CORNELL UNIVERSITY

UNIVERSITY HEALTH SERVICES FACILITY

SITE PLAN REVIEW

10.0 GEOTECHNICAL REPORT

SUBSURFACE INVESTIGATION
AND
GEOTECHNICAL EVALUATION

PROPOSED ADDITION TO GANNETT UNIVERSITY
HEALTH SERVICES
CORNELL UNIVERSITY
ITHACA, NEW YORK

CHIANG O'BRIEN ARCHITECTS

PREPARED FOR: Chiang O'Brien Architects
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ATL Report No. CD3538E-01-09-13

September 18, 2013

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1.0 INTRODUCTION

At the request of Ms. Grace Chiang, representing Chiang O'Brien Architects (COA), and in accordance with our proposal (ATL File No. CD998-129-03-13, dated March 28, 2013) Atlantic Testing Laboratories, Limited (ATL) performed a subsurface investigation and geotechnical evaluation for the referenced project. The subsurface investigation was performed on the dates of August 21 and 22, 2013.

The purpose of the investigation was to ascertain the subsurface soil, bedrock, and groundwater conditions at the site, to evaluate the engineering significance of these findings, and to provide recommendations related to foundation design and construction for the proposed project.

The proposed project is located at the intersection of Ho Plaza and Campus Road on the campus of Cornell University in Ithaca, New York. The approximate project coordinates are N 42°26'46" latitude and W 76°29'08" longitude. A **Site Location Plan** is included in **Appendix A**. All dimensions and elevations referenced in this report are in units of feet, unless otherwise noted.

2.0 PROJECT DESCRIPTION

The proposed project consists of constructing an addition to the existing Gannett University Health Services Facility. The existing building is "L" shaped and was reportedly constructed in 1957. An addition was constructed at the NW side of the building in 1979. The new addition will have four above ground levels and a basement beneath a portion of the addition that will contain an elevator, mechanical and electrical equipment. The basement and first floor will have finished floor slab-on-grade elevations of 741 and 754, respectively.

The anticipated maximum column loads for the new addition will reportedly range between 250 and 1000 kips.

Based on historical drawings reviewed for the project, the 1957 portion of the existing building is reportedly supported on shallow footings bearing on soil at approximately elevation 755.8 that will require shoring and/or underpinning to construct the addition. The 1979 portion was reportedly designed to be supported on bedrock that appears to vary in elevation across the building footprint. The specific as-built foundation details are not known.

3.0 PREVIOUS SUBSURFACE INVESTIGATIONS

A subsurface investigation and geotechnical evaluation was performed at the site by ATL in 2008 that consisted of the advancement of five soil borings (B-3 through B-7) and four test pits. The results were presented in ATL Report No. CD2911E-01-10-08. Soil boring information was also provided on a 1957 plot plan reviewed for the project. Based on the previous soil boring information, bedrock was encountered in the previous soil borings at depths ranging from approximately 3.5 to 28.5 feet (elevation 755 to 725) below the surface.

4.0 SITE SURFACE CONDITIONS

The proposed site currently supports the existing 3-story Gannett University Health Services building and asphalt paved parking lots separated by a retaining wall. Wee Stinky Glen is located to the north of the building with a creek that flows downward from east to west. Exposed bedrock that steps down in elevation to the west is visible at the bottom of the creek bed.

The site generally slopes downward from east to west from Ho Plaza to Campus Road. Based on available topographic survey information, the site elevations generally range from approximately 770 at the east side of the site, to 742 at the west side.

Lawn areas with trees and landscaping, asphalt paved parking lots, underground utilities, and sidewalks generally surround the existing building.

5.0 SUBSURFACE INVESTIGATION & SAMPLING METHODOLOGY

The boring locations were selected, staked and elevations determined by representatives of ATL. A **Boring Location Plan** is included in **Appendix B**.

The borings were advanced utilizing 3 ¾-inch inside diameter hollow stem augers. Soil sampling and standard penetration testing was performed utilizing a 2-inch outside diameter split spoon sampler in accordance with ASTM D 1586. Soil sampling was performed continuously from the ground surface to a minimum depth of 12 feet and at 5-foot intervals thereafter to boring termination at depths ranging from 17.7 to 26.1 feet below the surface. Bedrock was cored in boring P-2 from a depth of 21.2 to 26.2 feet utilizing a double tube, NX core barrel.

The soil samples were visually classified in the laboratory by an engineering technician using the Burmister Soil Classification System. The split spoon sampler does not recover material larger than 1⅜-inch in nominal dimension; therefore, the soil classifications may not be representative of the entire soil matrix. The visual classifications and the standard penetration test results are presented on the **Subsurface Investigation Logs** included in **Appendix C**.

A temporary observation well was installed in boring P-3 utilizing 2-inch PVC 0.010-inch machine slot screen and 2-inch PVC riser pipe. The well was removed and backfilled prior to departure from the site.

The boreholes were backfilled with on-site soils upon completion. It is important that the backfilled borings be monitored for settlement or subsidence. This will be the responsibility of Chang O'Brien Architects and/or their client. ATL assumes no liability for loss or damage resulting from borehole settlement.

6.0 SITE SUBSURFACE CONDITIONS

The following description of subsurface conditions is based on the soil, bedrock, and groundwater conditions encountered during this subsurface investigation. Actual subsurface conditions may vary across the site in both the horizontal and vertical dimensions. Detailed subsurface descriptions are provided on the Subsurface Investigation Logs.

6.1 Soil Borings

Borings P-1 and P-2 encountered 4 inches of asphalt pavement, and borings P-3 through P-5 encountered 6 to 9 inches of topsoil and organic material at the surface. Underlying the surficial materials, the borings generally encountered loose (N values 4 to 10) to medium compact (N values 10 to 30) silty sand with varying portions of gravel, organic material, and fill material that extended to depths ranging from approximately 2 to 10 feet (elevation 740.1 to 759.4) below the surface. In borings P-3, P-4, and P-5, the silty sand was underlain by medium compact to compact (N values 30 to 50) possible fill material consisting of gravel with varying portions of sand, silt, clay, and weathered rock that extended to a depth of approximately 13 feet (elevation 733.1 to 748.2). Underlying the silty sand in borings P-1 and P-2, and the possible fill in borings P-3, P-4, and P-5, medium stiff (N values 4 to 8) to very stiff (N values 15 to 30) silt with varying portions of sand, clay, and gravel was encountered that extended to depths ranging from approximately 17.5 to 25 feet (elevation 726.1 to 743.9). The silt was underlain by very compact (N values greater than 50) sandy gravel and gravelly sand with silt (weathered rock) that extended to auger refusal in borings P-1 and P-2 at depths of 17.7 (elevation 743.7) and 21.2 feet (elevation 740.4), and to boring termination in borings P-3, P-4, and P-5 at depths ranging from 20.2 to 26.1 feet (elevation 725.8 to 743.7). Cobbles were encountered in boring P-3 from 6 to 17 feet beneath the surface.

The bedrock in boring P-2 was cored utilizing a double tube, NX core barrel during this subsurface investigation. The rock core descriptions from this investigation and the 2008 investigation are presented below.

Rock Core Descriptions

Boring No.	Run No.	Depth (ft)	Rock Type	Recovery (%)	RQD (%)
P-2	Run 1	21.2-26.2	Siltstone	73	48
B-3	Run 1	20.2-25.2	Siltstone	100	48
B-4	Run 1	23.0-28.0	Siltstone	100	22
B-5	Run 1	28.5-33.5	Siltstone	100	78
B-6	Run 1	20.5-25.5	Siltstone	100	57
	Run 2	25.5-30.5	Siltstone	100	95
B-7	Run 1	22.5-27.5	Siltstone	100	72

A **Table of Subsurface Conditions** in included in **Appendix E**.

6.2 Groundwater

Water measurements were performed during the subsurface investigations through cased and open boreholes. The recovered soil samples were also classified for coloration and moisture conditions in the laboratory. A temporary observation well was installed in boring P-3 during this investigation and temporary observation wells were also installed during the 2008 subsurface investigation in borings B-2, B-5, and B-7.

Based on groundwater measurements and soil moisture content, it appears that freestanding water was encountered at depths ranging from approximately 10 to 18.5 feet (elevation 733.4 to 751.1) below the surface of borings B-5, B-6, B-7, P-3, and P-4 at the time of the investigations. Some of the water readings presented on the subsurface investigation logs may be affected by water that was utilized during bedrock coring. Freestanding water did not appear to be present in the remaining borings at the time of boring advancement.

Since the boreholes that did not contain temporary monitor wells were backfilled upon completion, water levels may not have had sufficient time to stabilize. Due to the variable overburden soils, a perched water condition may be encountered at higher elevations, especially during wetter periods.

Fluctuations in water levels may occur due to seasonal and climatic variations, changes in surface runoff patterns, construction activity, and subsequent development of the site along with other interrelated factors.

7.0 LABORATORY ANALYSES

Select soil samples were submitted to ATL's geotechnical laboratory for physical analyses. Water Content Determination of Soil (ASTM D 2216) was performed on 10 soil samples. The test results are located on the subsurface investigation logs included in Appendix C.

A Particle Size Analysis without Hydrometer (ASTM D 422) was performed on three soil samples. The **Particle Size Distribution Curves** are included in **Appendix F**.

Atterberg Limits Determination (ASTM D 4318) was performed on two soil samples. The results are presented below.

Atterberg Limits

Boring No.	Sample No.	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Moisture Content (%)
P-2	S-7	15-17	NP	NP	NP	18.0
P-4	S-7	15-17	31	19	12	17.8

Compression Testing of Rock Cores (ASTM D 2938) was previously performed during the 2008 subsurface investigation on intact portions of the rock cores recovered in borings B-3 and B-5. The results are presented below.

Rock Core Compression Test

Boring No.	Run No.	Dry Unit Weight (pcf)	Compressive Strength (psi)
B-3	Run 1	169	16,100
B-5	Run 1	170	11,900

8.0 GEOTECHNICAL ENGINEERING DISCUSSION

The Geotechnical Engineering Discussion is based on information provided by Chiang O'Brien Architects, Ryan-Biggs Associates, and the subsurface conditions outlined in this report.

8.1 Proposed Gannett Addition

8.1.1 Addition Site Work

Site work will require the removal of asphalt pavement, sidewalks, topsoil and organic material, and any deleterious fill encountered during sitework excavations. Any existing foundations and underground utilities within the addition footprint should be completely removed and backfilled with compacted Granular Fill to restore site or building grades.

Excavations to achieve the first floor and basement level slab subgrade elevations will extend below the existing building's bottom of footing elevation that will require shoring and/or underpinning of the existing foundations. Underpinning and excavation support systems evaluated for other projects at the campus have reportedly consisted of secant walls, jet grouting, soldier piles and lagging, and conventional concrete underpinning pit methods. The shoring and/or underpinning should be selected by the contractor and properly designed by the contractor's professional engineer to prevent settlement of the existing building's foundations and floor slab. Temporary shoring may also be required at other areas of the site to prevent disturbance to existing structures, utilities, and roadways during foundation and sitework excavations. The contractor should prepare a shoring plan and submit it to the architect and owner for review.

