O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

J0952-49-01
December 17, 2025

Johnson Roberts Associates Inc.
24 Dane Street
Somerville, MA 02143
Attn: Philip O'Brien

Re: Geotechnical Engineering Recommendations
Proposed Clinton Library
239 Chestnut Street
Clinton, Massachusetts

Dear Mr. O'Brien:

O'Reilly, Talbot & Okun Associates, Inc. (OTO) is pleased to provide this letter report summarizing our geotechnical engineering recommendations for the proposed new Clinton Library, located at 239 Chestnut Street in Clinton, Massachusetts. A Site Locus is provided as Figure 1. A Site Plan is provided as Figure 2.

Our geotechnical recommendations are based upon subsurface conditions observed in seven soil borings. Our services consisted of the full-time observation of the borings, review of the logs and soil samples, engineering analyses, and preparation of this report. This report is subject to the attached limitations.

1.0 SITE & PROJECT DESCRIPTION

The Site is located at 239 Chestnut Street in Clinton, Massachusetts. The current Site consists of grassy areas with areas of dense shrubs and trees, vehicle parking at the west portion of the Site, and trailer and vehicle storage throughout the central portion. The Site is bounded to the west by Chestnut Street, and to the north, south and east by residential areas. A small retaining wall (2 to 3 feet in height) is present along Chestnut Street. A residential home which was located at the center portion of the Site was demolished between 2008 and 2010. The location of the former building is shown on Figure 2.

In the Site vicinity, the ground surface slopes generally from the east downward to the west, towards Chestnut Street. The western edge of the proposed building is near elevation 384 at the southwest corner and elevation 395 and the northeast corner. The proposed parking area to the east is approximately elevation 395 in the western portion and elevation 404 in the eastern portion. Topography is shown on Figure 2.

Project plans call for construction of a new library building. Concept plans include a 12,500 square foot, two story structure built into the hillside so that the first floor will be walk out to the west and the second floor will be walk out to the east. The location of the proposed building footprint is shown on Figure 2.

We expect structural loads to be supported on both isolated column and continuous strip footings. We anticipate that maximum column loads will be on the order of 100 kips or less and bearing walls will carry a load of approximately five kips per linear foot. These assumptions should be confirmed by the design team.

2.0 SUBSURFACE EXPLORATIONS

Subsurface investigations consisted of seven soil borings (CS-1 through CS-7). The borings were performed on November 24, 2025 by Seaboard Drilling of Chicopee, Massachusetts. Borings were performed using a truck mounted drill rig, using hollow stem auger drilling techniques. Borings CS-1, CS-3, CS-5 through CS-7 were performed within or near the proposed building footprint, and borings CS-5 and CS-6 were performed within or near the former structure footprint. We note that most of the former building footprint was not accessible with the truck rig due to the presence of multiple vehicles and dense shrubs preventing access. Borings CS-2 and CS-4 were performed in proposed parking or access ways. The borings were extended to a maximum depth of 9 to 22 feet. Auger refusal was encountered in boring CS-5 of the borings at 15.3 feet below ground surface. Boring locations are shown on Figure 2. Boring logs are attached.

In general, soil samples were collected on a semi-continuous basis from the ground surface to a depth of five feet below ground surface, at a depth of five feet, and every five feet thereafter. Soil samples were collected using a two inch diameter split spoon sampler, driven 24 inches with a 140 pound automatic hammer falling 30 inches (American Society for Testing and Materials Test Method D1586-99 "Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils"). The number of blows required to drive the sampler each six inches was recorded. The standard penetration resistance, or N-value, is the number of blows required to drive the sampler the middle 12 inches. Soil properties, such as strength and density, are related to the N-value. The field N-values are corrected to a standard 60% hammer efficiency, known as N60, to account for differing hammer efficiencies for each hammer type and drill rig. The N-values presented on the boring logs are field values, which are not adjusted for hammer efficiency. However, the adjusted N60 values were used in our engineering calculations and analysis.

An O'Reilly, Talbot & Okun Associates, Inc. (OTO) engineer observed and logged the borings. Samples were classified according to a modified version of the Burmister Soil Classification System. After drilling, bore holes were backfilled with soil cuttings.

Three samples of near surface soils were submitted to Allied Testing Laboratories, Inc. of Springfield, Massachusetts for grain size distribution testing. The results were used to determine the suitability of the on-Site soils for re-use as engineered fills.

3.0 SUBSURFACE CONDITIONS

This discussion of subsurface conditions at the Site is based upon published geologic information, general knowledge of the Site location and nearby vicinity, and the soil investigations performed during this study.

The conditions are generally favorable for the proposed construction.

3.1 Soil Conditions

In general, subsurface conditions consisted of the following, in order of increasing depth: a surface layer of topsoil or hardpack; non-engineered fill (where present); silty sand; and glacial till.

Topsoil or Hardpack: Borings CS-1 through CS-6 were performed within grassy areas, and boring CS-7 was performed in an area covered by hardpack/gravel. Topsoil thickness ranged between relatively thin layer (2 inches or less) and approximately 12 inches. The topsoil generally consisted of loose, fine sand and silt or fine to medium sand with some silt, little medium sand and trace amounts of coarse sand, gravel and organics.

In boring CS-7, the hardpack/surficial gravel layer was 5-inches thick and consisted of loose gravel, some medium to coarse sand and trace fine sand.

Non-Engineered Fill: Generally between two and four feet of non-engineered fill was encountered in borings CS-1, and CS-4 through CS-7. A thicker amount of fill or reworked soils appeared to be present at borings CS-3 and CS-5 (between five and ten feet thick); however, it was difficult to determine the bottom of the fill layer due to poor recovery either due to debris or gravel in the native soils. In boring CS-5, trace amounts of organics (roots and sticks) were encountered up to a depth of 3.5 feet, and this organic layer appeared to be 7-inches thick. Trace pieces of glass, fabric, plastic and coal debris were observed in the top two feet of borings CS-3, CS-4, and CS-6. The depth to the bottom of non-engineered fill is presented in Table 1.

We expect fill soils to be present in the vicinity of the previously demolished structure. Furthermore, we recommend that test pits be performed in this area to observe the thickness of any non-engineered fill or disturbed soils; the presence of any former structures such as foundations, slabs or utilities; and to determine the suitability for re-use of these soils.

Additional information regarding the re-use of on-Site granular material is presented below in the Earthwork Considerations (Section 5.8).

Table 1
Depth /Approximate Elevation to Bottom of Fill

Location	Ground Surface Elevation (Approx. feet)	Depth to/ Elevation of Bottom of Non-Engineered Fill (feet)	Maximum Depth/Elevation Explored (Approx. feet)
CS-1	385.5	2/383.5	22/363.5
CS-2	388.0	N/E	9/379.0
CS-3	394.0	5 – 10*/389-384	16.3/377.7
CS-4	400.0	2/398	9/391.0
CS-5	390.0	5.5/384.5	15.3/374.7
CS-6	392.0	2/390.0	12/380.0
CS-7	384.5	5/379.5	12/372.5

Notes:
1. Elevations estimated by referring to the survey provided by JRA and/or GPS coordinates by OTO field staff. Data presented in this table should be considered accurate only to the degree implied by the method(s) used.
2. * Depth of fill difficult to distinguish due to poor recovery in borings. Few cuttings initially brough to surface, indicating disturbed material.

Silty Sand: Beneath the surficial layer in borings CS-1, CS-2 and CS-7, between 5 and 10 feet of native, silty sand was encountered. The soils generally consisted of medium dense, fine to medium sand, some silt, trace to little coarse sand and gravel. Trace to little amounts of clay were observed in boring CS-1 between 5 and 7 feet. Auger griding was observed during drilling, indicating the presence of occasional cobbles within this layer.

Glacial Till: Glacial till was encountered at each of the boring locations below the fill or silty sand layer (where present). Glacial till is a very dense, heterogeneous mixture of silt, clay, sand and gravel, and is generally present immediately above bedrock throughout New England. Each of the borings terminated in this layer. Boring CS-5 encountered refusal at a depth of 15.3 feet, likely upon a large cobble, boulder, or possible bedrock.

3.2 Laboratory and Field Testing Results: Grain Size Distribution

Three samples of near surface soils were submitted to Allied Testing Laboratories, Inc. of Springfield, Massachusetts. The samples included soils from the upper four to five feet at boring locations CS- 1, CS- 3, and CS-4. Each sample was classified as fine sand with some silt, some medium sand, and trace amounts of coarse sand and gravel. None of the samples met characteristics of an engineered fill. Laboratory data results are attached.

3.3 Groundwater Conditions

Groundwater was encountered in boring CS-1 at a depth of 19 feet below ground surface, corresponding to an approximate elevation of 366.5 feet; however, we expect perched layers are present during period of wet weather and flows may be encountered in permeable layers nearer the surface. Recommendations for groundwater and surface water control are provided in Section 5.4.

4.0 SIGNIFICANT GEOTECHNICAL ISSUES

The significant geotechnical issues for the proposed construction addressed in this report include the following: the presence of non-engineered fill within the footprint of the proposed building; foundation bearing capacity and settlement; seismic design considerations; the suitability of on-Site materials for reuse as engineered fill; perched groundwater and surface water control; and other construction related considerations.

5.0 DESIGN RECOMMENDATIONS

The following recommendations are provided for the construction assumed in this report. These recommendations may need to be revised if the building location and/or slab elevations change during design.

The recommendations in this report refer to the 10th Edition of the Massachusetts State Building Code (MSBC). We note that the 10th Edition of the MSBC includes amendments to the 2021 International Building Code (IBC).

5.1 Non-Engineered Fill & Former Structures

Up to three to four feet of non-engineered fill was encountered in most of the borings across the Site. At one location, CS-3, thicker fills or disturbed material may be present. We anticipate that non-engineered fill and/or disturbed soils are present within the footprint of the former structure; however, the borings could only be performed at the edges of the former footprint. We recommend that supplemental test pits be performed to observe the presence and nature of any fills within the former building footprint. In addition, any remaining footings, walls or slabs can be identified at that time.

