FINAL REPORT ON GEOTECHNICAL INVESTIGATION AND FOUNDATION DESIGN RECOMMENDATIONS
PROPOSED COLLEGE OF PHARMACY
UNIVERSITY OF NEW ENGLAND
PORTLAND, MAINE

by

Haley & Aldrich, Inc.
Portland, Maine

for

University of New England
Biddeford, Maine

File No. 34718-000
Revised 16 January 2008
2 November 2007

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University of New England
11 Hills Road
Biddeford, Maine 04005

Attention: Mr. Alan Thibeault

Subject: Geotechnical Investigation and Foundation Design Recommendations
Proposed College of Pharmacy
University of New England
Portland, Maine

Ladies and Gentlemen:

This report presents the results of our subsurface explorations, engineering evaluations, and design recommendations for the proposed College of Pharmacy (COP) to be constructed at the University of New England (UNE), Westbrook Campus, in Portland, Maine. This work was undertaken at your request in accordance with our proposal originally dated 28 August 2007, revised 7 September 2007, and your subsequent authorization, and our Agreement Amendment 1 dated 2 November 2007.

This report was originally issued on 2 November 2007, but it has been updated to reflect changes to the proposed project during design development, specifically raising of the basement slab from El. 113 to El. 115.

SUMMARY

We recommend that the proposed COP building be supported on spread and continuous wall footing foundations bearing on undisturbed glacial outwash deposits, glacial marine deposits or glacial till. The footings should be designed based on an allowable bearing pressure, in pounds per square foot (psf), equal to 2,000 multiplied by the least lateral dimension of the footing in feet, up to a maximum of 8,000 psf. We recommend that the lowest floor slab be designed as an earth-supported, concrete slab-on-grade.

Specific recommendations for foundation design, drainage, pavement and construction for the COP building and the adjacent improvements are presented herein.

ELEVATION DATUM

Elevations referenced herein are in feet and are assumed to reference the National Geodetic Vertical Datum of 1929 (NGVD 1929).

EXISTING SITE CONDITIONS

The Westbrook Campus of UNE is located on Stevens Avenue, as shown on Figure 1, Project Locus. The current study area includes the eastern portion of the campus, for which the existing site conditions are described below.

The easternmost portion of the campus is currently occupied by several buildings, grassed/landscaped common areas, and bituminous paved parking lots and sidewalks. The buildings that occupy the eastern portion of campus include Goddard Hall, Coleman Dental Hygiene Building and Ludcke Auditorium, the locations of which are shown on Figure 2. Existing site grades are relatively flat in the eastern portion of campus, with ground surface elevations ranging from about El. 125 to El. 130.

The northern portion of the campus is occupied by a gravel access road that extends west from the terminus of College Street and an existing athletic field, as shown on Figure 3. It is our understanding that this area is no longer planned for development as a part of this project.

PROPOSED DEVELOPMENT

Our understanding of the proposed site development is based on the Design Development (DD) document set issued by Port City Architecture (PCA) dated 7 December 2007. Additional modifications have been made to the proposed development, which were discussed during several project team meetings in December 2007 and January 2008.

Proposed College of Pharmacy

We understand that the proposed COP building will consist of a three-story structure with a plan footprint area of approximately 12,000 square feet (sf), the location of which is shown on Figure 2. The footprint of the COP is within the current parking lot area adjacent to Stevens Avenue, approximately 30 to 35 ft south of Ludcke Auditorium. The level of the first floor slab is proposed to be constructed at El. 130. The COP will be constructed with a full level of below grade space. We understand that the level of the basement floor slab will be constructed 15 ft below the first floor slab, corresponding to El. 115 (11 to 12.5 ft below existing site grades). Proposed site grades surrounding the building will vary from approximately El. 127 to El. 129, 0 to 2 ft above existing grades.

A vivarium is planned to be located in the basement level of the COP building. Based on discussion with the design team, we understand that the vivarium is very sensitive to moisture. As a result, the design team has chosen to install Grace Preprufe 300 positive-side waterproofing enveloping the entire basement area. It is our understanding that the waterproofing membrane will extend around the exterior side of all basement walls, below foundations, the slab and elevator pit and stairway slabs. All penetrations through the basement floor slab and foundation wall will also require waterproofing.

A 14-ft wide paved access road will be constructed along the west side of the COP building, between Coleman Dental Hygiene Building and the COP building. A 12-ft wide service drive will be constructed along the north side of the building, between the COP and Ludcke Auditorium. An entryway courtyard area will be constructed at the main entrance of the building, which is on the west side of the building as shown on Figure 2.

SUBSURFACE EXPLORATIONS

A subsurface exploration program was conducted to provide data on soil and groundwater conditions within the areas of the building and parking lot and access roadways. The program consisted of 22 test borings, designated HA07-1 through HA07-22. The subsurface explorations were drilled by Maine Test Borings, Inc. of Brewer, Maine between 13 and 19 September 2007 and 2 and 3 October 2007. All explorations were monitored by Haley & Aldrich personnel. The borings were drilled at the approximate locations shown on Figures 2 and 3.

Test borings were advanced to depths ranging from 4.0 to 37.0 ft below ground surface (BGS). All borings were terminated in naturally deposited soils or bedrock. The boreholes were backfilled with drill spoils at the completion of the exploration program. Soil samples were typically obtained either continuously or at 5-ft intervals by driving a 1 3/8-in. I.D. split-spoon sampler with a 140-lb weight dropped 30 in. as indicated on the test boring logs. The number of hammer blows required to advance the sampler for each 6-in. interval was recorded and is provided on the test boring logs. The SPT N-value is the total number of the hammer blows required to advance the sampler through the middle 12 in. of the 24-in. sampling interval. The soils samples were collected and preserved in glass jars.

Bedrock was cored in test borings HA07-20 and HA07-22 using an NQ-size core barrel. Total bedrock core lengths ranged from 4.6 to 5.0 ft. The recovered rock core was collected and stored in a wooden box and is available for review.

Test boring and core boring logs are provided in Appendix A. The locations of the test borings shown on Figures 2 and 3 are approximate and were estimated in the field by taping/pacing from existing improvements. Please note that ground surface elevations at test boring locations shown on the logs in Appendix A are approximate and were estimated using site topographic information provided by SYTDesign.

Groundwater observation wells were installed in completed boreholes HA07-3, HA07-5, HA07-13 and HA07-21. The well installation and monitoring reports are included in Appendix B.

SUBSURFACE CONDITIONS

Soil/Bedrock Conditions

Five principal soil units were encountered beneath a surficial layer of topsoil or bituminous concrete during the recent subsurface explorations conducted at the site: fill, organic deposit, glacial outwash deposit, glacial marine deposit and glacial till. The topsoil thickness varied from 0.3 to 2.4 ft, and the bituminous concrete thickness varied from 0.3 to 0.4 ft. Bedrock was apparently encountered beneath the glacial outwash or glacial till at five test boring locations (3 of 5 were determined by practicable drilling/sampling refusal). The soil and bedrock units encountered beneath the topsoil and bituminous concrete are described below.

Fill – Fill material was encountered at all of the test boring locations except for HA07-3 through HA07-5. The encountered fill thickness in the borings varies from 0.2 to 14.2 ft, typically ranging between 1.5 and 3.5 ft within the footprint of the COP building. The fill typically consists of loose to very dense, poorly graded to well-graded sand and silty sand, generally consisting of recompacted glacial outwash or glacial marine soils. The thickest fill (14.2 ft thick) was encountered near the southern end of the existing gravel road at the terminus of College Street (HA07-7). At this location, the fill material between 6 and 12 ft BGS consisted of 25 to 75 percent coal slag and ash. Coal slag and ash were also encountered in the fill in boring HA07-8 within 3.5 ft of existing ground surface. This indicates that the northern portion of the existing gravel road was partially filled using ash-laden and/or slag-laden soils. SPT N-values in the borings ranged from 3 to 57 blows per foot (bpf).

Organic Deposit – Soils containing organic matter were encountered below the in-situ fill material beneath the north and west perimeter of the proposed parking area (i.e., HA07-13, HA07-16, HA07-17 and HA07-18). In all of the borings except HA07-17, the organic deposit was only 0.1 to 0.2 ft thick and consisted of sandy silt to silty sand with varying amounts of organic matter. This material likely consists of topsoil that was not stripped prior to construction of the existing athletic field. In boring HA07-17, the organic deposit consisted of 1.9 ft of soft, brown sandy peat. The SPT N-value for the peat was 4 bpf.

Glacial Outwash Deposit – A glacial outwash deposit was encountered beneath the topsoil or fill at ten of the boring locations, including 3 of the 4 borings drilled within the footprint of the COP building. The thickness of the glacial outwash deposit was not determined in 7 of the 10 locations where it was encountered. Where the deposit was penetrated (within the footprint of the COP), the encountered thickness varied from approximately 2 to 21 ft. This deposit generally consists of dense to very dense poorly to well-graded sand with gravel and silt. SPT N-values ranged from 10 to greater than 100 bpf, but were typically greater than 30 bpf.

Glacial Marine Deposit – A glacial marine deposit was encountered beneath the topsoil, fill or organic deposit at the 12 boring locations where glacial outwash soils were not encountered and beneath the glacial outwash deposit in borings HA07-19 and HA07-21. The thickness of the glacial outwash deposit was not determined in 9 of the 14 locations where it was encountered. Where the deposit was penetrated, the encountered thickness varied from approximately 2 to 35 ft. Within the footprint of the COP building, the deposit varied from approximately 13 to 20 ft thick. This deposit generally consists of loose to very dense poorly-graded sand with silt. SPT N-values for the glacial marine sand ranged from 3 to greater than 100 bpf. The loose soils were only encountered beneath the existing athletic field. Approximately 1 to 3 ft of glacial marine clay was encountered beneath the north and west portions of the athletic field (in test borings HA07-13, HA07-17 and HA07-18), consisting of soft to hard lean clay with varying amounts of sand. The clay was encountered below the glacial marine sand, and the top of the clay varies from 7 to 10.5 ft BGS.

Glacial Till – Glacial till was encountered beneath the glacial marine deposit at five test boring locations, including three of the borings drilled within the COP footprint (i.e., HA07-19, HA07-21 and HA07-22. The thickness of the deposit was not determined at HA07-10, where it was greater than 2.4 ft in thickness. At other locations, the encountered thickness varied from 0.6 to 3.2 ft. This deposit typically consists of medium dense to very dense well-graded sand and silty sand with varying amounts of silt and gravel. SPT N-values ranged from 25 to greater than 100 bpf.

Bedrock – Bedrock was encountered (based on practicable drilling refusal or coring) in all of the borings drilled within the COP footprint (i.e., HA07-19 through HA07-22). The measured depth to bedrock ranged from 19.9 to 25.3 ft BGS within the COP footprint. The top of rock surface is relatively flat within the COP footprint but slopes down slightly from east (approximate El. 104.5 to El. 106.5) to west (approximate El. 101 to El. 102.5). Rock core samples were collected in test borings HA07-20 and HA07-22. The cored rock is described as hard to very hard, fresh to slightly weathered schist. Rock quality designation (RQD) values for the core specimens were relatively high, varying from 64 to 88 percent.

Groundwater Conditions

The depth to groundwater was measured in several of the completed boreholes immediately after drilling. The measured groundwater depths are provided on the boring logs in Appendix A. However, these measurements were influenced by the drilling operation and may not represent static water levels.

Several water level measurements were taken in the completed observation wells in between September 2007 and January 2008. The groundwater measurements in the observation wells are summarized below:

HA07-3(OW)	El. 102.8 to El. 103.2 (23.3 to 23.7 ft BGS)
HA07-5(OW)	El. 105.4 to El. 106.3 (18.7 to 19.6 ft BGS)
HA07-13(OW)	El. 93.3 to El. 93.9 (0.1 to 0.7 ft BGS)
HA07-21(OW)	El. 107.9 to El. 108.2 (18.3 to 18.6 ft BGS)

The measured groundwater depths indicate that the water levels vary by several feet over a relatively short distance within the area of the proposed COP building, considering that observation wells HA07-3(OW), HA07-5(OW) and HA07-21(OW) are all within approximately 250 ft of each other. This variance is likely a result of differences in the permeability of the subsurface soils and/or depth to top of bedrock surface. However, the measured groundwater depth has remained relatively constant in HA07-21(OW), located within the COP building footprint, over the three-month period that measurements have been taken.

It should be noted that the groundwater measurements recorded to-date are not likely to be representative of seasonal high groundwater levels because they were taken in the summer and early fall. We anticipate that seasonal high groundwater may be as much as 4 to 6 ft higher than the levels recorded in September and October 2007 in observation wells HA07-3(OW), HA07-5(OW) and HA07-21(OW).

Groundwater levels can be expected to fluctuate, subject to seasonal variation, local soil conditions, topography and precipitation. Groundwater levels encountered during construction may differ from those observed in the test borings or observation wells. Observation well installation and monitoring reports are included in Appendix B.

LABORATORY TEST RESULTS

Laboratory tests were conducted on representative soil samples from the test borings to quantify physical characteristics of the soils. Laboratory tests were performed to determine the water content and particle size distribution of representative samples from the borings. A summary of laboratory test results is provided in the table below, and the laboratory test reports are provided in Appendix C.

Test Boring	Sample Depth BGS (ft)	Material Type	USCS Classification	Particle Size Distribution			Natural Water Content (%)
				Percent Gravel	Percent Sand (coarse/med./fine)	Percent Fines[1]	
HA07-7	2-6	Fill	SM	14	9/30/28	18	6.8
HA07-10	0-2	Fill	SM	5	8/37/33	17	15.4
HA07-13	0.7-2	Fill	SP-SM	0	3/22/69	6	8.1
HA07-19	9.5-11.5	Glacial Marine	SP	0	0/26/71	3	6.5
HA07-20	9.5-11.5	Glacial Outwash	SP	1	5/58/34	2	2.0
HA07-22	0-2	Fill	SP-SM	30	9/29/21	10	2.8

[1] – Refers to the percentage of soil particles finer than the No. 200 (0.075 mm) sieve.

Organic content testing and moisture content testing was also performed on the sample of peat retrieved from boring HA07-17 at a depth of 4 to 6 ft BGS. The results of the laboratory tests on the peat sample are summarized below, and the laboratory reports are provided in Appendix C.

Peat

- Natural Water Content – 245.0 percent
- Organic Content – 32.6 percent

FINLEY HALL INVESTIGATIONS

On 7 and 14 December 2007, a Haley & Aldrich engineer visited Finley Hall to observe the basement and elevator pit to check for indications of past groundwater infiltration and other conditions that could be relevant to the foundation drainage and waterproofing details for the proposed College of Pharmacy (COP) building. Our observations and conclusions were summarized in a memorandum dated 17 December 2007 and is provided in Appendix D for information.

GEOTECHNICAL RECOMMENDATIONS

Structural Loading Information

Dan Burne of Becker Structural Engineers (Becker) provided us with typical column bay spacing and structural load information for the COP building by electronic mail on 10 October 2007. We used this information for our foundation evaluations. The structural information is summarized below:

- Typical column bay spacing of 21 ft by 20 to 34 ft.

- Typical dead plus live column loads (axial compression) of 375 kips (1 kip = 1,000 lb) for interior columns, 190 kips for perimeter columns and 100 kips for corner columns.
- Typical floor live loading of 100 psf (not including dead weight of proposed 6-in. thick slab).

Based on our discussions with Becker, we understand that the axial uplift loads for the COP are sufficiently small that they can be resisted by the dead load of the foundations and/or walls.

Foundation Support

We recommend that the COP building be supported on spread and continuous wall footing foundations bearing on undisturbed glacial outwash deposits, glacial marine deposits or glacial till. The footings should be designed based on an allowable bearing pressure, in pounds per square foot (psf), equal to 2,000 multiplied by the least lateral dimension of the footing in feet, up to a maximum of 8,000 psf. We recommend that all footings be at least 2 ft wide.

At the recommended allowable bearing pressure, we anticipate that the maximum post construction settlement of individual interior footings under static loading conditions, constructed as recommended herein, will not exceed ¾ in., with up to ½ in. of differential settlement between interior columns and adjacent perimeter or corner columns. If ½ in. of differential settlement over the proposed bay spacing is not structurally acceptable, we recommend that flexible construction joints be considered to accommodate the anticipated differential movement. Most of the settlement should occur during construction shortly after structure dead loads are placed on the foundations and during the initial snow loading of the roof.

Frost Protection

Soils at the site are considered to be moderately frost-susceptible. Bottoms of exterior footings should be founded a minimum of 4.5 ft below the lowest adjacent ground surface exposed to freezing. Bottoms of interior footings in heated areas should be founded a minimum of 1.5 ft below the top of the adjacent floor slab. However, if exposure to freezing is anticipated either during or following construction, these footings should be lowered in accordance with the recommendations for exterior footings, or the subgrades and foundations should be insulated to prevent freezing.

Ground Floor Slab

We recommend that the lowest-level floor slab be designed as a soil-supported concrete slab-on-grade. The floor slab should bear on a minimum 12-in. thick layer of crushed stone, overlain by waterproofing as discussed previously and underlain by separation filter fabric as outlined below in the foundation drainage section.

Resistance of Lateral Design Building Loads

Lateral loads can be resisted by a combination of friction along the base of the footings and passive pressure on the vertical faces of footings. Frictional resistance should be computed using an ultimate base friction coefficient (tan δ) between the footing concrete and the naturally deposited soils or granular fill equal to 0.30.

The net passive resistance (passive minus active) provided by the fill surrounding footings and foundation walls can be calculated using an equivalent fluid weight (triangular distribution) of 150 pounds per cubic foot (pcf). The soil within 1 ft of ground surface should be ignored unless it is confined by a slab or bituminous concrete. If the horizontal distance between adjacent footings or walls is less than twice the height of the subject structural element (measured from bottom of element to bottom of slab/ground surface), the passive pressure must be discounted proportionately to the distance (full pressure at twice the height away) to accommodate for interaction of the elements.

The frictional and passive resistance values may be used in combination without reduction. If a combination of these two resistance forces is not enough to provide adequate lateral resistance, we will consider the problem in more detail. A minimum factor of safety for sliding equal to 2.0 should be achieved for resistance of permanent lateral loads.

Foundation Drainage System

As mentioned previously, we anticipate that seasonal high groundwater levels will be several feet above the current levels. We anticipate that typical, sustained seasonal high groundwater levels may rise as much as 4 to 6 ft above current levels (El. 112 to El. 114), but it will generally stay below the level of the bottom of the basement floor slab. However, the groundwater level in the vicinity of the COP building may rise to or slightly above the level of the basement floor slab (El. 115) following a major storm event (e.g., 10-year storm) causing a sudden, short-term rise of the groundwater level. Therefore, we recommend that a permanent foundation drainage system be installed for the building to protect the slab from hydrostatic pressures.

The system should include an underslab drain system installed below the basement floor slab. This system should consist of separation filter fabric placed on the prepared, approved soil subgrade, a minimum 12 in. thickness of ¾-in. crushed stone placed above the fabric, and a network of 4 in. diameter perforated PVC or corrugated HDPE drain pipes (laid flat) embedded mid-height in the crushed stone layer. We recommend that one section of pipe be installed in each column bay (in the north-south and east-west directions). We estimate that the invert of the pipes would be approximately 12 in. below the finish floor elevation (i.e., El. 114).

The system should also include perimeter drains installed along the exterior side of the below-grade building foundation walls adjacent to the ground floor slab. We recommend that the system consist of a 4-in. diameter continuous perforated PVC or HDPE drain pipe (laid flat), surrounded by a minimum of 6 in. of crushed stone, wrapped in separation filter fabric. The invert level of the drain pipe should be positioned above the top of the wall footings and approximately 12 in. below the bottom of the ground floor slab. Per the requirements of the

IBC Code, the perimeter drain (including the pipe, crushed stone and filter fabric) should extend a minimum of 12 in. beyond the outside edge of the footing. We recommend that free-draining granular backfill (e.g., CGF) be placed within a minimum of 5 ft of below grade portions of the foundation walls.

Perimeter and underslab drain pipes should be installed at roughly the same invert elevation and should be laid flat. The underslab and perimeter drain pipes should be connected by constructing "wall-through" or "box-out" penetrations at discrete locations in the foundation wall. Considering the proposed waterproofing system, it will be necessary to coordinate penetrations through the foundation wall with appropriate waterproofing details. It will not be feasible to discharge the foundation drainage system by gravity into an appropriate receptor (e.g., new or existing storm drain system). Therefore, it will be necessary to install a sump pit with pumps to discharge the effluent from the system. Sump pits should be equipped with dual pumps with alternating cycles. The pumps should be wired into an emergency power source (e.g., generator). Based on groundwater seepage estimates, we recommend that the pumps be capable of pumping 50 gallons per minute (gpm). We understand that the sump pit will be constructed in a manhole located on the outside of the building adjacent to the foundation wall.

Pipe cleanouts should be provided at system corners (for both perimeter and underslab drain piping) to allow for future maintenance. Haley & Aldrich will coordinate the location and invert level of the drains, wall through penetrations and sump location/orientation with the Plumbing Consultant, Site Civil Engineer and Structural Engineer. It will be necessary to coordinate cleanouts located in the basement with appropriate waterproofing details.

As an additional measure of protection, surface runoff should be directed away from the building. In general, the level of the finished ground surface adjacent to the building should be sloped downward away from the structure to divert surface runoff. To limit surface water infiltration into the drainage system, it is recommended that the upper 8 in. of backfill within 10 ft of the building, in unpaved areas, consist of topsoil or other soil having low permeability.

We will provide a foundation drainage plan along with the appropriate drain system details for inclusion in the contract documents once the location and elevations of the below slab utilities are finalized.

Seismic Design Considerations

We understand that the proposed building will be designed in accordance with the seismic requirements of Table 1615.1.1 of the 2006 International Building Code (IBC). We recommend that the site be considered as Site Class "C". We recommend the following values be used to determine the design spectral response acceleration parameters (S_{DS} and S_{D1}) and to calculate the base shear for purposes of seismic design:

- Mapped Spectral Accelerations for Short Periods: $S_S = 0.32g$
- Mapped Spectral Accelerations for 1-Second Periods: $S_1 = 0.078g$
- Site Coefficient for Short Periods:, $F_a = 1.2$
- Site Coefficient for 1-Second Periods: $F_v = 1.7$

Please note that "g" refers to acceleration due to gravity.

The foundation soils are not considered to be susceptible to liquefaction.

Dampproofing/Waterproofing

We understand that the entire basement level will have positive-side waterproofing, located outside of the basement walls and below the slab and footings, to provide extra protection for the vivarium. As discussed with you, it is our opinion that subslab waterproofing is not needed, and humidity/moisture could be controlled by the proper installation of a subslab vapor barrier.

In general, we recommend that insulation be placed on the outside face of foundation walls where the adjacent interior space is below the level of the exterior ground surface, in accordance with the IBC Code.

The plans indicate that the base slab for the elevator pit is located below the invert of the underdrain system (El. 114). Therefore, the base slab should be designed to resist hydrostatic uplift loads based on a groundwater level at El. 116. We recommend that the walls and slab for the elevator pit be waterproofed.

Evaluations for the need to control humidity to prevent the formation of mold or other organisms within the building were not within the scope of work of this evaluation. If vapor barriers are used, the floor slab design and construction must be coordinated with the vapor barrier installation, as the barriers may impact concrete curing and curling.

Lateral Earth Pressures on Foundation Walls

We recommend that any exterior below-grade foundation walls retaining soil on one side and restrained at the top should be designed for static lateral earth pressures using an equivalent fluid unit weight of 60 lbs per cubic foot (pcf). Cantilever walls (i.e., walls that are free to rotate at the top) should be designed using an equivalent fluid unit weight of 40 pcf. These fluid weights assume that a free-draining granular backfill is placed within a minimum of 5 ft of the wall (with moist unit weight equal to 120 pcf) and that no unbalanced hydrostatic pressures exist (i.e., "drained condition"). Walls that are subjected to a surcharge due to floor slab live loading should be designed for an additional uniform lateral pressure equal to one-half the vertical design surcharge load, acting over the full height of the wall.

If the elevator pit is not drained, the walls should be designed for static lateral earth pressures using an equivalent fluid weight of 90 pcf.

Pavement Section

Recommendations for bituminous pavement section for auto traffic for the paved areas surrounding the COP building are provided below based upon the Maine Department of Transportation (MaineDOT) Standard Specification, Highways and Bridges (December 2002):

Standard-Duty Flexible Pavement (auto traffic/parking areas):

- 3 in. bituminous concrete, placed in two 1½ in. thick layers.
- 4 in. screened or crushed gravel base course.
- 12 in. sand or gravel subbase course.

Base and subbase course materials should conform to the following gradations:

Screened or Crushed Gravel - MaineDOT Standard Specification, Highways and Bridges; Section 703.06a, Type A.

Sand or Gravel Subbase - MaineDOT Standard Specification, Highways and Bridges; Section 703.06b, Type D. Type D aggregate should be modified to a maximum 4 in. size.

Subbase course material should be placed and compacted in separate 8 in. (maximum) thick loose lifts and compacted at approximately optimum moisture content to a minimum dry density of at least 95 percent of the maximum dry density as determined by ASTM D1557. Base course material should be placed in one loose lift and compacted with a minimum of two passes with self-propelled vibratory compaction equipment.

Prior to placement of pavement base and subbase course materials, all topsoil, organic matter and fill materials containing debris should be removed from within the limits of the proposed roadway/parking areas. The pavement recommendations are based on the assumption that a stable, firm subgrade is prepared beneath the base and subbase courses, as discussed in the Construction Considerations section of this report.

Pavement design recommendations can be provided for the access road and parking area in the northern portion of the site when design grading is available for our review.

Sidewalks

Concrete sidewalks should be supported on a minimum of 1.5 ft of CGF or subbase gravel. The soils at the site are considered to be moderately frost-susceptible and the purpose of placing free-draining granular soil below the sidewalks is to help control the potential for post-construction differential heaving and cracking. Prior to placement of CGF or subbase gravel, all topsoil, organic matter and fill materials containing debris should be removed from within the limits of the proposed roadway/parking area.

CONSTRUCTION CONSIDERATIONS

General

The primary purpose of this section of the report is to comment on items related to excavation, earthwork, and other related geotechnical concerns regarding the proposed construction. This will aid individuals responsible for preparation of plans and specifications, as well as personnel appointed to monitor construction activities. The contractor must evaluate construction problems on the basis of knowledge and experience in the Portland area as well as their experience on similar projects in other localities, taking into account proposed construction procedures, methods, equipment, and personnel.

Excavation

Excavation will be required for general site grading, and for construction of building foundations, the elevator pit, underground utilities, and sidewalks. We anticipate that excavation as deep as 14 ft BGS will be required to construct the COP footings and install the foundation drainage system. We anticipate that an additional 5 ft of excavation will be required to allow construction of the elevator pit.

All topsoil, debris and organic matter encountered within the limits of the proposed sidewalk and paved areas should be stripped and removed from the site, prior to placing site fills.

We expect that excavation of the in-situ soils can typically be accomplished using normal earth-moving equipment. Considering the age of the Westbrook Campus, we anticipate that areas of uncontrolled fill or obstructions associated with previous site uses may be encountered during excavation. At the location of boring HA07-2/2A, three different boring locations met refusal on buried debris within 5 ft of the ground surface prior to advancing boring HA07-2A. We recommend that the contract documents require the contractor to include provisions for obstruction removal in their earthwork bid.