Factors that should be considered in the shoring and/or underpinning design include the loose granular soils and elevated groundwater condition at the site, the underlying bedrock conditions, maintaining the stability of the existing building, and the potential for soil sloughing and caving of excavation sidewalls, especially if perched groundwater is

encountered. Surcharge loads due to the existing building, traffic, and other structures must also be considered in the shoring design.

Tiebacks may be required, depending on the selected shoring system, to limit lateral movement of the system and subsequent soil relaxation beneath the supported structures. Soldier piles may require pre-drilling into the underlying bedrock depending on the final design depth of the piles. A pre-construction survey should be performed for the existing building and the building should be monitored for signs of distress and settlement during construction.

Based on bedrock elevations estimated from the soil borings, it appears that bedrock removal will be required to achieve the slab and foundation subgrade elevation along the east side of the basement addition and elevator. Based on the bedrock core information, it is anticipated bedrock removal will require drilling, large hoe rams, or other acceptable rock removal method that will limit disturbance to the existing building. The contractor should submit a rock removal plan to the architect and owner prior to beginning rock removal operations.

8.1.2 Building Foundations

Based on the subsurface soil conditions and bedrock depths encountered during the subsurface investigation, it is recommended the addition be supported entirely on bedrock utilizing a combination of shallow and deep foundations. Deep foundations systems could consist of drilled piers (caissons) and/or micro-piles.

8.1.2.1 Shallow Footings

Shallow strip and spread footings should be founded on bedrock that is expected to step down in elevation from the east to the west side of the site. The excavations for the shallow foundations may require rock removal methods. All soil and loose bedrock should be removed to create a level rock bearing surface. Lean concrete may be utilized to provide a level bearing surface, as directed by the Geotechnical Engineer.

Shallow footings founded on bedrock and/or lean concrete may be designed using an allowable bearing capacity of 20 ksf. Settlement of footings founded on bedrock should be negligible.

8.1.2.2 Drilled Piers (Caissons)

The siltstone bedrock could support the addition using drilled piers advanced a minimum of 2-feet into the bedrock. The rock socket will provide additional vertical capacity and lateral stability to the piers.

The means and methods of the drilled pier installations should be the responsibility of the contractor. The drilled pier contractor must be equipped to advance the drilled piers to the design depths into the underlying competent bedrock. The drilled piers should be advanced with temporary casing to the surface of the bedrock and the casing seated a minimum 6 inches into the bedrock, to reduce piping of the in-situ soils into the drilled pier shaft.

Groundwater should be anticipated during drilled pier installations. The drilled pier excavation must have all drill cuttings removed and dewatered, prior to placing concrete.

If dewatering the drilled pier excavations is not practical, the concrete must be placed using the tremie method. The tremie pipe must be maintained at least five feet below the top of the concrete. The fresh concrete must be above the bottom of the casing at all times. Care should be taken in withdrawing the casing to prevent cave-in of the drillhole and/or formation of voids. Drilled pier concrete should be designed to minimize the risk of voids forming during concrete placement and casing removal.

Cobbles and fill materials were encountered in some of the soil borings and should be anticipated during drilled pier installations.

Drilled piers may be designed using an allowable skin friction of 4 ksf and an allowable end bearing capacity of 60 ksf. It is recommended that skin friction in the overburden soils be neglected when determining the total load capacity of the drilled piers. Based on practical construction and inspection methodologies, the minimum recommended drilled pier diameter is 30 inches.

The drilled pier installations must be monitored by a geotechnical engineer to ensure adequate bearing capacity has been achieved and proper installation techniques are followed.

8.1.2.3 Micro-piles

Micro-piles are typically advanced using air-rotary, percussion drilling methods that can penetrate cobbles and fill materials with fewer difficulties than other installation methods. Micro-piles are typically less than 12 inches in diameter and installed by advancing a steel casing to the surface of bedrock, drilling a socket below the casing bottom, then installing a center steel reinforcing bar and grout to the top of the casing.

Micro-piles would derive their axial capacity through bond resistance between the grout and underlying Siltstone bedrock. The permanent steel casing should be seated into the bedrock and the bond zone created below the casing. Based on the rock core data, an ultimate grout-to-ground bond of 150 psi is recommended for the rock socket.

The means and methods of the micro-pile installations should be the responsibility of the contractor. The contractor should prepare a bored-in-pile installation plan and submit it to the engineer and owner. The installation of the micro-piles should be continually monitored by a Geotechnical Engineer familiar with the subsurface conditions present at the site and the micro-pile procedures utilized by the contractor. It is recommended that at least one static pile load test be performed for each micro-pile type utilized at the project site.

Individual micro-pile spacing (center to center) should be greater than 3 times the piles largest cross sectional dimension and not less than 30 inches. The pile spacing should be measured center to center at the cut off elevation.

8.1.2 Foundation Drain and Exterior Foundation Backfill

Due to the elevated groundwater conditions observed at the site, a foundation drain should be installed around the perimeter of the addition. The foundation drain should consist of a 4-inch perforated PVC pipe installed around the exterior of the footing. The invert of the footing drain should not be above the top of the footing or below the bottom of the footing,

where the drain is located adjacent to the footing. The slope of the footing drain should be about ⅛ inch per foot. In some cases, a flatter slope may be required. The drains should have a minimum of 4-inches of NYSDOT Number 1, crushed gravel beneath the bottom of the pipe and a minimum of 12 inches surrounding the top and sides of the pipe. The crushed gravel should be wrapped in non-woven geotextile (Mirafi 160N or equivalent). The drains should be connected to a storm water collection system or a sump and pump system. Cleanouts should be installed for purposes of future maintenance.

The exterior foundation backfill should consist of granular fill that is placed to within 2 feet of the final exterior grade. The final 2 feet of material in areas that will not have sidewalks or pavement surfaces should consist of material with a coefficient of permeability of less than $1x10^{-5}$. The impervious material will assist in directing water away from the buildings. The fill must be placed in accordance with Geotechnical Recommendations 9.5.3 and 9.5.4.

8.1.3 Under Slab Drains

An under slab drainage system should be installed for the basement area by placing a minimum 12-inch layer of NYSDOT Number 1, crushed gravel, on a non-woven geotextile (Mirafi 160N or equivalent). The NYSDOT Number 1, crushed gravel should be compacted with 2 passes of a vibratory compactor or as directed by a Geotechnical Engineer. The crushed gravel must have less than 1 percent of the material passing the number 200 sieve. A perforated under drain system should be installed in this layer. The drains should consist of minimum 4-inch diameter, perforated PVC pipe, typically spaced at about 15 feet center-to-center.

The interior under slab drains should be connected to a storm sewer system or a sump and pump system. Cleanouts should be installed for purposes of future maintenance.

8.1.4 Slabs-on-Grade

The basement slab-on-grade should be supported on a minimum 12 inches of NYSDOT Number 1, crushed gravel. The first floor level slab-on-grade should be supported on a minimum of 10 inches of Engineered Structural Fill subbase. The slabs-on-grade may be designed using a modulus of subgrade reaction of 125 pci. Where possible, slab subgrades should be compacted with a minimum 10-ton roller and proofrolled with a fully-loaded, tandem axle dump truck, under the direction of a Geotechnical Engineer, to identify any unstable areas. All slab subgrades should be evaluated by a Geotechnical Engineer prior to placing subbase materials. Unstable areas or deleterious fill materials should be overexcavated and replaced, as directed by a Geotechnical Engineer.

A vapor retarder should be installed beneath the slabs-on-grade in accordance with current ACI 302.1 recommendations.

8.2 Frost Protection

Shallow foundations must be founded on competent bedrock or a minimum of 4.5 feet below final exterior grade to provide adequate frost protection.

8.3 Seismic

Based on the field standard penetration test results, the seismic site classification for the project site has been determined to be C. The site class C maximum considered earthquake spectral response acceleration for short periods, (S_{MS}) is 0.151g and at 1-second period, (S_{M1}) is 0.096g as determined from the Building Code of New York State 2010.

8.4 General

Cobbles, bedrock, fill materials, old foundations, underground utilities, and perched groundwater may be encountered during new foundation and utility excavations. The bedrock elevation is anticipated to vary in elevation across the site and may be encountered at higher or lower elevations than indicated on the soil boring logs. The varying bedrock elevation should be considered in the project design and construction.

The soil parameters presented in the following table may be used for foundation design.

Table of Soil Properties

Soil Property	Granular Fill	Engineered Structural Fill
Angle of Internal Friction (°)	32	34
Active Earth Coefficient (K_a)*	0.31	0.28
At Rest Earth Coefficient (K_o)*	0.47	0.44
Passive Earth Coefficient (K_p)*	3.25	3.54
Ultimate Coefficient of Sliding Friction	0.44	0.47
Wet Unit Weight (pcf)	135-145	140-150

*The earth pressure coefficients are for level backfill placed in a fully drained condition.

9.0 GEOTECHNICAL RECOMMENDATIONS

The following recommendations are presented as the minimum requirements for the design, planning, and construction of the foundation systems and slab-on-grade. The concepts and geotechnical engineering considerations presented in the preceding sections must be considered in project design and construction.

9.1 Site Preparation

9.1.1 In planning excavations adjacent to existing structures and utilities, care must be taken to locate and maintain their stability. The project should be designed to minimize disturbance to existing structures and utilities.

9.1.2 Underpinning and/or shoring should be designed by a Professional Engineer retained by the contractor. The contractor should prepare a shoring plan and submit it to the architect and owner for review.

9.1.3 Site work should be scheduled during the drier portions of the year to avoid possible delays and additional costs associated with construction during the wet seasons.

9.1.4 The asphalt pavement, topsoil and organic material, and any deleterious fill must be removed from within the addition footprint. The site should be prepared as discussed in Section 8.1.1 of the Geotechnical Engineering Discussion.

9.1.5 Site surface grading must be designed to convey surface water away from the structures.

9.1.6 The contractor must follow excavation safety practices as mandated by 29 CFR Part 1926 (OSHA) and by applicable state regulations.

9.2 Building Foundations

9.2.1 Shallow foundations

9.2.1.1 Footings founded on bedrock and/or lean concrete may be designed using a safe allowable rock bearing capacity of 20 ksf.

9.2.1.2 All soil and loose bedrock should be removed to create a level rock bearing surface.

9.2.2 Drilled Piers (Caissons)

9.2.2.1 The drilled piers should be advanced a minimum of 2 feet into competent siltstone bedrock. Drilled piers supported in competent bedrock, may be designed using an allowable end bearing capacity of 60 ksf and an allowable skin friction of 4 ksf.

9.2.2.2 The contractor should be advised that cobbles and fill materials may be encountered during the drilled pier excavations.

9.2.2.3 Based on practical construction and inspection methodologies, the minimum recommended drilled pier diameter is 30 inches.

