WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants
Celebrating 25 Years 1994 – 2019

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REPORT OF GEOTECHNICAL INVESTIGATION

PROPOSED MULTI-STORY RESIDENTIAL BUILDING
108 SOUTH MAIN STREET
SECTION 142.38, BLOCK 1, LOTS 35 & 37
PORT CHESTER, WESTCHESTER COUNTY, NEW YORK

Prepared for:

HUDSON PARK GROUP, LLC
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Prepared by:

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Whitestone Project No.: GJ1916910.000
December 30, 2019

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December 30, 2019

via email

HUDSON PARK GROUP, LLC
100 Brookfield Road
Mount Vernon, New York 10552

Attention: Mr. Glen Vetromile
Principal Managing Partner

Regarding: REPORT OF GEOTECHNICAL INVESTIGATION
PROPOSED MULTI-STORY RESIDENTIAL BUILDING
108 SOUTH MAIN STREET
SECTION 142.38, BLOCK 1, LOTS 35 & 37
PORT CHESTER, WESTCHESTER COUNTY, NEW YORK
WHITESTONE PROJECT NO.: GJ1916910.000

Dear Mr. Vetromile:

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 soil exploration efforts and presents recommendations for design of the proposed structural foundations, floor slabs, and related earthwork.

Whitestone's appreciates the opportunity to be of service to Hudson Park Group, LLC (Hudson Park). Please note that Whitestone has the capability to perform the additional geotechnical engineering services and construction phase testing and inspection services recommended herein.

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

Sincerely,

WHITESTONE ASSOCIATES, INC.

Kyle J. Kopacz, P.E.
Project Manager

Kevin A. Feath, P.E.
Senior Project Manager

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Enclosures
Copy: Laurence W. Keller, P.E. Whitestone Associates, Inc.

REPORT OF GEOTECHNICAL INVESTIGATION
Proposed Multi-Story Residential Building
108 South Main Street
Section 142.38, Block 1, Lots 35 & 37
Port Chester, Westchester County, New York

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SECTION 1.0
Summary of Findings

Whitestone Associates, Inc. (Whitestone) has conducted an exploration and evaluation of the subsurface conditions on the site of the proposed residential development located at 108 South Main Street in Port Chester, Westchester County, New York. The subject site can be identified further as Section 142.38, Block 1, Lots 35 and 37. The site of the proposed construction is shown on the *Boring Location Plan* included as Figure 1.

At the time of Whitestone's subsurface investigation, the site consisted of a mixed used residential and commercial site with associated pavements, landscaped areas, and utilities. Based on the August 15, 2018 *Topographic Survey* prepared by Link Land Surveyor, P.C., the subject site has a low elevation of 13.6 feet above North American Vertical Datum 1988 (NAVD 88) and a high elevation of 37.9 feet above NAVD 88.

Based on the February 4, 2019 *Architectural Plan Set* prepared by Papp Architects, P.C., the proposed redevelopment will include demolition of the existing site structures, and construction of a nine-story, residential facility with associated pavements, landscaped areas, and utilities. The proposed building is anticipated to encompass approximately 15,934 square feet. Proposed site grading was not provided at the time of this investigation, however, Whitestone anticipates that maximum earth cuts and fills will be on the order of 15 feet within the proposed building area. The proposed structure is expected to consist of concrete foundations and light-gage steel framing with maximum anticipated loads of 675 kips for columns and 10.0 kips per linear foot for continuous walls.

The subsurface exploration included performing a reconnaissance of the project site, drilling soil borings, and collecting soil samples for laboratory analyses. The data from this exploration were analyzed by Whitestone in light of the project information provided by Hudson Park Group, LLC (Hudson Park).

A summary of Whitestone's findings and recommendations is presented in the following:

- **Subsurface Conditions:** The field investigation consisted of five soil borings performed within accessible areas of the site. The subsurface tests were performed within either existing paved or landscaped areas across the subject site. Subsurface tests performed within existing paved portions encountered approximately three inches of asphalt pavement underlain by up to approximately nine inches of gravel subbase materials. Borings completed within existing landscaped areas of the site encountered approximately one inch of topsoil at the surface. Beneath the surface cover, the borings encountered existing fill materials that generally consisted of a combination of sand and silt with gravel and debris. The debris encountered consisted of glass, brick, plastic, and wood. Where encountered, the existing fill materials extended to depths

ranging from approximately three feet below ground surface (fbgs) to nine fbgs. Below the existing fill materials, the borings encountered weathered rock materials. The top of weathered rock was encountered at depths ranging between approximately three fbgs and nine fbgs. Beneath the weathered rock materials, the borings encountered refusal on top of intact rock at depths ranging from approximately 3.5 fbgs to 11.5 fbgs. The bedrock was sampled with rock coring techniques and generally consisted of schist bedrock. Rock core recovery in the intact bedrock cored as part of this investigation was measured as approximately 60 percent, and the Rock Quality Designation (RQD) value was measured as approximately 44 percent.

- **Groundwater:** Static groundwater was not encountered within the subsurface tests performed, however, perched water was encountered within one of the borings at a depth of approximately eight fbgs. Groundwater levels likely will fluctuate seasonally following periods of precipitation.

Recommendations developed upon consideration of these findings are summarized below and presented in greater detail in the following report.

- **Foundations:** Following overexcavation of the existing fill materials, where encountered at or below proposed foundation elevations, Whitestone recommends supporting the proposed structures on conventional shallow foundations bearing within controlled structural fill soils that are properly placed and compacted in accordance with the recommendations herein. Foundations bearing within the properly placed controlled structural fill materials may be designed using a maximum allowable net bearing pressure of 4,000 pounds per square foot (psf). Alternatively, the proposed structures can be founded entirely on the underlying in-tact weathered rock/bedrock using a maximum allowable net bearing pressure of 6.0 tons per square foot (tsp). Due to anticipated disturbance of upper portions of the subgrade soils during footing excavations, all footing bottoms should be improved by in-trench compaction in the presence of the geotechnical engineer. Localized areas may require overexcavation and replacement of approved on-site soils in controlled lifts.

