FRENCH & PARRELLO ASSOCIATES

ENGINEERING AND CONSULTING **SINCE 1974**

Report of Subsurface Exploration, Permeability Testing & Geotechnical Engineering Assessment

Heritage at Hopewell

Township of Hopewell, Mercer County, New Jersey



Mr. Greg Kanter
American Properties at Hopewell, LLC
517 Route One South, Suite 2100
Iselin, NJ 08830-3011

May 25, 2023 | FPA No. 18808.001R1
1800 Route 34, Suite 101, Wall Township, NJ 07719

FRENCH & PARRELLO ASSOCIATES

1800 Route 34, Suite 101
Wall Township, New Jersey 07719
T: 732.312.9800
F: 732.312.9801
fpaengineers.com

May 25, 2023

Mr. Greg Kanter
American Properties at Hopewell, LLC
517 Route One South, Suite 2100
Iselin, NJ 08830-3011

Re: Report of Subsurface Exploration, Permeability Testing &
Geotechnical Engineering Assessment
Heritage at Hopewell
Township of Hopewell, Mercer County, New Jersey
FPA No. 18808.001R1

Dear Mr. Kanter:

INTRODUCTION

This report presents the results of our Subsurface Exploration, Permeability Testing and Geotechnical Engineering Assessment performed in connection with the proposed residential development project to be located in the Township of Hopewell, Mercer County, New Jersey. The project site is located at 2500 Pennington Road and is designated as Block 78, Lot 17 on the Township of Hopewell Tax Map. The regional location of the project site is presented on Drawing No. 1, "Regional Location Plan."

Based on our review of the Concept Plan, the proposed residential development will include nine 3-story townhouse buildings and one apartment building, paved access drives and parking areas, and associated site utilities. As a result of the proposed improvements, associated stormwater management systems will need to be incorporated into the site design. The existing site grades vary from approximately elevation +200 feet along the northern portion of the site to +208 feet in the southwestern portions of the project site. We anticipate minimal cuts and fills will be required to achieve the proposed site grades.

The purpose for our involvement on the project at this time was to perform subsurface explorations and permeability testing of the soils specifically at the planned stormwater management systems to facilitate the design and construction of the subject structures as well as to verify the Hydrologic Soil Group across the project site. Our scope of work included the technical observation of 16 test pits, permeability testing of select samples recovered from the test pits and the preparation of this report.

SUBSURFACE EXPLORATION

French and Parrello Associates (FPA) observed the performance of 16 test pits on November 9, 2022 to characterize the subsurface soil and groundwater conditions at the project site. The test pits were performed by an excavation subcontractor retained by American Properties while under the full-time technical observation by a representative of FPA. The test pits were field located by our representative through the use of handheld GPS

equipment. The approximate test pit locations are presented on Drawing No. 2, “Test Pit Location Plan.”

The test pits, designated as TP-1 through TP-16, were excavated to depths ranging from approximately 5.7 feet to 11 feet below the existing ground surface using a Caterpillar 305E mini excavator. The exposed soil profiles were classified in accordance with the Burmister Soil Classification System. Indications of seasonal high groundwater (e.g., soil mottling) were also monitored within the test pits and noted on the logs where observed. Soil samples were also collected from the test pits for testing to assess the permeability of the in-situ soils. Details of the conditions encountered in the test pits are presented on the individual test pit logs included in Appendix A.

PERMEABILITY TESTING

Soil samples were collected from the test pits, returned to our soils laboratory and subjected to flexible wall permeability testing. Specifically, 12 samples were subjected to Flexible Wall Permeability Tests in accordance with ASTM D-5084, Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Material. Permeability test results are presented in Appendix B.

SITE CONDITIONS

Subsurface Conditions

The test pits typically encountered cohesive residual soils underlain by completely weathered and highly weathered/fractured Shale bedrock. The cohesive soils were encountered from the existing grade to depths ranging from approximately 1.5 feet to 5.4 feet and consisted of clay and silt intermixed with moderate amounts of medium to fine sand and minor amounts of fine gravel. The consistency of the cohesive residual deposits may be described as firm to stiff, typically increasing with depth.

Groundwater, which we believe to be perched, was encountered within 7 of the 16 test pits at depths ranging from approximately 5.2 feet to 9 feet below the existing grade. Soil mottling, an indication of the seasonal high water level, was not observed within the test pits. In accordance with the guidelines presented in the New Jersey Stormwater Best Management Practices (BMP) manual, perched water shall also be considered as the seasonal high water level for all aspects of design and soil testing. Seasonal and storm related fluctuations in the groundwater level, as well as the presence of perched groundwater, should be anticipated. For a more detailed description of the subsurface conditions encountered, please refer to the test pit logs in Appendix A.

Results of Permeability Tests

Permeability tests were performed on soil samples collected from the test pits within the vicinity of the anticipated stormwater features as well as within the surficial soils to verify the Hydrologic Soil Group of the site. As previously noted, the test pits encountered primarily cohesive soils which exhibit very low permeability rates. The tested infiltration rates ranged from 4.6×10^{-5} inches per hour to 6.5×10^{-2} inches per hour and a summary of the test results are included in Appendix B.