9.2.2.4 Construction methods, such as the installation of temporary casings, or other acceptable method which satisfactorily prevents caving and groundwater infiltration should be employed.

9.2.2.5 Unless otherwise specified, all excavations must be dewatered prior to placing concrete. A drilled pier excavation is considered dry if less than three inches of groundwater is present in the bottom of the excavation at the start of concrete placement and the groundwater infiltration rate is less than 0.25 inches rise per minute. Tremie concrete may be considered if approved by both the structural and geotechnical engineers.

9.2.2.6 Unless otherwise indicated, excavations for the drilled piers should be plumb to within a tolerance equal to 2% of the shaft length. Do not place the top of a drilled pier out of the indicated position by more than $1/24^{th}$ of the shaft diameter or three inches, whichever is less.

9.2.2.7 Do not excavate within three diameters of the drilled pier with new concrete for a minimum of 24 hours after concrete placement.

9.2.2.8 The contractor should submit a "Drilled Pier Installation Plan", describing the proposed means and methods for installation of the drilled piers.

9.2.3 Micro-piles

9.2.3.1 Micro-piles may be designed utilizing a bond stress of 150 psi between the grout and the siltstone bedrock.

9.3 Building Slab-on-Grade Preparation

9.3.1 A minimum of 12 inches of NYSDOT Number 1, crushed gravel should be placed to support the basement concrete slab-on-grade. A minimum of 10 inches of Engineered Structural Fill subbase should be placed to support the first level slab. The slabs may be designed using a modulus of subgrade reaction of 125 pci.

9.3.2 A vapor retarder should be installed beneath the slabs-on-grade in accordance with current ACI 302.1 recommendations.

9.3.3 An under slab drainage system should be installed beneath the basement slab-on-grade as discussed in Section 8.1.3 of the Geotechnical Engineering Discussion.

9.4 Dewatering

9.4.1. It will be the contractor's responsibility to maintain adequate water control at all times. Project specifications should clearly indicate that standing water, and/or saturated, unstable soil conditions will not be tolerated in areas to receive foundations or utilities. The project specifications should state that the contractor will not be reimbursed for extras related to the control of water.

9.4.2. Dewatering shall be performed in accordance with New York State Department Environmental Conservation (NYSDEC) storm water discharge requirements for construction.

9.5 Backfill and Compaction Requirements

9.5.1 The on-site soils, excluding deleterious organics and oversize material (particles larger than 4 inches in diameter), may be used for general site fill, provided the soil is placed and compacted in accordance with Geotechnical Recommendations 9.5.3 and 9.5.4. Granular Fill should be utilized as fill within the addition footprint and as foundation backfill.

9.5.2 **Granular Fill** should consist of a clean, screened, crushed, or bank-run gravel conforming to the following gradation:

Sieve Size	Percent Passing
4"	100
¼"	35-65
#200	0-10

9.5.3 All fill and backfill should be placed and compacted in lifts not exceeding eight inches in loose thickness, at a moisture content of ± 2% of the Optimum Moisture Content, and to densities in excess of 95%, as determined by ASTM D1557, or as directed by the Geotechnical Engineer.

9.5.4 Compaction should be performed with vibratory rollers unless there is concern for damage to adjacent structures or underground utilities.

9.6 Testing and Inspection

9.6.1 Foundation installations, drilled pier installations, underpinning, micro-pile installation, and slab-on-grade subbase placement and compaction must be continuously observed by an experienced Geotechnical Engineer and/or their representative, familiar with the subsurface conditions and analysis described in this report. The Geotechnical Engineer will be required to assess any unusual conditions and to ensure that adequate bearing capacities and proper foundation installation requirements are achieved.

9.6.2 All backfilling, placement of fill, compaction of in-situ soils, and concrete construction should be inspected by an Independent Testing Laboratory, which conforms to ASTM E-329, "The Standard Practice for use in the Evaluation of Testing and Inspection Agencies as Used in Construction". It should be the Independent Testing Laboratory's responsibility to monitor construction practices to determine if they are in accordance with the project documents.

9.6.3 The final foundation plans and project specifications should be reviewed by our office to ensure that there has not been a misinterpretation of this report.

10.0 SUMMARY

The subsurface investigation logs and this report in its entirety should be provided to the contractors for information and interpretation. The subsurface investigation logs may not be representative of the entire site subsurface condition, but only what was encountered at the individual test location at the time of the investigation. The subsurface soil, bedrock, and groundwater conditions may be different from those described on the subsurface investigation logs.

This report was prepared to present the findings of our subsurface investigation and engineering evaluation, and to outline concepts to be utilized in foundation design and construction. These concepts may require alterations to meet the specific design and economic considerations for this project.

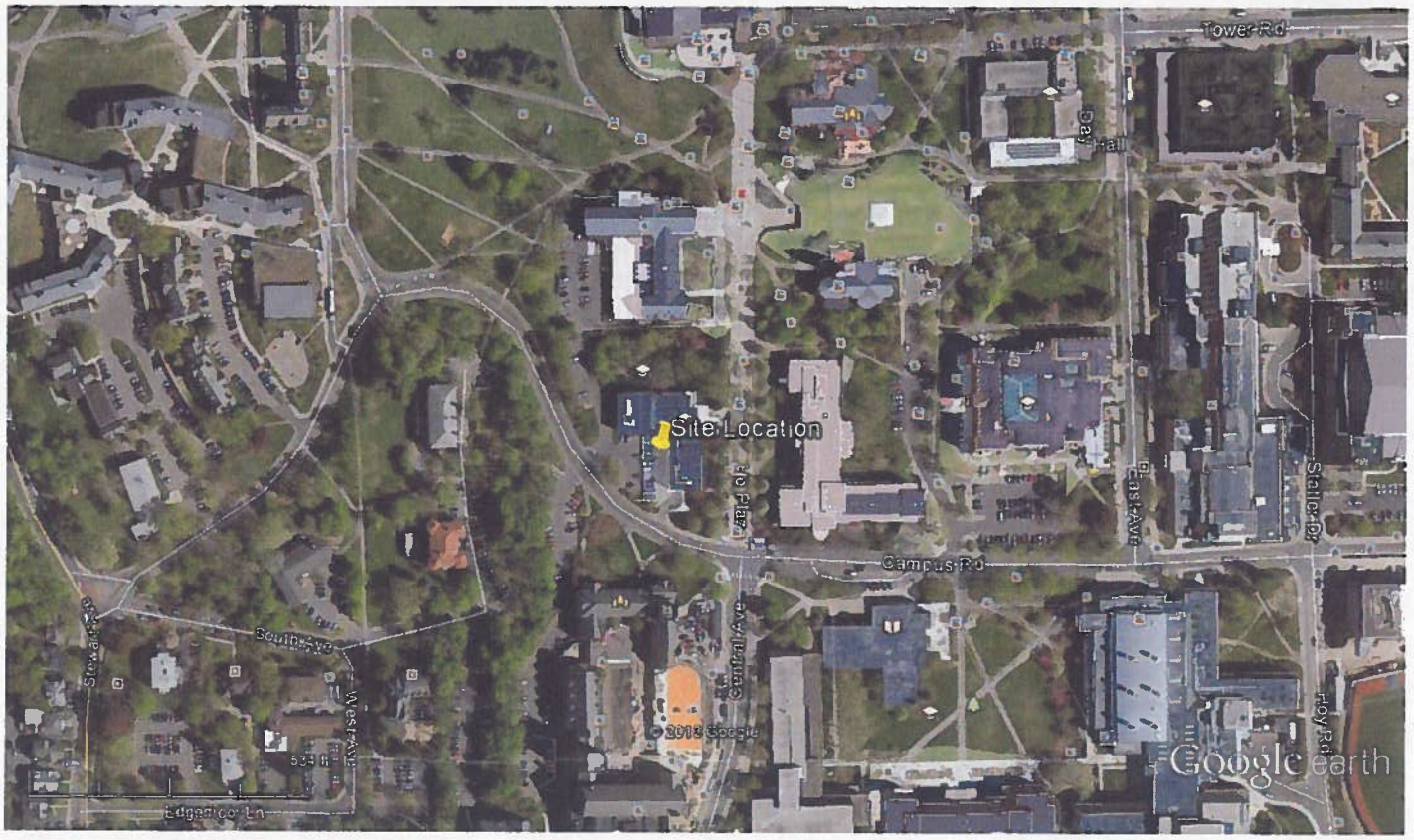
Prepared by:

Brian T. Barnes, PE
Senior Engineer

BTB/AJS/adw

APPENDIX A

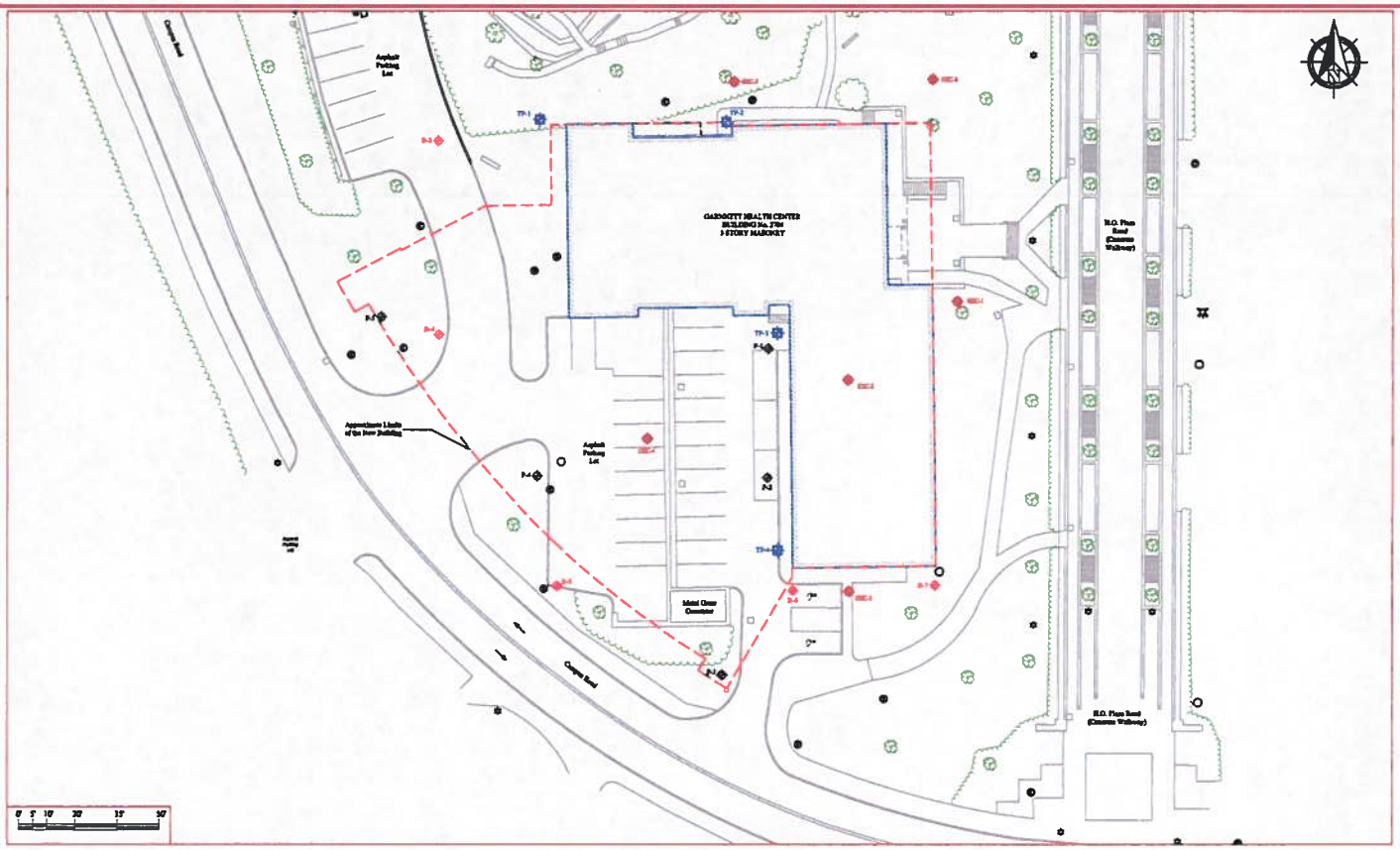
SITE LOCATION PLAN



Site Location Map	Drawn by: AJS	Scale: Not to scale	Project No.: CD3538	Date: September 2013
Proposed Addition to Gannett Health Services **Cornell University** **Ithaca, New York**	***ATLANTIC TESTING LABORATORIES*, Limited** Albany, NY · Binghamton, NY · Canton, NY · Elmira, NY · Plattsburgh, NY Poughkeepsie, NY · Syracuse, NY · Rochester, NY · Utica, NY · Watertown, NY			

APPENDIX B

BORING LOCATION PLAN



LEGEND

- P-1 — New Boring ID and Approximate Location (By ATL 2013)
- B-1 — Previous Boring ID and Approximate Location (By ATL 2008)
- TP-1 — Test Pit ID and Approximate Location (By ATL 2008)
- GHC-2 — Former Boring ID and Approximate Location (By Others 1957)

OVERALL SITE PLAN
Scale: As Noted

BORING LOCATION PLAN

Drawn by:	Scale :	Project No. :	Date :
REZ	As Noted	CD3538	September 2013

Subsurface Investigation & Geotechnical Evaluation
Proposed Addition - Gannett University Health Services
Cornell University
Ithaca, New York

ATLANTIC TESTING LABORATORIES, Limited
Albany, NY Binghamton, NY Canton, NY Elmira, NY Poughkeepsie, NY
Plattsburgh, NY Rochester, NY Syracuse, NY Utica, NY Watertown, NY

APPENDIX C

SUBSURFACE INVESTIGATION LOGS

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Report No.: CD3538E-01-09-13

Client: Chiang O'Brien Architects

Boring Location: See Boring Location Plan

Project: Subsurface Investigation

Proposed Addition-Gannett University Health Services

Ithaca, New York

Start Date: 8/21/2013 Finish Date: 8/21/2013

Boring No.: P-1 Sheet 1 of 1

Groundwater Observations

Date	Time	Depth	Casing
8/21/2013	AM	DRY	10'
8/21/2013	AM	DRY	17.5'
8/21/2013	AM	DRY	CAVED

Coordinates

Northing

Easting

Sampler Hammer

Weight: 140 lbs.

Fall: 30 in.

Hammer Type: Automatic

Ground Elev.: 761.4'

Boring Advance By: 3 3/4" Auger

Borehole caved at 14.8 feet.

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Recovery (Inches)
0							0.3	4" ASPHALT PAVEMENT	
1	AUGER	1	0.0	2.0	SS	24 9 7 8	2.0	Brown mf GRAVEL; some cmf SAND; little SILT (moist, non-plastic) FILL	10
2		2	2.0	4.0	SS	7 6 5 3		Grey SILT; some cmf SAND; little CLAY; trace mf GRAVEL (moist, slightly plastic) FILL	11
3									
4		3	4.0	6.0	SS	3 3 4 4		Similar Soil (moist, slightly plastic) FILL	17
5									
6		4	6.0	8.0	SS	4 4 6 7		Brown SILT; some cmf SAND; trace CLAY; trace ASPHALT PAVEMENT (moist, very slightly plastic) FILL	11
7							8.0		
8		5	8.0	10.0	SS	6 5 5 3		No Recovery	0
9							10.0		
10		6	10.0	12.0	SS	5 5 5 7		Brown SILT; some cmf SAND; trace mf GRAVEL (moist, non-plastic)	6
11									
12									
13									
14									
15		7	15.0	17.0	SS	7 9 9 6		Brown SILT; little cmf SAND; trace f GRAVEL (wet, non-plastic)	9
16									
17							17.5		
18		8	17.5	17.7	SS	50/2"	17.7	Grey mf GRAVEL; little cmf SAND; trace SILT (moist, non-plastic) Weathered ROCK	2
19								Boring terminated at 17.7 feet.	
20									
21								Notes:	
22								1. Borehole backfilled with on-site soils and the surface was patched with asphalt cold patch.	
23									
24									
25									

SS Split Spoon Sample
NX Rock Core
SH Undisturbed Sample (Shelby Tube)
Estimated Groundwater

Drillers: Kevin Remington; Kyle Johnson

Inspector:

ATL-LOG1 CD3538 CHIANG O'BRIEN ARCHITECTS - ITHACA, NEW YORK.GPJ LOG-WELL.GDT 9/11/13

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Report No.: CD3538E-01-09-13

Client: Chiang O'Brien Architects

Boring Location: See Boring Location Plan

Project: Subsurface Investigation

Proposed Addition-Gannett University Health Services

Ithaca, New York

Start Date: 8/21/2013 Finish Date: 8/21/2013

Boring No.: P-2 Sheet 1 of 2

Groundwater Observations

Date	Time	Depth	Casing
8/21/2013	AM	4.2'*	20'
8/21/2013	AM	6.1'*	CAVED

Coordinates

Northing

Easting

Sampler Hammer

Weight: 140 lbs.

Fall: 30 in.

Hammer Type: Automatic

Ground Elev.: 761.6'

Boring Advance By: 4 1/4" Auger

Borehole caved at 17.0 feet. *Affected by drill water.

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL (f - fine; m - medium; c - coarse; and - 35-50%; some - 20-35%; little - 10-20%; trace - 0-10%)	Recovery (Inches)
0	A	1	0.0	2.0	SS	34 7 6 7	0.3	4" ASPHALT PAVEMENT	10
1	U							Brown cmf SAND; some mf GRAVEL; little SILT (moist, non-plastic)	
2	G	2	2.0	4.0	SS	11 9 6 4		Brown cmf SAND; little SILT; trace f GRAVEL (moist, non-plastic)	4
3	E								
4	R	3	4.0	6.0	SS	3 3 3 1		Brown cmf SAND; trace SILT (moist, non-plastic) w=9.5%	12
5									
6		4	6.0	8.0	SS	1 3 3 3		Brown mf SAND; some SILT (wet, non-plastic) w=15.3%	9
7									
8		5	8.0	10.0	SS	2 3 3 2		Brown cmf SAND; little SILT; trace f GRAVEL (wet, non-plastic) w=12.3%	10
9							10.0		
10		6	10.0	12.0	SS	2 2 2 2		Brown SILT; some mf SAND (wet, non-plastic) w=20.2%	9
11									
12									
13									
14									
15		7	15.0	17.0	SS	8 6 6 7		Brown SILT; some mf SAND; trace f GRAVEL (wet, non-plastic) w=18.0% PL=NP, LL=NP, PI=NP	17
16									
17									
18									
19									
20		8	20.0	22.0	SS	4 28 50/2"	20.5		14
21	NX	9	21.2	26.2	NX	RUN1	21.2	Brown-Grey mf GRAVEL; some cmf SAND; little SILT; little CLAY; trace Weathered ROCK (wet, very slightly plastic)	44
22	C							Grey SILTSTONE	
23	O							44" or 73% Recovery	
24	R							7 Pieces (36") - 18% Chips and Fragments	
25	E							5 Pieces longer than 4" (25") - RQD = 48%	

SS Split Spoon Sample
NX Rock Core
SH Undisturbed Sample (Shelby Tube)
Estimated Groundwater

Drillers: Kevin Remington; Kyle Johnson

Inspector:

ATL-LOG1 CD3538 CHIANG O'BRIEN ARCHITECTS - ITHACA, NEW YORK.GPJ LOG-WELL.GDT 9/11/13

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Boring No.: P-2 Report No.: CD3538E-01-09-13 Sheet 2 of 2

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL (f - fine, m - medium, c - course; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	RECOVERY (inches)
26							26.2	Boring terminated at 26.2 feet.	
27									
28								Notes:	
29								1. Borehole backfilled with on-site soils and the surface was patched with asphalt cold patch.	
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
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60									
61									
62									

ATL-LOG1 CD3538 CHIANG O'BRIEN ARCHITECTS - ITHACA, NEW YORK.GPJ LOG-WELL.GDT 9/11/13

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Report No.: CD3538E-01-09-13

Client: Chiang O'Brien Architects

Boring Location: See Boring Location Plan

Project: Subsurface Investigation

Proposed Addition-Gannett University Health Services

Ithaca, New York

Start Date: 8/21/2013 Finish Date: 8/21/2013

Boring No.: P-3 Sheet 1 of 2

Groundwater Observations

Date	Time	Depth	Casing
8/21/2013	PM	DRY	25'
8/21/2013	PM	DRY	TOW@20.0'
8/22/2013	AM	18.0'	TOW@20.0'

Coordinates

Northing

Easting

Sampler Hammer

Weight: 140 lbs.

Fall: 30 in.

Hammer Type: Automatic

Ground Elev.: 761.2'

Boring Advance By: 3 3/4" Auger

Borehole caved at 20.0 feet.