The shallowest bedrock was encountered at approximately El. 106.5 (boring HA07-22) in the southeast corner of the proposed COP building footprint, with top of rock elevations ranging from about El. 101 to El. 104.5 in the other borings drilled in the building footprint. Therefore, the available information indicates that bedrock will likely be at least 8 ft below the level of the basement slab and at least 3 ft below the bottom of the excavation for the elevator pit. If shallower rock is encountered or the bedrock surface is locally higher than the levels encountered in the test borings, the use of drilling and blasting or other excavation techniques may be required for rock removal.

If blasting is required, the excavation contractor should be made responsible for the design and implementation of a blasting plan that meets applicable local, state and federal agency requirements, is safe and does not adversely impact adjacent structures, property or the general public.

Excavations will typically be made into sand with little or no fine-grained soil. Temporary cut earth slopes should, typically, be stable if constructed no steeper than about 1.5H:1V. Some sloughing and raveling should be anticipated in temporary earth slopes, especially during and after rainfall. All temporary excavations should be made in accordance with all OSHA and other applicable regulatory agency requirements. The contractor should be responsible for the design, stability and safety of all temporary and permanent excavations.

Temporary Excavation Support System

Based on the anticipated elevation of the bottom of footings in the basement area (approximately El. 112), existing site grades adjacent to the proposed basement excavation (El. 126 to El. 127) and the proximity of the property lines and Ludcke Hall relative to the location of the proposed basement area, it is likely that an excavation support system will be required to construct the basement level of the proposed building. Based on subsurface soil, rock and groundwater conditions at the site, we anticipate that the most cost effective excavation support system will consist of a soldier pile and lagging wall. It may be necessary to socket the soldier piles into bedrock in some areas (e.g., where soldier piles extend below El. 106 to El. 101). A "benched" excavation support system may be appropriate and should be considered.

We anticipate that support of excavation systems retaining greater than 15 ft of soil will require lateral support in the form of tiebacks or internal bracing. The excavation support system will be designed by the Contractor's engineer as part of the submittal process based on the design requirements outlined in the project specifications. Soil and groundwater properties and other design parameters will be provided in the specifications.

Construction Dewatering

Groundwater has generally been measured at elevations ranging from El. 103 to El. 108 in the vicinity of the proposed COP building footprint. We anticipate that groundwater will be encountered in excavations that extend deeper than these elevations. Groundwater will likely be encountered at shallower depths if excavation is performed in the spring or early summer. We expect that dewatering in these areas may be accomplished by pumping from open sumps and temporary ditches located at the base of the excavations. Sumps should be provided with filters suitable to prevent pumping of fine grained soil particles. Rainwater or snowmelt should be directed away from exposed soil bearing surfaces.

Dewatering and discharge of dewatering effluent should be performed in accordance with all applicable local, state and federal regulations. Due to the size of the site and the non permeable nature of the near surface soils, we anticipate that on-site recharge will not be feasible and that dewatering effluent will need to be discharged to a local storm drain. Sedimentation tanks or other treatment methods may be required for legal disposal of the effluent.

The contractor should be responsible for controlling all surface runoff, infiltration and water from other sources at all times during excavation. Rainwater or snowmelt should be directed away from exposed soil bearing surfaces. Dewatering should be performed as required to maintain the undisturbed nature of the soil bearing surfaces and enable all final excavation, foundation construction and backfilling to be completed "in-the-dry."

Dewatering should be performed in accordance with all applicable regulations. Dewatering should be conducted in a manner that avoids disturbance or undermining of existing foundations, backfill, prepared foundation subgrades, and that limits pumping of fines.

Subgrade Preparation

The following guidelines are recommended to protect subgrade soils beneath the new slab and footings:

- Make final excavations into bearing soils using smooth-bladed equipment to minimize disturbance.
- All work should be performed in the dry. Prevent water from accumulating on

bearing surfaces to reduce the possibility of softening. Surfaces that become disturbed due to softening should be excavated and stabilized with placement of crushed stone and filter fabric, as necessary, with approval of a geotechnical engineer.

- Exposed bearing surfaces should be examined in the field by an experienced geotechnical engineer or technician to verify strength and bearing capacity. Excavation may be necessary to remove weak, disturbed or otherwise unacceptable soils.
- Limit equipment and worker traffic on the finished bearing surfaces.

Footings

We recommend that the excavation work be conducted in a manner that minimizes disturbance to the subgrade soils when excavating for footing bearing surfaces. After final excavation to the design bearing levels, the exposed subgrade should be observed in the field by the Owner's on-site representative to confirm the assumed foundation bearing conditions. It may be necessary to over-excavate and replace locally weak, disturbed or otherwise unacceptable foundation bearing soils. Following excavation to the bearing stratum, exposed granular soil surfaces should be proofrolled with a minimum of two passes of a self-propelled vibratory roller or heavy hand-guided vibratory compactor, until firm, if the bearing soils are loosened by the excavation process as judged by the Owner's on-site representative. Saturated bearing soils should not be proofrolled.

Soil bearing surfaces below completed foundations and slabs must be protected against freezing, before and after foundation construction. If construction is performed during freezing weather, footings should be backfilled to a sufficient depth (up to 4.5 ft) as soon as possible after they are constructed. Alternatively, insulating blankets or other means may be used for protection against freezing.

Slab-on-Grade

Any debris and/or disturbed material should be removed from beneath the ground floor slab and should be replaced with CGF, lean concrete or crushed stone. Existing soil should be removed to a depth of 1 ft below the bottom of the floor slab for placement of the filter fabric and crushed stone for the foundation drainage system. We recommend that floor slab subgrade surface be inspected by a geotechnical engineer prior to placement of fill or construction of the floor slab.

Pavement Areas/Sidewalks

All topsoil, debris and organic matter should be removed within the limits of the sidewalk and pavement areas. Prior to placing any additional fill or base course material within these areas, the soil subgrade should be proofrolled with a minimum of four passes of a self-propelled vibratory roller. Any soft areas revealed by proofrolling should be removed and replaced by CGF. The surface should then be compacted with additional passes of the vibratory roller as deemed appropriate by the Owner's on-site representative.

Filling and Backfilling

Filling will be required to raise grades in some areas during general site grading. All topsoil, debris and organic matter should be removed as stated above prior to placement of fill material.

Placement of compacted fills should not be conducted when air temperatures are low enough (approximately 30 degrees F., or below) to cause freezing of the moisture in the fill during or before placement. Fill materials should not be placed on snow, ice or uncompacted frozen soil. Compacted fill should not be placed on frozen soil. No fill should be allowed to freeze prior to compaction. At the end of each day's operations, the last lift of fill, after compaction, should be rolled by a smooth-wheeled roller to eliminate ridges of uncompacted soil.

Fill Materials

Compacted Granular Fill

Compacted granular fill (CGF) placed within the ZOI of footings, beneath building slabs, and adjacent to foundation walls should consist of mineral, bank-run sand and gravel, free of organic material, snow, ice, or other unsuitable materials and should be well-graded within the following limits:

Sieve Size	Percent Finer by Weight
6 in. (1)	100
No. 4	30 – 80
No. 40	10 – 50
No. 200	0 – 8

(1) Cobbles or boulders having a size exceeding 2/3 of the loose lift thickness should be removed prior to compaction.

CGF should be placed in lifts not exceeding 12 in. in loose measure and compacted using self-propelled vibratory equipment. The soil should be placed near its approximate optimum moisture content to achieve a dry density of at least 95 percent of the maximum dry density, as determined in accordance with ASTM D1557. In confined areas, maximum particle size should be reduced to 3 in., maximum loose layer reduced to 6 in., and compaction performed by hand-guided equipment. A minimum of four systematic passes of the compaction equipment should be used to compact each lift. Cobbles or boulders having a size exceeding 2/3 of the loose lift thickness should be removed prior to compaction.

CGF placed on the outside of the perimeter foundation walls should extend laterally a minimum of 5 ft beyond the walls. Backfill beyond this limit may consist of common fill. The top 8 in. of fill around the exterior of the building should consist of low permeability material used to minimize water infiltration adjacent to the structure. Grading should be designed to promote drainage of surface water away from the structure.

Excavated glacial outwash soils and glacial marine soils are not considered acceptable for reuse as CGF within 5 ft of the basement walls due to the fine-grained nature and relatively low permeability of these soils. In-situ fill soils within the footprint of the COP may be suitable for reuse as CGF. If the contractor wishes to reuse this material, the fill should be stripped, stockpiled and tested to confirm that the gradation requirements are met.

Common Fill

The in-situ fill (excluding any debris-laden material) and naturally deposited glacial outwash and glacial marine soils are acceptable for use as common fill if they meet the requirements summarized below.

Common fill should consist of mineral sandy soil, free from organic matter, plastic, metal, wood, ice, snow or other deleterious material and should have the characteristic that it can be readily placed and compacted. Common fill imported to the site should have a maximum of 80 percent passing the No. 40 sieve and a maximum of 30 percent finer than the No. 200 sieve. The largest particle size for common fill should not exceed 2/3 of the loose lift thickness. Silty common fill soils may require moisture control during placement and compaction. Common fill should be placed in maximum 12 in. thick loose lifts using compaction equipment as described above for CGF.

Where common fill is used to raise grades beneath sidewalks and paved areas and as backfill more than 5 ft from the basement walls, it is recommended that either glacial outwash soils or sandy glacial marine soils be used to promote proper compaction.

Compaction Requirements

A summary of recommended compaction requirements is as follows:

Location	**Minimum Compaction Requirements**
Beneath footings and building slabs	95 percent
Parking, roadways and sidewalks	92 percent up to 3 ft below finished grade 95 percent in the upper 3 ft
Basement wall backfill (within 5 ft of wall)	95 percent
Landscaped areas	90 percent nominal compaction

Minimum compaction requirements refer to percentages of the maximum dry density determined in accordance with ASTM D1557.

Preparation of Contract Documents and Submittal Reviews

The contract drawings and specifications should be written so that the requirements of the documents are consistent with the design intent of the geotechnical recommendations outlined herein. Therefore, we recommend that Haley & Aldrich either be retained to prepare or provide technical review of the specifications and contract drawings related to the following topics:

- Earthwork
- Foundation Drainage
- Construction Dewatering
- Temporary Excavation Support System

We recommend that Haley & Aldrich be retained to provide foundation drainage plans and details for the COP building.

The contract specifications will require the Contractor and the Contractor's engineer to perform analyses and submit results to the designers for review. We recommend that Haley & Aldrich be allowed to review the geotechnical-related submittals to ensure that the Contractor's analyses/submittals are in accordance with the intent of the design. Haley & Aldrich should also respond to geotechnical-related RFIs from the Contractor, as needed.

Construction Monitoring

The foundation recommendations contained herein are based on the predictable behavior of a properly engineered and constructed foundation. Monitoring of the foundation construction is required to enable the geotechnical engineer to keep in contact with procedures and techniques used in construction, and to comply with Section 1808.2.10 of the IBC Code. Therefore, it is recommended that a geotechnical engineer or experienced technician be present during construction to monitor the following activities.

- Installation/testing of temporary excavation support system(s).
- Excavation to subgrade levels and subgrade inspection prior to construction of footings and slabs.
- Installation of the foundation drainage system.
- Placement and compaction testing of site fills.
- Confirming that soils used as backfill are in accordance with the project plans and specifications, and making judgments on suitability of excavated soils for reuse as fill.
- Backfilling adjacent to foundation walls and beneath the building slab.
- Inspection of the slab and pavement subgrade prior to slab construction/pavement installation.

We ask that you consider Haley & Aldrich be allowed to provide these services.

LIMITATIONS

This report is prepared for the exclusive use of the University of New England relative to the proposed College of Pharmacy project in Portland, Maine. There are no intended beneficiaries other than the University of New England. Haley & Aldrich shall owe no duty whatsoever to any other person or entity on account of the Agreement or the report. Use of this report by any person or entity other than the University of New England for any purpose whatsoever is expressly forbidden unless such other person or entity obtains written authorization from the University of New England and from Haley & Aldrich. Use of this report by such other person or entity without the written authorization of the University of New England and Haley & Aldrich shall be at such other person's or entities sole risk, and shall be without legal exposure or liability to Haley & Aldrich.

Use of this Report by any person or entity, including by the University of New England, for a purpose other than the proposed College of Pharmacy project in Portland, Maine is expressly prohibited unless such person or entity obtains written authorization from Haley & Aldrich indicating that the Report is adequate for such other use. Use of this Report by any other person or entity for such other purpose without written authorization by Haley & Aldrich shall be at such person's or entities sole risk, and shall be without legal exposure or liability to Haley & Aldrich.

The analyses and recommendations are based, in part, upon the data obtained from the referenced subsurface explorations. The nature and extent of variations between explorations may not become evident until construction. If variations then appear, it may be necessary to reevaluate the recommendations presented in this report.

We appreciate the opportunity to provide geotechnical engineering services on this project. Please do not hesitate to call if you have any questions or comments.

Sincerely yours,
HALEY & ALDRICH, INC.

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Vice President

Enclosures:
- Table I – Summary of Subsurface Explorations
- Figure 1 – Project Locus
- Figure 2 – Site and Subsurface Exploration Location Plan (College of Pharmacy)
- Figure 3 – Site and Subsurface Exploration Location Plan (Parking Improvements)
- Appendix A – Test Boring Logs
- Appendix B – Observation Well Installation and Groundwater Monitoring Reports
- Appendix C – Laboratory Test Reports
- Appendix D – 17 December 2007 Memorandum by Haley & Aldrich, Inc. entitled "Summary of Site Visit, Elevator Pit in Finley Hall Athletic Center"

c: Port City Architecture; Attn.: Lita Semrau
SYTDesign Consultants; Attn.: Peter Biegel
Becker Structural Engineers; Attn.: Dan Burne

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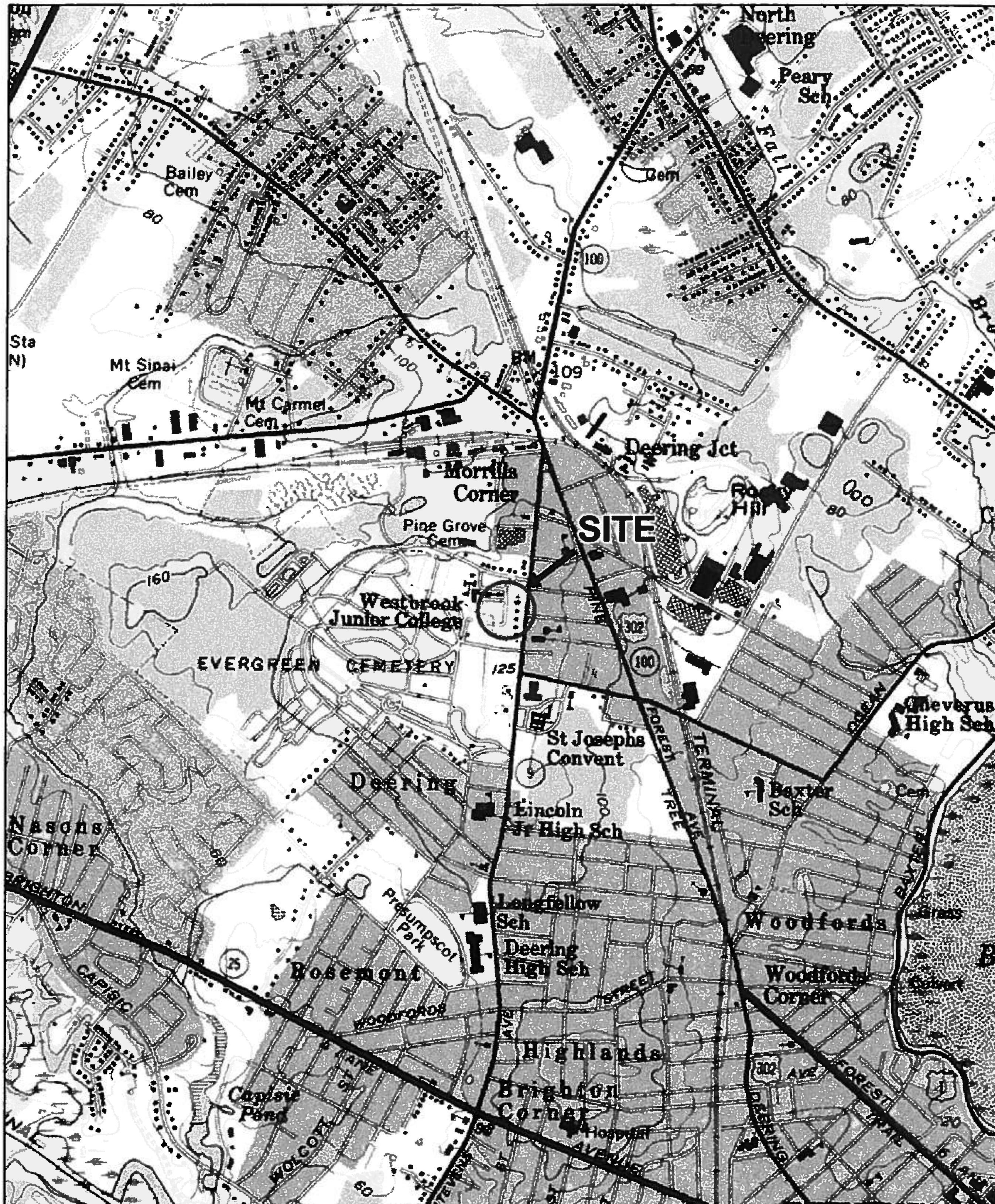
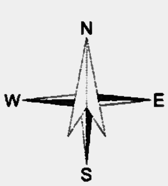
TABLE I
Summary of Subsurface Explorations
Proposed College of Pharmacy and Campus Improvements
University of New England
Portland, Maine

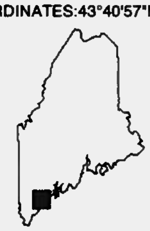
Test Boring No. [1]	Estimated Ground Surface Elevation [2,3]	Thickness of Strata (ft)						Measured Depth to Top of Bedrock [4] (ft)
		Topsoil	Fill	Organic Deposit	Glacial Outwash Deposit	Glacial Marine Deposit	Glacial Till	
HA07-1	127.5	0.7	2.3	NE	> 24.0 (BOE)	--	--	NE
HA07-2/2A	127.5	0.7	4.3	NE	> 22.2 (BOE)	--	--	NE
HA07-3(OW)	126.5	2.4	NE	NE	> 29.6 (BOE)	--	--	NE
HA07-4	127.5	0.6	NE	NE	NE	34.7	1.8	37.1
HA07-5(OW)	125	0.5	NE	NE	NE	> 19.8 (BOE)	--	NE
HA07-6	129	NE	0.9	NE	> 3.8 (BOE)	--	--	NE
HA07-7	118	NE	14.2	NE	> 1.8 (BOE)	--	--	NE
HA07-8	111	NE	3.6	NE	> 2.4 (BOE)	--	--	NE
HA07-9	105	NE	2.0	NE	> 2.0 (BOE)	--	--	NE
HA07-10	98	NE	1.8	NE	NE	1.8	> 2.4 (BOE)	NE
HA07-11	98	1.0	0.2	NE	NE	> 6.8 (BOE)	--	NE
HA07-12	97	0.3	3.7	NE	NE	> 4.0 (BOE)	--	NE
HA07-13(OW)	94	0.7	2.3	0.1	NE	> 13.9 (BOE)	--	NE
HA07-14	96	0.5	4.3	NE	NE	> 1.2 (BOE)	--	NE
HA07-15	98	0.4	3.6	NE	NE	> 2.0 (BOE)	--	NE
HA07-16	95	1.0	2.8	0.2	NE	> 2.0 (BOE)	--	NE
HA07-17	95	0.5	3.5	1.9	NE	> 4.1 (BOE)	--	NE
HA07-18	95	0.3	3.2	0.1	NE	> 28.4 (BOE)	--	NE
HA07-19	126.5	NE	1.6	NE	2.1	20.7	0.6	25.3
HA07-20	127	NE	1.0	NE	21.2	NE	NE	22.6
HA07-21(OW)	126.5	NE	1.7	NE	2.9	17.7	1.4	24.0
HA07-22	126.5	NE	3.2	NE	NE	13.2	3.2	19.9

Notes:
1 Test boring locations are shown on Figures 2 and 3, Site and Subsurface Exploration Location Plans.
2 Ground surface elevations at test boring locations are approximate and were estimated by interpolating between elevation contour data provided by SYTDesign (estimated to the nearest 0.5 ft).
3 Elevations are in feet and reference the National Geodetic Vertical Datum of 1929 (NGVD 29).
4 Measured bedrock depths were determined by practicable refusal of drilling equipment and/or rock coring ("NE" indicates bedrock not encountered).
5 "NE" indicates stratum was not encountered in test boring, "BOE" indicates bottom of exploration.



SITE COORDINATES:43°40'57"N 70°17'41"W





U.S.G.S. QUADRANGLE: PORTLAND WEST, ME

HALEY & ALDRICH

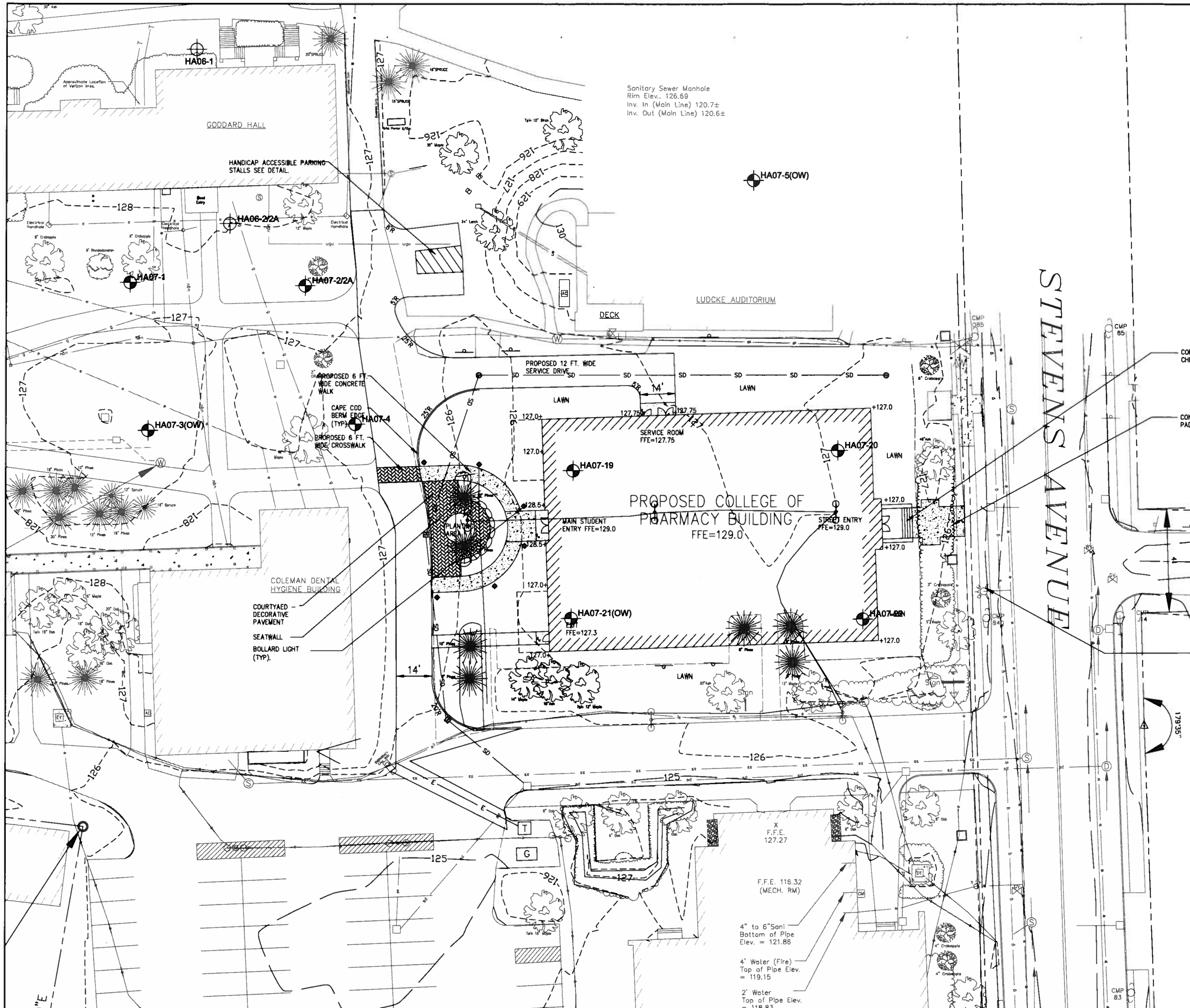
PROPOSED COLLEGE OF PHARMACY AND CAMPUS IMPROVEMENTS
UNIVERSITY OF NEW ENGLAND
PORTLAND, MAINE

PROJECT LOCUS

SCALE: 1:24,000
NOVEMBER 2007

FIGURE 1

34718-000 1.PDF

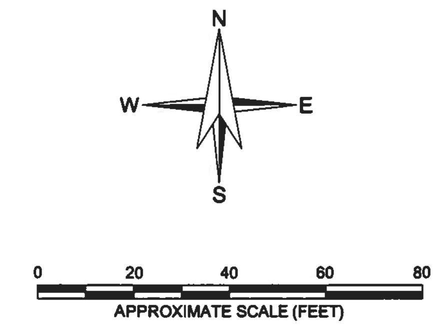


NOTES:

1. EXISTING AND PROPOSED TOPOGRAPHIC/GRADING INFORMATION AND LOCATION AND ORIENTATION OF EXISTING AND PROPOSED SITE FEATURES ARE TAKEN FROM THE ELECTRONIC AUTOCAD FILE ENTITLED "0621608 Site Plan Building," PROVIDED BY SYTDESIGN CONSULTANTS ON 10 OCTOBER 2007.
2. SUBSURFACE EXPLORATIONS WERE MONITORED IN THE FIELD BY HALEY & ALDRICH, INC. PERSONNEL.
3. LOCATIONS OF TEST BORINGS ARE APPROXIMATE AND WERE DETERMINED IN THE FIELD BY TAPING AND PACING DISTANCES FROM EXISTING SITE FEATURES.
4. ELEVATIONS ARE IN FEET AND REFERENCE THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD 29).
5. REFER TO APPENDIX A FOR LOGS OF RECENT TEST BORINGS.