DISCUSSION & RECOMMENDATIONS

Stormwater Management Soil Criteria

The guidelines presented in the New Jersey Stormwater BMP manual indicate that a minimum design permeability rate of 0.5 inches per hour is required for infiltration systems. Design rates consider a factor of safety of 2 applied to permeability test results. Based upon the encountered primarily cohesive soils throughout the site and the results of the permeability testing, it is our opinion stormwater infiltration is not feasible.

Hydrologic Soil Group

To verify the HSG for the site, permeability testing was performed within the surficial soils. The tested permeability of the in-situ soils ranged from 4.6×10^{-5} inches per hour to 6.5×10^{-2} inches per hour. Based on the summary of NRCS Guidance Documents to establish HSG with an impermeable soil layer existing at a depth between 20 inches and 40 inches, the permeability rate of the most hydraulically restrictive soil horizon to be classified as a HSG D must be less than 0.14 inches per hour. Based on the very low permeability rates for the in-situ soil, the entire site should be classified as a HSG D.

CLOSING & LIMITATIONS

The recommendations contained herein are contingent upon subsurface conditions remaining consistent with those encountered during our subsurface exploration. They are also contingent upon the basis that all stormwater management structure related aspects of construction, including stripping, excavation, removal of unsuitable soil and subgrade preparation, be observed by a representative of FPA. This is to observe compliance with the design concepts and specifications and to allow design changes in the event that subsurface conditions differ from those anticipated prior to construction.

The scope of our services did not include any environmental assessment or investigation for the presence or absence of wetlands, chemically hazardous, or biologically toxic materials in the soil, surface water, groundwater or air, on or below or around the site.

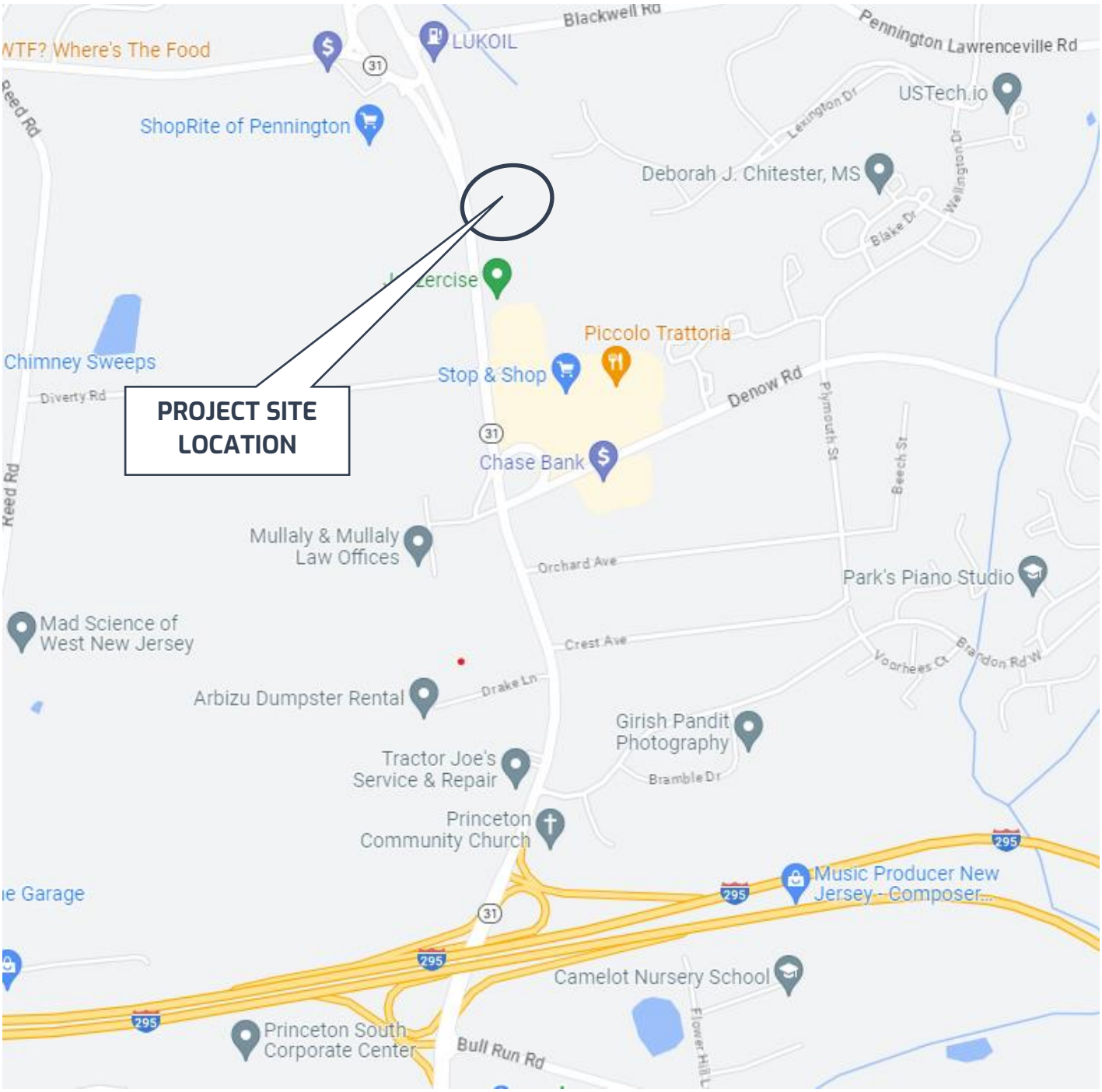
Services performed by FPA during this project have been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. No other representation, expressed or implied, and no warranty or guarantee is included or intended in the services provided.

