MIDLANTIC ENGINEERING, INC.
120 COMMERCE ROAD
PITTSTON TOWNSHIP, PA 18640-9552

GEOTECHNICAL ENGINEERING REPORT

STORMWATER MANAGEMENT AND INFILTRATION TESTING
HAWTHORNE MOUNT POCONO RESORT
PARADISE TOWNSHIP, PA

(Project #22021.2-SWM)

PREPARED FOR:

JSPA REALTY
% MR. JOEL SHTESL
175 TILLMAN STREET
STATEN ISLAND, NY 10314

MARCH 3, 2023

Applicants 22

MIDLANTIC ENGINEERING

March 3, 2023

JSPA Realty
% Mr. Joel Shtesl
175 Tillman Street
Staten Island, NY 10314
shtesl@gmail.com

REFERENCE: GEOTECHNICAL ENGINEERING REPORT (#22021.2-SWM)
Stormwater Management and Infiltration Testing
Hawthorne Mount Pocono Resort
Paradise Township, PA

Mr. Shtesl:

Submitted herewith is our geotechnical engineering report to address the proposed stormwater management areas and in-situ infiltration testing for the above referenced project. Our services have been performed in accordance with our proposal/agreement dated December 16, 2022 and your subsequent authorization to proceed.

1. SCOPE OF SERVICES

Services performed for this phase of the study included site reconnaissance, observation and logging of twelve test pits, in-situ infiltration testing, soil laboratory analysis, and preparation of our report. Our geotechnical engineering analysis and report for the stormwater management development areas includes the following:

a. Our evaluation of the estimated subsurface conditions within the stormwater management infiltration areas based on the data obtained.

b. Analysis of subgrade conditions, soil laboratory testing, and in-situ infiltration testing to provide design parameters for infiltration devices.

c. Comments concerning the use of infiltration practices at the designated areas tested.

Services with respect to environmental considerations, wetlands investigations, erosion control, construction cost or quantity estimates, and construction observation and testing are not included in the scope of services under this phase of our contract.

A geotechnical engineering study to address the building foundation areas, pavement areas, and related infrastructure was previously completed under a separate contract and reported separately.

2. DESCRIPTION OF SITE AND PROPOSED CONSTRUCTION

The project includes the development of a resort including cabins, restaurants, a banquet hall, a spa, a swimming pool, and associated infrastructure in Paradise Township, Pennsylvania. The site is bordered to the east by Trinity Hill Road, to the south by a residential area along Wiscasset Road, and to the north and west by wooded areas. The project vicinity is indicated on a 2019 USGS quadrangle map included as Figure No. 1-1 and on a 2016 aerial map included as Figure No. 1-2 in Enclosure (1).

We understand the project includes the construction of stormwater management facilities. These facilities are located at various locations and depths throughout the development area.

The information listed above was provided to us by your office or was obtained during our own site visits.

3. SUBSURFACE CONDITIONS

In order to evaluate subsurface conditions in the proposed stormwater management areas, twelve test pits were excavated on February 9 and 10, 2023. The test pits were extended to depths of 1.5 feet to 14 feet to determine the shallow subsurface stratification and depths to limiting zones, if applicable. The test pit logs, water observation data, and test pit location plan are included in Enclosure (4).

3.1 Test Pit Data and Stratification

The test pits indicate the following generalized strata underlie the proposed stormwater management areas to the depths investigated:

Stratum	Depths	Description
Stratum F	below topsoil to depths of approx. 2.5 feet at test pit TP-I-M2	silty sand with gravel – FILL
Stratum A	below topsoil and Stratum F to maximum depths investigated	red/yellow/brown silty SAND with gravel (SM), silty GRAVEL with sand (GM), and well graded GRAVEL with silt and sand (GW-GM)
Stratum R	at depths of 1.5 feet to 11.5 feet in test pits TP-I-A3, I-M1, I-M2, I-N1, I-N2, I-N3, and I-N4	brown/gray sandstone and shale bedrock

The soil symbols indicated in the stratum descriptions and on the test pit logs represent the Unified Soil Classification (ASTM D-2488) group symbols based on visual observation of the specimens recovered. Criteria for visual classification of soil samples are given in Enclosure (4) of this report. The visual classifications may vary from the results of laboratory testing classifications.

3.2 Geology

The granular fill materials of Stratum F are associated with previous site grading operations for former site developments.

The sand and gravel material of Stratum A represent glacial till deposits of the Pleistocene geologic epoch. These natural soils are moderately over-consolidated.

The underlying bedrock is referenced as Stratum R and consists of fine- to coarse-grained sandstone and shale. This sedimentary rock belongs to the Long Run member of the Catskill formation of the Devonian geologic age. Bedrock was encountered at depths of 4.5 feet at test pit TP-I-A3, 7.0 to 11.5 feet in Basin M, and 1.5 feet to 3.5 feet in Basin N. Geologic mapping of the study area is included as Figure No. 2-2 in Enclosure (2).

3.3 Groundwater Observations

Groundwater was encountered and redoximorphic features were observed during excavation at several of the test pit locations. The results of these observations are shown on the test pit logs in Enclosure (4). Groundwater or redoximorphic features were encountered at depths of 7.1 feet in test pit TP-I-K4, 1.5 feet in TP-I-O1, and 3.5 feet in TP-I-O2.

Water level readings at the test pit locations are considered to be a reliable indication of groundwater conditions at the times indicated. Fluctuations in groundwater levels, as well as perched water, may be expected with variations in precipitation, evaporation, adjacent construction activity, and similar factors.

4. INFILTRATION FACILITY ANALYSES

The proposed stormwater management areas were identified within the study area and were investigated for suitability for infiltration devices.

The Soil Conservation Service mapping of Monroe County was referenced for the development area. The SCS mapping of the development area is included as Figure No. 2-1 in Enclosure (2). The mapping indicates the subgrades within the area and depths of the proposed infiltration facilities generally consist of sand and gravel from glacial till deposits. The engineering index and physical properties of the represented series provided by SCS and correlating with our field investigation data are summarized as follows:

Series Designation	USCS Classifications	SCS Hydrologic Soil Group	Estimated Permeability (in/hr.)
LBE – Lackawanna and Bath soils	ML, SM, GM	C	0.06 to 2.0 in/hr.
LyE – Lordstown and Oquaga channery loam	ML, SM, GM	C	0.6 to 2.0 in/hr.
OxB, OxC – Oquaga-Lordstown complex	ML, SM, GM	C	0.06 to 2.0 in/hr.
WpB, WpC – Wellsboro channery loam	ML, SM, GM	C	0.06 to 2.0 in/hr.

The protocols outlined in the final draft of the Pennsylvania Stormwater Best Management Practices Manual were used as the reference for design and construction standards for stormwater infiltration systems. The protocols include parameters for the conduct of the infiltration testing, site conditions, design considerations, construction requirements and factors of safety.

4.1 Depth of Limiting Zones

Protocol 2 of the referenced manual recommends that a minimum 2-foot clearance be maintained between the bottom of the infiltration facility and a limiting zone of seasonally high water table or intact bedrock.

Groundwater or redoximorphic features were noted at depths of 7.1 feet at test pit TP-I-K4, at 1.5 feet at TP-I-O1, and 3.5 feet at TP-I-O2.

Intact bedrock was encountered at depths of 4.5 feet at TP-I-A3, 7.0 to 11.5 feet in Basin M, and 1.5 to 3.5 feet in Basin N.

The proposed infiltration facilities, at the proposed depths at Basins M and K, are generally considered feasible based on depths to limiting zones, considering the limitations of minimum clearance depths. Infiltration facilities at test pit TP-I-A3, Basin N, and Test Area O may be considered feasible at revised depths.

4.2 Soil Textures

Protocol 2 recommends that infiltration facilities be constructed in native soils without prior fill or disturbance. Protocol 2 allows infiltration in areas that have experienced historic fill or disturbance provided that sufficient time has elapsed to restore natural permeability, which is defined as at least 5 years in Chapter 6.

The proposed infiltration facilities are generally being planned in the granular natural soil subgrades of Stratum A.

The Pennsylvania Protocol does not have any criteria for soil gradations or for the allowable percentage of fines (<#200 sieve) in the soil, but the other standards referenced in the Pennsylvania Manual limit the clay content to 20 percent by weight, and the combined silt/clay content to 40 percent by weight.

Soil laboratory testing of the subgrade material was performed in accordance with ASTM D-2487 and is included in Enclosure (3). The laboratory gradation and classification test results are summarized as follows:

Soil Classifications Summary

Test Pit	Soil Sample Depth/Elev.	Stratum	Classification	% Moisture	Combined Silt/Clay (%<#200)
TP-I-A3	2.5' El 1411.7	A	silty SAND with gravel (SM)	12.2%	41%
TP-I-M2	3.1' El 1480.0	A	silty GRAVEL with sand (GM)	7.6%	28%
TP-I-M2	5.0' El 1478.1	A	silty GRAVEL with sand (GM)	8.7%	22%
TP-I-K5	2.9' El 1402.0	A	well graded GRAVEL with silt and sand (GW-GM)	6.5%	7%
TP-I-K5	8.0' El 1396.9	A	silty GRAVEL with sand (GM)	7.7%	26%
TP-I-N1	1.5' El 1573.2	A	silty GRAVEL with sand (GM)	14.0%	23%
TP-I-N4	0.5' El 1592.1	A	silty GRAVEL with sand (GM)	12.5%	29%
TP-I-O2	1.5' El 1503.3	A	silty SAND with gravel, mottling (SM)	11.8%	28%

The proposed infiltration facilities in the natural sand and gravel of Stratum A are considered feasible based on soil textures.

4.3 In-Situ Infiltration Rates

Protocol 2 recommends that soils underlying infiltration devices should have infiltration rates between 0.1 and 10 inches per hour.

In-situ infiltration testing was conducted at locations indicated on the site plan included in Enclosure (4). The test method referenced in Protocol 1, as summarized herein, was used to conduct the in-situ infiltration testing.

A test pit was excavated to the test depth at each of the study locations. A solid 4-inch I.D. PVC casing was installed and seated approximately 2 inches into the underlying soil subgrades. The outer ring of the infiltration test casing was sealed with a water-bentonite soil mixture. The test location was presoaked for 1 hour with a 12-inch depth of water immediately prior to testing with the water level re-established at 30-minute intervals. The drop in the water level during the last 30 minutes of the presoak period was used to determine the time interval used for the infiltration test in accordance with Protocol 1.

Measurements were taken at the appropriate time interval for a total of 8 readings obtained or until a stabilized rate of drop was obtained, whichever occurred first. A stabilized rate of drop is defined by Protocol 1 as a difference of ¼-inch or less of drop between the highest and lowest readings of four consecutive readings. The water level in the infiltration test casing was re-established after each reading.

The final in-situ infiltration rate was calculated as the average stabilized rate or the drop in water level during the final time period, expressed as inches per hour. Infiltration rates listed as zero includes tests where the rate of infiltration was below a measurable rate, less than $^{1}/_{16}$ of an inch per hour.

The observed in-situ infiltration rates at the test locations and depths are summarized below:

Test Pit	Surface Grade	Proposed Bottom of Basin	Infiltration Test Grade	Stratum	Soil Type	Average In-situ Infiltration Rate (in/hr.)
I-A1*	El 1411.3	El 1410.0	El 1410.4 (0.9')	A	silty GRAVEL with sand (GM)	5½ in/hr.
I-A2*	El 1415.3	El 1410.0	El 1411.3 (4.0')	A	silty SAND with gravel (SM)	1¼ in/hr.
I-A3	El 1414.2	El 1410.0	El 1411.7 (2.5')	A	silty SAND with gravel (SM), cobbles	1⅛ in/hr.
I-M1	El 1482.5**	El 1480.0	El 1480.3 (2.2')	A	silty SAND with gravel (SM)	⅝ in/hr.
I-M-1	El 1482.5**	El 1480.0	El 1474.5 (8.0')	A	silty GRAVEL with sand (GM)	2½ in/hr.
I-M-2	El 1483.1	El 1480.0	El 1480.0 (3.1')	A	silty GRAVEL with sand (GM)	2⅝ in/hr.
I-M-2	El 1483.1	El 1480.0	El 1478.1 (5.0')	A	silty GRAVEL with sand (GM)	2⅝ in/hr.