LEGEND:

HA07-1	DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING DRILLED BY MAINE TEST BORINGS, INC. OF BREWER, MAINE IN SEPTEMBER AND OCTOBER 2007
HA06-1	DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING DRILLED BY EAST COAST EXPLORATIONS OF HALLOWELL, MAINE ON 21 AND 22 SEPTEMBER 2006
(OW)	DENOTES OBSERVATION WELL INSTALLED IN COMPLETED BOREHOLE
——127	ELEVATION CONTOUR OF EXISTING GROUND SURFACE
+127.0	SPOT ELEVATION OF PROPOSED GROUND SURFACE
//////	PROPOSED COLLEGE OF PHARMACY BUILDING FOOTPRINT



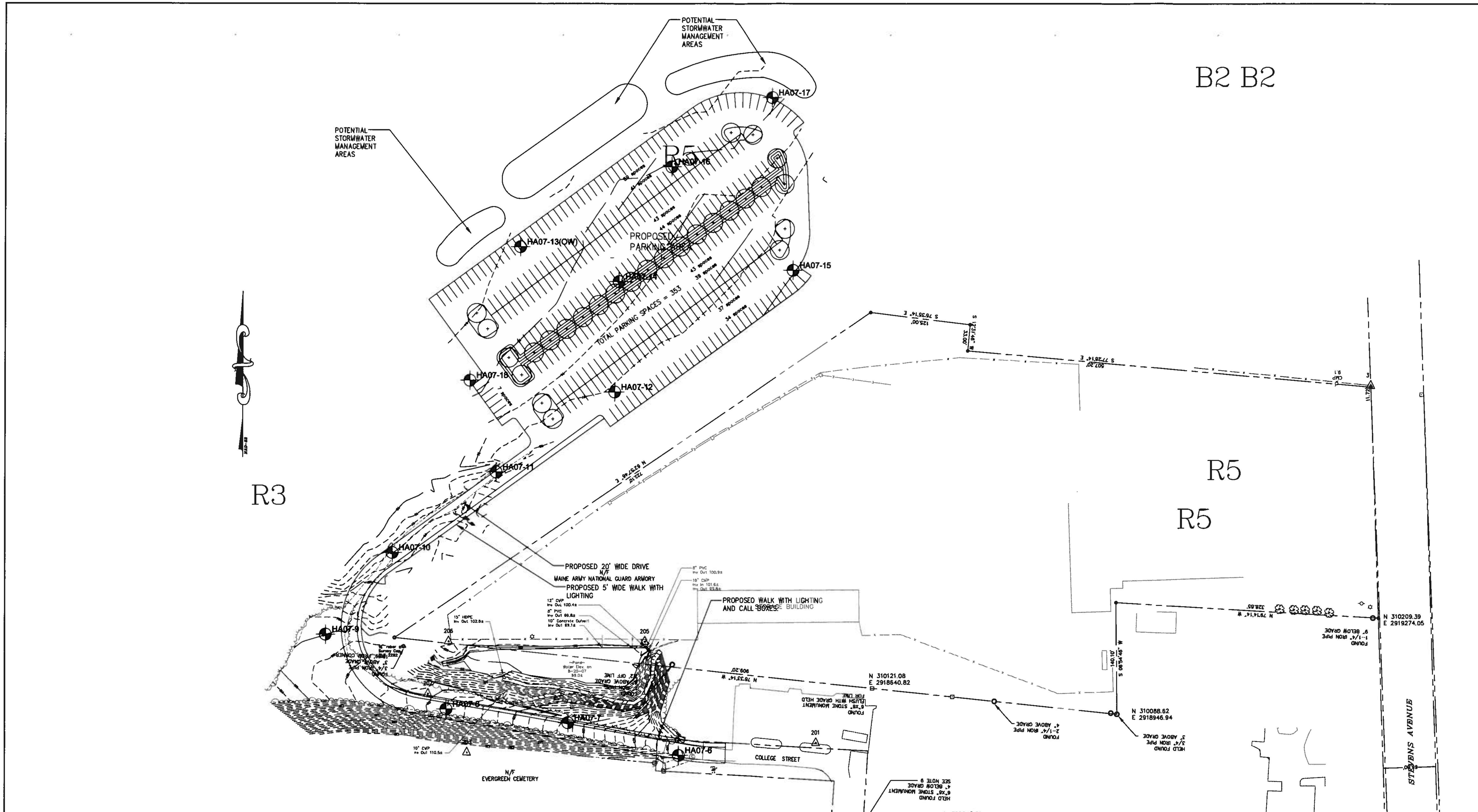
HALEY & ALDRICH

PROPOSED COLLEGE OF PHARMACY AND CAMPUS IMPROVEMENTS - UNIVERSITY OF NEW ENGLAND
PORTLAND, MAINE

SITE AND SUBSURFACE EXPLORATION LOCATION PLAN (COLLEGE OF PHARMACY)

SCALE: AS SHOWN
NOVEMBER 2007

FIGURE 2



NOTES:

1. EXISTING TOPOGRAPHIC INFORMATION AND LOCATION AND ORIENTATION OF EXISTING AND PROPOSED SITE FEATURES ARE TAKEN FROM THE ELECTRONIC AUTOCAD FILE ENTITLED "0621608 Site Plan Building," PROVIDED BY SYTDESIGN CONSULTANTS ON 10 OCTOBER 2007.
2. SUBSURFACE EXPLORATIONS WERE MONITORED IN THE FIELD BY HALEY & ALDRICH, INC. PERSONNEL.
3. LOCATIONS OF TEST BORINGS ARE APPROXIMATE AND WERE DETERMINED IN THE FIELD BY TAPING AND PACING DISTANCES FROM EXISTING SITE FEATURES.
4. ELEVATIONS ARE IN FEET AND REFERENCE THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD 29).
5. REFER TO APPENDIX A FOR LOGS OF RECENT TEST BORINGS.

LEGEND:

HA07-1	DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING DRILLED BY MAINE TEST BORINGS, INC. OF BREWER, MAINE IN SEPTEMBER AND OCTOBER 2007
(OW)	DENOTES OBSERVATION WELL INSTALLED IN COMPLETED BOREHOLE
----95	ELEVATION CONTOUR OF EXISTING GROUND SURFACE

N W E S

0 60 120 180 240

APPROXIMATE SCALE (FEET)

HALEY & ALDRICH

PROPOSED COLLEGE OF PHARMACY AND CAMPUS IMPROVEMENTS - UNIVERSITY OF NEW ENGLAND
PORTLAND, MAINE

SITE AND SUBSURFACE EXPLORATION LOCATION PLAN (PARKING IMPROVEMENTS)

SCALE: AS SHOWN
NOVEMBER 2007

FIGURE 3

S:\34718\F\G2.DWG

APPENDIX A

Test Boring Logs

HALEY & ALDRICH — TEST BORING REPORT

Boring No. HA07-1

Project: Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client: University of New England
Contractor: Maine Test Borings, Inc.

File No. 34718-000
Sheet No. 1 of 2
Start 14 September 2007
Finish 14 September 2007
Driller M. Porter
H&A Rep. E. Beirne
Elevation 127.5+/-
Datum NGVD 1929
Location See Plan

	Casing	Sampler	Barrel
Type	NW	S	--
Inside Diameter (in.)	3.0	1 3/8	--
Hammer Weight (lb.)	300	140	-
Hammer Fall (in.)	16	30	-

Drilling Equipment and Procedures

Rig Make & Model: Mobile B-53 Bombardier
Bit Type: Roller Bit
Drill Mud: None
Casing: NW Drive to 25 ft.
Hoist/Hammer: Winch/ Safety Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Toughness	Plasticity	Strength
0	2 4 14 7	S1 17	0.0 2.0	NO WELL INSTALLED		ML	Medium dense, dark brown, sandy SILT (ML), mps <1 mm, no structure, slight organic odor, dry to moist, rootlets throughout -TOPSOIL-				10	40	50				
					0.5	SP-SM	Medium dense, brown, poorly-graded SAND with silt (SP-SM), mps=2mm, no structure, no odor, moist				15	75	10				
					0.7	SW-SM	Medium dense, brown to black, well graded SAND with silt (SW-SM), mps=0.5 in., no structure, slight organic odor, moist, glass and tar fragments -FILL-		15	20	25	25	15				
					3.0												
5	17 22 19 24	S2 15	5.0 7.0			SW	Note: Driller noted change to brown sand and gravel at 3.0 ft. Dense, brown to white, well-graded SAND with gravel (SW), mps=2 in., no structure, no odor, dry -GLACIAL OUTWASH DEPOSIT-	20	10	15	35	20					
10	45 64 63 49	S3 16	10.0 12.0			SW	Very dense, brown, well-graded SAND with gravel (SW), mps=1.5 in., no structure, no odor, moist -GLACIAL OUTWASH DEPOSIT-	20	10	15	30	20	5				
15	18 26 26 29	S4 11	15.0 17.0			SW	Very dense, brown, well-graded SAND (SW), mps=.25 in., no structure, no odor, wet -GLACIAL OUTWASH DEPOSIT-		5	15	45	30	5				
20	16 26 24 24	S5 10	20.0 22.0			SW	Very dense, brown, well-graded SAND (SW), mps=.50 in., no structure, no odor, wet -GLACIAL OUTWASH DEPOSIT-		5	15	45	30	5				
25																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
9/14/07	12:40	0.1	20.0	24.0	--

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 27.0
Rock Cored (lin. ft.) --
Samples 6S

Boring No. HA07-1

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None; Toughness: L-Low, M-Medium, H-High; Plasticity: N-Nonplastic, L-Low, M-Medium, H-High; Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1] SPT = Sampler blows per 6 in. [2] Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\PROJECTS\34718\000\DRILLING\34718-000TB.GPJ 11 Oct 07

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA07-1
File No. 34718-000
Sheet No. 2 of 2

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
25	23 20 20 29	S6 12	25.0 27.0			SW-SM	Dense, well-graded SAND with silt (SW-SM), mps=.75 in., no structure, no odor, wet, two poorly-graded fine sand layers -GLACIAL OUTWASH DEPOSIT-	10	10	40	30	10					
					27.0		-BOTTOM OF EXPLORATION AT 27.0 FT.-										

[1]SPT = Sampler blows per 6 in.[2]Maximum particle size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA07-1

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\PROJECTS\34718\000\DRILLING\34718-000TB.GPJ 11 Oct 07

HALEY & ALDRICH — TEST BORING REPORT

Boring No. HA07-2

Project	Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client	University of New England
Contractor	Maine Test Borings, Inc.

File No.	34718-000
Sheet No.	1 of 1
Start	17 September 2007
Finish	17 September 2007
Driller	B. Enos
H&A Rep.	E. Beirne
Elevation	127.5+/-
Datum	NGVD 1929
Location	See Plan

	Casing	Sampler	Barrel
Type	NW	S	--
Inside Diameter (in.)	3.0	1 3/8	--
Hammer Weight (lb.)	300	140	-
Hammer Fall (in.)	16	30	-

Drilling Equipment and Procedures

- Rig Make & Model: Mobile Drill B-47
- Bit Type: Roller Bit
- Drill Mud: None
- Casing: NW Drive to 5 ft.
- Hoist/Hammer: Winch/ Doughnut Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
0	3 12 6 5	S1 21	0.0 2.0	NO WELL INSTALLED		SM	Medium dense, brown, silty SAND (SM), mps=2 mm, no structure, organic odor, moist, rootlets throughout -TOPSOIL- -				5	60	35				
					0.7	SW-SM	Medium dense, dark brown, well-graded SAND with silt (SW-SM), mps=1.25 in., no structure, odor, moist, pavement fragments -FILL-	5	15	20	20	30	15				
5	1 50/2	S2 6	5.0 5.7			SW-SM	Medium dense, dark brown, well-graded SAND with silt (SW-SM), mps=1.25 in., no structure, no odor, moist, pavement fragments -FILL-		25	10	20	35	10				
					5.5		Concrete										
					5.7		-BOTTOM OF EXPLORATION AT 5.7 FT.- Moved location ahead 5 ft., see HA07-2A.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

- O Open End Rod
- T Thin Wall Tube
- U Undisturbed Sample
- S Split Spoon
- G Geoprobe

Well Diagram

- Riser Pipe
- Screen
- Filter Sand
- Cuttings
- Grout
- Concrete
- Bentonite Seal

Summary

- Overburden (lin. ft.) 5.7
- Rock Cored (lin. ft.) --
- Samples 2S

Boring No. HA07-2

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None. Toughness: L-Low, M-Medium, H-High. Plasticity: N-Nonplastic, L-Low, M-Medium, H-High. Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

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HALEY & ALDRICH — TEST BORING REPORT

Boring No. HA07-2A

Project	Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client	University of New England
Contractor	Maine Test Borings, Inc.

File No.	34718-000
Sheet No.	1 of 2
Start	17 September 2007
Finish	17 September 2007
Driller	B. Enos
H&A Rep.	E. Beirne
Elevation	127.5+/-
Datum	NGVD 1929
Location	See Plan

	Casing	Sampler	Barrel
Type	NW	S	--
Inside Diameter (in.)	3.0	1 3/8	--
Hammer Weight (lb.)	300	140	-
Hammer Fall (in.)	16	30	-

Drilling Equipment and Procedures

- Rig Make & Model: Mobile Drill B-47
- Bit Type: Roller Bit
- Drill Mud: None
- Casing: NW Drive to 20.0 ft.
- Hoist/Hammer: Winch/ Doughnut Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
0				NO WELL INSTALLED			See HA07-2 for 0-5 ft.. Fourth attempted location for 5-7 ft. sample										
5	24 44 55 54	S1 19	5.0 7.0			SW	Very dense, brown to white, well-graded SAND with gravel (SW), mps=1.75 in., no structure, no odor, dry to moist -GLACIAL OUTWASH DEPOSIT-	15	15	20	30	20					
10	42 53 62 66	S2 14	10.0 12.0			SW	Very dense, light brown, well-graded SAND (SW), mps=3/4 in., no structure, no odor, moist to wet -GLACIAL OUTWASH DEPOSIT-		5	25	35	30	5				
15	42 47 44 54	S3 15	15.0 17.0			SW-SM	Very dense, brown, well-graded SAND with silt and gravel (SW-SM), mps=2.0 in., no structure, no odor, wet -GLACIAL OUTWASH DEPOSIT-	15	10	20	25	20	10				
20	47 72 55 47	S4 15	20.0 22.0			SW-SM	Very dense, brown, well-graded SAND with silt (SW-SM), mps=1.0 in., no structure, no odor, wet		10	20	25	35	10				
25																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
9/17/07	14:51	0.1	--	23.2	22.5

Sample Identification

- O Open End Rod
- T Thin Wall Tube
- U Undisturbed Sample
- S Split Spoon
- G Geoprobe

Well Diagram

- Riser Pipe
- Screen
- Filter Sand
- Cuttings
- Grout
- Concrete
- Bentonite Seal

Summary

- Overburden (lin. ft.) 27
- Rock Cored (lin. ft.) --
- Samples 5S

Boring No. HA07-2A

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None; Toughness: L-Low, M-Medium, H-High; Plasticity: N-Nonplastic, L-Low, M-Medium, H-High; Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA07-2A
File No. 34718-000
Sheet No. 2 of 2

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
25	63 53 43 50	S5 12	25.0 27.0			SM	Very dense, gray-brown, silty SAND with gravel (SM), mps=2.0 in., no structure, no odor, wet -GLACIAL OUTWASH DEPOSIT-	20	15	10	20	20	15				
					27.0		-BOTTOM OF EXPLORATION AT 27.0 FT.-										

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA07-2A

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TEST BORING REPORT

Boring No. HA07-3(OW)

Project: Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client: University of New England
Contractor: Maine Test Borings, Inc.

File No. 34718-000
Sheet No. 1 of 2
Start: 13 September 2007
Finish: 13 September 2007
Driller: M. Porter
H&A Rep.: E. Beirne
Elevation: 126.5+/-
Datum: NGVD 1929
Location: See Plan

	Casing	Sampler	Barrel
Type	NW	S	--
Inside Diameter (in.)	3.0	1 3/8	--
Hammer Weight (lb.)	300	140	-
Hammer Fall (in.)	16	30	-

Drilling Equipment and Procedures
Rig Make & Model: Mobile B-53 Bombardier
Bit Type: Roller Bit
Drill Mud: None
Casing: NW Drive to 30.0 ft.
Hoist/Hammer: Winch/ Safety Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
0	2 3 3 5	S1 14	0.0 2.0		0.3	ML	Medium stiff, brown, SILT with sand (ML), mps=2 mm, no structure, no odor, moist, roots throughout -TOPSOIL-				5	20	75				
						SM	Loose, dark brown, silty SAND (SM), mps=3/4 in., no structure, no odor, moist			15	35	30	20				
					2.4		Note: Driller noted change in density at 2.4 ft.										
5	15 30 37 57	S2 16	5.0 7.0			SW	Very dense, brown, well-graded SAND (SW), mps=1/2 in., no structure, no odor, moist -GLACIAL OUTWASH DEPOSIT-		10	15	45	25	5				
10	23 45 46 43	S3 14	10.0 12.0			SW-SM	Very dense, gray-brown, well-graded SAND with silt (SW-SM), mps=1/4 in., no structure, no odor, moist -GLACIAL OUTWASH DEPOSIT-			20	45	25	10				
15	19 27 41 78	S4 15	15.0 17.0			SW-SM	Very dense, gray-brown, well-graded SAND with silt and gravel (SW-SM), mps=1.0 in., no structure no odor, moist	5	10	25	35	15	10				
20	28 28 36 45	S5 12	20.0 22.0			SW	Very dense, gray-brown, well-graded SAND with gravel (SW), mps=2 in., no structure, no odor, moist	20	15	20	30	10	5				
25																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
9/13/07	17:34	0.25	30	29.3	23.2
9/13/07	06:15	11.25	30	28.5	23.3

Sample Identification
O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (lin. ft.) 32
Rock Cored (lin. ft.) --
Samples 7S

Boring No. HA07-3(OW)

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None; Toughness: L-Low, M-Medium, H-High; Plasticity: N-Nonplastic, L-Low, M-Medium, H-High; Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

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Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
25	19 22 15 16	S6 10	25.0 27.0			SW	Very dense, gray-brown, well graded SAND (SW), mps=3/4 in., no structure, no odor, moist to wet, finer with depth -GLACIAL OUTWASH DEPOSIT-		10	25	35	25	5				
30	9 13 19 23	S7 13	30.0 32.0			SW	Medium dense, gray-brown, well-graded SAND (SW), mps=1/2 in., no structure, no odor, wet -GLACIAL OUTWASH DEPOSIT-		10	30	45	15					
					32.0		-BOTTOM OF EXPLORATION AT 32.0 FT.-										

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY& ALDRICH

TEST BORING REPORT

Boring No. HA07-4

Project: Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client: University of New England
Contractor: Maine Test Borings, Inc.

File No. 34718-000
Sheet No. 1 of 2
Start: 13 September 2007
Finish: 13 September 2007
Driller: M. Porter
H&A Rep.: E. Beirne
Elevation: 127.5+/-
Datum: NGVD 1929
Location: See Plan

	Casing	Sampler	Barrel
Type	NW	S	--
Inside Diameter (in.)	3.0	1 3/8	--
Hammer Weight (lb.)	300	140	-
Hammer Fall (in.)	16	30	-

Drilling Equipment and Procedures
Rig Make & Model: Mobile B-53 Bombardier
Bit Type: Roller Bit
Drill Mud: None
Casing: NW Drive to 35.0 ft.
Hoist/Hammer: Winch/ Safety Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
0	6 10 7 5	S1 15	0.0 2.0	NO WELL INSTALLED		SP	Medium dense, dark brown, poorly-graded SAND (SP), mps=4mm, no structure, slight organic odor, moist, organics throughout -TOPSOIL-			5	25	65	5				
					0.6	SM	Medium dense, brown, silty SAND (SM), mps=1/2 in., no structure, no odor		5	10	20	50	15				
					2.4		Gravel layer (driller noted)										
					3.5												
5	25 20 25 40	S2 15	5.0 7.0			SP	Dense, light brown, poorly-graded SAND (SP), mps=4 mm, no structure, no odor, dry to moist -GLACIAL MARINE DEPOSIT-			10	15	75					
					6.5		Driller noted change in density at 6.5 ft.										
10	54 112	S3 6	10.0 11.0			SP	Very dense, light brown, poorly-graded SAND (SP), mps=2 mm, no structure, no odor, moist, much coarser for last 2 in. -GLACIAL MARINE DEPOSIT-			5	30	60	5				
15	30 43 62 87	S4 15	15.0 17.0			SP	Very dense, light brown, poorly-graded SAND (SP), mps=4 mm, no structure, no odor, moist -GLACIAL MARINE DEPOSIT-			15	40	40	5				
20	27 29 53 66	S5 11	20.0 22.0			SP	Very dense, light brown, poorly-graded SAND (SP), mps=4 mm, no structure, no odor, moist -GLACIAL MARINE DEPOSIT-			15	40	40	5				
25																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
9/13/07	12:25	0.25	--	21.4	20.6

Sample Identification
O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (lin. ft.) 37
Rock Cored (lin. ft.) --
Samples 8S

Boring No. HA07-4

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None; Toughness: L-Low, M-Medium, H-High; Plasticity: N-Nonplastic, L-Low, M-Medium, H-High; Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
25	6 16 19 23	S6 13	25.0 27.0			SM	Dense, olive-brown, silty SAND (SM), mps=2 mm, no structure, no odor, moist			15	55	30					
					25.3	SP	Dense, light brown, poorly-graded SAND (SP), mps=4mm, no structure, no odor, moist to wet, finer with depth, oxidized iron layer from 25.9-26.1 ft.		10	25	60	5					
30	3 10 11 13	S7 NR	30.0 32.0			SW	Medium dense, brown, well-graded SAND (SW), mps=4mm, no structure, no odor, mottled, wet -GLACIAL MARINE DEPOSIT-			10	40	45	5				
35	15 23 39 109	S8 14	35.0 37.0			SW	Very dense, gray-brown, well-graded SAND with gravel (SW), mps=1.5 in., no structure, no odor wet	15	20	15	30	20	0				
					35.3	SW	Very dense, brown, well-graded SAND with gravel (SW), mps=1.5 in., bonded, no odor, moist to wet -GLACIAL TILL-	10	10	10	35	30	5				
					37.1		Refusal on Probable Bedrock Advanced roller cone to 37.1 ft. -BOTTOM OF EXPLORATION AT 37.1 FT.-										

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA07-5(OW)

Project	Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client	University of New England
Contractor	Maine Test Borings, Inc.

File No.	34718-000
Sheet No.	1 of 1
Start	17 September 2007
Finish	18 September 2007
Driller	B. Enos
H&A Rep.	E. Beirne
Elevation	125.0+/-
Datum	NGVD 1929
Location	See Plan

	Casing	Sampler	Barrel
Type	HW	S	--
Inside Diameter (in.)	4.0	1 3/8	--
Hammer Weight (lb.)	300	140	-
Hammer Fall (in.)	16	30	-

Drilling Equipment and Procedures

- Rig Make & Model: Mobile Drill B-47
- Bit Type: Roller Bit
- Drill Mud: None
- Casing: HW Driven to 20.0 ft.
- Hoist/Hammer: Winch/ Doughnut Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	4 4 7 5	S1 10	0.0 2.0			ML	Stiff, brown, sandy SILT (ML), mps=2 mm, no structure, organic odor, dry to moist -TOPSOIL-				10	25	65				
					0.5	SP	Medium dense, light brown, poorly-graded SAND (SP), mps=2 mm no structure, slight organic odor, dry to moist				25	70	5				
					1.2	SM	Medium dense, dark brown, silty SAND (SM), mps=2mm, no structure, organic odor, moist				5	70	25				
5	7 17 22 31	S2 14	5.0 7.0		5.0	SP	Dense, light brown, poorly-graded SAND (SP), mps=1 mm, no structure, no odor, moist					95	5				
	38 80 50/0.2	S3 11	8.0 9.7														
10						SP	Very dense, light brown, poorly-graded SAND (SP), mps=4 mm, no structure, no odor, moist -GLACIAL MARINE DEPOSIT-			10	15	70	5				
15	43 63 55/0.3	S4 12	15.0 16.3			SP	Very dense, light brown, poorly-graded SAND (SP), mps=1/2 in., no structure, no odor, moist		5	10	20	65					
					19.3	GP-GM	Very dense, brown, poorly-graded GRAVEL with sand and silt (GP-GM), mps=1/2 in., wet -GLACIAL MARINE DEPOSIT-	15	40	20	10	5	10				
20	100/0.3	S5 3	20.0 20.3		20.3		-BOTTOM OF EXPLORATION AT 20.3 FT.- Observation well installed in completed borehole. See Observation Well Installation Report for details.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
9/18/07	6:10	12.0	15	17.0	14.5

Sample Identification

- O Open End Rod
- T Thin Wall Tube
- U Undisturbed Sample
- S Split Spoon
- G Geoprobe

Well Diagram

- Riser Pipe
- Screen
- Filter Sand
- Cuttings
- Grout
- Concrete
- Bentonite Seal

Summary

Overburden (lin. ft.)	20.3
Rock Cored (lin. ft.)	--
Samples	5S

Boring No. HA07-5(OW)

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Toughness: L-Low, M-Medium, H-High Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

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HALEY & ALDRICH — TEST BORING REPORT

Boring No. HA07-6

Project	Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client	University of New England
Contractor	Maine Test Borings, Inc.

File No.	34718-000
Sheet No.	1 of 1
Start	18 September 2007
Finish	18 September 2007
Driller	B. Enos
H&A Rep.	A. Blaisdell
Elevation	129.0+/-
Datum	NGVD 1929
Location	See Plan

	Casing	Sampler	Barrel
Type	--	S	--
Inside Diameter (in.)	--	2.5	--
Hammer Weight (lb.)	--	140	-
Hammer Fall (in.)	--	30	-

Drilling Equipment and Procedures

Rig Make & Model: Mobile Drill B-47
Bit Type: Roller Bit
Drill Mud: None
Casing: None
Hoist/Hammer: Winch/ Doughnut Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	50 70 76 81	S1 18	0.0 2.4	NO WELL INSTALLED	0.3		-BITUMINOUS CONCRETE-										
						SW-SM	Dense, dark brown, well-graded SAND with silt and gravel (SW-SM), mps=1 in., moist	5	20	30	20	10	15				
					1.2	SP	-FILL- (Existing Subbase)										
	57 80 110 50/0.3	S2 24	2.4 4.2			SP	Dense, light brown, poorly graded SAND (SP), mps=1/4 in., no structure, moist -GLACIAL OUTWASH DEPOSIT-		10	15	50	20	5				
					5.0		-BOTTOM OF EXPLORATION AT 4.2 FT.-										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

- O Open End Rod
- T Thin Wall Tube
- U Undisturbed Sample
- S Split Spoon
- G Geoprobe

Well Diagram

Riser Pipe, Screen, Filter Sand, Cuttings, Grout, Concrete, Bentonite Seal

Summary

Overburden (lin. ft.)	4.2
Rock Cored (lin. ft.)	--
Samples	2S

Boring No. HA07-6

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Toughness: L-Low, M-Medium, H-High Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA07-7

Project: Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client: University of New England
Contractor: Maine Test Borings, Inc.