Should you have any questions or if we can be of service to you in the future, please feel free to contact us.

Sincerely,

FRENCH & PARRELLO ASSOCIATES

Joseph M. Tierney, PE
Project Consultant, Manager of Geotechnical Services

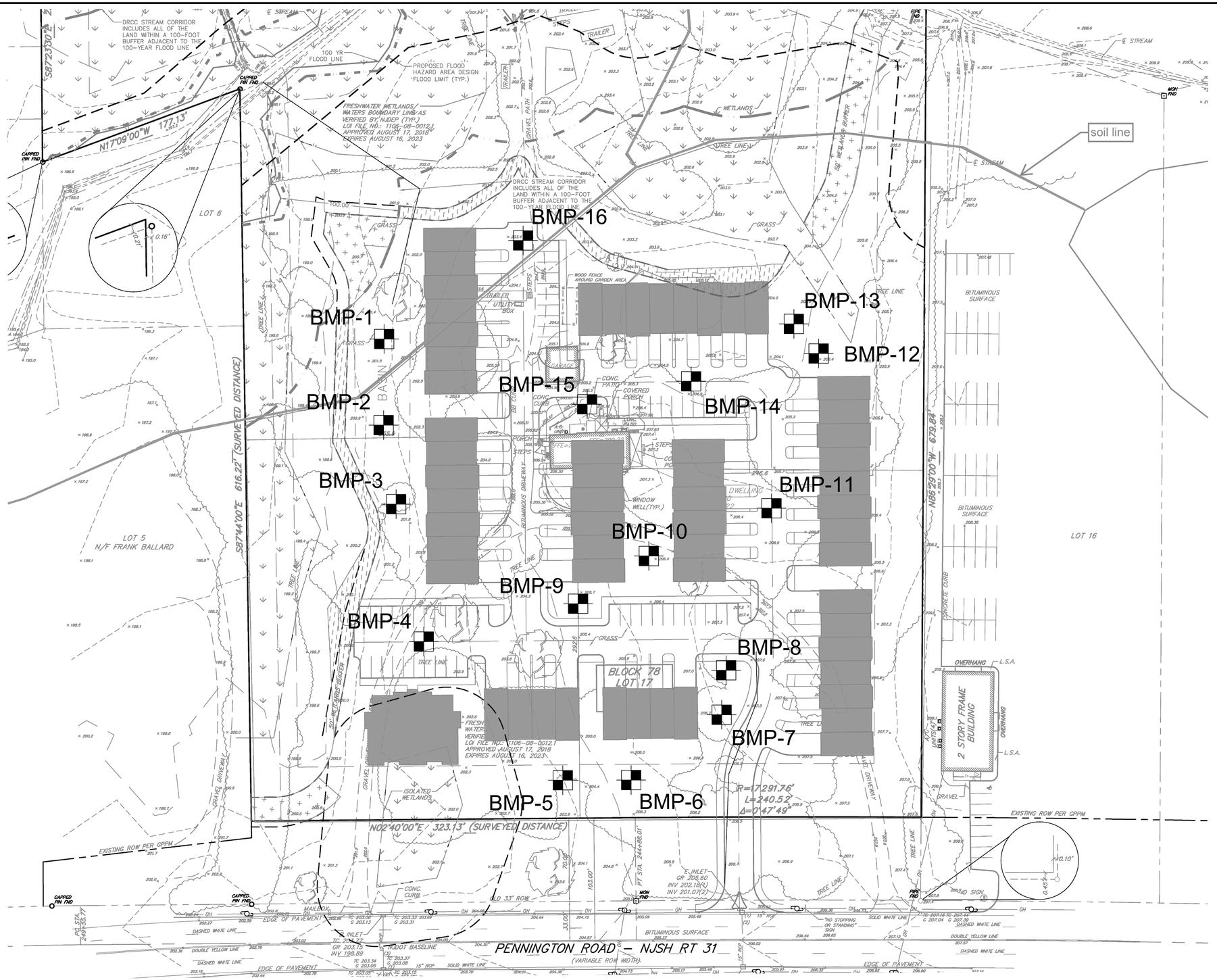


REGIONAL LOCATION PLAN

HERITAGE AT HOPEWELL

TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

SCALE:	DATE:	JOB NO.:	DRAWING NO.:
NTS	MAY 2023	18808.001	1



LEGEND:

TEST PIT LOCATION

No.	Date	Revision	Revised By	Checked By

40 0 40 80
SCALE IN FEET

FPA FRENCH & PARRELLO ASSOCIATES
New Jersey ▲ New York ▲ Pennsylvania ▲ Georgia

Corporate Office:
1800 Rt 34, Suite 101
Wall, New Jersey 07719
732.312.9800

FPAengineers.com

TEST PIT LOCATION PLAN

FOR

HERITAGE AT HOPEWELL

TOWNSHIP OF HOPEWELL
MERCER COUNTY NEW JERSEY

DATE:	DESIGNED BY:	SCALE:	PROJECT NUMBER:
NOVEMBER 2022	–	APPROX. 1"=40'	18808.001
DRAWN BY:	CHECKED BY:	FIELD BOOK	DRAWING NO.:
MTM	JMT	–	2

Appendix A
Test Pit Logs

TEST PIT LOG

HERITAGE AT HOPEWELL
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY (FPA JOB NO. 18808.001)

