 - 10%
little (li)	10 - 20%
some (so)	20 - 35%
and	35 - 50%

Abbreviations:

Color
Blue (Bl) Tan (T)
Red (R) Gray (Gy)
Light (lt) Brown (Br)
Dark (dk) Yellow (Yl)

Angular
Round (rnd.)
Angular (ang.)

Misc.
Fragments (frag.)
Cement (cem.)
Well-Graded Sand (SW)
Poorly-Graded Sand (SP)
Well-Graded Gravel (GW)
Poorly-Graded Gravel (GP)
Below Land Surface (BLS)
Not Available (N/A)

Size
Fine = (f) Fine to Coarse = (f-c)
Medium = (m) Very = (v)
Coarse = (c) More/Less = (+/-)
Dark = (dk)

BORING LOG

MW-3

Horsley Witten Group
Sustainable Environmental Solutions
90 Route 6A • Sandwich, MA • 02563
Tel: 508-833-6600 • Fax: 508-833-3150 • www.horsleywitten.com

Project: Proposed Fearing Hill Solar Facility
Client: Town of Wareham
Boring Contractor: Northern Drill Service, Inc.
Boring Equipment:

Date: 1/12/2022
Completion Depth: 16.5'
Elevation:
Inspector:

Depth Feet	Description	Sample Interval	Penetra./ Recovery	Blow Count	USCS Code	USCS Color	USGS Angularity	Comments	Well Details	Depth Feet
0								stick up protective casing with locking cap Concrete Seal		0
5	f SAND, tr gravel	4-6	2/2			T		2' Bentonite Seal		5
								Slotted 2" PVC 6.5-16.5'		
								Water Table ~ 10'		
10	f-m SAND, tr gravel	9-11	2/2			T				10
15	f SAND, so gravel	14-16	2/2			T		Well set @ 16.5'		15
20	f-m SAND, so gravel	19-21	2/2			T				20
								Backfilled bagged sand to 16.5'		
25	f-m SAND, and gravel	24-26	2/2			T				25
30	f SAND, and silt	29-31	2/2			Br-Gy				30
								Bedrock @ 33'		
										35

Proportions Used:

trace (tr)	0 - 10%
little (li)	10 - 20%
some (so)	20 - 35%
and	35 - 50%

Abbreviations:

Color
Blue (Bl) Tan (T)
Red (R) Gray (Gy)
Light (lt) Brown (Br)
Dark (dk) Yellow (Yl)

Angular
Round (rnd.)
Angular (ang.)

Misc.
Fragments (frag.)
Cement (cem.)
Well-Graded Sand (SW)
Poorly-Graded Sand (SP)
Well-Graded Gravel (GW)
Poorly-Graded Gravel (GP)
Below Land Surface (BLS)
Not Available (N/A)

Size
Fine = (f) Fine to Coarse = (f-c)
Medium = (m) Very = (v)
Coarse = (c) More/Less = (+/-)
Dark = (dk)

BORING LOG

MW-4

Horsley Witten Group
Sustainable Environmental Solutions
90 Route 6A • Sandwich, MA • 02563
Tel: 508-833-6600 • Fax: 508-833-3150 • www.horsleywitten.com

Project: Proposed Fearing Hill Solar Facility
Client: Town of Wareham
Boring Contractor: Northern Drill Service, Inc.
Boring Equipment:

Date: 1/13/2022
Completion Depth: 17'
Elevation:
Inspector:

Depth Feet	Description	Sample Interval	Penetra./ Recovery	Blow Count	USCS Code	USCS Color	USGS Angularity	Comments	Well Details	Depth Feet
0								stick up protective casing with locking cap Concrete Seal		0
								Bagged sand to concrete		
5	f-m SAND, tr gravel	4-6	2/2			T		2' Bentonite Seal		5
								Slotted 2" PVC 7-17'		
10	f-m SAND, and gravel	9-11	2/2			T				10
								Water Table ~ 13.5'		
15	f SAND, and gravel	14-16	2/2			T		Bedrock @ 16.5' Well set @ 17'		15
										20
										25
										30
										35

Proportions Used:

trace (tr)	0 - 10%
little (li)	10 - 20%
some (so)	20 - 35%
and	35 - 50%

Abbreviations:

Color

Blue (Bl)	Tan (T)
Red (R)	Gray (Gy)
Light (lt)	Brown (Br)
Dark (dk)	Yellow (Yl)

Angular

Round (rnd.)
Angular (ang.)