File No. 34718-000
Sheet No. 1 of 1
Start 18 September 2007
Finish 18 September 2007
Driller B. Enos
H&A Rep. M. Snow
Elevation 118.0+/-
Datum NGVD 1929
Location See Plan

	Casing	Sampler	Barrel
Type	HSA	S	--
Inside Diameter (in.)	2.5	1 3/8	--
Hammer Weight (lb.)	--	140	-
Hammer Fall (in.)	--	30	-

Drilling Equipment and Procedures
Rig Make & Model: Mobile Drill B-47
Bit Type: Roller Bit
Drill Mud: None
Casing: HSA
Hoist/Hammer: Winch/ Doughnut Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Toughness	Plasticity	Strength
0	5 8 12 11	S1 7	0.0 2.0	NO WELL INSTALLED		SW	Medium dense, dark brown, well-graded SAND with gravel (SW), mps=1.0 in., dry -FILL-	5	10	20	40	25					
	12 8 4 4	S2 10	2.0 4.0			SM	Medium dense, dark brown, silty SAND (SM), mps=1/2 in., dry		5	10	30	40	15				
5	4 3 3 4	S3 3	4.0 6.0			SM	Loose, dark brown, silty SAND (SM) 1-in. piece clayey SILT (ML), mps=1.0 in., damp to dry		5	10	30	40	15				
	3 3 15 17	S4 12	6.0 8.0		6.0	SP	30% coal slag and ash. Medium dense, with dark brown, poorly-graded SAND (SP) mps=1/2 in., damp -COAL SLAG- -FILL-		5	15	30	30	20				
	12 12 13 14	S5 6	8.0 10.0			SP	(cave-in from above) 25% coal slag, little ash. Medium dense, dark brown, poorly-graded SAND (SP), mps=1/2 in., damp -COAL SLAG- -FILL-		5	15	30	35	15				
10	10 5 6 7	S6 12	10.0 12.0			SP	75% coal slag with ash and coal pieces. Medium dense, dark brown, poorly-graded SAND, mps=1.0 in., moist		5	15	25	40	15				
	3 1 2 5	S7 8	12.0 14.0		11.9	SP	Loose, dark brown to brown, poorly-graded SAND with silt and gravel (SP). mps=1.0 in., moist -FILL-		15	5	25	35	20				
15	8 5 5 3	S8 12	14.0 16.0		14.2	SP	Light brown to brown, poorly-graded SAND (SP), mps=3.0 mm, moist -GLACIAL OUTWASH DEPOSIT-			15	40	40	5				
					16.0		-BOTTOM OF EXPLORATION AT16.0 FT.-										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification
O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (lin. ft.) 16
Rock Cored (lin. ft.) --
Samples 8S

Boring No. HA07-7

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None; Toughness: L-Low, M-Medium, H-High; Plasticity: N-Nonplastic, L-Low, M-Medium, H-High; Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA07-8

Project	Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client	University of New England
Contractor	Maine Test Borings, Inc.

File No.	34718-000
Sheet No.	1 of 1
Start	18 September 2007
Finish	18 September 2007
Driller	B. Enos
H&A Rep.	M. Snow
Elevation	111.0+/-
Datum	NGVD 1929
Location	See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	S	--	Rig Make & Model: Mobile Drill B-47
Inside Diameter (in.)	2.5	1 3/8	--	Bit Type: Roller Bit; Drill Mud: None
Hammer Weight (lb.)	--	140	-	Casing: HSA
Hammer Fall (in.)	--	30	-	Hoist/Hammer: Winch/ Doughnut Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
0	8 16 25 14	S1 16	0.0 2.0	NO WELL INSTALLED		SP	50% coal slag, ash, coal pieces. Dense, brown to dark brown, poorly-graded SAND (SP), mps=1.0 in., damp		20	10	25	35	10				
	6 5 13 20	S2A 14	2.0 3.6			SP	(S2A) 35% coal slag. Medium dense, dark brown, poorly-graded SAND (SP), mps=4.75 mm, damp -FILL-			10	40	40	10				
		S2B	3.6 4.0		3.6	SP	Medium dense, light brown to brown, poorly- graded SAND (SP), mps=4.75 mm, dry -GLACIAL OUTWASH DEPOSIT-			20	20	55	5				
5	10 14 24 20	S3 16	4.0 6.0			SP	Dense, light brown, poorly-graded SAND (SP), mps=3/4 in., dry		5	20	30	40	5				
					6.0		-BOTTOM OF EXPLORATION AT 6.0 FT.-										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

- O Open End Rod
- T Thin Wall Tube
- U Undisturbed Sample
- S Split Spoon
- G Geoprobe

Well Diagram

- Riser Pipe
- Screen
- Filter Sand
- Cuttings
- Grout
- Concrete
- Bentonite Seal

Summary

Overburden (lin. ft.)	6
Rock Cored (lin. ft.)	--
Samples	3S

Boring No. HA07-8

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None; Toughness: L-Low, M-Medium, H-High; Plasticity: N-Nonplastic, L-Low, M-Medium, H-High; Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY& ALDRICH

TEST BORING REPORT

Boring No. HA07-9

Project: Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client: University of New England
Contractor: Maine Test Borings, Inc.

File No. 34718-000
Sheet No. 1 of 1
Start: 18 September 2007
Finish: 18 September 2007
Driller: B. Enos
H&A Rep.: M. Snow
Elevation: 105.0+/-
Datum: NGVD 1929
Location: See Plan

	Casing	Sampler	Barrel
Type	HSA	S	--
Inside Diameter (in.)	2.5	1 3/8	--
Hammer Weight (lb.)	--	140	-
Hammer Fall (in.)	--	30	-

Drilling Equipment and Procedures
Rig Make & Model: Mobile Drill B-47
Bit Type: Roller Bit
Drill Mud: None
Casing: HSA
Hoist/Hammer: Winch/ Doughnut Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
0	7 21 36 47	S1 14	0.0 2.0	NO WELL INSTALLED		SW	Very dense, brown, well-graded SAND (SW), mps=1.0 in., moist 1/2-in. asphalt layer -FILL-		10	25	30	25	10				
	8 6 5 4	S2 14	2.0 4.0		2.0	SP	Medium dense, brown, poorly-graded SAND (SP), mps=4.75 mm, moist -GLACIAL OUTWASH DEPOSIT-			15	40	40	5				
					4.0		-BOTTOM OF EXPLORATION AT 4.0 FT.-										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification
O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (lin. ft.) 4
Rock Cored (lin. ft.) --
Samples 2S

Boring No. HA07-9

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None; Toughness: L-Low, M-Medium, H-High; Plasticity: N-Nonplastic, L-Low, M-Medium, H-High; Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA07-10

Project	Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client	University of New England
Contractor	Maine Test Borings, Inc.

File No.	34718-000
Sheet No.	1 of 1
Start	18 September 2007
Finish	18 September 2007
Driller	B. Enos
H&A Rep.	M. Snow
Elevation	98.0+/-
Datum	NGVD 1929
Location	See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	S	--	Rig Make & Model: Mobile Drill B-47
Inside Diameter (in.)	2.5	1 3/8	--	Bit Type: Roller Bit; Drill Mud: None
Hammer Weight (lb.)	--	140	-	Casing: HSA
Hammer Fall (in.)	--	30	-	Hoist/Hammer: Winch/ Doughnut Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
0	5 6 5 7	S1 14	0.0 2.0	NO WELL INSTALLED		SM	Medium dense, brown, silty SAND (SM), mps=1.0 in., wet -FILL-		5	15	30	30	20				
	10 27 20 26	S2 14	2.0 4.0		1.8	SM-ML	Dense, brown-gray, silty SAND to sandy SILT (SM-ML), mottled, wet, mps=0.43 mm -GLACIAL MARINE DEPOSIT-					50	50				
5	4 11 14 14	53 14	4.0 6.0		3.6	SW-SM	Dense, brown-gray, well-graded SAND with silt and gravel (SW-SM), mps=1.0 in., wet -GLACIAL TILL-		15	20	20	20	25				
						SW-SM	Medium dense, brown-gray, well-graded SAND with silt (SW-SM), mps=1.0 in., wet		10	25	25	20	20				
					6.0		-BOTTOM OF EXPLORATION AT 6.0 FT.-										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
9/18/07	12:00				2.8

Sample Identification

- O Open End Rod
- T Thin Wall Tube
- U Undisturbed Sample
- S Split Spoon
- G Geoprobe

Well Diagram

- Riser Pipe
- Screen
- Filter Sand
- Cuttings
- Grout
- Concrete
- Bentonite Seal

Summary

Overburden (lin. ft.)	6
Rock Cored (lin. ft.)	--
Samples	3S

Boring No. HA07-10

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None; Toughness: L-Low, M-Medium, H-High; Plasticity: N-Nonplastic, L-Low, M-Medium, H-High; Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1] SPT = Sampler blows per 6 in. [2] Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

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HALEY& ALDRICH

TEST BORING REPORT

Boring No. HA07-11

Project	Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client	University of New England
Contractor	Maine Test Borings, Inc.

File No.	34718-000
Sheet No.	1 of 1
Start	18 September 2007
Finish	18 September 2007
Driller	B. Enos
H&A Rep.	M. Snow
Elevation	98.0+/-
Datum	NGVD 1929
Location	See Plan

	Casing	Sampler	Barrel
Type	HSA	S	–
Inside Diameter (in.)	2.5	1 3/8	--
Hammer Weight (lb.)	--	140	-
Hammer Fall (in.)	--	30	-

Drilling Equipment and Procedures

Rig Make & Model: Mobile Drill B-47
Bit Type: Roller Bit
Drill Mud: None
Casing: HSA
Hoist/Hammer: Winch/ Doughnut Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	5 7 13 11	S1 18	0.0 2.0	NO WELL INSTALLED			Roadway SAND										
					0.2	SM-ML	Medium dense, dark brown, sandy SILT (SM-ML) to silty SAND, mps=0.42 mm, wet -TOPSOIL-				10	45	45				
	16 21 27 37	S2 12	2.0 4.0		1.2		Medium dense, brown, silty SAND (SM), mps=0.42 mm, wet -GLACIAL MARINE DEPOSIT-					70	30				
						SP	Dense, brown, poorly-graded SAND (SP), mps=1.0 in., wet		5	10	25	50	10				
5	13 15 18 17	S3 17	4.0 6.0			SP-SM	Dense, brown, poorly-graded SAND with silt (SP-SM) with occasional gray lean clay layers (1/2 in.), mps=0.42 mm, wet -GLACIAL MARINE DEPOSIT-				35	55	10				
	8 11 20 23	S4	6.0 8.0			SP-SM	Dense, brown, poorly-graded SAND with silt (SP-SM) with occasional sandy silt lenses, mps=0.42 mm, wet				35	55	10				
					7.7	SW	Dense, brown, well-graded SAND (SW), mps=4.75 mm, wet -GLACIAL MARINE DEPOSIT-			25	35	35	5				
					8.0		-BOTTOM OF EXPLORATION AT 8.0 FT.-										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
9/18/07					2.9

Sample Identification

- O Open End Rod
- T Thin Wall Tube
- U Undisturbed Sample
- S Split Spoon
- G Geoprobe

Well Diagram

- Riser Pipe
- Screen
- Filter Sand
- Cuttings
- Grout
- Concrete
- Bentonite Seal

Summary

Overburden (lin. ft.)	8
Rock Cored (lin. ft.)	--
Samples	4S

Boring No. HA07-11

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None. Toughness: L-Low, M-Medium, H-High. Plasticity: N-Nonplastic, L-Low, M-Medium, H-High. Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1] SPT = Sampler blows per 6 in. [2] Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY & ALDRICH — TEST BORING REPORT

Boring No. HA07-12

Project	Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client	University of New England
Contractor	Maine Test Borings, Inc.

File No.	34718-000
Sheet No.	1 of 1
Start	18 September 2007
Finish	18 September 2007
Driller	B. Enos
H&A Rep.	M. Snow
Elevation	97.0+/-
Datum	NGVD 1929
Location	See Plan

	Casing	Sampler	Barrel
Type	HSA	S	--
Inside Diameter (in.)	2.5	1 3/8	--
Hammer Weight (lb.)	--	140	-
Hammer Fall (in.)	--	30	-

Drilling Equipment and Procedures

Rig Make & Model: Mobile Drill B-47
Bit Type: Roller Bit
Drill Mud: None
Casing: HSA
Hoist/Hammer: Winch/ Doughnut Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
0	4 10 11 9	S1 10	0.0 2.0	NO WELL INSTALLED	0.3	OL/ OH	Medium dense, brown, SAND with silt, mps=0.25 in., dry -TOPSOIL-				35	45	20				
						SW	Medium dense, brown, gravelly SAND (SW), mps=2.0 in., dry		20	30	25	20	5				
	5 4 2 3	S2 12	2.0 4.0			SP	Loose, brown, poorly-graded SAND (SP), mps=3/4 in., dry -FILL-		10	20	30	35	5				
5	2 2 1 3	S3 1	4.0 6.0		4.0	SM	Loose, brown, silty SAND (SM), mps=0.42 mm, moist -GLACIAL MARINE DEPOSIT-			10	40	35	15				
	9 11 6 3	S4 8	6.0 8.0			SM	Medium dense, brown, silty SAND (SM), mps=1.5 in., wet				40	40	20				
					8.0		-BOTTOM OF EXPLORATION AT 8.0 FT.-										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 8
Rock Cored (lin. ft.) --
Samples 4S

Boring No. HA07-12

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None; Toughness: L-Low, M-Medium, H-High; Plasticity: N-Nonplastic, L-Low, M-Medium, H-High; Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

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HALEY& ALDRICH

TEST BORING REPORT

Boring No.HA07-13(OW)

Project: Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client: University of New England
Contractor: Maine Test Borings, Inc.

File No. 34718-000
Sheet No. 1 of 1
Start 18 September 2007
Finish 18 September 2007
Driller B. Enos
H&A Rep. M. Snow
Elevation 94.0+/-
Datum NGVD 1929
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	NW	S	--	Rig Make & Model: Mobile Drill B-47
Inside Diameter (in.)	3.0	1 3/8	--	Bit Type: Roller Bit; Drill Mud: None
Hammer Weight (lb.)	300	140	-	Casing: NW Drive to 17.0
Hammer Fall (in.)	30	30	-	Hoist/Hammer: Winch/ Doughnut Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	5 9 14 14	S1 20	0.0 2.0			SM	Loose to medium, dense, dark brown, silty SAND (SM), mps=4.75 mm, no structure, organic odor, moist, rootlets throughout -TOPSOIL-			5	10	70	15				
					0.7	SP-SM				5	15	70	10				
						SP-SM	Medium dense, yellow brown, poorly graded SAND with silt (SP-SM), mps=4.75 mm, no structure, no odor, moist -FILL-			5	15	70	10				
	2 7 20 26	S2 12	3.0 5.0		3.0	OL/ OH	Loose, yellow brown, poorly graded SAND with silt (SP-SM), mps=4.75 mm, no structure, no odor, moist -FILL-										
					3.1												
5	14 18 18 22	S3 16	5.0 7.0			SP-SM	Very soft, black, sandy ORGANIC SOIL (OL/OH), mps=2 mm, no structure, organic odor, moist -ORGANIC DEPOSIT-				5	85	10				
							Dense, tan, poorly-graded SAND with silt (SP-SM), mps=2 mm, no structure, no odor, moist				5	85	10				
							-GLACIAL MARINE DEPOSIT-				5	85	10				
					9.0	CL	Medium stiff, gray lean CLAY (CL), mps=0.42 mm, no odor, wet -GLACIAL MARINE DEPOSIT-					10	90				
10	1 2 2 3	S4 24	10.0 12.0			CL	Medium stiff, gray, sandy lean CLAY (CL), mps=0.42 mm, no odor, wet -GLACIAL MARINE DEPOSIT-					30	70				
					12.0												
15	5 8 9 14	S5 6	15.0 17.0			SP	Medium dense, gray, poorly-graded SAND (SP), mps=4.75 mm, no structure, no odor, wet -GLACIAL MARINE DEPOSIT-			15	70	10	5				
					17.0		-BOTTOM OF EXPLORATION AT 17.0 FT.- NOTE: Observation well installed in completed borehole. See Well Installation Report for details.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification
- O Open End Rod
- T Thin Wall Tube
- U Undisturbed Sample
- S Split Spoon
- G Geoprobe

Well Diagram
- Riser Pipe
- Screen
- Filter Sand
- Cuttings
- Grout
- Concrete
- Bentonite Seal

Summary
- Overburden (lin. ft.) 17
- Rock Cored (lin. ft.) --
- Samples 5S

Boring No. HA07-13(OW)

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None; Toughness: L-Low, M-Medium, H-High; Plasticity: N-Nonplastic, L-Low, M-Medium, H-High; Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1] SPT = Sampler blows per 6 in. [2] Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY& ALDRICH

TEST BORING REPORT

Boring No. HA07-14

Project: Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client: University of New England
Contractor: Maine Test Borings, Inc.

File No. 34718-000
Sheet No. 1 of 1
Start: 18 September 2007
Finish: 18 September 2007
Driller: B. Enos
H&A Rep.: B. Steinert
Elevation: 96.0+/-
Datum: NGVD 1929
Location: See Plan

	Casing	Sampler	Barrel
Type	HSA	S	--
Inside Diameter (in.)	2.5	1 3/8	--
Hammer Weight (lb.)	-	140	-
Hammer Fall (in.)	-	30	-

Drilling Equipment and Procedures
Rig Make & Model: Mobile Drill B-47
Bit Type: Roller Bit
Drill Mud: None
Casing: HSA
Hoist/Hammer: Winch/ Doughnut Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
0	4 9 18 19	S1 12	0.0 2.0	NO WELL INSTALLED	0.5	OL/OH	Medium dense; dark brown, silty SAND with organics(OL/OH), mps=0.075 mm, moist -TOPSOIL-				10	65	25				
						SP	Medium dense, brown, poorly graded SAND (SP), mps=1/2 in., moist		5	15	35	40	5				
	17 17 19 21	S2 14	2.0 4.0			SP	Dense, brown, poorly-graded SAND with gravel (SP), mps=1.0 in., moist -FILL-	5	15	10	25	35	5				
5	14 22 24 21	S3 16	4.0 6.0		4.8	SP-SM	Dense, brown, poorly-graded SAND with silt (SP-SM), mps=4.75 mm, wet			5	30	40	25				
					6.0	SP	Dense, brown, poorly-graded SAND (SP), occasional silt/clay bands, mps=1/2 in., wet -GLACIAL MARINE DEPOSIT-		5	10	35	40	10				
							-BOTTOM OF EXPLORATION AT 6.0 FT.-										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
					4.4

Sample Identification
O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (lin. ft.) 6
Rock Cored (lin. ft.) --
Samples 3S

Boring No. HA07-14

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None; Toughness: L-Low, M-Medium, H-High; Plasticity: N-Nonplastic, L-Low, M-Medium, H-High; Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA07-15

Project: Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client: University of New England
Contractor: Maine Test Borings, Inc.

File No. 34718-000
Sheet No. 1 of 1
Start: 18 September 2007
Finish: 18 September 2007
Driller: B. Enos
H&A Rep.: M. Snow
Elevation: 98.0+/-
Datum: NGVD 1929
Location: See Plan

	Casing	Sampler	Barrel
Type	HSA	S	--
Inside Diameter (in.)	2.5	1 3/8	--
Hammer Weight (lb.)	--	140	-
Hammer Fall (in.)	--	30	-

Drilling Equipment and Procedures
Rig Make & Model: Mobile Drill B-47
Bit Type: Roller Bit
Drill Mud: None
Casing: HSA
Hoist/Hammer: Winch/ Doughnut Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
0	4 10 11 14	S1 14	0.0 2.0	NO WELL INSTALLED	0.4	OL/OH	Medium dense, dark brown, silty SAND (OL/OH), mps=0.075 mm, moist -TOPSOIL-					75	25				
						SP	Medium dense, light brown, poorly-graded SAND (SP), mps=4.75 mm, dry -FILL-			20	40	35	5				
	15 18 19 16	S2 14	2.0 4.0			SW	Dense, light brown, well-graded SAND (SW), mps=1.5 in., dry		15	25	30	25	5				
5	6 7 14 14	S3 14	4.0 6.0		4.0	SM	Dense, brown, silty SAND with gravel (SM), mps=2.0 in., wet -GLACIAL MARINE DEPOSIT-	5	20	20	15	20	20				
					6.0		-BOTTOM OF EXPLORATION AT 6.0 FT.-										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
9/18/07	3:15	0	6.8	5.5	

Sample Identification
O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (lin. ft.) 6
Rock Cored (lin. ft.) --
Samples 3S

Boring No. HA07-15

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None; Toughness: L-Low, M-Medium, H-High; Plasticity: N-Nonplastic, L-Low, M-Medium, H-High; Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY& ALDRICH

TEST BORING REPORT

Boring No. HA07-16

Project: Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client: University of New England
Contractor: Maine Test Borings, Inc.

File No. 34718-000
Sheet No. 1 of 1
Start: 18 September 2007
Finish: 18 September 2007
Driller: B. Enos
H&A Rep.: M. Snow
Elevation: 95.0+/-
Datum: NGVD 1929
Location: See Plan

	Casing	Sampler	Barrel
Type	HSA	S	--
Inside Diameter (in.)	2.5	1 3/8	--
Hammer Weight (lb.)	--	140	-
Hammer Fall (in.)	--	30	-

Drilling Equipment and Procedures
Rig Make & Model: Mobile Drill B-47
Bit Type: Roller Bit
Drill Mud: None
Casing: HSA
Hoist/Hammer: Winch/ Doughnut Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
0	2 3 4 6	S1 14	0.0 2.0	NO WELL INSTALLED		OL/OH	Loose, brown SAND with silt (OH/OH) -TOPSOIL-				30	55	15				
					1.0	SP	Loose, brown to rust-brown, poorly-graded SAND (SP), mps=1/2 in., moist			25	35	30	10				
	8 2 2 3	S2 10	2.0 4.0			SP	-FILL- Loose, rust-brown, poorly-graded SAND (SP), mps=1/2 in., moist			25	35	30	10				
	2 8 14 14	S3 16	4.0 6.0		3.8	SM-ML	Dark brown, sandy SILT (ML) to silty SAND with organics (SM), mps=0.42 mm, wet -ORGANIC DEPOSIT-					50	50				
5					4.0	SW	Medium dense, gray, well-graded SAND (SW), mps=4.75 mm, wet -GLACIAL MARINE DEPOSIT-			35	30	30	5				
					6.0		-BOTTOM OF EXPLORATION AT 6.0 FT.-										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
9/18/07	1:15	0	--	6.0	4.8

Sample Identification
O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (lin. ft.) 6
Rock Cored (lin. ft.) --
Samples 3S

Boring No. HA07-16

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None; Toughness: L-Low, M-Medium, H-High; Plasticity: N-Nonplastic, L-Low, M-Medium, H-High; Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY & ALDRICH	TEST BORING REPORT	Boring No. HA07-17

Project	Proposed College of Pharmacy and Campus Improvements Portland, Maine	File No. 34718-000
Client	University of New England	Sheet No. 1 of 1
Contractor	Maine Test Borings, Inc.	Start 18 September 2007
		Finish 18 September 2007
		Driller B. Enos
		H&A Rep. M. Snow

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	S	--	Rig Make & Model: Mobile Drill B-47
Inside Diameter (in.)	2.5	1 3/8	--	Bit Type: Roller Bit Drill Mud: None
Hammer Weight (lb.)	--	140	-	Casing: HSA
Hammer Fall (in.)	--	30	-	Hoist/Hammer: Winch/ Doughnut Hammer

Elevation 95.0+/-
Datum NGVD 1929
Location See Plan

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	4 7 15 18	S1 6	0.0 2.0	NO WELL INSTALLED	0.5	SM	Medium dense, brown, poorly-graded SAND with silt (SM), mps=1.0 in., dry -TOPSOIL-		5	10	25	40	20				
	8 6 5 2	S2 12	2.0 4.0			SP	Medium dense, rust-brown, poorly-graded SAND (SP), mps=1.5 in., moist -FILL-			15	40	35	10				
	2 2 2 4	S3 10	4.0 6.0		3.8	SP	Dark brown, silty SAND lense at 3.8 ft.				15	60	25				
5					4.0	SP-SM	Gray, poorly-graded SAND with silt (SP-SM), mps=0.43 mm, wet										
						PT	Brown sandy PEAT (PT), wet -ORGANIC DEPOSIT-										
	1 1 WOH 2	S4 16	6.0 8.0		5.9	SM	Gray, medium to fine SAND layer 5.9-6.0 ft.				35	50	15				
					7.0		Loose, gray, silty SAND (SM), mps=0.43 mm, wet										
	WOH 1 4 3	S5 18	8.0 10.0			CL	Soft to medium stiff, gray, lean CLAY (CL), with shells mps=0.075 mm, wet -GLACIAL MARINE DEPOSIT-						100				
10					10.0		Gray, silty fine SAND layer at 9.9 ft.										
							-BOTTOM OF EXPLORATION AT 10.0 FT.-										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
9/18/07	2:55				6.0

Sample Identification

- O Open End Rod
- T Thin Wall Tube
- U Undisturbed Sample
- S Split Spoon
- G Geoprobe

Well Diagram

- Riser Pipe
- Screen
- Filter Sand
- Cuttings
- Grout
- Concrete
- Bentonite Seal

Summary

Overburden (lin. ft.) 10
Rock Cored (lin. ft.) --
Samples 5S

Boring No. HA07-17

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Toughness: L-Low, M-Medium, H-High Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY & ALDRICH — TEST BORING REPORT

Boring No. HA07-18

Project	Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client	University of New England
Contractor	Maine Test Borings, Inc.

File No.	34718-000
Sheet No.	1 of 2
Start	18 September 2007
Finish	18 September 2007
Driller	B. Enos
H&A Rep.	M. Snow
Elevation	95.0+/-
Datum	NGVD 1929
Location	See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	S	--	Rig Make & Model: Mobile Drill B-47
Inside Diameter (in.)	3.0	1 3/8	--	Bit Type: Roller Bit; Drill Mud: None
Hammer Weight (lb.)	--	140	-	Casing: HSA
Hammer Fall (in.)	--	30	-	Hoist/Hammer: Winch/ Doughnut Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
0	5 6 8 6	S1 8	0.0 2.0	NO WELL INSTALLED		OL/OH	Medium dense, dark brown, sandy SILT (OL/OH) -TOPSOIL-										
					0.3	SP	Medium dense, brown, poorly-graded SAND (SP), mps=1.0 in., dry -FILL-		5	20	30	25	10				
	3 2 6 15	S2 10	2.0 4.0			SP	Loose, brown, poorly-graded SAND (SP), mps=1.0 in., wet		5	20	30	25	10				
					3.5	SM-ML	Dark brown, sandy SILT (SM-ML) layer with organics at 3.5-3.6 ft. -ORGANIC DEPOSIT-										
5	11 16 16 16	S3 14	4.0 6.0		3.6	SP	Medium dense, gray-brown, poorly-graded SAND (SP), mps=1.0 in., wet -GLACIAL MARINE DEPOSIT-		5	25	25	30	15				
						SP	Medium dense, brown, poorly-graded SAND (SP), mps=0.42 mm, wet				30	50	20				
10	1 1 8 10	S4 20	10.0 12.0		10.5	SC	Medium stiff, brown, sandy CLAY (SC), mps=0.75 mm, wet					35	65				
					11.5	SP	Medium dense, brown, poorly-graded SAND (SP), mps=1.0 in., wet -GLACIAL MARINE DEPOSIT-		5	20	35	30	10				
15	3 5 8 12	S5 6	15.0 17.0			SP	Medium dense, brown, poorly-graded SAND (SP), mps=0.43 mm, wet -GLACIAL MARINE DEPOSIT-			5	50	40	5				
20	12 13 15 13	S6 18	20.0 22.0			SP	Medium dense, brown, poorly-graded SAND (SP), occasional sandy SILT lenses (SM-ML), mps=1/2 in., wet			15	50	30	5				
25																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification
- O Open End Rod
- T Thin Wall Tube
- U Undisturbed Sample
- S Split Spoon
- G Geoprobe

Well Diagram
- Riser Pipe
- Screen
- Filter Sand
- Cuttings
- Grout
- Concrete
- Bentonite Seal

Summary
- Overburden (lin. ft.) 32?
- Rock Cored (lin. ft.) --
- Samples 8S

Boring No. HA07-18

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None. Toughness: L-Low, M-Medium, H-High. Plasticity: N-Nonplastic, L-Low, M-Medium, H-High. Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

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HALEY& ALDRICH

TEST BORING REPORT

Boring No. HA07-18
File No. 34718-000

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
25	12 17 22 41	S7 12	25.0 27.0			SP	Dense, brown, poorly-graded SAND (SP), mps=1/2 in., wet			15	50	30	5				
30	7 11 19 28	S8 24	30.0 32.0			CL	Hard, gray sandy CLAY (CL) with sand layers			5	10	10	75				
							-GLACIAL MARINE DEPOSIT-										
					32.0		-BOTTOM OF EXPLORATION AT 32.0 FT.-										

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA07-18

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA07-19

Project	Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client	University of New England
Contractor	Maine Test Borings, Inc.