TEST PIT NO.: BMP-1
DATE: 11/9/2022

GROUND ELEV.: +202'±
DEPTH OF WATER: Dry
GROUNDWATER ELEV.: N/A
DEPTH TO EST. SEASONAL HIGH WATER: Not Observed

DEPTH	DESCRIPTION
0 – 8"	Dark Brown **SILT & CLAY**, some^{+} cmf^{+} Sand, trace f Gravel, w/ few roots.
8 – 18"	Red-Brown **SILT & CLAY**, some mf Sand, some^{-} cmf^{+} Gravel. *(S-1)*
18 – 45"	Red-Brown **CLAY & SILT**, some^{+} cmf^{+} Gravel, little mf^{+} Sand. *(S-2)* *(completely weathered shale)*
45 – 78"	Red-Brown highly weathered, fractured **SHALE**.

END OF TEST PIT @ 7.1' *(Excavator Refusal)*

NOTES:

SOILS ENGINEER: J. Tierney, PE	**CONTRACTOR:** Rizzo & Son Excavating
TEST PIT OBSERVER: D. Rohmeyer, PE	**EXCAVATOR:** Komatsu PC138

The information shown hereon indicates the subsurface conditions encountered at the specified test pit location on the date(s) of excavation. Subsurface conditions are likely to vary across the project site. Interpretation of the subsurface data shall be at the discretion of the user.

TEST PIT LOG

HERITAGE AT HOPEWELL
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY (FPA JOB NO. 18808.001)

TEST PIT NO.: BMP-2
DATE: 11/9/2022

GROUND ELEV.: +201.5'±
DEPTH OF WATER: Dry
GROUNDWATER ELEV.: N/A
DEPTH TO EST. SEASONAL HIGH WATER: Not Observed

DEPTH	DESCRIPTION
0 – 5"	Brown **SILT & CLAY**, some⁻ f Sand, w/ many roots.
5 – 26"	Red-Brown **CLAY & SILT**, little⁺ cmf⁺ Sand, little⁻ f Gravel. *(S-1)*
26 – 48"	Red-Brown & Grey **SILT & CLAY**, and cm⁺f Gravel, little⁺ cmf Sand. *(S-2)* *(completely weathered shale)*
48 – 98"	Red-Brown highly weathered, fractured **SHALE**.

END OF TEST PIT @ 8.2' *(Excavator Refusal)*

NOTES:

SOILS ENGINEER: J. Tierney, PE	**CONTRACTOR:** Rizzo & Son Excavating
TEST PIT OBSERVER: D. Rohmeyer, PE	**EXCAVATOR:** Komatsu PC138

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TEST PIT LOG

HERITAGE AT HOPEWELL
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY (FPA JOB NO. 18808.001)

TEST PIT NO.: BMP-3
DATE: 11/9/2022

GROUND ELEV.: +201.5'±
DEPTH OF WATER: 6.9 '±*
GROUNDWATER ELEV.: N/A
DEPTH TO EST. SEASONAL HIGH WATER: 6.9 '±*

DEPTH	DESCRIPTION
0 – 8"	Dark Brown **Clayey SILT**, and cmf^{+} Sand, w/ few roots.
8 – 37"	Brown **SILT & CLAY**, some^{+} cmf^{+} Sand, little^{-} f Gravel. *(S-1)*
37 – 74"	Red-Brown **SILT & CLAY**, some^{-} mf^{+} Sand, little^{+} mf Gravel. *(S-2)* *(completely weathered shale)*
74 – 99"	Red-Brown & Grey highly weathered, fractured **SHALE**.

END OF TEST PIT @ 8.3' *(Excavator Refusal)*

NOTES: *Perched groundwater encountered @ 83".

SOILS ENGINEER: J. Tierney, PE	**CONTRACTOR:** Rizzo & Son Excavating
TEST PIT OBSERVER: D. Rohmeyer, PE	**EXCAVATOR:** Komatsu PC138

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TEST PIT LOG

HERITAGE AT HOPEWELL
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY (FPA JOB NO. 18808.001)

TEST PIT NO.: BMP-4
DATE: 11/9/2022

GROUND ELEV.: +202.5'±
DEPTH OF WATER: Dry
GROUNDWATER ELEV.: N/A
DEPTH TO EST. SEASONAL HIGH WATER: Not Observed

DEPTH	DESCRIPTION
0 – 8"	Dark Brown **SILT & CLAY**, little^{+} mf Sand, w/ many roots.
8 – 36"	Red-Brown **SILT & CLAY**, little^{-} f Sand, trace^{+} f Gravel. *(S-1)*
36 – 42"	Dark Red-Brown & Grey **CLAY & SILT**, little mf Sand.
42 – 62"	Grey **SILT & CLAY**, and^{-} mf^{+} Gravel, little mf Sand. *(S-2)* *(completely weathered shale)*
62 – 97"	Grey highly weathered, fractured **SHALE**.

END OF TEST PIT @ 8.1' *(Excavator Refusal)*

NOTES:

SOILS ENGINEER: J. Tierney, PE	**CONTRACTOR:** Rizzo & Son Excavating
TEST PIT OBSERVER: D. Rohmeyer, PE	**EXCAVATOR:** Komatsu PC138

The information shown hereon indicates the subsurface conditions encountered at the specified test pit location on the date(s) of excavation. Subsurface conditions are likely to vary across the project site. Interpretation of the subsurface data shall be at the discretion of the user.