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Recovery (Inches)
1	AUGER	1	0.0	2.0	SS	6 5 6 8	0.5	6" TOPSOIL and ORGANIC MATERIAL	14
2								Brown cmf SAND; little SILT; trace mf GRAVEL; trace DEBRIS (tile) (moist, non-plastic) FILL	
3		2	2.0	4.0	SS	8 9 10 12		Brown cmf SAND; little SILT; trace mf GRAVEL; trace DEBRIS (asphalt pavement, glass) (moist, non-plastic) FILL	9
4									
5		3	4.0	6.0	SS	9 9 8 11		Black cmf SAND; some mf GRAVEL; little SILT (moist, non-plastic) Possible FILL	6
6							6.0		
7		4	6.0	8.0	SS	13 10 10 6		Grey cmf GRAVEL; some cmf SAND; trace SILT (moist, non-plastic) Possible FILL	10
8								Cobbles encountered from 6 to 17 feet	
9		5	8.0	10.0	SS	7 6 8 11		Similar Soil without c GRAVEL (moist, non-plastic) Possible FILL	3
10									
11		6	10.0	12.0	SS	9 15 17 10		Grey ROCK Fragments (dry, non-plastic) Possible FILL	2
12									
13							13.0		
14									
15		7	15.0	17.0	SS	3 4 6 8		Grey cmf GRAVEL; little cmf SAND; little SILT; little CLAY (wet, very slightly plastic)	9
16									
17									
18							18.0 ▼		
19									
20									
21		8	20.0	22.0	SS	6 5 7 7		Brown SILT; little cmf SAND; little f GRAVEL; little CLAY (wet, slightly plastic)	23
22									
23							23.0		
24									
25							25.1		

SS Split Spoon Sample
NX Rock Core
SH Undisturbed Sample (Shelby Tube)
Estimated Groundwater

Drillers: Kevin Remington; Kyle Johnson

Inspector:

ATL-LOG1 CD3538 CHIANG O'BRIEN ARCHITECTS - ITHACA, NEW YORK.GPJ LOG-WELL.GDT 9/11/13

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Boring No.: P-3 Report No.: CD3538E-01-09-13 Sheet 2 of 2

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL (f - fine, m - medium, c - course; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	RECOVERY (inches)
		9	25.0	25.1	SS	50/1"		Grey Weathered ROCK (dry, non-plastic)	1
26									
27								Boring terminated at 25.9 feet.	
28									
29								Notes:	
30								1. Temporary observation well installed to a depth of 20 feet.	
31								The well was pulled and backfilled with on-site soil on	
32								8/22/2013.	
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
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61									
62									

ATL-LOG1 CD3538 CHIANG O'BRIEN ARCHITECTS - ITHACA, NEW YORK.GPJ LOG-WELL.GDT 9/11/13

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Report No.: CD3538E-01-09-13

Client: Chiang O'Brien Architects

Boring Location: See Boring Location Plan

Project: Subsurface Investigation

Proposed Addition-Gannett University Health Services

Ithaca, New York

Start Date: 8/22/2013 Finish Date: 8/22/2013

Boring No.: P-4 Sheet 1 of 2

Groundwater Observations

Date	Time	Depth	Casing
8/22/2013	PM	20.3'	25'
8/22/2013	PM	18.5'	CAVED

Coordinates

Northing

Easting

Sampler Hammer

Weight: 140 lbs.

Fall: 30 in.

Hammer Type: Automatic

Ground Elev.: 751.9'

Boring Advance By: 3 3/4" Auger

Borehole caved at 19.0 feet.

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Recovery (Inches)
0	AUGER	1	0.0	2.0	SS	1 4 6 9	0.8	9" TOPSOIL and ORGANIC MATERIAL	10
1							2.0	Brown cmf SAND; some SILT; little cmf GRAVEL; trace ORGANIC MATERIAL (root hairs) (moist, non-plastic)	
2		2	2.0	4.0	SS	8 8 12 16		Grey cmf GRAVEL; and cmf SAND; trace SILT (moist, non-plastic) Possible Weathered ROCK - Possible FILL	12
3									
4		3	4.0	6.0	SS	10 8 6 37		Greyish - Brown cmf SAND; and cmf GRAVEL; little SILT (moist, non-plastic) Possible Weathered ROCK - Possible FILL w=9.5%	14
5									
6		4	6.0	8.0	SS	64 12 6 5		Grey cmf SAND; and cmf GRAVEL; little SILT (moist, non-plastic) Possible Weathered ROCK - Possible FILL w=2.2%	7
7									
8		5	8.0	10.0	SS	15 17 10 18		No Recovery	0
9									
10		6	10.0	12.0	SS	16 16 8 12		Grey cmf SAND; and cmf GRAVEL; little SILT (moist, non-plastic) Possible Weathered ROCK - Possible FILL w=2.2%	4
11									
12							13.0		
13									
14									
15		7	15.0	17.0	SS	3 5 7 6		Brown SILT; some CLAY; some cmf SAND (wet, slightly plastic) w=17.8% PL=19, LL=31, PI=12	14
16									
17									
18								▼	
19									
20		8	20.0	22.0	SS	6 6 6 7		Grey Similar Soil w=20.4%	24
21									
22									
23							23.0		
24									
25									

SS Split Spoon Sample
NX Rock Core
SH Undisturbed Sample (Shelby Tube)
Estimated Groundwater

Drillers: Kevin Remington; Kyle Johnson

Inspector:

ATL-LOG1 CD3538 CHIANG O'BRIEN ARCHITECTS - ITHACA, NEW YORK.GPJ LOG-WELL.GDT 9/11/13

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Boring No.: P-4 Report No.: CD3538E-01-09-13 Sheet 2 of 2

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL (f - fine, m - medium, c - course; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	RECOVERY (inches)
26		9	25.0	26.1	SS	33 36 50/1"	26.1	Grey cmf GRAVEL; and cmf SAND; little SILT (saturated, non-plastic) Weathered ROCK	9
27								Boring terminated at 26.1 feet.	
28									
29								Notes:	
30								1. Borehole backfilled with on-site soils.	
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
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61									
62									

ATL-LOG1 CD3538 CHIANG O'BRIEN ARCHITECTS - ITHACA, NEW YORK.GPJ LOG-WELL.GDT 9/11/13

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Report No.: CD3538E-01-09-13

Client: Chiang O'Brien Architects

Boring Location: See Boring Location Plan

Project: Subsurface Investigation
Proposed Addition-Gannett University Health Services
Ithaca, New York

Start Date: 8/22/2013 Finish Date: 8/22/2013

Boring No.: P-5 Sheet 1 of 1

Coordinates
Northing
Easting

Sampler Hammer
Weight: 140 lbs.
Fall: 30 in.
Hammer Type: Automatic

Ground Elev.: 746.1'

Boring Advance By: 4 1/4" Auger

Groundwater Observations

Date	Time	Depth	Casing
8/22/2013	PM	DRY	20'
8/22/2013	PM	DRY	CAVED

Borehole caved at 14.0 feet.

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Recovery (Inches)
1	AUGER	1	0.0	2.0	SS	2 3 4 9	0.8	9" TOPSOIL and ORGANIC MATERIAL	10
2		2	2.0	4.0	SS	4 4 7 5		Brown cmf SAND; some SILT; little mf GRAVEL; trace ORGANIC MATERIAL (root hairs) (moist, non-plastic) - FILL Similar Soil - FILL	2
4		3	4.0	6.0	SS	3 6 2 2		Similar Soil - FILL	2
6		4	6.0	8.0	SS	12 11 12 10	6.0	Grey mf GRAVEL; trace cmf SAND; trace SILT (moist, non-plastic) - Possible FILL	2
8		5	8.0	10.0	SS	4 4 8 4		Grey cmf GRAVEL; and cmf SAND; little SILT (moist, non-plastic) Possible Weathered Rock - Possible FILL	9
10		6	10.0	12.0	SS	12 10 6 8		Similar Soil - Possible FILL	14
13							13.0		
15		7	15.0	17.0	SS	3 3 3 4		Brown SILT; and f SAND; little CLAY; trace f GRAVEL (wet, moderately plastic)	18
20							20.0		
20		8	20.0	20.2	SS	50/2"	20.2	Grey cmf SAND; some mf GRAVEL; little SILT (moist, non-plastic) Weathered ROCK	2
								Boring terminated at 20.2 feet.	
								Notes: 1. Borehole backfilled with on-site soils.	

SS Split Spoon Sample
NX Rock Core
SH Undisturbed Sample (Shelby Tube)
Estimated Groundwater

Drillers: Kevin Remington; Kyle Johnson

Inspector:

ATL-LOG1 CD3538 CHIANG O'BRIEN ARCHITECTS - ITHACA, NEW YORK.GPJ LOG-WELL.GDT 9/11/13

APPENDIX D

PREVIOUS SUBSURFACE BORING LOGS (2008)

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Report No.: CD2911-09-08

Client: Tsoi/Kobus Associates

Boring Location: See Boring Location Plan

Project: Subsurface Investigation

Gannett

Proposed University Health Services

Cornell University

Start Date: 9/15/2008 Finish Date: 9/15/2008

Boring No.: B-3 Sheet 1 of 2

Groundwater Observations

Date	Time	Depth	Casing
9/15/2008	4:15 PM	DRY	10.0'
9/15/2008	5:40 PM	DRY	20.0'
9/15/2008	6:00 PM	*3.2'	20.0'
9/15/2008	6:20 PM	*5.6'	OUT

Coordinates

Northing

Easting

Sampler Hammer

Weight: 140 lbs.

Fall: 30 in.

Hammer Type: Automatic

Ground Elev.: 745.9

Boring Advance By: 4 1/4" Auger

Borehole caved at 19.4 feet. *May be affected by drill water. Based on soil moisture content groundwater appears to be about 12 feet below the surface.

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Recovery (inches)
0	AUGER	1	0.0	2.0	SS	68 27 14 14	0.5	6" ASPHALT PAVEMENT	14
1								Brown cmf SAND; and cmf GRAVEL; little SILT; trace CLAY (moist, very slightly plastic) w=6.6%	
2		2	2.0	4.0	SS	24 11 10 9		Brown cmf GRAVEL; and cmf SAND; little SILT; trace CLAY (moist, very slightly plastic) w=6.9%	9
3							4.0		
4		3	4.0	6.0	SS	4 5 4 4		Brown cmf SAND; some cmf GRAVEL; little SILT; trace CLAY (moist, very slightly plastic) w=13.1%	11
5									
6		4	6.0	8.0	SS	6 6 7 7		Brown cmf SAND; some SILT; trace mf GRAVEL (moist, non-plastic) w=9.6%	14
7									
8		5	8.0	10.0	SS	4 4 3 3		Similar Soil (moist, non-plastic) w=9.6%	15
9									
10		6	10.0	12.0	SS	6 5 7 5		Brown cmf SAND; little SILT; little mf GRAVEL (moist, non-plastic) w=8.6%	14
11									
12		7	12.0	14.0	SS	12 11 12 14	12.0 ▼	Brown SILT; some CLAY; trace f SAND; trace mf GRAVEL (wet, non-plastic) w=18.6%	21
13									
14							14.0		
15		8	15.0	15.9	SS	39 50/5"	15.9	Greyish-Brown cmf GRAVEL; and cmf SAND; little SILT; trace CLAY (wet, very slightly plastic) w=5.3%	7
16									
17									
18									
19									
20	NX CORE	9	20.0 20.2	20.2 25.2	SS NX	100/2" RUN 1	20.2	Greyish-White cmf GRAVEL (Rock Chip) (dry, non-plastic)	1
21								Grey SILTSTONE	60
22								60" or 100% Recovery	
23								15 Pieces (57")-5% Chips and Fragments	
24								5 Pieces longer than 4" (29")-RQD=48%	
25									

SS Split Spoon Sample
NX Rock Core
SH Undisturbed Sample (Shelby Tube)
Estimated Groundwater

Drillers: Tony Mallory; Justin Sochia

Inspector:

ATL-LOG1 CD2911.GPJ LOG-WELL.GDT 10/30/08

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Boring No.: B-3 Report No.: CD2911-09-08 Sheet 2 of 2

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL	RECOVERY (Inches)
							25.2	Boring terminated at 25.2 feet.	
								Note:	
								1. Borehole backfilled with cement-bentonite grout.	

f - fine
m - medium
c - course

and - 35-50%
some - 20-35%
little - 10-20%
trace - 0-10%

26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62

ATL-LOG1 CD2911.GPJ LOG-WELL.GDT 10/30/08

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Report No.: CD2911-09-08

Client: Tsoi/Kobus Associates

Boring Location: See Boring Location Plan

Project: Subsurface Investigation

Gannett

Proposed University Health Services

Cornell University

Start Date: 9/17/2008 Finish Date: 9/17/2008

Boring No.: B-4 Sheet 1 of 2

Groundwater Observations

Date	Time	Depth	Casing
9/17/2008	6:30 PM	*4.3'	23.0'
9/17/2008	6:50 PM	*6.2'	OUT

Coordinates

Northing

Easting

Sampler Hammer

Weight: 140 lbs.

