FOUNDATION ENGINEERING REPORT

278 UNION STREET

NEW BEDFORD, MASSACHUSETTS

AUGUST 22, 2017

Prepared For:

Alinea Capital Partners, LLC
1786 Washington Street
Boston, MA 02118

2269 Massachusetts Avenue
Cambridge, MA 02140
www.mcphailgeo.com
(617) 868-1420

PROJECT NO. 6410

August 22, 2017

Alinea Capital Partners, LLC
1786 Washington Street
Boston, MA 02118

Attention: Mr. L. Duane Jackson

Reference: 278 Union Street; New Bedford, Massachusetts
Foundation Engineering Report

Ladies and Gentlemen:

This report documents the results of our recent subsurface exploration program and foundation design study for the proposed development to be located at 278 Union Street in New Bedford, Massachusetts. Refer to the Project Location Plan, **Figure 1** for the general site location.

This report was prepared in accordance with our proposal dated April 17, 2017 and the authorization of Alinea Capital Partners, LLC. These services are subject to the limitations contained in **Appendix A**.

Purpose and Scope

The purposes of the subsurface exploration program and foundation design study are to provide an assessment of the subsurface soil, rock and groundwater conditions across the building footprint as they relate to foundation design of the structure.

Foundation design includes foundation support of the proposed building and its lowest level slab, treatment of the lowest level slab in consideration of groundwater, and seismic design considerations in accordance with the provisions of the Eighth Edition of the Massachusetts State Building Code (Code). Foundation construction considerations relating to geotechnical aspects of the proposed structure are also presented herein.

Available Information

Information provided to McPhail Associates, LLC (McPhail) included the following:

- A set of drawings entitled “The Caravela - Apartments” dated January 11, 2017 prepared by DHK Architects; and
- A 20-scale drawing entitled “ALTA/ACSM Land Title Survey” dated September 29, 2015 prepared by Tibbetts Engineering Corp.

Elevations as referenced herein are understood to refer to the New Bedford City Base Datum.

Existing Conditions

Fronting onto Union Street to the north, the subject site is improved by a 1-story masonry building with a footprint that occupies about one-third of the property and is located within the northern portion of the site. Currently, the area in the rear of the existing building is occupied by a parking lot. The existing building fronts onto Union Street to the north for a distance of 50 feet and abuts existing buildings consisting of 282 Union Street to the west for a distance of 90 feet and 276 Union Street building at the east for a distance of 70 feet. The existing parking lot abuts the southern side of the existing 282 Union Street building, 8th Street at the west, Spring Street at the south and 95 Spring Street private property to the east.

The perimeter foundation wall of the existing 278 Union Street building consists of a granite block retaining wall. Based on the provided drawings of the existing building, it is understood that the building contains a full basement with a lowest-level slab that varies at Elevation +75.5 to Elevation +76.5.at Elevation. The first floor slab of the existing building is located at about Elevation +83.5. It is unknown if the adjacent existing buildings contain below grade space. The existing ground surface immediately adjacent the entrance to the existing on-site building on Union Street is at about Elevation +83. The ground surface across the existing parking area in the rear of the building generally slopes downward from west to east from about Elevation +89 to Elevation +83.

Proposed Building

It is understood that upon demolition of the existing 1-story building, the proposed development is planned to consist of a 5-to-6-story residential structure which will include a full below-grade garage and occupy an approximate 15,750 square-foot plan area. Based on our review of the drawings provided to us, the proposed building footprint will occupy the entire site and will abut the existing 282 Union Street, 276 Union Street buildings, 95 Spring Street private property and to the property lines along the 8th Street and Spring Street sidewalks. It is understood that the proposed garage floor slab is planned to be constructed at Elevation +74.8. It is uncertain if the existing granite block foundation wall will remain in-place or it will be demolished as part of the new construction. If the granite block wall is demolished, it is likely that the abutting structures would need underpinning but the new foundations could be constructed to abut the existing adjacent buildings. If the granite block wall remains, underpinning would likely be unnecessary but new foundations would need to be constructed inside of these existing walls.

Subsurface Explorations

A subsurface exploration program was conducted as part of our foundation engineering services on July 27 and 28, 2017 consisting of five (5) borings, B-1 through B-5, and three (3) test pits, TP-1 through TP-3. The borings were performed by Carr-Dee Corp. of Medford, Massachusetts. The test pits were conducted by Pond View Excavation of

Seekonk, Massachusetts. Boring and test pit logs are contained in **Appendix B** and **Appendix C**, respectively. Locations of the borings and test pits are as indicated on the attached Subsurface Exploration Plan, **Figure 2**.

The borings were performed utilizing truck-mounted drilling equipment and advanced using 2.25-inch inner diameter hollow stem augers and/or 3-inch inner diameter casing utilizing wet rotary drilling methods. Standard 2-inch O.D. split-spoon samples and standard penetration tests (SPT) were generally obtained at 5-foot intervals of depth in accordance with the standard procedures in ASTM D1586. The borings were terminated at depths of about 2 to 18.2 feet below the existing ground surface.

The test pits were hand-excavated and backfilled with the excavated soil following completion of the excavation. The test pits were terminated within the natural glacial till deposit or bedrock at depths ranging from 0.5 to 2.2 feet below ground surface.

The explorations were observed by a representative of McPhail who performed field layout, prepared field logs, obtained and visually classified soil samples, monitored groundwater conditions in the borings and installed observation well, and made minor adjustments to the exploration locations and determined the required exploration depths based upon the actual subsurface conditions encountered.

Field locations of the borings and test pits were determined by taping from existing site features indicated on the available plan. The existing ground surface elevation at each boring location was determined by a level survey performed by our field staff utilizing vertical control information indicated on the plan.

Laboratory Testing

At the completion of the recent field work, soil samples were returned to our laboratory for more detailed classification, analysis and testing. The laboratory testing consisted of sieve analyses to determine the soil gradations and confirm the visual classifications of the fill, glacial outwash and glacial till deposits. Laboratory test procedures were in general accordance with applicable ASTM Standards. Results of the gradation testing for the fill, glacial outwash and glacial till deposits appear on **Figure 3, Figure 4** and **Figure 5**, respectively.

Subsurface Conditions

Detailed descriptions of the subsurface conditions encountered within each of the explorations are presented on the boring and test pit logs contained in **Appendix B** and **Appendix C**. Following is a discussion of the generalized subsurface conditions across the site which are inferred from the prior and recent explorations, and also from our knowledge of local site geology.

The ground surface treatment in the area of test pits TP-1 through TP-3 completed within the existing building, consisted of an approximate 2-inch to 4-inch thickness of concrete. In addition, borings B-1 through B-5 performed within the existing parking lot, encountered about 6-inch thickness of bituminous asphalt at the existing ground surface.

Directly beneath the surface treatments, the explorations encountered a fill deposit. Within test pits TP-1 through TP-3 the fill deposit was observed to extend to depths of 0.5 to 1.5 feet below the existing slab. Within borings B-1 through B-5 the fill deposit was observed to extend to depths of 1.5 to 2.5 feet below the existing ground surface. The fill deposit generally consists of loose to compact, yellow/brown to gray/brown, gravelly sand with some silt varying to sand and gravel with some silt and containing various amounts of brick. Grain size distributions of typical samples of the fill deposit are included on the enclosed **Figure 3**.

Due to the obstructions within the fill deposit, boring B-1 was terminated at a depth of 2 feet below the existing ground surface.

A subsoil deposit was encountered in boring B-5 below the fill material at a depth of 1.5 feet below ground surface corresponding to Elevation +83.6. The subsoil was observed to consist of a loose, yellow-brown silt and sand.

A natural glacial outwash deposit was present below the surface treatments, fill or subsoil deposits within borings B-2 through B-5. The surface of the glacial outwash deposit was observed at depths of 1.5 to 2.5 feet below the existing ground surface, which corresponds to Elevation +82.2 and Elevation +85.8. The glacial outwash deposit was observed to consist of a compact to very dense, light gray-brown, silty sand with some gravel to sand and gravel with some silt. Grain size distributions of typical samples of the glacial outwash deposit are presented on the enclosed **Figure 4.**

Underlying the fill deposit in test pits TP-1 and TP-3, a glacial till deposit was encountered at depths 0.8 to 1.2 feet below the existing slab corresponding to Elevation +74.6 to Elevation +75.8. The glacial till was observed to vary from dense to very dense, light gray silty sand with some gravel to well-graded mixture of silt, sand and gravel. A grain size distribution of a typical sample of the glacial till deposit is contained on the enclosed **Figure 5**.

Borings B-2 through B-5 and test pit TP-2, encountered dense to very dense, orange/brown to gray/brown, very severely to completely weathered bedrock, schist. Within borings B-2 through B-5, a split-spoon was advanced between 2.4 and 8.6 feet into the weathered rock before encountering split-spoon, auger or roller bitt refusal.

Specifically, split-spoon, auger or roller bitt refusal was encountered in the explorations at borings B-2, B-3 (OW), B-4 and B-5 at depths of 18.1, 18.2, 16.3 and 14 feet below ground surface corresponding to Elevation +65.6, Elevation +67, Elevation +72 and Elevation +71.1, respectively.

