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Environmental & Geotechnical Engineers & Consultants
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MT. BETHEL CORPORATE CENTER
35 TECHNOLOGY DRIVE
WARREN, NJ 07059
908.668.7777
whitestoneassoc.com

REPORT OF GEOTECHNICAL INVESTIGATION

PROPOSED ASSISTED LIVING FACILITY
153 - 155 WHITE PLAINS ROAD
VILLAGE OF TARRYTOWN, WESTCHESTER COUNTY, NEW YORK

Prepared for:

ARTIS SENIOR LIVING OF TARRYTOWN, LLC
1651 Old Meadow Road, Suite 100
McLean, Virginia 22102

Prepared by:

WHITESTONE ASSOCIATES, INC.
35 Technology Drive
Warren, New Jersey 07059

Mudar Khantamr, P.E.
Project Manager

Laurence W. Keller, P.E.
Principal, Geotechnical Services

Whitestone Project No.: GJ1815765.000
February 7, 2019

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February 7, 2019

via email

ARTIS SENIOR LIVING OF TARRYTOWN, LLC
1651 Old Meadow Road, Suite 100
McLean, Virginia 22102

Attention: Ms. Priya Dhaduk
Development Coordinator

Regarding: REPORT OF GEOTECHNICAL INVESTIGATION
PROPOSED ASSISTED LIVING FACILITY
153 - 155 WHITE PLAINS ROAD
VILLAGE OF TARRYTOWN, WESTCHESTER COUNTY, NEW YORK
WHITESTONE PROJECT NO.: GJ1815765.000

Dear Ms. Dhaduk:

Whitestone Associates, Inc. (Whitestone) is pleased to submit the attached *Report of Geotechnical Investigation* for the above-referenced project. The attached report presents the results of Whitestone's soils exploration efforts and presents recommendations for design of the proposed structural foundations, floor slabs, pavements, and related earthwork.

Whitestone's geotechnical division appreciates the opportunity to be of service to Artis Senior Living of Tarrytown, LLC (Artis). Please note that Whitestone has the capability to perform the additional geotechnical engineering services recommended herein.

Please contact us at (908) 668-7777 with any questions or comments regarding the enclosed report.

Sincerely,

WHITESTONE ASSOCIATES, INC.

Mudar Khantamr, P.E.
Project Manager

Laurence W. Keller, P.E.
Principal, Geotechnical Services

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Enclosures
Copy: Max Ferentinos, Artis Senior Living
Richard Williams, Jr., P.E., Insite Engineering

REPORT OF GEOTECHNICAL INVESTIGATION
PROPOSED ASSISTED LIVING FACILITY
153 - 155 White Plains Road
Village of Tarrytown, Westchester County, New York

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PROPOSED ASSISTED LIVING FACILITY
153 - 155 White Plains Road
Village of Tarrytown, Westchester County, New York

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SECTION 1.0
Summary of Findings

Whitestone has performed an exploration and evaluation of the subsurface conditions for the proposed assisted living facility located at 153 through 155 White Plains Road in the Village of Tarrytown, Westchester County, New York. The site of the proposed construction is shown on the *Test Location Plan* included as Figure 1. At the time of Whitestone's exploration, the site primarily consisted of a moderately-wooded lot with an asphaltic pavement path bisecting the site.

Based on the March 7, 2018 *Site Plan* prepared by Insite Engineering (Insite) and information provided by Artis, the proposed site redevelopment will include clearing of the wooded area and construction of a 64-bed, two-story assisted living facility with a maximum footprint of approximately 21,656 square feet, site retaining walls, stormwater management (SWM) areas, trash enclosure, and associated new pavements, landscaping, and utilities.

The subsurface exploration included drilling 16 soil test borings (including associated offsets), excavating seven soil profile pits, and collecting soil samples for laboratory analyses. A portion of the subsurface tests encountered variable existing fill materials with variable amounts of debris overlying natural residual soils that generally consisted of a mixture of sand, silt, and weathered rock fragments (USCS: SP, SM, and ML). The residual soils were underlain by weathered rock followed by intact bedrock. Static groundwater was encountered within one boring at a depth of approximately 9.0 fbgs, corresponding to an approximate elevation of 161.0 feet above the North American Vertical Datum of 1988 (NAVD 88).

In general, the results of the investigation indicate the proposed structures may be supported on conventional shallow foundations designed to bear within the underlying improved natural site soils, weathered rock/bedrock, and/or on structural fill placed over the on-site natural materials provided the soils are properly evaluated, placed, and compacted as described herein. Existing fill materials should be overexcavated where encountered at or below proposed foundation bearing elevations. The majority of the existing fill materials are anticipated to be suitable for floor slab and pavement support following supplemental evaluation and subgrade preparation as described herein.

Weathered rock and rock were encountered across the subject property at variable depths that can present difficult excavation. Based on proposed grades and top of weathered rock/bedrock elevations encountered during this investigation, removal of weathered rock and bedrock is anticipated to be required during mass grading for portions of the proposed building footprint, excavation of proposed building foundations, cut retaining walls, and site utilities. Conventional excavating equipment likely will be effective in removing the upper few feet of weathered rock. However, planned excavation in confined excavations, such as for footing and utility trenches, may require ripping tools, pneumatic hammers, pre-spitting and/or expansive grout. Blasting may also be required in confined excavations or to expedite construction excavation.

SECTION 2.0
Introduction

2.1 AUTHORIZATION

Mr. Jason Erb of Artis issued authorization to Whitestone to perform a geotechnical investigation on this site relevant to the construction of a proposed assisted living facility. The geotechnical investigation was performed in general accordance with the July 17, 2018 *Agreement* with Artis.

2.2 PURPOSE

The purpose of this subsurface exploration and analysis was to:

- ascertain the various soil profile components at test locations;
- estimate the engineering characteristics of the proposed foundation bearing and subgrade materials;
- provide geotechnical criteria for use by the design engineers in preparing the foundation, floor slab, and pavement design;
- provide recommendations for required earthwork and subgrade preparation;
- record groundwater and/or bedrock levels (where encountered) at the time of the investigation and discuss the potential impact on the proposed construction; and
- recommend additional investigation and/or analysis (if warranted).

2.3 SCOPE

The scope of the exploration and analysis included the subsurface exploration; field testing and sampling; laboratory analysis; and a geotechnical engineering analysis and evaluation of the subsurface materials. This *Report of Geotechnical Investigation* is limited to addressing the site conditions related to the physical support of the proposed construction. Any references to suspicious odors, materials, or conditions are provided strictly for the client's information.

2.3.1 Field Exploration

Field exploration of the project site was conducted by means of 16 soil borings (identified as B-1 through B-13 and offsets B-3A, B-5A, and B-7A) with a track-mounted drill rig using hollow stem augers and split-spoon sampling techniques and excavating seven soil profile pits (identified as SPP-1 through SPP-7) with a track-mounted excavator. The subsurface tests were backfilled to the surface with soils from the

investigation and borings performed within existing paved areas were surficially patched with asphaltic pavement cold patch, as necessary.

The locations of the subsurface tests are shown on the accompanying *Test Location Plan* included as Figure 1. *Records of Subsurface Exploration* are provided in Appendix A. The test locations and termination depths are summarized in the following table.

TEST LOCATION/TERMINATION DEPTH SUMMARY TABLE		
Proposed Construction	**Test No.**	**Termination Depth (fbgs)**
Senior Living Building	B-1 through B-6, B-8, B-9 & B-12	3.0 to 20.0
Retaining Walls	B-7, B-7A, B-10, B-11 & B-13	2.5 to 16.0
SWM Areas	SPP-1 through SPP-7	1.0 to 12.5

The subsurface tests were conducted in the presence of a Whitestone engineer who performed field tests, recorded visual classifications, and collected samples of the various strata encountered. The tests were located in the field using normal taping procedures and estimated right angles. These locations are presumed to be accurate within a few feet.

Soil borings and standard penetration tests (SPTs) were conducted in general accordance with American Society for Testing and Materials (ASTM) designation D-1586. The SPT resistance value (N) can be used as an indicator of the consistency of fine-grained soils and the relative density of coarse-grained soils. The N-value for various soil types can be correlated with the engineering behavior of earthworks and foundations. Rock was sampled using a NQ-sized diamond bit. The rock core description, recovery, Rock Quality Designation (RQD), and other pertinent information were recorded on the boring logs and are included in Appendix A on the *Records of Subsurface Exploration*. The RQD values reflect the quality and fracture spacing of the rock and are calculated by summing all unbroken samples that are four inches or longer divided by the total length of the run. The percentage of core recovery and RQD values provide an understanding of the physical and engineering properties of the rock.

Groundwater level observations, where encountered, were recorded during and at the completion of field operations prior to backfilling the tests. Seasonal variations, temperature effects, and recent rainfall conditions may influence the levels of the groundwater, and the observed levels will depend on the permeability of the soils. Groundwater elevations derived from sources other than seasonally observed groundwater monitor wells may not be representative of true groundwater levels.

2.3.2 Laboratory Testing Program

In addition to the field investigation, a supplemental laboratory testing program was conducted to determine additional, pertinent engineering characteristics of representative samples of on-site soils. The

laboratory testing program was performed in general accordance with applicable ASTM standard test methods and included physical/textural testing of representative samples of various strata.

Physical/Textural Analysis: Representative samples of selected strata encountered were subjected to a laboratory testing program that included moisture content determinations (ASTM D-2216) and washed gradation analyses (ASTM D-422) in order to perform supplementary engineering soil classifications in general accordance with ASTM D-2487. The soil strata tested were classified by the Unified Soil Classification System (USCS) and results of the laboratory testing are summarized in the following table.

PHYSICAL/TEXTURAL ANALYSIS SUMMARY							
Boring	**Sample Number**	**Depth (fbgs)**	**Natural Moisture (%)**	**Liquid Limit (%)**	**Plastic Index (%)**	**Passing No. 200 Sieve (%)**	**USCS Classification**
B-3	S-4	6.0 - 8.0	6.0	NP	NP	21.0	SM
B-5	S-2	2.0 - 4.0	19.3	NP	NP	65.3	ML
B-8	S-3	4.0 - 6.0	13.1	NP	NP	62.4	ML
B-13	S-3	4.0 - 6.0	21.9	NP	NP	79.8	ML

Notes: NP = Non-Plastic

The engineering classifications are useful when considered in conjunction with the additional site data to estimate properties of the soil types encountered and to predict the soil's behavior under construction and service loads. Laboratory test results are provided in Appendix B.

SECTION 3.0
Site Description

3.1 LOCATION AND DESCRIPTION

The subject property is located at 153 through 155 White Plains Road in the Village of Tarrytown, Westchester County, New York. The site is bound to the north by Martling Avenue followed by an industrial building; to the south by an office building followed by White Plains Road; to the east by an asphaltic concrete pavement parking lot associated with a medical facility; and to the west by retail/residential. The site of the proposed construction is shown on the *Test Location Plan* included as Figure 1.

3.2 EXISTING CONDITIONS

Surface Cover/Development: At the time of Whitestone's exploration, the site primarily consisted of a moderately-wooded lot with an asphaltic pavement path bisecting the site.

Topography: Based on the *Site Plan* prepared by Insite, the area of the proposed redevelopment has a high elevation of approximately 196.0 feet above NAVD 88 in the northeastern corner and a low elevation of approximately 150.0 feet above NAVD 88 in the northwestern corner. More specifically, the area of the proposed building has a grade change of approximately 20.0 feet.

Utilities: At the time of Whitestone's investigation, the subject site was serviced aboveground by electric and telephone lines and underground by water and stormwater sewer lines. Other utilities were not observed at the time of the geotechnical investigation, but may be present at or near the site. The utility information contained in this report is presented for general discussion only and is not intended for construction purposes.

Site Drainage: Surface runoff generally consists of sheet flow across the existing ground surface and generally appeared to flow in a northwesterly direction.

3.3 SITE GEOLOGY

The subject site is mapped as Fordham Gneiss. Fordham Gneiss is comprised of gneiss with variable mineral content that general consists of garnet, biotite, quartz, plagioclase, sillimanite, amphibolite and hornblende. The subject site is overlain by residual soils formed from the weathering of the underlying bedrock. Overburden materials also include man-made fill associated with past and present development of the subject site.

3.4 PROPOSED CONSTRUCTION

Based on the *Site Plan* prepared by Insite and information provided by Artis, the proposed site redevelopment will include clearing of the wooded area and construction of a 64-bed, two-story assisted living facility with a maximum footprint of approximately 21,656 square feet. The proposed building is anticipated to have a finished floor elevation of 180.9 feet above NAVD 88 and is not ancitipated to contain a basement or cellar. The proposed redevelopment will also include an approximately 120 linear feet cut retaining wall with a maximum exposed height of approximately five feet within the northeastern portion of the site; an approximately 120 linear feet fill retaining wall with a maximum exposed height of approximately four feet within the southern portion of the site; an approximately 165 linear feet to 330 linear feet fill, one- to two-tier retaining wall with a maximum combined height of approximately 10 feet within the western portion of the site; and a trash enclosure, associated new pavements, landscaping, and utilities.

Based on existing and proposed grades, the proposed building will require up to 10 feet of fill within the northwestern portion and up to approximately 10 feet of cut within the eastern portion. The proposed development also is anticipated to include SWM basins throughout the site. The final locations, types, and bottom elevations of the SWM basins has not been provided at this time.

The anticipated maximum loads for the proposed building are expected to be as follows:

- column loads - 200 kips;
- wall loads - 4.0 kips/linear foot; and
- floor slab loads - 125 pounds per square foot (live load).

The scope of Whitestone's investigation and the professional advice contained in this report were generated based on the project details and loading noted herein. Any revisions or additions to the design details enumerated in this report should be brought to the attention of Whitestone for additional evaluation as warranted.