Fall: 30 in.

Hammer Type: Automatic

Ground Elev.: 748.3

Boring Advance By: 4 1/4" Auger

Borehole caved at 22.7 feet. *May be affected by drill water.

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Recovery (inches)
0									
1	A	1	0.0	2.0	SS	6 5 5 5		Brown cmf SAND; little cmf GRAVEL; little SILT; trace ORGANIC MATERIAL (root hairs) (moist, non-plastic) w=3.4%	5
2	C								
3	G	2	2.0	4.0	SS	3 4 4 3		Brown c GRAVEL (moist, non-plastic) w=1.7%	1
4	R						4.0		
5		3	4.0	6.0	SS	4 4 7 9		Brown cmf SAND; and cmf GRAVEL; little SILT; trace ORGANIC MATERIAL (root hairs, grass) (moist non-plastic) w=4.0%	7
6							6.0		
7		4A	6.0	7.5	SS	5 3 6	7.5	Brown SILT; little mf GRAVEL; little cmf SAND; trace CLAY (moist, very slightly plastic) w=10.6%	4
8		4B	7.5	8.0	SS	7			5
9		5	8.0	10.0	SS	9 8 7 6		Brown cmf SAND; some cmf GRAVEL; some SILT; trace CLAY (moist, very slightly plastic) w=10.4%	8
10		6	10.0	12.0	SS	5 3 2 2		Brown cmf SAND; little mf GRAVEL; little SILT (moist, non-plastic) w=8.1%	18
11								Similar Soil (moist, non-plastic) w=8.2%	
12		7	12.0	14.0	SS	3 2 2 2		Brown mf SAND; little SILT; trace CLAY (moist, very slightly plastic) w=12.8%	20
13									
14		8	14.0	16.0	SS	5 10 12 15	14.0	Brown SILT; some CLAY; little mf SAND (moist, non-plastic) w=17.2%	20
15									
16									
17									
18							18.0		
19									
20		9A	20.0	20.5	SS	9	20.5	Brown cmf SAND; some SILT; little mf GRAVEL; trace CLAY (moist, very slightly plastic) w=8.1%	6
21		9B	20.5	21.1	SS	44 50/2"			2
22								Greyish-Brown cmf GRAVEL; little cmf SAND; trace SILT (moist, non-plastic) Possible Weathered Rock w=3.3%	
23	N		23.0	28.0	NX	RUN 1	23.0	Grey SILTSTONE 60" or 100% Recovery	60
24	X								
25									

SS Split Spoon Sample
NX Rock Core
SH Undisturbed Sample (Shelby Tube)
Estimated Groundwater

Drillers: Tony Mallory; Justin Sochia

Inspector:

ATL-LOG1 CD2911.GPJ LOG-WELL.GDT 10/30/08

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Boring No.: B-4 Report No.: CD2911-09-08 Sheet 2 of 2

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL	RECOVERY (inches)
26	R C							2 Pieces (13")-78% Chips and Fragments	
27	R C							2 Pieces longer than 4" (13")-RQD=22%	
28	R C							Rock core encountered a vertical seam that was approximately	
29							28.0	3.5 feet long.	
30								Boring terminated at 28.0 feet.	
31									
32								Note:	
33								1. Borehole backfilled with on-site soils.	
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									

f - fine, m - medium, c - course

and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%

ATL-LOG1 CD2911.GPJ LOG-WELL.GDT 10/30/08

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Report No.: CD2911-09-08

Client: Tsoi/Kobus Associates

Boring Location: See Boring Location Plan

Project: Subsurface Investigation

Gannett

Proposed University Health Services

Cornell University

Start Date: 9/16/2008 Finish Date: 9/16/2008

Boring No.: B-5 Sheet 1 of 2

Groundwater Observations

Date	Time	Depth	Casing
9/16/2008	2:20 PM	DRY	10.0'
9/16/2008	4:45 PM	*8.6'	28.5'
9/18/2008	6:35 PM	15.2'	TOW@32.3'
9/20/2008	8:30 AM	17.3'	TOW@32.3'

*May be affected by drill water.

Coordinates

Northing

Easting

Sampler Hammer

Weight: 140 lbs.

Fall: 30 in.

Hammer Type: Automatic

Ground Elev.: 753.7

Boring Advance By: 4 1/4" Auger

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Recovery (inches)
1	A	1	0.0	2.0	SS	4 8 12 11	0.3	3" TOPSOIL & ORGANIC MATERIAL	12
2	C							Brown cmf SAND; some cmf GRAVEL; little SILT; trace ORGANIC MATERIAL (root hairs) (moist, non-plastic)	
3	G	2	2.0	4.0	SS	10 11 5 7		Grey cmf GRAVEL (Rock Chips); little cmf SAND; trace SILT (moist, non-plastic)	8
4	E						4.0		
5		3	4.0	6.0	SS	4 9 9 10		Greyish-Brown cmf SAND; some cmf GRAVEL; little SILT; trace CLAY (moist, very slightly plastic)	12
6									
7		4	6.0	8.0	SS	11 9 8 6		Greyish-Brown cmf GRAVEL; and cmf SAND; trace SILT (moist, non-plastic)	10
8									
9		5	8.0	10.0	SS	4 5 6 7		Greyish-Brown cmf GRAVEL; little cmf SAND; trace SILT (moist, non-plastic)	8
10									
11		6	10.0	12.0	SS	10 9 10 8		Greyish-Brown cmf GRAVEL; some cmf SAND; trace SILT (moist, non-plastic)	19
12									
13							13.5		
14									
15		7	15.0	17.0	SS	5 7 10 15		Brown SILT; some CLAY; trace of GRAVEL (wet, moist plastic)	19
16									
17								▼	
18									
19									
20		8	20.0	22.0	SS	6 10 14 18		Greyish-Brown Similar Soil (wet, moderately plastic)	22
21									
22									
23									
24									
25									

SS Split Spoon Sample
NX Rock Core
SH Undisturbed Sample (Shelby Tube)
Estimated Groundwater

Drillers: Tony Mallory; Justin Sochia

Inspector:

ATL-LOG1 CD2911.GPJ LOG-WELL.GDT 10/30/08

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Boring No.: B-5 Report No.: CD2911-09-08 Sheet 2 of 2

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL	RECOVERY (inches)
		9	25.0	27.0	SS	12 22 15 30	25.5	Greyish-Brown cmf SAND; and cmf GRAVEL; little SILT; trace CLAY (wet, very slightly plastic)	14
								Possible Weathered Bedrock	
							28.5		
	NX CORE		28.5	33.5	NX	RUN 1		Grey SILTSTONE 60" or 100% Recovery 12 Pieces (60")-0% Chips and Fragments 7 Pieces longer than 4" (47")-RQD=78%	
							33.5	Boring terminated at 36.5 feet.	

f - fine
m - medium
c - course

and - 35-50%
some - 20-35%
little - 10-20%
trace - 0-10%

Note:
1. A temporary observation well was installed to a depth of 32.3 feet.

ATL-LOG1 CD2911.GPJ LOG-WELL.GDT 10/30/08

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Report No.: CD2911-09-08

Client: Tsoi/Kobus Associates

Boring Location: See Boring Location Plan

Project: Subsurface Investigation

Gannett

Proposed University Health Services

Cornell University

Start Date: 9/16/2008 Finish Date: 9/17/2008

Boring No.: B-6 Sheet 1 of 2

Groundwater Observations

Date	Time	Depth	Casing
9/17/2008	7:30 AM	DRY	15.0'
9/17/2008	8:17 AM	DRY	20.5'
9/17/2008	10:25 AM	10.0'	20.5'
9/17/2008	11:00 AM	15.9'	OUT

Coordinates

Northing

Easting

Sampler Hammer

Weight: 140 lbs.

Fall: 30 in.

Hammer Type: Automatic

Ground Elev.: 761.1

Boring Advance By: 4 1/4" Auger

Borehole caved at 17.2 feet.

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Recovery (inches)
0	AUGER	1A	0.0	1.5	SS	26 8 7	0.3	3" ASPHALT PAVEMENT	4
1							0.6	4" CRUSHER RUN	
2		1B	1.5	2.0	SS	7			5
		2	2.0	4.0	SS	9 4 3 4		Brown cmf SAND; some cmf GRAVEL; little SILT; trace CLAY (wet, very slightly plastic)	19
3								Brown cmf+ SAND; some SILT; little mf GRAVEL; trace CLAY	
4		3	4.0	6.0	SS	8 10 12 16		(wet, slightly plastic) w=14.8%	7
5								Grey cmf GRAVEL; little cmf SAND; trace SILT (moist,	
6		4	6.0	8.0	SS	12 7 6 4		non-plastic) w=2.4%	
7								Greyish-Brown Similar Soil (wet, non-plastic) w=4.1%	2
8		5	8.0	10.0	SS	3 3 4 5		Similar Soil (wet, non-plastic) w=5.7%	3
9									
10		6	10.0	12.0	SS	3 2 3 3		Brown cmf SAND; little mf GRAVEL; little SILT; trace CLAY (saturated, very slightly plastic) w=12.2%	19
11									
12		7	12.0	14.0	SS	3 WOH 2		Brown mf SAND; little SILT; little CLAY (saturated, slightly plastic) w=19.1%	24
13									
14		8	14.0	16.0	SS	2 1 1 1		Brown mf SAND; some SILT; little CLAY (saturated, slightly plastic) w=22.3%	20
15							16.0		
16		9	16.0	18.0	SS	1 2 3 3		Brown SILT; some CLAY; little mf SAND (wet, moderately plastic) w=22.4%	13
17							18.0		
18		10A	18.0	19.5	SS	WOH 11 23	18.5	Brown cmf SAND; some cmf GRAVEL; little SILT; little CLAY (wet, slightly plastic) w=10.2%	12
19									
20		10B	19.5	19.8	SS	50/4"		Greyish-Brown cmf GRAVEL; some cmf SAND; little SILT	4
		11	20.0	20.5	SS	50/5"	20.5	(moist, non-plastic) w=5.7%	1
21	NX CORE		20.5	25.5	NX	RUN 1		Greyish-Brown cmf SAND; some cmf GRAVEL; little SILT; trace CLAY (wet, very slightly plastic)	
22									
23								Grey SILTSTONE	
24								60" or 100% Recovery	
25								12 Pieces (49")-18% Chips and Fragments	