Groundwater was observed within completed borings B-2 through B-5 at approximate depths of 8 to 9.5 feet below ground surface, corresponding to about Elevation +80.3 to Elevation +75.7, respectively. Groundwater levels recorded in observation well B-3 (OW) range from depths of 7.4 to 7.8 feet below ground surface corresponding to Elevation +77.8 to Elevation +77.4. A groundwater monitoring report is contained in **Appendix D**. However, it is anticipated that groundwater may become temporarily trapped or perched on the surface of the glacial till or bedrock due to factors such as normal seasonal changes, runoff particularly during or following periods of heavy precipitation, and alterations of existing drainage patterns.

Existing Foundation Conditions

Based on the results of test pit TP-2 performed against interior face of the western granite foundation wall, the bottom of the existing footings consisting of granite blocks was observed to be located at the same level as top of the concrete slab at about Elevation +75.1. The footing at this location is observed to bear on severely weathered bedrock, schist. The lowest level slab at this location was observed to be about 4 inches thick. No evidence of a perimeter drainage was observed within the excavated test pit.

Test pits TP-1 and TP-3 were excavated against the interior face of the granite block foundation wall at the northern and eastern sides of the existing 278 Union Street building, respectively. Within excavated test pits TP-1 and TP-3, it was observed that the bottom of the granite block foundation wall is at depths of 1.5 and 0.8 feet below the existing slab which corresponds to Elevation +74.3 and Elevation +75.6, respectively. At both test pit locations, the lowest level slab was observed to vary from to 2 to 3 inches in thickness. A foundation drain consisting of a 4-inch PVC horse-shoe shaped pipe surrounded by ¾-inch crushed stone was observed within TP-1 and TP-3. In addition, groundwater was observed in open test pits TP-1 and TP-3 entering rapidly at a depth of 0.2 below the top of the existing slab corresponding to Elevation +75.6 and Elevation 76.4, respectively.

Foundation Design Recommendations

Based on our understanding of the proposed development and the anticipated subsurface conditions described above, foundation support of the proposed building is recommended to be provided by spread footing foundations in conjunction with slab-on-grade construction. The footings should bear directly on the undisturbed natural glacial outwash or glacial till deposits or bedrock, or on compacted structural fill placed directly over the surface of the undisturbed glacial outwash or glacial till deposits or bedrock following removal of the overlying existing fill material. It is recommended that the footings be proportioned utilizing a maximum design bearing pressure of three (3) tons per square-foot (tsf). Recommended minimum footing widths for continuous and isolated spread footings are 24 and 36 inches, respectively.

All perimeter foundations and interior foundations below unheated areas should be provided with a minimum 4-foot thickness of soil cover as frost protection unless the footing bears directly on the bedrock, in which case the footing should be provided with a minimum of 2 feet of soil cover for frost protection. Interior footings below heated areas should be located such that the top of the foundation concrete is at least 6 inches below the underside of the lowest level slab. Interior foundations below heated areas should be located such that the top of the foundation concrete is a minimum of 6 inches below the underside of the lowest level slab.

All foundations should be located such that they bear below a theoretical line drawn upward and outward at 2 to 1 (horizontal to vertical) from the bottom exterior edge of all adjacent footings, structures and utilities. Footings to be located adjacent to the 282 Union Street and 276 Union Street buildings are anticipated to extend below the existing adjacent foundation level. Therefore, the proposed foundation wall in this area should be designed to accommodate the surcharge load from the existing adjacent building footings.

In addition, underpinning of the existing 282 Union Street and 276 Union Street buildings may be required where the proposed below-grade level of the new 278 Union Street building is understood to be lower than the existing adjacent slab elevation. Underpinning requirements are discussed below in the “Foundation Construction Considerations” section of this report.

Further, any existing underground utilities which currently traverse the footprint of the proposed structure should be removed in their entirety below footing locations, and the utilities re-routed.

It is recommended that the proposed basement be provided with perimeter and underslab drainage to protect the occupied below-grade space against groundwater intrusion. The underslab drainage system should consist of 4-inch diameter perforated PVC pipes embedded within the 9-inch layer of 3/4-inch crushed stone and have the highest invert a minimum of 12 inches below the underside of the lowest level slab. It is recommended that the pipes be surrounded by a minimum 6-inch thickness of 3/4-inch crushed stone surrounded by a thickness of filter fabric such as Mirafi 140N, or equivalent. Due to the limited space between the proposed foundation walls and property lines, specifically within the northern portion of the site near the adjacent existing 282 Union Street and 276 Union Street buildings, it is recommended that the perimeter drain will consist of a prefabricated drainage product such as Miradrain 6000 which will be installed directly against the exterior face of the earth support and tied into the perimeter drainage system. After a prefabricated drainage product is utilized on the face of the excavation wall, the proposed walls are anticipated to be form as single sided walls. The perimeter drain should be connected to the underslab drainage system.

In the event that the proposed foundation walls are off-set along the property lines of 8th Street, Spring Street and 95 Spring Street and are formed as double sided walls, instead of the perimeter drain that will consist of a prefabricated drainage product such as Miradrain 6000, the exterior walls may be backfilled with a minimum two-foot wide "chimney" of free-

draining compacted gravel fill containing a maximum of 8 percent weight passing the number 200 sieve. Where the adjacent finished exterior surface treatment consist of a grassed or landscaped area, the upper two feet of foundation wall backfill should consist of an impervious ordinary fill containing a minimum of 30 percent by weight passing the number 200 sieve. Also, perimeter foundation walls could be provided with bitumastic damproofing. If the construction of the proposed foundation walls require opening outside the property limits onto public property (along 8th and Spring Streets) or private property (along 95 Spring Street private property), approval from the City of New Bedford or the owner of the private 95 Spring Street property will be required, respectively.

The perimeter and underslab drains should be terminated within a sump pit which discharges into the storm drain system. The sump pit should be equipped with duplex pumps capable of pumping a minimum of 60 gallons per minute (gpm).
The finished exterior grade should be pitched away from the proposed building to promote surface runoff away from the building.

All pits and depressions extending below the basement slab (i.e. elevator pits, etc.) should be designed for hydrostatic uplift resulting from the depth of the pit below the underslab drain invert elevations and be provided with properly tied continuous waterstops in all construction joints and cementitious waterproofing on their interior surfaces.

General Foundation Recommendations

Below-grade foundation walls receiving lateral support at the top and bottom (i.e. restrained walls) should be designed for a lateral earth pressure corresponding to an equivalent fluid density of 60 pounds per cubic-foot. Similarly, drained cantilevered retaining walls, (i.e. receiving no lateral support at the top) should be designed for a lateral earth pressure corresponding to an equivalent fluid density of 40 pounds per cubic-foot. To these values must be added the pressures attributable to earthquake forces per the Code. To these values must be added the pressures attributable to earthquake forces per Section 1610.2 of the Code.

Lateral forces can be considered to be transmitted from the structure to the soil by passive pressure against the foundation walls utilizing an equivalent fluid density of 120 pounds per cubic-foot providing that the walls are designed to resist these pressures. Lateral force can also be considered to be transmitted from the structure to the soil by friction on the base of footings using a coefficient of 0.45, to which a safety factor of 1.5 should be applied.

Seismic Design Considerations

For the purposes of determining parameters for structural seismic design, this site is considered to be a Site Class C as defined in Section 1613.5 of the Code. Furthermore, the bearing strata on the proposed site is not considered to be subject to liquefaction during an earthquake based on the criterion of Section 1806.4 of the Code.

Foundation Construction Considerations

The foundation construction considerations include preparation of the foundation bearing surfaces and the slab-on-grade subgrades, temporary earth support, underpinning, dewatering, and off-site disposal of excess excavated soil.

Preparation of the Building Pad

Preparation of the building pad within the proposed building footprint for support of the spread footings and slab-on-grade should include the removal of all existing site improvements, utilities, topsoil, fill and subsoil from within the building footprint.

Footings should bear directly on the undisturbed, natural glacial outwash, glacial till deposit or bedrock or on compacted structural fill placed directly over the undisturbed glacial till or glacial outwash deposits or bedrock. Where proposed footings are to be supported on structural fill, the lateral limits of the excavation should extend beyond the outside edge of the footing for a horizontal distance equal to the depth from the bottom of the proposed footing to the surface of the natural, undisturbed glacial outwash deposit, plus two feet in all plan directions.

All glacial outwash, glacial till, or severely weathered bedrock or structural fill bearing surfaces should be excavated with an excavator bucket which has either a smooth, toothless cutting edge, or a steel plate welded across the teeth. Further, it is recommended that glacial outwash, glacial till and structural fill bearing surfaces be immediately covered with a 3-inch thickness of 3/4-inch crushed stone to minimize disturbance of the subgrade during subsequent forming operations.

Temporary Earth Support

Based upon existing site grades and the planned lowest-level slab elevation of the below-grade garage of the new building, excavation of soil for construction of the proposed building foundation is estimated to range from 7 to 15 feet below the existing ground surface.

In consideration of proximity of the existing buildings and adjacent streets, open cut soil slopes are not anticipated to be feasible. Therefore, a temporary excavation support will be required to perform the building excavation at the site along the 8th Street, Spring Street, 95 Spring Street property line. In addition, in the event that the existing foundation wall at the north side of the existing building along the Union Street is demolished during construction, earth support will be required at this location as well. If the temporary earth support system be installed outside the property limits onto public property (8th and Spring Streets) or private property (along 95 Spring Street private property), approval from the City of New Bedford or the owner of the private 95 Spring Street property will be required, respectively. The temporary excavation support system is likely to consist of a drilled-in cantilevered steel soldier pile and timber lagging wall. The temporary earth support system should be designed by a professional engineer registered in the Commonwealth of

Massachusetts who is employed by the Contractor. The design should be based on the Contractor's equipment, personnel and anticipated construction sequence and procedures, with input from specialty excavation support subcontractors.