(continued on next page)

Test Pit	Surface Grade	Proposed Bottom of Basin	Infiltration Test Grade	Stratum	Soil Type	Average In-situ Infiltration Rate (in/hr.)
I-K4	El 1407.1	El 1402.0	El 1402.0 (5.1')	A	well graded GRAVEL with silt and sand (GW-GM)	1 in/hr.
I-K5	El 1404.9	El 1402.0	El 1402.0 (2.9')	A	well graded GRAVEL with silt and sand (GW-GM)	> 10 in/hr.
I-K5	El 1404.9	El 1402.0	El 1396.9 (8.0')	A	silty GRAVEL with sand (GM)	⅛ in/hr.
I-K6	El 1400.3	El 1402.0	El 1398.3 (2.0')	A	silty GRAVEL with sand (GM)	9⅞ in/hr.
I-K6	El 1400.3	El 1402.0	El 1392.3 (8.0')	A	well graded GRAVEL with silt and sand (GW-GM)	⅛ in/hr.
I-N1	El 1574.7	El 1572.0	El 1573.2 (1.5')	A	silty GRAVEL with sand (GM)	> 10 in/hr.
I-N2	El 1572.8	El 1572.0	No testing performed – rock at 1.5 feet			---
I-N3	El 1587.5	---	El 1587.0 (0.5')	A	silty SAND with gravel (SM)	9 in/hr.
I-N4	El 1592.6	---	El 1592.1 (0.5')	A	silty GRAVEL with sand (GM)	5½ in/hr.
I-O1	El 1505.2	---	No testing performed – rock at 1.5 feet			---
I-O2	El 1504.8	---	El 1503.3 (1.5')	A	silty SAND with gravel (SM)	7⅛ in/hr.

Note: * Information from previous report.
** Elevation approximated.

Based upon the recommended infiltration rates in Protocol 2, infiltration facilities may be feasible at the proposed bottom of basin elevation in the natural granular subgrades of Stratum A, at the proposed bottom of basin elevation bottom at Basin M, test pit TP-I-K4, or at revised elevations as noted above.

4.4 Safety Factors

Protocol 2 recommends the minimum safety factor that may be used is two (2). It further recommends that a minimum safety factor of three (3) be used for soils which classify as silty loam, clay loam, silty clay loam, sandy clay loam or clay under the USDA classification system if the percolation test methodology is used.

Based on the gradation and classification of subgrade materials encountered, we recommend a safety factor of two (2) in the sand and gravel soils of Stratum A.

4.5 Infiltration Design Recommendations

Based on the measured in-situ rates at varying depths below surface grades, we recommend the following in-situ infiltration design parameters:

General Study Area	Stratum	Infiltration Test Grade	Proposed Bottom of Basin Grade	Recommended In-situ Infiltration Rate (in/hr.)	Recommended Design Factor of Safety
Basin A	A	El 1410.4-1411.3	El 1410.0	2⅝ in/hr.	2
Basin M	A	El 1480.0-1480.3	El 1480.0	1⅝ in/hr.	2
Test Pit I-K4	A	El 1402.0	El 1402.0	1 in/hr.	2

Other in-situ infiltration rates may be achieved at revised elevations as detailed in paragraph 4.3.

If infiltration facilities are incorporated into the development, we recommend that the infiltration facilities be designed in strict accordance with Pennsylvania Stormwater Best Management Practices most recent edition of the manual.

4.6 Remediation – Subgrade Preparation Recommendations

In order to prepare subgrade areas lowered into bedrock for suitable design infiltration rates; at proposed basin bottom elevations for Basin N, we recommend that the materials encountered be drilled and shot to be over-excavated a minimum of 24 inches and replaced with an engineered soil buffer layer. We also recommend the materials encountered that have excessive infiltration rates, test pit TP-I-K5, be overexcavated a minimum of 24 inches and replaced with an engineered soils buffer layer. An engineered soil consisting of a mixture of sand and topsoil may be used to develop a subgrade infiltration rate to within a range of 2 to 6 inches per hour and consider a factor of safety of two (2).

Estimated proposed subgrade cross-sections for these construction processes are included for reference as Figure Nos. 6-1 and 6-2 in Enclosure (6). The soil buffer should be tested after installation to ensure the required infiltration rates are achieved.

5. OBSERVATIONS REQUIREMENTS AND STUDY LIMITATIONS

The report is based on the design concept of the proposed project as furnished to our office during the preparation of this report. Any substantial changes in construction locations or grading should be brought to our attention so that we may determine any effect on the recommendations given herein.

The analysis and recommendations submitted in this report are based upon the test pit data and the site plans provided to us. This report does not reflect variations which may occur between the test locations. The nature and extent of variations between test locations may not become evident until the course of construction. It is recommended that on-site observation of facility installations be performed during the construction period to ascertain if re-evaluation of the recommendations of this report must be made.

We have prepared this report for the use of your office and the design professionals for design and planning purposes in accordance with generally accepted geotechnical engineering practices. No other warranties, either expressed or implied are made as to the professional services included in this report.

We appreciate the opportunity to be of service to you for this project. Please do not hesitate to contact us for further clarification of any aspect of this study.

Sincerely,

MIDLANTIC ENGINEERING, INC.

Richard Heater, P.E.
Supervising Engineer

Timothy Burns, P.E.
President

Encls:

(1) Project Vicinity Plans
- Project Vicinity Plan – USGS 2019 Figure No. 1-1
- Project Vicinity Plan – Aerial 2016, Figure No. 1-2

(2) Geologic Mapping
- SCS Mapping, Figure No. 2-1
- Bedrock Geology Mapping, Figure No. 2-2

(3) Laboratory Testing Data
- Soil Classifications Summary
- Gradation and Classifications (8 Sheets)

(4) Subsurface Investigation Report
- General Notes
- Identification of Soils
- Test Pit Location Plan, Figure No. 4-1
- Test Pit Logs (TP I-A3, TP I-M1, TP I-M2, TP I-K4 through TP I-K6, TP I-N1 through TP I-N4, TP I-O1 and TP I-O2)

(5) In-Situ Infiltration Testing Setup

(6) Detail – Prepared Infiltration Subgrade, Figure Nos. 6-1 and 6-2

cc: Landmark Consulting Group
Attn: Mr. Mark Moseson
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Boucher & James, Inc.
Attn: Mr. Michael E. Gable, P.E.
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Attn: Mr. Kris J. Reiss, P.E.
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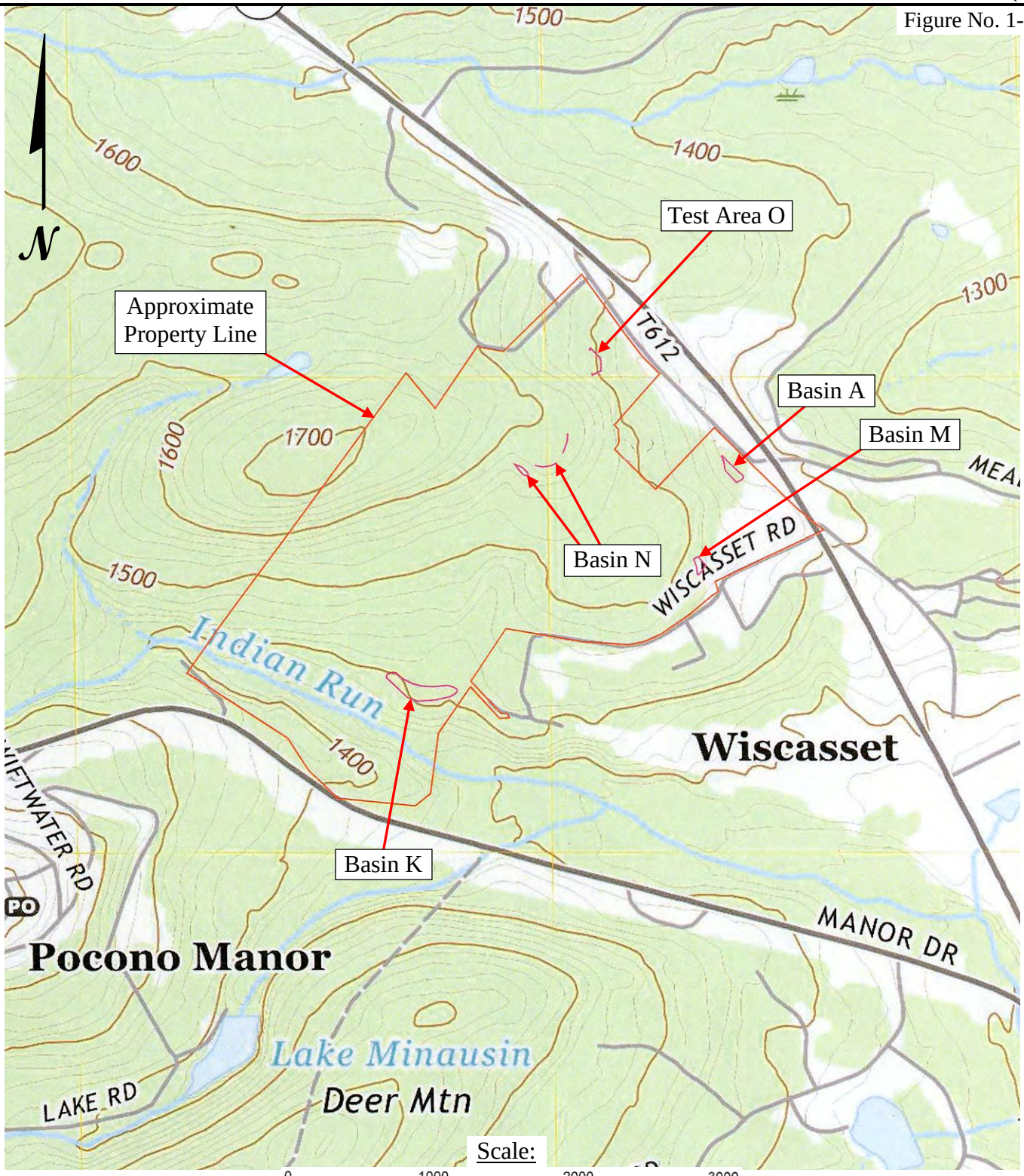
Figure No. 1-1



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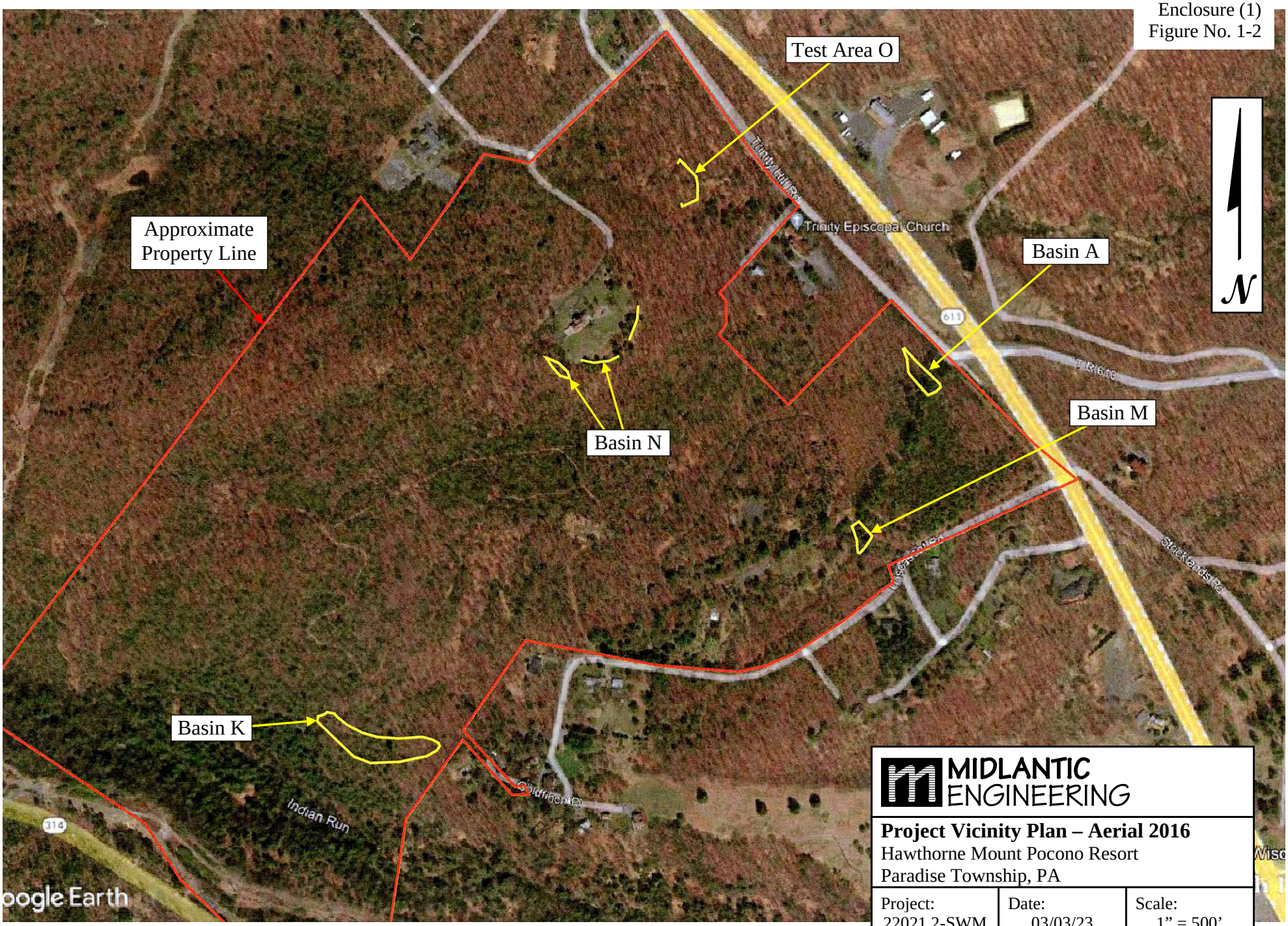
Drawing Title:
Project Vicinity Plan – USGS 2019
Hawthorne Mount Pocono Resort
Paradise Township, PA