ATL-LOG1 CD2911.GPJ LOG-WELL.GDT 10/30/08

SS Split Spoon Sample
NX Rock Core
SH Undisturbed Sample (Shelby Tube)
Estimated Groundwater

Drillers: Tony Mallory; Justin Sochia

Inspector:

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Boring No.: B-6 Report No.: CD2911-09-08 Sheet 2 of 2

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL	RECOVERY (Inches)
26			25.5	30.5	NX	RUN 2	25.5	5 Pieces longer than 4" (34")-RQD=57%	
27								Grey SILTSTONE	
28								60" or 100% Recovery	
29								4 Pieces (60")-0% Chips and Fragments	
30								3 Pieces longer than 4" (57")-RQD=95%	
31							30.5	Boring terminated at 13 feet.	
32									
33								Note:	
34								1. Borehole backfilled with on-site soils and the surface was patched with asphalt cold patch.	
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									

c - course: and - 35-50%; some - 20-35%; little - 10-20%; trace - 0-10%

ATL-LOG1 CD2911.GPJ LOG-WELL.GDT 10/30/08

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Client: Tsoi/Kobus Associates
Project: Subsurface Investigation
Proposed University Health Services
Cornell University

Report No.: CD2911-09-08
Boring Location: See Boring Location Plan
Gannett

Start Date: 9/17/2008 Finish Date: 9/17/2008

Boring No.: B-7 Sheet 1 of 2

Coordinates
Northing
Easting

Sampler Hammer
Weight: 140 lbs.
Fall: 30 in.
Hammer Type: Automatic

Ground Elev.: 783.5
Boring Advance By: 4 1/4" Auger

Groundwater Observations

Date	Time	Depth	Casing
9/17/2008	1:50 PM	DRY	22.5'
9/17/2008	2:33 PM	*3.3'	22.5'
9/18/2008	6:25 AM	13.8'	TOW@26.2'
9/20/2008	8:30 AM	13.1'	TOW@26.2'

Borehole caved at 16 feet. *May be effected by drill water.

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Recovery (Inches)
1	AUGER	1	0.0	2.0	SS	2 3 4 4	0.3	3" TOPSOIL & ORGANIC MATERIAL	14
2								Brown mf SAND; little f GRAVEL; trace SILT (moist, non-plastic)	
3		2	2.0	4.0	SS	2 WOH 2		Brown f SAND; some SILT; trace CLAY; trace ORGANIC MATERIAL (wood) (wet, very slightly plastic)	13
4		3	4.0	6.0	SS	2 2 2 2		Brown cmf SAND; little SILT; trace f GRAVEL (wet, non-plastic)	18
5									
6		4	6.0	8.0	SS	2 2 2 5		Similar Soil (wet, non-plastic)	14
7									
8		5	8.0	10.0	SS	6 7 7 5	8.0	Brown cmf SAND; some cmf GRAVEL; little SILT; trace CLAY (moist, very slightly plastic)	12
9									
10		6	10.0	12.0	SS	7 5 3 4		Brown cmf SAND; trace mf GRAVEL; trace SILT; trace CLAY (moist, very slightly plastic)	15
11									
12		7	12.0	14.0	SS	7 12 20 30	12.0	Brown SILT; little CLAY; little mf SAND; trace f GRAVEL (wet, slightly plastic)	18
13									
14									
15		8	15.0	17.0	SS	4 6 12 11		Grey cmf SAND; some SILT; little cmf GRAVEL; trace CLAY (wet, very slightly plastic)	19
16									
17									
18							18.0		
19									
20		9	20.0	22.0	SS	16 12 14 22		Greyish-Brown cmf SAND; and cmf GRAVEL; trace SILT; trace CLAY (saturated, very slightly plastic)	12
21									
22							22.5		
23	NX		22.5	27.5	NX	RUN 1		Grey SILTSTONE 60" or 100% Recovery 14 Pieces (59")-2% Chips and Fragments	
24									
25	C								

SS Split Spoon Sample
NX Rock Core
ST Undisturbed Sample (Shelby Tube)
Estimated Groundwater

Drillers: Tony Mallory; Justin Sochia
Inspector:

ATL-LOG1 CD2911.GPJ LOG-WELL.GDT 10/30/08

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Boring No.: B-7 Report No.: CD2911-09-08 Sheet 2 of 2

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL	RECOVERY (Inches)
26	CORE							7 Pieces longer than 4" (43")-RQD=72%	
27							27.5		
28								Boring terminated at 13 feet.	
29									
30								Note:	
31								1. A temporary observation well was installed to a depth of 26.2 feet.	
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
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47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									

f - fine
m - medium
c - course

and - 35-50%
some - 20-35%
little - 10-20%
trace - 0-10%

ATL-LOG1 CD2911.GPJ LOG-WELL.GDT 10/30/08

APPENDIX E

TABLE OF SUBSURFACE CONDITIONS

ATLANTIC TESTING LABORATORIES, Limited
Gannett University Health Serives
Cornell Univeristy
TABLE OF SUBSURFACE CONDITIONS
ATL Report No. CD3538E-01-09-13

Boring No.	Date	Surface Elevation (ft)	Depth of Groundwater (ft)	Elevation of Groundwater (ft)	Depth of Weathered Rock (ft)	Elevation of Weathered Rock (ft)	Depth of Bedrock (ft)	Elevation of Bedrock (ft)
GHC-1	1957	765.0	NA	NA	NA	NA	12.8	752.3
GHC-2	1957	765.3	NA	NA	NA	NA	16.1	749.2
GHC-3	1957	759.9	NA	NA	NA	NA	17.5	742.4
GHC-4	1957	755.7	NA	NA	NA	NA	17.5	738.2
GHC-5	1957	750.1	NA	NA	NA	NA	3.5	746.6
GHC-6	1957	761.3	NA	NA	NA	NA	6.5	754.8
B-3	2008	745.9	12.0	733.9	20.0	725.9	20.2	725.7
B-4	2008	748.3	--	--	20.5	727.8	23.0	725.3
B-5	2008	753.7	15.2	738.5	25.5	728.2	28.5	725.2
B-6	2008	761.1	10.0	751.1	19.5	741.6	20.5	740.6
B-7	2008	763.5	13.1	750.4	--	--	22.5	741.0
P-1	2013	761.4	--	--	17.5	743.9	17.7	743.7
P-2	2013	761.6	--	--	20.5	741.1	21.2	740.4
P-3	2013	761.2	18.0	743.2	25.0	736.2	--	--
P-4	2013	751.9	18.5	733.4	25.0	726.9	--	--
P-5	2013	746.1	--	--	20.0	726.1	--	--

APPENDIX F

PARTICLE SIZE DISTRIBUTION CURVES

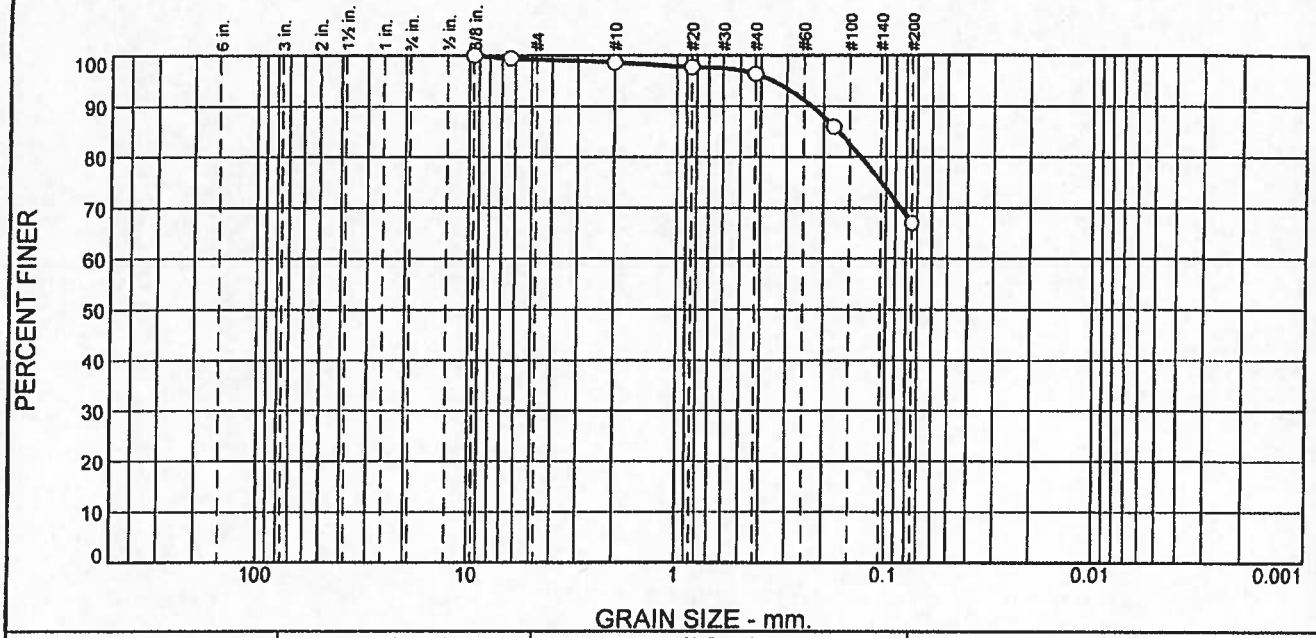
Particle Size Distribution Report

Project: Proposed Addition Gannett University Health Services **Report No.:** CD3538SL-02-09-13

Client: Chang O'Brien Architects **Date:** 9/10/13

Sample No: P-2; S-7 **Source of Sample:** Boring Sample

Location: **Elev./Depth:** 15.0 - 17.0'



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	1	0	3	29	67	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
3/8"	100		
1/4"	99		
#10	99		
#20	98		
#40	96		
#80	86		
#200	67		

* (no specification provided)

Soil Description

Brown SILT; some cmf SAND; trace f GRAVEL

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{85}= 0.1708 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