Should the existing granite foundation walls of the existing building located at the north side (along Union Street), the west side (eastern wall of the 282 Union Street adjacent building) and the east side (western wall of the 276 Union Street adjacent building) be kept during construction of the proposed development, the internal bracing of the walls may be required due to the sequencing of construction.

The temporary design bracing system may likely to consist of rakers and concrete kicker blocks and it should be designed by a professional engineer registered in the Commonwealth of Massachusetts who is employed by the Contractor. The design should be based on the Contractor's equipment, personnel and anticipated construction sequence and procedures, with input from specialty excavation support subcontractors.

Underpinning

As discussed above, some of the proposed footings of the new building will likely bear below the 2 to 1 zone of influence line of the adjacent existing footings to remain. Therefore, underpinning of the existing foundation walls located at the eastern and southern sides of the 282 Union Street adjacent building and as well as the western side of the 276 Union Street adjacent building foundation wall may be required.

Underpinning of the existing foundations should consist of continuous, hand-excavated, timber lagged underpinning pits. The maximum width of each individual underpinning pit along the length of the foundation wall should not exceed four (4) feet and the minimum clear distance between simultaneously excavated pits should not be less than eight (8) feet. At existing column footing locations, the maximum width of each individual underpinning pit should be determined by the Contractor, but should not exceed half of the footing width.

Concrete should be placed "in the dry" within each underpinning pit to the surface of the glacial outwash deposit or bedrock to within approximately 3 inches of the bottom of the existing foundation. After the concrete has sufficiently cured, the space between the concrete underpinning pit and bottom surface of the existing foundation should be dry-packed in accordance with proper underpinning practice. During the underpinning process, the existing building should be monitored for settlement. With proper execution of the underpinning, the building settlement is anticipated to be less than 3/8-inch.

The underpinning design should be prepared by a professional engineer registered in the Commonwealth of Massachusetts who is employed by the Contractor. The design should also be submitted for review by the Architect.

Dewatering

Based on the proposed scope of construction, on-site recharge of groundwater is not considered practical. Therefore, off-site discharge of groundwater during foundation excavation and construction will be required. Temporary off-site discharge of groundwater during construction activities will require the submittal of an application for a temporary construction dewatering permit to either the US Environmental Protection Agency (EPA) or to the City of New Bedford. A review of the municipal stormwater and sewer maps of the area surrounding the project site would be required to determine if off-site discharge of groundwater would be via a dedicated storm drain line and into a surface water body or a combined drainage and sewer line.

Off-Site Disposal of Excess Soil

Should excess excavated soil generated from the proposed construction require off-site disposal, current Department of Environmental Protection (DEP) policies and regulations for off-site reuse of excess excavated soil require environmental characterization of the excavated soil prior to its off-site reuse.

Final Comments

McPhail has been retained to provide design assistance during the design phase of this project. The purpose of this involvement is to review the structural foundation drawings and foundation notes for conformance with the recommendations presented herein and to prepare or review the earthwork specification section for inclusion into the Contract Documents for construction.

Lastly, it is recommended that McPhail be retained for the construction period to observe the preparation of foundation bearing surfaces, preparation of the slab-on-grade subgrade, underpinning and installation of temporary earth support. Our involvement during the construction phase of the work should minimize costly delays due to unanticipated field problems since our field engineer would be under the direct supervision of our project manager who was responsible for the subsurface exploration and foundation design recommendations documented herein.

We trust that the above is sufficient for your present requirements. Should you have any questions concerning the recommendations presented herein, please do not hesitate to call us.

Very truly yours,

McPHAIL ASSOCIATES, LLC

Fatima Babic-Konjic, P.E.

Ambrose J. Donovan, P.E., L.S.P.

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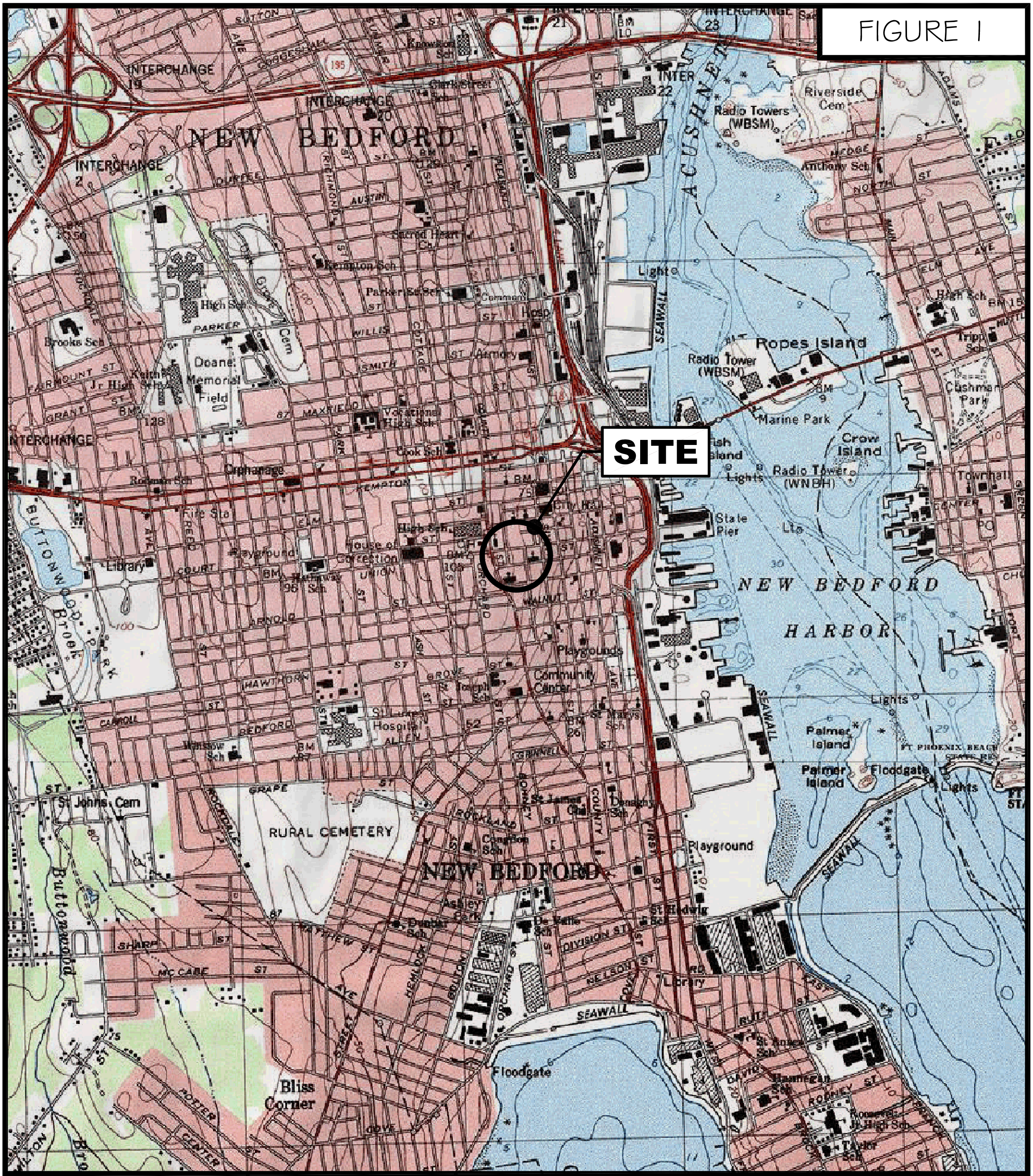
FBK/ajd



McPHAIL ASSOCIATES, LLC
Geotechnical and Geoenvironmental Engineers
2269 Massachusetts Avenue
Cambridge, MA 02140
617/868-1420
617/868-1423 (Fax)
www.mcphailgeo.com