SECTION 4.0
Subsurface Conditions

4.1 SUBSURFACE SOIL CONDITIONS

Details of the subsurface materials encountered are presented on the *Records of Subsurface Exploration* presented in Appendix A of this report. The subsurface soil conditions encountered in the subsurface tests consisted of the following generalized strata in order of increasing depth.

Surface Cover: The subsurface tests were performed within either existing grass-covered areas, paved areas, or encountered existing fill materials at the surface as detailed below. The borings performed within existing grass-covered areas encountered approximately six inches to 24 inches topsoil/mulch/roots at the surface. The boring performed within an existing paved area encountered approximately six inches of asphaltic concrete pavement at the surface. Subbase materials were not encountered.

Existing Fill Materials: At or underlying the surface cover materials, a portion of the subsurface tests performed encountered existing fill materials that generally consisted of: silty sand with variable amounts of gravel and debris; sandy silt; and/or poorly graded gravel with sand. The debris encountered consisted of concrete, brick, and occasional wood fragments. Where encountered, the existing fill materials extended to depths ranging from approximately two fbgs to six fbgs. SPT N-values recorded within this stratum ranged between four blows per foot (bpf) and 11 bpf, and averaged approximately seven bpf.

Residual Soils: Beneath the surface cover and/or existing fill materials, the majority of the tests encountered natural residual soils. The residual soils generally consisted of: silty sand (USCS: SM) with variable amounts of gravel-sized weathered rock fragments; poorly graded sand (USCS: SP) with variable amounts of gravel-sized weathered rock fragments; and/or silt (USCS: ML) with variable amounts of sand and gravel-sized weathered rock fragments. Where encountered, the residual soils extended to depths ranging between approximately two fbgs to 16.0 fbgs. SPT N-values within coarse-grained portions of this stratum ranged between three bpf and refusal (refusal defined as greater than 50 blows per six inches of split-spoon sampler advancement), generally indicating very loose to very dense relative density and averaging approximately 27 bpf. Pocket penetrometer tests performed within fine-grained portions of this stratum resulted in unconfined compressive strengths ranging between approximately 0.25 ton per square foot (tsf) and one tsf, generally indicating soft to stiff consistency.

Weathered Rock: Below the surface cover and/or residual soils, the tests encountered weathered rock materials. The top of weathered rock was encountered at depths ranging from approximately one fbgs and 16.0 fbgs. SPT N-values within this stratum consistently were generally in the refusal range.

Intact Rock: Beneath the weathered rock materials, the tests encountered refusal on top of apparent intact rock at depths ranging between approximately one fbgs and 16.0 fbgs. The bedrock was sampled with rock coring techniques within borings B-3A and B-5A and generally consisted of gneiss. Rock core recoveries in the intact rock ranged from approximately 87 percent to 92 percent and RQD values ranged from approximately 70 percent to 92 percent.

4.2 GROUNDWATER

Static groundwater was encountered within boring B-10 at a depth of approximately 9.0 fbgs, corresponding to an approximate elevation of 161.0 feet above NAVD 88. Additionally, indications of seasonal high groundwater were encountered within soil profile pits SPP-1, SPP-5, and SPP-6 at depths ranging from approximately four fbgs to 6.5 fbgs. Groundwater conditions likely will fluctuate seasonally and following periods of precipitation.

SECTION 5.0
Conclusions and Recommendations

5.1 GENERAL

Whitestone recommends supporting the proposed structures on conventional shallow foundations bearing within the underlying improved natural soils, weathered rock/bedrock, and/or controlled structural fill soils that are properly inspected, placed and compacted in accordance with Sections 5.2, 5.3, and 5.11 of this report. The existing fill materials should be overexcavated where encountered at or below proposed foundation bearing elevations. Portions of the natural materials encountered within the top four feet to six feet were relatively loose and will require improvement prior to foundation support, if encountered at or below proposed foundation bearing elevations.

Whitestone anticipates that proposed floor slabs and pavements may be supported on approved and improved existing fill materials, underlying natural materials, and/or controlled structural fill materials subject to supplemental evaluation and subgrade preparation as described herein with limited areas of overexcavation and replacement or recompaction anticipated due to the presence of existing fill materials including debris.

Based on proposed grades and top of weathered rock/bedrock elevations encountered during this investigation, removal of weathered rock and bedrock is anticipated to be required during mass grading for portions of the proposed building footprint, excavation of proposed building foundations, cut retaining walls, and site utilities. Based on the geologic structure of the gneiss bedrock, large excavation machinery equipped with ripping tools and/or pneumatic hammers are expected to be effective for removing the upper few feet of the weathered rock strata. Based on local experience, Whitestone expects that blasting may be necessary to efficiently remove more resistant intact rock below refusal depths and to expedite the construction schedule. The blasting program should consider the proximity of adjacent structures and neighboring properties as well as local ordinances.

5.2 SITE PREPARATION AND EARTHWORK

Surface Cover Stripping: Prior to stripping operations, all utilities should be identified and secured. The existing surface cover to be stripped should be removed from within and at least five feet beyond the limits any areas requiring structural fill, if possible. Former structural elements (if encountered), such as foundation walls, or any concrete foundations, walls or slabs encountered during excavations, should be removed entirely from below proposed foundations and their zones of influence (as determined by lines extending at least one foot laterally beyond footing edges for each vertical foot of depth) and excavated to at least two feet below proposed construction subgrade levels elsewhere. Foundations and slabs may remain in place below these depths below proposed ground-supported slabs, pavements and landscaped

areas, provided they do not interfere with future construction; however, any existing slab to remain should be thoroughly broken such that maximum particle size is 12 inches to allow vertical drainage of water.

The demolition contractor should be required to perform all earthwork in accordance with the recommendations in this report including backfilling any excavation, former structural elements, etc. with structural fill. All fill or backfill placed in structural areas during any demolition operations should be placed as structural fill in accordance with Section 5.2 and 5.3 of this report. Vegetation, trees, topsoil, and organic matter should be removed from within and at least five feet beyond the limits of the proposed building footprint as well as any other area that will require controlled structural fill placement. Tree and/or brush removal should include the removal of stumps and root material.

Excavation Difficulties/Weathered Rock and Bedrock Removal: Weathered rock and rock was encountered across the subject property at variable depths that can present difficult excavation. Based on proposed grades and top of weathered rock/bedrock elevations encountered during this investigation, removal of weathered rock and bedrock will be required within the eastern, northeastern, and central portions of the proposed building. Additional removal of weathered rock/bedrock will be required for foundations within the aforementioned areas. Weathered rock/bedrock removal may also be required for the proposed cut retaining wall within the northeastern portion of the site as well as within portions of the proposed utility excavations. Heavy excavating equipment with ripping tools will typically be effective in removing dense/hard weathered soils, transition materials, and cobble/boulder-sized rock fragments during site mass grading. The speed and ease of excavation will depend on the type of grading equipment, the skill of the equipment operators, and the geologic structure of the material itself, such as the direction of planes of weakness and spacing between discontinuities. Planned excavation in confined excavations, such as for footing and utility trenches, may require ripping tools, pneumatic hammers, pre-spitting, expansive grout, and/or blasting.

Blasting will expedite the grading and rock excavation processes; however, special measures should be taken including pre- and post-construction surveys of the neighboring properties and vibration monitoring during the construction phase. Blasting should be conducted by an experienced specialty contractor in accordance with applicable Village of Tarrytown, state and federal regulations. Where blasting is deemed necessary, care should be taken to minimize the amount of charge required to avoid over-blast and to provide proper engineering controls during and following blasting operations. Engineering controls will include properly cleaning of all loose shot rock from blasted surfaces and allowing the geotechnical engineer to inspect subsurface conditions.

High impact energy generated by rock blasting and possibly the use of rock ripping equipment potentially could induce high traveling underground vibrations, which could cause structural damage to the nearby roadways, existing structures, proposed foundations and slabs depending on the magnitudes of the velocities, and frequencies of the traveling vibration waves. As such, prior to construction of bearing elements (footings, walls, slabs, etc.), all rock excavation or blasting within a safe distance (safe zone) from those structures should be completed. Actual safe distances (zones) will vary depending on the rock

and soils conditions, and should be established based on field measurement during a testing phase at a predetermined location such as the central portion of the site.

The approximate depths and elevations for the top of weathered rock and refusal encountered are provided in the following table:

SUMMARY OF ENCOUNTERED WEATHERED ROCK AND REFUSAL DEPTHS/ELEVATIONS					
Test Number	**Approximate Surface Elevation (feet*)**	**Top of Weathered Rock**		**Top of Refusal**	
		Depth (fbgs)	**Approx. Elevation (feet*)**	**Depth (fbgs)**	**Approx. Elevation (feet*)**
B-1	± 190.0	2.0	± 188.0	7.8	± 182.2
B-2	± 190.0	10.0	± 180.0	10.5	± 179.5
B-3	± 192.0	8.5	± 183.5	11.5	± 180.5
B-3A	± 192.0	11.5	± 180.5	15.0	± 177.0
B-4	± 188.0	2.0	± 186.0	3.0	± 185.0
B-5	± 192.0	6.0	± 186.0	6.3	± 185.7
B-5A	± 190.0	5.0	± 185.0	14.0	± 176.0
B-6	± 188.0	7.5	± 180.5	7.8	± 180.2
B-7	± 178.0	1.0	± 177.0	2.5	± 175.5
B-7A	± 176.0	1.0	± 175.0	5.0	± 171.0
B-8	± 184.0	10.0	± 174.0	13.5	± 170.5
B-9	± 185.0	9.5	± 175.5	10.5	± 174.4
B-10	± 170.0	--	--	16.0	± 154.0
B-11	± 165.0	7.5	± 157.5	8.0	± 157.0
B-12	± 170.0	6.0	± 164.0	6.3	± 163.7
B-13	± 158.0	9.5	± 148.5	10.0	± 148.0
SPP-1	± 190.0	12.0	± 178.0	12.5	± 177.5
SPP-2	± 189.0	9.0	± 180.0	11.0	± 178.0
SPP-3	± 186.0	--	--	1.0	± 185.0
SPP-4	± 180.0	--	--	6.0	± 174.0
SPP-5	± 177.0	--	--	6.3	± 170.7
SPP-6	± 159.0	--	--	7.0	± 152.0
SPP-7	± 176.0	--	--	2.0	± 174.0

* above NAVD 88

Surface Preparation/Proofrolling: Prior to placing any fill or subbase materials to raise or restore grades to the desired subgrade elevations, the existing exposed soils should be compacted to a firm surface with several passes in two perpendicular directions of a minimum 10-ton vibratory roller. The

roller should be operated in the static mode or a kneading "sheepsfoot" roller should be used if silt and/or clay soils are encountered at subgrade elevations. The surface then should be proofrolled with a loaded tandem axle truck in the presence of the geotechnical engineer to help identify soft or loose pockets which may require removal and replacement or further investigation. Proofrolling should be performed after a suitable period of dry weather to avoid degrading an otherwise stable subgrade. Any fill or backfill should be placed and compacted in accordance with Section 5.3.

Bedrock Subgrade Preparation: Bedrock slopes should not be steeper than 4:1 (horizontal:vertical). Bedrock steeper than 4:1 (horizontal:vertical) should be stepped. Loose bedrock should be removed from the subgrade prior to placement of crushed stone. Bedrock fractures and joints should be tight. Bedrock joints, fractures, or fissures greater than 0.25-inch in width should be filled with lean concrete. Only minus 0.75-inch crushed stone should be placed directly over the bedrock. Structural fill (sand and gravel) should not be placed directly on the bedrock surface to reduce the likelihood of migration of fines into the bedrock.

Weather Performance Criteria: Because portions of the site soils are highly moisture sensitive (fine-grained soils) and may soften when exposed to water, every effort must be made to maintain drainage of surface water runoff away from construction areas by grading and limiting the exposure of excavations and prepared subgrades to rainfall. Accordingly, excavation and fill placement procedures should be performed during favorable weather conditions. Overexcavation of saturated soils and replacement with controlled structural fill per Section 5.3 of this report may be required prior to resuming work on disturbed subgrade soils.

Subgrade Protection and Inspection: Every effort should be made to minimize disturbance of the on-site materials by construction traffic and surface runoff. The on-site soils will deteriorate when subjected to repeated wetting and construction traffic and likely will require extensive drying or overexcavation and replacement. However, if properly protected and maintained during warm, dry weather as recommended herein, the site soils will provide adequate support for the proposed construction. The site contractors should employ necessary means and methods to protect the subgrade including, but not limited to the following:

- sealing exposed subgrade soils on a daily basis with a smooth drum roller operated in static mode;
- regrading the site as needed to maintain positive drainage away from construction areas;
- removing wet surficial soils immediately; and
- limiting exposure to construction traffic especially following inclement weather and subgrade thawing.

5.3 STRUCTURAL FILL AND BACKFILL

Imported Fill Material: Any imported material placed as structural fill or backfill to raise elevations or restore design grades should consist of clean, relatively well graded sand or gravel with a maximum particle size of three inches and five percent to 10 percent of material finer than a #200 sieve. Silts, clays, and silty or clayey sands and gravels with higher percentage of fines and with a liquid limit less than 40 and a plasticity index less than 20 may be considered subject to the owner's approval, provided that the required moisture content and compaction controls are met. The material should be free of clay lumps, organics and deleterious material. Imported structural fill material should be approved by a qualified geotechnical engineer prior to delivery to the site.

On-Site Materials: Based on the conditions disclosed by the subsurface tests, Whitestone anticipates that the majority of the existing fill materials and the underlying natural soils may be reusable as structural fill and/or backfill below proposed foundations, floor slabs, and pavements provided any objectionable debris are segregated and moisture contents are controlled within two percent of the optimum moisture content. Reuse of the existing fill will be contingent on careful inspection in the field by the owner's geotechnical engineer by visual observation and/or test pit excavations either prior to or during construction in accordance with Section 5.11 of this report.