- **Floor Slabs:** Contingent upon supplemental evaluation of existing fill materials, Whitestone anticipates that approved and improved existing fill materials, the underlying natural soils, and/or controlled structural fill will be suitable for support of the proposed floor slabs provided these materials are properly recompacted, proofrolled, and evaluated during the construction phase. Localized areas of unsuitable portions of the existing fill may require overexcavation and recompaction with approved portions of on-site soils or imported structural fill in controlled lifts due to the variability of the existing fill materials as evidenced by the debris encountered and erratic N-values. 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 fill.

- **Soil Reusability:** Whitestone anticipates that the majority of the existing fill materials (non-debris laden portions) and processed portions of the underlying natural materials may be reusable as structural fill and/or backfill below proposed foundations and floor slabs where free of deleterious materials, objectionable materials are segregated, and moisture contents are controlled near optimum moisture content. 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. Cobble and boulder sized weathered rock encountered will require processing prior to re-use and should not be used within three feet of utilities. Construction schedules and budgets should account for earthwork contingencies, such as moisture control and importing materials to raise grades, restore overexcavations, and backfill utility trenches when construction must occur following wet weather or on an expedited basis. The contractor should be required to protect the subgrade at all times and limit subgrade exposure to precipitation.

- **Groundwater Control:** Static groundwater was not encountered during this investigation with the deepest depth explored of 11.5 fbgs. Therefore, Whitestone anticipates that static groundwater will be deeper than proposed foundation and utility excavations and does not anticipate the need for extensive dewatering or permanent groundwater control. However, trapped/perched water was encountered within the subsurface tests and may be expected to be encountered within the existing fill materials and/or at the existing fill materials/weathered rock interface, especially following precipitation events. As such, construction phase dewatering of trapped/perched water through the use of gravity fed sump pumps may be anticipated during excavation activities for this site.

- **Excavation Difficulties/Bedrock Removal**: Very dense existing fill materials with obstructions weathered rock with apparent cobble/boulder-sized rock fragments, and intact bedrock encountered at the site will present excavation difficulties at marginal depths below the ground surface during proposed site excavations. Excavation difficulties will be affected by the size and depth of the excavation depth and equipment used.

Detailed design criteria and construction recommendations for proposed foundations, slabs, pavements, and earthwork are discussed in the following sections of this report.

SECTION 2.0
Introduction

2.1 AUTHORIZATION

Mr. Glen Vetromile of Hudson Park issued authorization to Whitestone to perform the geotechnical investigation on this site relevant to the proposed development. The geotechnical investigation was performed in general accordance with Whitestone's November 19, 2019 proposal to Hudson Park.

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 pavements;
- 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 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

The field exploration of the project site consisted of drilling five soil test borings (identified as B-1 through B-5). The borings were performed with a truck-mounted drill rig using hollow stem augers and

split-spoon sampling and NQ rock techniques. The subsurface tests were backfilled with excavated soils generated from the investigation and surficially patched with asphalt cold patch, as necessary. The locations of the subsurface tests are shown on the accompanying *Boring Location Plan* included as Figure 1. *Records of Subsurface Exploration* are provided in Appendix A.

The subsurface tests were conducted in the presence of a Whitestone field engineer who performed field tests, recorded visual classifications, and collected samples of the various strata encountered. The tests locations 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 immediately following the completion of the testing operations within 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 monitoring wells may not be representative of true groundwater levels.

2.3.2 Laboratory Program

In addition to the field investigation, a laboratory program was conducted to determine additional, pertinent engineering characteristics of representative samples of on-site soils. The laboratory program was performed in general accordance with applicable ASTM standard test methods and included physical/textural testing of representative samples of various strata.

The results of the laboratory program are presented in this section in a general manner and qualitatively interpreted. The results are incorporated into the findings and recommendations discussed throughout this report. Quantitative test results are provided in Appendix B.

Physical/Textural Analyses: Representative samples of selected strata encountered were subjected to a laboratory testing program that included Atterberg limits determinations (ASTM D-4318), 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. Quantitative test results are provided in Appendix B.

PHYSICAL/TEXTURAL ANALYSES SUMMARY							
Boring	**Sample**	**Depth (fbgs)**	**% Passing No. 200 Sieve**	**Moisture Content (%)**	**Liquid Limit**	**Plastic Index**	**USCS Classification**
B-2	S-1	1.0 - 3.0	51.0	11.5	NP	NP	ML (Fill)

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.

SECTION 3.0
Site Description

3.1 LOCATION & DESCRIPTION

The subject site is located at 108 South Main Street in Port Chester, Westchester County, New York. The site is bound to the north by an active railroad, to the south by South Main Street, and to the east and west by commercial buildings. The site of the proposed construction is shown on the *Boring Location Plan* included as Figure 1.

3.2 HISTORIC & EXISTING CONDITIONS

Surface Cover/Current Development: At the time of Whitestone's subsurface investigation, the site consisted of a mixed used residential and commercial site with associated pavements, landscaped areas, and utilities.

Topography: Based on the August 15, 2018 *Topographic Survey* prepared by Link Land Surveyor, P.C., the subject site has a low elevation of 13.6 feet above North American Vertical Datum 1988 (NAVD 88) and a high elevation of 37.9 feet above NAVD 88.

Utilities: At the time of Whitestone's investigation, the subject site was serviced underground by electric, water and natural gas. Other utilities were not observed at the time of the 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 run-off for the site generally follows existing topography draining across paved areas of the subject site towards stormwater inlets located within the adjacent roadway right of ways. The termini of the stormwater inlets are unknown.

3.3 SITE GEOLOGY

The area of the subject site is situated within the Manhattan Prong of the New England Uplands Physiographic Province of the Northeastern United States. The site reportedly is underlain by the Middle Ordovician to Lower Cambrian-aged Hartland Formation. This formation generally consists of schist, gneissic granite, and amphibolite. Overburden material includes glacial deposits associated with the Wisconsinan glacial cycle which reached its most southerly advance thousands of years ago and man-made fill materials.