N

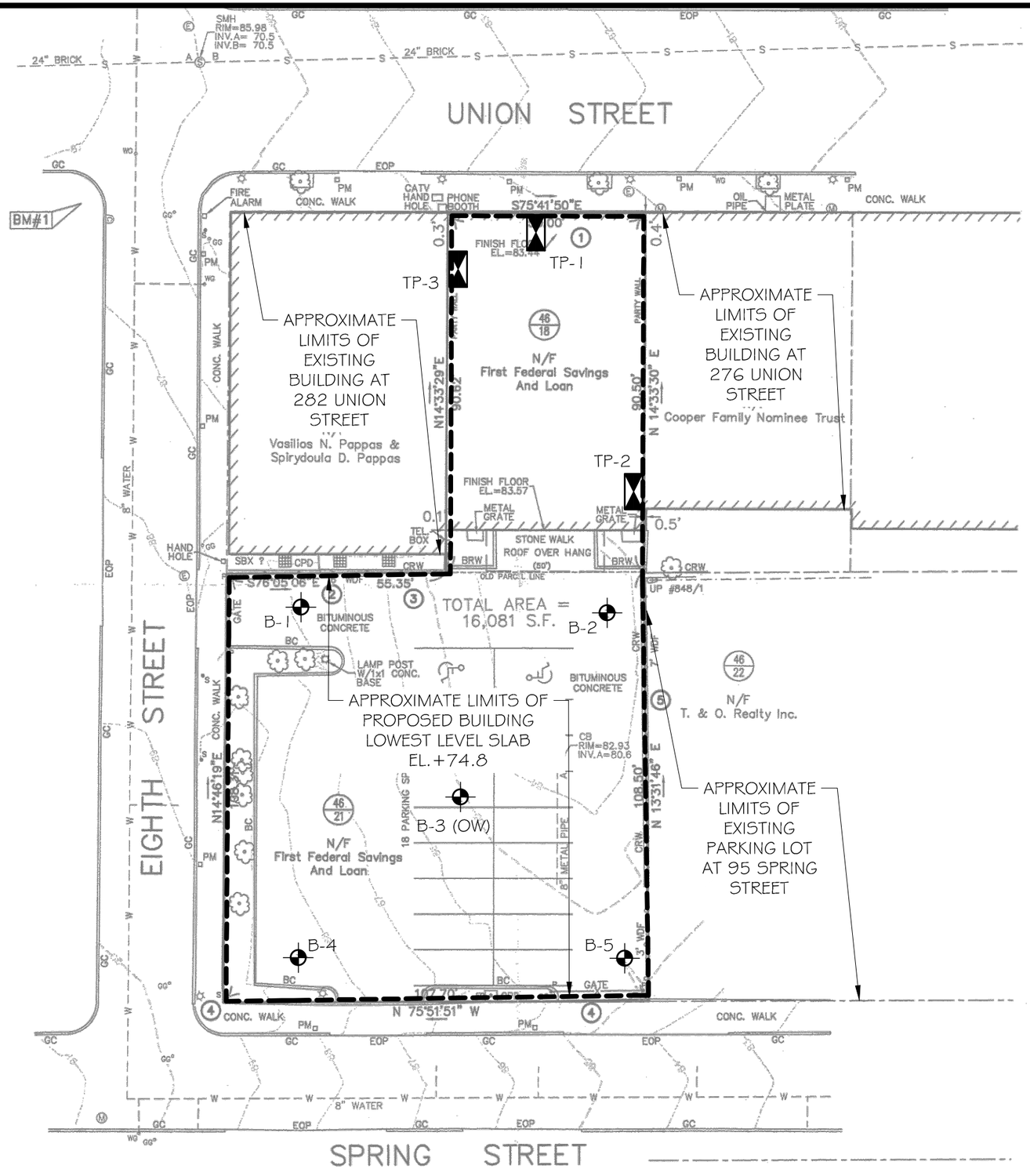
SCALE 1:25,000

PROJECT LOCATION PLAN

278 UNION STREET

NEW BEDFORD MASSACHUSETTS

FIGURE 2



NORTH

LEGEND

— APPROXIMATE LOCATION OF TEST PIT PERFORMED BY POND VIEW EXCAVATION OF SEEKONK OF MASSACHUSETTS ON JULY 27 AND 28, 2017 FOR McPHAIL ASSOCIATES, LLC

— APPROXIMATE LOCATION OF BORING PERFORMED BY CARR-DEE CORP. ON ON JULY 27 AND 28, 2017 FOR McPHAIL ASSOCIATES, LLC

REFERENCE: THIS PLAN WAS PREPARED FROM A 20-SCALE DRAWING ENTITLED "ALTA/ACSM LAND TITLE SURVEY" DATED SEPTEMBER 29, 2005 BY TIBBETTS ENGINEERING CORP.

GRAPHIC SCALE

30 0 30 60

McPHAIL ASSOCIATES, LLC
Geotechnical and Geoenvironmental Engineers
2269 Massachusetts Avenue
Cambridge, MA 02140
617/868-1420
617/868-1423 (Fax)
www.mcphailgeo.com

278 UNION STREET
NEW BEDFORD MASSACHUSETTS

SUBSURFACE EXPLORATION PLAN

FOR
ALINEA CAPITAL PARTNERS, LLC
BY
McPHAIL ASSOCIATES, LLC

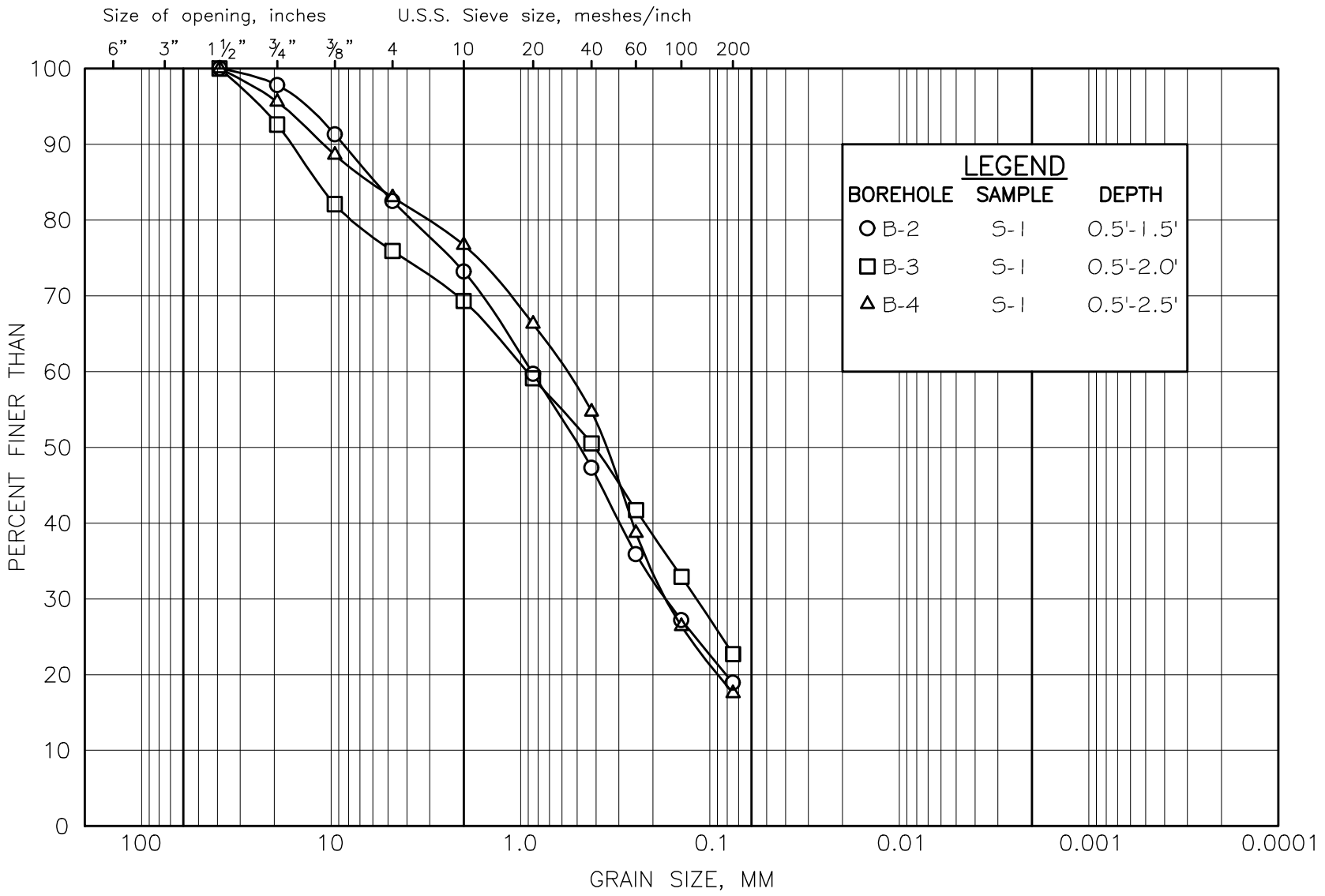
Date: AUGUST 2017	Dwn: F.G.P.	Chkd: F.B.K.	Scale: 1" = 30'
Project No: 6410			

FILE NAME: N:\Acad\JOBS\6410\6410-F02.dwg

FILE NAME: N:\Acad\JOBS\6410\6410-F03_Sieve.dwg

PROJECT No. 6410

M.I.T. GRAIN SIZE SCALE



COBBLE SIZE	GRAVEL SIZE			SAND SIZE			FINE GRAINED	
	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT SIZE	CLAY SIZE