Misc.

Fragments (frag.)
Cement (cem.)
Well-Graded Sand (SW)
Poorly-Graded Sand (SP)
Well-Graded Gravel (GW)
Poorly-Graded Gravel (GP)
Below Land Surface (BLS)

Not Available (N/A)

Size

Fine = (f)	Fine to Coarse = (f-c)
Medium = (m)	Very = (v)
Coarse = (c)	More/Less = (+/-)
Dark = (dk)	

BORING LOG

MW-5

Horsley Witten Group
Sustainable Environmental Solutions
90 Route 6A • Sandwich, MA • 02563
Tel: 508-833-6600 • Fax: 508-833-3150 • www.horsleywitten.com

Project: Proposed Fearing Hill Solar Facility
Client: Town of Wareham
Boring Contractor: Northern Drill Service, Inc.
Boring Equipment:

Date: 1/13/2022
Completion Depth: 17'
Elevation:
Inspector:

Depth Feet	Description	Sample Interval	Penetra./ Recovery	Blow Count	USCS Code	USCS Color	USGS Angularity	Comments	Well Details	Depth Feet
0								stick up protective casing with locking cap Concrete Seal		0
								Bagged sand to concrete 2' Bentonite Seal		
5	f-m SAND, tr gravel	4-6	2/2			Br		Water Table ~ 7'		5
								Slotted 2" PVC 7-17'		
10	f-m SAND, tr gravel	9-11	2/2			T				10
15	f-m SAND, so gravel	14-16	2/2			T				15
								Well set @ 17' Bagged sand backfill to 17' Bedrock @ 19'		
										20
										25
										30
										35

Proportions Used:

trace (tr)	0 - 10%
little (li)	10 - 20%
some (so)	20 - 35%
and	35 - 50%

Abbreviations:

Color

Blue (Bl)	Tan (T)
Red (R)	Gray (Gy)
Light (lt)	Brown (Br)
Dark (dk)	Yellow (Yl)

Angular

Round (rnd.)
Angular (ang.)

Misc.

Fragments (frag.)
Cement (cem.)
Well-Graded Sand (SW)
Poorly-Graded Sand (SP)
Well-Graded Gravel (GW)
Poorly-Graded Gravel (GP)
Below Land Surface (BLS)