3.4 PROPOSED CONSTRUCTION

Based on the *Architectural Plan Set* prepared by Papp Architects, P.C., the proposed redevelopment will include demolition of the existing site structures, and construction of a nine-story, residential facility with associated pavements, landscaped areas, and utilities. The proposed building is anticipated to encompass approximately 15,934 square feet. Proposed site grading was not provided at the time of this investigation, however, Whitestone anticipates that maximum earth cuts and fills will be on the order of 15 feet within the proposed building area.

The anticipated maximum loads are expected to be less than the following:

- column loads - 675 kips;
- wall loads - 10.0 kips per foot; and
- floor slab loads - 125 pounds per square foot.

The above-referenced structural loads were assumed based upon Whitestone's previous experience with other similar facilities and should be confirmed by the project structural engineer. The scope of Whitestone's investigation and the professional advice contained in this report were generated based on the project details 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 PROFILE

Details of the materials encountered during the investigation performed at this site are presented on the *Records of Subsurface Exploration* presented in Appendix A of this report. The subsurface soil conditions encountered in the soil borings performed as part of the geotechnical investigation consisted of the following generalized strata in order of increasing depth.

Surface Materials: The subsurface tests were performed within either existing paved or landscaped areas across the subject site. Subsurface tests performed within existing paved portions encountered approximately three inches of asphalt pavement underlain by up to approximately nine inches of gravel subbase materials. Borings completed within existing landscaped areas of the site encountered approximately one inch of topsoil at the surface.

Existing Fill Materials: Beneath the surface cover, the borings encountered existing fill materials that generally consisted of a combination of sand and silt with gravel and debris. The debris encountered consisted of glass, brick, plastic, and wood. Where encountered, the existing fill materials extended to depths ranging from approximately three fbgs to nine fbgs. Standard Penetration Test (SPT) N-values recorded within the existing fill soils ranged between three blows per foot (bpf) and refusal (defined as more than 50 blows per six inches of split spoon sampler penetration).

Weathered Rock: Below the existing fill materials, the borings encountered weathered rock materials. The top of weathered rock was encountered at depths ranging between approximately three fbgs and nine fbgs. The SPT N-values recorded within this stratum were consistently in the refusal range, generally indicating a very dense relative density.

Intact Bedrock: Beneath the weathered rock materials, the borings encountered refusal on top of intact rock at depths ranging from approximately 3.5 fbgs to 11.5 fbgs. The bedrock was sampled with rock coring techniques and generally consisted of schist bedrock. Rock core recovery in the intact bedrock cored as part of this investigation was measured as approximately 60 percent, and the Rock Quality Designation (RQD) value was measured as approximately 44 percent.

4.2 GROUNDWATER

Static groundwater was not encountered during this investigation with the deepest depth explored of approximately 11.5 fbgs. Therefore, Whitestone anticipates that static groundwater will be deeper than proposed foundation and utility excavations and does not anticipate the need for extensive dewatering or permanent groundwater control. However, trapped/perched water was encountered within the subsurface tests and may be expected to be encountered within the existing fill materials and/or at the existing fill materials/weathered rock interface, especially following precipitation events. As such, construction phase dewatering of trapped/perched water should be anticipated.

SECTION 5.0
Conclusions & Recommendations

5.1 GENERAL

Based on the conditions disclosed by the soil borings performed as part of this investigation, following overexcavation of existing fill materials, the proposed structures may be supported on shallow foundations bearing on the underlying weathered rock/bedrock and/or approved and compacted structural fill.

Contingent upon supplemental evaluation and improvement of the existing fill materials, Whitestone anticipates that the proposed floor slabs may be supported on properly evaluated, improved and approved existing fill materials, the underlying natural soils, or properly placed structural fill and backfill provided these materials are properly compacted and proofrolled as recommended herein. Limited overexcavation and replacement/recompaction of unsuitable portions of existing fill materials should be anticipated in floor slab areas due to the presence of debris, including wood, within the existing fill materials.

Subgrade evaluation by construction phase test pits and proofrolling, careful inspection by the owner's geotechnical engineer, and overexcavation and replacement of excessively unsuitable materials will be required in structural areas. Existing fill materials should be overexcavated beneath proposed foundations and associated influence zones if encountered at or below proposed foundation bearing elevations.

Apparent weathered rock and bedrock were encountered at depths as shallow as three fbgs. As such, excavation difficulties and bedrock removal should be expected at marginal depths below the ground surface during earthwork performed to achieve final grades.

5.2 SITE PREPARATION & EARTHWORK

Surface Cover Stripping and Demolition: Prior to demolition and stripping operations, all utilities should be identified and secured. The existing surface cover to be demolished and stripped should be removed from within and at least 10 feet beyond the limits of the proposed building footprint and pavement areas. Existing structural elements, 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. The resulting excavations should be backfilled to elevations consistent with proposed construction subgrades in accordance with the recommendations of Section 5.3.

The demolition contractor should be required to perform all earthwork, including placement of structural backfill, in accordance with the recommendations in this report.

Overexcavation Criteria: Existing fill materials were encountered throughout the site during Whitestone's field explorations. Based on the results of Whitestone's subsurface exploration and proposed grades, overexcavation of existing fill should be anticipated across the subject site. The actual depth and aerial extent of overexcavation, if required, will depend on field conditions encountered during excavations and proposed grading. The overexcavations should be delineated and witnessed by a competent geotechnical engineer retained by the owner and restored with structural fill. The bottoms of overexcavated areas should be compacted to improve locally disturbed materials and densify any underlying loose zones.

Excavation Difficulties/Bedrock Removal: Very dense existing fill materials with obstructions, weathered rock with cobble/boulder-sized rock fragments, and intact bedrock encountered at the site will present excavation difficulties at marginal depths below the ground surface during proposed site excavations. Excavation difficulties will be affected by the size of the excavation depth and equipment used.