Any non-engineered fill, disturbed soils, foundation walls or slabs, basements, or utilities that are located within the footprint of the proposed building should be removed in their entirety. These excavations may extend below the planned slab and footing levels. Any excavations resulting from the removal of existing foundations and/or slabs, should be backfilled with compacted engineered fill, consistent with the recommendations provided below and in the Earthwork Considerations section.

Given the nature of the material, it is unlikely that the fill containing debris can be re-used as engineered fill for the project. However, it may be possible to re-use some of the excavated material, provided over-sized and deleterious materials (debris) are removed. Additional information regarding the re-use of on-Site granular material is presented in Section 5.8.

To treat any loose areas at the base of the excavation and within the building pad, we recommend that the entire footprint be thoroughly proof compacted, prior to the placement of any engineered fill. Proof compaction should be accomplished by a minimum of six passes with a 6,000 pound vibratory roller. This will ensure that the footings bear on a firm dense surface and will limit differential settlement.

Abandoned buried utilities containing asbestos (such as electrical conduit insulation or transite pipe) may be found during construction excavations. Furthermore, former structures (pipes, conduits, foundations walls) may contain or be covered with materials containing asbestos. Such materials should be handled in accordance with MassDEP's asbestos regulations (310 CMR 7.15). We recommend that suspect materials be managed appropriately and tested by a Massachusetts Department of Labor Standards (DLS) licensed asbestos inspector prior to disturbances.

5.2 Foundation Recommendations

The proposed building can be founded on normal spread footing foundations, bearing on the densified native soils and compacted engineered fill. We note that the near surface soils are susceptible to disturbance when exposed to wet weather conditions; therefore, we recommend that a minimum of 12 inches of crushed stone or compacted sand and gravel be placed below the footings, to protect the subgrade and provide a firm bearing surface. Any disturbed or reworked soils should be removed in their entirety and replaced with engineered fill.

Provided the recommendations presented in this section are followed, a maximum allowable bearing pressure of 4,000 pounds per square foot may be used for the design of exterior and isolated column footings bearing on soil.

We estimate that settlement of footings and slabs bearing on crushed stone and engineered fills over the densified native soils should be small and largely elastic in nature. Maximum settlements should be less than 1 inch and should occur relatively quickly after load application (during construction).

Exterior footings should be embedded a minimum of 48 inches below the lowest adjacent grade for frost protection. Interior footings should bear at least two feet below the surrounding floor slab. Strip footings, beneath the load bearing walls, should be at least 18 inches wide. Isolated column footings should be at least 24 inches wide. All other applicable requirements of the Massachusetts State Building Code (MSBC) should be followed.

Footings should not be placed on frozen soils. Footing excavations should be free of loose or disturbed materials. Any boulders or cobbles larger than four inches in diameter should be removed from within one foot of the bottom of the footings and replaced with compacted Sand and Gravel or Crushed Stone. The footing subgrades should be densified immediately prior to placement of footing concrete with at least three passes with a vibrating plate compactor. If loose materials are present in the excavations, they shall be recompacted to form a firm, dense bearing surface.

5.3 Concrete Slabs

We recommend that concrete floor slabs bear on at least 12 inches of compacted Sand and Gravel or Crushed Stone to provide uniform support and a capillary moisture break. The subgrade should also be free of large boulders or cobbles, if encountered. The Sand and Gravel and/or Crushed Stone fill beneath the concrete slabs should meet the grain size distribution characteristics outlined in Table 4.

The subgrade within the footprint of the proposed building should be stripped of topsoil, and any non-engineered fill. Prior to the placement of any engineered fill, we recommend that the entire footprint be thoroughly densified to treat any loose areas present. If non-engineered fill, soft, or disturbed areas are present, these materials should be removed and recompacted or replaced with compacted engineered fill. Fill supporting slabs should be placed in accordance with the recommendations presented on Sheet 1.

5.4 Groundwater and Surface Water Control

Wet soils were observed in boring CS-1 at a depth of 19 feet below ground surface, which appears to be well below anticipated foundation and slab elevations. However, we expect that near surface perched water layers may be present during periods of wet weather due to the impermeable nature of the near surface soils and the ground surface topography.

Temporary Water Control: If perched groundwater is encountered during excavations for footings and utilities, it should be possible to dewater these excavations by using sump pumps. Significant flows may be encountered within any permeable layers. Furthermore, the contractor should establish and maintain proper drainage of soils during construction. The near surface silty soils and underlying glacial till present at the Site are susceptible to moisture, due to the high percentage of fines within the soil mass. If these soils become wet during construction, they will become soft and easily disturbed and will need to be removed and replaced with engineering fill.

Permanent Water Control: We recommend that the building include perimeter drainage to control groundwater and surface water infiltration. The perimeter drainage system can consist of perforated PVC pipe, installed in a Crushed Stone trench, and wrapped in a non-woven geotextile fabric. Furthermore, we strongly recommend that a Crushed Stone drainage layer be included beneath the floor slab. The Crushed Stone drainage layer and perimeter drain should be hydraulically connected to allow the water to flow away from the foundation via gravity. A typical detail of the underdrain system is shown on Sheet 2. Clean-outs should be provided in the sub-slab and/or perimeter drainage system, to allow for future maintenance.

Depending upon final grades, we recommend the consideration to include the installation of a trench drain to intercept runoff from the eastern hillside. The trench drain will prevent the flow of water towards the building and into the lower pavement subgrade. We anticipate that the drain could consist of a six inch diameter perforated PVC pipe buried approximately three feet below ground surface in a Crushed Stone filled trench lined with a non-woven geotextile filter fabric.

5.5 Below Grade and/or Retaining Walls

Static lateral earth pressures will be imposed on below grade and/or retaining walls. These walls should be designed for unbalanced loading conditions. In addition, basement walls should not be backfilled until the first floor slab is installed. If basement walls are unbraced, they need to be designed to resist overturning, sliding, and bearing capacity failure. For unbraced walls, we recommend an equivalent fluid pressure of 35 pounds per cubic foot (pcf). If the walls are structurally braced, and not free to deflect, and recommend that an equivalent fluid pressure of 55 pcf be used. A coefficient of friction of 0.44 is recommended to evaluate frictional resistance to sliding along the base of the wall and footings. These values apply to unsaturated soil conditions.

The soil against the outside of basement/retaining walls should not be over-compacted, since this would greatly increase lateral loads against the walls. The recommended degree of compaction for engineered fill and compaction means and methods are presented on Sheet 1. We note that these are general guidelines and if it is determined that a location falls into two or more categories, as presented in Table 1-1, the design team should be notified to determine appropriate compaction efforts and/or methods.

5.6 Seismic Considerations

Earthquake loadings must be considered under requirements in Section 1613 and 1806 of the 10th Edition (October 2024) of the Massachusetts State Building Code (MSBC), which is based upon the International Building Code 2021 (IBC) with Massachusetts amendments. Note that the IBC refers to ASCE-7, Minimum Design Loads for Buildings and Other Structures.

Site Class and Earthquake Design Factors

Section 1613 of the IBC covers lateral forces imposed on structures from earthquake shaking and requires that every structure be designed and constructed to resist the effects of earthquake motions in accordance with ASCE-7. Lateral forces are dependent on the type and properties of soils present beneath the Site, along with the geographic location. Per Table 1604.11, the maximum considered earthquake spectral response acceleration at short periods (S_s) and at 1-sec (S_1) was determined for Clinton, Massachusetts.

Soil properties are represented through Site Classification. Procedures for the Site-specific determination of Site Classification are provided in Chapter 20 of ASCE-7. At this Site, we evaluated Site Classification using one of the parameters allowed, Standard Penetration Resistance (N-value). Furthermore, the Site coefficients F_a and F_v were determined according to Tables 1613.2.3(1) and 1613.2.3(2) of the IBC (2021), using both the S_s and S_1 values and the Site Class. Seismic design parameters are provided in Table 2.

Table 2
Seismic Design Parameters

Parameter	Value
S_s	0.257
S_1	0.065
Site Class	C
F_a	1.3
F_v	1.5

Any below grade or retaining walls should be designed to resist dynamic lateral earth forces in accordance with Section 1610.2 of the MSBC. The seismic earth forces as defined in Section 1610.2 should be applied as an inverted triangle over the height of the wall and added to the static lateral pressures. For purposes of the calculation, a total unit weight of 125 pounds per cubic foot should be used for the backfill against the retaining wall.

Liquefaction

Section 1806.4 relates to the liquefaction potential of the underlying soils. The liquefaction potential was evaluated for saturated Site soils, using Figure 1806.4 of the MSBC. Based upon the observed density of Site soils, it is unlikely that liquefaction would occur under the design earthquake. In addition, we do not anticipate that loose soil layers will be present below the maximum depth explored.

5.7 Exterior Slabs and Pavements

This section provides recommendations for exterior entryways, slabs, and sidewalks, as well as flexible and rigid pavements.

Entryways and Sidewalks

Exterior concrete slabs, such as those at entryways and sidewalks adjacent to the building should be designed to mitigate differential frost movement between adjacent slabs, doorways, and pavements. To address this concern, we recommend that concrete slabs at entryways be underlain by four feet of non-frost susceptible Sand and Gravel fill. Where exterior slabs butt against hard surfaces, we recommend that for the area beyond the edges of the slab, the bottom of Sand and Gravel fill should transition gradually upward at a slope of 3H:1V or flatter (zone of influence).

We recommend that concrete sidewalks that are outside the zone of influence of the building and entryways, as well as areas where differential frost movement would not cause a tripping hazard, bear on at least 12 inches of imported, compacted Sand and Gravel to provide uniform support and a capillary moisture break. Fill should be placed in accordance with the recommendations for compaction provided on Sheet 1. Subgrades should also be free of large boulders. We recommend that the entire subgrade of the sidewalk be proof compacted with a heavy vibrating roller to treat any loose areas. The Sand and Gravel fill beneath the concrete slabs and sidewalks should meet the grain size distribution characteristics described in Table 4. Drainage layers should be considered due to the low permeable soils present at the Site.