File No.	34718-000
Sheet No.	1 of 2
Start	3 October 2007
Finish	3 October 2007
Driller	M. Porter
H&A Rep.	E. Beirne
Elevation	126.5+/-
Datum	NGVD 1929
Location	See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	NW	S	-	Rig Make & Model: Mobile B-53 Bombardier
Inside Diameter (in.)	3.0	1 3/8	-	Bit Type: Roller Bit; Drill Mud: None
Hammer Weight (lb.)	300	140	-	Casing: NW Driven to 20 ft.
Hammer Fall (in.)	16	30	-	Hoist/Hammer: Winch/ Doughnut Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
0							-BITUMINOUS CONCRETE-										
	5 6 5 9	S1 9	0.3 2.3		0.3	SW-SM	Medium dense, gray, well graded SAND with silt (SW-SM), mps = .25 in., no structure, no odor, moist -FILL-		5	5	35	45	10				
					1.2	GW-GM	Medium dense, black, well graded GRAVEL with silt and sand (GW-GM), mps = 2.0 in., no structure, no odor, moist -FILL-	25	25	5	15	20	10				
					1.9	SW	Medium dense, brown well graded SAND (SW), mps = .50 in., no structure, no odor, moist -GLACIAL OUTWASH DEPOSIT-		5	10	45	40					
5	7 12 23 32	S2 19	4.5 6.5		4.0	SP	Dense, light brown poorly graded SAND (SP), mps = .25 in., no structure, no odor, moist, zones of brown sand			5	35	60					
10	18 32 43 60	S3 19	9.5 11.5	NO WELL INSTALLED		SP	Very dense, light brown, poorly graded SAND (SP), mps = 4mm., no structure, no odor, moist -GLACIAL MARINE DEPOSIT-				30	70					
15	14 26 33 43	S4 16	15.0 17.0			SP	Very dense, light brown, poorly graded SAND (SP), occasional silt layers, mps = 4mm., no structure, no odor, moist -GLACIAL MARINE DEPOSIT-				45	50	5				
20	9 19 23 28	S5 15	20.0 22.0			SP	Dense, brown, poorly graded SAND (SP), mps = 2mm., no structure, no odor, wet -GLACIAL MARINE DEPOSIT-				25	70	5				
25																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
10/03/07	11:47	0.1	20.0	25.3	14.0
10/03/07	11:58	0.2	-	25.3	18.0

Sample Identification

- O Open End Rod
- T Thin Wall Tube
- U Undisturbed Sample
- S Split Spoon
- G Geoprobe

Well Diagram

- Riser Pipe
- Screen
- Filter Sand
- Cuttings
- Grout
- Concrete
- Bentonite Seal

Summary

- Overburden (lin. ft.) 25.3
- Rock Cored (lin. ft.) -
- Samples 6S

Boring No. HA07-19

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None; Toughness: L-Low, M-Medium, H-High; Plasticity: N-Nonplastic, L-Low, M-Medium, H-High; Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
25	50/0.3	S6 2	25.0 25.3		24.7 25.3	SM	Note: Driller noted change in material at 24.7 ft. Very dense, gray-brown silty SAND (SM), mps = .50 in., bonded, no odor, moist -GLACIAL TILL- Split spoon refusal at 25.3 ft.				25	45	30				
							-BOTTOM OF EXPLORATION AT 25.3 FT.-										

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY & ALDRICH — TEST BORING REPORT

Boring No. HA07-20

Project	Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client	University of New England
Contractor	Maine Test Borings, Inc.

File No.	34718-000
Sheet No.	1 of 2
Start	3 October 2007
Finish	3 October 2007
Driller	M. Porter
H&A Rep.	E. Beirne
Elevation	127.0+/-
Datum	NGVD 1929
Location	See Plan

	Casing	Sampler	Barrel
Type	NW	S	-
Inside Diameter (in.)	3.0	1 3/8	-
Hammer Weight (lb.)	300	140	-
Hammer Fall (in.)	16	30	-

Drilling Equipment and Procedures

Rig Make & Model: Mobile B-53 Bombardier
Bit Type: Roller Bit
Drill Mud: None
Casing: NW Driven to 20.0 ft.
Hoist/Hammer: Winch/ Doughnut Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
0				NO WELL INSTALLED			-BITUMINOUS CONCRETE-										
	4 3 3 4	S1 23	0.4 2.4		0.4	SM	-SUBBASE- Loose, dark brown, silty SAND with gravel (SM), mps = .50 in., no structure, no odor, moist, organics throughout		15	10	25	30	20				
					0.6	SP	-FILL-				40	55	5				
					1.4		Loose, brown, poorly graded SAND (SP), mps = .25 in., no structure, no odor, moist, trace organics										
5	10 17 17 28	S2 19	4.5 6.5			SP	Dense, light brown, poorly graded SAND (SP), mps = 2mm., no structure, no odor, moist -GLACIAL OUTWASH DEPOSIT-				15	85					
10	27 45 46 80	S3 24	9.5 11.5			SP	Very dense, brown to gray-brown, poorly graded SAND (SP), mps = .25 in., no structure, no odor, moist			5	60	35					
15	26 49 85	S4 12	15.0 16.5			SW-SM	Very dense, brown well graded SAND with silt (SW-SM), mps = .50 in., no structure, no odor, wet -GLACIAL OUTWASH DEPOSIT-		10	10	40	30	10				
20	13 21 23 31	S5 12	20.0 22.0			SP	Dense, gray-brown, poorly graded SAND (SP), mps = 4mm., no structure, no odor, wet			5	55	40					
					22.6		Top of Bedrock at 22. 6 ft. Advanced roller bit to 22.7 ft. Begin NQ rock core at 22.7 ft. See Core Boring Report for bedrock details.										
25																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.)	22.6
Rock Cored (lin. ft.)	4.5
Samples	5S, 1C

Boring No. HA07-20

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None; Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Toughness: L-Low, M-Medium, H-High; Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

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HALEY & ALDRICH

CORE BORING REPORT

Boring No. HA07-20
File No. 34718-000

Depth (ft)	Drilling Rate Min./ft	Run No.	Depth (ft)	Recovery/RQD in.	Recovery/RQD %	Weath-ering	Well Dia-gram	Elev./Depth (ft)	Visual Description and Remarks
20									SEE TEST BORING REPORT FOR OVERBURDEN DETAILS
		C1	22.7 27.3	50/35	93/64	Fr.-SL.	NO WELL INSTALLED	22.6	Top of Bedrock at 22.6 ft. Advanced roller bit to 22.7 ft. Begin NQ rock core at 22.7 ft. Very hard, fresh to slightly weathered, light gray fine grained to aphanitic SCHIST. Joints are high angle to horizontal, very close to moderately spaced, planar, stepped and undulating, rough, tight to open, some calcite infilling. Quartz, calcite veins throughout. Chlorite mineralization coincident with quartz-rich zones.
25									
								27.3	-BOTTOM OF EXPLORATION AT 27.3 FT.-

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA07-21(OW)

Project	Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client	University of New England
Contractor	Maine Test Borings, Inc.

File No.	34718-000
Sheet No.	1 of 2
Start	2 October 2007
Finish	3 October 2007
Driller	M. Porter
H&A Rep.	E. Beirne
Elevation	126.5+/-
Datum	NGVD 1929
Location	See Plan

	Casing	Sampler	Barrel
Type	NW	S	-
Inside Diameter (in.)	3.0	1 3/8	-
Hammer Weight (lb.)	300	140	-
Hammer Fall (in.)	16	30	-

Drilling Equipment and Procedures

- Rig Make & Model: Mobile B-53 Bombardier
- Bit Type: Roller Bit
- Drill Mud: None
- Casing: NW Driven to 20.0 ft.
- Hoist/Hammer: Winch/ Doughnut Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0							-BITUMINOUS CONCRETE-										
	12 25 14 13	S1 17	0.3 2.3		0.3	SW-SM	Dense, dark brown to brown, well graded SAND with silt and gravel (SW-SM), mps = 2.0 in., no structure, no odor, dry to moist -FILL-	10	15	5	25	35	10				
					2.0	SW											
5	17 29 33 37	S2 20	4.5 6.5			SW	Very dense, brown to light brown, well graded SAND (SW), mps = 1.0 in., no structure, no odor, moist -GLACIAL OUTWASH DEPOSIT-		10	5	30	55					
					4.9	SP	Very dense, light brown, poorly graded SAND (SP), mps = 4mm., no structure, no odor, moist				25	75					
10	18 32 36 52	S3 24	9.5 11.5			SP	Very dense, light brown, poorly graded SAND (SP) with oxidized iron spots, mps = 4mm., no structure, no odor, moist -GLACIAL MARINE DEPOSIT-				25	75					
15	8 19 22 24	S4 14	15.0 17.0			SP	Dense, light brown, poorly graded SAND (SP), mps = 4mm., no structure, no odor, moist to wet, somewhat mottled. Silt and fine sand layer in tip -GLACIAL MARINE DEPOSIT-				55	45					
20	10 26 33 41	S5 13	20.0 22.0			SP	Very dense, gray-brown poorly graded SAND (SP), mps = 4 mm., no structure, no odor, wet				60	40					
					22.6	SW	Note: Driller detected gravel layer at 22.6ft. -PROBABLE GLACIAL TILL-										
					24.0		Bedrock encountered at 24.0 ft. Advanced roller bit to 24.2 ft										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

- O Open End Rod
- T Thin Wall Tube
- U Undisturbed Sample
- S Split Spoon
- G Geoprobe

Well Diagram

- Riser Pipe
- Screen
- Filter Sand
- Cuttings
- Grout
- Concrete
- Bentonite Seal

Summary

- Overburden (lin. ft.) 24.0
- Rock Cored (lin. ft.) -
- Samples 5S

Boring No. HA07-21(OW)

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None; Toughness: L-Low, M-Medium, H-High; Plasticity: N-Nonplastic, L-Low, M-Medium, H-High; Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1] SPT = Sampler blows per 6 in. [2] Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
					24.2		-BOTTOM OF EXPLORATION AT 24.2 FT.- Installed observation well. See Observation Well Report HA07-21(OW) for details.										

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY& ALDRICH

TEST BORING REPORT

Boring No. HA07-22

Project: Proposed College of Pharmacy and Campus Improvements Portland, Maine
Client: University of New England
Contractor: Maine Test Borings, Inc.

File No. 34718-000
Sheet No. 1 of 2
Start: 2 October 2007
Finish: 2 October 2007
Driller: M. Porter
H&A Rep.: E. Beirne
Elevation: 126.5+/-
Datum: NGVD 1929
Location: See Plan

	Casing	Sampler	Barrel
Type	NW	S	-
Inside Diameter (in.)	3.0	1 3/8	-
Hammer Weight (lb.)	300	140	-
Hammer Fall (in.)	16	30	-

Drilling Equipment and Procedures
Rig Make & Model: Mobile B-53 Bombardier
Bit Type: Roller Bit
Drill Mud: None
Casing: NW Driven to 19.9 ft.
Hoist/Hammer: Winch/ Doughnut Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
0				NO WELL INSTALLED			-BITUMINOUS CONCRETE-										
	25 32 19 10	S1 8	0.3 2.3		0.3	SP-SM	Very dense, brown, poorly graded SAND with silt and gravel (SP-SM), mps = 2.0 in., no structure, no odor, moist -FILL-	15	15	10	30	20	10				
					3.5	SM	Note: Driller detected change to dark brown, silty SAND with gravel										
5	6 7 23 67	S2 22	4.5 6.5		4.1	SP	Dense, brown, poorly graded SAND (SP), mps = .25 in., no structure, no odor, moist -GLACIAL MARINE DEPOSIT-			5	35	55	5				
					5.8	SP	Dense, light brown, poorly graded SAND (SP), mps = 4mm., no structure, no odor -GLACIAL MARINE DEPOSIT-				25	75	5				
10	19 40 48 58	S3 14	10.0 12.0			SP	Very dense, light brown, poorly graded SAND (SP), mps = 4mm., no structure, no odor, wet			5	40	55					
15	13 38 45 83	S4 15	15.0 17.0			SP	Very dense, brown, poorly graded SAND (SP), mps = .25 in., no structure, no odor, moist to wet -GLACIAL MARINE DEPOSIT-			5	40	55					
					16.7	SW-SM	Very dense, gray-brown well graded SAND with silt and gravel (SW-SM), mps = .75 in., no structure, no odor, wet -GLACIAL TILL-	5	15	5	25	40	10				
20					19.9		Bedrock encountered at 19.9 ft. Advanced roller bit to 20.4 ft. Begin NQ rock core at 20.4 ft. See Core Boring Report for details.										
25																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
10/02/07	14:35	0.1	20.0	25.4	12.6
10/02/07	14:55	0.3	-	19.4	14.4

Sample Identification
O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (lin. ft.) 19.9
Rock Cored (lin. ft.) 5.0
Samples 4S, 1C

Boring No. HA07-22

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None; Toughness: L-Low, M-Medium, H-High; Plasticity: N-Nonplastic, L-Low, M-Medium, H-High; Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

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CORE BORING REPORT

Depth (ft)	Drilling Rate Min./ft	Run No.	Depth (ft)	Recovery/RQD in.	Recovery/RQD %	Weathering	Well Diagram	Elev./Depth (ft)	Visual Description and Remarks
									SEE TEST BORING REPORT FOR OVERBURDEN DETAILS
20								19.9	
		C1	20.4 25.4	60/53	100/88	Fr.-SL.	NO WELL INSTALLED		Very hard to hard, fresh to slightly weathered, fine grained to aphanitic SCHIST. Joints are high angle to horizontal, very close to moderately spaced, planar, stepped and undulating, rough, tight to open, some calcite infilling. Quartz/calcite veins throughout core. Chlorite mineralization coincident with quartz-rich zones.
25									
								25.4	-BOTTOM OF EXPLORATION AT 25.4 FT.-

APPENDIX B

Observation Well Installation and Groundwater Monitoring Reports

HALEY & ALDRICH

OBSERVATION WELL INSTALLATION REPORT

Well No.	HA07-3(OW)
Boring No.	HA07-3

PROJECT	Proposed School of Pharmacy, University of New England	**H&A FILE NO.**	34718-000
LOCATION	Portland, Maine	**PROJECT MGR.**	A. Blaisdell
CLIENT	University of New England	**FIELD REP.**	E. Beirne
CONTRACTOR	Maine Test Borings, Inc.	**DATE INSTALLED**	9/14/2007
DRILLER	M. Porter	**WATER LEVEL**	23.33 ft., 12:45

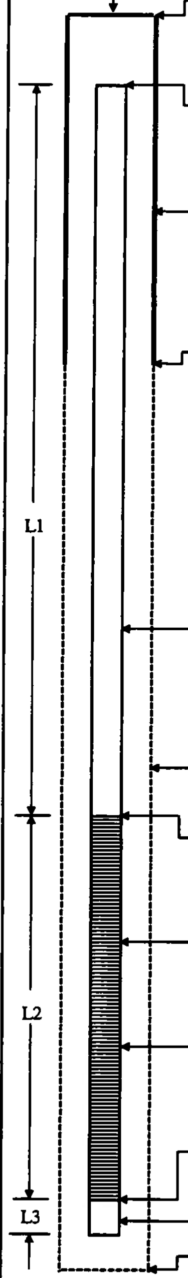
Ground El. 126.5+/- ft **Location** See Plan

El. Datum NGVD 1929

☐ **Guard Pipe**
☑ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
-TOPSOIL-	
0.3	
Silty SAND -FILL-	0.9
2.4	Bentonite Chips
	6.0
-GLACIAL OUTWASH DEPOSIT- (Sand)	Filter Sand
	25.0
	Collapsed Native Material
30.0	30.0

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)



Type of protective cover/lock	Steel cover w/1/2-in. bolts	
Depth of top of roadway box below ground surface	0.0	ft
Depth of top of riser pipe below ground surface	0.5	ft
Type of protective casing:	Roadway Box	
Length	0.8	ft
Inside Diameter	6.0	in
Depth of bottom of roadway box	0.8	ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Concrete		
Bentonite Seal	0.9	5.1

Type of riser pipe:	Schedule 40 PVC	
Inside diameter of riser pipe	1.5	in
Type of backfill around riser	Filter Sand/Bentonite Seal	
Diameter of borehole	3.0	in
Depth to top of well screen	8.35	ft
Type of screen	Schedule 40 PVC Slotted	
Screen gauge or size of openings	0.010	in
Diameter of screen	1.5	in
Type of backfill around screen	Filter Sand	
Depth of bottom of well screen	25.15	ft
Bottom of Silt trap	25.35	ft
Depth of bottom of borehole	30.0	ft

(Not to Scale)

7.5 ft + 17.0 ft + 0.2 ft = 24.7 ft
Riser Pay Length (L1) + Length of screen (L2) + Length of silt trap (L3) = Pay length

COMMENTS:

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HALEY & ALDRICH

GROUNDWATER MONITORING REPORT

OW/PZ NUMBER **HA07-3(OW)**

Page 1 of 1

PROJECT	Proposed School of Pharmacy, University of New England	**H&A FILE NO.**	34718-000
LOCATION	Portland, Maine	**PROJECT MGR.**	A. Blaisdell
CLIENT	University of New England	**FIELD REP.**	E. Beirne
CONTRACTOR	Maine Test Borings, Inc.	**DATE**	9/14/2007
ELEVATION SUBTRAHEND	126.5 ft +/-, NGVD 29		

Date	Time	Elapsed Time (days)	Depth of Water from Ground Surface	Elevation of Water	Remarks	Read By
9/14/2007	12:45	0	23.3	103.2		ARB
9/25/2007	15:42	11	23.5	103.0		ECB
9/27/2007	13:45	13	23.6	102.9	2-hours after large rain event	ECB
9/28/2007	7:50	14	23.5	103.0	1 day after rain event	ECB
10/1/2007	11:15	17	23.7	102.8		ARB
10/12/2007	15:32	28	23.7	102.8	During rain event	ECB

HALEY & ALDRICH

OBSERVATION WELL INSTALLATION REPORT

Well No. **HA07-5(OW)**

Boring No. **HA07-5**

PROJECT	Proposed School of Pharmacy, University of New England	**H&A FILE NO.**	34718-000
LOCATION	Portland, Maine	**PROJECT MGR.**	A. Blaisdell
CLIENT	University of New England	**FIELD REP.**	A. Blaisdell
CONTRACTOR	Maine Test Borings, Inc.	**DATE INSTALLED**	9/18/2007
DRILLER	B. Enos	**WATER LEVEL**	18.7 ft., 07:30

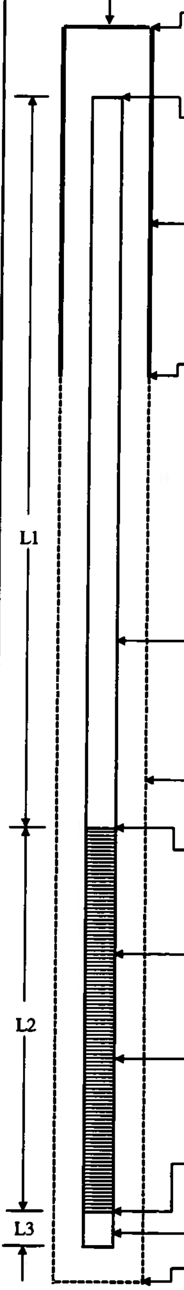
Ground El. 125.0+/- ft **Location** See Plan ☐ **Guard Pipe**

El. Datum NGVD 1929 ☑ **Roadway Box**

SOIL/ROCK CONDITIONS	**BOREHOLE BACKFILL**
0.0	0.0
-TOPSOIL-	Filter Sand
0.5	5.0
-GLACIAL MARINE DEPOSIT- (Sand)	Bentonite Chips
	8.0
	Filter Sand
20.0	20.0

(Bottom of Exploration)

(Numbers refer to depth from ground surface in feet)



(Not to Scale)

Type of protective cover/lock	Steel cover w/1/2-in. bolts
Depth of top of roadway box below ground surface	0.0 ft
Depth of top of riser pipe below ground surface	0.5 ft
Type of protective casing:	Roadway Box
Length	0.8 ft
Inside Diameter	6.0 in
Depth of bottom of roadway box	0.8 ft

Type of Seals	**Top of Seal (ft)**	**Thickness (ft)**
Concrete		
Bentonite Seal	5.0	3.0

Type of riser pipe:	Schedule 40 PVC
Inside diameter of riser pipe	2.0 in
Type of backfill around riser	Filter Sand/Bentonite Seal
Diameter of borehole	4.0 in
Depth to top of well screen	10.0 ft
Type of screen	Schedule 40 PVC Slotted
Screen gauge or size of openings	0.010 in
Diameter of screen	2.0 in
Type of backfill around screen	Filter Sand
Depth of bottom of well screen	19.8 ft
Bottom of Silt trap	20.0 ft
Depth of bottom of borehole	30.0 ft

9.8 ft (Riser Pay Length (L1)) + 10.0 ft (Length of screen (L2)) + 0.2 ft (Length of silt trap (L3)) = 20.0 ft (Pay length)

COMMENTS:

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GROUNDWATER MONITORING REPORT

OW/PZ NUMBER **HA07-5(OW)**

PROJECT Proposed School of Pharmacy, University of New England
LOCATION Portland, Maine
CLIENT University of New England
CONTRACTOR Maine Test Borings, Inc.
ELEVATION SUBTRAHEND 125 ft +/-, NGVD 29

H&A FILE NO. 34718-000
PROJECT MGR. A. Blaisdell
FIELD REP. A. Blaisdell
DATE 9/17/2007

Date	Time	Elapsed Time (days)	Depth of Water from Ground Surface	Elevation of Water	Remarks	Read By
9/18/2007	7:30	1	18.7	106.3		ARB
9/25/2007	15:51	8	19.1	105.9		ECB
9/27/2007	13:52	10	19.3	105.8	2-hours after large rain event	ECB
9/28/2007	8:12	11	19.2	105.8	1 day after rain event	ECB
10/1/2007	11:25	14	19.3	105.7		ARB
10/5/2007	11:06	18	19.3	105.7		ECB
10/12/2007	15:40	25	19.6	105.4	During rain event	ECB

HALEY & ALDRICH

OBSERVATION WELL INSTALLATION REPORT

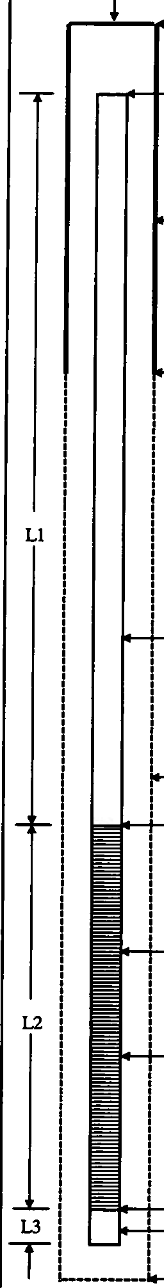
Well No. **HA07-13(OW)**
Boring No. **HA07-13**

PROJECT	Proposed School of Pharmacy, University of New England	**H&A FILE NO.**	34718-000
LOCATION	Portland, Maine	**PROJECT MGR.**	A. Blaisdell
CLIENT	University of New England	**FIELD REP.**	B. Steinert
CONTRACTOR	Maine Test Borings, Inc.	**DATE INSTALLED**	9/19/2007
DRILLER	B. Enos	**WATER LEVEL**	

Ground El. 94.0+/- ft **Location** See Plan ☑ **Guard Pipe**
El. Datum NGVD 1929 ☐ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
-TOPSOIL-	
0.7	
-FILL- (Sand)	Bentonite Chips
3.0	
-PEAT-	
3.1	
	4.0
-MARINE DEPOSIT- (Sand)	
9.0	Filter Sand
-MARINE DEPOSIT- (Clay)	
12.0	
-MARINE DEPOSIT- (Sand)	
17.0 (Bottom of Exploration)	15.0

(Numbers refer to depth from ground surface in feet)



(Not to Scale)

Type of protective cover/lock	Steel Guardpipe
Depth of top of guardpipe above ground surface	2.9 ft
Depth of top of riser pipe above ground surface	2.9 ft
Type of protective casing:	Steel Guardpipe
Length	5.25 ft
Inside Diameter	3.5 in
Depth of bottom of guardpipe	2.35 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Concrete		
Bentonite Seal	0.0	4.0

Type of riser pipe:	Schedule 40 PVC
Inside diameter of riser pipe	1.5 in
Type of backfill around riser	Filter Sand/Bentonite Seal
Diameter of borehole	3.0 in
Depth to top of well screen	5.0 ft
Type of screen	Schedule 40 PVC Slotted
Screen gauge or size of openings	0.010 in
Diameter of screen	1.5 in
Type of backfill around screen	Filter Sand
Depth of bottom of well screen	15.0 ft
Bottom of Silt trap	15.0 ft
Depth of bottom of borehole	17.0 ft

7.9 ft + 10.0 ft + 0 ft = 17.9 ft
Riser Pay Length (L1) + Length of screen (L2) + Length of silt trap (L3) = Pay length

COMMENTS: Begin Well Installation at 0800, finish @ 0830, 1.5 Bags Sand, 1/2 Bag Bentonite Chips

HALEY & ALDRICH

GROUNDWATER MONITORING REPORT

OW/PZ NUMBER: HA07-13(OW)

PROJECT	Proposed School of Pharmacy, University of New England	**H&A FILE NO.**	34718-000
LOCATION	Portland, Maine	**PROJECT MGR.**	A. Blaisdell
CLIENT	University of New England	**FIELD REP.**	B. Steinert
CONTRACTOR	Maine Test Borings, Inc.	**DATE**	9/18/2007
ELEVATION SUBTRAHEND	94 ft +/-, NGVD 29		