Weathered rock zones with apparent cobble/boulder-sized rock fragments were encountered at depths as shallow as three fbgs throughout different portions site. Heavy excavating equipment with ripping tools will typically be effective in removing dense/hard weathered materials, transition materials, and cobble/boulder-sized rock fragments during site mass grading. However, 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 bedding, planes of weakness, and spacing between discontinuities.

Planned excavation depths beyond refusal depths and in confined excavations, such as for deeper foundation embedment or utility trenches should expect ripping tools, pneumatic hammers and/or controlled and monitored blasting.

Surface Preparation/Proofrolling: Prior to placing any fill or subbase materials to raise grades to the desired building pad or pavement subgrade elevations, the existing exposed soils should be compacted to a firm and unyielding surface with several passes in two perpendicular directions of a minimum 10 ton, vibratory drum roller. The surface should be proofrolled with a loaded tandem axle truck in the presence of the geotechnical engineer to help identify loose pockets which may require removal and replacement or further investigation. Fill and backfill should be placed and compacted in accordance with Section 5.3.

Weather Performance Criteria: Because portions of the site soils 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 Maintenance: Portions of the on-site soils are silty in composition and will degrade rapidly if exposed to inclement weather and repeated construction traffic. Proofrolling should be conducted after a suitable period of dry weather to avoid degrading an otherwise acceptable subgrade. Site materials placed as fill should be sealed on a daily basis using a smooth drum roller to promote drainage and prevent ponding of stormwater. Materials that become exceedingly wet likely will require discing, aerating, and possibly drying during favorable weather. Alternatively, imported fill materials or subgrade stabilization procedures may be required to attain the desired grades and expedite earthwork operations during wet weather periods. The owner's geotechnical engineer should be retained to inspect soil conditions during construction and verify the suitability of prepared foundations and floor slabs subgrades for support of design loads.

The site contractors should employ necessary means and methods to protect the subgrade including, but not limited to the following:

- leaving the existing pavement in place as long as practical to protect the subgrade from freeze-thaw cycles and exposure to inclement weather;
- 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 open earthwork construction areas and to prevent standing water;
- removing wet surficial soils immediately; and
- limiting exposure to construction traffic especially following inclement weather and subgrade thawing.

5.3 STRUCTURAL FILL & 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 15 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 during favorable weather conditions. 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 Material: Based on the conditions disclosed by the soil borings, Whitestone anticipates that portions of the existing fill materials and underlying natural soils may be suitable for reuse as structural fill and/or backfill provided objectionable debris are segregated and moisture contents are controlled near the optimum during favorable weather conditions. Reuse of any of the existing fill materials will be contingent upon careful inspection in the field by visual observation and test pit excavations prior to or during construction in accordance with Section 5.11 of this report. The on-site soils will become increasingly difficult to reuse and compact if they become wetted beyond the optimum moisture content. Immediate re-use of on-site soils should not be anticipated.

Cobbles and boulders, or similarly sized materials (weathered rock fragments or durable construction debris encountered) greater than three inches in diameter will need to be separated from on-site soils to be placed as structural fill or backfill. Cobbles 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 subgrade 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. Boulders 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. Alternatively, imported fill materials may be used to attain the desired grades and expedite earthwork operations during wet weather periods. Any stripped surface cover materials, including asphaltic concrete and topsoil, should not be used as general fill or backfill.

Demolition Material: Demolition material, free of environmental restrictions, may be used as fill material provided the material is properly segregated and processed as recommended herein. Concrete masonry materials should be crushed to a well-graded blend with a maximum size of three inches in diameter. Stripped asphaltic materials and deleterious building materials should not be used as general structural fill 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.

Compaction and Placement Requirements: All structural 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 existing coarse-grained site soils, and used in the static mode to compact the on-site fine-grained soils or a small hand held vibratory compactor within excavations.

Structural Fill Testing: At least one week before filling operations begin, representative samples of each proposed fill material should be collected by a geotechnical engineer. The samples should be tested

to determine the maximum dry density, optimum moisture content, natural moisture content, gradation, and plasticity of the soil prior to construction in order to avoid construction delays. These tests are needed for quality control during compaction and also to determine if the proposed fill material is acceptable. 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.

5.4 GROUNDWATER CONTROL

Static groundwater was not encountered during this investigation with the deepest depth explored of 11.5 fbgs. Therefore, Whitestone anticipates that static groundwater will be deeper than proposed foundation and utility excavations and does not anticipate the need for extensive dewatering or permanent groundwater control. However, trapped/perched water was encountered within the subsurface tests and may be expected to be encountered within the existing fill materials and/or at the existing fill materials/natural soil interface, especially following precipitation events. As such, construction phase dewatering of trapped/perched water through gravity fed pumps should be anticipated.

5.5 FOUNDATIONS

Shallow Foundation Design Criteria: Following complete overexcavation of existing fill materials, if encountered at or below foundation bearing elevations and their associated zones of influence, Whitestone recommends supporting the proposed structures on conventional spread and continuous wall footings designed to bear within the underlying weathered rock/bedrock and/or controlled structural fill, provided these materials are properly evaluated, placed, compacted, and prepared. Foundations bearing within the controlled structural fill may be designed to impart a maximum allowable net bearing pressure of 4,000 psf. Alternatively, the structure may be entirely supported on the underlying intact weathered rock/bedrock and be designed to impart a maximum allowable net bearing pressure of 6.0 tons per square foot.

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.

Foundation Inspection: 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. If unsuitable bearing conditions are encountered, such as existing fill materials, these materials should be overexcavated and replaced with controlled structural backfill to provide a suitable footing subgrade. 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 building foundations on the order of less than one inch if the recommendations outlined in this report are properly implemented. Differential settlements of building foundations should be less than one-half inch.

Frost Coverage/Footing Embedment: 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 subgrade.