Flexible Pavement Design

We understand that the proposed pavements will experience loads from both light and occasional heavier vehicles. Recommended designs are presented for both loading conditions in Table 3.

Table 3
Pavement Design Sections

Layer	Thickness (in)
Asphalt Finish Course	1.5
Asphalt Binder Course	1.5
Gravel Base Course	12

The project Civil Engineer should review and revise the Asphalt Finish Course and Binder Couse thicknesses, as appropriate for the anticipated traffic loads. We recommend that the pavement subgrade be proof compacted to treat any loose areas present. We note that pavements underlain by non-engineered fill may require more frequent maintenance and repair than typical pavements.

As described above, the near-surface silty soils present at the Site are poorly drained, are susceptible to disturbances during construction, and have the potential to cause frost heaves to occur in pavements. We recommend that pavements be pitched to promote surface water runoff and perimeter drainage be included to collect water from upgradient flows.

Table 4 presents recommendations for gradation requirements for the Gravel Base Course material. Please note that the Gravel Base Course specification is Mass Highway M1.03.1, Processed Gravel for Subbase.

5.8 Earthwork Considerations

We anticipate that earthwork for this project will include the following: excavations for footings; placement of compacted engineered fill beneath the floor slab and pavements; and the treatment of the existing soils to address any localized loose areas that may be present.

Presence of Cobbles, Boulders and Other Oversized Materials

We note that numerous cobbles were encountered within the near surface soils in each of the borings, and also note that occasional boulders may be present. Cobbles and boulders over 4 inches in diameter are to be removed from foundation and slab subgrades. Excavations may extend beyond anticipated depths to remove cobbles and boulders.

In addition, former slabs, walls or footings may be present within the area of the former structure.

Engineered Fill Recommendations

Four engineered fill types are recommended:

- Sand and Gravel for use immediately below footings, slabs, and sidewalks;
- Crushed Stone for use as an alternative to Sand and Gravel and within drainage systems;
- Gravel Base Course for use beneath pavements; and

- Granular Fill for use as miscellaneous fill and to form the building pads at depths greater than 12 inches beneath floor slabs and footings.

Grain size distribution requirements are presented in Table 4. The near surface soils are not suitable for re-use as free draining Sand and Gravel or Granular Fill. Based on grain size distribution analysis performed on a sample collected during this study, the near-surface soils contain a significant amount of fines (between 26 and 33 percent). Due to the potential for frost movements, we recommend that the on-Site silty sand not be reused within two feet of sidewalk or pavement subgrades. Due to its uniformity and high silt content, the existing surficial soils would be suitable for re-use as granular fill under engineer supervision only, and only if they are kept dry and protected and/or supplemented with coarser material.

If the contractor elects to use the on-Site material as fill, we recommend that a representative sample be collected and a grain size distribution analysis is performed to obtain approval by the engineer. Oversized materials (over 3 inches in diameter) should be removed from any soils considered for re-use.

Table 4
Grain Size Distribution Requirements

Size	Sand and Gravel	Gravel Base Course	Granular Fill	Crushed Stone
	Percent Finer by Weight			
3 inch	100	100	100	100
1 inch	---	---	---	100
¾ inch	---	---	---	90-100
½ inch	50-85	50-85	---	10-50
⅜ inch	---	---	---	0-20
No. 4	40-75	40-75	---	0-5
No. 10	---	30-60	30-90	---
No. 40	10-35	10-35	10-70	---
No. 100	---	5-20	---	---
No. 200	0-8	2-10	0-15	---

Compaction Recommendations

Any unsuitable fill, debris, topsoil, or organic soils should be removed from beneath the building footprint and should not be re-used as fill beneath structures. To avoid point loads, any cobbles or boulders, larger than four inches in diameter, encountered at the subgrade should also be removed. Prior to the placement of any engineered fill, we recommend that the entire fill area be thoroughly proof compacted. Proof compaction should be accomplished by a minimum of six passes with a 6,000 pound vibratory roller. To facilitate compaction, the moisture content of the on-Site material should be maintained at or near the optimum moisture content as determine by ASTM D1557.

Compacted fill should be placed in lifts ranging in thickness between 6 and 12 inches depending on the size and type of equipment. Recommended degrees of compaction and compaction means and methods are presented on Sheet 1.

Compaction within five feet of foundations should be performed using a hand-operated roller or vibratory plate compactor. If new walls are to be backfilled on both sides, placement and compaction of engineered fill should proceed on both sides of the wall so that the difference in top of fill on either side does not exceed two feet. For retaining walls (walls where backfill is only on one side), the walls should be designed for unbalanced loading conditions and the engineered fill within ten feet of the wall should be compacted using hand-operated plate or light drum rollers.

Weather Considerations

The contractor should note that the near surface silty soils are poorly draining and susceptible to disturbance when wet due to its high fines content. If these soils become wet during construction, they will become soft and easily disturbed. During periods of precipitation, the silty soils will tend to remain wet and cannot be easily dried or stabilized. It may be necessary to remove the disturbed soils and replace the materials with compacted sand and gravel or crushed stone. To avoid this potential issue, the contractor should establish and maintain proper drainage and protection of soil surfaces during construction.

Sloping and Earth Support

It does not appear that significant amounts of sloping, shoring and/or underpinning will be necessary to construct the proposed additions at this time with the possible exception that the non-engineered fill. All excavations shall be sloped to protect the existing structure and personnel. The need for temporary earth support should be evaluated during final design of the project. Sloping and earth support may be needed during the removal of non-engineered fill soils, the installation of utilities, and if foundations are extended to depths greater than four feet below existing grade or below adjacent footings of existing buildings.

7.0 SUPPLEMENTAL INVESTIGATIONS

We recommend that test pits be performed within footprint of the former structure to determine the depth of non-engineered fill and in any other areas to further evaluate near surface soils for potential re-use.

If the footprint(s) of the new construction vary from those assumed in this report, additional borings may be appropriate.

8.0 FINAL DESIGN AND CONSTRUCTION PHASE SERVICES

It is recommended that O’Reilly, Talbot & Okun Associates, Inc. (OTO) be retained during construction to prepare and/or review appropriate specification sections and drawings, if necessary. During construction phases, we recommend that OTO be retained to provide engineering support and to document subgrade conditions and preparation.

We appreciated the opportunity to be of service on this project. If you have any questions, please do not hesitate to contact the undersigned.

Sincerely yours,
O'Reilly, Talbot & Okun Associates, Inc.

Ashley L Sullivan

Caren Irgang	Ashley L. Sullivan, PE
Engineer III	Principal

Attachments: Limitations, Site Locus, Site Plan, Sheet 1, Sheet 2, Boring Logs, Laboratory Data

LIMITATIONS

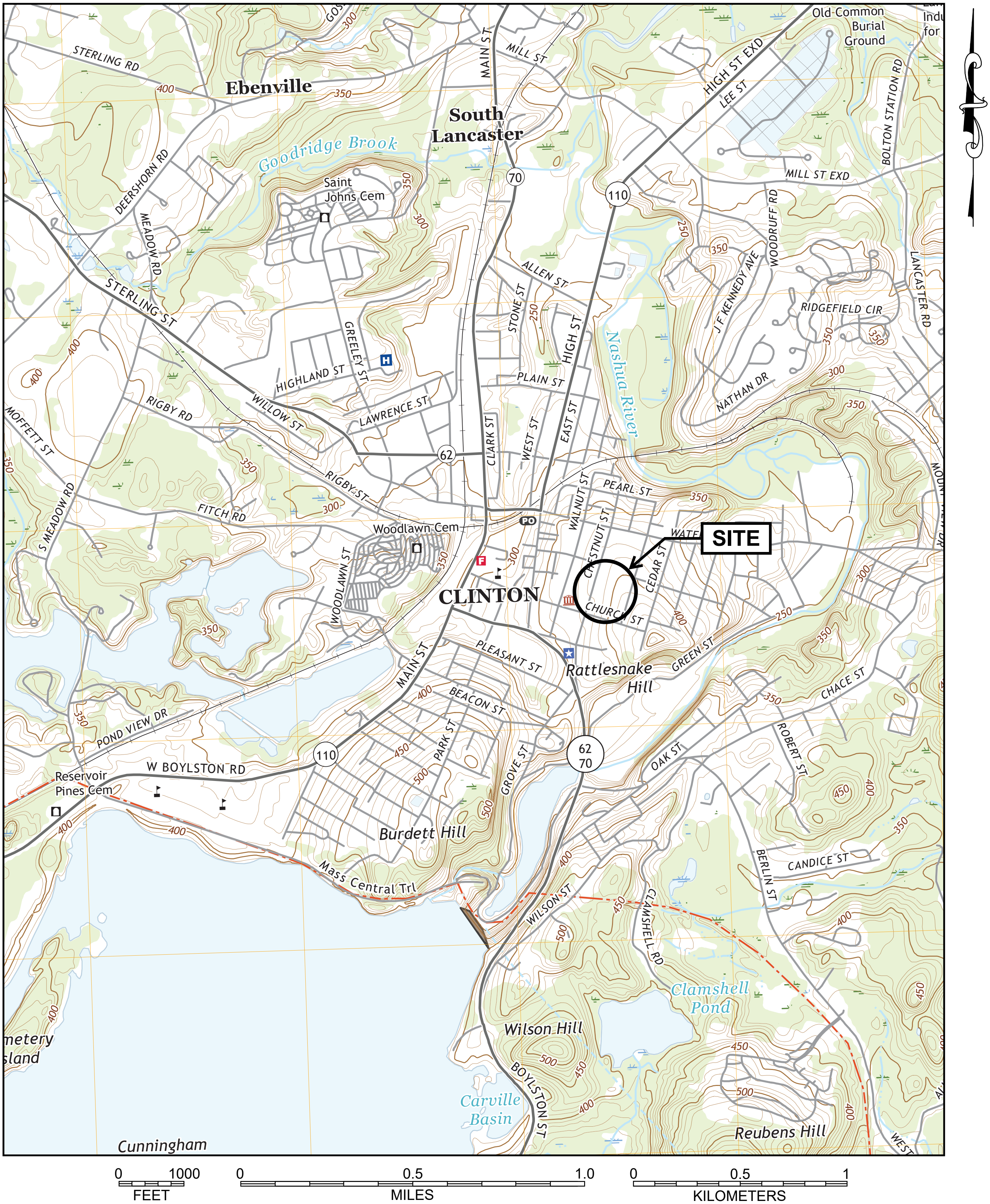
1. The observations presented in this report were made under the conditions described herein. The conclusions presented in this report were based solely upon the services described in the report and not on scientific tasks or procedures beyond the scope of the project or the time and budgetary constraints imposed by the client. The work described in this report was carried out in accordance with the Statement of Terms and Conditions attached to our proposal.