TEST PIT LOG

HERITAGE AT HOPEWELL
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY (FPA JOB NO. 18808.001)

TEST PIT NO.: BMP-5
DATE: 11/9/2022

GROUND ELEV.: +204'±
DEPTH OF WATER: 9'±*
GROUNDWATER ELEV.: N/A
DEPTH TO EST. SEASONAL HIGH WATER: 9'±*

DEPTH	DESCRIPTION
0 – 4"	Dark Brown **CLAY & SILT**, some^{-} cmf^{+} Sand, w/ many roots.
4 – 18"	Brown **SILT & CLAY**, little^{-} mf^{+} Sand. *(S-1)*
18 – 36"	Red-Brown **CLAY & SILT**, trace^{+} f Sand, trace^{+} f Gravel. *(S-2)*
36 – 90"	Dark Red-Brown **CLAY & SILT**, some^{+} c^{+}mf Sand, little^{+} mf Gravel. *(S-3)* *(completely weathered shale)*
90 – 112"	Red-Brown highly weathered, fractured **SHALE**.

END OF TEST PIT @ 9.3' *(Excavator Refusal)*

NOTES: *Perched groundwater encountered @ 108".

SOILS ENGINEER: J. Tierney, PE	**CONTRACTOR:** Rizzo & Son Excavating
TEST PIT OBSERVER: D. Rohmeyer, PE	**EXCAVATOR:** Komatsu PC138

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TEST PIT LOG

HERITAGE AT HOPEWELL
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY (FPA JOB NO. 18808.001)

TEST PIT NO.: BMP-6
DATE: 11/9/2022

GROUND ELEV.: +205.5'±
DEPTH OF WATER: Dry
GROUNDWATER ELEV.: N/A
DEPTH TO EST. SEASONAL HIGH WATER: Not Observed

DEPTH	DESCRIPTION
0 – 5"	Dark Brown **Clayey SILT**, some^{+} mf^{+} Sand, w/ many roots.
5 – 30"	Brown **CLAY & SILT**, little^{+} mf Sand, little^{-} f Gravel. *(S-1)*
30 – 65"	Red-Brown **SILT & CLAY**, some^{+} m^{+}f Gravel, little^{+} cmf Sand. *(S-2)* *(completely weathered shale)*
65 – 81"	Red-Brown highly weathered, fractured **SHALE**.

END OF TEST PIT @ 6.8' *(Excavator Refusal)*

NOTES:

SOILS ENGINEER: J. Tierney, PE	**CONTRACTOR:** Rizzo & Son Excavating
TEST PIT OBSERVER: D. Rohmeyer, PE	**EXCAVATOR:** Komatsu PC138

The information shown hereon indicates the subsurface conditions encountered at the specified test pit location on the date(s) of excavation. Subsurface conditions are likely to vary across the project site. Interpretation of the subsurface data shall be at the discretion of the user.

TEST PIT LOG

HERITAGE AT HOPEWELL
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY (FPA JOB NO. 18808.001)

TEST PIT NO.: BMP-7
DATE: 11/9/2022

GROUND ELEV.: +207'±
DEPTH OF WATER: Dry
GROUNDWATER ELEV.: N/A
DEPTH TO EST. SEASONAL HIGH WATER: Not Observed

DEPTH	DESCRIPTION
0 – 4"	Dark Brown **Clayey SILT**, some^{-} mf Sand, trace f Gravel, w/ many roots.
4 – 30"	Red-Brown **SILT & CLAY**, some^{+} mf^{+} Sand, little^{+} cmf^{+} Gravel. *(S-1)*
30 – 42"	Dark Red-Brown **SILT & CLAY**, some cmf Gravel, little cmf^{+} Sand. *(S-2)* *(completely weathered shale)*
42 – 79"	Red-Brown & Grey highly weathered, fractured **SHALE**.

END OF TEST PIT @ 6.6' *(Excavator Refusal)*

NOTES:

SOILS ENGINEER: J. Tierney, PE	**CONTRACTOR:** Rizzo & Son Excavating
TEST PIT OBSERVER: D. Rohmeyer, PE	**EXCAVATOR:** Komatsu PC138

The information shown hereon indicates the subsurface conditions encountered at the specified test pit location on the date(s) of excavation. Subsurface conditions are likely to vary across the project site. Interpretation of the subsurface data shall be at the discretion of the user.

TEST PIT LOG

HERITAGE AT HOPEWELL
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY (FPA JOB NO. 18808.001)

TEST PIT NO.: BMP-8
DATE: 11/9/2022

GROUND ELEV.: +207.5'±
DEPTH OF WATER: Dry
GROUNDWATER ELEV.: N/A
DEPTH TO EST. SEASONAL HIGH WATER: Not Observed

DEPTH	DESCRIPTION
0 – 6"	Dark Brown **SILT & CLAY**, little^{+} mf Sand, trace mf Gravel, w/ many roots.
6 – 26"	Brown **CLAY & SILT**, little mf^{+} Sand, little^{-} f Gravel. *(S-1)*
26 – 56"	Grey-Brown **SILT & CLAY**, some^{+} m^{+}f Gravel, little^{-} cmf Sand. *(S-2)* *(completely weathered shale)*
56 – 64"	Grey & Red-Brown cmf^{+} **GRAVEL**, little^{+} Clay & Silt, little c^{+}mf Sand. *(S-3)* *(completely to highly weathered shale)*
64 – 76"	Grey & Red-Brown highly weathered, fractured **SHALE**.