Laboratory results indicate that the existing site silty soils (USCS: ML) are highly moisture sensitive. The reuse of these fine-grained soils and granular site materials with more than approximately 12 percent fines (USCS: SM) typically is possible only during ideal weather conditions. Reuse of these soils is expected to require mixing with a granular material, extensive moisture conditioning, and/or drying to facilitate their reuse, workability, and compaction in fill areas.

The on-site soils will become increasingly difficult to reuse and compact where wetted beyond the optimum moisture content. Immediate re-use of on-site soil should not be anticipated. Materials that are, or become, exceedingly wet likely will require discing and aerating that may not be practical during wet seasons. Alternatively, imported fill materials may be used to attain the desired grades and expedite earthwork operations. The stripped asphaltic concrete pavement and topsoil/mulch should not be used as fill or backfill.

Cobble- and boulder-sized weathered rock/bedrock materials or similarly sized materials greater than three inches in diameter will need to be separated from on-site soils to be placed as structural fill or backfill. Cobble-sized materials between three inches to 12 inches may be crushed or individually placed in structural fill or backfill layers deeper than two feet below proposed foundation and pavement subgraded levels. Care must be taken to individually seat any large particles and to compact soil around large particles with hand operated equipment to minimize risk of void formation. Boulder-sized greater than 12 inches in diameter need to be crushed prior to replacement as structural fill materials. Materials greater than three inches in size should be placed a minimum of three feet from utilities.

Demolition Material: Milled or recycled asphalt pavement (RAP) may be re-used as granular base for proposed pavements provided that the RAP particle size meets New York State Department of Transportation (NYSDOT) standard specifications for granular base and no more than 50% of the pavement granular base contains RAP.

Submerged Fill: Where necessary, up to two feet of an open-graded, crushed, three-quarter inch stone may be placed in the wet to provide a working mat, expedite dewatering efforts and enable subsequent placement of structural fill or backfill in the dry. Prior to placing submerged fill materials, free water and disturbed materials should be removed to the extent recommended by the geotechnical engineer. A separation geotextile, such as Mirafi 140N or equivalent, should be placed at the base and sides of the overexcavation to separate the stone from underlying and adjacent soils. The fabric also should be placed on top of the stone prior to subsequent fill placement if fill soils with a substantial amount of fines are to be used to restore grade.

Compaction and Placement Requirements: All fill and backfill should be placed in maximum nine inch loose lifts and compacted to 95 percent of the maximum dry density within two percent of the optimum moisture content as determined by ASTM D 1557 (Modified Proctor). Whitestone recommends using a vibratory drum roller to compact the on-site soils or a small hand held vibratory compactor within excavations.

Structural Fill Testing: A sample of the imported fill material or any on-site material proposed for reuse as structural fill or backfill should be submitted to the geotechnical engineer for analysis and approval at least one week prior to its use. The placement of all fill and backfill should be monitored by a qualified engineering technician to ensure that the specified material and lift thicknesses are properly installed. A sufficient number of in-place density tests should be performed to ensure that the specified compaction is achieved throughout the height of the fill or backfill.

5.4 GROUNDWATER CONTROL

Static groundwater was encountered within one boring at a depth of approximately 9.0 fbgs, corresponding to an approximate elevation of 161.0 feet above NAVD 88. Based on the groundwater levels encountered during this investigation and the proposed grades, Whitestone anticipates that static groundwater will be deeper than proposed foundation and typical utility excavations and does not anticipate the need for extensive dewatering or permanent groundwater control. However, perched/trapped water may be encountered within the existing fill materials, at the existing fill materials/natural soil interface, within fine-grained portions of the site soils, and at the natural soil/weathered rock/bedrock interfaces, especially following precipitation events. As such, construction phase dewatering of trapped/perched water through the use of gravity fed sump pumps should be anticipated during excavation activities for this site. Whitestone anticipates that dewatering typically would include numerous sump pumps along the excavation perimeter and/or deep well points to lower the groundwater level.

Site and Subgrade Drainage: Considering that portions of the proposed pavement subgrades will consist of relatively impervious weathered rock (specifically within the southern portion of the site), Whitestone recommends installing radial interceptor drains extending out from the stormwater inlet structures to assist with removing trapped water from beneath pavements that can lead to premature pavement deterioration. In addition, interceptor drains should be installed adjacent to pavements and sidewalks areas that are downslope of cut areas. Interceptor drains typically consist of top perforated polyvinyl chloride (PVC) piping encased in 12 inches of crushed stone and a filtration fabric. For the fine-grained soils present on the site, a woven fabric such as long term clog-resistant Mirafi Filterweave 700X, or equivalent, is recommended. Interceptor drains should be designed to pitch towards and discharge into the stormwater management system. The pipes should have a minimum slope of 0.5 percent. If sufficient fall is available, gravity flow is preferable; otherwise, the water should be collected in a sump and pumped. In addition to interceptor drains, pre-cast perforated inlet structures will assist with removing trapped water from beneath pavements. Additional drainage is recommended for below-grade walls as discussed in Section 5.8.

Because the subsurface soils will soften when exposed to water, every effort must be made to maintain drainage of surface water runoff away from construction areas by grading and limiting the exposure of excavations to rainfall. Overexcavation of saturated soils and replacement with controlled structural fill and/or one foot to two feet of open graded gravel (such as 3/4 inch clean crushed stone) may be required prior to resuming work on disturbed subgrade soils.

5.5 FOUNDATIONS

Shallow Foundation Design Criteria: Whitestone recommends supporting the proposed structures on conventional spread and continuous wall footings designed to bear within the underlying improved natural materials, intact weathered rock/bedrock, and/or controlled structural fill provided these materials are properly evaluated, placed and compacted in accordance with Sections 5.2, 5.3, and 5.11 of this report. Existing fill materials should be overexcavated if encountered at or below proposed foundation bearing elevations and the resulting overexcavation should be restored with approved structural fill materials. Portions of the natural materials encountered within the top four feet to six feet were relatively loose and will require improvement prior to foundation support, if encountered at or below proposed foundation bearing elevations. Foundations bearing within the improved natural residual soils and/or controlled structural fill materials may be designed using a maximum allowable net bearing pressure of 3,000 pounds per square foot (psf). Foundations bearing on competent weathered rock/bedrock may be designed using a maximum allowable net bearing pressure of 6,000 psf. Higher bearing capacities of isolated foundation on rock may be considered once all loads and spans are confirmed.

Reuse of the existing fill materials for foundation support will be contingent upon supplemental evaluation, as described in Section 5.11. All footing bottoms should be improved by in-trench compaction in the presence of the geotechnical engineer. Regardless of loading conditions, proposed

foundations should be sized no less than minimum dimensions of 24 inches for continuous wall footings and 36 inches for isolated column footings.

Footings subject to overturning moments should be designed so that the maximum toe pressure due to the combined effect of vertical loads and overturning moment does not exceed the recommended maximum allowable net bearing pressure. In addition, positive contact pressure should be maintained throughout the base of the footings such that no uplift or tension exists between the base of the footings and the supporting soil. Uplift loads should be resisted by the weight of the concrete. Side friction should be neglected when proportioning the footings so that lateral resistance should be provided by friction resistance at the base of the footings. A coefficient of friction against sliding of 0.35 is recommended for use in the design of the foundations bearing within the existing site soils or imported structural fill soils.

Partial Weathered Rock/Bedrock Support: Foundations should not be supported partially on weathered rock, weathered rock-sized cobbles/boulders, or bedrock and partially on soil because of the risk of brittle fracture due to a hinging effect. If the proposed bearing elevations result with partial bearing on such materials, Whitestone recommends removing a minimum of six inches of the weathered rock/bedrock and restoring the bearing elevation with structural fill. As such, rock should be overexcavated for a transition length of 20 feet and backfilled with structural backfill per Section 5.3 for any foundation that results in partial rock and partial soil conditions.

Foundation Inspection/Overexcavation Criteria: Whitestone recommends that the suitability of the bearing soils along and below the footing bottoms be verified by a geotechnical engineer prior to placing concrete for the footings. Where areas of unsuitable materials are encountered in footing excavations, such as existing fill materials, overexcavation and recompaction or replacement may be necessary to provide a suitable footing subgrade in accordance with Section 5.2. Any overexcavation to be restored with structural fill will need to extend at least one foot laterally beyond footing edges for each vertical foot of overexcavation. Lateral overexcavation can be reduced if the grade is restored with lean concrete or approved flowable fill. The bottom of overexcavation should be compacted with vibrating plates or plate tampers (“jumping jacks”) to compact locally disturbed materials.

Settlement: Whitestone estimates post construction settlements of proposed foundations on the order of less than one inch if the recommendations outlined in this report are properly implemented. Differential settlements of foundations should be less than one-half inch.

Frost Coverage: Footings subject to frost action should be placed at least 42 inches below adjacent exterior grades or the depth required by local building codes to provide protection from frost penetration. Interior footings not subject to frost action may be placed at a minimum depth of 18 inches below the slab subbase. Because competent rock is not susceptible to frost heaving conditions, foundations bearing directly on top of competent rock, as verified during construction by the geotechnical engineer, are not required to extend to typical frost protection depths.

5.6 FLOOR SLAB

Contingent upon supplemental evaluation of existing fill materials, Whitestone anticipates that the improved and approved existing fill materials, underlying natural materials, and/or controlled structural fill materials will be suitable for support of the proposed floor slabs provided these materials are properly evaluated, placed, compacted and proofrolled in accordance with Sections 5.2, 5.3, and 5.11 of this report. Areas of overexcavation may be anticipated due to the variability that exists within the existing fill materials, evidenced by the debris encountered, and/or if the subgrades are exposed to precipitation. Any areas that become softened or disturbed as a result of wetting and/or repeated exposure to construction traffic should be removed and replaced with compacted structural backfill. The properly prepared on-site soils are expected to yield a minimum subgrade modulus (k) of 150 psi/in.

A minimum four inch layer of stone should be installed below the floor slabs to provide a capillary break. An impervious membrane also should be provided as a moisture vapor barrier beneath all floor slabs. Post construction settlements of floor slabs installed in accordance with the recommendations outlined in this report are estimated to be on the order of one quarter inch.

5.7 PAVEMENT DESIGN CRITERIA

General: Whitestone anticipates that either improved and approved existing fill materials, the underlying natural materials, and/or compacted structural fill and/or backfill placed to raise or restore design elevations are expected to be suitable for support of the proposed pavements provided these materials are properly evaluated, compacted, and proofrolled in accordance with Sections 5.2, 5.3, and 5.11 of this report during favorable weather conditions. Localized overexcavation of unsuitable existing fill materials should be anticipated due to existing fill materials including debris that were sporadically encountered throughout the site.

Alternatively, subgrade stabilization with a biaxial geogrid, such as Synteen SF-12 or equal, should be anticipated to limit overexcavation. Where existing fill materials remain below proposed subgrades, increased maintenance, possibly including crack sealing, patching or more frequent re-paving, may be necessary. If the risk of increased maintenance is not acceptable, more extensive subgrade preparation recommendations can be developed. The following pavement section recommendations are based on the assumption that such an increased risk is acceptable. Whitestone would be pleased to prepare alternative recommendations for the more substantial subgrade improvements.

Design Criteria: A California Bearing Ratio value of five has been assigned to the properly prepared subgrade soils for pavement design purposes. This value was correlated with pertinent soil support values and assumed traffic loads to prepare flexible and rigid pavement designs per the AASHTO *Guide for the Design of Pavement Structures*.

Design traffic loads were assumed based on typical volumes for similar facilities and correlated with 18-kip equivalent single axle loads (ESAL) for a 20 year life. An estimated maximum load of 25,000 ESAL was used for all pavement areas assuming the pavement primarily will accommodate both automobile and limited heavier truck traffic. Actual pavement loads should be less than this value.

Pavement Sections: The recommended flexible pavement section is presented below:

FLEXIBLE PAVEMENT SECTION		
Layer	**Material**	**Thickness (Inches)**
Asphalt Surface	NYSDOT Type 7 or 7F Top	1.5
Asphalt Base	NYSDOT Type 3 Binder	2.5
Granular Subbase	NYSDOT Type 2 Subbase	6.0

A rigid concrete pavement should be used to provide suitable support at areas of high traffic or severe turns (such as at ingress/egress locations). The recommended rigid pavement is presented below in tabular format:

RIGID PAVEMENT SECTION		
Layer	**Material**	**Thickness (Inches)**
Surface	4,000 psi air-entrained concrete	5.0[1]
Base	NYSDOT Type 2 Subbase	6.0

Note[1]: The outer edges of concrete pavements are susceptible to damage as trucks move from rigid pavement to adjacent flexible pavement. Therefore, the thickness at the outer two feet of the rigid concrete pavement should be 12 inches.

Additional Design Considerations: The pavement section thickness designs presented in this report are based on the design parameters detailed herein and are contingent on proper construction, inspection, and maintenance. Additional pavement thicknesses may be required by local code. The designs are contingent on achieving the minimum soil support value in the field. To accomplish this requirement, all subgrade soil and supporting fill or backfill must be placed, compacted, and evaluated in accordance with Sections 5.2, 5.3, and 5.11 of this report. Proper drainage must be provided for the pavement structure including appropriate grading and surface water control as outlined in Section 5.4.

The performance of the pavement also will depend on the quality of materials and workmanship. Whitestone recommends that NYSDOT standards for materials, workmanship, and maintenance be applied to this site. Project specifications should include verifying that the installed asphaltic concrete material composition is within tolerance for the specified materials and that the percentage of air voids of the installed pavement is within specified ranges for the respective materials. All rigid concrete pavements should be suitably air-entrained, jointed, and reinforced.

5.8 LATERAL EARTH PRESSURES

General: The proposed redevelopment will include multiple site retaining walls. While the design and investigation of the retaining structures are beyond Whitestone's current scope of work, Whitestone would be pleased to assist with the calculation of lateral earth pressures based on the soil parameters presented herein during the structural design phase when final grading and wall geometries are available.