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

3. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretations of widely spaced explorations and samples; actual soil transitions are probably more erratic. For specific information, refer to the boring logs.

4. In the event that any changes in the nature, design or location of the proposed structures are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by O'Reilly, Talbot & Okun Associates Inc. It is recommended that we be retained to provide a general review of final plans and specifications.

5. Our report was prepared for the exclusive benefit of our client. Reliance upon the report and its conclusions is not made to third parties or future property owners.



1:24,000 SCALE   NATIONAL GEODETIC VERTICAL DATUM 1929   10 FOOT CONTOUR INTERVAL

O:\Job Files\J0900\952 Johnson Roberts Architects\49-01 Clinton Library - Geotech\Figures

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES
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www.OTO-ENV.com

CLINTON LIBRARY

239 CHESTNUT STREET
CLINTON, MASSACHUSETTS

SITE LOCUS

Topographic Map Quadrants:
CLINTON, MA

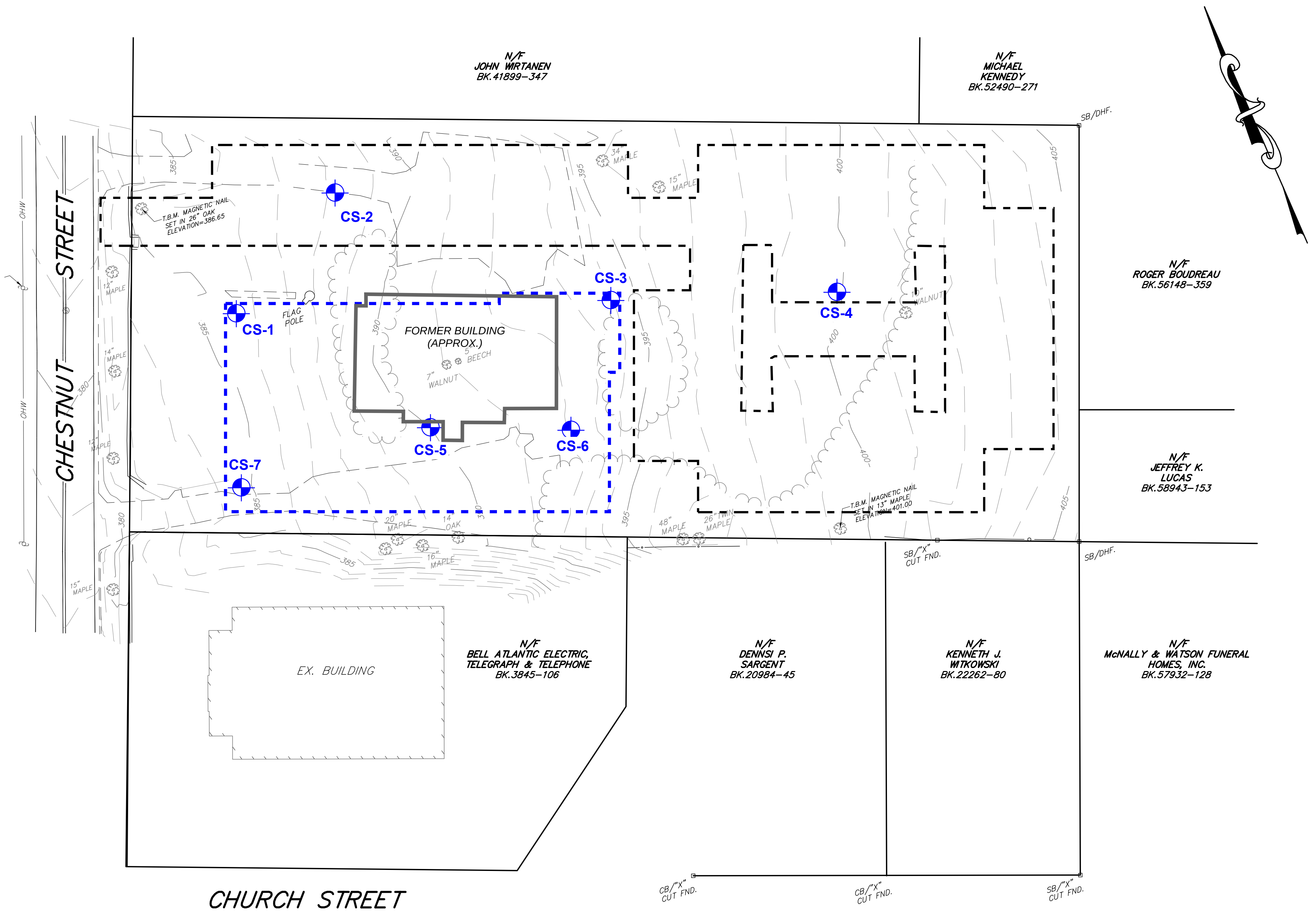
Map Version: 1964

Current As Of: 1984

Date: DECEMBER 2025

PROJECT No.
J0952-49-01

FIGURE No.
1



NOTES:

1. BASE MAP PROVIDED TO OTO IN ELECTRONIC FORMAT. ORIGINAL DRAWING TITLED "SITE PLAN OF LAND", DATED OCTOBER, 2025
2. SAMPLE LOCATIONS ARE SHOWN ACCORDING TO TAPED MEASUREMENTS TAKEN FROM EXISTING SITE FEATURES
3. ALL DATA IS TO BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHODS USED IN THE DEVELOPMENT OF THIS PLAN

LEGEND:

⊕	APPROXIMATE SOIL BORING LOCATION PERFORMED BY SEABOARD DRILLING ON 11/24/2024, OBSERVED BY OTO
- - -	APPROXIMATE LOCATION OF PROPOSED BUILDING FOOTPRINT
— -	APPROXIMATE LOCATION OF PROPOSED PARKING AREA

SCALE IN FEET
1" = 50'
0' 25' 50' 100'

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DESIGNED BY: MPS
DRAWN BY: MPS
CHECKED BY: CYI
DATE: 12/04/25
REV. DATE:

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CLINTON, MASSACHUSETTS

SITE PLAN

PROJECT NO.
J0952-49-01

FIGURE NO.
2

952 Johnson Roberts Architects\49-01 Clinton Library - Geotech\Figures\Figure 2 - Site Sketch (11X17).pdf"

Table 1-1
Degree of Compaction Recommendations

Location	Minimum Compaction*
Below Structures (Foundations and Slabs)	95%
Below Pavements/Sidewalks/Exterior Slabs	95%
Against Basement Walls/Retaining Walls	92%
Utility Trenches	95%
General Landscaped Areas	90%

Notes.
1. Percentage of the maximum dry density as determined by Modified Proctor ASTM D1557, Method C.
2. When location falls into two or more categories, the engineer should be notified to determine appropriate compaction efforts and/or methods.
3. Crushed stone should be compacted in lifts of 12 inches to form a dense matrix using either traditional compaction methods (vibratory plate and/or roller) or tamping with an excavator bucket in deep excavations. It is generally not necessary to perform laboratory or field density testing on crushed stone.

Table 1-2
General Guidelines for Compaction Means and Methods

Compaction Method	Maximum Stone Size	Maximum Lift Thickness (inches)		Minimum Number of Passes	
		Below Structures & Pavement (Critical Areas)	Less Critical Areas	Below Structures & Pavement (Critical Areas)	Less Critical Areas
Hand-operated Vibratory Plate and confined spaces	3 inches	6 inches	8 inches	6 inches	4 inches
Hand-operated vibratory drum roller (less than 1000 pounds)	3 inches	6 inches	8 inches	6 inches	4 inches
Hand-operated vibratory drum roller (at least 1,000 pounds)	4 inches	8 inches	10 inches	6 inches	4 inches
Light vibratory drum roller (minimum 3000 pounds)	4 inches	10 inches	14 inches	6 inches	4 inches
Heavy vibratory drum roller (minimum 6000 pounds)	4 inches	12 inches	18 inches	6 inches	4 inches

Notes: The contractor should reduce or stop drum vibration if pumping of the subgrade is observed.