END OF TEST PIT @ 6.3' *(Excavator Refusal)*

NOTES:

SOILS ENGINEER: J. Tierney, PE	**CONTRACTOR:** Rizzo & Son Excavating
TEST PIT OBSERVER: D. Rohmeyer, PE	**EXCAVATOR:** Komatsu PC138

The information shown hereon indicates the subsurface conditions encountered at the specified test pit location on the date(s) of excavation. Subsurface conditions are likely to vary across the project site. Interpretation of the subsurface data shall be at the discretion of the user.

TEST PIT LOG

HERITAGE AT HOPEWELL
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY (FPA JOB NO. 18808.001)

TEST PIT NO.: BMP-9
DATE: 11/9/2022

GROUND ELEV.: +205.5'±
DEPTH OF WATER: Dry
GROUNDWATER ELEV.: N/A
DEPTH TO EST. SEASONAL HIGH WATER: Not Observed

DEPTH	DESCRIPTION
0 – 6"	Dark Brown **Clayey SILT**, some^{+} mf^{+} Sand, trace^{-} f Gravel, w/ few roots.
6 – 27"	Brown **SILT & CLAY**, little^{+} mf^{+} Sand, trace f Gravel. *(S-1)*
27 – 46"	Red-Brown **CLAY & SILT**, some^{+} cmf^{+} Gravel, little^{+} cmf Sand. *(S-2)* *(completely weathered shale)*
46 – 68"	Red-Brown highly weathered, fractured **SHALE**.

END OF TEST PIT @ 5.7' *(Excavator Refusal)*

NOTES:

SOILS ENGINEER: J. Tierney, PE	**CONTRACTOR:** Rizzo & Son Excavating
TEST PIT OBSERVER: D. Rohmeyer, PE	**EXCAVATOR:** Komatsu PC138

The information shown hereon indicates the subsurface conditions encountered at the specified test pit location on the date(s) of excavation. Subsurface conditions are likely to vary across the project site. Interpretation of the subsurface data shall be at the discretion of the user.

TEST PIT LOG

HERITAGE AT HOPEWELL
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY (FPA JOB NO. 18808.001)

TEST PIT NO.: BMP-10
DATE: 11/9/2022

GROUND ELEV.: +206.5'±
DEPTH OF WATER: 5.8'±*
GROUNDWATER ELEV.: N/A
DEPTH TO EST. SEASONAL HIGH WATER: 5.8'±*

DEPTH	DESCRIPTION
0 – 4"	Dark Brown **SILT & CLAY**, some⁻ mf⁺ Sand, w/ few roots.
4 – 20"	Brown **CLAY & SILT**, little⁺ mf⁺ Sand, trace f Gravel. *(S-1)*
20 – 37"	Red-Brown **CLAY & SILT**, trace⁺ mf Sand. *(S-2)*
37 – 52"	Red-Brown **SILT & CLAY**, some cm⁺f Gravel, little⁺ c⁺mf Sand. *(S-3)* *(completely weathered shale)*
52 – 74"	Red-Brown highly weathered, fractured **SHALE**.

END OF TEST PIT @ 6.2' *(Excavator Refusal)*

NOTES: *Perched groundwater encountered @ 70".

SOILS ENGINEER: J. Tierney, PE
TEST PIT OBSERVER: D. Rohmeyer, PE

CONTRACTOR: Rizzo & Son Excavating
EXCAVATOR: Komatsu PC138

TEST PIT LOG

HERITAGE AT HOPEWELL
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY (FPA JOB NO. 18808.001)

TEST PIT NO.: BMP-11
DATE: 11/9/2022

GROUND ELEV.: +206'±
DEPTH OF WATER: 8'±*
GROUNDWATER ELEV.: N/A
DEPTH TO EST. SEASONAL HIGH WATER: Not Observed

DEPTH	DESCRIPTION
0 – 10"	Dark Brown **SILT & CLAY**, and^{-} cmf^{+} Sand, w/ many roots.
10 – 36"	Light Brown **Clayey SILT**, and^{+} mf^{+} Sand. *(S-1)*
36 – 67"	Red-Brown **SILT & CLAY**, little^{+} m^{+}f Gravel, little^{-} mf^{+} Sand. *(S-2)*
67 – 98"	Red-Brown mf **GRAVEL**, some^{-} Silt & Clay, little cmf^{+} Sand. *(S-3)* *(completely weathered shale)*
98 – 129"	Red-Brown highly weathered, fractured **SHALE**.

END OF TEST PIT @ 10.8' *(Excavator Refusal)*

NOTES: *Perched groundwater encountered @ 96".

SOILS ENGINEER: J. Tierney, PE	**CONTRACTOR:** Rizzo & Son Excavating
TEST PIT OBSERVER: D. Rohmeyer, PE	**EXCAVATOR:** Komatsu PC138

The information shown hereon indicates the subsurface conditions encountered at the specified test pit location on the date(s) of excavation. Subsurface conditions are likely to vary across the project site. Interpretation of the subsurface data shall be at the discretion of the user.