Lateral Earth Pressures: Temporary retaining structures and permanent retaining/below-grade walls may be required to resist lateral earth pressures. Proposed retaining/below-grade walls must be capable of withstanding active and at-rest earth pressures. Retaining/below-grade walls free to rotate generally can be designed to resist active earth pressures. Retaining/below-grade walls corners and restrained walls need to be designed to resist at-rest earth pressures. Such structures should be properly designed by the Owner's engineer. The following soil parameters apply to the encountered subsurface strata and may be used for design of the proposed temporary and permanent retaining structures.

LATERAL EARTH PRESSURE PARAMETERS		
Parameter	**On-Site Soils**	**Imported Granular Backfill**
Moist Density (γ_{moist})	140 pcf	140 pcf
Internal Friction Angle (φ)	28°	30°
Active Earth Pressure Coefficient (K_a)	0.36	0.33
Passive Earth Pressure Coefficient (K_p)	2.77	3
At-Rest Earth Pressure Coefficient (K_o)	0.53	0.5

Lateral earth pressure will depend on the backfill slope angle and the wall batter angle. A sloped backfill will add surcharge load and affect the angle of the resultant force. The effect of other surcharges will also need to be included in earth pressure calculations, including the loads imposed by adjacent structures and traffic. The effects of proposed sloped backfill surface grades, and proposed slopes beyond the toe of the retaining structure, if applicable, must be considered when calculating resultant forces to be resisted by the retaining structure. A coefficient of friction of 0.35 against sliding can be used for concrete on the existing site soils. Retaining/below-grade wall footings should be designed so that the combined effect of vertical and horizontal resultants and overturning moment does not exceed the maximum soil bearing capacity provided in Section 5.5.

Backfill Criteria: Whitestone recommends that granular soils be used to backfill behind the proposed retaining/below-grade walls. The granular backfill materials should consist of clean, relatively well graded sand or gravel with a maximum particle size of three inches and five percent to 15 percent of material finer than a #200 sieve. The material should be free of clay lumps, organics, and deleterious material. Limited portions of the on-site soils encountered consisted of poorly graded sand (USCS: SP) which are anticipated to be satisfactory for retaining/below-grade wall backfill, if encountered during site excavations. The remaining portions of the existing site soils are not anticipated to be suitable for

retaining/below-grade wall backfill. Weathered rock/bedrock fragments greater than three inches should also not be used as backfill. Accordingly, imported granular soils may be required. A maximum density of 140 pcf should not be exceeded to avoid creating excessive lateral pressure on the walls during compaction operations.

Whitestone recommends that backfill directly behind any walls be compacted with light, hand-held compactors. Heavy compactors and grading equipment should not be allowed to operate within a zone of influence measured at a 45-degree angle from the base of the walls during backfilling to avoid developing excessive temporary or long-term lateral soil pressures.

Wall Drainage: Positive gravity drainage of the backfill should be provided at the base of the retaining/below-grade walls by a series of perforated pipes surrounded by at least 12 inches of clean crushed stone that discharges into a stormwater sewer or daylight to appropriate site surface drainage. Whitestone recommends that a two-foot wide zone of clean crushed stone or washed sand, separated from the backfill by a filter fabric, be constructed adjacent to the back of the wall. This zone should prevent the buildup of hydrostatic pressures and pressures from freezing moisture in the backfill. The vertical drain should be tied into the gravity drainage system (perforated pipe) installed at the base of the wall. Alternatively, temporary retaining walls may include weep holes instead of a drain tied to the site drainage system. If wall drainage is not provided, the wall should be designed to withstand full hydrostatic pressure.

Whitestone should be notified if any other retaining structures or design considerations requiring lateral earth pressure estimations are proposed. Specific recommendations for temporary retaining structures are beyond Whitestone's scope of work.

5.9 SEISMIC AND LIQUEFACTION CONSIDERATIONS

Based on a review of the subsurface conditions relevant to the *New York State International Building Code (2015)*, the subject site may be assigned a Site Class C. A Site Class designation of B may be likely, however, additional shear wave velocity testing would be required to confirm a higher site class. Based on the seismic zone and soil profile, liquefaction considerations are not expected to have a substantial impact on design.

5.10 EXCAVATIONS

Temporary excavations less than 20 feet in height should be performed and evaluated in accordance with 29 CFR Part 1926 (OSHA). Based on the results of this investigation, soil conditions and preliminarily estimated soil types are outlined in the table below. Actual conditions encountered during construction should be evaluated by a competent person (as defined by OSHA) to ensure that safe excavation methods and/or shoring and bracing requirements are implemented.

TEMPORARY EXCAVATION SLOPE RECOMMENDATIONS		
Material Type	**Soil Type**	**Maximum Allowable Slope[1]**
Existing Fill	Type C	1.5 (H) : 1.0 (V)
Dry to Moist, Natural Soil, Free of Water	Type B	1.0 (H) : 1.0 (V)
Dry to Moist, Weathered Rock/Bedrock, Free of Water	Stable Rock	Vertical

Note 1 - As required by OSHA, each soil and rock deposit shall be classified daily by a competent person as Stable Rock, Type A, Type B, or Type C in accordance with 29 CFR Part 1926.

The classification of the deposits shall be made based on the results of at least one visual and at least one manual analysis. Such analyses shall be conducted by a competent person. In a layered system, the system shall be classified in accordance with its weakest layer. However, each layer may be classified individually where a more stable layer lies under a less stable layer.

5.11 SUPPLEMENTAL POST INVESTIGATION SERVICES

Construction Phase Evaluation of Existing Fill Materials: Based on the conditions disclosed by the soil borings, Whitestone anticipates that the existing fill material will not be suitable for foundation support, however, may be suitable for floor slab and pavement support with some anticipated overexcavation due to the variable amounts of debris encountered, possible variability within existing fill materials, and with increased risk of future maintenance within proposed pavement areas where marginal unimproved existing fill remains. Whitestone also anticipates that the majority of the existing fill materials will be suitable for reuse as structural fill provided they are free of deleterious debris and implementation of moisture control operations are utilized. Reuse of the existing fill materials will be contingent on careful inspection in the field by the owner's geotechnical engineer by visual observation and/or test pit excavations during construction as recommended herein. Due to the inherent variability that exists within existing fill, Whitestone recommends confirming further the condition of the existing fill for structural support and/or re-use as structural fill by means of supplemental evaluation either prior to or during the early stages of construction, as discussed further herein, to identify areas requiring removal and possible uncontrolled conditions or deleterious materials not disclosed by the subsurface tests conducted during this exploration.

Construction Inspection and Monitoring: The owner's geotechnical engineer with specific knowledge of the subsurface conditions and design intent should perform inspection, testing, and consultation during construction as described in previous sections of this report. Monitoring and testing should also be performed to verify that the structures are properly demolished, any encountered underground structures are properly backfilled, the existing surface cover materials are properly removed, and suitable materials are used for controlled fill over properly placed and compacted suitable subgrade soils. The overexcavation of existing fill materials below proposed foundations and proofrolling of all subgrades prior to foundation, floor slab, and pavement support should be witnessed and documented by the owner's geotechnical engineer.

Vibrations and Pre-/Post-Construction Surveys: The subject site is situated within a developed area. The surrounding developments include adjacent site buildings and public roadways. Therefore, care should be maintained while commencing the rock removal operations associated with the redevelopment.

While the exact rock removal method is not known at this time, steady state vibrations which are typically generated by ripping tools, pneumatic hammers, blasting, etc. are transmitted to the varying distances from the point of impact. When performing the rock removal operations within the interior of a large site, the off-site effects of the ground vibrations are usually negligible. However, when performing the rock removal operations near the edges of the property in developed area such as the subject site and near the adjacent buildings, ground vibrations can be transmitted into the adjacent facilities and in some instances may cause annoyance or structural damage. Therefore, Whitestone recommends monitoring vibrations during construction especially during rock removal operations to ensure that vibrations don't effect or damage the adjacent structures.

Based on the U.S. Bureau of Mines studies, risk of structural damage is minimized if the peak velocities generated due to rock removal operation do not exceed 0.75 inches per second (in/sec) within the range of 10 HZ and 40 HZ for modern structures, 0.25 in/sec within 1 HZ and 10 HZ for historic buildings, and three in/sec within the range of 10 HZ and 100 HZ for buried utilities. Higher allowable peak velocities could be allowed, based on field testing and site specific subsurface conditions.

Whitestone also recommends pre-construction and post-construction surveys of the structures adjacent to the proposed development. These surveys should include documentation, photographs and/or videotapes of the existing conditions of the adjacent structures prior to construction activities at the subject site and a comparison to a post-construction survey should be performed to determine possible construction impacted settlements and/or damage to the adjacent structures. These surveys should be conducted to monitor the potential progression of building cracks and the existing pavement condition/distress.

5.12 STORMWATER MANAGEMENT AREA EVALUATION

General: Soil profile pits SPP-1 through SPP-7 were performed within accessible areas of the proposed SWM facility locations provided by Insite. The soil profile pits performed within the SWM area were terminated at depths of approximately one fbgs to 12.5 fbgs. Infiltration testing was not performed at this time per Insite due to the estimated seasonal high groundwater levels and/or limiting zones (weathered rock/bedrock) encountered.

Estimated Seasonal High Groundwater Levels: The methods used in determining the seasonal high groundwater level include evaluating the soil morphology within a test excavation and identifying irregular spots or blotches of different colors or minerals unlike that of the surrounding soil (mottles). A summary of the estimated seasonal high groundwater observations, where encountered, are included in the following table.

SWM AREA EVALUATION SUMMARY			
Profile Pit #	**Surface Elevation (feet above NAVD 88)**	**Estimated Seasonal High Groundwater**	
		Depth (fbgs)	**Elevation (feet above NAVD 88)**
SPP-1	± 190.0	6.5	183.5
SPP-2	± 189.0	Not Encountered	--
SPP-3	± 186.0	Not Encountered	--
SPP-4	± 180.0	Not Encountered	--
SPP-5	± 177.0	4.0	173.0
SPP-6	± 159.0	4.0	155.0
SPP-7	± 176.0	Not Encountered	--

SECTION 6.0
General Comments

Supplemental recommendations may be required upon finalization of construction plans or if significant changes are made in the characteristics or location of the proposed structure. Soil bearing conditions should be checked at the appropriate time for consistency with those conditions encountered during Whitestone's geotechnical investigation.

The recommendations presented herein should be utilized by a qualified engineer in preparing the project plans and specifications. The engineer should consider these recommendations as minimum physical standards which may be superseded by local and regional building codes and structural considerations. These recommendations are prepared for the sole use of Artis Senior Living of Tarrytown, LLC for the specific project detailed and should not be used by any third party. These recommendations are relevant to the design phase and should not be substituted for construction specifications.

The possibility exists that conditions between borings and soil profile pits may differ from those at specific test locations, and conditions may not be as anticipated by the designers or contractors. In addition, the construction process may alter soil and rock conditions. Therefore, experienced geotechnical personnel should observe and document the construction procedures used and the conditions encountered.

Whitestone assumes that a qualified contractor will be employed to perform the construction work, and that the contractor will be required to exercise care to ensure all excavations are performed in accordance with applicable regulations and good practice. Particular attention should be paid to avoiding damaging or undermining adjacent properties and maintaining slope stability. Whitestone recommends that the services of the geotechnical engineer be engaged to test and evaluate the soils in the footing excavations prior to concreting in order to determine that the soils will support the bearing capacities. Monitoring and testing also should be performed to verify that suitable materials are used for controlled fills and that they are properly placed and compacted over suitable subgrade soils.

The exploration and analysis of the foundation conditions reported herein are considered sufficient in detail and scope to form a reasonable basis for the foundation design. The recommendations submitted for the proposed construction are based on the available soil information and the design details furnished by Artis Senior Living of Tarrytown, LLC. Deviations from the noted subsurface conditions encountered during construction should be brought to the attention of the geotechnical engineer.

The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been promulgated after being prepared in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics, and engineering geology. No other warranties are implied or expressed.

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FIGURE 1
Test Location Plan

LEGEND

SPP-1	SOIL PROFILE PIT LOCATION (APPROX.)
B-1	BORING LOCATION (APPROX.)
[1.0'/2.5']	DEPTH TO TOP OF WEATHERED ROCK/REFUSAL
NE	NOT ENCOUNTERED
	SUBJECT PROPERTY BOUNDARY (APPROX.)

REFERENCE

THIS PLAN IS BASED ON A MARCH 7, 2018 SITE PLAN PREPARED BY INSITE ENGINEERING.