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GENERAL COMPACTION GUIDELINES

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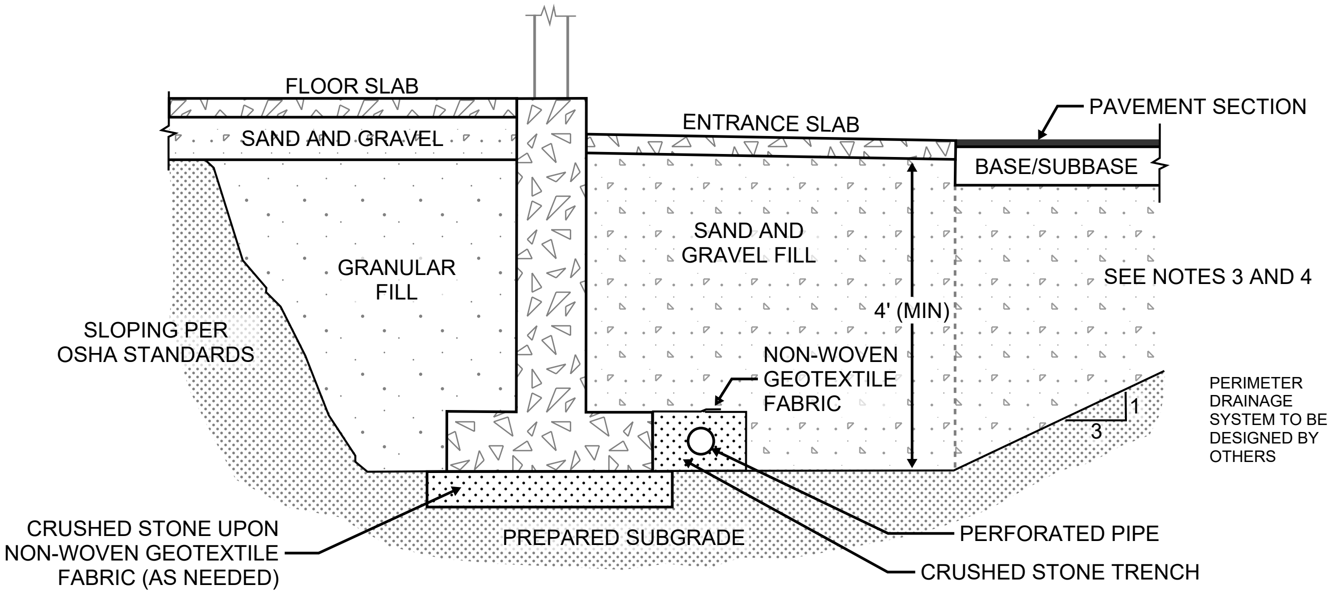
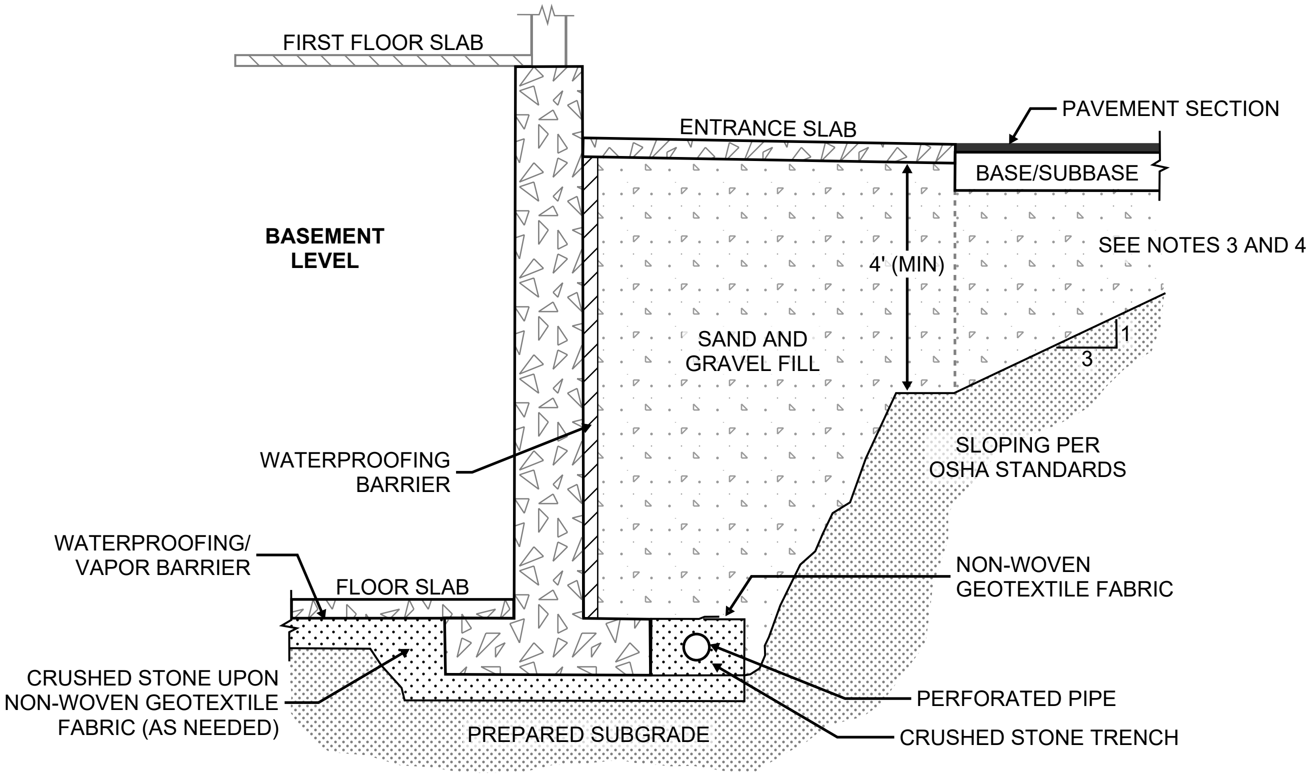
PROJECT No.
J0952-49-01

SHEET No.
1



TYPICAL FOUNDATION SECTION
SLAB ON GRADE FOOTING WITH ENTRANCE SLAB



TYPICAL FOUNDATION SECTION
BASEMENT FOUNDATION WITH GROUND LEVEL ENTRANCE SLAB

NOTES:

1. NOT FOR CONSTRUCTION, FOR ILLUSTRATION PURPOSES ONLY

2. FOR ADDITIONAL INFORMATION, REFER TO OTO's GEOTECHNICAL REPORT DATED DECEMBER 2025

3. UNPAVED AREAS SHALL INCLUDE LOAM CAP AND SHOULD BE GRADED TO DIRECT SURFACE FLOW AWAY FROM BUILDING

4. PERMEABLE BACKFILL SHALL BE USED IN AREAS WITH UNDERDRAIN SYSTEMS

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TYPICAL FOUNDATION SECTION

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DATE: 12/16/2025
REV. DATE:

PROJECT No.
J0952-49-01

SHEET No.
2

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LOG OF BORING CS-1

Page 1 of 1

PROJECT	Clinton Library			CONTRACTOR	Seaboard Environmental Drilling		
JOB NUMBER	0952-49-01	FINAL DEPTH (ft)	22.0	DRILLING EQUIPMENT	Track Mounted Rig		
LOCATION	Clinton, MA	SURFACE ELEV (ft)	--	FOREMAN	Joe	CASING	
START DATE	11/24/2025	DISTURBED SAMPLES	7	HELPER	Preston	CASE DIAMETER	N/A
FINISH DATE	11/24/2025	UNDISTURBED SAMPLES	0	BIT TYPE	Hollow Stem Auger (2.25" O.D.)	HAMMER WGT	N/A
ENGINEER/SCIENTIST	Caren Irgang	WATER LEVEL		ROD TYPE	A (1 5/8" O.D.)	HAMMER DROP	N/A
BORING LOCATION	Northwest corner of proposed building footprint	FIRST (ft)	19.0	SAMPLER	2" O.D. Split Spoon	ROCK CORING INFORMATION	
		LAST (ft)	N/A	HAMMER TYPE	Automatic	TYPE	N/A
		TIME (hr)	N/A	HAMMER WGT/DROP	140 lb / 30"	SIZE	N/A

	SAMPLES						
DEPTH (ft)/ SAMPLES	PENETR. RESIST. (bl / 6 in)	REC. (in)	TYPE/ NO.	FIELD TEST DATA	SAMPLE DESCRIPTION (MODIFIED BURMISTER)	PROFILE DEPTH (ft) ELEV.	REMARKS/ WELL CONSTRUCTION
	4/4/4/6	12/24	S-1 (0-2')	--	Top 8": Loose, dark brown, fine SAND and SILT, little medium sand, trace coarse sand, trace gravel, trace organics (roots), damp (gravel piece at top, TOPSOIL) Bottom 4": Loose, brown to yellow, fine SAND and SILT, little medium sand, trace coarse sand, trace gravel, trace organics (roots), damp	TOPSOIL FILL 2.0	
	29/17/13/14	19/24	S-2 (2-4')	--	Top 3": Dense, yellow, fine SAND and SILT, trace coarse sand, trace gravel, damp Next 4": Dense, gray, fractured COBBLE, damp Bottom 12": Hard, brown to gray, fine to medium SAND, some clayey silt, little coarse sand, little gravel, damp	SILTY SAND	1
5'	9/11/8/11	20/24	S-3 (5-7')	--	Medium dense, brown to gray, fine to medium SAND, some coarse sand, some clayey silt, little gravel, damp (frost mottling)		
	23/7/7/13	24/24	S-4 (7-9')	--	Medium dense, gray brown, fine to medium SAND, some silt, some coarse sand, little gravel, damp (little silt bottom 10")	10.0	
10'	10/15/18/23	24/24	S-5 (10-12')	--	Dense, gray brown, fine to medium SAND, some silt, little coarse sand, little fine gravel, trace coarse gravel, dry	GLACIAL TILL	
15'	7/11/17/25	21/24	S-6 (15-17')	--	Very stiff, brown, clayey SILT, little fine to medium sand, trace fine gravel, trace coarse gravel, damp (sand in occasional 1/8" layers, bottom 3" moist)		
						▽	2
20'	50/42/39/45	19/24	S-7 (20-22')	--	Very dense, brown, fine to medium SAND, some coarse sand, little gravel, little silt, wet (wet at top 7" and tip, trace rust staining)	22.0	
					End of exploration 22'		
25'							

Remarks:
1. Intermittent auger grinding from 2 to 15'.
2. Rods wet at 19'.