Drawn By:	Checked By:	Scale:
LJ	TB	1” = 1,000’
Date:	Project No.:	Sheet No.
03/03/23	22021.2-SWM	---

Enclosure (1)
Figure No. 1-2



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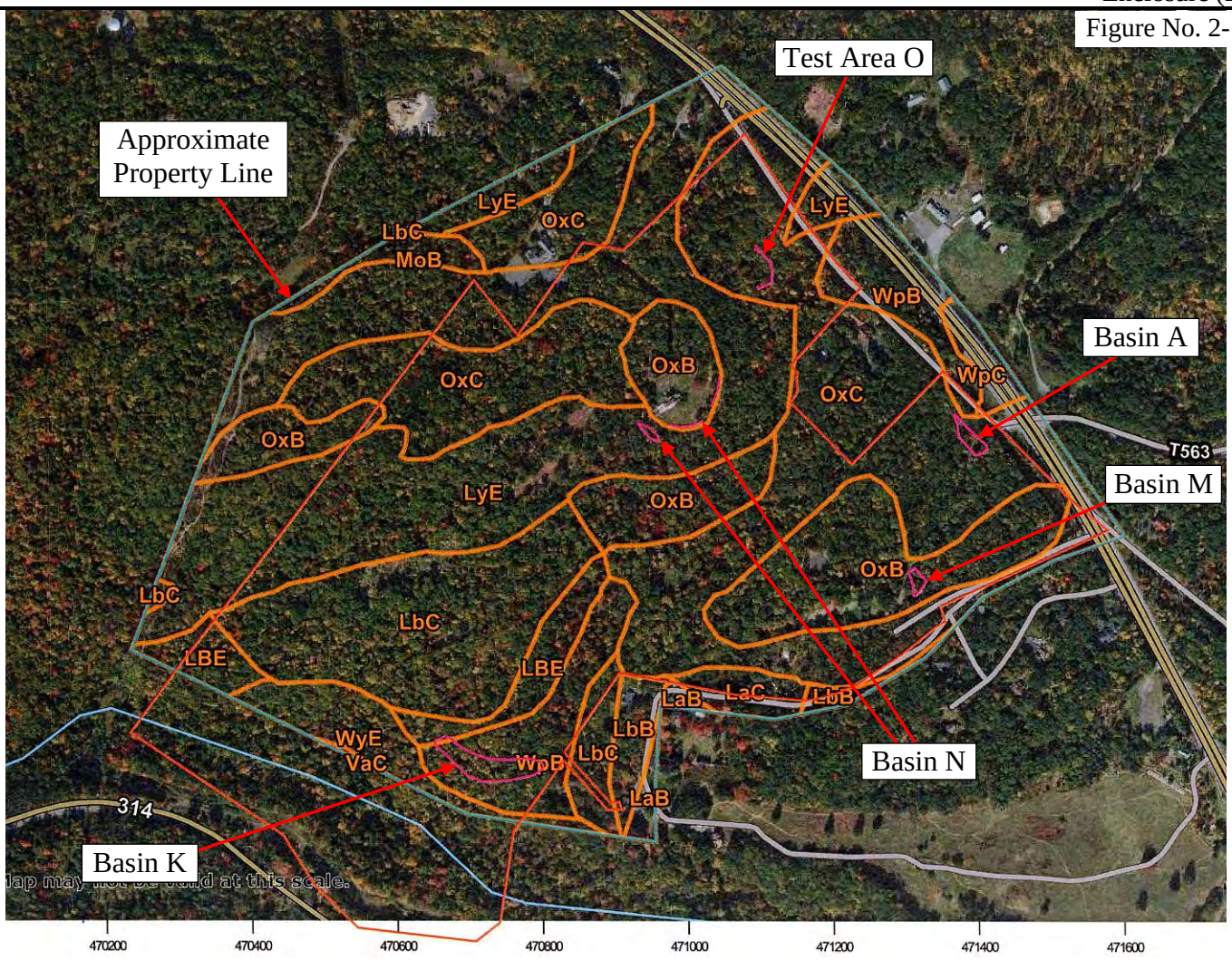
Project Vicinity Plan – Aerial 2016
Hawthorne Mount Pocono Resort
Paradise Township, PA

Project:	Date:	Scale:
22021.2-SWM	03/03/23	1” = 500’

Figure No. 2-1



Scale:

N

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

Map Unit Legend

Symbol	USCS Classifications
LBE – Lackawanna and Bath Soils	ML, SM, GM
LyE – Lordstown and Oquaga channery loam	ML, SM, GM
OxB, OxC – Oquaga-Lackawanna Complex	ML, SM, GM
WpB, WpC – Wellsboro channery loam	ML, SM, GM

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Drawing Title:
SCS Mapping
Hawthorne Mount Pocono Resort
Paradise Township, PA

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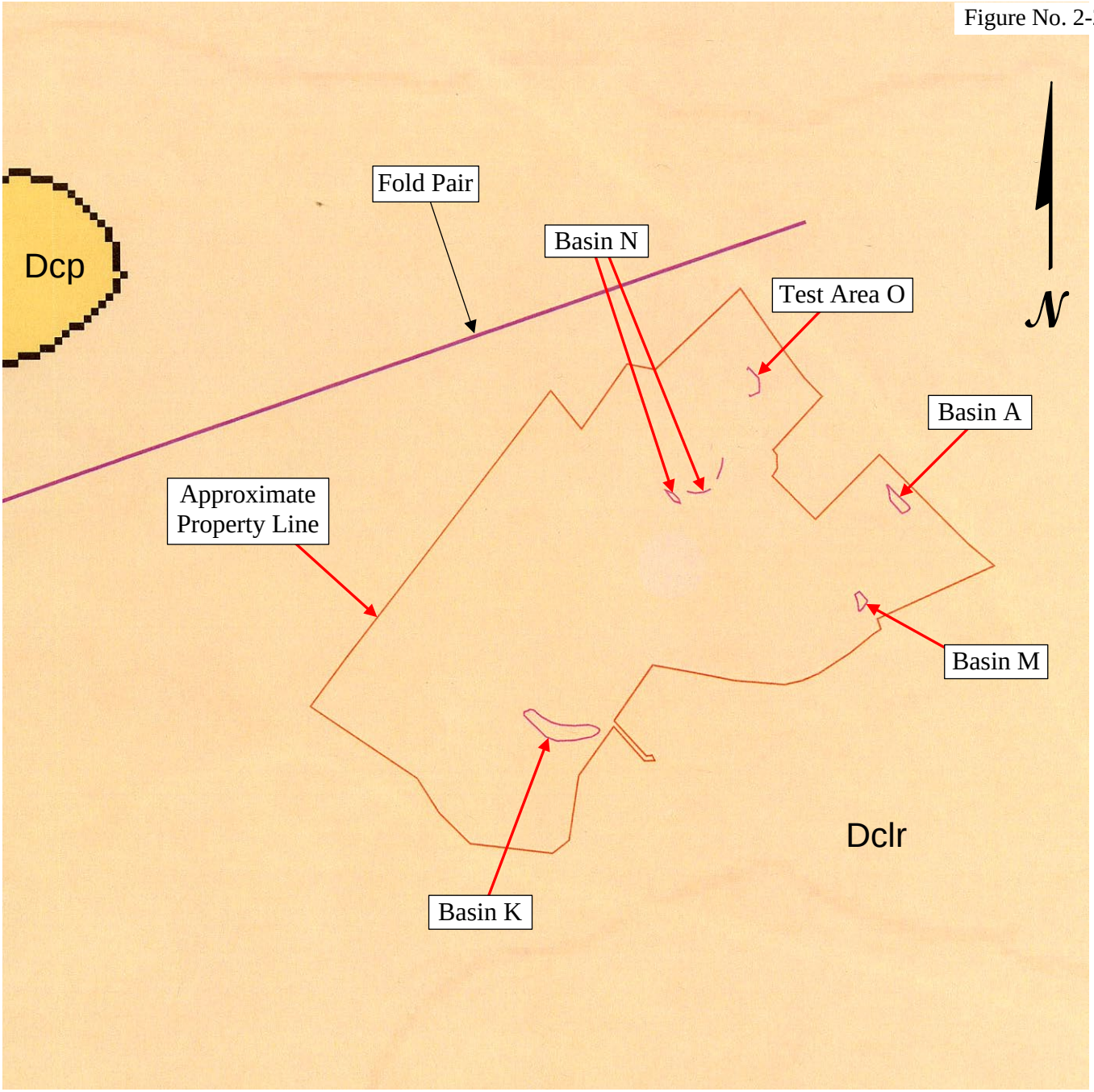
LJ	TB	as shown
Date:	Project No.:	Sheet No.
03/03/23	22021.2-SWM	---

Figure No. 2-2



Legend:

Dclr **Catskill Formation**
The Long Run Member of the Catskill Formation consists of typically cyclic, fine-to medium-grained, olive-gray sandstones grading upward into finer grained grayish-red-purple sandstones, then up into grayish-red shales. The unit is well bedded, and the sandstones generally have planar bedding.

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Drawing Title:
Bedrock Geology Mapping
Hawthorne Mount Pocono Resort
Paradise Township, PA

Drawn By:	Checked By:	Scale:
LJ	TB	1” = 1,000’±
Date:	Project No.:	Sheet No.
03/03/23	22021.2-SWM	---

MIDLANTIC ENGINEERING INC.
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LABORATORY TEST DATA

- Soil Classifications Summary
- Gradation and Classifications (8 Sheets)

SOIL CLASSIFICATIONS SUMMARY

Results of testing are summarized in the following table, and the individual gradation and classification curves are included within this enclosure.