McPHAIL ASSOCIATES, LLC

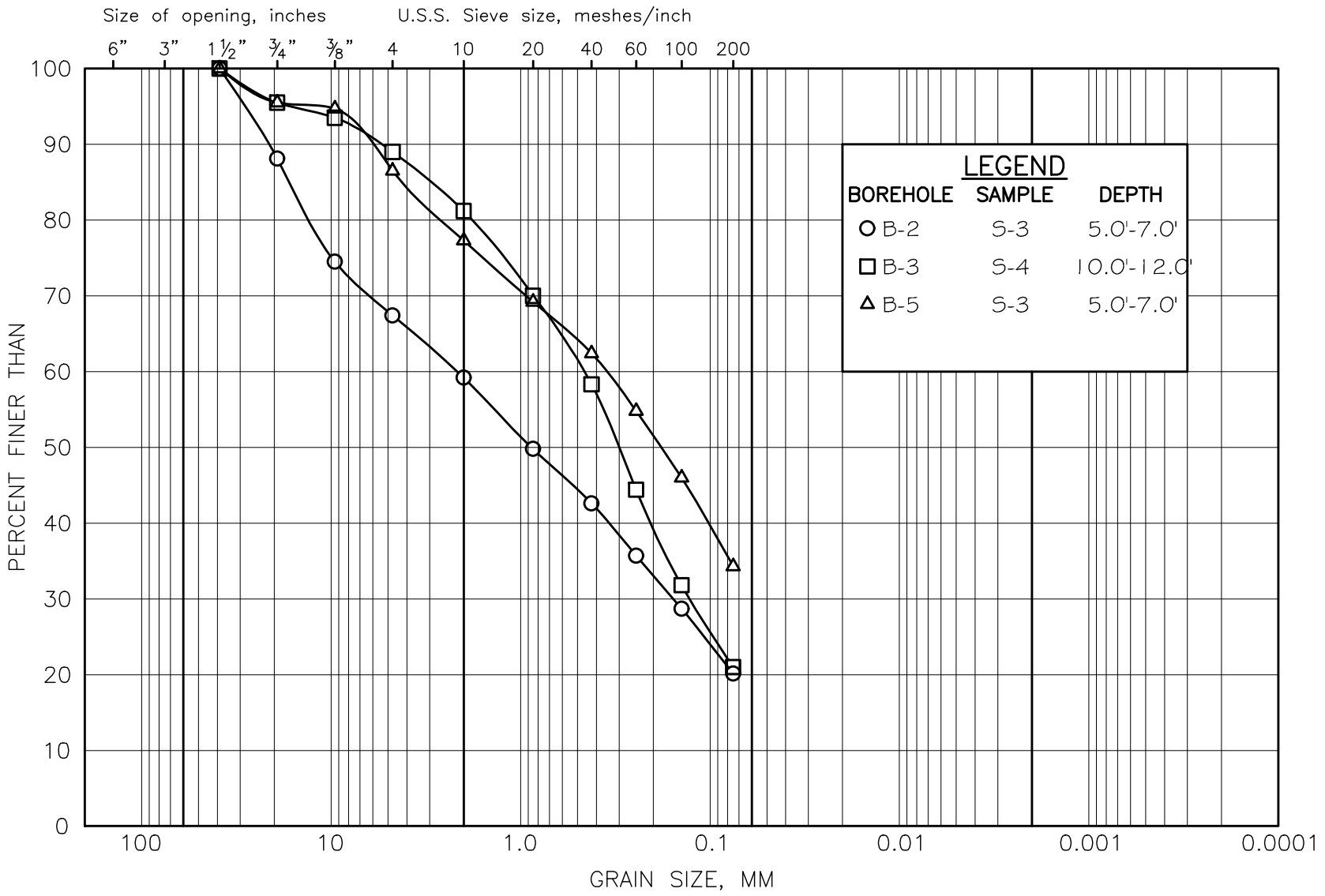
GRAIN SIZE DISTRIBUTION
FILL

FIGURE 3

FILE NAME: N:\Acad\JOBS\6410\6410-F04_Sieve.dwg

PROJECT No. 6410

M.I.T. GRAIN SIZE SCALE



COBBLE SIZE	GRAVEL SIZE			SAND SIZE			FINE GRAINED	
	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT SIZE	CLAY SIZE

McPHAIL ASSOCIATES, LLC

GRAIN SIZE DISTRIBUTION
GLACIAL OUTWASH

FIGURE 4

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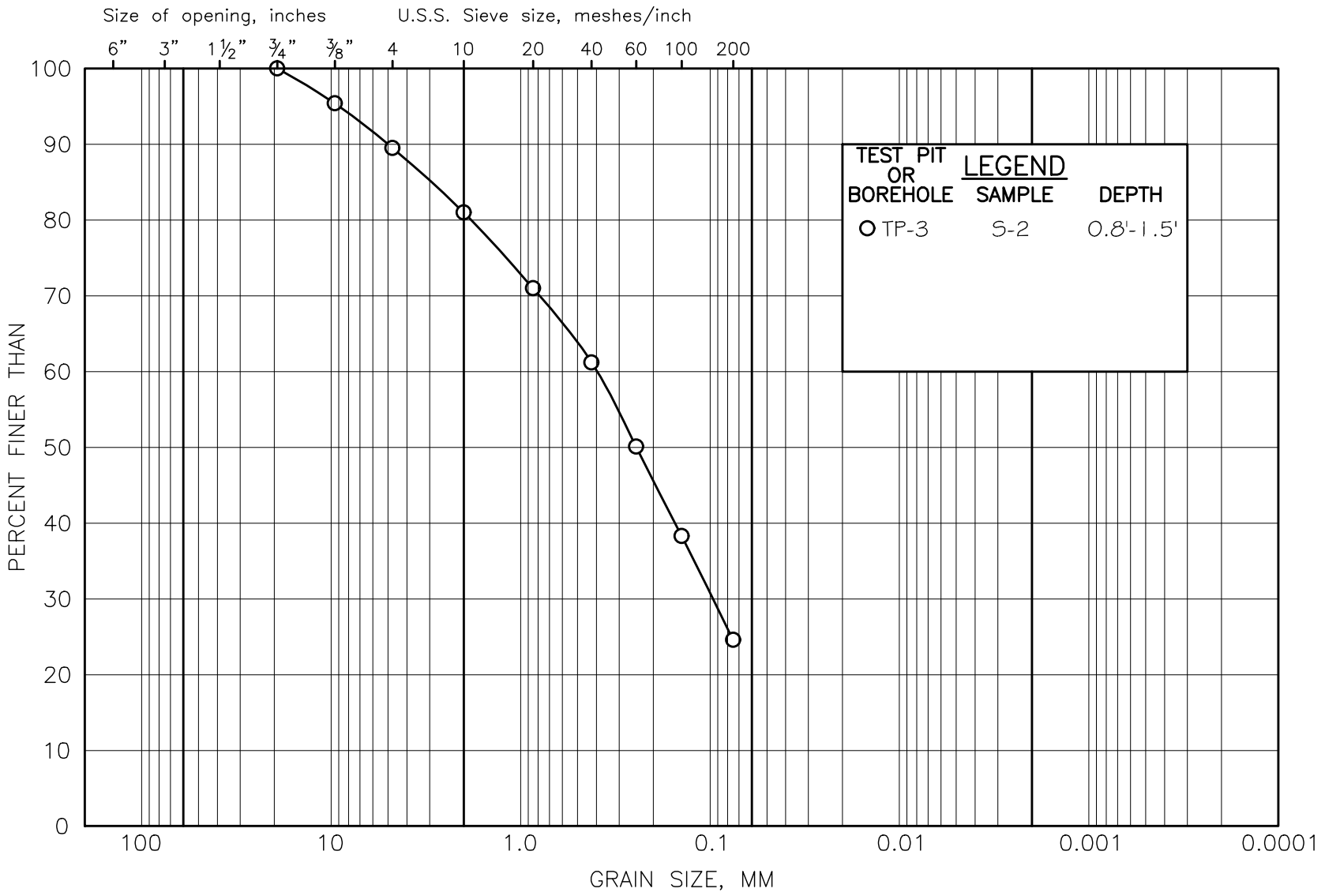
PROJECT No. 6410

M.I.T. GRAIN SIZE SCALE



COBBLE SIZE	GRAVEL SIZE			SAND SIZE			FINE GRAINED	
	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT SIZE	CLAY SIZE

McPHAIL ASSOCIATES, LLC

GRAIN SIZE DISTRIBUTION
GLACIAL TILL

FIGURE 5

APPENDIX A:

LIMITATIONS

LIMITATIONS

This report has been prepared on behalf of and for the exclusive use of Alinea Capital Partners, LLC for specific application to the proposed 278 Union Street Development to be located in New Bedford Massachusetts in accordance with generally accepted soil and geotechnical engineering practices. No other warranty, expressed or implied, is made.

In the event that any changes in nature or design of the proposed construction are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by McPhail Associates.

The analyses and recommendations presented in this report are based upon the data obtained from the subsurface explorations performed at the approximate locations indicated on the enclosed plan. If variations in the nature and extent of subsurface conditions between the widely spaced explorations become evident during the course of construction, it will be necessary for a re-evaluation of the recommendations of this report to be made after performing on-site observations during the construction period and noting the characteristics of any variations.

APPENDIX B:

BORING LOGS B-1 THROUGH B-5
PREPARED BY CARR-DEE

CARR-DEE CORP.

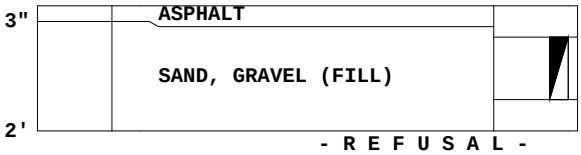
37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 7-31-2017 Job No.: 2017-114

Location: 278 UNION STREET, NEW BEDFORD, MA Scale: 1 in.= 3 ft.

GROUND SURFACE +87.8

BORING 1



S#1, 6" to 1'6"
(17-19-100/0")
RECOVERED 10 in.