5.6 FLOOR SLABS

Contingent upon supplemental evaluation of existing fill materials, Whitestone anticipates that approved and improved existing fill materials, the underlying natural site soils, and/or controlled structural fill will be suitable for support of the proposed floor slabs provided these materials are properly evaluated, compacted and proofrolled in accordance with Sections 5.2, 5.3 and 5.11 of this report. The suitability of existing fill materials for floor slab support will be contingent upon careful inspection and evaluation during the construction phase. Some areas of overexcavation should be anticipated due to the presence of debris within the existing fill materials including organic materials. 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 fill.

The properly prepared on-site soils are expected to yield a minimum subgrade modulus (k) of 150 psi/in. A minimum eight inch layer of clean granular coarse aggregate should be installed below the floor slabs to provide a capillary break.

5.7 PAVEMENT DESIGN CRITERIA

No pavements are anticipated for the redevelopment of the subject site. If site plans change or proposed pavement areas are required, Whitestone should be contacted immediately for further evaluation.

5.8 LATERAL EARTH PRESSURES

General: Based on project information, no retaining structures are currently anticipated for the proposed structure. However, the proposed development will be situated directly adjacent to an existing public sidewalk and may require shoring during installation. While the design 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: Permanent below grade walls may be required to resist lateral earth pressures. 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})	135 pcf	140 pcf
Internal Friction Angle (φ)	28°	30°
Active Earth Pressure Coefficient (K_a)	0.36	0.33
Passive Earth Pressure Coefficient	2.77	3.00
At-Rest Earth Pressure Coefficient	0.53	0.50

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. Retaining/below grade walls situated below static groundwater levels should also be designed to resist hydrostatic pressure.

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.

Adequate drainage of water that may collect on the backfill side of the retaining wall should be incorporated into the design and/or hydrostatic pressures should be added to the pressure calculations. Depending on the wall type, drainage along the backside and in front of the wall may be provided by a free draining, clean stone layer separated from surrounding soils by a filtration fabric. Numerous commercially fabricated drainage systems also are available. A system of perforated drain pipes and/or weep holes may be used at the base of the backfill side of the retaining wall in order to collect and remove the water and relieve hydrostatic pressure.

Backfill Criteria: Whitestone recommends that granular soils be used to backfill behind the proposed 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. Rock fragments and cobbles/boulders greater than three inches should not be used as backfill. Additionally, imported granular soils may be required. Maximum density as provided in the above table should not be exceeded to avoid creating excessive lateral pressure on the walls during compaction operations.

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

5.9 SEISMIC & LIQUEFACTION CONSIDERATIONS

The site soils are consistent with a Site Class C defined by the *International Building Code 2015*. Based on the seismic zone and soil profile, liquefaction considerations are not expected to have a substantial impact on design.

5.10 TEMPORARY EXCAVATIONS

The site soils encountered during the investigation are consistent with, at least, Type C Soil Conditions as defined by 29 CFR Part 1926 (OSHA) which require a maximum unbraced excavation angle of 1.5:1 (horizontal:vertical). 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.

5.11 SUPPLEMENTAL POST INVESTIGATION SERVICES

Supplemental Evaluation of the Existing Fill Materials and Inaccessible Areas: Based on the conditions disclosed by the soil borings, Whitestone anticipates that the existing fill material will not be suitable for foundation support in its current condition, however, may be suitable for ground-supported floor slab support contingent on supplemental evaluation by means of supplemental test pit excavations and subgrade improvement as recommended herein. Due to the inherent variability that exists within existing fill, evidenced by the debris encountered, Whitestone anticipates that portions of the existing fill materials will require overexcavation and recompaction/replacement or subgrade stabilization within proposed floor slab areas. Whitestone also anticipates that the majority of the existing fill materials will be suitable for re-use as structural fill following segregation of any objectionable debris and proper moisture control. Whitestone recommends confirming further the condition of the existing fill for floor slab support and/or re-use as structural fill by means of supplemental evaluation following demolition and either prior to or during the early stages of construction to identify areas requiring removal and possible uncontrolled conditions or deleterious materials not disclosed by the soil borings conducted during this exploration.

Demolition and 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 existing structures are properly demolished, any encountered underground structures and utilities are properly backfilled, the existing surface cover materials are properly removed, and suitable materials used for controlled fill are properly placed and compacted over suitable subgrade soils.

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 use of Hudson Park Group, LLC. and their respective successors and assigns 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.

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.

The possibility exists that conditions between borings and test pits may vary from those at specific test locations, and conditions may differ from those anticipated by the designers or contractors. In addition, the construction process may alter soil and groundwater conditions. Therefore, experienced geotechnical personnel should observe and document the construction procedures used and the conditions encountered.