TEST PIT LOG

HERITAGE AT HOPEWELL
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY (FPA JOB NO. 18808.001)

TEST PIT NO.: BMP-12
DATE: 11/9/2022

GROUND ELEV.: +205.5'±
DEPTH OF WATER: Dry
GROUNDWATER ELEV.: N/A
DEPTH TO EST. SEASONAL HIGH WATER: Not Observed

DEPTH	DESCRIPTION
0 – 12"	Dark Brown **Clayey SILT**, some^{+} mf^{+} Sand.
12 – 47"	Light Brown & Grey **SILT & CLAY**, and f Sand, trace^{+} f Gravel. *(S-1)*
47 – 65"	Red-Brown **CLAY & SILT**, some^{-} mf Gravel, little^{+} cmf^{+} Sand. *(S-2)*
65 – 86"	Red-Brown mf **GRAVEL**, some^{-} Clay & Silt, little^{+} cmf Sand. *(S-3)* *(completely weathered shale)*
86 – 132"	Red-Brown highly weathered, fractured **SHALE**.

END OF TEST PIT @ 11' *(Excavator Refusal)*

NOTES:

SOILS ENGINEER: J. Tierney, PE	**CONTRACTOR:** Rizzo & Son Excavating
TEST PIT OBSERVER: D. Rohmeyer, PE	**EXCAVATOR:** Komatsu PC138

The information shown hereon indicates the subsurface conditions encountered at the specified test pit location on the date(s) of excavation. Subsurface conditions are likely to vary across the project site. Interpretation of the subsurface data shall be at the discretion of the user.

TEST PIT LOG

HERITAGE AT HOPEWELL
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY (FPA JOB NO. 18808.001)

TEST PIT NO.: BMP-13
DATE: 11/9/2022

GROUND ELEV.: +205'±
DEPTH OF WATER: 6.3'±*
GROUNDWATER ELEV.: N/A
DEPTH TO EST. SEASONAL HIGH WATER: 6.3'±*

DEPTH	DESCRIPTION
0 – 9"	Dark Brown **SILT & CLAY**, and^{-} mf^{+} Sand, w/ few roots.
9 – 21"	Light Brown & Grey **CLAY & SILT**, little^{-} mf^{+} Sand. *(S-1)*
21 – 48"	Grey & Red-Brown **SILT & CLAY**, some^{+} mf Sand, trace^{+} f Gravel. *(S-2)*
48 – 78"	Red-Brown & Grey **CLAY & SILT**, some mf Gravel, little cmf Sand. *(S-3)* *(completely weathered shale)*
78 – 96"	Red-Brown highly weathered, fractured **SHALE**.

END OF TEST PIT @ 8' *(Excavator Refusal)*

NOTES: *Significant perched groundwater encountered @ 75".

SOILS ENGINEER: J. Tierney, PE	**CONTRACTOR:** Rizzo & Son Excavating
TEST PIT OBSERVER: D. Rohmeyer, PE	**EXCAVATOR:** Komatsu PC138

The information shown hereon indicates the subsurface conditions encountered at the specified test pit location on the date(s) of excavation. Subsurface conditions are likely to vary across the project site. Interpretation of the subsurface data shall be at the discretion of the user.

TEST PIT LOG

HERITAGE AT HOPEWELL
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY (FPA JOB NO. 18808.001)

TEST PIT NO.: BMP-14
DATE: 11/9/2022

GROUND ELEV.: +205'±
DEPTH OF WATER: 6'±*
GROUNDWATER ELEV.: N/A
DEPTH TO EST. SEASONAL HIGH WATER: 6'±*

DEPTH	DESCRIPTION
0 – 7"	Dark Brown **Clayey SILT**, some^{+} mf^{+} Sand, w/ few roots.
7 – 24"	Dark Brown **SILT & CLAY**, some^{+} mf Sand, little^{-} mf^{+} Gravel. *(S-1)*
24 – 37"	Brown **SILT & CLAY**, little^{-} mf^{+} Sand, trace^{+} f Gravel. *(S-2)*
37 – 70"	Red-Brown & Grey-Brown cm^{+}f **GRAVEL**, some^{+} Clay & Silt, little^{+} c^{+}mf Sand. *(S-3)* *(completely weathered shale)*
70 – 86"	Red-Brown highly weathered, fractured **SHALE**.

END OF TEST PIT @ 7.2' *(Excavator Refusal)*

NOTES: *Significant perched groundwater encountered @ 72".

SOILS ENGINEER: J. Tierney, PE	**CONTRACTOR:** Rizzo & Son Excavating
TEST PIT OBSERVER: D. Rohmeyer, PE	**EXCAVATOR:** Komatsu PC138

TEST PIT LOG

HERITAGE AT HOPEWELL
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY (FPA JOB NO. 18808.001)

TEST PIT NO.: BMP-15
DATE: 11/9/2022

GROUND ELEV.: +206'±
DEPTH OF WATER: Dry
GROUNDWATER ELEV.: N/A
DEPTH TO EST. SEASONAL HIGH WATER: Not Observed

DEPTH	DESCRIPTION
0 – 5"	Dark Brown **Clayey SILT**, little^{-} mf^{+} Sand, w/ few roots.
5 – 12"	Brown & Red-Brown **SILT & CLAY**, some^{-} mf^{+} Sand, trace^{+} f Gravel. *(S-1)*

END OF TEST PIT @ 1'*

NOTES: *Test pit not advanced due to potential utility conflict.