Test Pit	Soil Sample Depth/Elev.	Stratum	Classification	% Moisture	Combined Silt/Clay (%<#200)
TP-I-A3	2.5' El 1411.7	A	silty SAND with gravel (SM)	12.2%	41%
TP-I-M2	3.1' El 1480.0	A	silty GRAVEL with sand (GM)	7.6%	28%
TP-I-M2	5.0' El 1478.1	A	silty GRAVEL with sand (GM)	8.7%	22%
TP-I-K5	2.9' El 1402.0	A	well graded GRAVEL with silt and sand (GW-GM)	6.5%	7%
TP-I-K5	8.0' El 1396.9	A	silty GRAVEL with sand (GM)	7.7%	26%
TP-I-N1	1.5' El 1573.2	A	silty GRAVEL with sand (GM)	14.0%	23%
TP-I-N4	0.5' El 1592.1	A	silty GRAVEL with sand (GM)	12.5%	29%
TP-I-O2	1.5' El 1503.3	A	silty SAND with gravel, mottling (SM)	11.8%	28%

GRADATION AND CLASSIFICATION (ASTM D2487)

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	17.5	8.8	5.6	7.0	20.2	26.1	14.8

	Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
○	TP-I-A3	S-1	2.5'/1411.7	2/10/23	SM	brown silty SAND with gravel	12.2	NV	NP
						Stratum A			

Client JSPA Realty c/o Mr. Joel Shtesl

Project Hawthorne Mount Pocono Resort

Paradise Twp., PA

Project No. 22021.2

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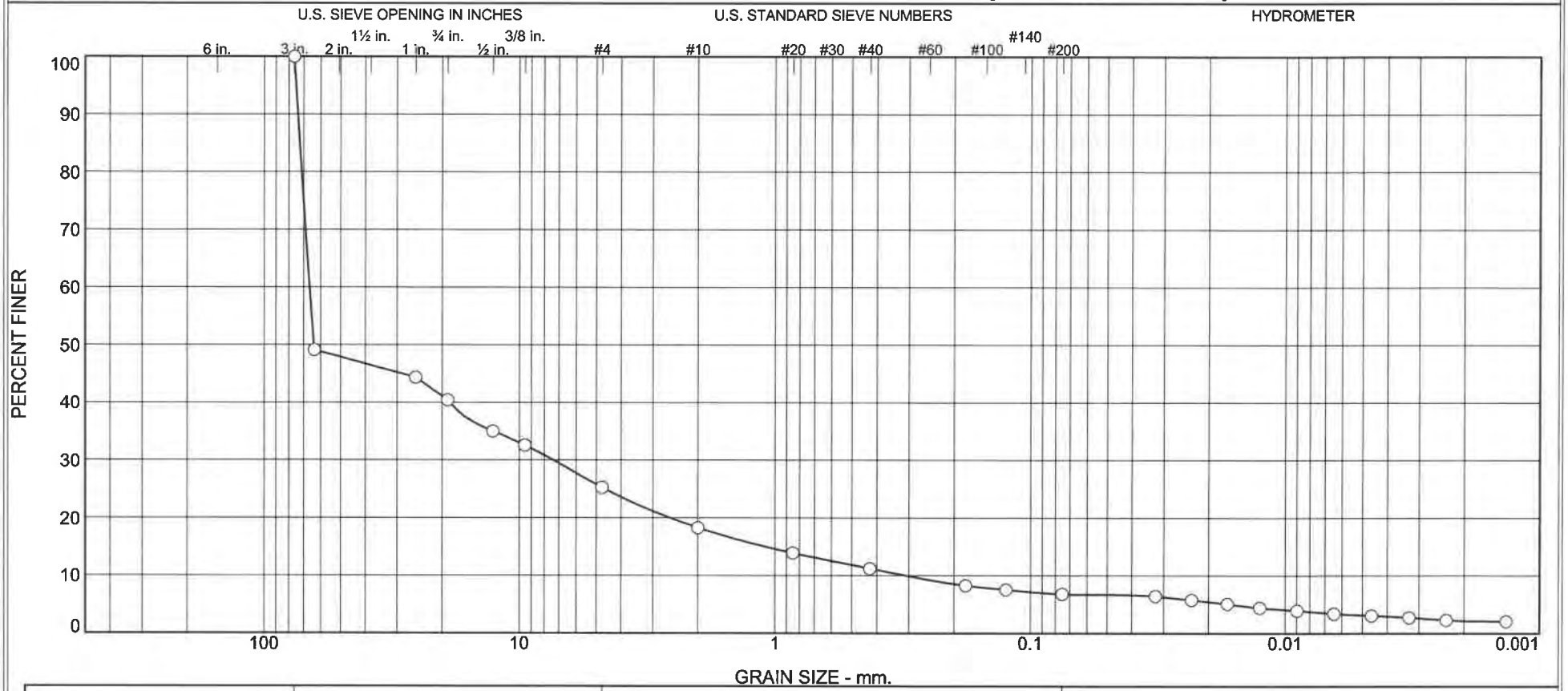
○ cobbles
USDA: loam

Tested By: MJ **Checked By:** DH

GRADATION AND CLASSIFICATION (ASTM D2487)



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	59.6	15.1	7.0	7.1	4.4	4.6	2.2

	Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
○	TP-I-K5	S-1	2.9'/1402.0	2/10/23	GW-GM	brown well-graded GRAVEL with silt and sand	6.5	NV	NP
						Stratum A			

Client JSPA Realty c/o Mr. Joel Shtesl

Project Hawthorne Mount Pocono Resort

Paradise Twp., PA

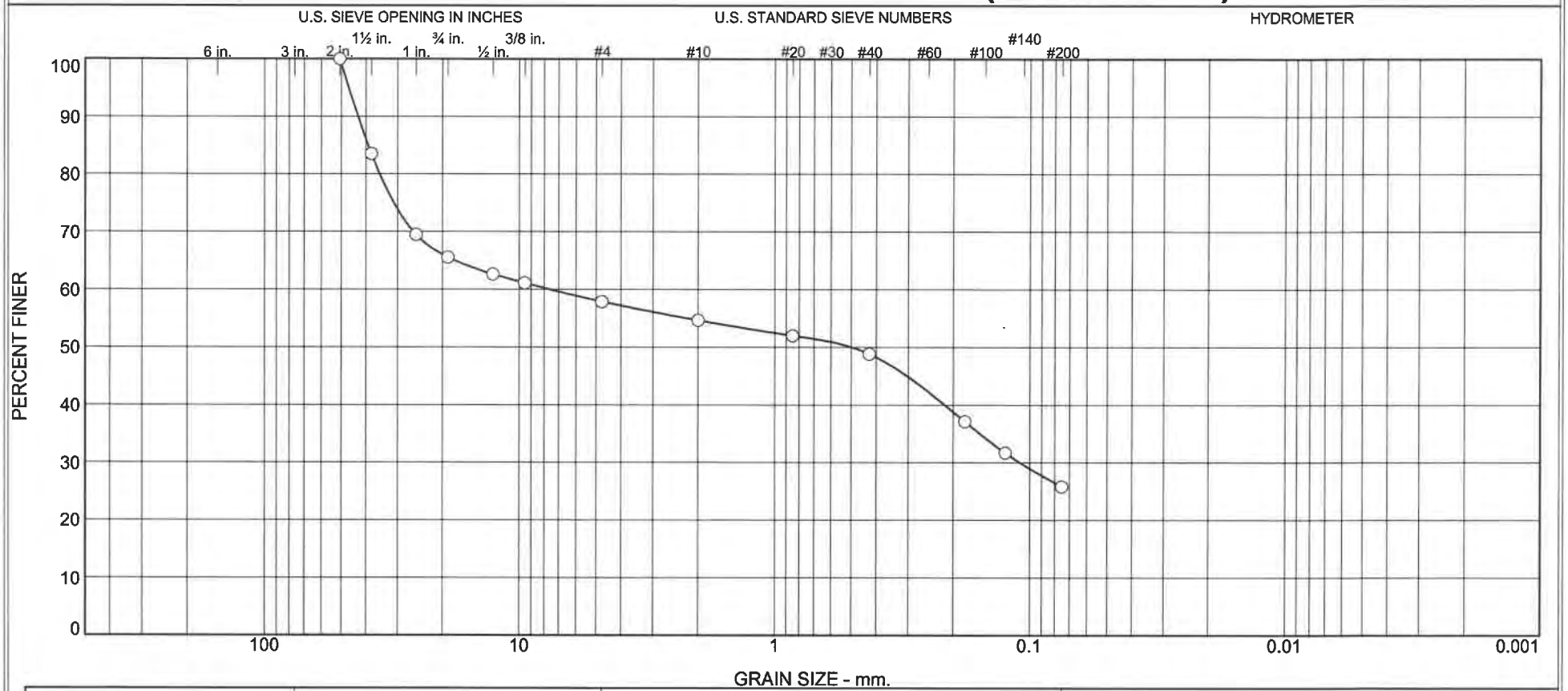
Project No. 22021.2

MIDLANTIC ENGINEERING

○ USDA: sandy loam

Tested By: MJ **Checked By:** DH

GRADATION AND CLASSIFICATION (ASTM D2487)



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	34.4	7.7	3.2	5.9	23.0	25.8	

	Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
○	TP-I-K5	S-2	8.0'/1396.9	2/10/23	GM	brown silty GRAVEL with sand	7.7	NV	NP
						Stratum A			

Client JSPA Realty c/o Mr. Joel Shtesl

Project Hawthorne Mount Pocono Resort

Paradise Twp., PA

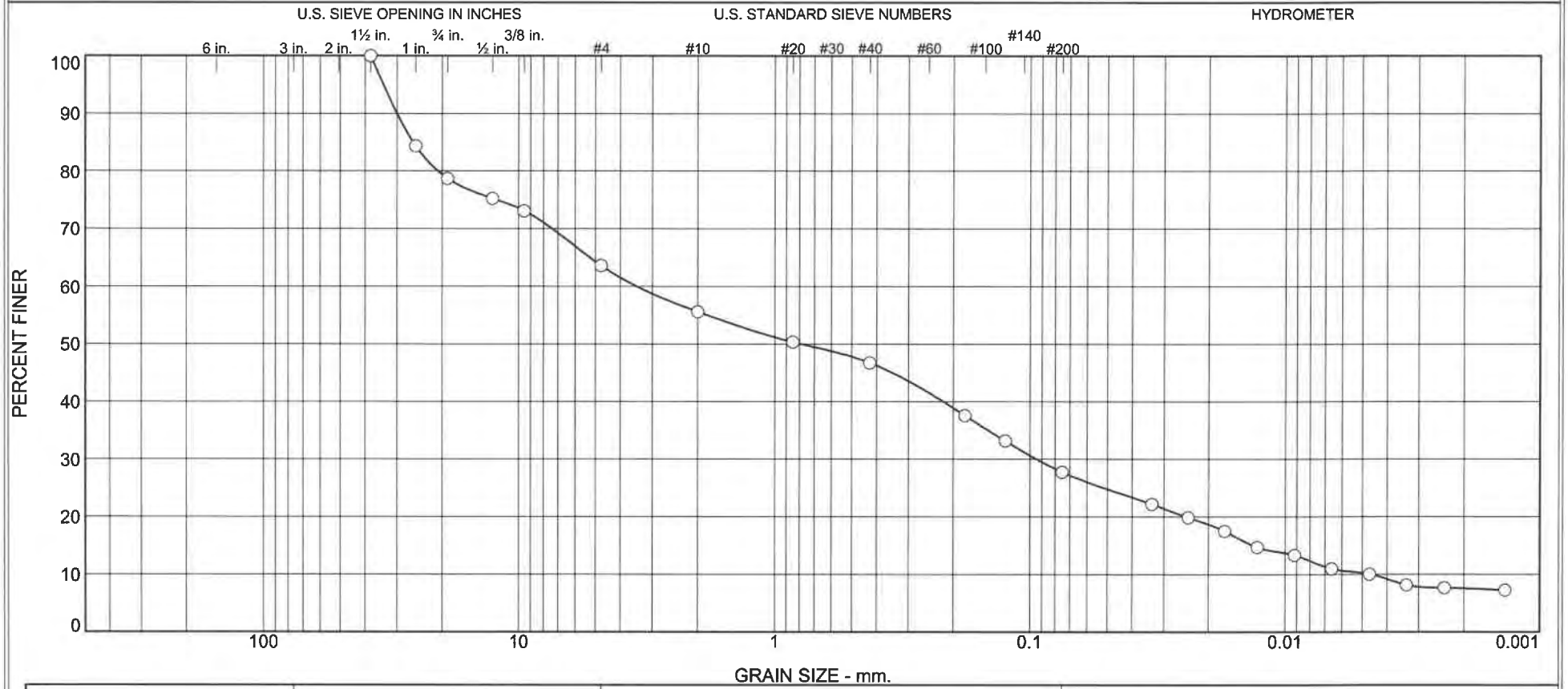
Project No. 22021.2

MIDLANTIC ENGINEERING

○ USDA: sandy loam

Tested By: MJ **Checked By:** DH

GRADATION AND CLASSIFICATION (ASTM D2487)



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	21.3	15.1	8.0	8.9	18.9	20.2	7.6

	Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
○	TP-I-M2	S-1	3.1'/1480.0	2/10/23	GM	brown silty GRAVEL with sand	7.6	NV	NP
						Stratum A			