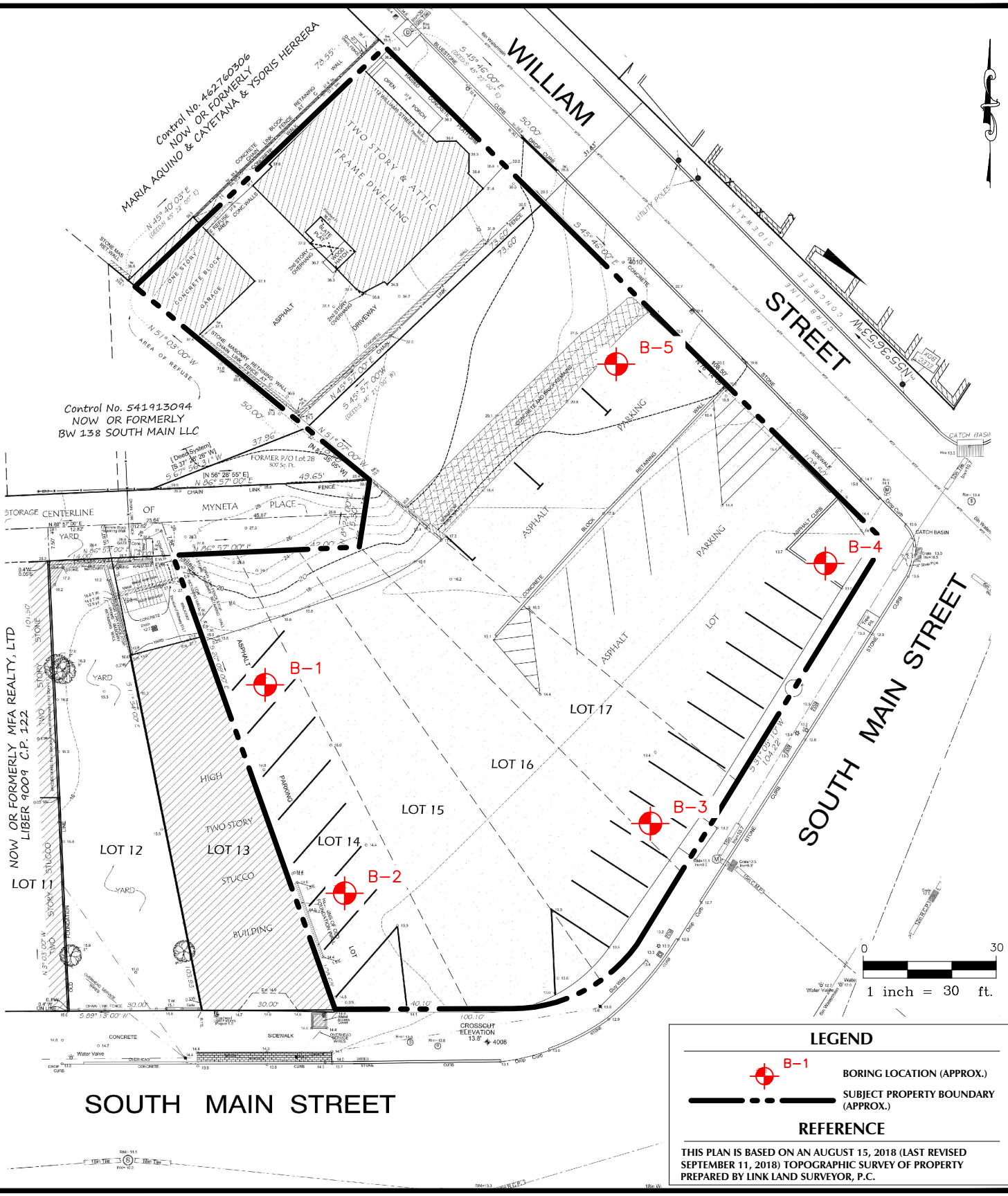
Whitestone recommends that the services of the geotechnical engineer be engaged to test and evaluate the soils in the footing excavations prior to concreting in order to determine that the soils will support the bearing capacities. Monitoring and testing should also be performed to verify that suitable 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 preliminary design details furnished by Hudson Park Group, LLC. If deviations from the noted subsurface conditions are encountered during construction, they 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.

WHITESTONE ASSOCIATES, INC.

FIGURE 1
Boring Location Plan



LEGEND

B-1 — BORING LOCATION (APPROX.)

SUBJECT PROPERTY BOUNDARY (APPROX.)

REFERENCE

THIS PLAN IS BASED ON AN AUGUST 15, 2018 (LAST REVISED SEPTEMBER 11, 2018) TOPOGRAPHIC SURVEY OF PROPERTY PREPARED BY LINK LAND SURVEYOR, P.C.

PROJECT #:	GJ1916910.000
DESIGNED BY:	GR
PROJ. MGR.:	KK
DATE:	12/30/19
FIGURE:	1
SCALE:	1" = 30'

DRAWING TITLE: **BORING LOCATION PLAN**

CLIENT: **HUDSON PARK GROUP, LLC**

PROJECT:
PROPOSED MULTI-STORY RESIDENTIAL BUILDING
108 SOUTH MAIN STREET
PORT CHESTER, WESTCHESTER COUNTY, NY

WHITESTONE ASSOCIATES, INC.
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WHITESTONE ASSOCIATES, INC.

APPENDIX A
Records of Subsurface Exploration

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-1

Page 1 of 1

Project:	Proposed Multi-Story Residential Building	**WAI Project No.:**	GJ1916910.000
Location:	108 South Main Street; Port Chester, Westchester County, NY	**Client:**	Hudson Park Group, LLC

				Water Depth | Elevation (feet bgs) | (feet)	Cave-In Depth | Elevation (feet bgs) | (feet)
Surface Elevation:	± NS feet	**Date Started:**	12/5/2019		
Termination Depth:	10.5 feet bgs	**Date Completed:**	12/5/2019		
Proposed Location:	Building Pad	**Logged By:**	RL	**During:** NE | ---	
Drill / Test Method:	HSA / SPT /	**Contractor:**	Allied	**At Completion:** NE | ---	**At Completion:** 6.0 | ---
	MUD ROTARY	**Equipment:**	Mobile Drill	**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				
							FILL		3" Asphalt, Gravel Subbase	
						1.0				50/1" with 300 LB Hammer
1 - 1.6	S-1	X	17 - 50/2"	4	50/2"		FILL		Light Brown Silt with Gravel, Dry (FILL)	Glass and Brick Debris
										Augered Through Probable Boulder
3 - 4.3	S-2	X	29 - 40 - 50/3"	>1	90/9"				As Above (FILL)	Small Piece of Brick in Spoon Tip
						5.0				
5 - 5.3	S-3	X	50/4" - 50/4" - 67 - 18	6	117/10"				As Above (FILL)	Brick and Plastic Debris
									As Above (Fill)	
7 - 9	S-4	X	5 - 7 - 69 - 90	6	67	8.0	WEATHERED ROCK		Brown to Black Weathered Rock with Sand, Dry, Very Dense (WR)	
						10.0				
						10.5			Boring Log B-1 Terminated at a Depth of 10.5 Feet Below Ground Surface Due to Auger Refusal on Apparent Bedrock	
						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