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants
35 TECHNOLOGY DRIVE, WARREN, NJ 07059
908.668.7777 WHITESTONEASSOC.COM

DRAWING TITLE: **TEST LOCATION PLAN**

CLIENT: **ARTIS SENIOR LIVING OF TARRYTOWN, LLC**

PROJECT: PROPOSED ASSISTED LIVING FACILITY
153-155 WHITE PLAINS ROAD
TARRYTOWN, WESTCHESTER COUNTY, NY

PROJECT #: GJ1815765.000	
DESIGNED BY: GR	PROJ. MGR.: MK
DATE: 11/13/18	FIGURE: 1
SCALE: 1" = 50'	

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APPENDIX A
Records of Subsurface Exploration

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-1

Page 1 of 1

Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC

Surface Elevation:	± 190.0 feet	**Date Started:**	9/26/2018		**Water Depth | Elevation (feet bgs) | (feet)**		**Cave-In Depth | Elevation (feet bgs) | (feet)**
Termination Depth:	7.8 feet bgs	**Date Completed:**	9/26/2018				
Proposed Location:	Building	**Logged By:**	AV	**During:**	NE | ---		
Drill / Test Method:	HSA / SPT	**Contractor:**	ETD	**At Completion:**	--- | ---	**At Completion:**	--- | ---
		Equipment:	Geoprobe	**24 Hours:**	--- | ---	**24 Hours:**	--- | ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
						0.5	TOPSOIL		6" Topsoil	
0 - 2	S-1		2 - 2 - 2 - 14	24	4		FILL		Tan-Brown Sandy Silt, Moist (FILL)	
						2.0				
2 - 4	S-2		39 - 28 - 37 - 33	20	65		WEATHERED ROCK		Tan-White-Gray Weathered Rock, Dry, Very Dense (WR)	
4 - 6	S-3		33 - 23 - 25 - 36	NR	48	5.0			No Recovery, Assumed As Above (WR)	
6 - 7.8	S-4		25 - 20 - 27 - 50/4"	10	47				As Above, Dry, Dense (WR)	
						7.8			Boring Log B-1 Terminated at a Depth of 7.8 Feet Below Ground Surface Due to Auger and Spoon Refusal	
						10.0				
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-2

Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC

				Water Depth | Elevation (feet bgs) | (feet)	Cave-In Depth | Elevation (feet bgs) | (feet)
Surface Elevation:	± 190.0 feet	**Date Started:**	9/26/2018		
Termination Depth:	10.5 feet bgs	**Date Completed:**	9/26/2018		
Proposed Location:	Building	**Logged By:**	AV	**During:** NE | ---	
Drill / Test Method:	HSA / SPT	**Contractor:**	ETD	**At Completion:** --- | ---	**At Completion:** --- | ---
		Equipment:	Geoprobe	**24 Hours:** --- | ---	**24 Hours:** --- | ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
						0.5	TOPSOIL		6" Topsoil	
0 - 2	S-1		4 - 4 - 4 - 5	2	8		FILL		Light Brown Silty Sand with Gravel, Moist (FILL)	
						2.0				
2 - 4	S-2		17 - 16 - 25 - 21	14	41		RESIDUAL		Brown-Gray Fine Silty Sand with Gravel-Sized Weathered Rock Fragments, Dry, Dense (SM)	
4 - 6	S-3		15 - 18 - 24 - 20	10	42	5.0			As Above (SM)	
6 - 8	S-4		24 - 20 - 23 - 31	12	43				As Above (SM)	
8 - 10	S-5		10 - 12 - 14 - 25	18	26				As Above, Medium Dense (SM)	
						10.0				
10 - 10.1	S-6		50/1"	1	50/1"	10.5	WR		Weathered Rock (WR)	Rock in Tip Jammed
									Boring Log B-2 Terminated at a Depth of 10.5 Feet Below Ground Surface Due to Auger Refusal	
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-3

Page 1 of 1

Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC

				Water Depth | Elevation (feet bgs) | (feet)	Cave-In Depth | Elevation (feet bgs) | (feet)
Surface Elevation:	± 192.0 feet	**Date Started:**	9/26/2018		
Termination Depth:	11.5 feet bgs	**Date Completed:**	9/26/2018		
Proposed Location:	Building	**Logged By:**	AV	**During:** NE | ---	
Drill / Test Method:	HSA / SPT	**Contractor:**	ETD	**At Completion:** --- | ---	**At Completion:** --- | ---
		Equipment:	Geoprobe	**24 Hours:** --- | ---	**24 Hours:** --- | ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
						0.5	TOPSOIL		6" Topsoil	
0 - 2	S-1	X	8 - 5 - 2 - 5	18	7		FILL		Brown-Tan Silty Sand, Moist (FILL)	
						2.5			As Above (FILL)	
2 - 4	S-2	X	3 - 3 - 15 - 16	14	18		RESIDUAL		Brown-Gray Poorly Graded Sand with Gravel-Sized Weathered Rock Fragments, Moist, Medium Dense (SP)	
4 - 5.3	S-3	X	10 - 45 - 50/4"	10	95/10"	5.0			As Above, Very Dense (SP)	
6 - 8	S-4	X	6 - 10 - 8 - 8	18	18				Tan-Gray Silty Sand with Gravel, Moist, Medium Dense (SM)	
						8.5			As Above, Very Dense (SM)	
8 - 10	S-5	X	8 - 26 - 42 - 32	8	68		WEATHERED ROCK		Brown-Gray Weathered Rock, Moist, Very Dense (WR)	
						10.0				
						11.5				
									Boring Log B-3 Terminated at a Depth of 11.5 Feet Below Ground Surface Due to Auger Refusal; See Offset B-3A	
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-3A

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Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC
Surface Elevation:	± 192.0 feet	**Date Started:**	10/3/2018
Termination Depth:	20.0 feet bgs	**Date Completed:**	10/3/2018
Proposed Location:	Building	**Logged By:**	AV
Drill / Test Method:	MUD ROTARY / ROCK CORE	**Contractor:**	ETD
		Equipment:	Geoprobe

Water Depth | Elevation (feet bgs) | (feet)		Cave-In Depth | Elevation (feet bgs) | (feet)	
During:	NE | ---		
At Completion:	--- | ---	**At Completion:**	--- | ---
24 Hours:	--- | ---	**24 Hours:**	--- | ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
Augered to 15.0 fbgs						0.0				
						0.5	TOPSOIL		6" Topsoil	
							FILL		Brown Silty Sand, Moist (FILL)	
						2.5	RESIDUAL		Brown-Gray Poorly Graded Sand with Gravel-Sized Weathered Rock Fragments, Moist, Medium Dense (SP)	
						5.0				
									Tan-Gray Silty Sand with Gravel, Moist (SM)	
						10.0				
						11.5	WEATHERED ROCK		Brown-Gray Weathered Rock, Moist (Assumed WR)	Very Slow Rollert Bit Advancement @ 11.5 fbgs to 15.0 fbgs with Grinding
	Total Elapsed Cut Time/Cut Time Per Ft.			REC	RQD	15.0				
			6.5 / 6.5			16.0	ROCK		Dark Gray, Soft, Highly Weathered, Very Broken Gneiss	Steady, Moderate Core Barrel Advancement with Full Water Return @ 15.0 fbgs to 20.0 fbgs
			6.5 / 13.0						Light to Dark Gray, Hard, Slightly Broken to Massive, Slightly Weathered to Fresh Gneiss	
15 - 20	R1	NQ	5.75 / 18.75	52" 87%	42" 70%					
			4.75 / 23.5							
			8.0 / 31.5			20.0				
									Boring Log B-3A Terminated at a Depth of 20.0 Feet Below Ground Surface	
						25.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-4

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Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC

				Water Depth | Elevation (feet bgs) | (feet)	Cave-In Depth | Elevation (feet bgs) | (feet)
Surface Elevation:	± 188.0 feet	**Date Started:**	9/26/2018		
Termination Depth:	3.0 feet bgs	**Date Completed:**	9/26/2018		
Proposed Location:	Building	**Logged By:**	AV	**During:** NE | ---	
Drill / Test Method:	HSA / SPT	**Contractor:**	ETD	**At Completion:** --- | ---	**At Completion:** --- | ---
		Equipment:	Geoprobe	**24 Hours:** --- | ---	**24 Hours:** --- | ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
0 - 2	S-1		7 - 8 - 7 - 50/4"	3	15	0.5	PAVEMENT		6" Asphalt, No Apparent Subbase	
							RESIDUAL		Orange Brown Sandy Silt with Gravel, Moist (ML)	
						2.0				
2 - 2.3	S-2		50/4"	NR	50/4"		WEATHERED ROCK		No Recovery, Rock in Tip Brown, Assumed (WR)	
						3.0				
									Boring Log B-4 Terminated at a Depth of 3.0 Feet Below Ground Surface Due to Auger Refusal; Two Offsets, Same Result with Refusal @ 2.5 fbgs to 3.0 fbgs	
						5.0				
						10.0				
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-5

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Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC

				Water Depth | Elevation (feet bgs) | (feet)	Cave-In Depth | Elevation (feet bgs) | (feet)
Surface Elevation:	± 192.0 feet	**Date Started:**	9/26/2018		
Termination Depth:	6.3 feet bgs	**Date Completed:**	9/26/2018		
Proposed Location:	Building	**Logged By:**	AV	**During:** NE | ---	
Drill / Test Method:	HSA / SPT	**Contractor:**	ETD	**At Completion:** --- | ---	**At Completion:** --- | ---
		Equipment:	Geoprobe	**24 Hours:** --- | ---	**24 Hours:** --- | ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
						0.5	TOPSOIL		6" Topsoil	
0 - 2	S-1		11 - 9 - 7 - 2	8	16		RESIDUAL		Light Brown Sandy Silt, Stiff, Moist (ML)	Qu = 1.0 tsf
2 - 4	S-2		1 - 1 - 2 - 4	10	3				As Above with Gravel, Moist, Soft (ML)	Qu = 0.25 tsf
						4.5				
4 - 6	S-3		10 - 18 - 15 - 19	9	33	5.0			Tan-Brown to Gray Silty Sand with Gravel, Dry, Dense (SM)	
						6.0	WR		Weathered Rock (WR)	
6 - 6.3	S-4		50/4"	1	50/4"	6.3			Boring Log B-5 Terminated at a Depth of 6.3 Feet Below Ground Surface Due to Auger and Spoon Refusal; See Offset B-5A	
						10.0				
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-5A

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Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC
Surface Elevation:	± 190.0 feet	**Date Started:**	10/3/2018
Termination Depth:	19.0 feet bgs	**Date Completed:**	10/3/2018
Proposed Location:	Building	**Logged By:**	AV
Drill / Test Method:	MUD ROTARY / ROCK CORE	**Contractor:**	ETD
		Equipment:	Geoprobe

Water Depth | Elevation (feet bgs) | (feet)		Cave-In Depth | Elevation (feet bgs) | (feet)	
During:	NE | ---		
At Completion:	--- | ---	**At Completion:**	--- | ---
24 Hours:	--- | ---	**24 Hours:**	--- | ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
Augered to 14.0 fbgs						0.0				
						0.5	TOPSOIL		6" Topsoil	
							RESIDUAL		Light Brown Sandy Silt, Moist (ML)	
						4.5				
						5.0			Tan-Brown to Gray Gravelly Silty Sand, Dry (SM)	
							WEATHERED ROCK		Assumed Weathered Rock	
						10.0				
						13.0				
	Total Elapsed Cut Time/Cut Time Per Ft.			REC	RQD					
			6.5 / 6.5			15.0	ROCK			
			7.0 / 13.5							
14 - 19	R1	NQ	7.5 / 21.0	55" 92%	55" 92%				Light to Dark Gray, Hard, Slightly Broken to Massive, Fresh to Lightly Weathered Gneiss	
			7.5 / 28.5							
			8.0 / 36.5			19.0				
						20.0			Boring Log B-5A Terminated at a Depth of 19.0 Feet Below Ground Surface	
						25.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-6

Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC

				Water Depth | Elevation (feet bgs) | (feet)	Cave-In Depth | Elevation (feet bgs) | (feet)
Surface Elevation:	± 188.0 feet	**Date Started:**	9/26/2018		
Termination Depth:	7.8 feet bgs	**Date Completed:**	9/26/2018		
Proposed Location:	Building	**Logged By:**	AV	**During:** NE | ---	
Drill / Test Method:	HSA / SPT	**Contractor:**	ETD	**At Completion:** --- | ---	**At Completion:** --- | ---
		Equipment:	Geoprobe	**24 Hours:** --- | ---	**24 Hours:** --- | ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
0 - 2	S-1		4 - 3 - 8 - 6	10	11		FILL		Gray-Brown Poorly Graded Gravel with Sand, Moist (FILL)	
2 - 4	S-2		2 - 2 - 2 - 2	12	4				Tan-Brown Silty Fine Sand with Gravel, Dry, Trace Debris (FILL)	Debris: Concrete
4 - 6	S-3		12 - 7 - 3 - 4	6	10	5.0	RESIDUAL		Brown-Gray Silty Sand with Gravel, Dry, Medium Dense (SM)	
6 - 7.8	S-4		2 - 3 - 6 - 50/3"	2	9				Low Recovery, Assumed As Above (SM)	
						7.5	WR		Weathered Rock (WR)	
						7.8			Boring Log B-6 Terminated at a Depth of 7.8 Feet Below Ground Surface Due to Auger and Spoon Refusal	
						10.0				
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-7

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Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC

Surface Elevation:	± 178.0 feet	**Date Started:**	9/27/2018		**Water Depth | Elevation (feet bgs) | (feet)**		**Cave-In Depth | Elevation (feet bgs) | (feet)**
Termination Depth:	2.5 feet bgs	**Date Completed:**	9/27/2018				
Proposed Location:	Retaining Wall	**Logged By:**	AV	**During:**	NE | ---		
Drill / Test Method:	HSA / SPT	**Contractor:**	ETD	**At Completion:**	--- | ---	**At Completion:**	--- | ---
		Equipment:	Geoprobe	**24 Hours:**	--- | ---	**24 Hours:**	--- | ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
0 - 1.3	S-1	X	1 - 1 - 50/4"	2	50/10"	1.0	TOPSOIL		12" Mulch / Topsoil	
							WEATHERED ROCK		Low Recovery, Rocks in Tip Jarred Along with Topsoil, Very Dense, Moist (WR)	
2 - 2.3	S-2	X	50/4"	NR	50/4"	2.5			No Recovery, Assumed As Above (WR)	
									Boring Log B-7 Terminated at a Depth of 2.5 Feet Below Ground Surface Due to Auger Refusal; See Offset B-7A	
						5.0				
						10.0				
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-7A

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Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC

				Water Depth | Elevation (feet bgs) | (feet)	Cave-In Depth | Elevation (feet bgs) | (feet)
Surface Elevation:	± 176.0 feet	**Date Started:**	9/27/2018		
Termination Depth:	5.0 feet bgs	**Date Completed:**	9/27/2018		
Proposed Location:	Retaining Wall	**Logged By:**	AV	**During:** NE | ---	
Drill / Test Method:	HSA / SPT	**Contractor:**	ETD	**At Completion:** --- | ---	**At Completion:** --- | ---
		Equipment:	Geoprobe	**24 Hours:** --- | ---	**24 Hours:** --- | ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
Augered to 4.0 fbgs						0.0				
						1.0	TOPSOIL		12" Mulch Chips / Topsoil	
							WEATHERED ROCK			
						4.0				
4 - 4.3	S-1	X	50/4"	2	50/4"				Gray/White Rock with Tan-Brown Silty Sand, Moist, Very Dense (WR)	
						5.0				
									Boring Log B-7A Terminated at a Depth of 5.0 Feet Below Ground Surface Due to Auger Refusal	
						10.0				
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-8

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Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC

				Water Depth | Elevation (feet bgs) | (feet)	Cave-In Depth | Elevation (feet bgs) | (feet)
Surface Elevation:	± 184.0 feet	**Date Started:**	9/27/2018		
Termination Depth:	13.5 feet bgs	**Date Completed:**	9/27/2018		
Proposed Location:	Building	**Logged By:**	AV	**During:** NE | ---	
Drill / Test Method:	HSA / SPT	**Contractor:**	ETD	**At Completion:** --- | ---	**At Completion:** --- | ---
		Equipment:	Geoprobe	**24 Hours:** --- | ---	**24 Hours:** --- | ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
0 - 2	S-1		1/12" - 1/12"	5	1	1.0	TOPSOIL		12" Wood Chips / Topsoil	
							RESIDUAL		Light to Dark Brown Silt with Sand, Trace Roots, Moist, Soft (ML)	
2 - 4	S-2		1 - 1 - 1 - 1	3	2				As Above (ML)	
						4.0				
4 - 6	S-3		1 - 2 - 1 - 2	20	3	5.0			Tan-Brown/Gray Sandy Silt, Moist (ML)	
6 - 8	S-4		2 - 3 - 2 - 2	18	5				As Above, Reddish-Brown (ML)	
8 - 10	S-5		1 - 2 - 5 - 14	24	7				As Above (ML)	
						10.0	WEATHERED ROCK			Probable Weathered Rock @ 10.0 fbgs Due to Auger Grinding
13 - 13.2	S-6		50/2"	NR	50/2"	13.5			No Recovery, Rock in Spoon Jarred, Assumed (WR)	
						15.0			Boring Log B-8 Terminated at a Depth of 13.5 Feet Below Ground Surface Due to Auger Refusal	
						20.0				
						25.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-9

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Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC

				Water Depth | Elevation (feet bgs) | (feet)	Cave-In Depth | Elevation (feet bgs) | (feet)
Surface Elevation:	± 185.0 feet	**Date Started:**	9/27/2018		
Termination Depth:	10.5 feet bgs	**Date Completed:**	9/27/2018		
Proposed Location:	Building	**Logged By:**	AV	**During:** NE | ---	
Drill / Test Method:	HSA / SPT	**Contractor:**	ETD	**At Completion:** --- | ---	**At Completion:** --- | ---
		Equipment:	Geoprobe	**24 Hours:** --- | ---	**24 Hours:** --- | ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
0 - 2	S-1		1/12" - 1/12"	16	1	1.0	TOPSOIL		12" Topsoil and Roots	
2 - 4	S-2		2 - 3 - 5 - 7	10	8		RESIDUAL		Light Brown Silty Fine Sand with Roots, Moist, Very Loose (SM)	
4 - 5.4	S-3		20 - 25 - 50/5"	11	75/11"	5.0			As Above, with Gravel, Loose (SM)	
6 - 8	S-4		23 - 19 - 18 - 15	18	37				Brown to Gray Silty Fine Sand with Gravel, Moist, Very Dense (SM)	
8 - 9.8	S-5		15 - 11 - 10 - 50/4"	3	21	9.5			As Above, Dense (SM)	
						10.0			As Above, Moist, Medium Dense (SM)	
						10.5	WEATHERED ROCK		Weathered Rock (WR)	
						15.0			Boring Log B-9 Terminated at a Depth of 10.5 Feet Below Ground Surface Due to Auger Refusal	
						20.0				
						25.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-10

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Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC

Surface Elevation:	± 170.0 feet	**Date Started:**	9/27/2018		**Water Depth (feet bgs) | Elevation (feet)**		**Cave-In Depth (feet bgs) | Elevation (feet)**
Termination Depth:	16.0 feet bgs	**Date Completed:**	9/27/2018				
Proposed Location:	Retaining Wall	**Logged By:**	AV	**During:**	13.5 | 156.5		
Drill / Test Method:	HSA / SPT	**Contractor:**	ETD	**At Completion:**	9.0 | 161.0	**At Completion:**	10.0 | 160.0
		Equipment:	Geoprobe	**24 Hours:**	--- | ---	**24 Hours:**	--- | ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
							TOPSOIL		10" Topsoil	
0 - 2	S-1		W O H - 1 - 1 - 1	8	2	0.8	RESIDUAL		Light Brown Sandy Silt with Roots, Moist, Soft (ML)	
2 - 4	S-2		1 - 1 - 2 - 4	14	3	2.0			Tan-Brown Silty Fine Sand with Roots, Moist, Very Loose (SM)	
4 - 6	S-3		7 - 12 - 11 - 10	18	23	5.0			As Above, with Gravel, Moist, Medium Dense (SM)	
6 - 8	S-4		11 - 14 - 16 - 16	18	30				As Above, Dense (SM)	
8 - 10	S-5		11 - 15 - 16 - 17	24	31				As Above (SM)	
						10.0				
13 - 15	S-6		21 - 14 - 12 - 14	10	26	15.0			As Above, Moist to Wet, Medium Dense (SM)	
									Boring Log B-10 Terminated at a Depth of 16.0 Feet Below Ground Surface Due to Auger Refusal	
						20.0				
						25.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-11

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Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC

				Water Depth | Elevation (feet bgs) | (feet)	Cave-In Depth | Elevation (feet bgs) | (feet)
Surface Elevation:	± 165.0 feet	**Date Started:**	9/27/2018		
Termination Depth:	8.0 feet bgs	**Date Completed:**	9/27/2018		
Proposed Location:	Retaining Wall	**Logged By:**	AV	**During:** NE | ---	
Drill / Test Method:	HSA / SPT	**Contractor:**	ETD	**At Completion:** --- | ---	**At Completion:** --- | ---
		Equipment:	Geoprobe	**24 Hours:** --- | ---	**24 Hours:** --- | ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
0 - 2	S-1		1/12" - 1 - 1	8	1.5	1.0	TOPSOIL		12" Topsoil	
							RESIDUAL		Light Brown Fine Sandy Silt, Moist, Loose (ML)	
2 - 4	S-2		1 - 2 - 6 - 7	14	8	3.0			As Above, with Gravel (ML)	
									Light Brown Silty Fine Sand with Fine Roots and Gravel, Moist, Loose (SM)	
4 - 6	S-3		11 - 16 - 10 - 13	18	26	5.0			As Above, Medium Dense (SM)	
6 - 7.8	S-4		15 - 13 - 15 - 50/3"	18	28	7.5			As Above (SM)	
						8.0	WR		Weathered Rock (WR)	
									Boring Log B-11 Terminated at a Depth of 8.0 Feet Below Ground Surface Due to Auger Refusal	
						10.0				
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-12

Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC
Surface Elevation:	± 170.0 feet	**Date Started:**	9/27/2018
Termination Depth:	6.3 feet bgs	**Date Completed:**	9/27/2018
Proposed Location:	Building	**Logged By:**	AV
Drill / Test Method:	HSA / SPT	**Contractor:**	ETD
		Equipment:	Geoprobe

Water Depth | Elevation (feet bgs) | (feet)			Cave-In Depth | Elevation (feet bgs) | (feet)	
During:	NE	---		
At Completion:	---	---	**At Completion:**	--- | ---
24 Hours:	---	---	**24 Hours:**	--- | ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
0 - 2	S-1		1/12" - 1/12"	14	1	1.0	TOPSOIL		24" Mulch	
						2.0				
2 - 4	S-2		1 - 2 - 7 - 8	12	9		RESIDUAL		Light Brown Sandy Silt, Moist, Stiff (ML)	
4 - 6	S-3		4 - 4 - 10 - 14	6	14	5.0			Light Brown Silty Fine Sand with Gravel, Moist, Loose (SM) As Above, Medium Dense (SM)	
						6.0	WR		Weathered Rock (WR)	
6 - 6.3	S-4		50/4"	1	50/4"	6.3			Boring Log B-12 Terminated at a Depth of 6.3 Feet Below Ground Surface Due to Spoon and Auger Refusal	
						10.0				
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-13

Page 1 of 1

Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC

				Water Depth | Elevation (feet bgs) | (feet)	Cave-In Depth | Elevation (feet bgs) | (feet)
Surface Elevation:	± 158.0 feet	**Date Started:**	9/27/2018		
Termination Depth:	10.0 feet bgs	**Date Completed:**	9/27/2018		
Proposed Location:	Retaining Wall	**Logged By:**	AV	**During:** NE | ---	
Drill / Test Method:	HSA / SPT	**Contractor:**	ETD	**At Completion:** --- | ---	**At Completion:** --- | ---
		Equipment:	Geoprobe	**24 Hours:** --- | ---	**24 Hours:** --- | ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
0 - 2	S-1		1/24"	18	1/24"	1.0	TOPSOIL		12" Topsoil	
2 - 4	S-2		2 - 3 - 5 - 8	10	8		RESIDUAL		Light Brown Silt with Sand, Trace Roots, Moist, Soft (ML)	
4 - 6	S-3		6 - 8 - 7 - 9	24	15	5.0			As Above, Stiff (ML)	
6 - 8	S-4		6 - 14 - 14 - 14	20	28	6.5			As Above (ML)	Qu = 1.0 tsf
8 - 9.8	S-5		15 - 26 - 32 - 50/4"	10	58	9.5			Gray-Brown Silty Sand with Gravel, Dry, Medium Dense (SM)	
						10.0	WR		As Above, Very Dense (SM)	
						15.0			Weathered Rock (WR)	
						20.0			Boring Log B-13 Terminated at a Depth of 10.0 Feet Below Ground Surface Due to Auger Refusal	
						25.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: SPP-1

Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC

Surface Elevation:	± 190.0 feet	**Date Started:**	9/26/2018		**Water Depth (feet bgs)**	**Elevation (feet)**	**Est. Seasonal High GW (feet bgs) / Elevation (feet)**
Termination Depth:	12.5 feet bgs	**Date Completed:**	9/26/2018				
Proposed Location:	SWM Area	**Logged By:**	AV	**During:**	NE	---	
Excavating Method:	Test Pit Excavation	**Contractor:**	Carroccia	**At Completion:**	---	---	**At Completion:** 6.5 / 183.5
Test Method:	Visual Observation	**Rig Type:**	Deere 60G	**24 Hours:**	---	---	

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				TOPSOIL		12" Topsoil	
			1.0				
				FILL		Granular Fill; Large Slabs of Concrete; Granular Structure; Many, Medium Roots; Wavy Gradual Boundary (FILL)	
			4.5				
				SANDY LOAM		Reddish-Yellow (7.5YR 6/6) SANDY LOAM; 10% Gravel; Slightly Moist; Medium, Fine to Crumb to Granular Structure; No Roots; Wavy Gradual Boundary	
			5.0				
						Mottling @ 6.5 fbgs (6" to 8" Thick)	
			7.5				
						As Above; 5% Boulder, 10% Gravel, 10% Cobbles	
			9.5				
				LOAMY SAND		Strong Brown (7.5YR 5/6) LOAMY SAND; 15% Cobbles, 5% Boulders, 5% Gravel; Slightly Moist; Medium Structure; No Roots	
			10.0				
			12.0				
				WEATHERED ROCK		As Above, Weathered Rock (WR)	
			12.5				
						Soil Profile Pit Log SPP-1 Terminated at a Depth of 12.5 Feet Below Ground Surface Due to Machine Refusal on Apparent Bedrock	
			15.0				

NOTES: bgs = below ground surface, DNC = Did Not Cave, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: SPP-2

Page 1 of 1

Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC

Surface Elevation:	± 189.0 feet	**Date Started:**	9/26/2018		**Water Depth (feet bgs)**	**Elevation (feet)**	**Est. Seasonal High GW (feet bgs) / Elevation (feet)**
Termination Depth:	11.0 feet bgs	**Date Completed:**	9/26/2018				
Proposed Location:	SWM Area	**Logged By:**	AV	**During:**	NE	---	
Excavating Method:	Test Pit Excavation	**Contractor:**	Carroccia	**At Completion:**	---	---	**At Completion:** NE / ---
Test Method:	Visual Observation	**Rig Type:**	Deere 60G	**24 Hours:**	---	---	

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				TOPSOIL		12" Topsoil	
			1.0				
				FILL		Dark Olive Gray (5Y 3/2) Granular Fill; Blocky to Granular Structure; Few Moderate Roots; Brick Debris, Wood Debris; 5% Gravel, 10% Cobbles; Slightly Hard (FILL)	
			5.0				
			6.0				
				LOAMY SAND		Reddish-Yellow (7.5YR 6/6) LOAMY SAND; 5% Gravel; Slightly Moist; Moderate, Fine, Crumb to Granular Structure; Friable; Slightly Hard, No Roots, No Mottling	
			9.0				
				WEATHERED ROCK		Weathered Rock (WR)	
			10.0				
			11.0				
						Soil Profile Pit Log SPP-2 Terminated at a Depth of 11.0 Feet Below Ground Surface Due to Machine Refusal on Apparent Bedrock	
			15.0				

NOTES: bgs = below ground surface, DNC = Did Not Cave, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: SPP-3