Client JSPA Realty c/o Mr. Joel Shtesl

Project Hawthorne Mount Pocono Resort

Paradise Twp., PA

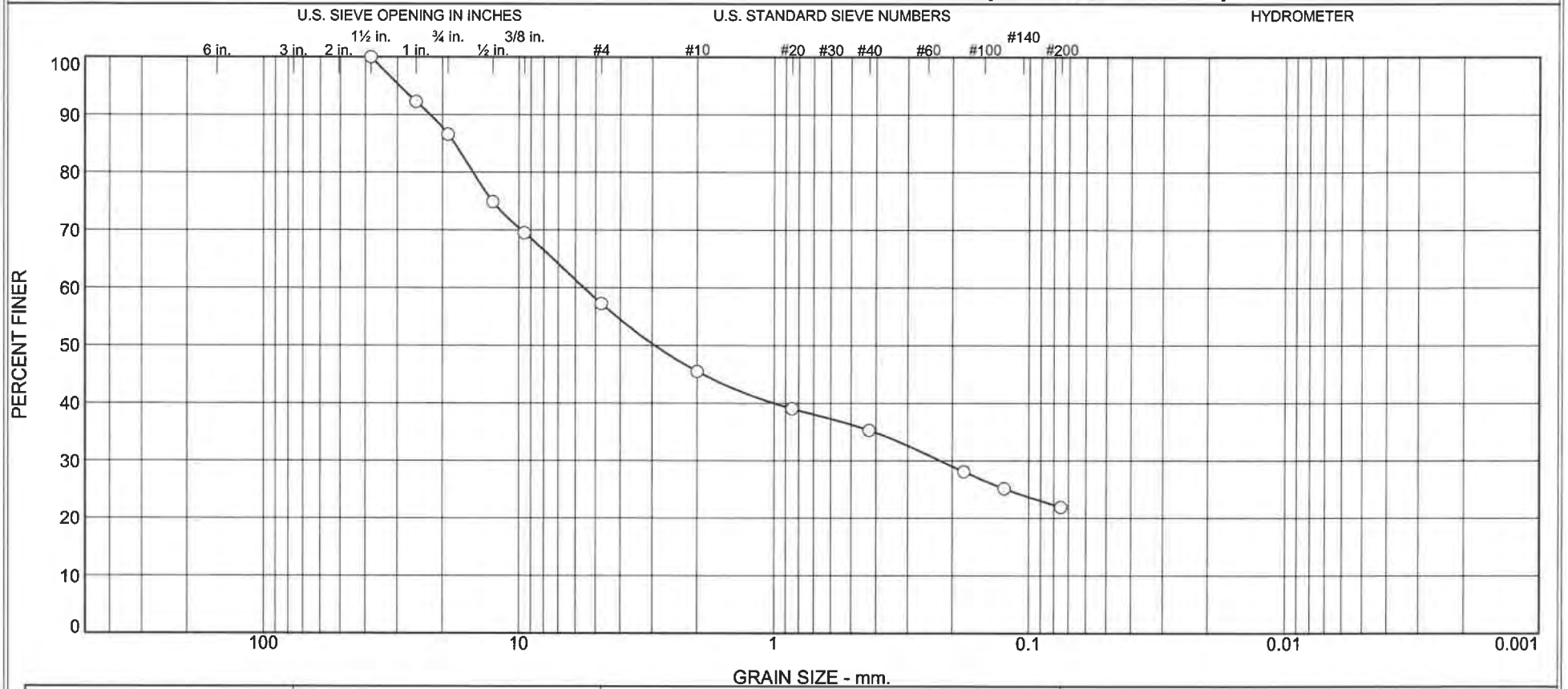
Project No. 22021.2

MIDLANTIC ENGINEERING

○ USDA: sandy loam

Tested By: MJ **Checked By:** DH

GRADATION AND CLASSIFICATION (ASTM D2487)



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	13.4	29.3	11.8	10.2	13.4	21.9	

	Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
○	TP-I-M2	S-2	5.0'/1478.1	2/10/23	GM	red/brown silty GRAVEL with sand	8.7	NV	NP
						Stratum A			

Client JSPA Realty c/o Mr. Joel Shtesl

Project Hawthorne Mount Pocono Resort

Paradise Twp., PA

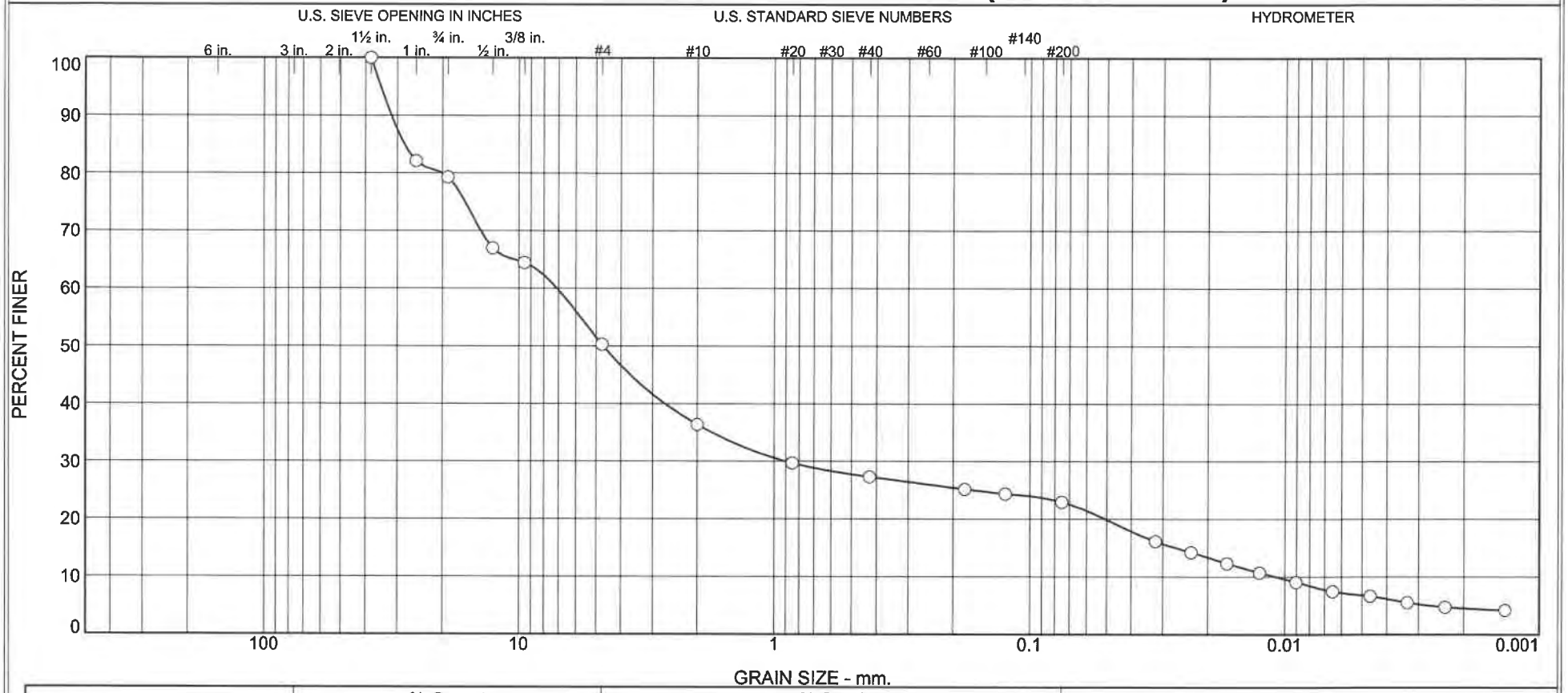
Project No. 22021.2

MIDLANTIC ENGINEERING

○ USDA: sandy loam

Tested By: MJ **Checked By:** DH

GRADATION AND CLASSIFICATION (ASTM D2487)



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	20.7	29.0	13.9	9.1	4.3	18.5	4.5

	Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
○	TP-I-N1	S-1	1.5'/1573.2	2/10/23	GM	red/brown silty GRAVEL with sand	14.0	34	32
						Stratum A			

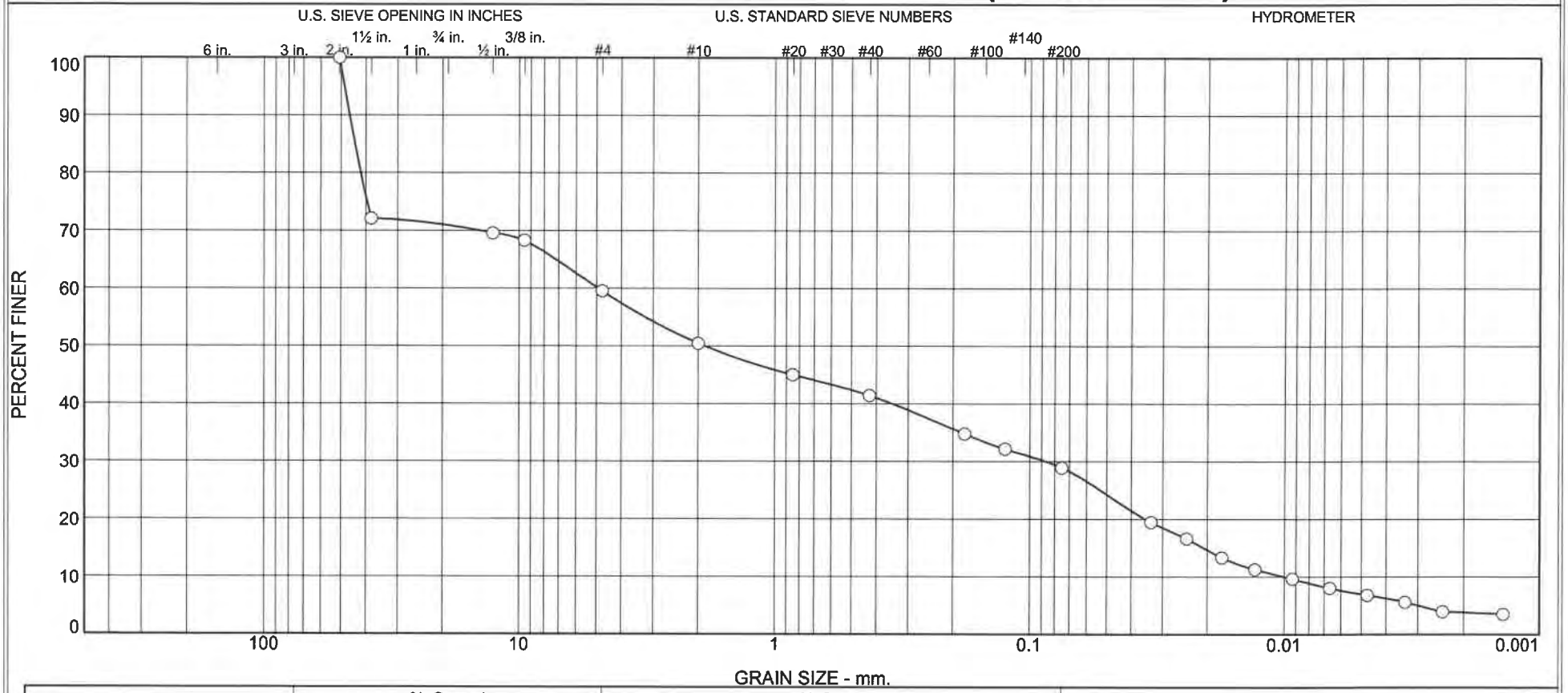
Client JSPA Realty c/o Mr. Joel Shtesl
Project Hawthorne Mount Pocono Resort
Paradise Twp., PA
Project No. 22021.2

MIDLANTIC ENGINEERING

○ Plasticity Index PI= 2
USDA: loam

Tested By: MJ **Checked By:** DH

GRADATION AND CLASSIFICATION (ASTM D2487)



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	29.1	11.4	9.0	9.1	12.5	25.1	3.8

	Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
○	TP-I-N4	S-1	0.5'/1592.1	2/10/23	GM	red/brown silty GRAVEL with sand	12.5	NV	NP
						Stratum A			