Page 1 of 1

Project:	Proposed Multi-Story Residential Building	**WAI Project No.:**	GJ1916910.000
Location:	108 South Main Street; Port Chester, Westchester County, NY	**Client:**	Hudson Park Group, LLC

				Water Depth | Elevation (feet bgs) | (feet)	Cave-In Depth | Elevation (feet bgs) | (feet)
Surface Elevation:	± NS feet	**Date Started:**	12/5/2019		
Termination Depth:	16.5 feet bgs	**Date Completed:**	12/5/2019		
Proposed Location:	Building Pad	**Logged By:**	RL	**During:** NE | ---	
Drill / Test Method:	HSA / SPT /	**Contractor:**	Allied	**At Completion:** NE | ---	**At Completion:** 5.0 | ---
	MUD ROTARY	**Equipment:**	Mobile Drill	**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				
							PAVEMENT		3" Asphalt, Gravel Subbase	
						1.0				
1 - 3	S-1	X	16 - 7 - 9 - 10	12	16		FILL		Brown Silt with Gravel, Moist (FILL)	Brick and Glass Debris
3 - 5	S-2	X	4 - 3 - 2 - 3	4	5				As Above (FILL)	Brick and Glass Debris
						5.0				
5 - 7	S-3	X	1 - 1 - 2 - 3	6	3				As Above (FILL)	Brick Debris, Trace Concrete
7 - 8.3	S-4	X	1 - 21 - 50/3"	NR	71/9"				No Recovery, Presumed As Above (FILL)	
						8.0	WEATHERED ROCK			
9 - 10.3	S-5	X	72 - 69 - 50/4"	6	119/10"				Gray to Black Weathered Rock, Dry, Very Dense (WR)	
						10.0				
	Total Elapsed Cut Time/Cut Time Per Ft.			REC	RQD	11.5				
			6.9 / 6.0				BEDROCK			
			6.0 / 12.0							
11.5 - 16.5	R1	NQ	5.0 / 17.0	36" 60%	26" 43.3%				Black to White Schist, Competent Recovery, Very Hard, Slightly Weathered, Slightly Fractured, Moderately Close Joint, Medium Bedding and Foliation, 2" to 1' Spacing, Moderately Dipping Attitude (35° to 55°)	
			5.5 / 22.5			15.0				
			4.0 / 26.5			16.5				
									Boring Log B-2 Terminated at a Depth of 16.5 Feet Below Ground Surface	
						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 Multi-Story Residential Building	**WAI Project No.:**	GJ1916910.000
Location:	108 South Main Street; Port Chester, Westchester County, NY	**Client:**	Hudson Park Group, LLC

				Water Depth | Elevation (feet bgs) | (feet)	Cave-In Depth | Elevation (feet bgs) | (feet)
Surface Elevation:	± NS feet	**Date Started:**	12/5/2019		
Termination Depth:	10.0 feet bgs	**Date Completed:**	12/5/2019		
Proposed Location:	Building Pad	**Logged By:**	RL	**During:** NE | ---	
Drill / Test Method:	HSA / SPT	**Contractor:**	Allied	**At Completion:** NE | ---	**At Completion:** 4.0 | ---
		Equipment:	Mobile Drill	**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				
							PAVEMENT		3" Asphalt, Gravel Subbase	
						1.0				
1 - 3	S-1		8 - 8 - 3 - 3	4	11		FILL		Black Silty Sand with Gravel, Moist (FILL)	Brick Debris
3 - 5	S-2		6 - 6 - 4 - 5	6	10				As Above (FILL)	
						5.0				
5 - 7	S-3		12 - 8 - 5 - 7	12	13				As Above (FILL)	
7 - 9	S-4		5 - 10 - 16 - 50/4"	6	26				As Above (FILL)	Fuel Odor
						8.5				
9 - 9.2	S-5		50/2"	1	50/2"		WEATHERED ROCK		Gray to Black Weathered Rock, Dry, Very Dense (WR)	
						10.0				
									Boring Log B-3 Terminated at a Depth of 10.0 Feet Below Ground Surface Due to Auger Refusal on Apparent Bedrock	
						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-4

Page 1 of 1

Project:	Proposed Multi-Story Residential Building	**WAI Project No.:**	GJ1916910.000
Location:	108 South Main Street; Port Chester, Westchester County, NY	**Client:**	Hudson Park Group, LLC

				Water Depth | Elevation (feet bgs) | (feet)	Cave-In Depth | Elevation (feet bgs) | (feet)
Surface Elevation:	± NS feet	**Date Started:**	12/5/2019		
Termination Depth:	11.0 feet bgs	**Date Completed:**	12/5/2019		
Proposed Location:	Building Pad	**Logged By:**	RL	**During:** 8.0 | ---	
Drill / Test Method:	HSA / SPT	**Contractor:**	Allied	**At Completion:** 8.0 | ---	**At Completion:** 4.0 | ---
		Equipment:	Mobile Drill	**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		1" Topsoil	
0 - 2	S-1		6 - 8 - 12 - 15	8	20	0.1	FILL		Brown Silt with Gravel, Moist (FILL)	Brick and Concrete Debris
2 - 4	S-2		7 - 6 - 5 - 6	<1	11				As Above (FILL)	Brick Debris
4 - 6	S-3		3 - 5 - 5 - 6	2	10	5.0			As Above (FILL)	Brick Debris
6 - 8	S-4		5 - 4 - 2 - 2	2	6				As Above (FILL)	Brick Debris Dropped an Extra 6" on Last Blow Count
8 - 9	S-5		2 - 2 - 50/1"	4	52/7"	9.0			As Above, Wet (FILL)	Brick and Wood Debris
						10.0	WEATHERED ROCK			
10 - 10.1	S-6		50/1"	1	50/1"				Gray to Black Weathered Rock, Wet, Very Dense (WR)	
						11.0				
									Boring Log B-4 Terminated at a Depth of 11.0 Feet Below Ground Surface Due to Auger Refusal on Apparent Bedrock	
						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