PROJECT NO.
0952-49-01

LOG OF BORING
CS-1

O'Reilly, Talbot & Okun
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LOG OF BORING CS-2

Page 1 of 1

PROJECT	Clinton Library			CONTRACTOR	Seaboard Environmental Drilling		
JOB NUMBER	0952-49-01	FINAL DEPTH (ft)	9.0	DRILLING EQUIPMENT	Track Mounted Rig		
LOCATION	Clinton, MA	SURFACE ELEV (ft)	--	FOREMAN	Joe	CASING	
START DATE	11/24/2025	DISTURBED SAMPLES	4	HELPER	Preston	CASE DIAMETER	N/A
FINISH DATE	11/24/2025	UNDISTURBED SAMPLES	0	BIT TYPE	Hollow Stem Auger (2.25" O.D.)	HAMMER WGT	N/A
ENGINEER/SCIENTIST	Caren Irgang	WATER LEVEL		ROD TYPE	A (1 5/8" O.D.)	HAMMER DROP	N/A
BORING LOCATION	North portion of proposed parking area	FIRST (ft)	N/E	SAMPLER	2" O.D. Split Spoon	ROCK CORING INFORMATION	
		LAST (ft)	N/A	HAMMER TYPE	Automatic	TYPE	N/A
		TIME (hr)	N/A	HAMMER WGT/DROP	140 lb / 30"	SIZE	N/A

DEPTH (ft)/ SAMPLES	SAMPLES PENETR. RESIST. (bl / 6 in)	REC. (in)	TYPE/ NO.	FIELD TEST DATA	SAMPLE DESCRIPTION (MODIFIED BURMISTER)	PROFILE DEPTH (ft) ELEV.	REMARKS/ WELL CONSTRUCTION
	4/3/5/12	11/24	S-1 (0-2')	--	Top 9": Loose, dark brown, fine to medium SAND, some silt, trace gravel, trace coarse sand, trace organics (roots), damp Bottom 2": Loose, yellow, fine to medium SAND, some silt, trace gravel, trace coarse sand, damp	TOPSOIL 0.75 SILTY SAND	1
	9/6/11/14	18/24	S-2 (2-4')	--	Top 4": Medium dense, yellow to brown, fine to medium SAND, some silt, trace gravel, trace coarse sand, damp Bottom 14": Medium dense, gray brown, fine to medium SAND, some silt, little coarse sand, little gravel, damp (some gravel in bottom 8")		
5'	6/8/7/13	23/24	S-3 (5-7')	--	Medium dense, gray brown, fine to medium SAND, some silt, little coarse sand, little fine gravel, damp (gravel in bottom 6")		
	10/9/10/9	22/24	S-4 (7-9')	--	Medium dense, gray brown, fine to medium SAND, some silt, little coarse sand, little fine gravel, damp (trace rust flakes)	9.0	
					End of exploration at 9'		
10'							
15'							
20'							
25'							

Remarks:
1. Intermittent auger grinding from 0 to 10'.

PROJECT NO.
0952-49-01

LOG OF BORING
CS-2

LOG OF BORING CS-3

PROJECT	Clinton Library			CONTRACTOR	Seaboard Environmental Drilling		
JOB NUMBER	0952-49-01	FINAL DEPTH (ft)	16.3	DRILLING EQUIPMENT	Track Mounted Rig		
LOCATION	Clinton, MA	SURFACE ELEV (ft)	--	FOREMAN	Joe	CASING	
START DATE	11/24/2025	DISTURBED SAMPLES	6	HELPER	Preston	CASE DIAMETER	N/A
FINISH DATE	11/24/2025	UNDISTURBED SAMPLES	0	BIT TYPE	Hollow Stem Auger (2.25" O.D.)	HAMMER WGT	N/A
ENGINEER/SCIENTIST	Caren Irgang	WATER LEVEL		ROD TYPE	A (1 5/8" O.D.)	HAMMER DROP	N/A
BORING LOCATION	Northeast corner of proposed building footprint	FIRST (ft)	N/E	SAMPLER	2" O.D. Split Spoon	ROCK CORING INFORMATION	
		LAST (ft)	N/A	HAMMER TYPE	Automatic	TYPE	N/A
		TIME (hr)	N/A	HAMMER WGT/DROP	140 lb / 30"	SIZE	N/A

DEPTH (ft)/ SAMPLES	SAMPLES PENETR. RESIST. (bl / 6 in)	REC. (in)	TYPE/ NO.	FIELD TEST DATA	SAMPLE DESCRIPTION (MODIFIED BURMISTER)	PROFILE DEPTH (ft) ELEV.	REMARKS/ WELL CONSTRUCTION
☒	2/2/6/10	19/24	S-1 (0-2')	--	Loose, dark brown to brown, fine to medium SAND, some silt, little coarse sand, trace gravel, trace organics (roots), trace debris (glass), damp	FILL ↓	
☒	5/20/14/19	6/24	S-2 (2-4')	--	Dense, gray brown, fine to medium SAND, some silt, little coarse sand, little gravel, dry (mottling in bottom 7", gravel piece at tip)		
5' ☒	8/8/7/9	0/24	S-3 (5-7')	--	NO RECOVERY (likely debris)		1
☒	10/11/13/17	0/24	S-4 (7-9')	--	NO RECOVERY (likely debris)		
10' ☒	11/12/22/22	24/24	S-5 (10-12')	--	Dense, gray brown, fine to medium SAND, some silt, little coarse sand, little fine gravel, trace coarse gravel, damp	10.0 GLACIAL TILL ↓	
15' ☒	28/56/50 for 4"	19/16	S-6 (15-16.3')	--	Very dense, gray brown, fine to medium SAND, some coarse sand, some fine gravel, little silt, little coarse gravel, damp	16.3	
					End of explotation at 16.3'		
20'							
25'							

Remarks:

1. Intermittent auger grinding from 5 to 15'.

PROJECT NO.
0952-49-01

LOG OF BORING
CS-3

O'Reilly, Talbot & Okun
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LOG OF BORING CS-4

Page 1 of 1

PROJECT	Clinton Library		
JOB NUMBER	0952-49-01	FINAL DEPTH (ft)	9.0
LOCATION	Clinton, MA	SURFACE ELEV (ft)	--
START DATE	11/24/2025	DISTURBED SAMPLES	4
FINISH DATE	11/24/2025	UNDISTURBED SAMPLES	0
ENGINEER/SCIENTIST	Caren Irgang	WATER LEVEL	
BORING LOCATION	East portion of proposed parking area	FIRST (ft)	N/E
		LAST (ft)	N/A
		TIME (hr)	N/A

CONTRACTOR	Seaboard Environmental Drilling
DRILLING EQUIPMENT	Track Mounted Rig
FOREMAN	Joe
HELPER	Preston
BIT TYPE	Hollow Stem Auger (2.25" O.D.)
ROD TYPE	A (1 5/8" O.D.)
SAMPLER	2" O.D. Split Spoon
HAMMER TYPE	Automatic
HAMMER WGT/DROP	140 lb / 30"

CASING	
CASE DIAMETER	N/A
HAMMER WGT	N/A
HAMMER DROP	N/A
ROCK CORING INFORMATION	
TYPE	N/A
SIZE	N/A

DEPTH (ft)/ SAMPLES	SAMPLES PENETR. RESIST. (bl / 6 in)	REC. (in)	TYPE/ NO.	FIELD TEST DATA	SAMPLE DESCRIPTION (MODIFIED BURMISTER)	PROFILE DEPTH (ft) ELEV.	REMARKS/ WELL CONSTRUCTION
	2/3/3/5	18/24	S-1 (0-2')	--	Top 9": Loose, very dark brown, fine to medium SAND, some silt, trace coarse sand, little debris (fabric, plastic, glass), damp Bottom 9": Loose, brown to yellow, fine to medium SAND, some silt, little coarse sand, trace organics (tree root), damp (trace fine gravel in bottom 3")	FILL 2.0	
	6/12/13/9	20/24	S-2 (2-4')	--	Medium dense, gray brown, fine to medium SAND, some silt, little coarse sand, little fine gravel, trace coarse gravel, damp (frost mottling in bottom 7")	GLACIAL TILL	
5'							
	11/12/12/13	22/24	S-3 (5-7')	--	Medium dense, gray brown, fine to medium SAND, some silt, little coarse sand, little gravel, damp		
	10/10/23/15	24/24	S-4 (7-9')	--	Dense, gray brown, fine to medium SAND, some silt, little coarse sand, little gravel, damp (trace rust flakes in top 12")	9.0	
					End of exploration at 9'		
10'							
15'							
20'							
25'							

Remarks:

PROJECT NO.
0952-49-01

LOG OF BORING
CS-4

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LOG OF BORING CS-5

Page 1 of 1

PROJECT	Clinton Library			CONTRACTOR	Seaboard Environmental Drilling		
JOB NUMBER	0952-49-01	FINAL DEPTH (ft)	17.0	DRILLING EQUIPMENT	Track Mounted Rig		
LOCATION	Clinton, MA	SURFACE ELEV (ft)	--	FOREMAN	Joe	CASING	
START DATE	11/24/2025	DISTURBED SAMPLES	5	HELPER	Preston	CASE DIAMETER	N/A
FINISH DATE	11/24/2025	UNDISTURBED SAMPLES	0	BIT TYPE	Hollow Stem Auger (2.25" O.D.)	HAMMER WGT	N/A
ENGINEER/SCIENTIST	Caren Irgang	WATER LEVEL		ROD TYPE	A (1 5/8" O.D.)	HAMMER DROP	N/A
BORING LOCATION	South portion of proposed building footprint	FIRST (ft)	N/E	SAMPLER	2" O.D. Split Spoon	ROCK CORING INFORMATION	
		LAST (ft)	N/A	HAMMER TYPE	Automatic	TYPE	N/A
		TIME (hr)	N/A	HAMMER WGT/DROP	140 lb / 30"	SIZE	N/A

DEPTH (ft)/ SAMPLES	SAMPLES				SAMPLE DESCRIPTION (MODIFIED BURMISTER)	PROFILE	REMARKS/ WELL CONSTRUCTION
	PENETR. RESIST. (bl / 6 in)	REC. (in)	TYPE/ NO.	FIELD TEST DATA		DEPTH (ft) ELEV.	
	2/5/4/5	20/24	S-1 (0-2')	--	Top 4": Loose, dark brown to light brown, fine to medium SAND, little coarse sand, trace organics (roots, sediment), trace to little silt, damp Next 7": Loose, very dark brown, fine to medium SAND, some silt, trace organics (roots), trace fine gravel, damp (OLD TOPSOIL) Bottom 4": Loose, gray brown, fine to medium SAND, some silt, little coarse sand, trace gravel, damp	FILL	
	4/3/13/22	16/24	S-2 (2-4')	--	Top 12": Medium dense, gray brown, fine to medium SAND, some silt, little coarse sand, trace gravel, trace organics (roots, stick), damp (organics at 9") Bottom 4": Medium dense, gray, fractured COBBLE , damp (pieces in tip)	3.5 GLACIAL TILL	
5'	60/38/21/16	12/24	S-3 (5-7')	--	Top 3": Very dense, gray, fractured COBBLE, damp Bottom 9": Very dense, gray brown, fine to medium SAND, some silt, little coarse sand, little gravel, damp		1
10'	30/19/20/20	23/24	S-4 (10-12')	--	Dense, gray brown, fine to medium SAND, some gravel, little silt, little coarse sand, damp		
							2
15'	50 for 3"	0/3	S-5 (15-15.3')	--	NO RECOVERY (likely bedrock)	15.3	
					Hammer refusal at 15.3'		
20'							
25'							

Remarks:
1. Intermittent auger grinding from 5 to 5.5'.
2. Auger grinding steady from 14 to 15'.