Client JSPA Realty c/o Mr. Joel Shtesl

Project Hawthorne Mount Pocono Resort

Paradise Twp., PA

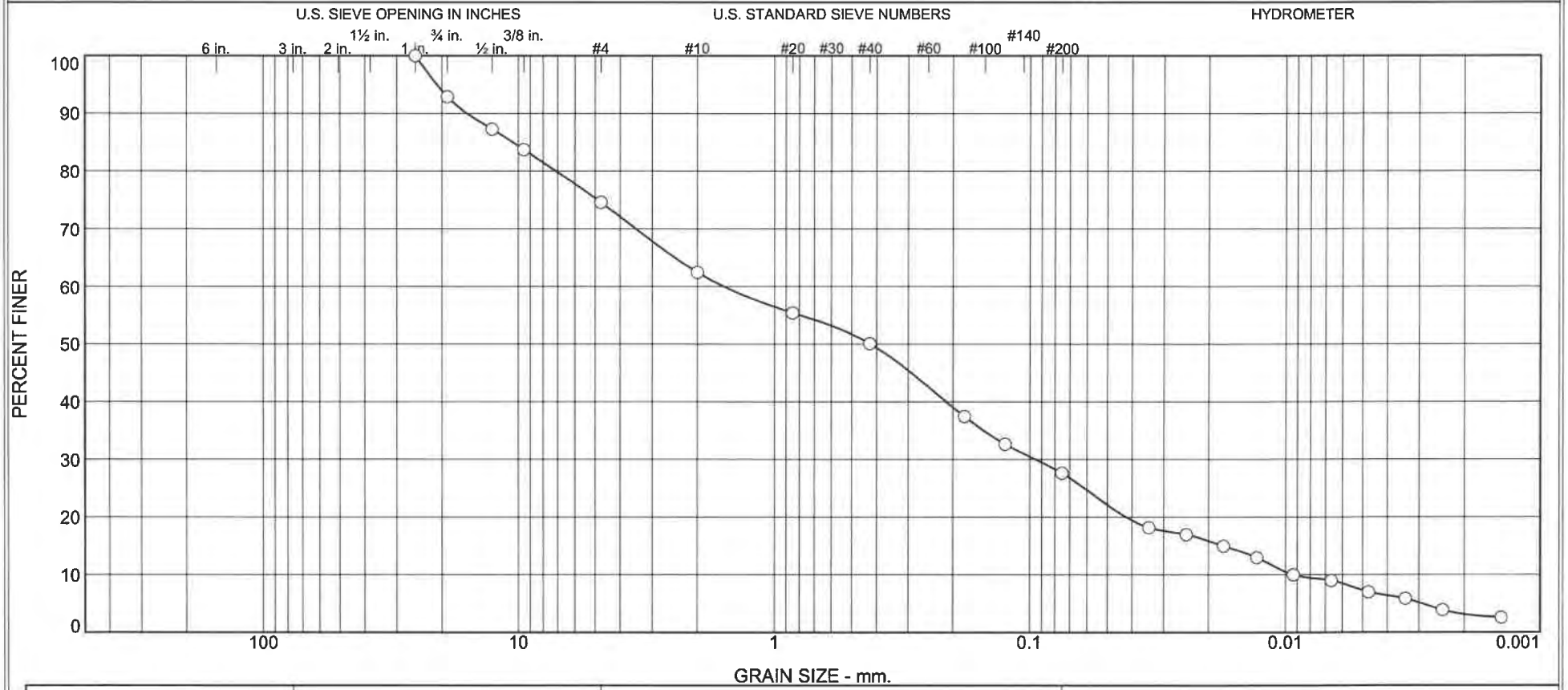
Project No. 22021.2

MIDLANTIC ENGINEERING

○ USDA: sandy loam

Tested By: MJ **Checked By:** DH

GRADATION AND CLASSIFICATION (ASTM D2487)



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	7.1	18.3	12.2	12.3	22.5	24.5	3.1

	Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
○	TP-I-O2	S-2	1.5'/1518.3	2/10/23	SM	brown silty SAND with gravel	11.8	19	18
						Stratum A			

Client JSPA Realty c/o Mr. Joel Shtesl

Project Hawthorne Mount Pocono Resort

Paradise Twp., PA

Project No. 22021.2

MIDLANTIC ENGINEERING

○ Plasticity Index PI= 1
mottling at 3.5'
USDA: sandy loam

Tested By: MJ **Checked By:** DH

SUBSURFACE INVESTIGATION REPORT

- General Notes
- Identification of Soils
- Test Pit Location Plan, Figure No. 4-1
- Test Pit Logs (TP I-A3, TP I-M1, TP I-M2, TP I-K4 through TP I-K6, TP I-N1 through TP I-N4, TP I-O1 and TP I-O2)

GENERAL NOTES

1. Test pits are logged by engineering personnel to provide a record for geotechnical evaluation. The log itself includes a description of soil and rock materials encountered using visual classification in the field. Boundary lines between various strata are identified where possible and a graphical presentation is included based on the material excavated from the pit. Any significant features, such as fill conditions, underground structures, groundwater or water seepage conditions are recorded.

2. The test pit logs and related information depict subsurface conditions only at the specific location and at the particular time excavated. Soil conditions at other locations may differ from conditions occurring at these test pit locations. Also, the passage of time may result in a change in the subsurface soil and groundwater conditions at these locations.

3. The stratification lines represent the approximate boundary between soil and rock types as observed in the test pits. The profiles and water level observations presented have been made with reasonable care and accuracy and must be considered only an approximate representation of subsurface conditions to be encountered at the particular location.

4. Strata descriptions are based on visual inspection and are in accordance with the Unified Soil Classification System, per ASTM D-2488.

5. The test pit locations and grades are based on information provided by others and should be considered as approximate only. The test pit observations and draft logs were prepared by Daniel Hartigan, P.E. of this office.

MIDLANTIC ENGINEERING INC.
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IDENTIFICATION OF SOILS

I. Definition of Soil Group Names – ASTM D-2487-11			Symbol	Group Name
Coarse-Grained Soils More than 50% retained on No. 200 sieve	**Gravels** – More than 50% of coarse fraction retained on No. 4 sieve Coarse, ¾" to 3" Fine, No. 4 to ¾"	Clean Gravels Less than 5% fines	GW	well-graded gravel
			GP	poorly graded gravel
		Gravels with Fines More than 12% fines	GM	silty gravel
			GC	clayey gravel
	Sands – 50% or more of coarse fraction passes No. 4 sieve Coarse: No. 10 to No. 4 Medium: No. 40 to No. 10 Fine: No. 200 to No. 40	Clean Sands Less than 5% fines	SW	well-graded sand
			SP	poorly graded sand
		Sands with Fines More than 12% fines	SM	silty sand
			SC	clayey sand
Fine-Grained Soils 50% or more passes the No. 200 sieve	**Silts and Clays** – Liquid Limit less than 50 Low to medium plasticity	Inorganic	CL	lean clay
			ML	silt
		Organic	OL	organic clay
				organic silt
	Silts and Clays – Liquid Limit 50 or more Medium to high plasticity	Inorganic	CH	fat clay
			MH	elastic silt
		Organic	OH	organic clay
				organic silt
Highly Organic Soils	Primarily organic matter, dark in color, and organic odor		PT	peat

II. Definition of Minor Component Proportions		Approximate Percentage of Fraction by Weight
adjective form	gravelly, sandy	30% or more coarse grained
with	sand, gravel	15% or more coarse grained
	silt, clay	5% to 12% fine grained
trace	sand, gravel	Less than 15% coarse grained
	silt, clay	Less than 5% fine grained

III. Glossary of Miscellaneous Terms

symbols Unified Soil Classification Symbols are shown above as group symbols. Use a Line Chart for laboratory identification. Dual symbols are used for borderline classifications.

boulders & cobbles Boulders are considered rounded pieces of rock larger than 12 inches, while cobbles range from 3 to 12 inch size.

disintegrated rock Very generally defined as residual rock material with a standard penetration resistance (SPT) of more than 50 blows per foot, and less than refusal. Refusal is defined as a SPT of 100 blows for 2" or less penetration.

rock fragments Angular pieces of rock, distinguished from transported gravel, which have separated from original vein or strata and are present in a soil matrix.

quartz A hard silica mineral often found in residual soils

ironite Iron oxide deposited within a soil layer forming cemented deposits

cemented sand Usually localized rock-like deposits within a soil stratum composed of sand grains cemented by calcium carbonate or other materials.

mica A soft plate of silica mineral found in many rocks, and in residual or transported soil derived therefrom.

organic materials (excluding peat) Topsoil: Surface soils that support plant life and which contain considerable amounts of organic matter;
Organic Matter: Soil containing organic colloids throughout its structure;
Lignite: Hard, brittle decomposed organic matter with low fixed carbon content (a low grade of coal).

fill Man made deposit containing soil, rock and often foreign matter

probable fill Soils which contain no visually detected foreign matter but which are suspect with regard to origin

lenses 0 to 2 inch seam of minor soil component

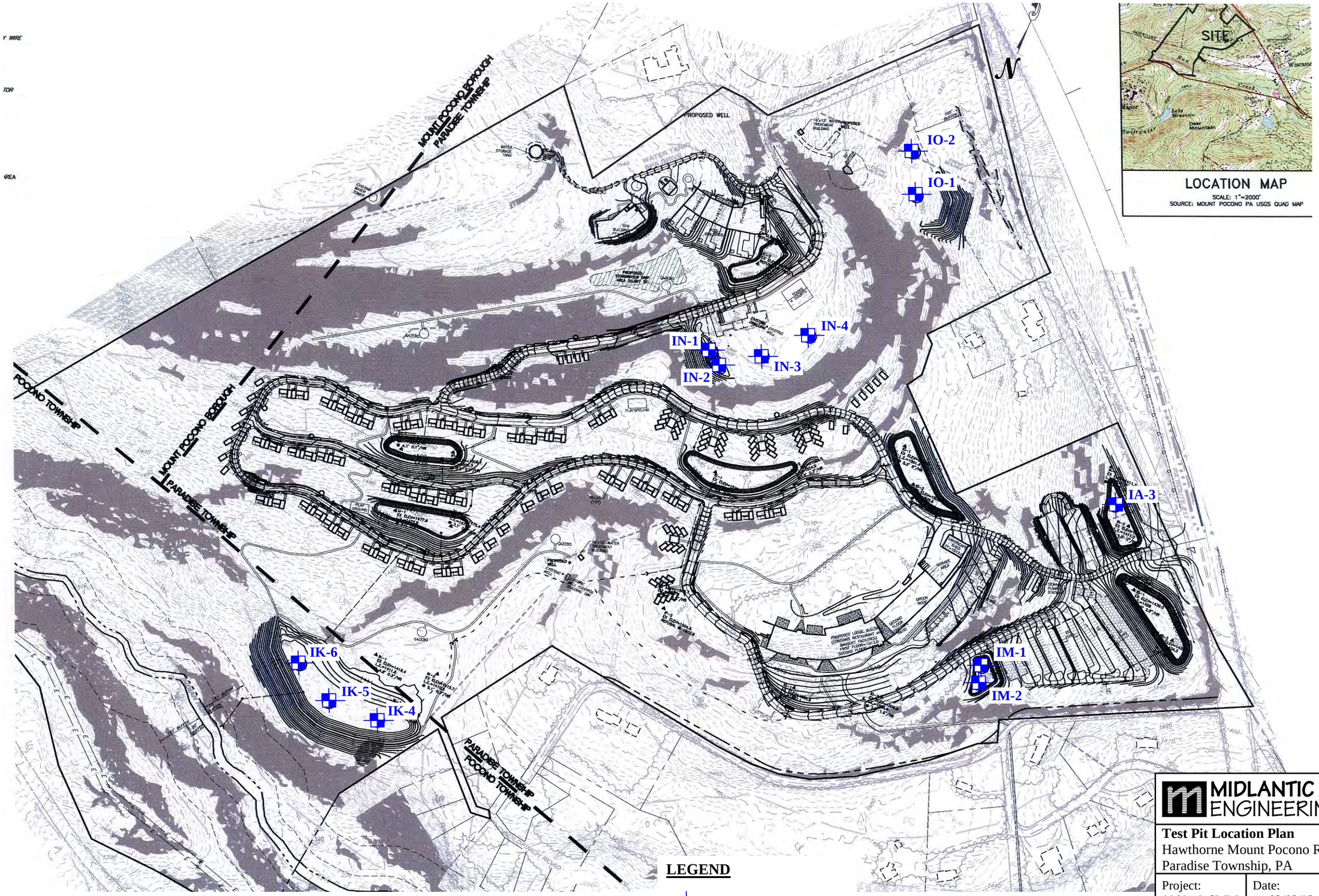
layers 2 to 12 inch seam of minor soil component

pocket Discontinuous body of minor soil component

color shades Light to dark to indicate substantial difference in color

moisture conditions Wet, moist, or dry to indicate visual appearance of specimen

Enclosure (4)
Figure No. 4-1



LOCATION MAP
SCALE: 1"=2000'
SOURCE: MOUNT POCONO PA USGS QUAD MAP

LEGEND

= Test Pit Location

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Test Pit Location Plan
Hawthorne Mount Pocono Resort
Paradise Township, PA

Project:	Date:	Scale:
22021.2-SWM	03/03/23	1" = 300'

MIDLANTIC ENGINEERING

TEST PIT LOG TP-I-A3

Project: Hawthorne Mount Pocono Resort
Paradise Township, PA

Test Loc. No.: **TP-I-A3**

Contract No.: **22021.2**

Date Excavated: 02/09/23

ME, Inc. Rep.: D.H.