- R E F U S A L -

(NO PENETRATION WITH AUGERS)
NO WATER ENCOUNTERED
SIZE OF AUGERS: 3-3/4" I.D., LENGTH: 2'0"
DRILLER: G. SMITH, INSPECTOR: T. CORMICAN
DATE STARTED & CMPLETED: 7-28-2017

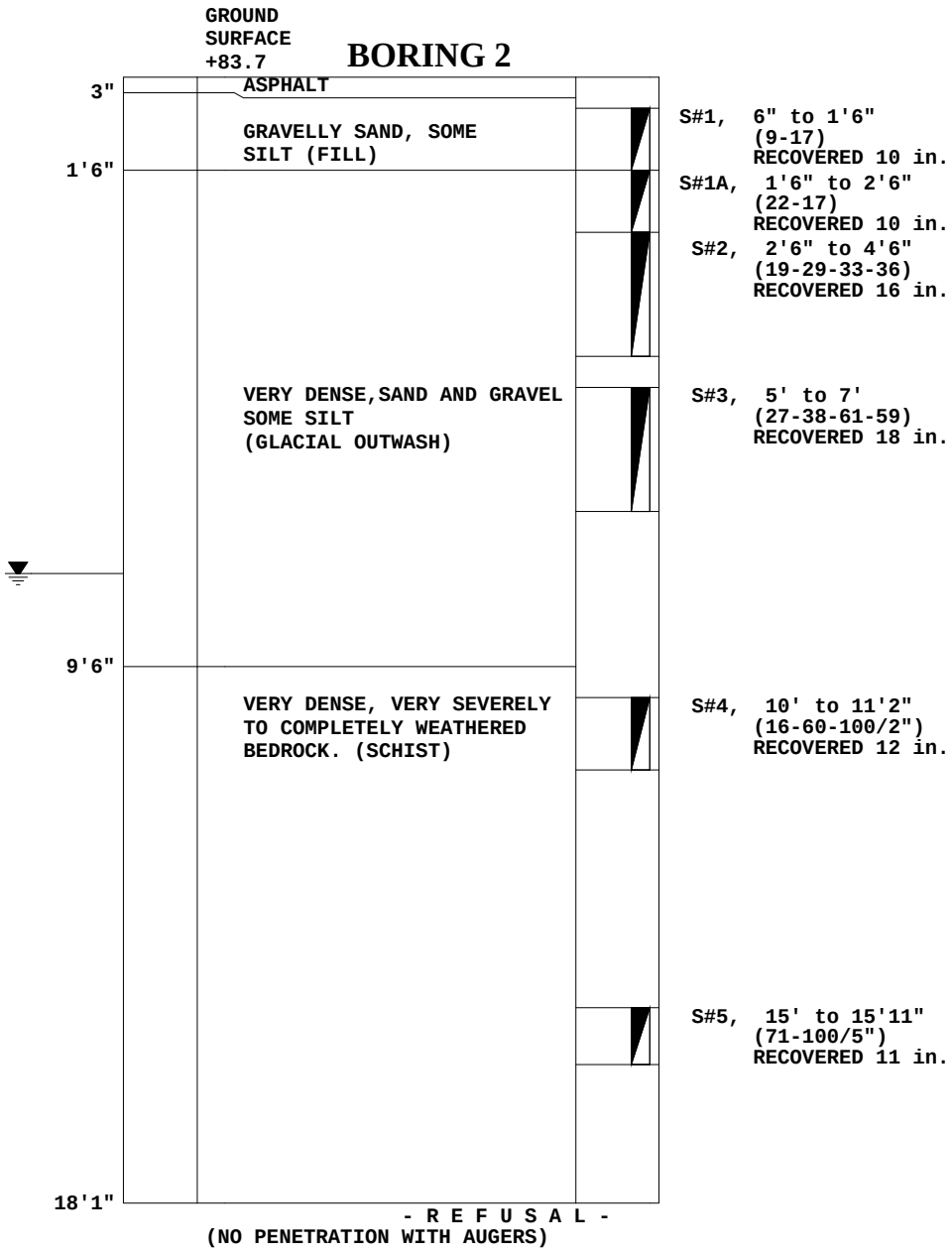
All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

CARR-DEE CORP.

37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 7-31-2017 Job No.: 2017-114

Location: 278 UNION STREET, NEW BEDFORD, MA Scale: 1 in.= 3 ft.



WATER LEVEL 8'
SIZE OF AUGERS: 3-3/4" I.D., LENGTH: 18'1"
DRILLER: G. SMITH, INSPECTOR: T. CORMICAN
DATE STARTED & CMPLETED: 7-28-2017

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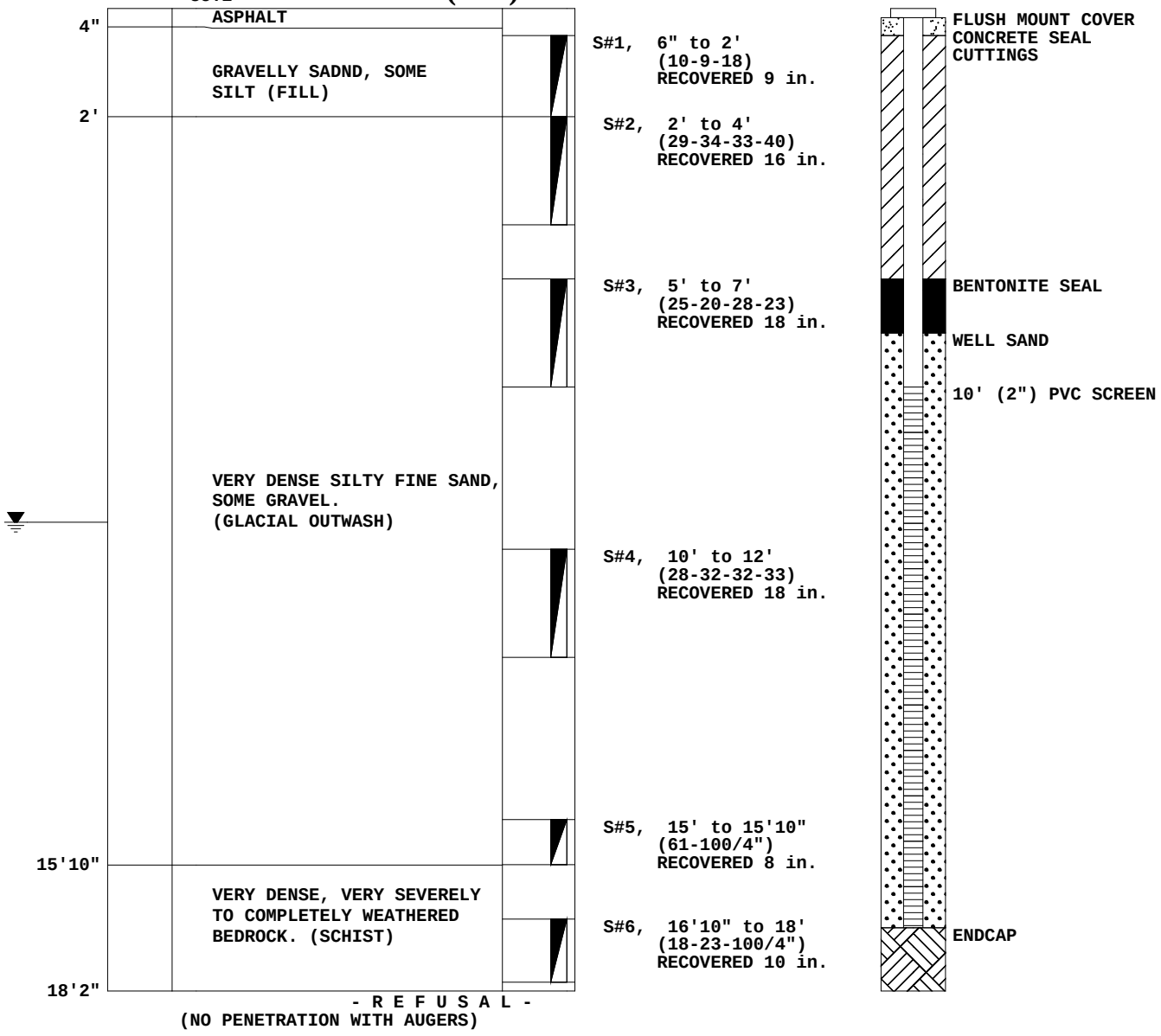
Location: 278 UNION STREET, NEW BEDFORD, MA Scale: 1 in.= 3 ft.

BORING 3(OW)



WATER LEVEL 9'6"
SIZE OF AUGERS: 3-3/4" I.D., LENGTH: 17'0"
DRILLER: G. SMITH, INSPECTOR: T. CORMICAN
DATE STARTED & CMPLETED: 7-27-2017