Page 1 of 1

Project:	Proposed Multi-Story Residential Building	**WAI Project No.:**	GJ1916910.000
Location:	108 South Main Street; Port Chester, Westchester County, NY	**Client:**	Hudson Park Group, LLC

Surface Elevation:	± NS feet	**Date Started:**	12/5/2019		**Water Depth (feet bgs) | Elevation (feet)**	**Cave-In Depth (feet bgs) | Elevation (feet)**	
Termination Depth:	3.5 feet bgs	**Date Completed:**	12/5/2019				
Proposed Location:	Building Pad	**Logged By:**	RL	**During:**	NE | ---		
Drill / Test Method:	HSA / SPT	**Contractor:**	Allied	**At Completion:**	NE | ---	**At Completion:**	1.0 | ---
		Equipment:	Mobile Drill	**24 Hours:**	--- | ---	**24 Hours:**	--- | ---

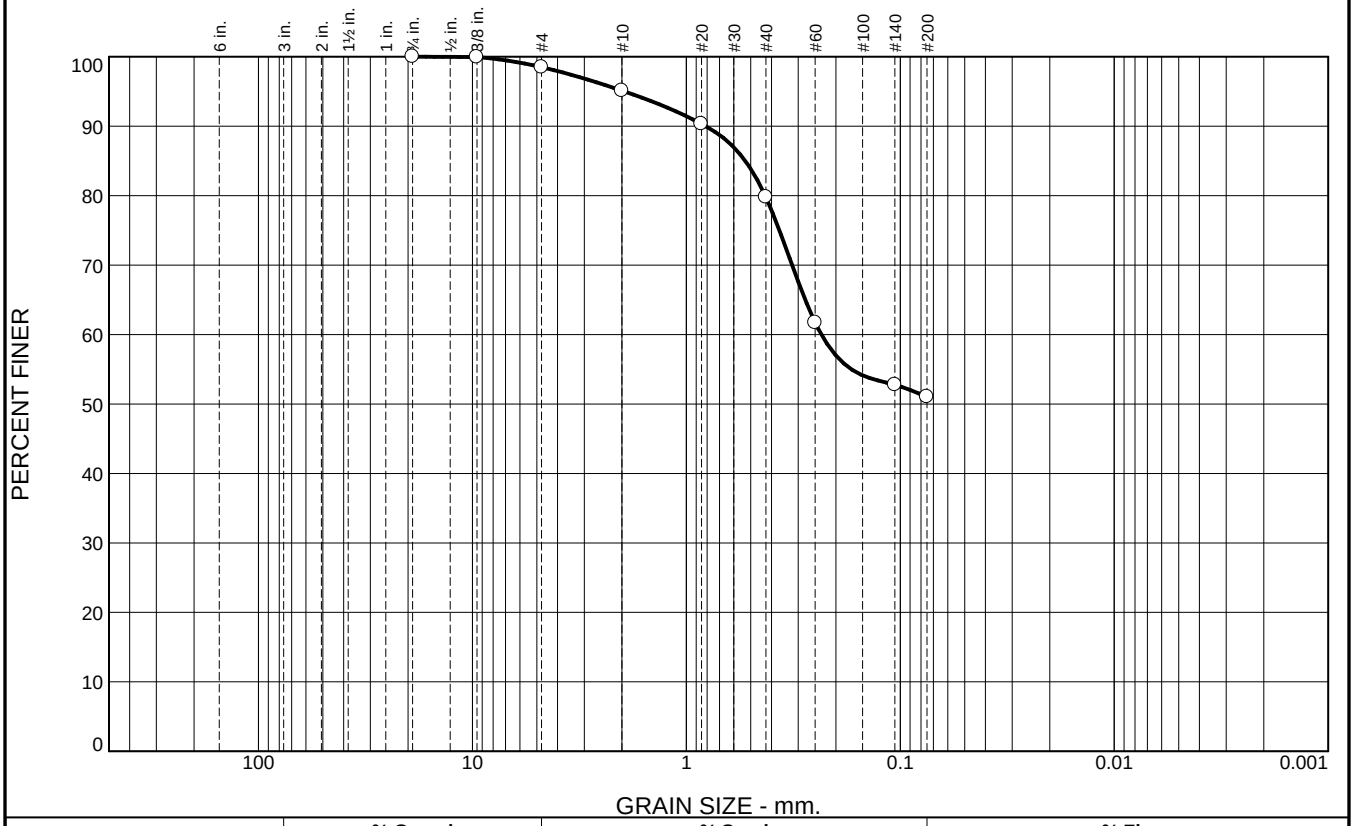
SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
							FILL			
1 - 2.5	S-1		20 - 15 - 14 - 50/1"	3	29				Brown Silty Sand with Gravel (FILL)	
						3.0				
3 - 3.2	S-2		50/2"	1	50/2"	3.5	WR		White Weathered Rock, Very Dense (WR)	
									Boring Log B-5 Terminated at a Depth of 3.5 Feet Below Ground Surface Due to Auger Refusal on Apparent Bedrock	
						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.

APPENDIX B
Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.5	3.4	15.3	28.8	51.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.375	99.9		
#4	98.5		
#10	95.1		
#20	90.3		
#40	79.8		
#60	61.7		
#140	52.8		
#200	51.0		

* (no specification provided)

Material Description

sandy silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.8136 D_{85}= 0.5304 D_{60}= 0.2339
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

W_n = 11.5%

Source of Sample: B-2 **Depth:** 1.0' - 3.0'
Sample Number: S-1

Date: 12/30/2019

WHITESTONE ASSOCIATES, INC.
Warren, New Jersey

Client: Hudson Park Group, LLC
Project: Proposed Multi-Story Residential Building
108 South Main Street, Port Chester, New York
Project No: GJ1916910.000 **Figure**

WHITESTONE ASSOCIATES, INC.

APPENDIX C
Supplemental Information (USCS, Terms & Symbols)

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants

MT. BETHEL CORPORATE CENTER
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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

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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		

Other Office Locations:

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