PROJECT NO.
0952-49-01

LOG OF BORING
CS-5

O'Reilly, Talbot & Okun
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LOG OF BORING CS-6

Page 1 of 1

PROJECT	Clinton Library			CONTRACTOR	Seaboard Environmental Drilling		
JOB NUMBER	0952-49-01	FINAL DEPTH (ft)	12.0	DRILLING EQUIPMENT	Track Mounted Rig		
LOCATION	Clinton, MA	SURFACE ELEV (ft)	--	FOREMAN	Joe	CASING	
START DATE	11/24/2025	DISTURBED SAMPLES	5	HELPER	Preston	CASE DIAMETER	N/A
FINISH DATE	11/24/2025	UNDISTURBED SAMPLES	0	BIT TYPE	Hollow Stem Auger (2.25" O.D.)	HAMMER WGT	N/A
ENGINEER/SCIENTIST	Caren Irgang	WATER LEVEL		ROD TYPE	A (1 5/8" O.D.)	HAMMER DROP	N/A
BORING LOCATION	Southeast corner of proposed building footprint	FIRST (ft)	N/E	SAMPLER	2" O.D. Split Spoon	ROCK CORING INFORMATION	
		LAST (ft)	N/A	HAMMER TYPE	Automatic	TYPE	N/A
		TIME (hr)	N/A	HAMMER WGT/DROP	140 lb / 30"	SIZE	N/A

DEPTH (ft)/ SAMPLES	SAMPLES				SAMPLE DESCRIPTION (MODIFIED BURMISTER)	PROFILE DEPTH (ft) ELEV.	REMARKS/ WELL CONSTRUCTION
	PENETR. RESIST. (bl / 6 in)	REC. (in)	TYPE/ NO.	FIELD TEST DATA			
	4/4/6/6	17/24	S-1 (0-2')	--	Medium dense, gray brown, fine SAND, some silt, some medium to coarse sand, little gravel, trace debris (coal), damp	FILL	1
						2.0	
	5/5/16/16	17/24	S-2 (2-4')	--	Very stiff, gray brown, fine SAND and clayey SILT, some medium to coarse sand, trace gravel, moist	SILTY SAND	
5'						5.0	
	19/13/11/18	0/24	S-3 (5-7')	--	NO RECOVERY (likely cobble)	GLACIAL TILL	
	36/11/13/22	0/24	S-4 (7-9')	--	NO RECOVERY (likely cobble)		
10'							
	24/32/29/20	23/24	S-5 (10-12')	--	Very dense, gray brown, fine to medium SAND and GRAVEL, some coarse sand, trace silt, damp		
						12.0	
					End of exploration at 12'		
15'							
20'							
25'							

Remarks:
1. Intermittent auger grinding from 0 to 5.5'.

PROJECT NO.
0952-49-01

LOG OF BORING
CS-6

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

LOG OF BORING CS-7

Page 1 of 1

PROJECT	Clinton Library			CONTRACTOR	Seaboard Environmental Drilling		
JOB NUMBER	0952-49-01	FINAL DEPTH (ft)	12.0	DRILLING EQUIPMENT	Track Mounted Rig		
LOCATION	Clinton, MA	SURFACE ELEV (ft)	--	FOREMAN	Joe	CASING	
START DATE	11/24/2025	DISTURBED SAMPLES	4	HELPER	Preston	CASE DIAMETER	N/A
FINISH DATE	11/24/2025	UNDISTURBED SAMPLES	0	BIT TYPE	Hollow Stem Auger (2.25" O.D.)	HAMMER WGT	N/A
ENGINEER/SCIENTIST	Caren Irgang	WATER LEVEL		ROD TYPE	A (1 5/8" O.D.)	HAMMER DROP	N/A
BORING LOCATION	Southwest corner of proposed building footprint	FIRST (ft)	N/E	SAMPLER	2" O.D. Split Spoon	ROCK CORING INFORMATION	
		LAST (ft)	N/A	HAMMER TYPE	Automatic	TYPE	N/A
		TIME (hr)	N/A	HAMMER WGT/DROP	140 lb / 30"	SIZE	N/A

DEPTH (ft)/ SAMPLES	SAMPLES				SAMPLE DESCRIPTION (MODIFIED BURMISTER)	PROFILE DEPTH (ft) ELEV.	REMARKS/ WELL CONSTRUCTION
	PENETR. RESIST. (bl / 6 in)	REC. (in)	TYPE/ NO.	FIELD TEST DATA			
	6/2/2/3	16/24	S-1 (0-2')	--	Top 5": Loose, gray to black, GRAVEL, some medium to coarse sand, trace fine sand, damp Bottom 11": Loose, brown to yellow, fine SAND, some silt, little medium to coarse sand, trace organics (tree roots), damp	BASE COURSE FILL	
	1/2/7/8	17/24	S-2 (2-4')	--	Top 7": Loose, yellow, fine SAND, some silt, some medium to coarse sand, moist Bottom 10": Loose, yellow, fine to medium SAND, some silt, little coarse sand, little coarse gravel, damp	3.0 SILTY SAND	
5'	22/16/10/10	12/24	S-3 (5-7')	--	Medium dense, gray brown, fine to medium SAND, some silt, little coarse sand, trace gravel, damp	5.0 GLACIAL TILL	1
10'	10/12/16/22	20/24	S-4 (10-12')	--	Medium dense, gray brown, fine to medium SAND, some coarse sand, little silt, little gravel, damp	12.0	
					End of exploration at 12'		
15'							
20'							
25'							

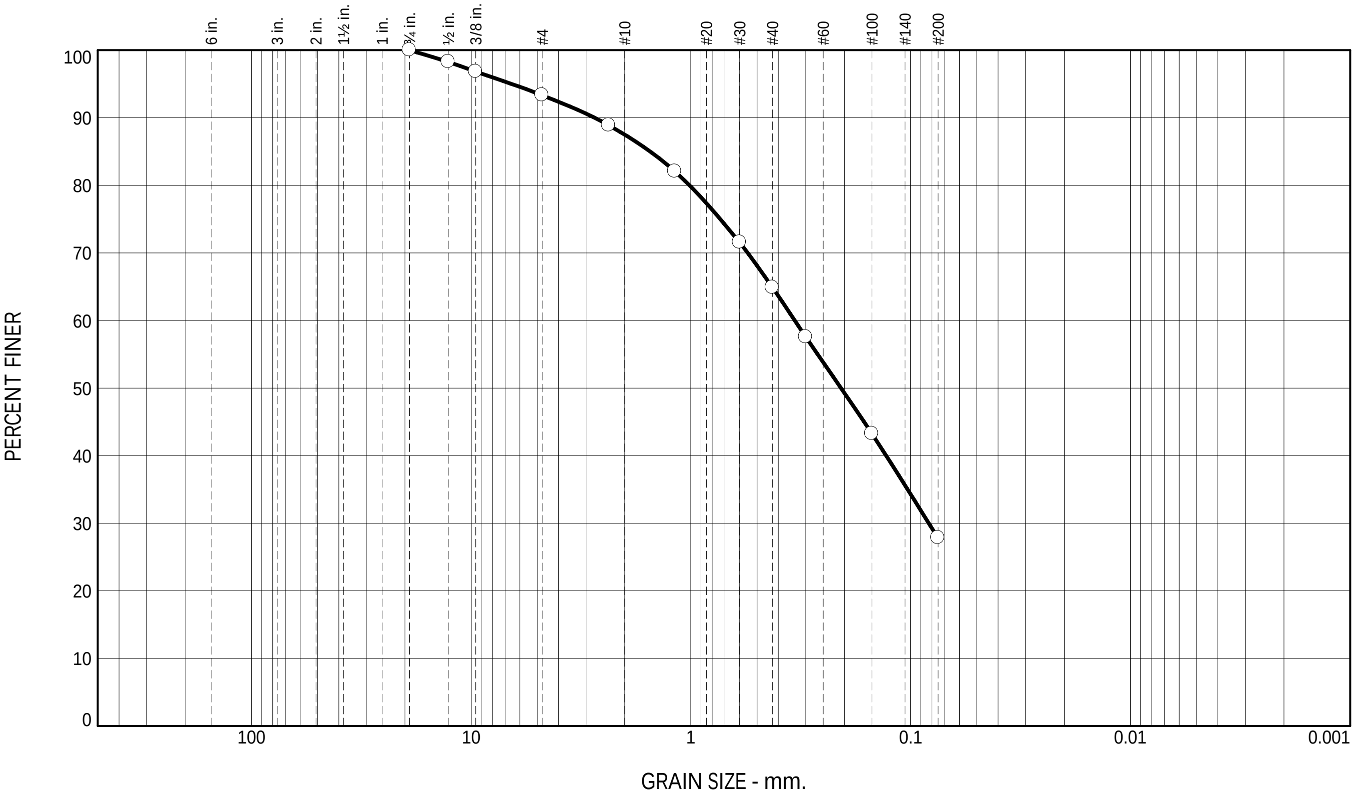
Remarks:
1. Intermittent auger grinding from 5 to 10'.