Page 1 of 1

Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC

Surface Elevation:	± 186.0 feet	**Date Started:**	9/26/2018		**Water Depth (feet bgs)**	**Elevation (feet)**	**Est. Seasonal High GW (feet bgs)** / **Elevation (feet)**
Termination Depth:	1.0 feet bgs	**Date Completed:**	9/26/2018				
Proposed Location:	SWM Area	**Logged By:**	AV	**During:**	NE	---	
Excavating Method:	Test Pit Excavation	**Contractor:**	Carroccia	**At Completion:**	---	---	**At Completion:** NE / ---
Test Method:	Visual Observation	**Rig Type:**	Deere 60G	**24 Hours:**	---	---	

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				TOPSOIL		12" Topsoil	
			1.0				
				BEDROCK		Soil Profile Pit Log SPP-3 Terminated at a Depth of 1.0 Feet Below Ground Surface Due to Machine Refusal on Apparent Bedrock	
			5.0				
			10.0				
			15.0				

NOTES: bgs = below ground surface, DNC = Did Not Cave, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: SPP-4

Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC

Surface Elevation:	± 180.0 feet	**Date Started:**	9/26/2018		**Water Depth (feet bgs) | Elevation (feet)**	**Est. Seasonal High GW (feet bgs) | Elevation (feet)**	
Termination Depth:	6 - 7.5 feet bgs	**Date Completed:**	9/26/2018				
Proposed Location:	SWM Area	**Logged By:**	AV	**During:**	NE | ---		
Excavating Method:	Test Pit Excavation	**Contractor:**	Carroccia	**At Completion:**	--- | ---	**At Completion:**	NE | ---
Test Method:	Visual Observation	**Rig Type:**	Deere 60G	**24 Hours:**	--- | ---		

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				TOPSOIL		18" Topsoil and Thick Roots	
			1.5				
				FILL		Yellowish-Brown (7.5YR 4/4) LOAMY SAND FILL with Construction Debris Throughout; 5% Gravel, 5% Cobbles; Slightly Moist; Medium to Fine, Granular to Crumb Structure; Friable; Soft; Many Medium Roots	
			5.0				
			6.0				
				BEDROCK		Bedrock Varies 6.0 fbgs to 7.5 fbgs	
			7.5				
						Soil Profile Pit Log SPP-4 Terminated at Depths Ranging from 6.0 to 7.5 Feet Below Ground Surface Due to Machine Refusal on Apparent Bedrock	
			10.0				
			15.0				

NOTES: bgs = below ground surface, DNC = Did Not Cave, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: SPP-5

Page 1 of 1

Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC

				Water Depth (feet bgs)	Elevation (feet)	Est. Seasonal High GW (feet bgs)	Elevation (feet)
Surface Elevation:	± 177.0 feet	**Date Started:**	9/26/2018				
Termination Depth:	6.3 - 7.5 feet bgs	**Date Completed:**	9/26/2018				
Proposed Location:	SWM Area	**Logged By:**	AV	**During:**	NE / ---		
Excavating Method:	Test Pit Excavation	**Contractor:**	Carroccia	**At Completion:**	--- / ---	**At Completion:**	4.0 / 173.0
Test Method:	Visual Observation	**Rig Type:**	Deere 60G	**24 Hours:**	--- / ---		

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				TOPSOIL		12" Topsoil	
			1.0				
				SAND		Dark Yellowish-Brown (10YR 4/5) SAND; 5% Gravel; Slightly Moist; Moderate, Fine Granular to Crumb Structure; Friable; Few Fine Roots; Fine; Gradual Clear Boundary	
			4.0				Mottling @ 4.0 fbgs
				SILTY LOAM		Gray SILTY LOAM; Moist; Mottled	
			4.5				
				SAND		Dark Yellowish-Brown (10YR 4/5) SAND; 10% Boulders, 5% Cobbles; Slightly Moist; Moderate, Fine Granular to Crumb Structure; Friable`	
			6.3				
				BEDROCK		Bedrock Ledge @ 76"	
						Soil Profile Pit Log SPP-5 Terminated at Depths Ranging from 6.3 to 7.5 Feet Below Ground Surface Due to Machine Refusal on Apparent Bedrock	
			10.0				
			15.0				

NOTES: bgs = below ground surface, DNC = Did Not Cave, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: SPP-6

Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC

Surface Elevation:	± 159.0 feet	**Date Started:**	9/26/2018		**Water Depth (feet bgs)**	**Elevation (feet)**	**Est. Seasonal High GW (feet bgs) / Elevation (feet)**
Termination Depth:	7.0 feet bgs	**Date Completed:**	9/26/2018				
Proposed Location:	SWM Area	**Logged By:**	AV	**During:**	NE	---	
Excavating Method:	Test Pit Excavation	**Contractor:**	Carroccia	**At Completion:**	---	---	**At Completion:** 4.0 / 155.0
Test Method:	Visual Observation	**Rig Type:**	Deere 60G	**24 Hours:**	---	---	

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				TOPSOIL		8" Topsoil	
			0.7	SILTY LOAM		Reddish-Yellow (7.5YR 6/8) SILTY LOAM; 5% Gravel; Crumb Structure; Friable; Few, Fine to Medium Roots; Common; Clear Gradual Boundary	
			4.0	SILTY LOAM		Strong Brown (7.5YR 5/8) SILTY LOAM; Mottling	
			4.5			Strong Brown (7.5YR 5/8) SILTY LOAM; 5% Boulders, 5% Gravel, 5% Cobbles; Crumb Structure; Friable; Slightly Hard; No Roots; No Mottling	
			5.0				
			7.0			Soil Profile Pit Log SPP-6 Terminated at a Depth of 7.0 Feet Below Ground Surface Due to Machine Refusal on Apparent Bedrock	
			10.0				
			15.0				

NOTES: bgs = below ground surface, DNC = Did Not Cave, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: SPP-7

Page 1 of 1

Project:	Proposed Assisted Living Facility	**WAI Project No.:**	GJ1815765.000
Location:	153 - 155 White Plains Road; Village of Tarrytown, Westchester County, NY	**Client:**	Artis Senior Living of Tarrytown, LLC

Surface Elevation:	± 176.0 feet	**Date Started:**	9/26/2018		**Water Depth (feet bgs)** | **Elevation (feet)**		**Est. Seasonal High GW (feet bgs)** | **Elevation (feet)**
Termination Depth:	2.0 - 3.0 feet bgs	**Date Completed:**	9/26/2018				
Proposed Location:	SWM Area	**Logged By:**	AV	**During:**	NE | ---		
Excavating Method:	Test Pit Excavation	**Contractor:**	Carroccia	**At Completion:**	--- | ---	**At Completion:**	NE | ---
Test Method:	Visual Observation	**Rig Type:**	Deere 60G	**24 Hours:**	--- | ---		

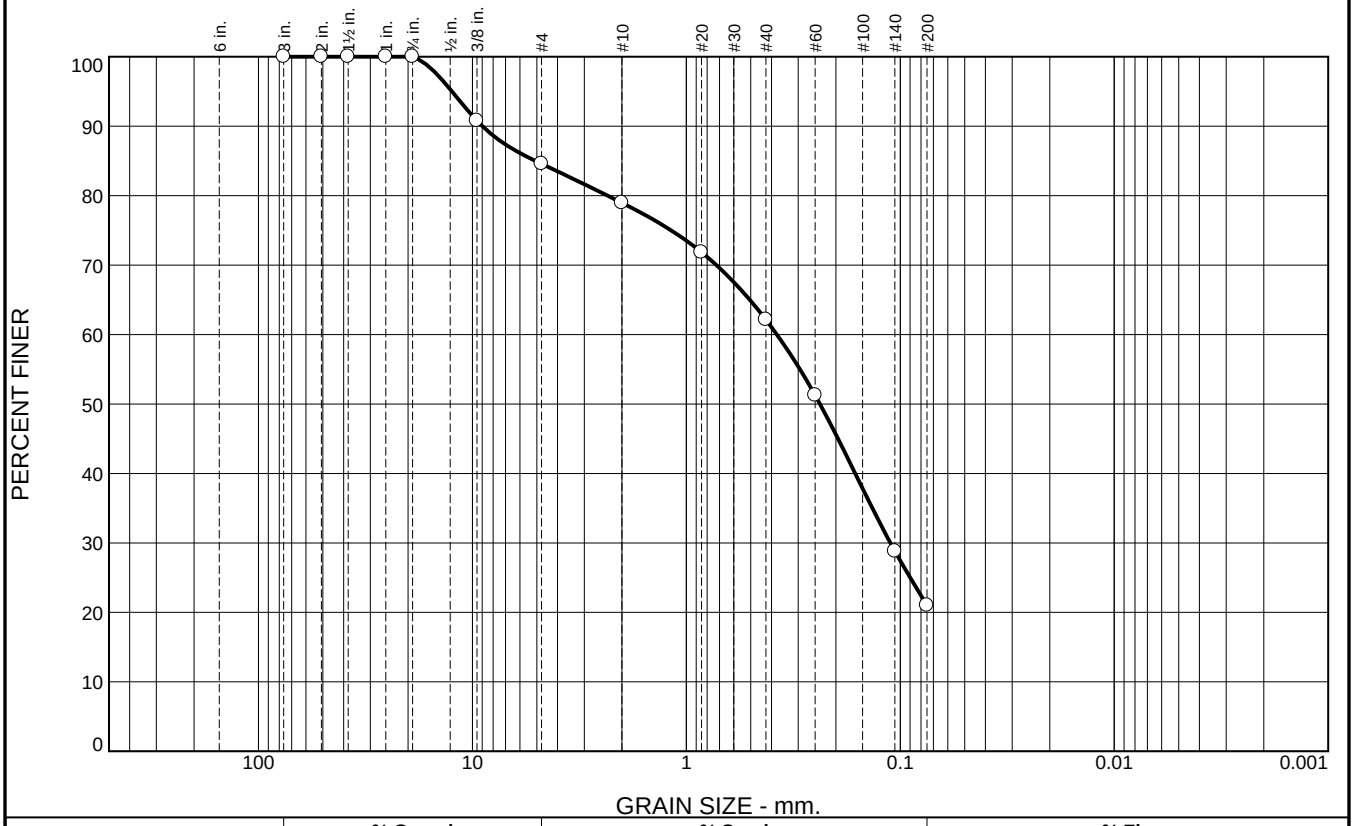
SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				TOPSOIL		12" Topsoil	
			1.0				
				SANDY LOAM		Tan-Brown, Reddish-Yellow (7.5YR 6/6) SANDY LOAM; 5% Cobbles; Slightly Moist; Medium, Fine Crumb Structure; Friable; Many Fine Roots	
			2.0				
				BEDROCK		Bedrock Varies from 2.0 to 3.0 fbgs	
			3.0				
						Soil Profile Pit Log SPP-7 Terminated at Depths Ranging from 2.0 to 3.0 Feet Below Ground Surface Due to Machine Refusal on Apparent Bedrock	
			5.0				
			10.0				
			15.0				

NOTES: bgs = below ground surface, DNC = Did Not Cave, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

APPENDIX B
Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	15.4	5.6	16.9	41.1	21.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	90.8		
#4	84.6		
#10	79.0		
#20	71.9		
#40	62.1		
#60	51.2		
#140	28.8		
#200	21.0		

* (no specification provided)

Material Description

Silty Sand with Gravel

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 8.9866 D_{85}= 5.0750 D_{60}= 0.3774
D_{50}= 0.2375 D_{30}= 0.1113 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

W_n = 6.0%

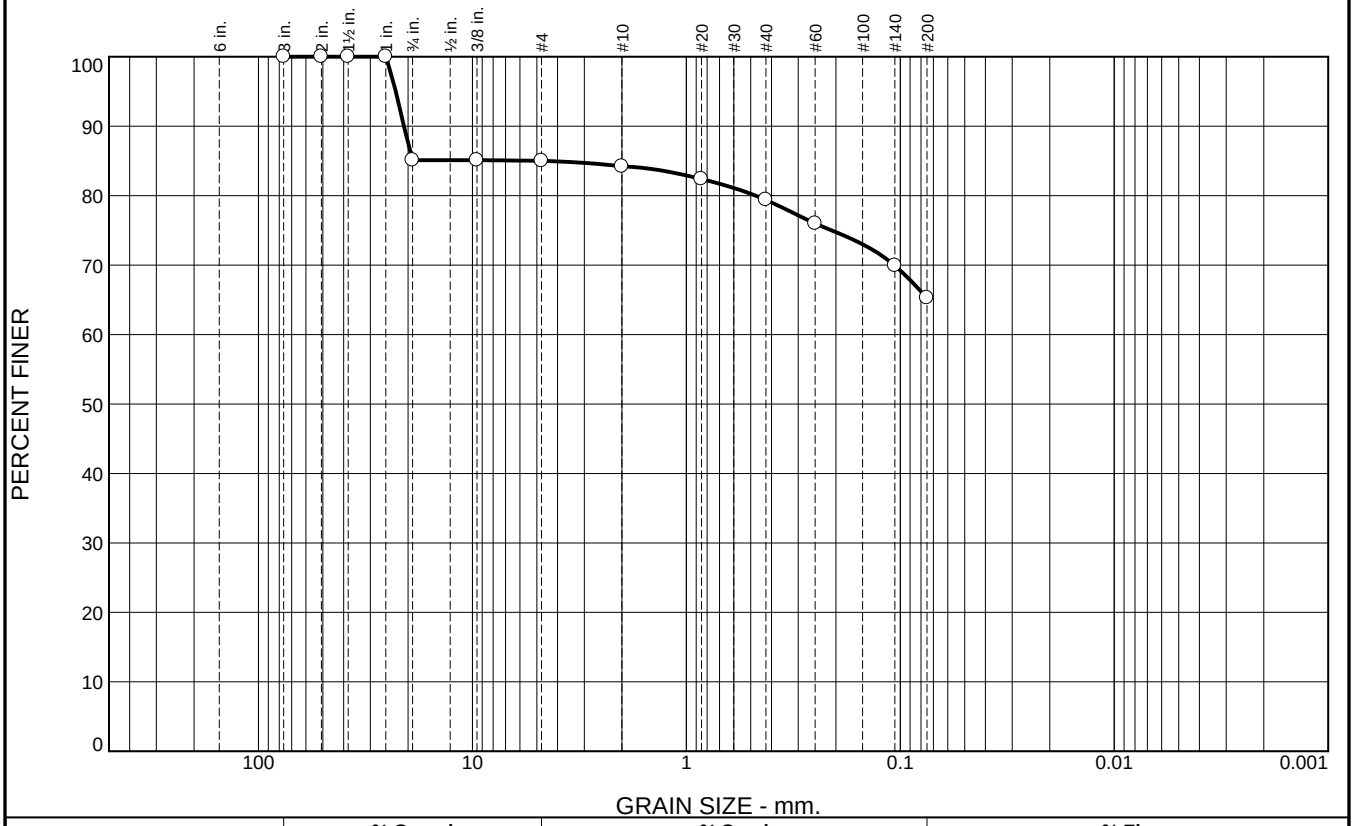
Source of Sample: B-3 **Depth:** 6.0' - 8.0'
Sample Number: S-4