Equip. Used: Excavator

Surface Elev: 1414.2

Groundwater Observations

Encountered:	02/09/23	Depth:	none
Completion:	02/09/23	Depth:	dry

Depth (ft.)	Strata Description	Class.	Str'm	Elev.	InSitu Testing Depth	InSitu Testing Geoprobe Penetr'n	M (%)	Remarks
1	5" topsoil				1			
2	brown silty SAND with gravel, cobbles	SM	A		2		12.2	infiltration testing @ 2.5'; El 1411.7
3					3			
4				1409.7	4			
5	Refusal at 4.5 feet Bottom of Test Pit at 4.5 feet				5			
6					6			
7					7			
8					8			
9					9			
10					10			
11					11			
12					12			
13					13			
14					14			
15					15			

Comments: Backfilled upon completion.

MIDLANTIC ENGINEERING

TEST PIT LOG TP-I-M1

Project: Hawthorne Mount Pocono Resort
Paradise Township, PA

Test Loc. No.: **TP-I-M1**

Contract No.: **22021.2**

Date Excavated: 02/09/23

ME, Inc. Rep.: D.H.

Equip. Used: Excavator

Surface Elev: 1482.5 (est.)

Groundwater Observations

Encountered:	02/09/23	Depth:	none
Completion:	02/09/23	Depth:	dry

Depth (ft.)	Strata Description	Class.	Str'm	Elev.	InSitu Testing Depth	InSitu Testing Geoprobe Penetr'n	M (%)	Remarks
1	5" topsoil							
2	yellow/brown silty SAND with gravel	SM	A				26.8	infiltration testing @ 2.2'; El 1480.3
3								
4								
5	brown silty GRAVEL with sand	GM						
6								
7								
8							11.5	infiltration testing @ 8.0'; El 1474.5
9								
10	dark red/brown silty GRAVEL with sand, cobbles							
11				1471.0				
12	Refusal at 11.5 feet Bottom of Test Pit at 11.5 feet							
13								
14								
15								

Comments: Backfilled upon completion.

MIDLANTIC ENGINEERING

TEST PIT LOG TP-I-M2

Project: Hawthorne Mount Pocono Resort
Paradise Township, PA

Test Loc. No.: **TP-I-M2**

Contract No.: **22021.2**

Date Excavated: 02/09/23

ME, Inc. Rep.: D.H.

Equip. Used: Excavator

Surface Elev: 1483.1

Groundwater Observations

Encountered:	02/09/23	Depth:	none
Completion:	02/09/23	Depth:	dry

Depth (ft.)	Strata Description	Class.	Str'm	Elev.	InSitu Testing Depth	InSitu Testing Geoprobe Penetr'n	M (%)	Remarks
1	5" topsoil							
1	brown silty sand with gravel - FILL	SM	F		1			
2	@ 2.5': pipe			1480.6	2			
3	brown silty GRAVEL with sand	GM	A		3		7.6	infiltration testing @ 3.1'; El 1480.0
4					4			
5					5		8.7	infiltration testing @ 5.0'; El 1478.1
6	red/brown silty GRAVEL with sand				6			
7				1476.1	7			
8	Refusal at 7.0 feet Bottom of Test Pit at 7.0 feet				8			
9					9			
10					10			
11					11			
12					12			
13					13			
14					14			
15					15			

Comments: Backfilled upon completion.

MIDLANTIC ENGINEERING

TEST PIT LOG TP-I-K4

Project: Hawthorne Mount Pocono Resort
Paradise Township, PA

Test Loc. No.: **TP-I-K4**

Contract No.: **22021.2**

Date Excavated: 02/09/23

ME, Inc. Rep.: D.H.

Equip. Used: Excavator

Surface Elev: 1407.1

Groundwater Observations

Encountered:	02/09/23	Depth:	7.1’
Completion:	02/09/23	Depth:	7.1’

Depth (ft.)	Strata Description	Class.	Str’m	Elev.	InSitu Testing Depth	InSitu Testing Geoprobe Penetr’n	M (%)	Remarks
1	5” topsoil				1			
2	brown well graded GRAVEL with silt and sand	GW-GM	A		2			
3					3			
4					4			
5					5		6.7	infiltration testing @ 5.1’; El 1402.0
6					6			
7					7			
8	@ 7.5’: gray mottling			1398.6	8			
9	Bottom of Test Pit at 8.5 feet				9			
10					10			
11					11			
12					12			
13					13			
14					14			
15					15			

Comments: Backfilled upon completion.

MIDLANTIC ENGINEERING

TEST PIT LOG TP-I-K5

Project: Hawthorne Mount Pocono Resort
Paradise Township, PA

Test Loc. No.: **TP-I-K5**

Contract No.: **22021.2**

Date Excavated: 02/09/23

ME, Inc. Rep.: D.H.

Equip. Used: Excavator

Surface Elev: 1404.9

Groundwater Observations

Encountered:	02/09/23	Depth:	none
Completion:	02/09/23	Depth:	dry

Depth (ft.)	Strata Description	Class.	Str'm	Elev.	InSitu Testing Depth	InSitu Testing Geoprobe Penetr'n	M (%)	Remarks
1	6" topsoil							
2	yellow/brown well graded GRAVEL with silt and sand	GW-GM	A					
3							6.5	infiltration testing @ 2.9'; El 1402.0
4								
5	brown silty GRAVEL with sand	GM						
6								
7								
8							7.7	infiltration testing @ 8.0'; El 1396.9
9								
10								
11								
12								
13								
14				1390.9				
15	Bottom of Test Pit at 14.0 feet							

Comments: Backfilled upon completion.

MIDLANTIC ENGINEERING

TEST PIT LOG TP-I-K6

Project: Hawthorne Mount Pocono Resort
Paradise Township, PA

Test Loc. No.: **TP-I-K6**

Contract No.: **22021.2**

Date Excavated: 02/10/23

ME, Inc. Rep.: D.H.

Equip. Used: Excavator

Surface Elev: 1400.3

Groundwater Observations

Encountered:	02/10/23	Depth:	none
Completion:	02/10/23	Depth:	dry

Depth (ft.)	Strata Description	Class.	Str'm	Elev.	InSitu Testing Depth	InSitu Testing Geoprobe Penetr'n	M (%)	Remarks
1	5" topsoil							
2	brown silty GRAVEL with sand	GM	A				11.4	infiltration testing @ 2.0'; El 1398.3
3								
4								
5	brown well graded GRAVEL with silt and sand	GW-GM						
6	@ 6'-10': cobbles							
7								
8							18.5	infiltration testing @ 8.0'; El 1392.3
9								
10				1390.3				
10	Bottom of Test Pit at 10.0 feet							
11								
12								
13								
14								
15								

Comments: Backfilled upon completion.

MIDLANTIC ENGINEERING

TEST PIT LOG TP-I-N1

Project: Hawthorne Mount Pocono Resort
Paradise Township, PA

Test Loc. No.: **TP-I-N1**

Contract No.: **22021.2**

Date Excavated: 02/10/23

ME, Inc. Rep.: D.H.

Equip. Used: Excavator

Surface Elev: 1574.7

Groundwater Observations

Encountered:	0210/23	Depth:	none
Completion:	02/10/23	Depth:	dry

Depth (ft.)	Strata Description	Class.	Str'm	Elev.	InSitu Testing Depth	InSitu Testing Geoprobe Penetr'n	M (%)	Remarks
1	6" topsoil				1			
2	red/brown silty GRAVEL with sand	GM	A		2		14.0	infiltration testing @ 1.5'; El 1573.2
3				1571.2	3			
4	Refusal at 3.5 feet Bottom of Test Pit at 3.5 feet				4			
5					5			
6					6			
7					7			
8					8			
9					9			
10					10			
11					11			
12					12			
13					13			
14					14			
15					15			

Comments: Backfilled upon completion.

MIDLANTIC ENGINEERING

TEST PIT LOG TP-I-N2

Project: Hawthorne Mount Pocono Resort
Paradise Township, PA

Test Loc. No.: **TP-I-N2**

Contract No.: **22021.2**

Date Excavated: 02/10/23

ME, Inc. Rep.: D.H.

Equip. Used: Excavator

Surface Elev: 1572.8

Groundwater Observations

Encountered:	02/10/23	Depth:	none
Completion:	02/10/23	Depth:	dry

Depth (ft.)	Strata Description	Class.	Str'm	Elev.	InSitu Testing Depth	InSitu Testing Geoprobe Penetr'n	M (%)	Remarks
1	3" topsoil red/brown silty GRAVEL with sand	GM	A	1571.3	1			No infiltration testing performed – insufficient depth to limiting zone.
2	Refusal at 1.5 feet Bottom of Test Pit at 1.5 feet				2			
3					3			
4					4			
5					5			
6					6			
7					7			
8					8			
9					9			
10					10			
11					11			
12					12			
13					13			
14					14			
15					15			

Comments: Backfilled upon completion.

MIDLANTIC ENGINEERING

TEST PIT LOG TP-I-N3

Project: Hawthorne Mount Pocono Resort
Paradise Township, PA

Test Loc. No.: **TP-I-N3**

Contract No.: **22021.2**

Date Excavated: 02/10/23

ME, Inc. Rep.: D.H.

Equip. Used: Excavator

Surface Elev: 1587.5

Groundwater Observations

Encountered:	02/10/23	Depth:	none
Completion:	02/10/23	Depth:	dry

Depth (ft.)	Strata Description	Class.	Str'm	Elev.	InSitu Testing Depth	InSitu Testing Geoprobe Penetr'n	M (%)	Remarks
1	1" topsoil				1		27.9	infiltration testing @ 0.5'; El 1587.0
2	red/brown silty SAND with gravel	SM	A	1585.0	2			
3	Refusal at 2.5 feet Bottom of Test Pit at 2.5 feet				3			
4					4			
5					5			
6					6			
7					7			
8					8			
9					9			
10					10			
11					11			
12					12			
13					13			
14					14			
15					15			

Comments: Backfilled upon completion.

MIDLANTIC ENGINEERING

TEST PIT LOG TP-I-N4

Project: Hawthorne Mount Pocono Resort
Paradise Township, PA

Test Loc. No.: **TP-I-N4**

Contract No.: **22021.2**

Date Excavated: 02/10/23

ME, Inc. Rep.: D.H.

Equip. Used: Excavator

Surface Elev: 1592.6

Groundwater Observations

Encountered:	02/10/23	Depth:	none
Completion:	02/10/23	Depth:	dry

Depth (ft.)	Strata Description	Class.	Str'm	Elev.	InSitu Testing Depth	InSitu Testing Geoprobe Penetr'n	M (%)	Remarks
1	1" topsoil						12.5	infiltration testing @ 0.5'; El 1592.1
2	red/brown silty GRAVEL with sand	GM	A	1590.1				
3	Refusal at 2.5 feet Bottom of Test Pit at 2.5 feet							
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Comments: Backfilled upon completion.

MIDLANTIC ENGINEERING

TEST PIT LOG TP-I-O1

Project: Hawthorne Mount Pocono Resort
Paradise Township, PA

Test Loc. No.: **TP-I-O1**

Contract No.: **22021.2**

Date Excavated: 02/10/23

ME, Inc. Rep.: D.H.

Equip. Used: Excavator

Surface Elev: 1505.2

Groundwater Observations

Encountered:	02/10/23	Depth:	1.5’
Completion:	02/10/23	Depth:	1.5’

Depth (ft.)	Strata Description	Class.	Str’m	Elev.	InSitu Testing Depth	InSitu Testing Geoprobe Penetr’n	M (%)	Remarks
1	9” topsoil				1			
2	gray/orange silty SAND with gravel @ 1.5’: mottling	SM	A		2		13.2	No infiltration testing conducted due to depth of groundwater at 1.5’.
3				1501.7	3			
4	Bottom of Test Pit at 3.5 feet				4			
5					5			
6					6			
7					7			
8					8			
9					9			
10					10			
11					11			
12					12			
13					13			
14					14			
15					15			

Comments: Backfilled upon completion.

MIDLANTIC ENGINEERING

TEST PIT LOG TP-I-O2

Project: Hawthorne Mount Pocono Resort
Paradise Township, PA

Test Loc. No.: **TP-I-O2**

Contract No.: **22021.2**

Date Excavated: 02/10/23

ME, Inc. Rep.: D.H.