Date	Time	Elapsed Time (days)	Depth of Water from Ground Surface	Elevation of Water	Remarks	Read By
9/25/2007	16:05	7	0.7	93.3		ECB
9/27/2007	14:07	9	0.6	93.4	2-hours after large rain event	ECB
9/28/2007	8:24	10	0.5	93.6	1 day after rain event	ECB
10/12/2007	15:15	24	0.1	93.9	During rain event	ECB

HALEY & ALDRICH

OBSERVATION WELL INSTALLATION REPORT

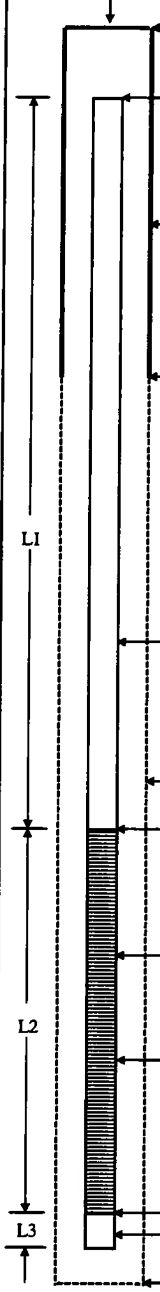
Well No. **HA07-21(OW)**
Boring No. **HA07-21(OW)**

PROJECT	Proposed School of Pharmacy, University of New England	**H&A FILE NO.**	34718-000
LOCATION	Portland, Maine	**PROJECT MGR.**	A. Blaisdell
CLIENT	University of New England	**FIELD REP.**	E. Beirne
CONTRACTOR	Maine Test Borings, Inc.	**DATE INSTALLED**	10/3/2007
DRILLER	M. Porter	**WATER LEVEL**	18.25 ft., 9:08AM

Ground El. 126.5+/- ft **Location** See Plan ☐ **Guard Pipe**
El. Datum NGVD 1929 ☑ **Roadway Box**

SOIL/ROCK CONDITIONS	**BOREHOLE BACKFILL**
-BITUMINOUS CONCRETE-	
0.3	
-FILL-	Cuttings (Sand)
3.0	
	5.0
	Bentonite Chips
	9.7
-GLACIAL OUTWASH DEPOSIT- (Sand)	Filter Sand
24.0	
-BEDROCK-	
24.2	24.2

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)



Type of protective cover/lock	Steel cover w/1/2-in. bolts	
Depth of top of roadway box below ground surface	0.0	ft
Depth of top of riser pipe below ground surface	0.2	ft
Type of protective casing:	Roadway Box	
Length	0.8	ft
Inside Diameter	6.0	in
Depth of bottom of roadway box	0.8	ft

Type of Seals	**Top of Seal (ft)**	**Thickness (ft)**
Concrete		
Bentonite Seal	5.0	4.7

Type of riser pipe:	Schedule 40 PVC	
Inside diameter of riser pipe	1.5	in
Type of backfill around riser	Filter Sand/Bentonite Seal	
Diameter of borehole	3.0	in
Depth to top of well screen	13.0	ft
Type of screen	Schedule 40 PVC Slotted	
Screen gauge or size of openings	0.010	in
Diameter of screen	1.5	in
Type of backfill around screen	Filter Sand	
Depth of bottom of well screen	22.8	ft
Bottom of Silt trap	23.0	ft
Depth of bottom of borehole	24.2	ft

(Not to Scale)

13.0 ft + 9.8 ft + 0.2 ft = 23.0 ft
Riser Pay Length (L1) + Length of screen (L2) + Length of silt trap (L3) = Pay length

COMMENTS:

HALEY & ALDRICH

GROUNDWATER MONITORING REPORT

OW/PZ NUMBER
HA07-21(OW)

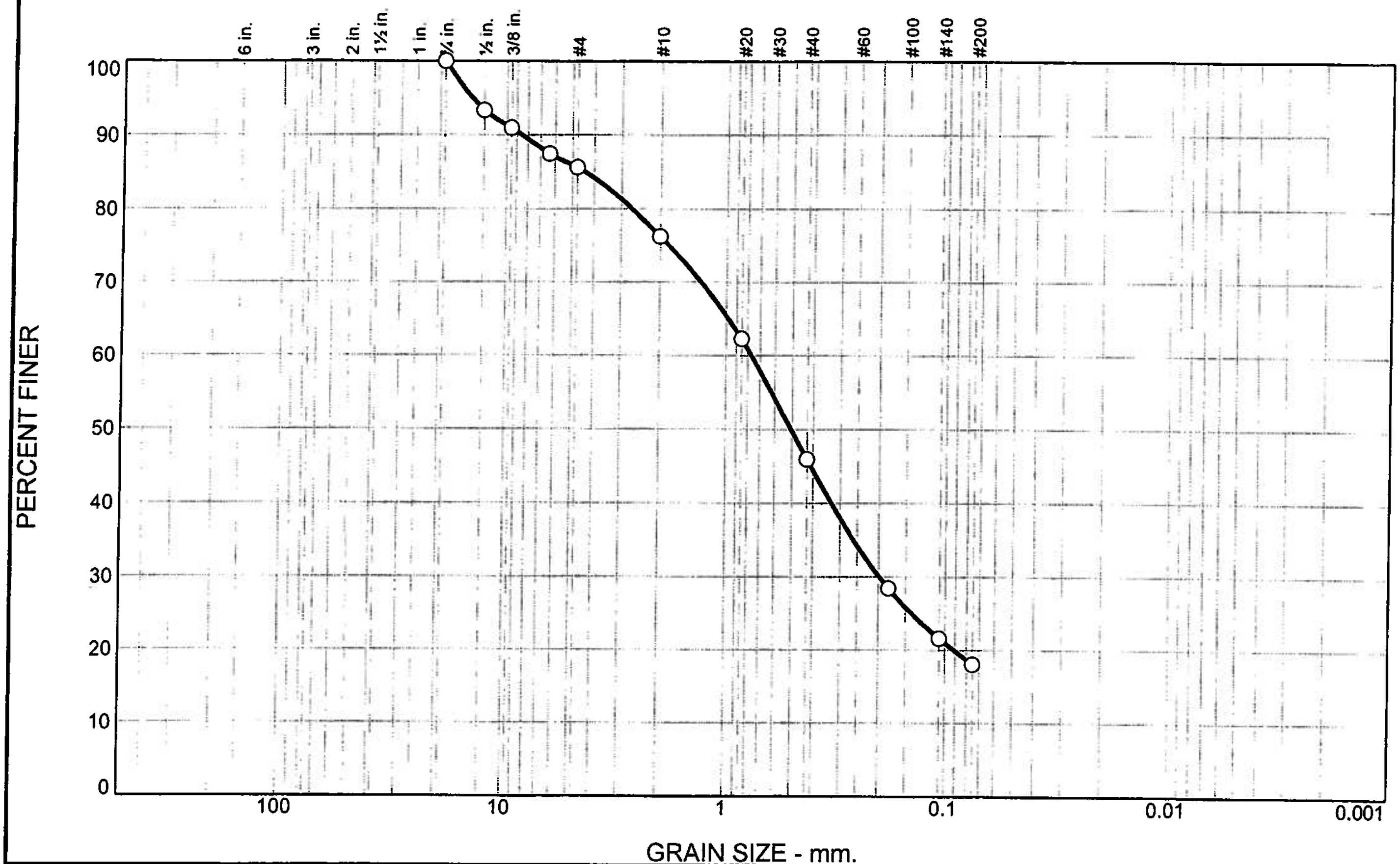
PROJECT	Proposed School of Pharmacy, University of New England	**H&A FILE NO.**	34718-000
LOCATION	Portland, Maine	**PROJECT MGR.**	A. Blaisdell
CLIENT	University of New England	**FIELD REP.**	E. Beirne
CONTRACTOR	Maine Test Borings, Inc.	**DATE**	10/3/2007
ELEVATION SUBTRAHEND	126.5 ft +/-, NGVD 29		

Date	Time	Elapsed Time (days)	Depth of Water from Ground Surface	Elevation of Water	Remarks	Read By
10/5/2007	11:00	2	18.3	108.2		ECB
10/12/2007	15:28	9	18.5	108.0	During rain event	ECB
12/3/2007	8:30	61	18.4	108.1		ARB
1/1/2008	11:45	90	18.6	107.9		DAD
1/9/2008	16:35	98	18.6	107.9		ARB

APPENDIX C

Laboratory Test Reports

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	14.4	9.3	30.4	27.9	18.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	93.3		
3/8"	91.0		
1/4"	87.5		
#4	85.6		
#10	76.3		
#20	62.3		
#40	45.9		
#80	28.5		
#140	21.6		
#200	18.0		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 4.3716 D_{60}= 0.7652 D_{50}= 0.5025
D_{30}= 0.1978 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

Moisture content: 6.8%

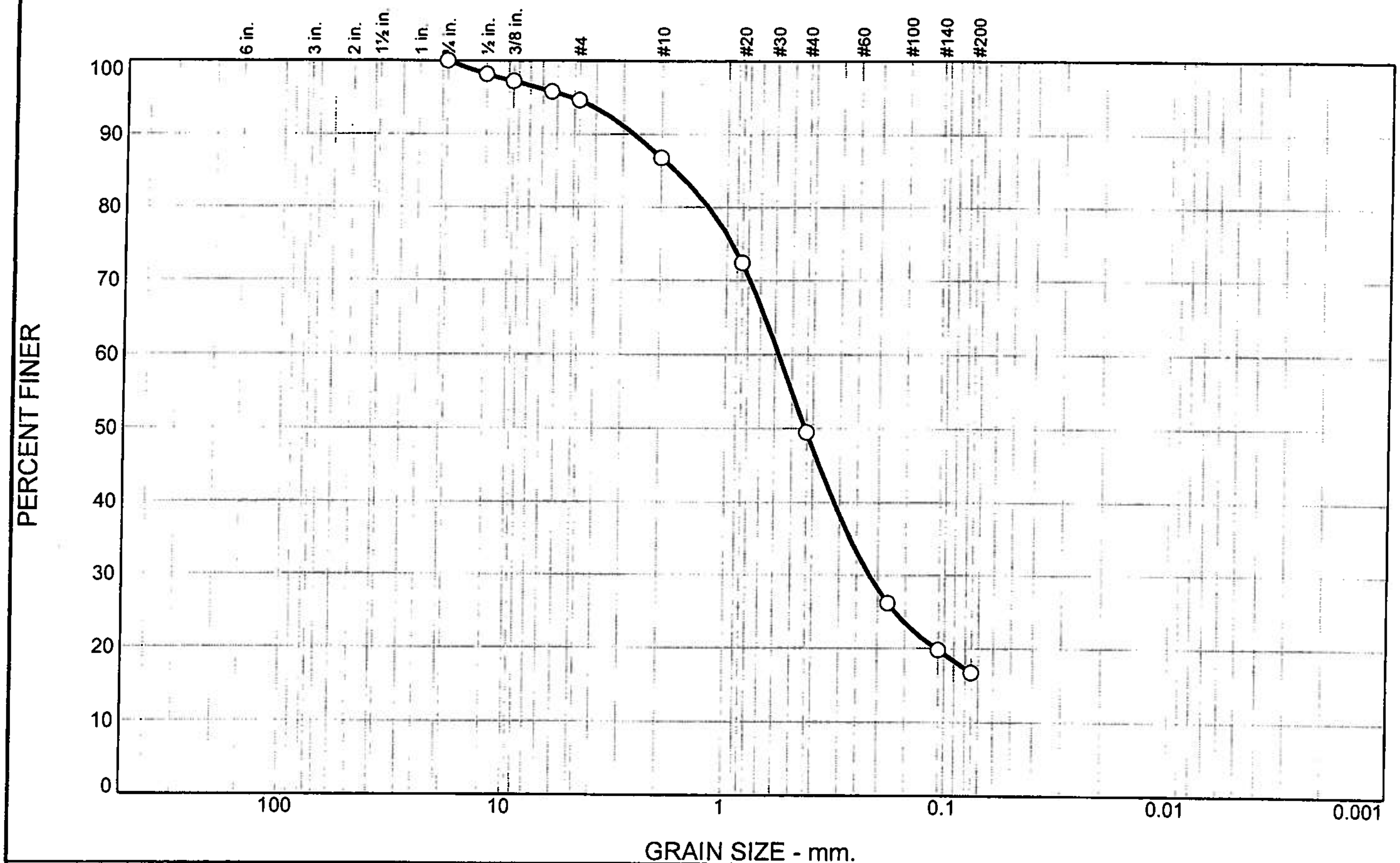
Sample No.: S-2/S-3
Location: HA07-7
Source of Sample: University of New England, Portland, Maine
Date: 10/07/07
Elev./Depth: 2'-6'

R.W. Gillespie & Associates, Inc. Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing
Project No: 956-04
Lab # 9867a

Tested By: JJH/DCH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.4	7.8	37.3	32.8	16.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	98.1		
3/8"	97.2		
1/4"	95.8		
#4	94.6		
#10	86.8		
#20	72.3		
#40	49.5		
#80	26.2		
#140	19.8		
#200	16.7		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 1.7230 D_{60}= 0.5738 D_{50}= 0.4312
D_{30}= 0.2181 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

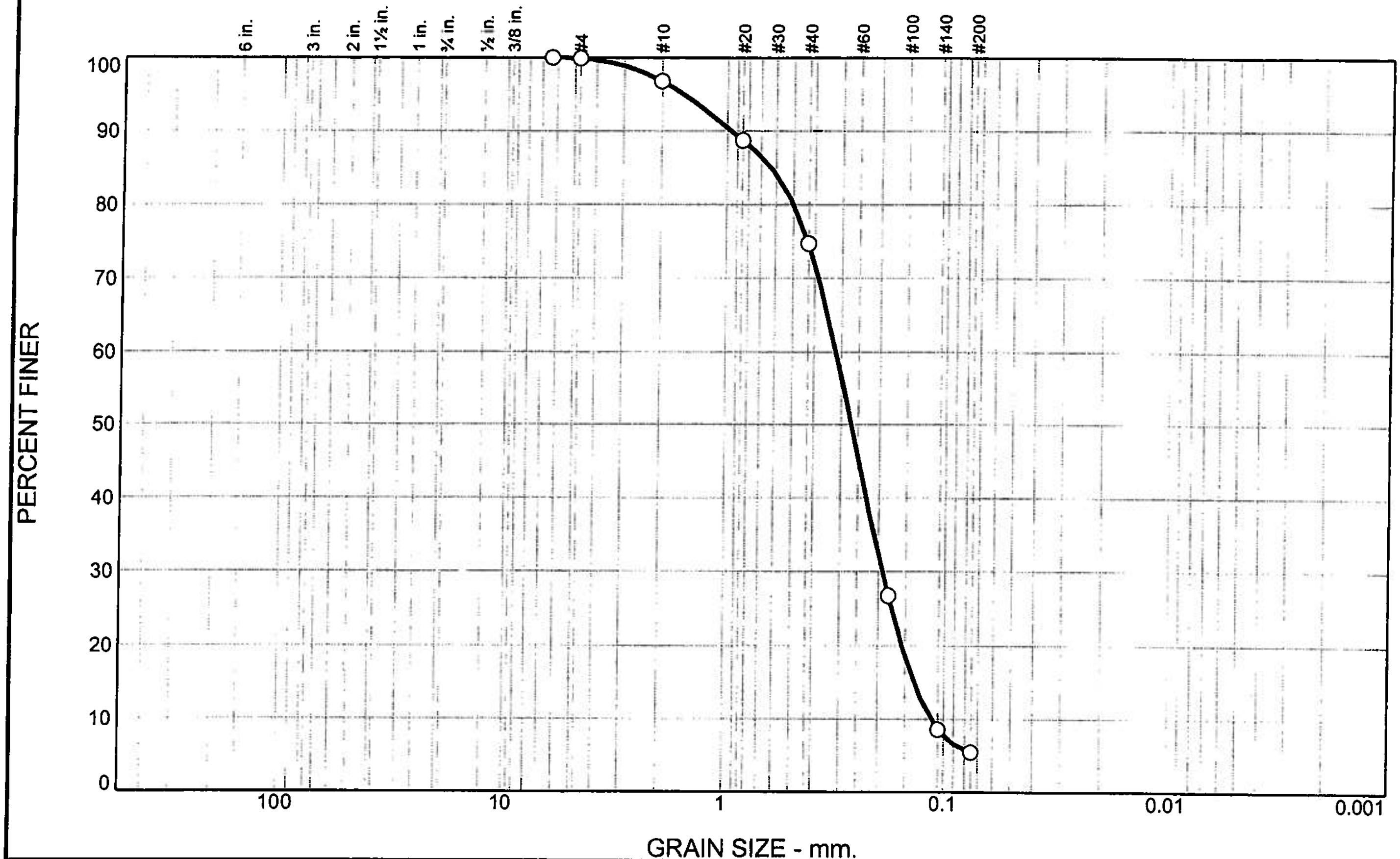
Moisture content: 15.4%

Sample No.: S-1 **Source of Sample:** University of New England, Portland, Maine **Date:** 10/1/07
Location: HA07-10 **Elev./Depth:** 0-2'

R.W. Gillespie & Associates, Inc. Saco, Maine	**Client:** Haley & Aldrich, Inc. **Project:** Misc. Testing **Project No:** 956-04 **Lab #** 9867b

Tested By: JJH/DCH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	3.1	22.1	69.2	5.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/4"	100.0		
#4	99.9		
#10	96.8		
#20	88.7		
#40	74.7		
#80	26.7		
#140	8.6		
#200	5.5		

* (no specification provided)

Soil Description

poorly graded sand with silt

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 0.6282 D_{60}= 0.3167 D_{50}= 0.2681
D_{30}= 0.1915 D_{15}= 0.1365 D_{10}= 0.1140
C_u= 2.78 C_c= 1.02

Classification

USCS= SP-SM AASHTO= A-3

Remarks

Moisture content: 8.1%

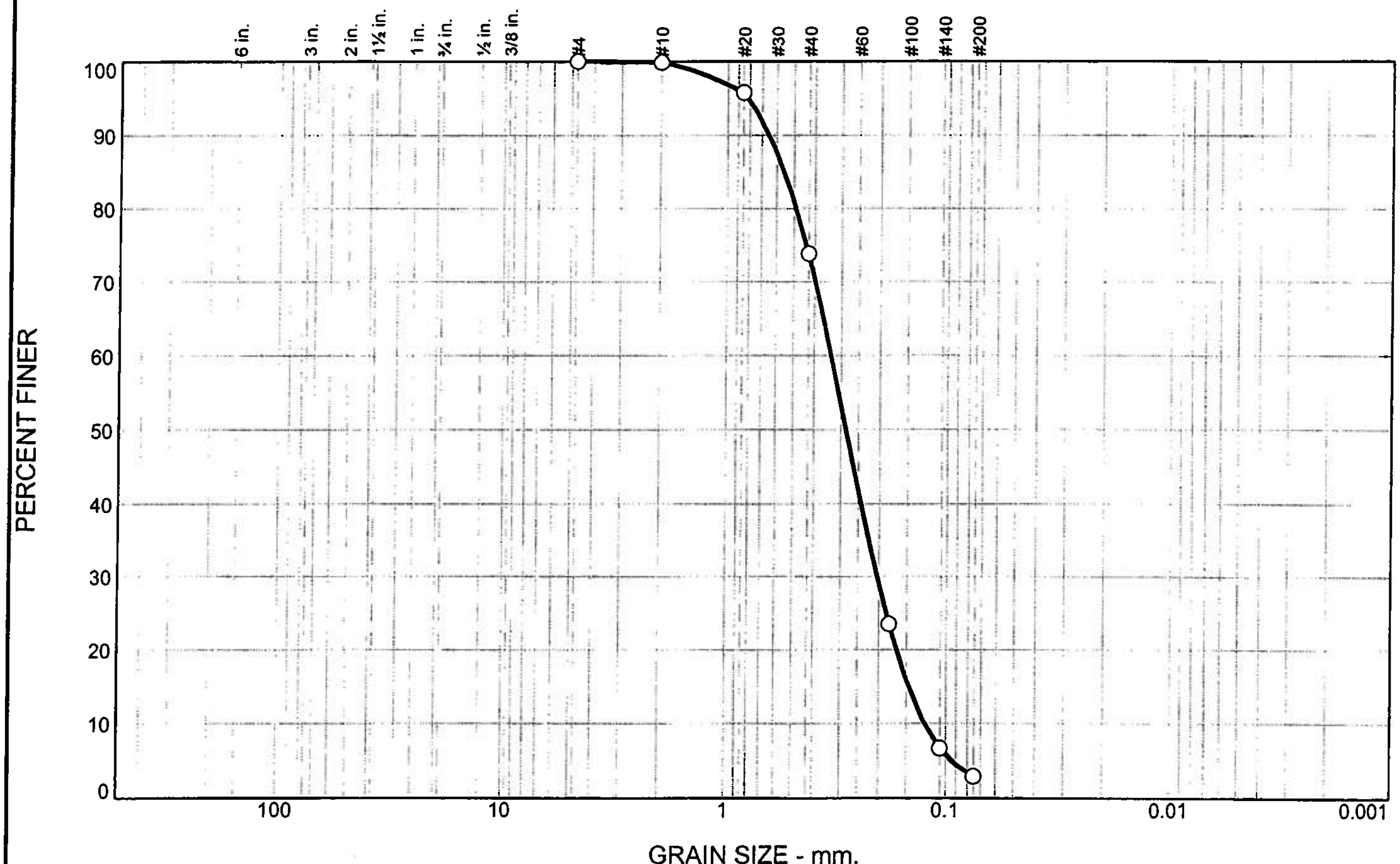
Sample No.: S-1B **Source of Sample:** University of New England, Portland, Maine **Date:** 10/17/07
Location: HA07-13 **Elev./Depth:** 0.7-2'

R.W. Gillespie & Associates, Inc. Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing
Project No: 956-04 **Lab #** 9867c

Tested By: JJH/DCH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	26.1	70.9	2.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	95.8		
#40	73.8		
#80	23.5		
#140	6.7		
#200	2.9		

* (no specification provided)

Soil Description

poorly graded sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.5518 D_{60}= 0.3328 D_{50}= 0.2836
D_{30}= 0.2040 D_{15}= 0.1466 D_{10}= 0.1241
C_u= 2.68 C_c= 1.01

Classification

USCS= SP AASHTO=

Remarks

Moisture content: 6.5%

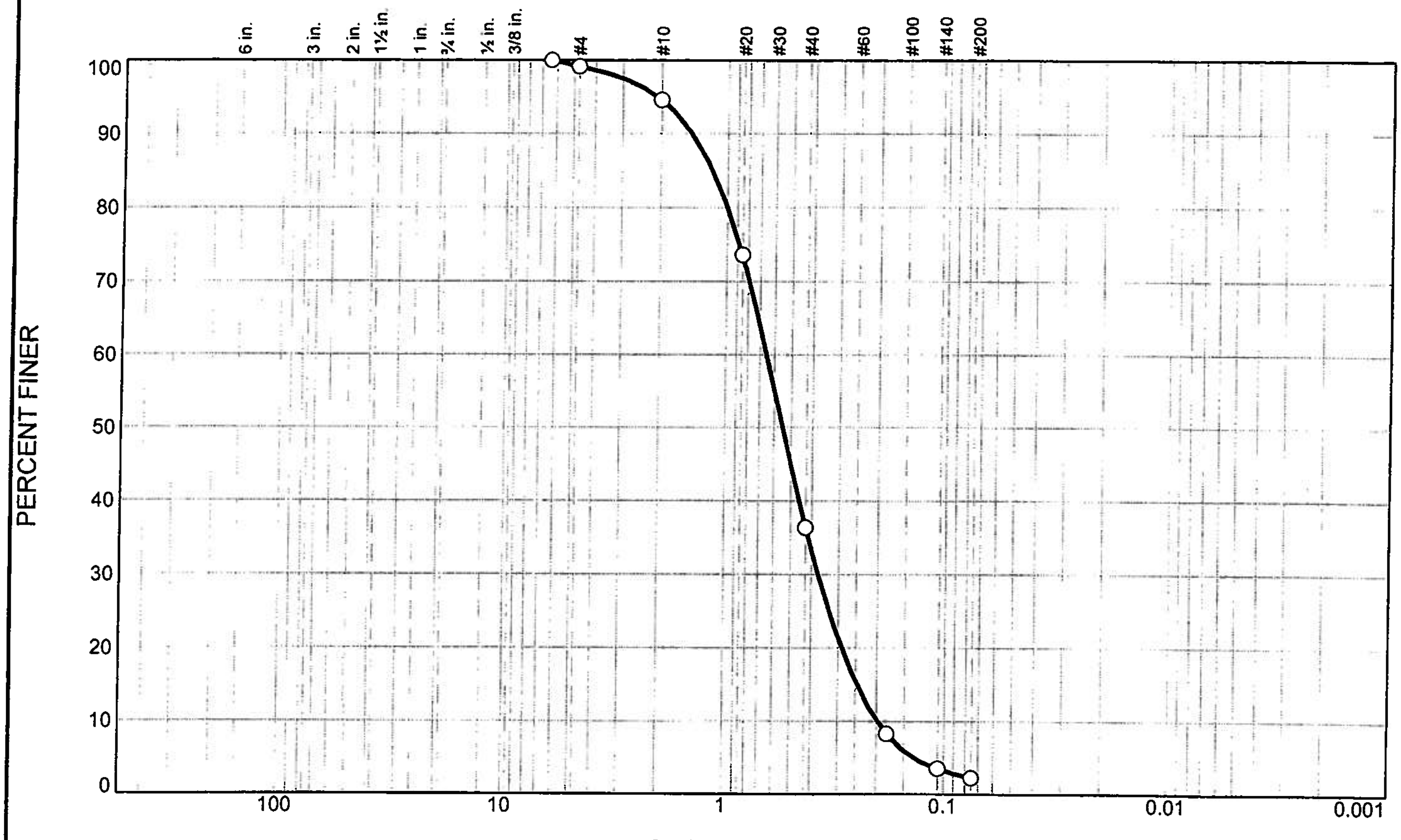
Sample No.: S-3 **Source of Sample:** University of New England, Portland, Maine **Date:** 10/17/07
Location: HA07-19 **Elev./Depth:** 9.5'-11.5'

R.W. Gillespie & Associates, Inc. Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing
Project No: 956-04 **Lab #** 9867d

Tested By: JJH/DCH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.9	4.5	58.3	34.0	2.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/4"	100.0		
#4	99.1		
#10	94.6		
#20	73.6		
#40	36.3		
#80	8.3		
#140	3.5		
#200	2.3		

* (no specification provided)

Soil Description

poorly graded sand

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 1.1707 D_{60}= 0.6515 D_{50}= 0.5460
D_{30}= 0.3720 D_{15}= 0.2453 D_{10}= 0.1984
C_u= 3.28 C_c= 1.07