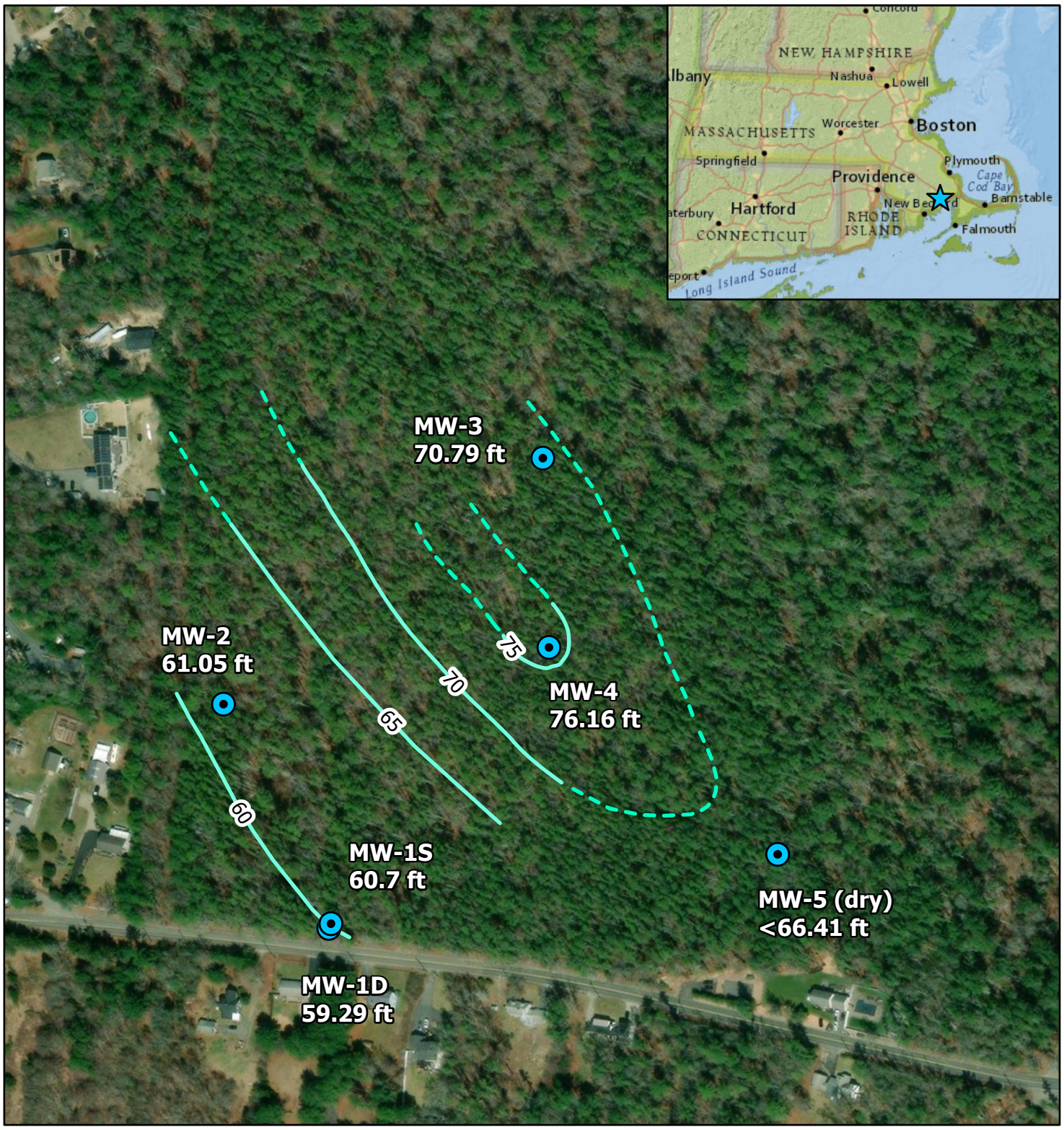
Not Available (N/A)

Size

Fine = (f)	Fine to Coarse = (f-c)
Medium = (m)	Very = (v)
Coarse = (c)	More/Less = (+/-)
Dark = (dk)	

Attachment F

Water Table Elevation Maps



Path: H:\Projects\2021\21134 Fearing Hill Solar Farm Wareham\GIS\Originals\Fearing_Hill_GW_Cont\Fearing_Hill_GW_Cont.aprx

Legend

- Fearing Hill Monitoring Wells
- Water Table Contours (5 Foot Intervals)
- Interpolated Contours

N

0 125 250 500 Feet

Datums:

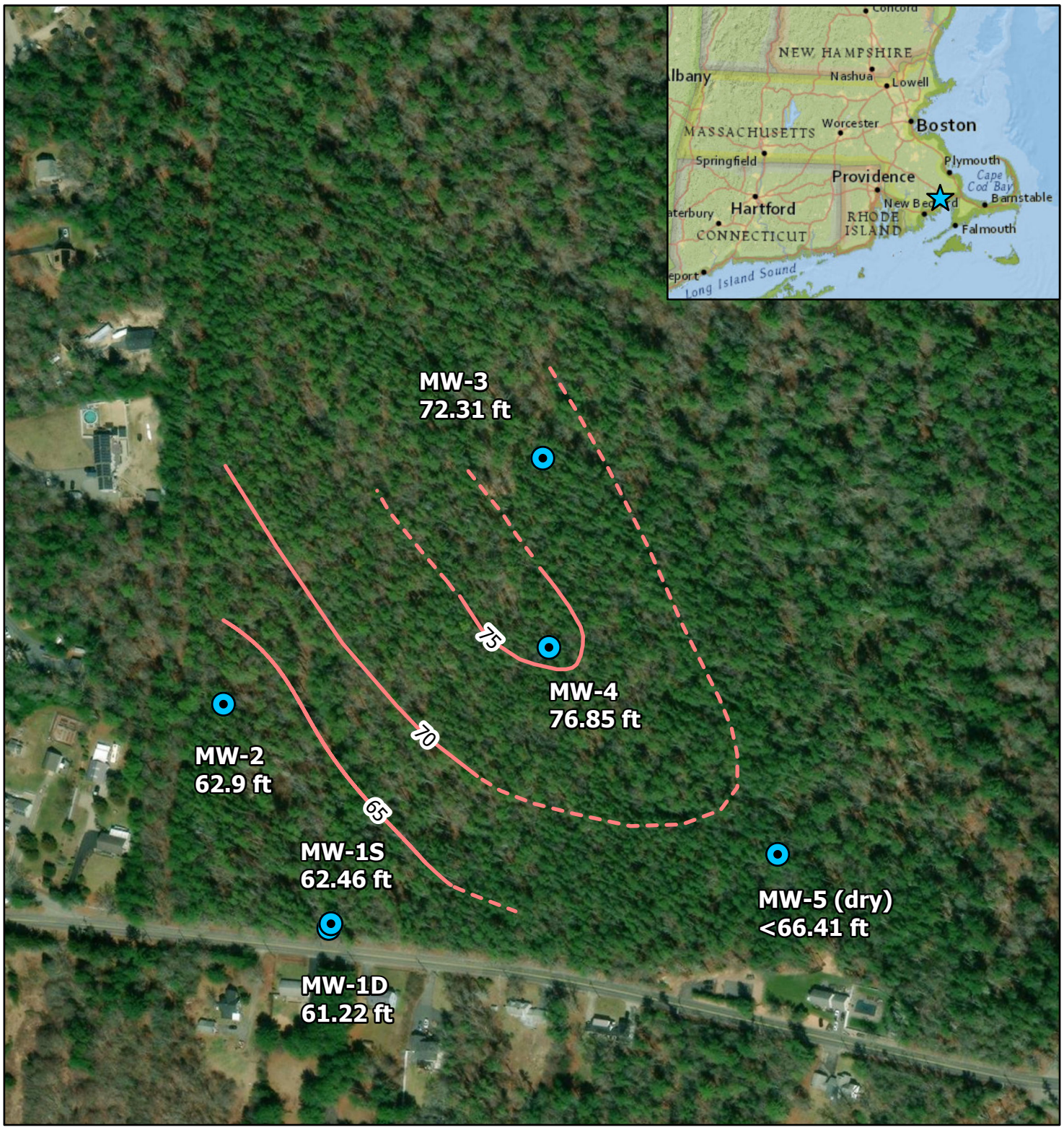
Vertical: NAVD 88
Horizontal: NAD 83

Horsley Witten Group
Sustainable Environmental Solutions
90 Route 6A • Unit 1 • Sandwich, MA 02563
508-833-6600 • horsleywitten.com

Fearing Hill Water Table Contours
January 26th, 2022

Date: 3/24/2022

Figure 2



Path: H:\Projects\2021\21134 Fearing Hill Solar Farm Wareham\GIS\Originals\Fearing_Hill_GW_Cont\Fearing_Hill_GW_Cont.aprx

Legend

- Fearing Hill Monitoring Wells
- Water Table Contours (5 Foot Intervals)
- Interpolated Contours

N

0 125 250 500 Feet

Datums:

Vertical: NAVD 88
Horizontal: NAD 83

Horsley Witten Group
Sustainable Environmental Solutions
90 Route 6A • Unit 1 • Sandwich, MA 02563
508-833-6600 • horsleywitten.com

Fearing Hill Water Table Contours
February 9th, 2022

Date: 3/24/2022

Figure 3