Equip. Used: Excavator

Surface Elev: 1504.8

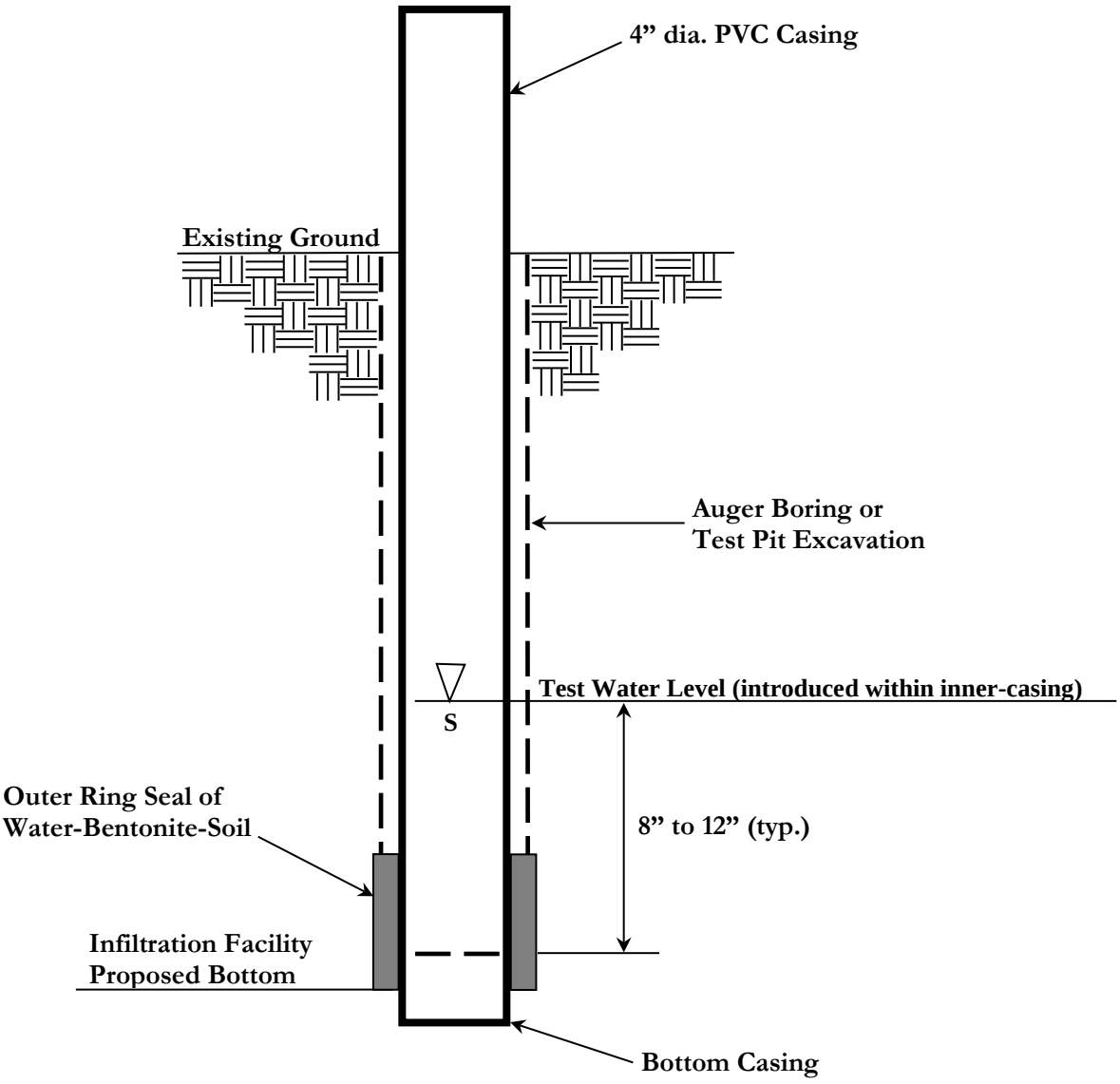
Groundwater Observations

Encountered:	02/10/23	Depth:	none
Completion:	02/10/23	Depth:	dry

Depth (ft.)	Strata Description	Class.	Str'm	Elev.	InSitu Testing Depth	InSitu Testing Geoprobe Penetr'n	M (%)	Remarks
1	5" topsoil				1			
2	brown silty SAND with gravel	SM	A		2		18.6	infiltration testing @ 1.5'; El 1503.3
3	@ 3.5': mottling				3			
4					4		11.8	
5				1499.8	5			
6	Bottom of Test Pit at 5.0 feet				6			
7					7			
8					8			photo of mottling @ 3.5'
9					9			
10					10			
11					11			
12					12			
13					13			
14					14			
15					15			

Comments: Backfilled upon completion.

IN-SITU INFILTRATION TESTING



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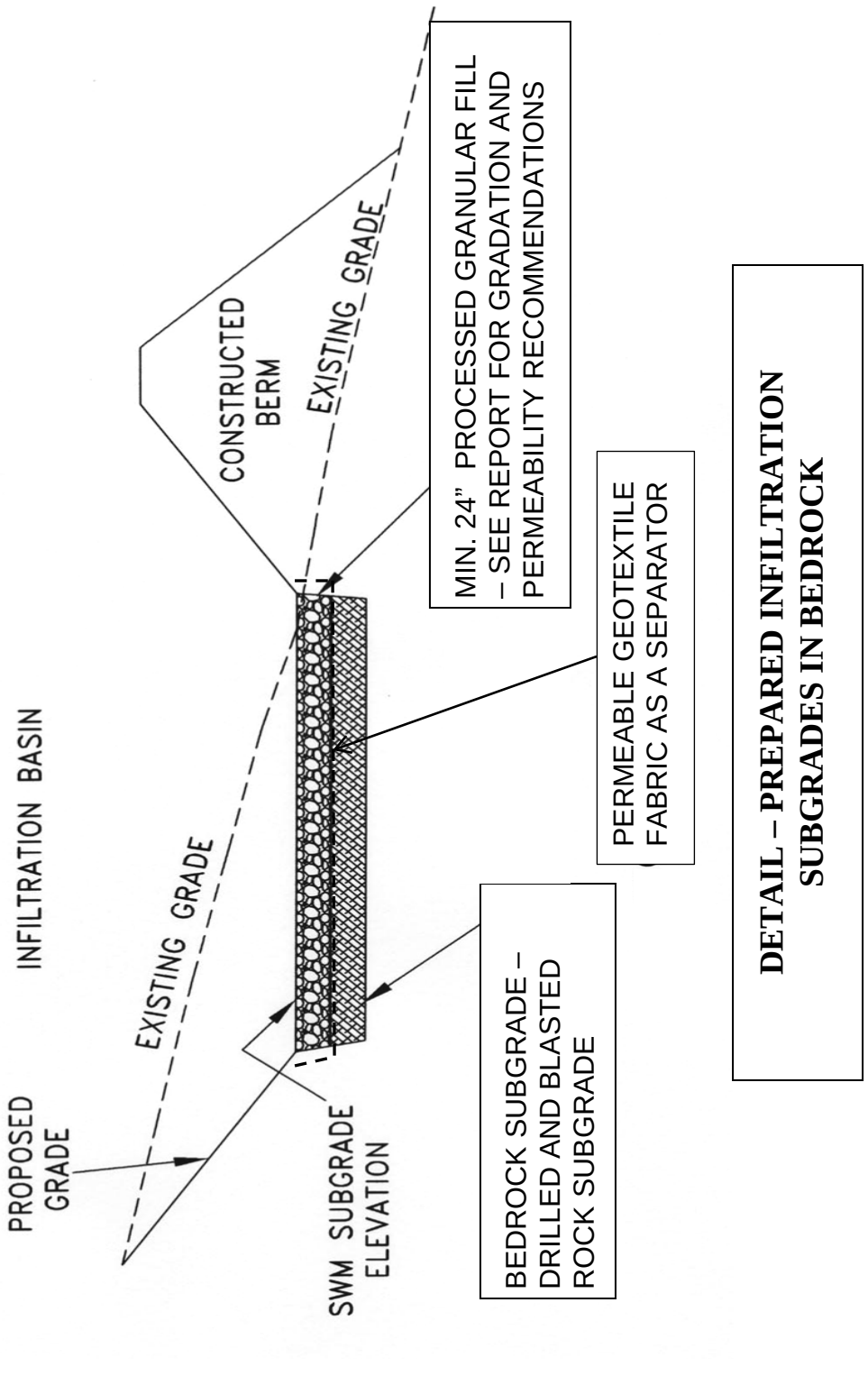
Drawing Title:
In-situ Infiltration Testing Setup
Hawthorne Mount Pocono Resort
Paradise Township, PA

Drawn By:	Checked By:	Scale:
LA	TB	NTS
Date:	Project No.:	Sheet No.
03/03/23	22021.2-SWM	---



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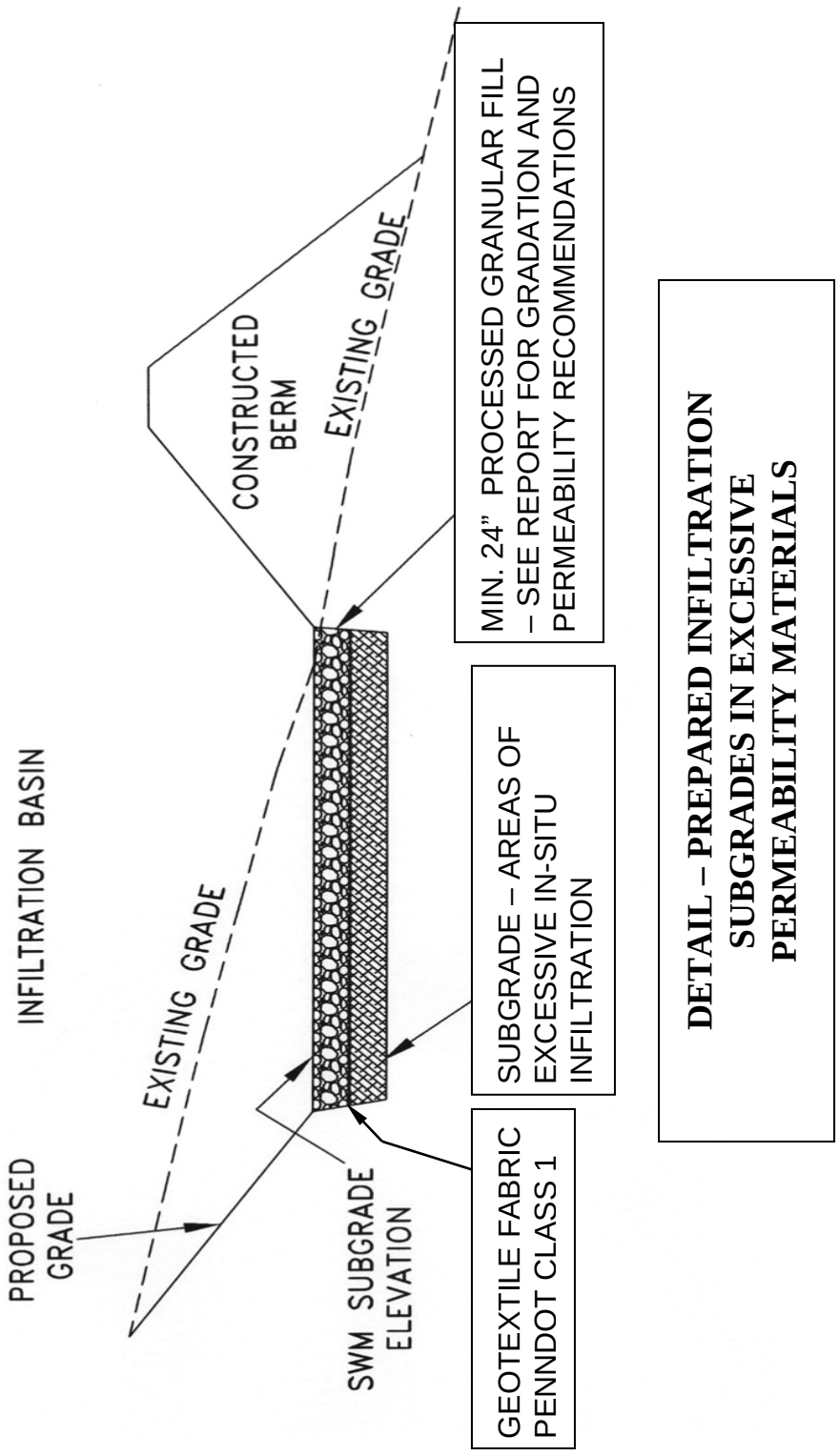
Drawing Title:
Detail – Prepared Infiltration Subgrades
Hawthorne Mount Pocono Resort
Paradise Township, PA

Drawn By:	Checked By:	Scale:
LJ	TB	NTS
Date:	Project No.:	Sheet No.
03/03/23	22021.2-SWM	---



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Drawing Title:
Detail – Prepared Infiltration Subgrades
Hawthorne Mount Pocono Resort
Paradise Township, PA

Drawn By:	Checked By:	Scale:
LA	TB	NTS
Date:	Project No.:	Sheet No.
03/03/23	22021.2-SWM	---