Date: 10/03/18

WHITESTONE ASSOCIATES, INC.
Warren, New Jersey

Client: Artis Senior Living of Tarrytown, LLC
Project: Proposed Assisted Living Facility
153-155 White Plains Road, Tarrytown, Westchester Co, NY
Project No: GJ1815765.000 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	14.9	0.1	0.8	4.8	14.1	65.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	85.1		
.375	85.1		
#4	85.0		
#10	84.2		
#20	82.4		
#40	79.4		
#60	76.0		
#140	69.9		
#200	65.3		

* (no specification provided)

Material Description

Sandy Silt with Gravel

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 20.9164 D_{85}= 4.8435 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

W_n = 19.3%

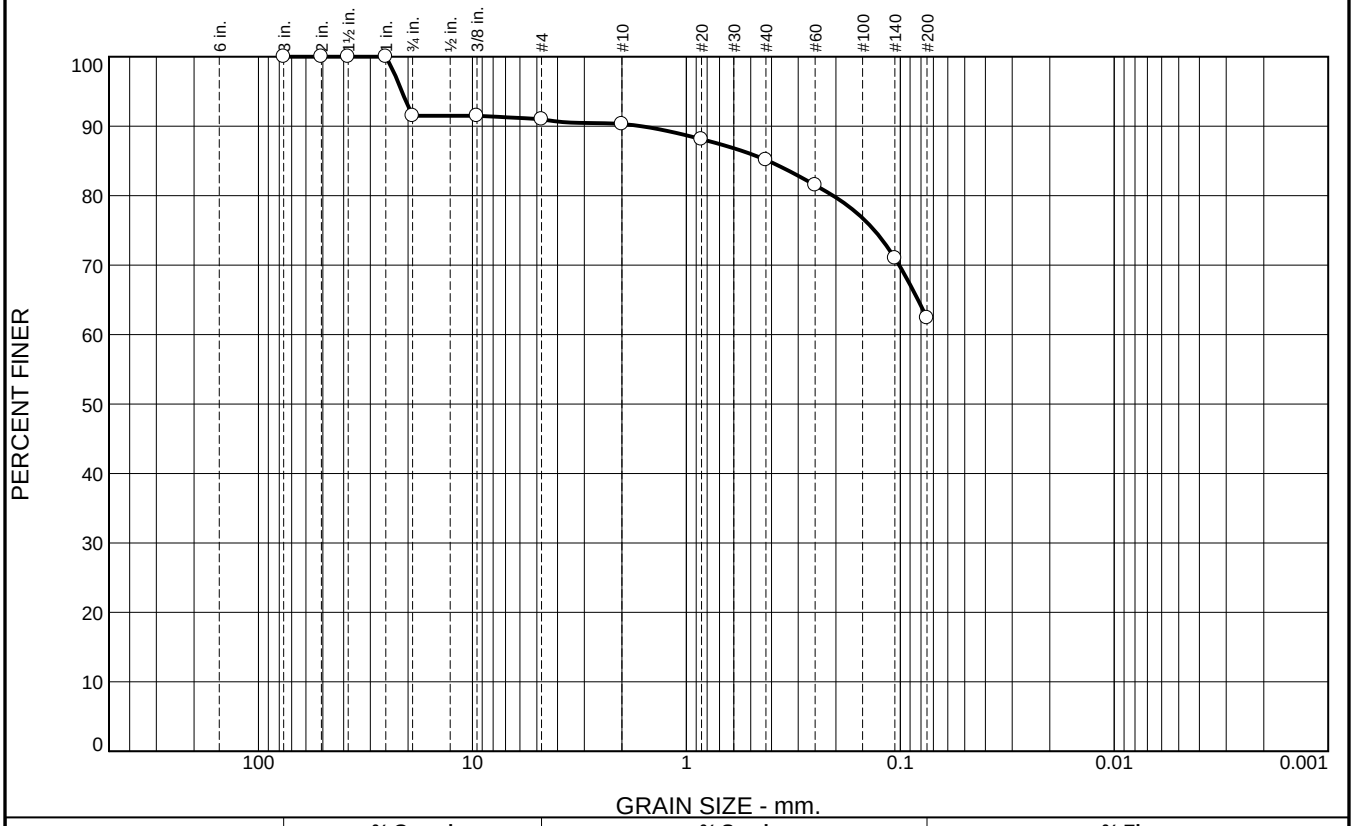
Source of Sample: B-5 **Depth:** 2.0' - 4.0'
Sample Number: S-2

Date: 10/03/18

WHITESTONE ASSOCIATES, INC.
Warren, New Jersey

Client: Artis Senior Living of Tarrytown, LLC
Project: Proposed Assisted Living Facility
153-155 White Plains Road, Tarrytown, Westchester Co, NY
Project No: GJ1815765.000 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	8.5	0.5	0.7	5.2	22.7	62.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	91.5		
.375	91.5		
#4	91.0		
#10	90.3		
#20	88.1		
#40	85.1		
#60	81.5		
#140	71.0		
#200	62.4		

* (no specification provided)

Material Description

Sandy Silt

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 1.6296 D_{85}= 0.4150 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

W_n = 13.1%

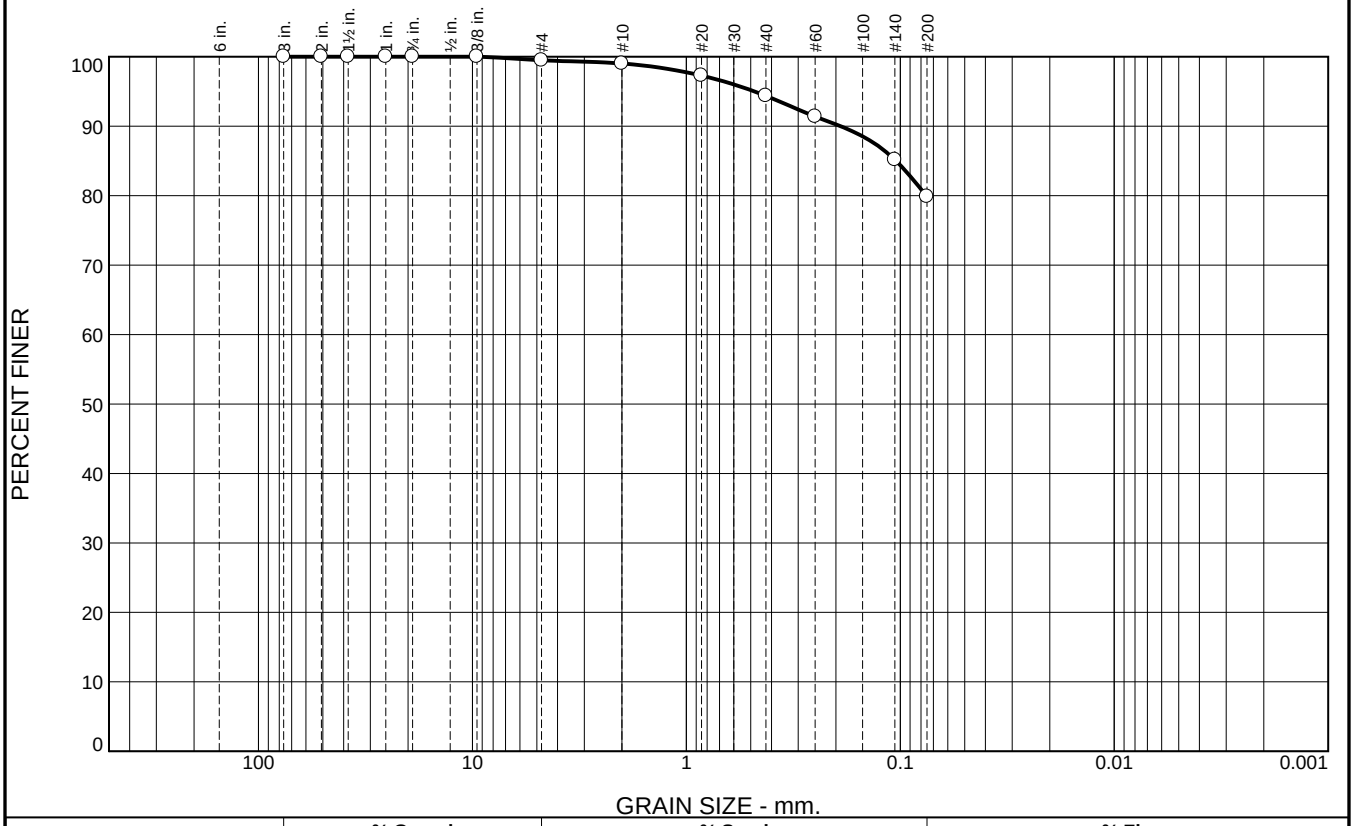
Source of Sample: B-8 **Depth:** 4.0' - 6.0'
Sample Number: S-3

Date: 10/03/18

WHITESTONE ASSOCIATES, INC.
Warren, New Jersey

Client: Artis Senior Living of Tarrytown, LLC
Project: Proposed Assisted Living Facility
153-155 White Plains Road, Tarrytown, Westchester Co, NY
Project No: GJ1815765.000 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.5	0.5	4.6	14.6	79.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	99.5		
#10	99.0		
#20	97.3		
#40	94.4		
#60	91.4		
#140	85.2		
#200	79.8		

* (no specification provided)

Material Description

Silt with Sand

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.1906 D_{85}= 0.1047 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

W_n = 21.9%

Source of Sample: B-13 **Depth:** 4.0' - 6.0'
Sample Number: S-3

Date: 140/03/18

WHITESTONE ASSOCIATES, INC.
Warren, New Jersey

Client: Artis Senior Living of Tarrytown, LLC
Project: Proposed Assisted Living Facility
153-155 White Plains Road, Tarrytown, Westchester Co, NY
Project No: GJ1815765.000 **Figure**

WHITESTONE ASSOCIATES, INC.

APPENDIX C
Supplemental Information (USCS, Terms and Symbols)

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants

MT. BETHEL CORPORATE CENTER
35 TECHNOLOGY DRIVE
WARREN, NJ 07059
908.668.7777
whitestoneassoc.com

UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

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

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS FOR SAMPLES WITH 5% TO 12% FINES

GRADATION*

% FINER BY WEIGHT

TRACE..... 1% TO 10%
LITTLE..... 10% TO 20%
SOME..... 20% TO 35%
AND..... 35% TO 50%

COMPACTNESS*
Sand and/or Gravel

RELATIVE DENSITY

LOOSE. ..... 0% TO 40%
MEDIUM DENSE.... 40% TO 70%
DENSE..... 70% TO 90%
VERY DENSE..... 90% TO 100%

CONSISTENCY*
Clay and/or Silt

RANGE OF SHEARING STRENGTH IN POUNDS PER SQUARE FOOT

VERY SOFT..... LESS THAN 250
SOFT..... ..... 250 TO 500
MEDIUM..... 500 TO 1000
STIFF..... 1000 TO 2000
VERY STIFF..... 2000 TO 4000
HARD..... GREATER THAN 4000

** VALUES ARE FROM LABORATORY OR FIELD TEST DATA, WHERE APPLICABLE. WHEN NO TESTING WAS PERFORMED, VALUES ARE ESTIMATED.*

L:\Geotechnical Forms and References\Reports\USCSTRMSSYM NJ.docx

Other Office Locations:

CHALFONT, PA 215.712.2700
SOUTHBOROUGH, MA 508.485.0755
ROCKY HILL, CT 860.726.7889
WALL, NJ 732.592-2101
STERLING, VA 703.464.5858
EVERGREEN, CO 303.670.6905

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GEOTECHNICAL TERMS AND SYMBOLS

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

N: Standard Penetration Value: Blows per ft. of a 140 lb. hammer falling 30" on a 2" O.D. split-spoon.
Qu: Unconfined compressive strength, TSF.
Qp: Penetrometer value, unconfined compressive strength, TSF.
Mc: Moisture content, %.
LL: Liquid limit, %.
PI: Plasticity index, %.
δd: Natural dry density, PCF.
▼: Apparent groundwater level at time noted after completion of boring.

DRILLING AND SAMPLING SYMBOLS

NE: Not Encountered (Groundwater was not encountered).
SS: Split-Spoon - 1 ⅜" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
AU: Auger Sample.
OB: Diamond Bit.
CB: Carbide Bit
WS: Washed Sample.

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

Term (Non-Cohesive Soils)	Standard Penetration Resistance
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

Term (Cohesive Soils)	Qu (TSF)
Very Soft	0 - 0.25
Soft	0.25 - 0.50
Firm (Medium)	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00+

PARTICLE SIZE

Boulders	8 in.+	Coarse Sand	5mm-0.6mm	Silt	0.074mm-0.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074mm		

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