Classification

USCS= SP AASHTO= A-1-b

Remarks

Moisture content: 2.0%

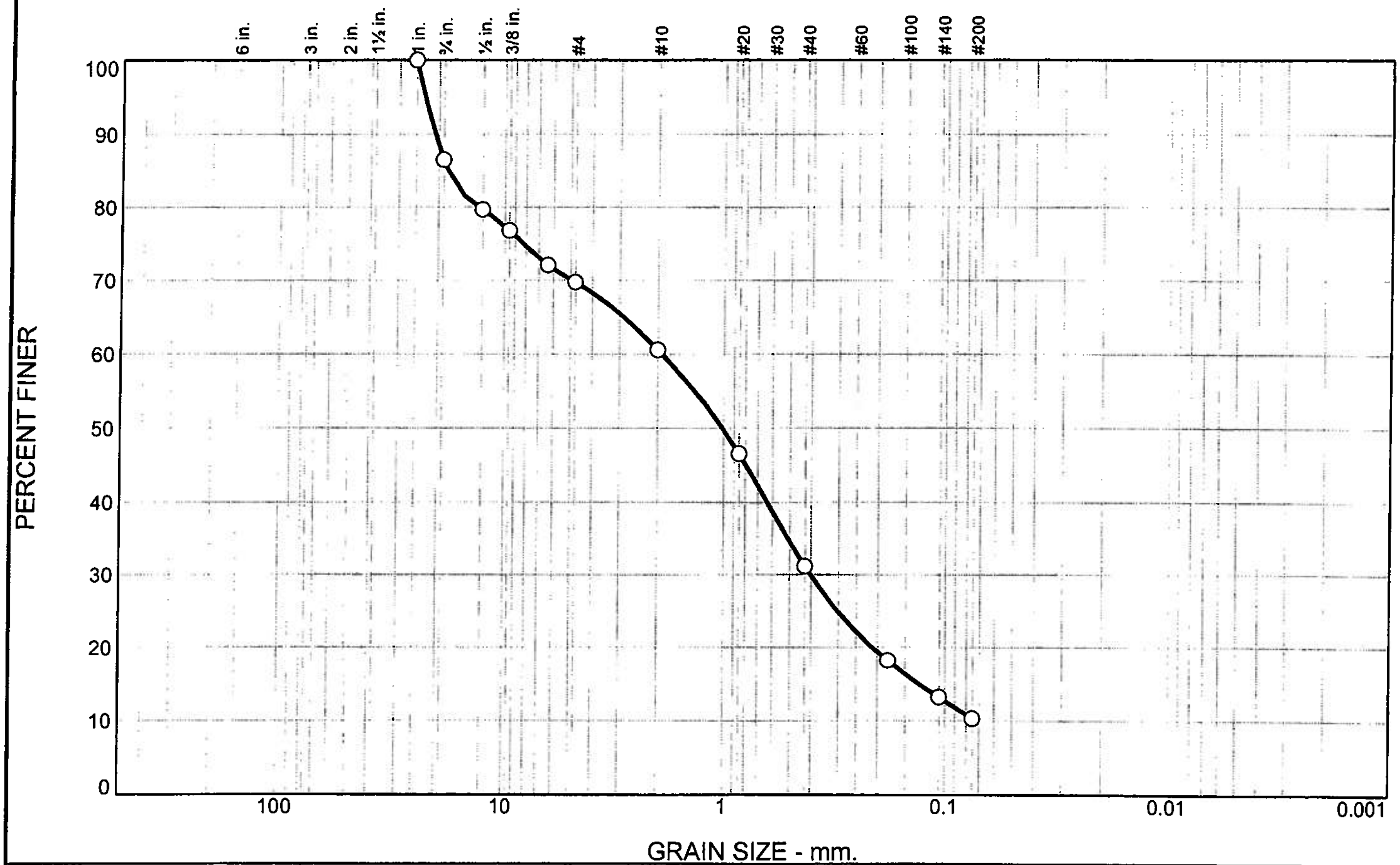
Sample No.: S-3 **Source of Sample:** University of New England, Portland, Maine **Date:** 10/17/07
Location: HA07-20 **Elev./Depth:** 9.5'-11.5'

R.W. Gillespie & Associates, Inc. Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing
Project No: 956-04 **Lab #** 9867e

Tested By: JJH/DCH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	13.5	16.7	9.2	29.4	20.9	10.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	86.5		
1/2"	79.7		
3/8"	76.8		
1/4"	72.1		
#4	69.8		
#10	60.6		
#20	46.6		
#40	31.2		
#80	18.2		
#140	13.2		
#200	10.3		

* (no specification provided)

Soil Description

poorly graded sand with silt and gravel

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 18.1366 D_{60}= 1.9138 D_{50}= 1.0098
D_{30}= 0.4010 D_{15}= 0.1307 D_{10}=
C_u= C_c=

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

Moisture content: 2.8%

Sample No.: S-1 **Source of Sample:** University of New England, Portland, Maine **Date:** 10/17/07
Location: HA07-22 **Elev./Depth:** 0-2'

R.W. Gillespie & Associates, Inc. Saco, Maine	**Client:** Haley & Aldrich, Inc. **Project:** Misc. Testing **Project No:** 956-04 **Lab #** 9867f

Tested By: JJH/DCH **Checked By:** MTG MTG

HALEY & ALDRICH, INC.
GEOTECHNICAL LABORATORY

TEST DATE: 10/18/2007

ORGANIC CONTENT RESULTS

FILE No.:	34718-000
PROJECT:	Proposed College of Pharmacy
	Portland, Maine

EXPL. No.:	HA07
SAMPLE No.:	S03
DEPTH (ft.):	4.0-6.0
SAMPLE DESCRIPTION:	Dark brown Organic Soil

NATURAL WATER CONTENT

WT CONT. + WET SAMPLE (g)	128.8600
WT CONT. + DRY SAMPLE (g)	45.1200
WT CONTAINER (g)	10.9400
WATER CONTENT (%)	**245.0**

LOSS ON IGNITION

WT CONTAINERS + OVEN DRY SAMPLE BEFORE COMBUSTION (g)	35.2983
WT CONTAINERS + OVEN DRY SAMPLE AFTER COMBUSTION (g)	33.4725
WT CONTAINER (CRUCIBLE + B CAN)	29.6978
ORGANIC CONTENT (%)	**32.6**

APPENDIX D

17 December 2007 Memorandum by Haley & Aldrich, Inc. entitled "Summary of Site Visit, Elevator Pit in Finley Hall Athletic Center"

Haley & Aldrich
75 Washington Avenue
Suite 203
Portland, ME 04101-2617
Tel: 207.482.4600
Fax: 207.775.7666
HaleyAldrich.com

HALEY& ALDRICH

MEMORANDUM

17 December 2007
File No. 34718-010

TO: University of New England
Alan Thibeault

C: Port City Architecture; Attn.: Lita Semrau
Becker Structural Engineers; Attn.: Dan Burne
SYTDesign; Attn.: Andy Morrill, Peter Biegel

FROM: Haley & Aldrich, Inc.
Andrew R. Blaisdell, P.E.; Wayne A. Chadbourne, P.E.

SUBJECT: Summary of Site Visit
Elevator Pit in Finley Hall Athletic Center
University of New England
Portland, Maine

On 7 and 14 December 2007, Andrew Blaisdell of Haley & Aldrich, Inc. visited Finley Hall to observe the basement and elevator pit to check for indications of past groundwater infiltration and other conditions that could be relevant as we finalize the foundation drainage and waterproofing details for the proposed College of Pharmacy (COP) building. This memorandum summarizes our on-site observations and presents photographs that were taken during the site visit.

Observations from Site Visit

Elevator Pit Sump

The elevator pit is located along the northern wall of Finley Hall, approximately 75 ft south of the southern edge of the proposed COP building (see attached structural plans for location). The bottom of the elevator pit (i.e., top of elevator pit slab) is approximately 4.1 ft below the basement finish floor level (which was surveyed at El. 116.32 according to the plan entitled "Existing Conditions, July 2007, College of Pharmacy," dated 31 July 2007, prepared by Colonial Surveying Company, LLC), corresponding to approximately El. 112.2. The elevator pit base slab was constructed using cast-in-place (CIP) concrete. "Negative-side" waterproofing (i.e., waterproofing located on the inside face of the pit walls and slab) was not observed.

A sump pit with a submersible pump is present in the southeast corner of the elevator pit (see Photographs 5 and 6, and attached structural plans for location). As shown on Photograph 6, the sump pit appears to have been "chipped out" of the elevator pit slab at some point after the slab was initially constructed. Based on our discussions with UNE facility personnel, the actual timing regarding when the pump was installed is not known. The bottom of the sump pit is 0.9 ft below the base of the elevator pit (El. 111.3). At the time of our site visit, the sump pit was partially filled with water to 0.5 ft below the base of the pit (El. 111.7). The water appeared to contain a concentration of some sort of chemical constituent, possibly antifreeze.

An approximately 1.25-in. diameter vertical PVC discharge pipe was attached to the pump and exited the elevator sump pit through its eastern wall, at approximately El. 116.5 (invert). The discharge pipe extends through the wall, extending approximately 2 in. beyond the other side before reaching a 90-degree elbow and extending down through the floor slab, as shown in Photograph 9. Based on these observations, we anticipate that the discharge pipe ties into the foundation drainage system for Finley Hall.

The northern wall of the elevator pit was constructed using concrete masonry blocks (CMU blocks) for the entire height of the wall, down to (and potentially below) the base of the elevator pit. The northern wall is the only wall that is also an exterior building wall. The other walls were constructed with cast-in-place (CIP) concrete from the base of the pit up to the level of the top of the basement finish floor (El. 116.32). CMU blocks were used to construct the other walls above the basement floor level.

Rust-colored staining was observed on the lower approximately 0.7 ft of the elevator pit walls (up to El. 112.9). Dark gray coloring was observed on the portion of the walls between 0.7 and 1.8 ft above the base of the pit (El. 112.9 to El. 114). Staining was not observed on the remaining portions of the walls (see Photograph 1).

Several cracks were documented in the mortar between CMU blocks on the exterior (northern) wall and interior walls. One such crack on the northern wall of the pit is shown on Photograph 2. A similar crack was observed on the eastern wall of the stairway down to the basement, between CMU and CIP concrete portions of the walls, as shown on Photograph 13. This crack had a maximum open width of about 3/32 in.

A cemented white substance is present on the elevator pit walls and slab in the northeast and northwest corners of the pit (see Photographs 7 and 8). It appears that the substance may have leached from the mortar between the CMUs when water infiltrated into the pit area.

Foundation Drainage System Sump

The sump pit for the foundation drainage system is located along the eastern wall of Finley Hall, approximately 90 ft south of the southern edge of the proposed COP building (see attached structural plans for location). The level of the bottom of the drain sump pit (i.e., top of pit slab) is reportedly at El. 112.5, approximately 3.8 ft below the basement finish floor level.

The sump pit is covered with a steel plate (see Photograph 10) that we were unable to remove during our site visit. Two, 2-in. diameter PVC pipes extend through the steel plate and up the basement walls. A six-foot ruler was inserted through a hole in the steel plate (for the cords from the submersible pump) to attempt to measure the depth of the pit. Water was documented in the pit at a depth of 1.9 ft below the basement finish floor level (El. 114.5). The submersible pump was not operating during our 14 December 2007 site visit. We anticipate that the water in the sump pit is below the level that triggers operation of the pump. Because of the steel plates, we were unable to visually inspect the pump.

During insertion of the six-foot ruler, a relatively soft substance was encountered approximately 2.8 ft below the finish floor level (El. 113.5). We were able to advance the an additional 6 in. (to El. 113) before meeting refusal. We anticipate that the 6 in. of soft material encountered in the sump pit consists of silt sized soil particles that have washed into the pit from the surrounding natural soil through the foundation/underslab drain pipes (geotextile separation fabric was not part of the underdrain design). The portion of the ruler that extended into the silt exhibited a slight hydrocarbon odor upon removal.

Sewer Ejector Pit

The sewer ejector pit is also located along the eastern wall of Finley Hall, approximately 4 ft south of the southern edge of the foundation drainage system sump (see attached structural plans for location). The sewer ejector pit is reportedly 3 ft below the basement finish floor level. We were able to remove the western steel plate that covered the sewer ejector pit. The ejector pit is shown with the western cover removed in Photograph 12.

Two, 2-in. diameter PVC pipes extend through the steel plate that remained in place over the pit. One of the pipes extended down to the top of the pump, consisting of the effluent pipe. The second pipe apparently terminated just below the bottom of the steel plate. A 5-in. diameter pipe extended through the western wall of the sump pit with an invert level approximately 1.6 ft below the finish floor level (El. 114.7). This pipe appears to consist of an influent pipe. Liquid occasionally dripped from this pipe while the cover was removed.

The liquid level in the pit on 14 December 2007 was approximately 2.6 ft below the slab finish floor level (El. 113.7). The submersible pump did not operate during the time of our site visit, indicating that the liquid level was too low to trigger operation of the pump. We were unable to take detailed measurements of the pump, but it did appear larger than the pump that was observed in the elevator pit.

The submersible pump was plugged into an outlet that was connected to a pump control box manufactured by Gould Pumps (Simplex Pump Control Model A3-2012). The switch on the control panel was set to "auto".

Review of Available Structural and Electrical Plans

Upon completion of our site inspection, we reviewed available structural and electrical plans to obtain additional information on the existing foundation drainage system for Finley Hall. Relevant excerpts from the structural drawings are attached to this memo for reference. Based on our review of these plans, we have the following observations:

- The Finley building has an existing foundation drainage system consisting of 6-in. dia. PVC perimeter drain pipes located along the outside of the foundation wall, and a network of 6-in. dia. PVC underslab drain pipes installed within an 18-in. thick layer of crushed stone beneath the slab. The details do not include any geotextile separation fabric between the crushed stone and natural soil.

- All foundation drainage pipes are pitched towards the foundation drain sump pit located on the interior side of the eastern basement wall (see attached structural plan). The bottom of the sump pit consists of a 12-in. thick concrete mat, the top of which is at El. 112.5. At the sump, the invert of the underslab drain system is El. 114.0, and the invert of the perimeter drain system is El. 114.5.

- The outside face of the below-grade portions of the Finley basement walls have been dampproofed. Incorporation of waterproofing of the exterior portion of foundation walls and below the ground floor slab were not part of the original design for Finley Hall.

- According to the electrical plans, the sump pit and the sewage ejector pit are each outfitted with a ¼ HP pump, 120 volt motor and a power rating of 13 AMPs.

- The structural plans show a 1-in. thick metallic waterproofing should have been installed on the inside face of the elevator pit base slab and walls. This waterproofing material was not observed during our site visit. There is no elevator sump pit shown on the structural plans.

- There is a small discrepancy in the level of the top of the basement slab between the structural plans (El. 116.5) and the plans with the recent surveyed information provided by Colonial Surveying Company, LLC (El. 116.32).

Conclusions

Based on our observations during the site visit and our review of the available structural and electrical drawings, we have the following general conclusions regarding the foundation drainage system for Finley Hall:

- Waterproofing of the elevator pit was not installed as shown on the structural plans. We believe that the elevator pit sump was a retrofit that was installed after initial pit construction and was likely installed in place of the waterproofing membrane.

- The pumps in the elevator sump pit and the foundation drain system sump pit are currently operational and are performing satisfactorily. Based on discussions with UNE facilities personnel, both pumps are believed to be inactive most of the time. The pumps are not on separate electric meters, so actual pump usage is not known.

- There is no evidence that the water level within the elevator pit has risen to a level higher than El. 114. It is not known whether this high water level occurred prior to or after installation of the pump into the elevator pit. Based on discussions with UNE facility personnel, the only time water was observed in the elevator pit was when the pump had been inadvertently unplugged from the power outlet.

- The electrical plans indicate that effluent from the foundation drainage system is removed from the system by a ¼-HP, 120-volt pump. Based on our experience and review of similar sizes of pumps, we anticipate that this corresponds to a maximum pump discharge rate of between 20 and 30 gpm.

- The pump in the elevator sump pit is apparently smaller than the one observed in the sewer ejector pit. Therefore, it is anticipated that it has a maximum pump discharge rate of less than 20 gpm.

- The foundation drain system for Finley Hall has been effective in keeping the below-grade space dry. UNE facilities personnel cited no event during the life of the building when water encroached into the basement.

- Up to 6 in. or more of silt may have collected in the bottom of the foundation drain sump pit. If this material is silt, it was likely washed in from the natural soils, through the crushed stone, and into the sump pit. Given the size of the sump pit (18 in. by 18 in.), the volume of silt present in the sump pit is relatively insignificant compared to soil loss surrounding the crushed stone.

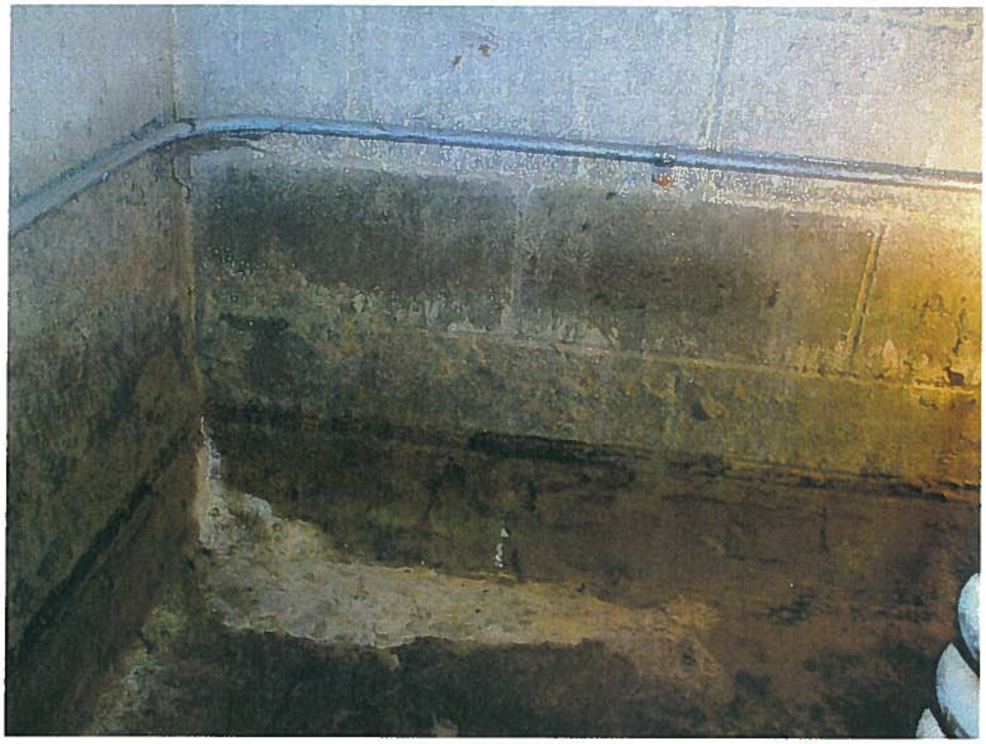
- The existing Finley Hall foundation drainage system and dampproofing design is essentially the same system that we proposed in our 2 November 2007 geotechnical report.

Closure

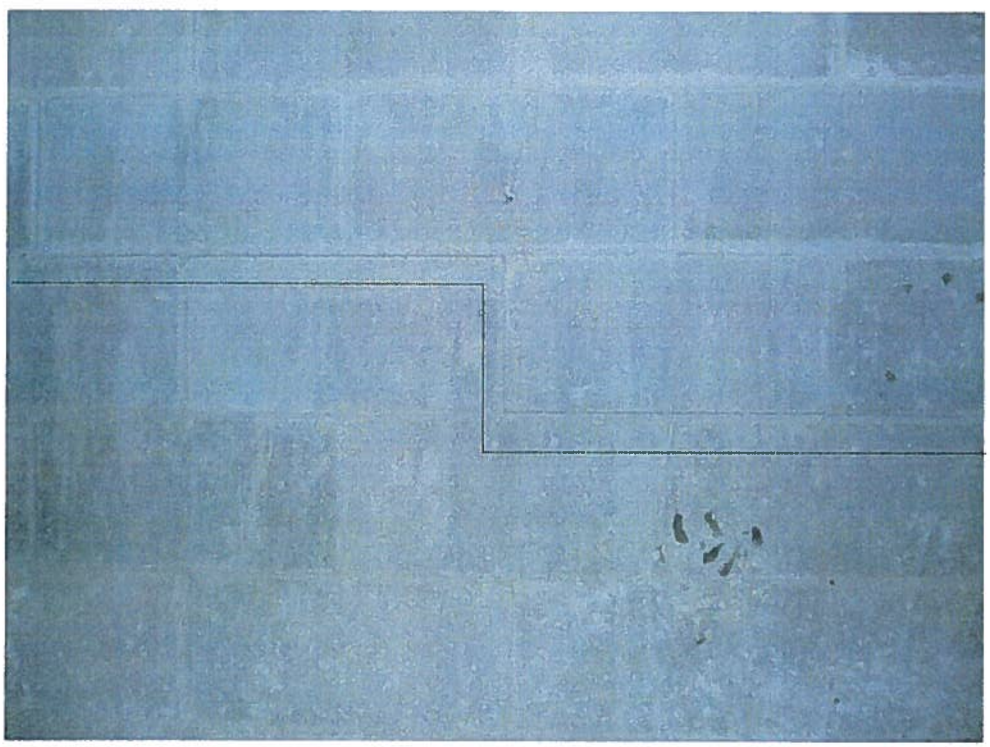
We will use the information summarized in this memorandum to provide our final design recommendations for the foundation drainage system and waterproofing/dampproofing. Please contact us if you have any questions regarding the information submitted herein.

Attachments:
Photograph Summary (7 pages)
Excerpts from available Structural Drawings for Finley Hall (4 pages)

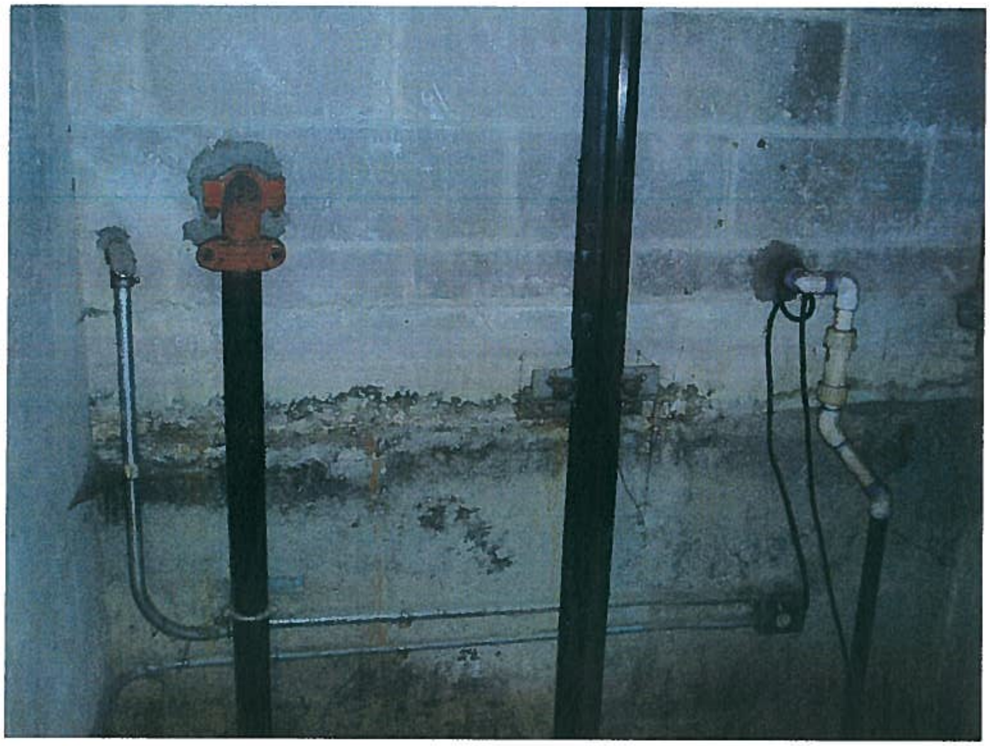
G:\PROJECTS\34718\010\2007-1214-wac-FinleyMemo-f.doc



Photograph 1. Northwest corner of elevator pit, looking north. Rust coloring extends 0.7 ft above top of elevator slab (El. 112.9), dark gray coloring extends 1.8 ft above top of pit slab (El. 114.0)



Photograph 2. Concrete masonry unit wall, north wall of elevator pit, looking north. Crack visible in grout between CMUs between approximately El. 117 and El. 118 (above black dotted line).

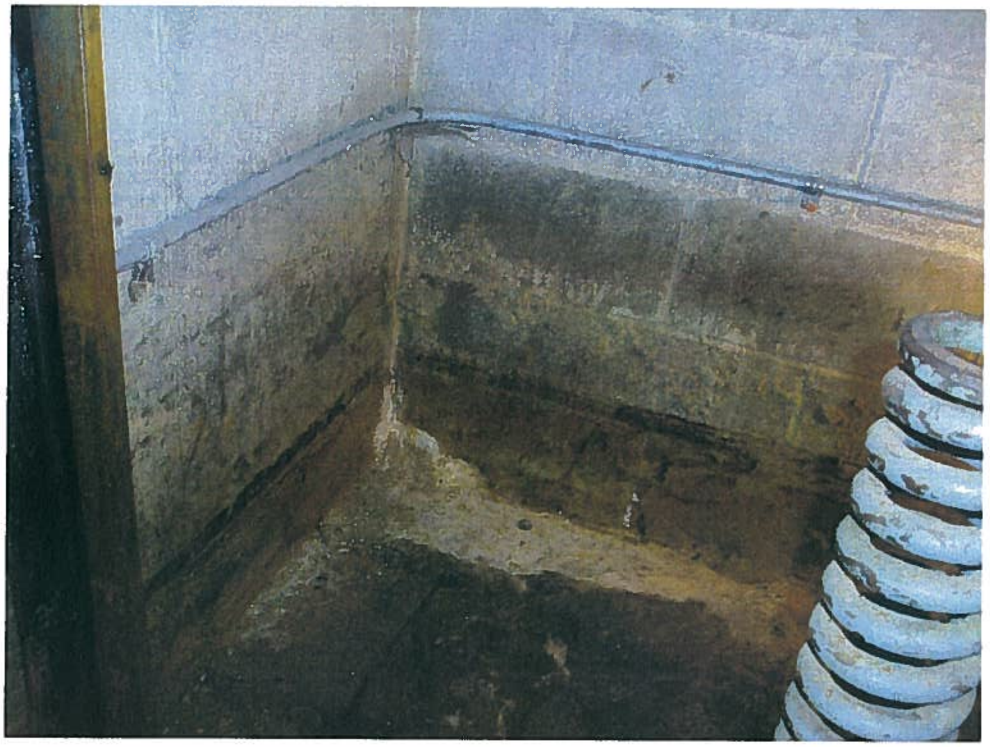


Photograph 3. Eastern wall of elevator pit, looking east. Wall is cast-in-place concrete from bottom to basement floor level, CMUs above. Southernmost PVC piping comes up from sump pump, apparently piped into foundation drainage system.