Moisture content 18.0%

Figure

ATLANTIC TESTING LABORATORIES, LIMITED

Reviewed by: Date: 9/11/13

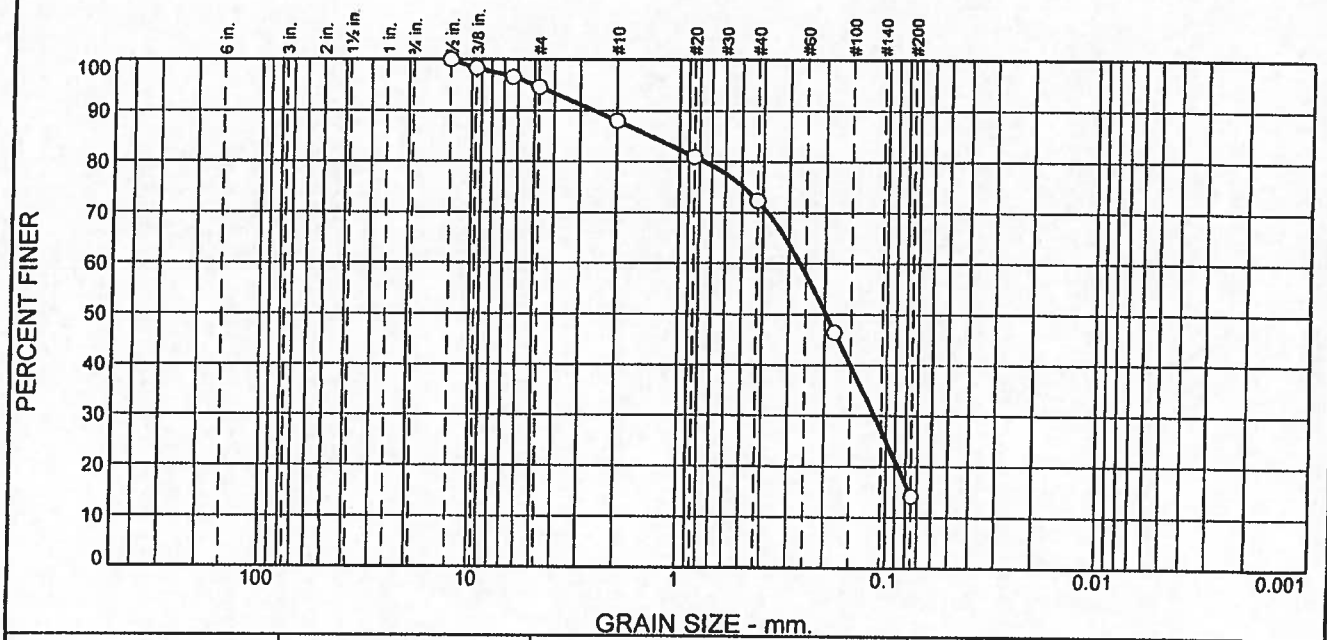
Particle Size Distribution Report

Project: Proposed Addition Gannett University Health Services **Report No.:** CD3538SL-01-09-13

Client: Chang O'Brien Architects **Date:** 9/10/13

Sample No: P-2; S-5 **Source of Sample:** Boring Sample

Location: **Elev./Depth:** 8.0 - 10.0'



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	5	7	16	58	14	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
1/2"	100		
3/8"	98		
1/4"	97		
#4	95		
#10	88		
#20	81		
#40	72		
#80	46		
#200	14		

* (no specification provided)

Soil Description

Brown cmf+ SAND: little SILT; trace f GRAVEL

Atterberg Limits

PL= -- LL= -- PI= --

Coefficients

D_{85}= 1.3807 D_{60}= 0.2670 D_{50}= 0.1987

D_{30}= 0.1147 D_{15}= 0.0767 D_{10}=

C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

Moisture content 12.3%

Figure

ATLANTIC TESTING LABORATORIES, LIMITED

Reviewed by: R R Date: 9/11/13

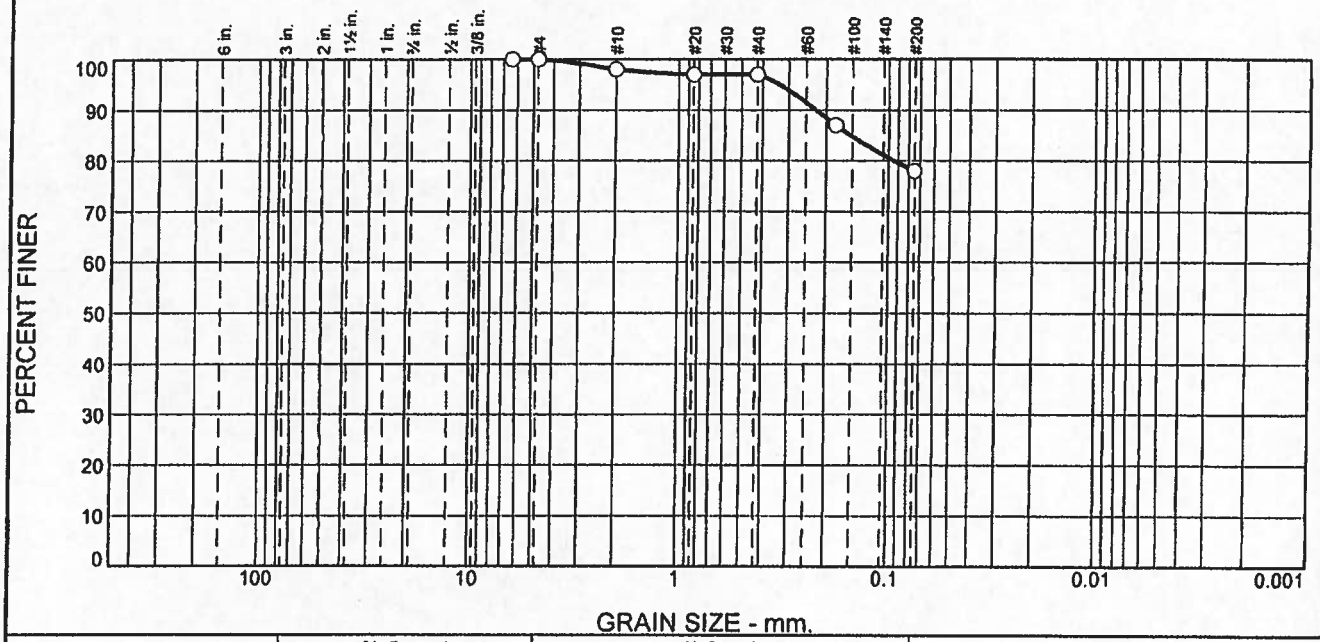
Particle Size Distribution Report

Project: Proposed Addition Gannett University Health Services **Report No.:** CD3538SL-03-09-13

Client: Chang O'Brien Architects **Date:** 9/10/13

Sample No: P-4; S-7 **Source of Sample:** Boring Sample

Location: **Elev./Depth:** 15.0 - 17.0'



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	2	1	19	78	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
1/4"	100		
#4	100		
#10	98		
#20	97		
#40	97		
#80	87		
#200	78		

Soil Description

Brown SILT; some CLAY; some cmf+ SAND

Atterberg Limits

PL= 19 LL= 31 PI= 12

Coefficients

D_{85}= 0.1528 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

Moisture content 17.8%

* (no specification provided)

Figure

ATLANTIC TESTING LABORATORIES, LIMITED

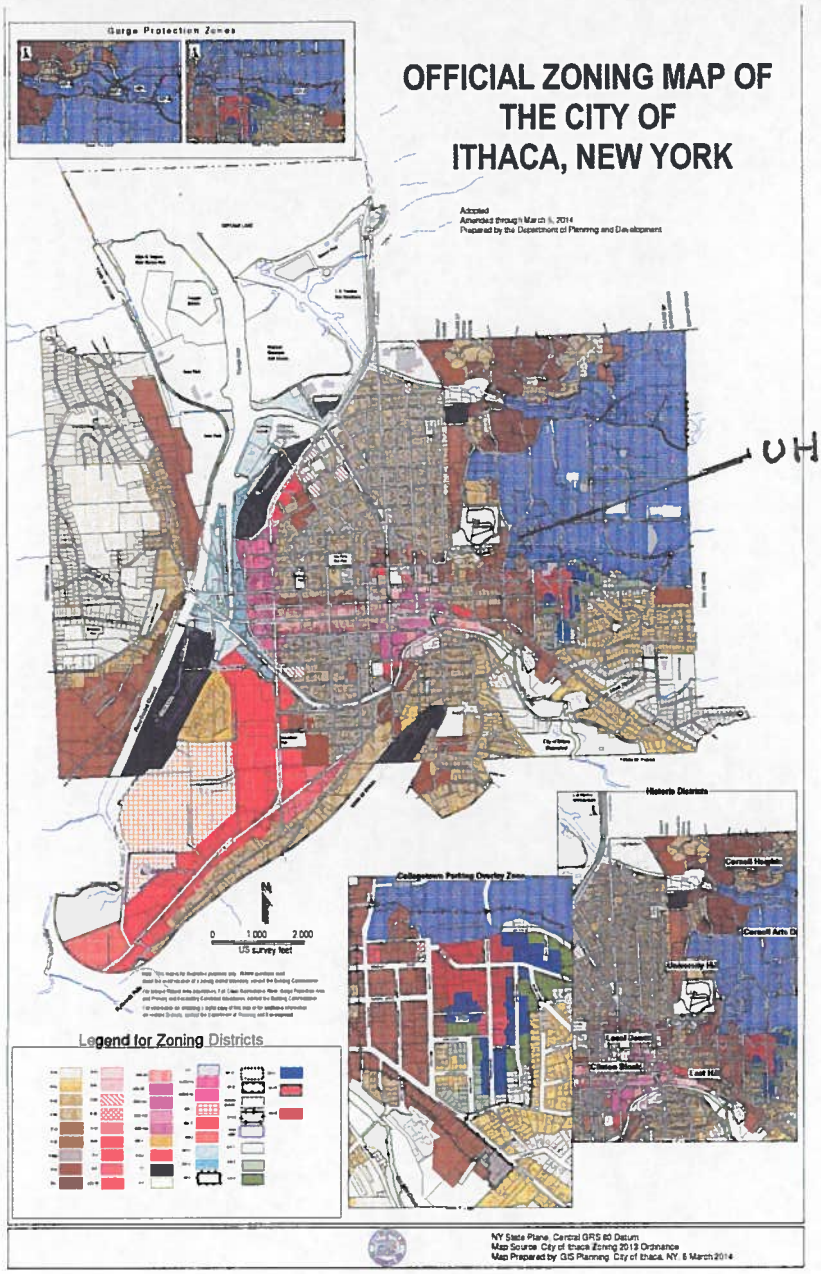
Reviewed by: _____ Date: 9/11/13

CORNELL UNIVERSITY

UNIVERSITY HEALTH SERVICES FACILITY

SITE PLAN REVIEW

11.0 ZONING MAP


Gorge Protection Zones
OFFICIAL ZONING MAP OF THE CITY OF ITHACA, NEW YORK
Adopted
Amended through March 5, 2014
Prepared by the Department of Planning and Development
UHSF
Historic Districts
Collegetown Parking Overlay Zone
Cornell Hospitals
Cornell Arts Di
University Hill
Local Historic
Cayuga Heights
East Hill
0 1,000 2,000
US survey feet
Legend for Zoning Districts
NY State Plane, Central GRS 80 Datum
Map Source: City of Ithaca Zoning 2013 Ordinance
Map Prepared by: GIS Planning, City of Ithaca, NY, 5 March 2014