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

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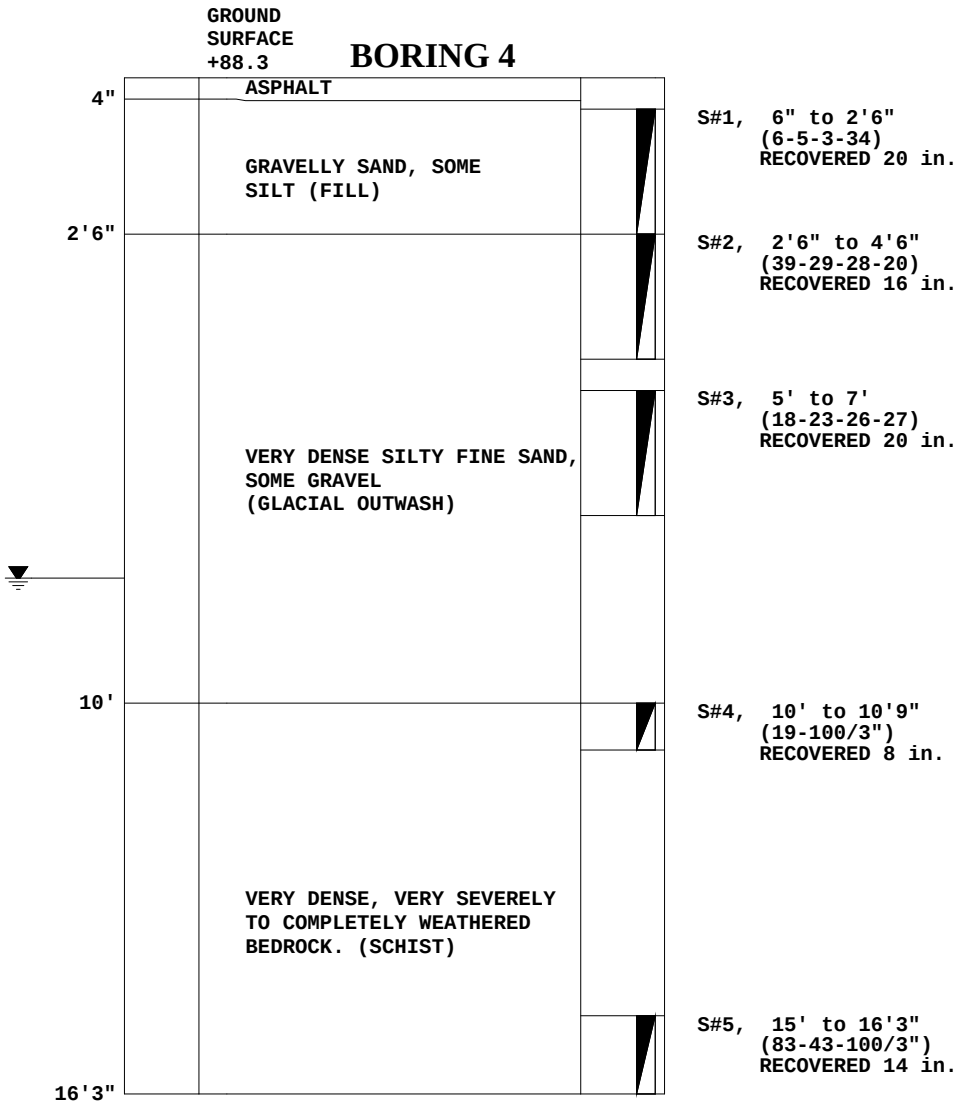
To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 7-31-2017 Job No.: 2017-114

Location: 278 UNION STREET, NEW BEDFORD, MA Scale: 1 in.= 3 ft.



WATER LEVEL 8'
SIZE OF AUGERS: 3-3/4" I.D., LENGTH: 15'0"
DRILLER: G. SMITH, INSPECTOR: T. CORMICAN
DATE STARTED & CMPLETED: 7-27-2017

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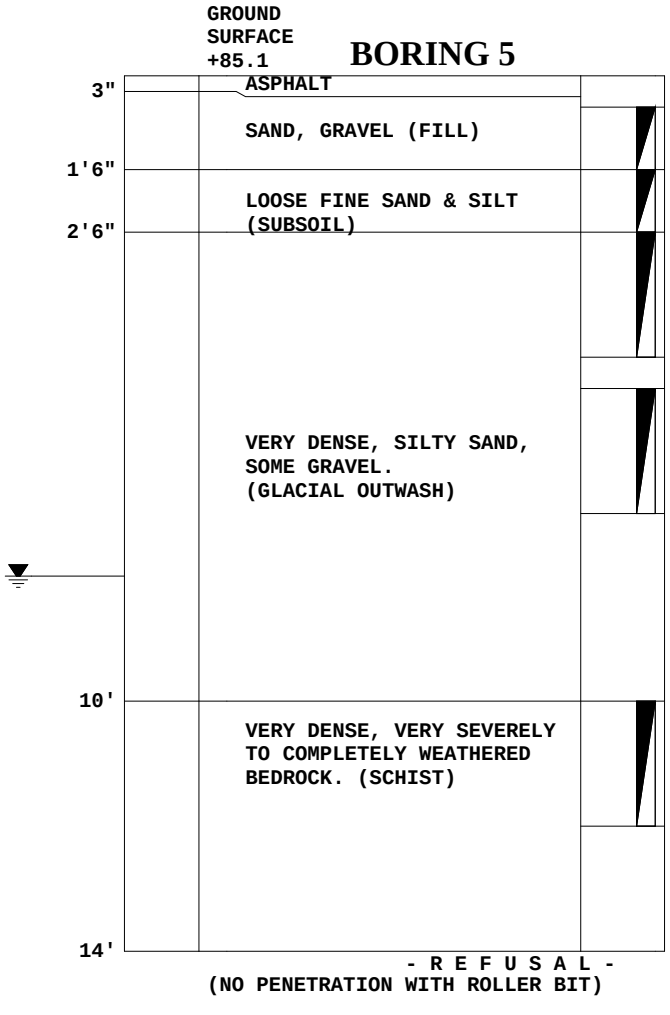
37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 7-31-2017 Job No.: 2017-114

Location: 278 UNION STREET, NEW BEDFORD, MA Scale: 1 in.= 3 ft.

BORING 5



S#1, 6" to 1'6" (5-3) RECOVERED 8 in.

S#1A, 1'6" to 2'6" (4-4) RECOVERED 5 in.

S#2, 2'6" to 4'6" (16-29-57-56) RECOVERED 14 in.

S#3, 5' to 7' (35-43-30-32) RECOVERED 18 in.

S#4, 10' to 12' (15-18-22-28) RECOVERED 13 in.

S#5, 14' to 14' (100/0") RECOVERED 0 in.

WATER LEVEL 8'
SIZE OF CASING: NW, LENGTH: 10'0"
DRILLER: G. SMITH, INSPECTOR: T. CORMICAN
DATE STARTED & CMPLETED: 7-28-2017

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

APPENDIX C:

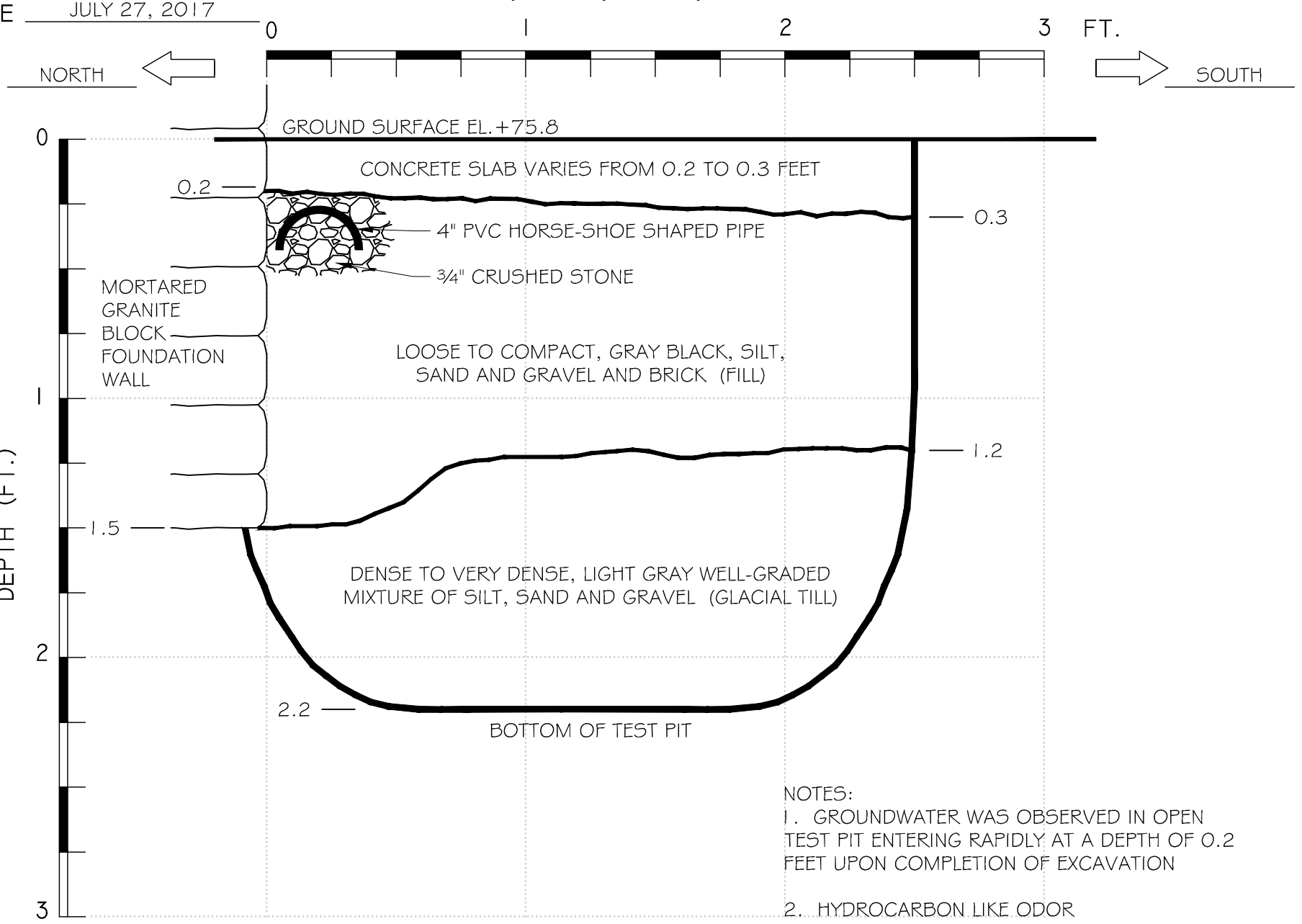
TEST PIT LOGS TP-1, TP-2 AND TP-3
PREPARED BY MCPHAIL

JOB NO. 6410

DATE JULY 27, 2017

TEST PIT LOG

TEST PIT NO. 1



McPHAIL ASSOCIATES, LLC

NOTES:

1. GROUNDWATER WAS OBSERVED IN OPEN TEST PIT ENTERING RAPIDLY AT A DEPTH OF 0.2 FEET UPON COMPLETION OF EXCAVATION

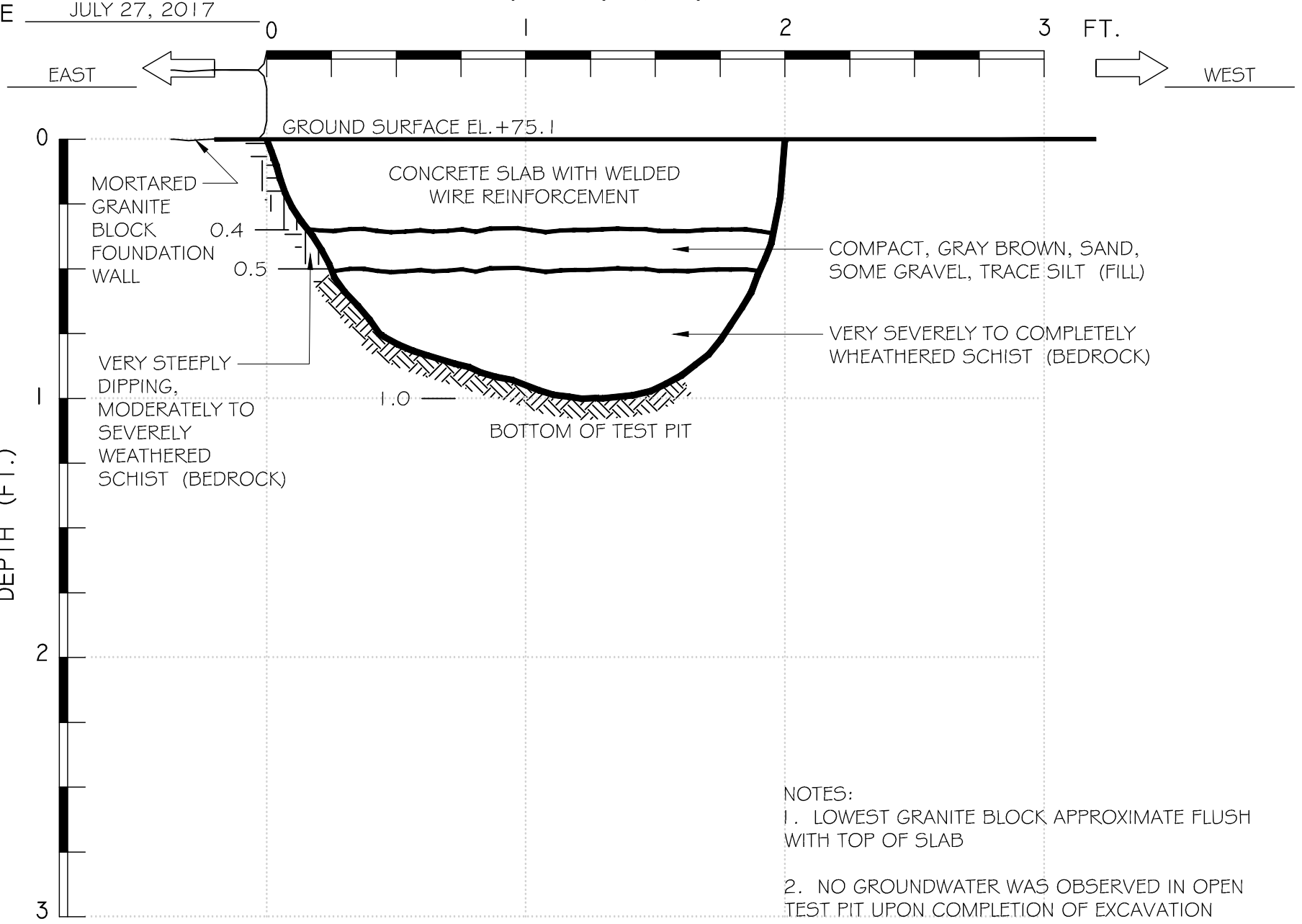
2. HYDROCARBON LIKE ODOR

JOB NO. 6410

DATE JULY 27, 2017

TEST PIT LOG

TEST PIT NO. 2



McPHAIL ASSOCIATES, LLC

NOTES:

1. LOWEST GRANITE BLOCK APPROXIMATE FLUSH WITH TOP OF SLAB

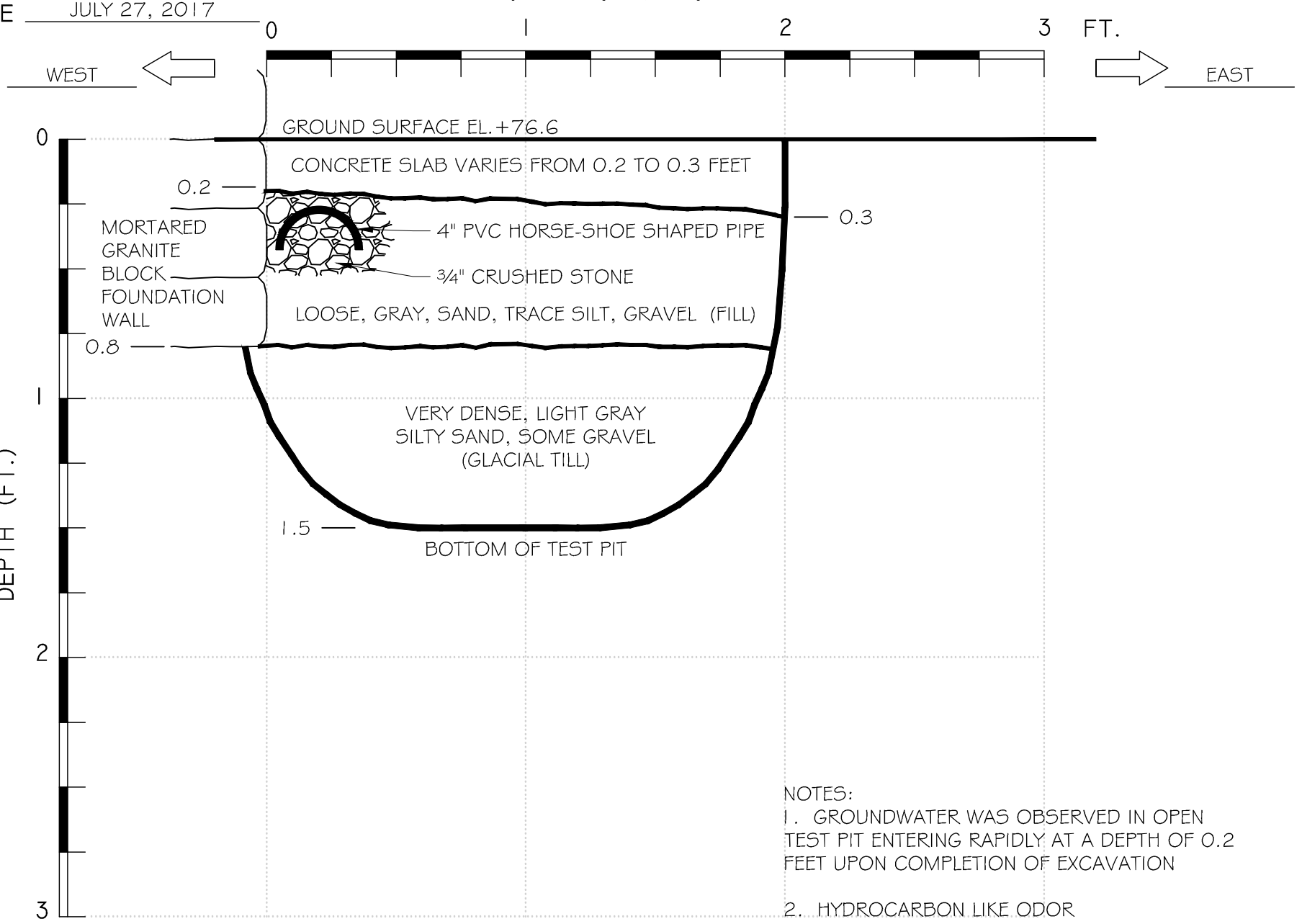
2. NO GROUNDWATER WAS OBSERVED IN OPEN TEST PIT UPON COMPLETION OF EXCAVATION

JOB NO. 6410

DATE JULY 27, 2017

TEST PIT LOG

TEST PIT NO. 3



McPHAIL ASSOCIATES, LLC

NOTES:

1. GROUNDWATER WAS OBSERVED IN OPEN TEST PIT ENTERING RAPIDLY AT A DEPTH OF 0.2 FEET UPON COMPLETION OF EXCAVATION

2. HYDROCARBON LIKE ODOR

APPENDIX D:

A GROUNDWATER MONITORING REPORT
B-3 (OW)
PREPARED BY MCPHAIL

GROUNDWATER MONITORING REPORT

Well I.D.	B-3 (OW)	**Elevation of Road Box**	+85.2
Job. No.	6410		
Job Name	278 UNION STREET		

Date	Time	Elapsed Time	Depth of Water from Road Box	Elevation of Water	Remarks	Read By
		Days	Feet	Feet		
7/27/2017	11:30	Initial	7.8	77.4		TMC
7/28/2017	7:10	1	7.4	77.8		TMC
8/3/2017	14:38	7	7.6	77.6		MGS