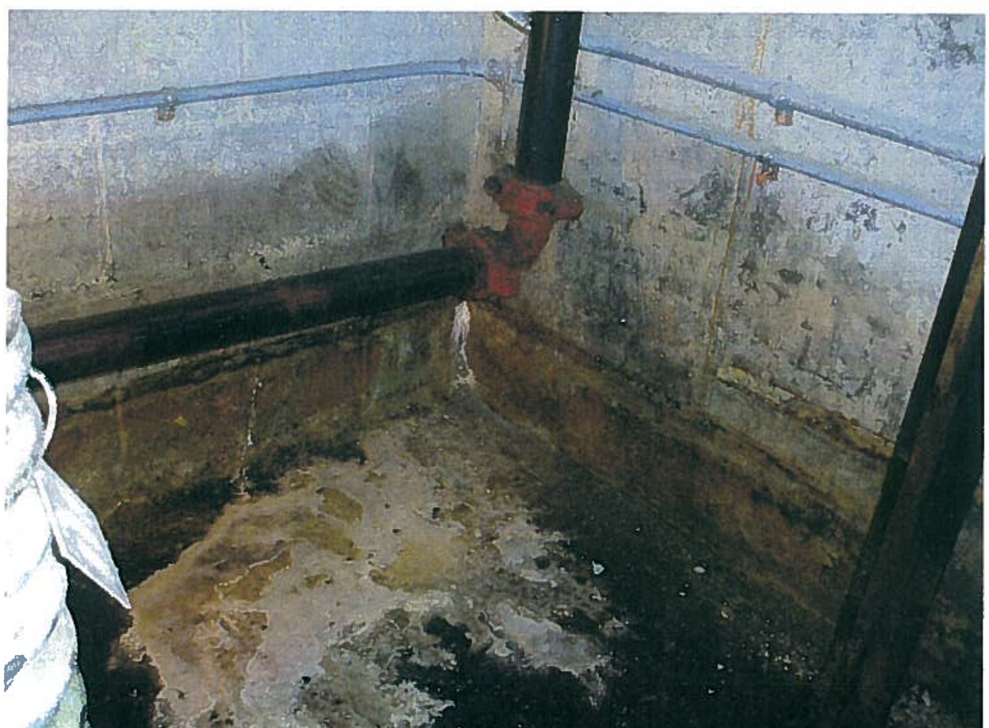
Photograph 4. Southeast corner of elevator pit, looking southeast. PVC piping from sump pump is approx. 1.25-in. OD. Sump pump is plugged into outlet shown.

Photograph 5. Sump pump in roughly cut sump pit in southeast corner of elevator pit, looking down (southeast). Bottom of sump pit is 0.9 ft below top of elevator slab (El. 111.3), water level is 0.5 ft below top of slab (El. 111.7). Water apparently contains antifreeze.

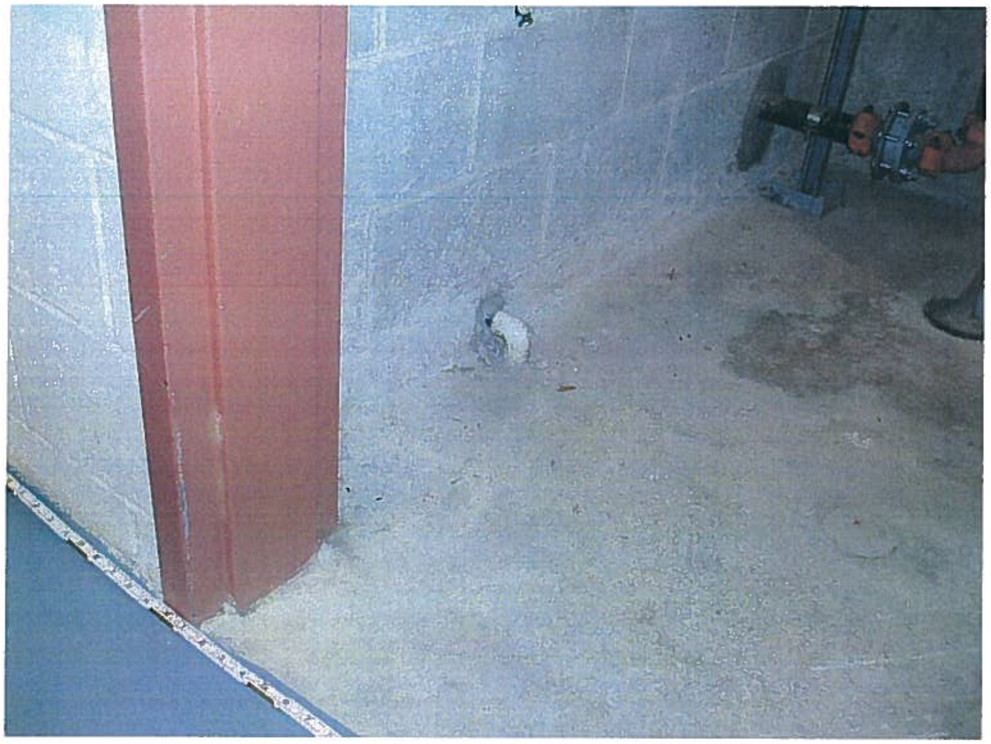
Photograph 6. Sump pump in roughly cut sump pit in southeast corner of elevator pit, looking down (south).



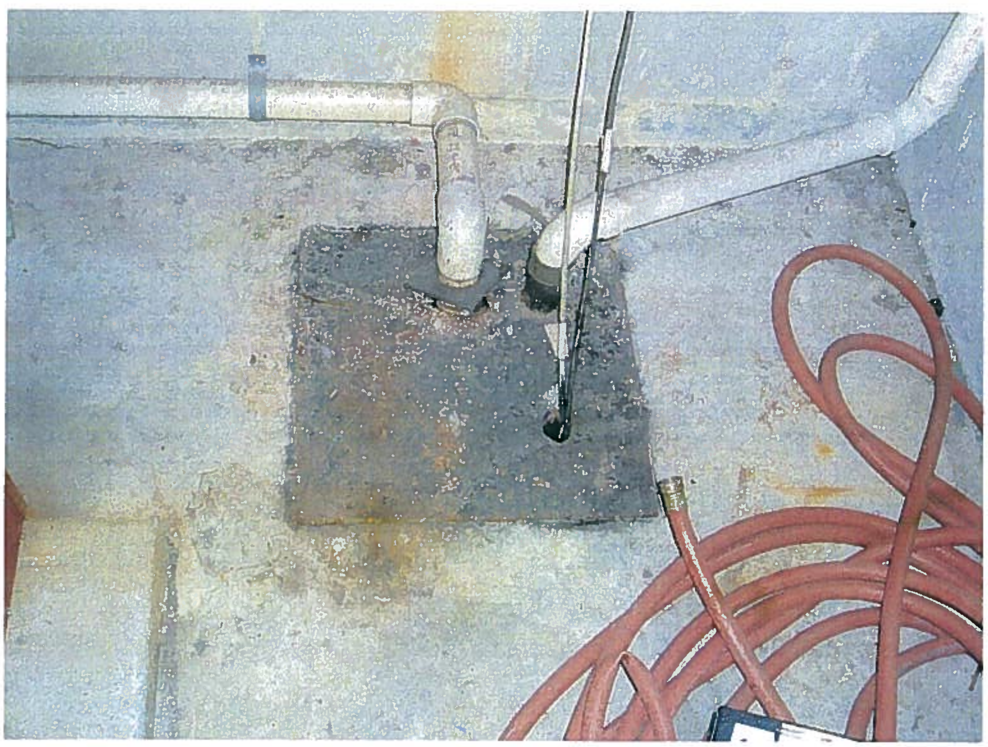
Photograph 7. Northwest corner of elevator pit, looking northwest. Apparent leachate from grout coats joint between CMU wall and cast-in-place wall and covers top of elevator pit slab in corner.



Photograph 8. Northeast corner of elevator pit, looking northeast. Apparent leachate from grout coats joint between CMU wall and cast-in-place wall and covers top of elevator pit slab in corner.

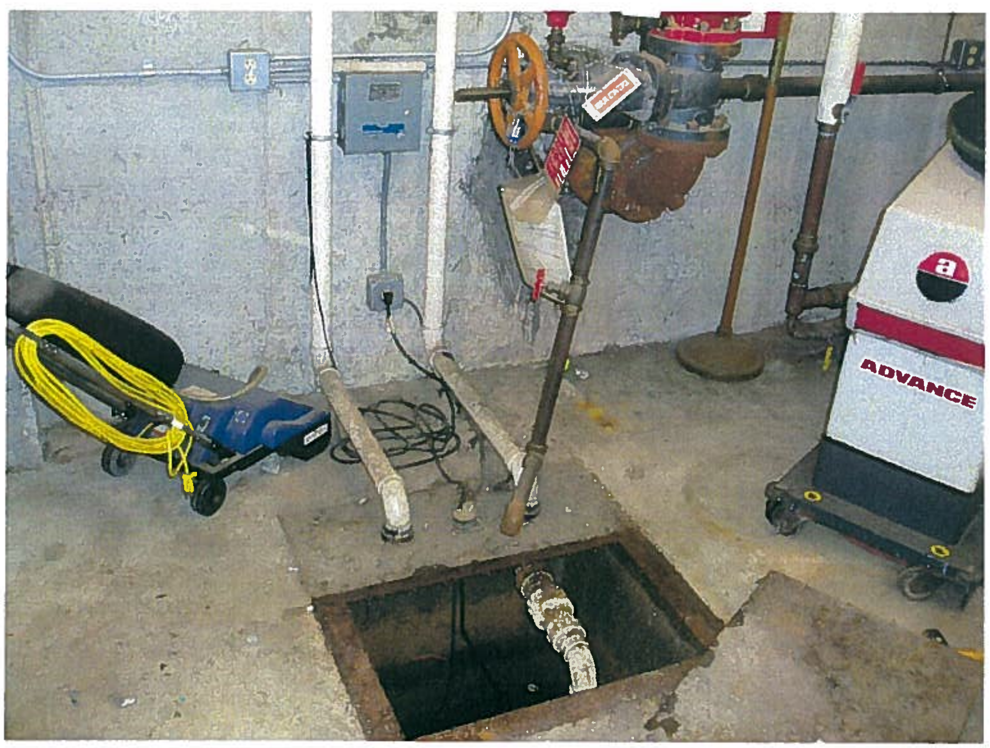


Photograph 9. PVC pipe from elevator sump pit (invert El. 116.5), extending through elevator wall and taking 90 degree bend down through floor slab, looking northwest.



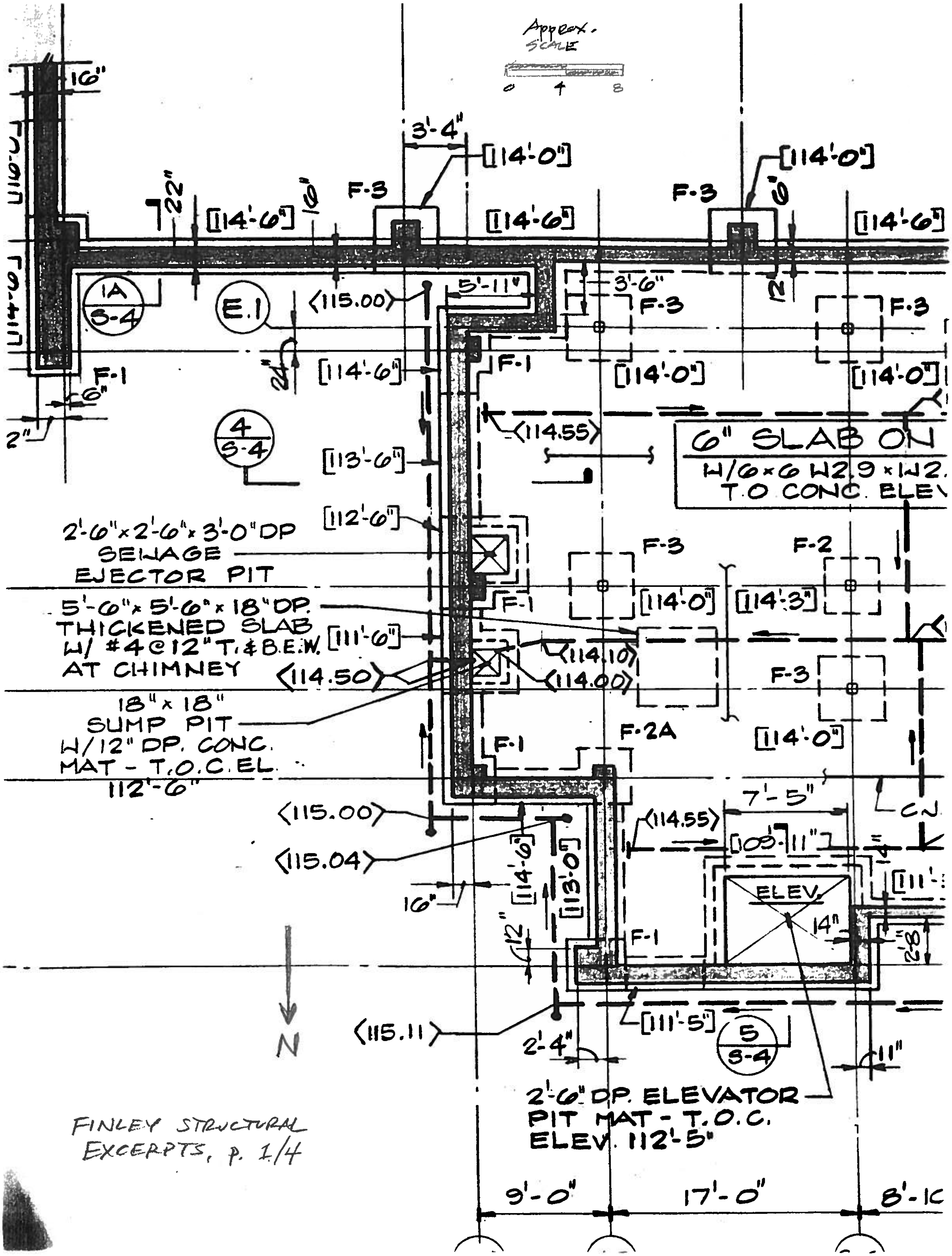
Photograph 10. Foundation drainage system sump pit, looking north. Documented measurements were taken through the hole with two cords extending through.

Photograph 11. Sewer ejector pit with steel plate removed, looking down (south). Top of sump pump visible with 2-in. diameter PVC effluent pipe, extending through portion of steel plate still in place.

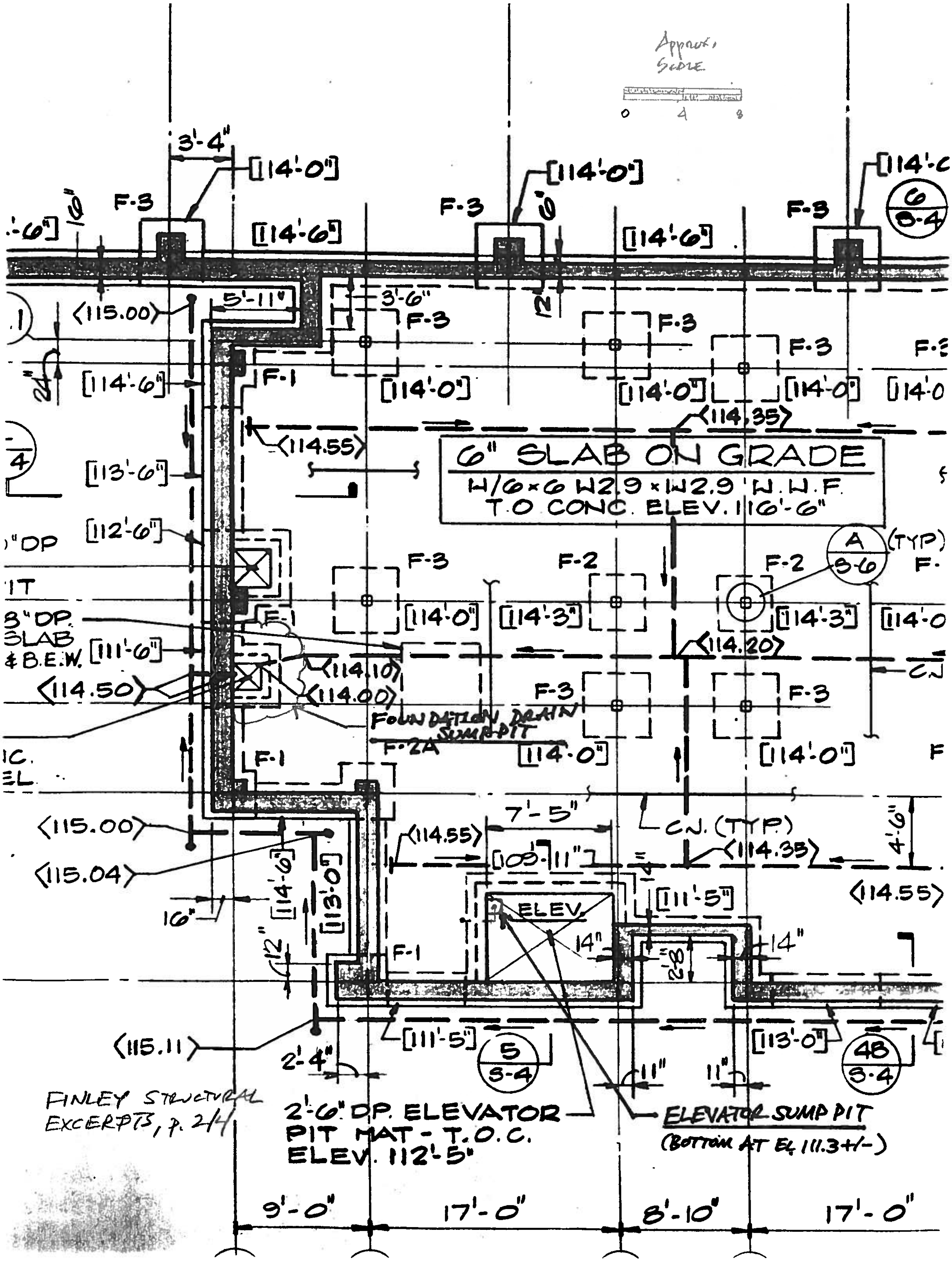


Photograph 12. Ejector sump pit, PVC pipes extending up wall, and control system for ejector pit, looking east.

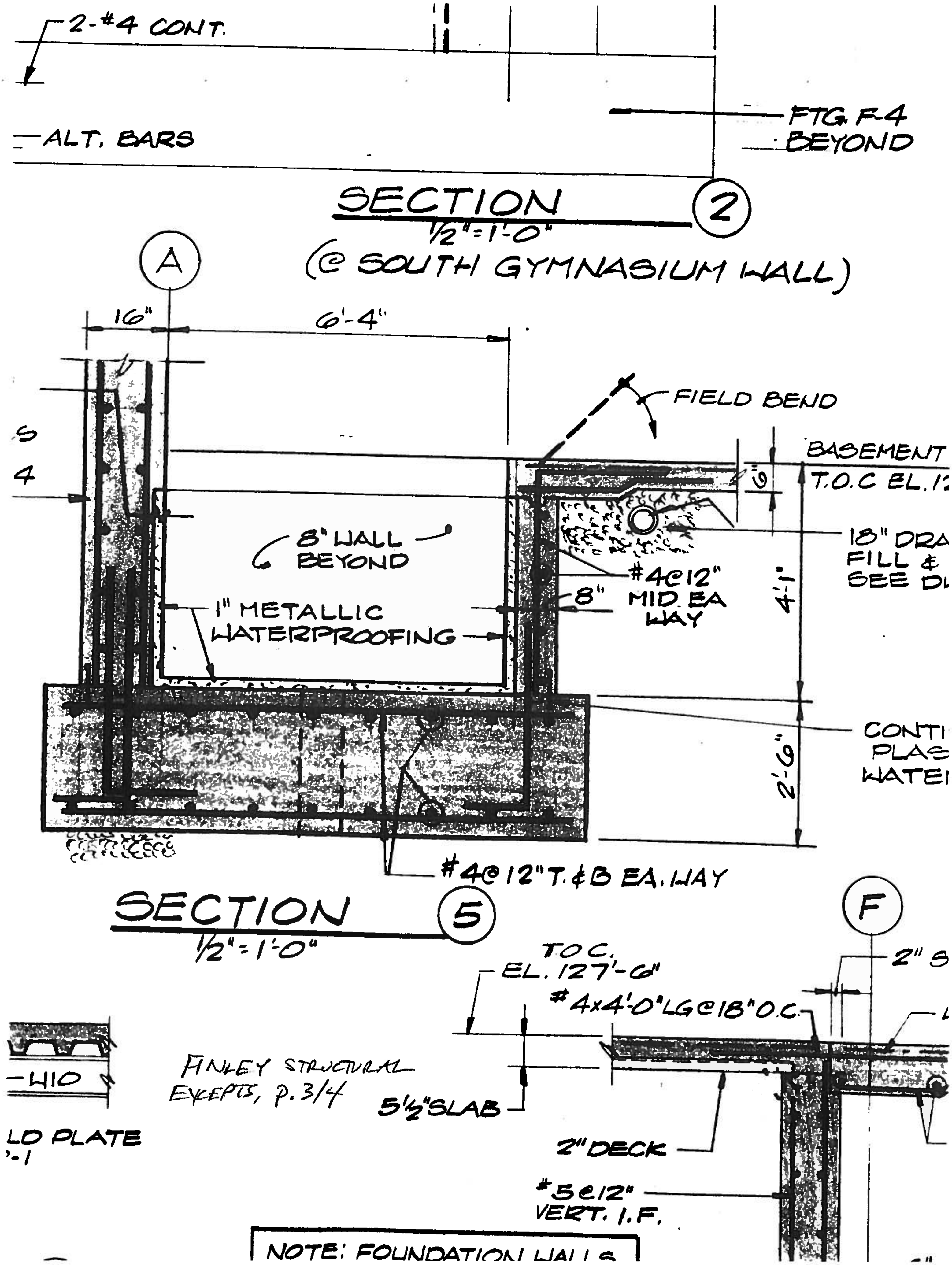
Photograph 13. Crack observed between CMU and cast-in-place concrete on east side of stairway wall, looking east. Maximum crack opening width was approximately 3/32 in. wide.



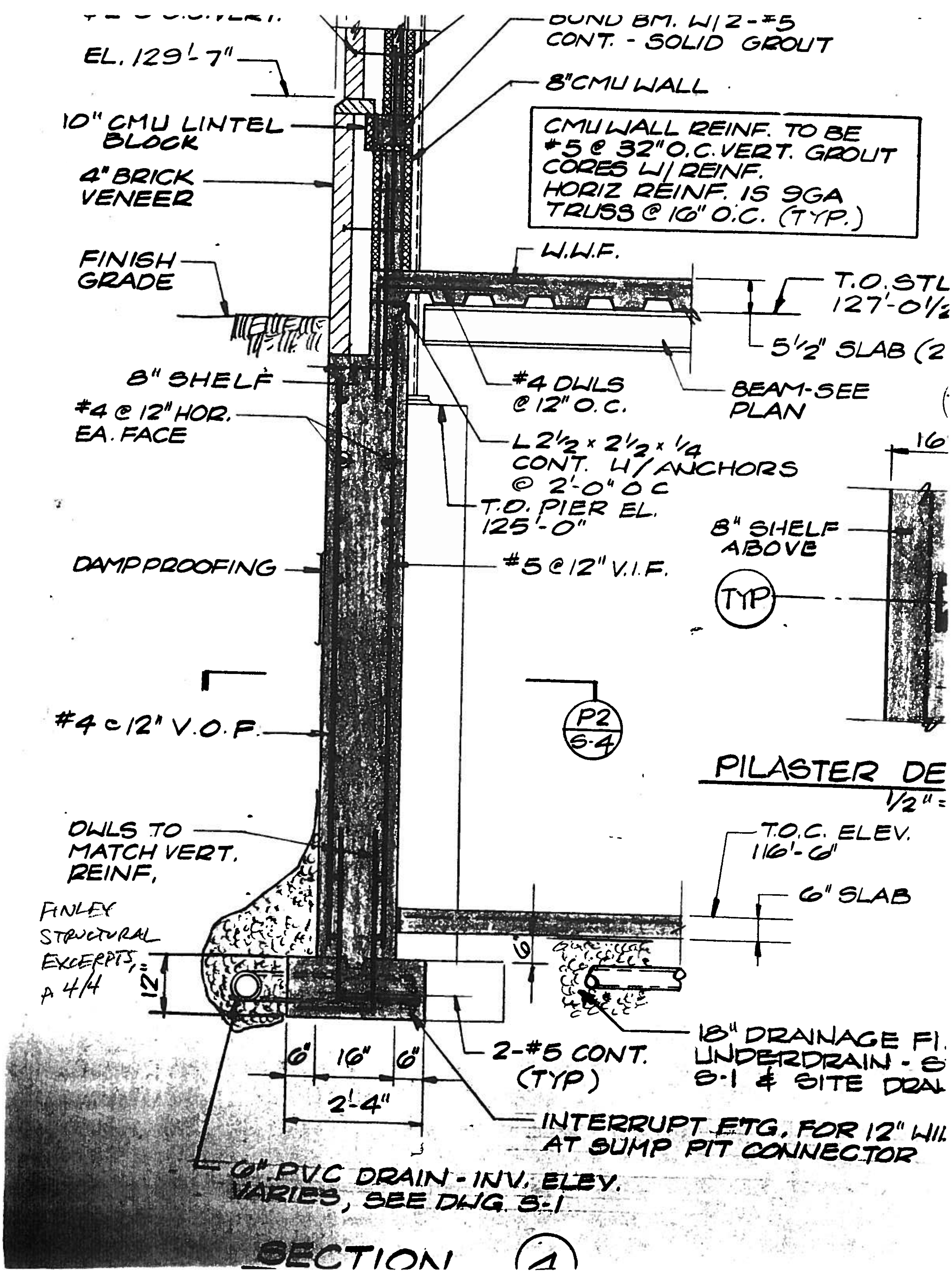
FINLEY STRUCTURAL EXCERPTS, p. 1/4



FINLEY STRUCTURAL EXCERPTS, p. 2/4



FINLEY STRUCTURAL
EXCEPTS, p. 3/4



EL. 129'-7"
BOND BM. W/ 2-#5 CONT. - SOLID GROUT
8" CMU WALL
10" CMU LINTEL BLOCK
4" BRICK VENEER
CMU WALL REINF. TO BE #5 @ 32" O.C. VERT. GROUT CORES W/ REINF. HORIZ REINF. IS 9GA TRUSS @ 16" O.C. (TYP.)
FINISH GRADE
W.W.F.
T.O. STL 127'-0½
5½" SLAB (2
8" SHELF
#4 DWLS @ 12" O.C.
BEAM-SEE PLAN
#4 @ 12" HOR. EA. FACE
L 2½ x 2½ x ¼ CONT. W/ ANCHORS @ 2'-0" O.C.
T.O. PIER EL. 125'-0"
8" SHELF ABOVE
DAMPPROOFING
#5 @ 12" V.I.F.
TYP
#4 @ 12" V.O.F.
P2
S-4
PILASTER DE
½" =
DWLS TO MATCH VERT. REINF.
T.O.C. ELEV. 116'-6"
6" SLAB
FINLEY STRUCTURAL EXCERPTS, p 4/4
6
12
6" 16" 6"
2'-4"
2-#5 CONT. (TYP)
18" DRAINAGE FI. UNDERDRAIN - S S-1 & SITE DRAI.
INTERRUPT FTG. FOR 12" WI. AT SUMP PIT CONNECTOR
6" PVC DRAIN - INV. ELEV. VARIES, SEE DWG. S-1
SECTION 1