PROJECT NO.
0952-49-01

LOG OF BORING
CS-7

Particle Size Distribution Report

ASTM C117 & C136



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.7	5.8	22.6	37.1	27.8	

Test Results (ASTM C117 & C136)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
3/4	100.0			
1/2	98.3			
3/8	96.8			
#4	93.3			
#8	88.9			
#16	82.0			
#30	71.5			
#40	64.9			
#50	57.6			
#100	43.2			
#200	27.8			

* (no specification provided)

Material Description

CS-1(0.5'-5')

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 2.7401	D_{85}= 1.5315	D_{60}= 0.3369
D_{50}= 0.2075	D_{30}= 0.0827	D_{15}=
D_{10}=	C_u=	C_c=

Classification

USCS= AASHTO=

Test Remarks

This sample was washed.

Sample Number: 4946

Sample Date: 12/15/25

ALLIED TESTING
LABORATORIES, INC.
Springfield, Massachusetts

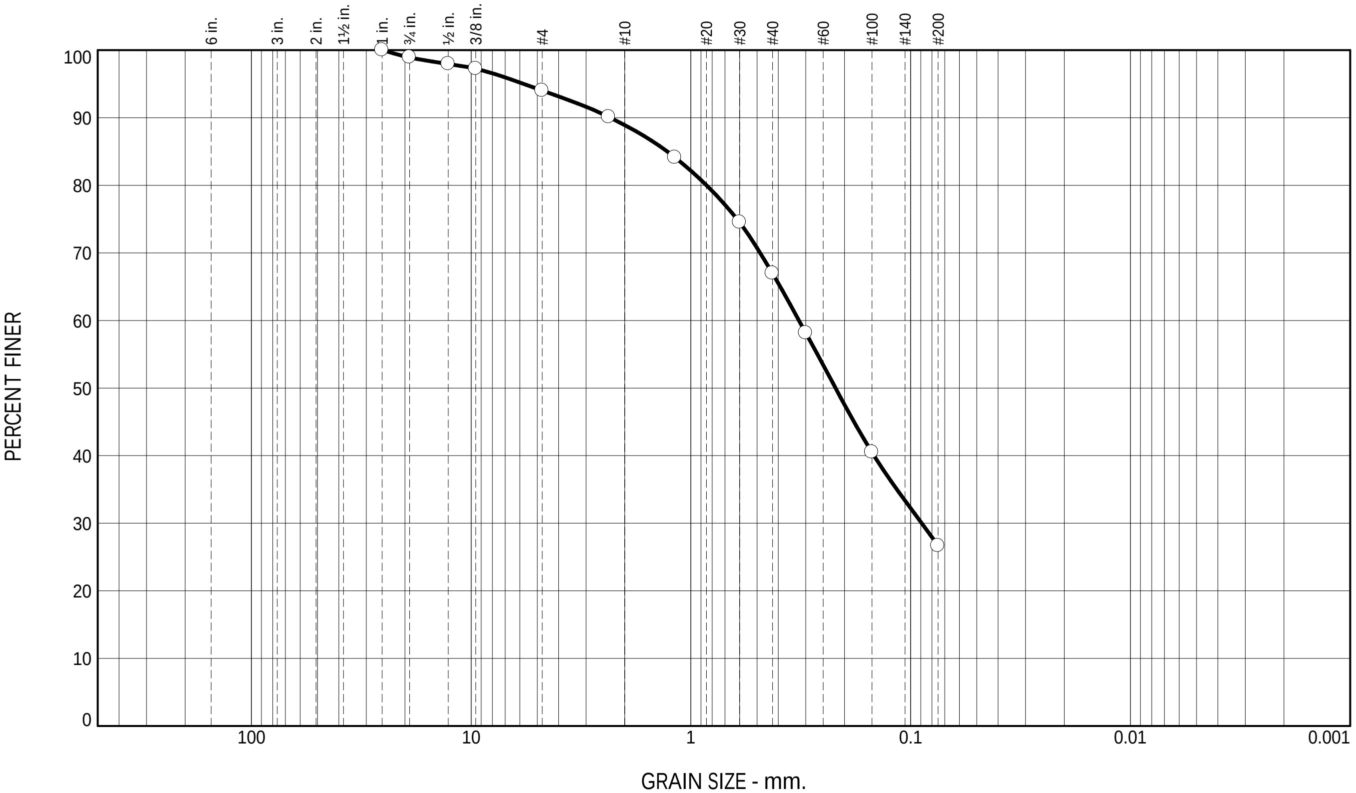
Client: OTO
Project: Clinton Library

Project No: 0952-48-01 Figure

Checked By: John McGreevy

Particle Size Distribution Report

ASTM C117 & C136



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	1.1	4.9	5.1	21.9	40.3	26.7	

Test Results (ASTM C117 & C136)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
1	100.0			
3/4	98.9			
1/2	97.9			
3/8	97.3			
#4	94.0			
#8	90.1			
#16	84.1			
#30	74.5			
#40	67.0			
#50	58.1			
#100	40.5			
#200	26.7			

* (no specification provided)

Material Description

CS-3(0.5'-5')

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 2.3277 D_{85}= 1.2789 D_{60}= 0.3226
D_{50}= 0.2197 D_{30}= 0.0890 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Test Remarks

This sample was washed.

Sample Number: 4947

Sample Date: 12/15/25

ALLIED TESTING
LABORATORIES, INC.
Springfield, Massachusetts

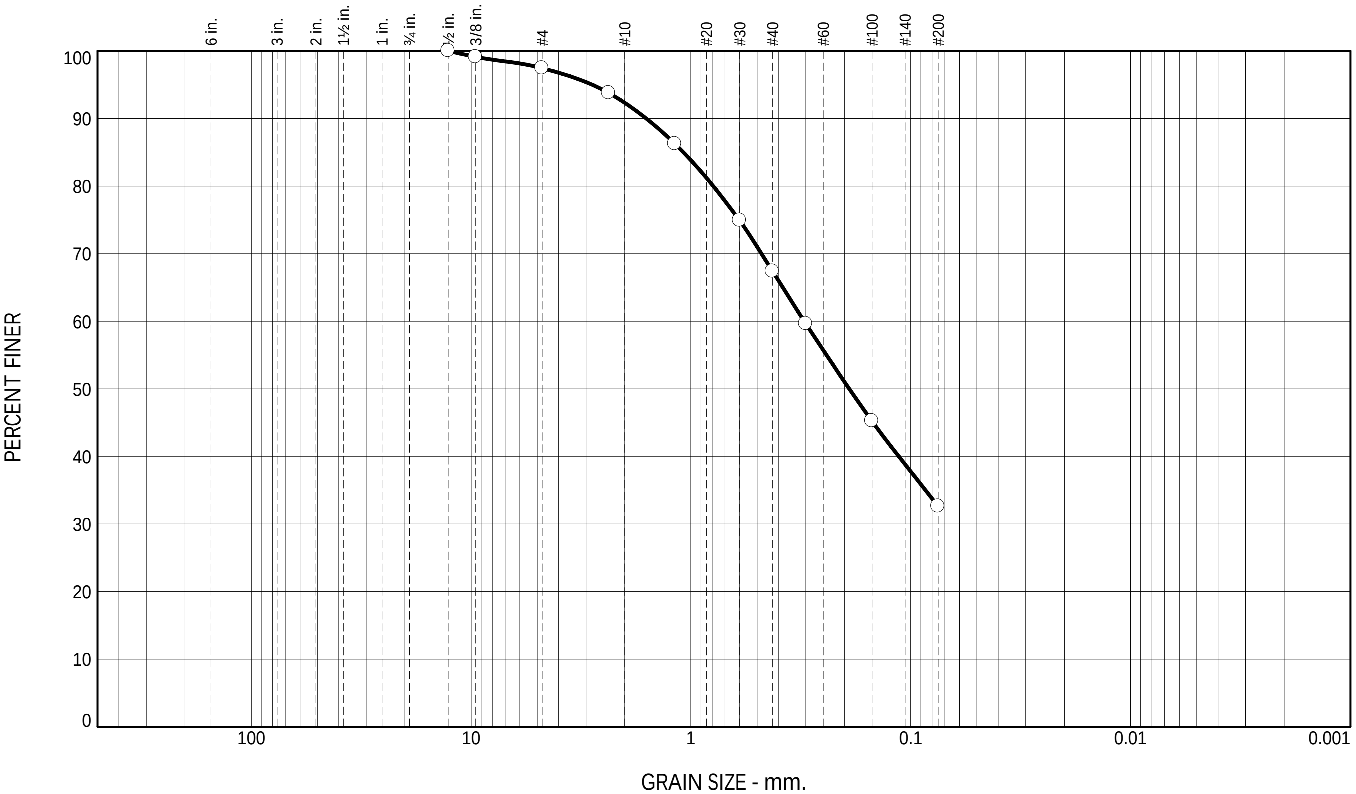
Client: OTO
Project: Clinton Library

Project No: 0952-48-01 Figure

Checked By: John McGreevy

Particle Size Distribution Report

ASTM C117 & C136



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.5	5.2	24.9	34.8	32.6	

Test Results (ASTM C117 & C136)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
1/2	100.0			
3/8	99.1			
#4	97.5			
#8	93.8			
#16	86.2			
#30	74.9			
#40	67.4			
#50	59.6			
#100	45.2			
#200	32.6			

* (no specification provided)

Material Description

CS-4(1'-5')

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.5949 D_{85}= 1.0814 D_{60}= 0.3053
D_{50}= 0.1904 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Test Remarks

This sample was washed.

Sample Number: 4948

Sample Date: 12/15/25

ALLIED TESTING LABORATORIES, INC.
Springfield, Massachusetts

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Project: Clinton Library

Project No: 0952-48-01 Figure

Checked By: John McGreevy