SOILS ENGINEER: J. Tierney, PE	**CONTRACTOR:** Rizzo & Son Excavating
TEST PIT OBSERVER: D. Rohmeyer, PE	**EXCAVATOR:** Komatsu PC138

The information shown hereon indicates the subsurface conditions encountered at the specified test pit location on the date(s) of excavation. Subsurface conditions are likely to vary across the project site. Interpretation of the subsurface data shall be at the discretion of the user.

TEST PIT LOG

HERITAGE AT HOPEWELL
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY (FPA JOB NO. 18808.001)

TEST PIT NO.: BMP-16
DATE: 11/9/2022

GROUND ELEV.: +203.5'±
DEPTH OF WATER: 5.2'±*
GROUNDWATER ELEV.: N/A
DEPTH TO EST. SEASONAL HIGH WATER: 5.2'±*

DEPTH	DESCRIPTION
0 – 8"	Brown **CLAY & SILT**, little^{-} mf^{+} Sand, trace f Gravel, w/ few roots.
8 – 24"	Red-Brown **SILT & CLAY**, little^{+} mf^{+} Sand, trace^{+} f Gravel. *(S-1)*
24 – 58"	Red-Brown **SILT & CLAY**, some cmf^{+} Gravel, little cmf^{+} Sand. *(S-2)* *(completely weathered shale)*
58 – 105"	Red-Brown highly weathered, fractured **SHALE**.

END OF TEST PIT @ 8.8' *(Excavator Refusal)*

NOTES: *Perched groundwater encountered @ 62".

SOILS ENGINEER: J. Tierney, PE	**CONTRACTOR:** Rizzo & Son Excavating
TEST PIT OBSERVER: D. Rohmeyer, PE	**EXCAVATOR:** Komatsu PC138

The information shown hereon indicates the subsurface conditions encountered at the specified test pit location on the date(s) of excavation. Subsurface conditions are likely to vary across the project site. Interpretation of the subsurface data shall be at the discretion of the user.

Appendix B
Laboratory Testing

SUMMARY OF LABORATORY TESTING

PROJECT: Heritage @ Hopewell **PROJECT #:** 18808.001 **DATE:** 5/23

Boring & Sample Number	Depth (inches)	Classification	Natural Water Content %	Atterberg Limits		AASHTO T-290 Sulfate (ppm)	AASHTO T-291 Chloride (ppm)	Unit Dry Weight PCF	Specific Gravity	Permeability inches / hour @ 20 deg C	Compaction	Grain Size	Consolidation	Triaxial	% Passing #200	pH	Organic Content %
				Liquid Limit	Plastic Limit												
BMP-2 S-1	**5 - 26**	**Red-Brown CLAY & SILT, little+ cmf+ Sand, little- f Gravel**	**21**					**101.7**		**3.4×10^{-4}**							
BMP-3 S-1	**8 - 37**	**Brown SILT & CLAY, some+ cmf+ Sand, little- f Gravel**	**17**					**112.3**		**8.4×10^{-5}**							
BMP-4 S-1	**8 - 36**	**Red-Brown SILT & CLAY, little- f Sand, trace+ f Gravel**	**20**					**105.3**		**1.6×10^{-4}**							
BMP-5 S-1	**4 - 18**	**Brown SILT & CLAY, little- mf+ Sand**	**23**					**99.2**		**2.2×10^{-4}**							
BMP-6 S-1	**5 - 30**	**Brown CLAY & SILT, little+ mf Sand, little- f Gravel**	**6**					**93.3**		**4.8×10^{-3}**							
BMP-7 S-1	**4 - 30**	**Red-Brown SILT & CLAY, some+ mf+ Sand, little+ cmf+ Gravel**	**16**					**108.1**		**7.8×10^{-4}**							
BMP-8 S-1	**6 - 26**	**Brown CLAY & SILT, little mf+ Sand, little f Gravel**	**2**					**91.8**		**1.7×10^{-2}**							
BMP-9 S-1	**6 - 27**	**Brown SILT & CLAY, little+ mf+ Sand, trace f Gravel**	**23**					**99.2**		**1.1×10^{-4}**							
BMP-10 S-1	**4 - 20**	**Brown CLAY & SILT, little+ mf+ Sand, trace f Gravel**	**23**					**97.3**		**2.1×10^{-4}**							
BMP-11 S-1	**10 - 36**	**Light Brown Clayey SILT, and+ mf+ Sand**	**3**					**95.0**		**9.0×10^{-3}**							
BMP-12 S-1	**12 - 47**	**Light Brown & Grey SILT & CLAY, and f Sand, trace+ f Gravel**	**18**					**108.5**		**2.5×10^{-4}**							
BMP-13 S-1	**9 - 21**	**Light Brown & Grey CLAY & SILT, little- mf+ Sand**	**10**					**102.0**		**6.7×10^{-4}**							
BMP-14 S-1	**7 - 24**	**Dark Brown SILT & CLAY, some+ mf Sand, little- mf+ Gravel**	**18**					**109.4**		**4.6×10^{-5}**							
BMP-15 S-1	**5 - 12**	**Brown & Red-Brown SILT & CLAY, some- mf+ Sand, trace+ f Gravel**	**1**					**83.5**		**6.5×10^{-2}**							

* SEE TEST CURVES

Supervising Professional Engineer: Michael W. Schappert, PE