APPENDIX 1

GEOTECHNICAL DATA

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GEOTECHNICAL ENGINEERING REPORT
FOR THE PROPOSED
PUMP STATION AND STREAM CROSSING
TAUNTON, MASSACHUSETTS

Prepared for:

Beta Group, Inc.
6 Blackstone Valley Place
Lincoln, RI 02865

Prepared by:

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PBA No. 17006
August 2017

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August 16, 2017

Mr. Christopher Cronin, P.E.
Project Manager
Beta Group, Inc.
6 Blackstone Valley Place
Lincoln, RI 02865

Re: Geotechnical Engineering Report
Pump Station and Stream Crossing
Taunton, MA
PBA Job No 17006

Dear Mr. Cronin:

Paul B. Aldinger & Associates Inc. (PBA) is pleased to provide BETA Group Inc. (BETA) with this geotechnical engineering report for the above referenced project. This report is subject to the limitations that are outlined in Appendix A.

1.00 INTRODUCTION/PROJECT DESCRIPTION

The proposed project will consist of constructing a new Main Sewage Pump Station and influent sewage pipeline and intermediate manhole structures, located near the existing pump station off West Water Street in Taunton, Massachusetts. Figure 1, Site Vicinity Plan, provides the approximate location of the proposed site. Additionally, we have been tasked with recommendations for the Stream Crossing of the new twin 24 inch diameter ductile iron force mains, which will be mostly be located within an undeveloped wooded area just north of the treatment plant's sludge landfill.

We reviewed:

- A preliminary plan, sheet M-2D dated March 2017, which indicates a section through the existing and proposed pump stations.
- A plan titled "Proposed Force Main Plan & Borings" dated July 1974 developed by CE Maguire, Inc. which indicates the location of the existing sewer force main.
- The "Site Grading Plan - Sheet C-4" dated March 2017, which indicates a plan view of the existing and proposed pump stations as well as other site features.
- The plan set "Main Lift Pump Station, City of Taunton, Massachusetts, Draft, DPW Meeting Set, July 12, 2017.

The proposed pump station will be located less than 10 feet to the east of the existing pump station and will be founded deeper than the existing pump station. Due to the proximity of the two structures, existing shallow groundwater depth, and depth of proposed pump station construction, an excavation support system will be required for construction of the proposed pump station, especially considering that the proposed pump station foundation will extend below the existing pump station. The proposed site is presently asphalt paved and relatively flat with an elevation of approximately +11.5 feet.

To the east of the proposed pump station the grades slope downward to the Taunton River. There is an existing sewer siphon extending from beneath the Taunton River into the existing pump station, that bisects the proposed pump station foot print. This will need to be relocated prior to construction. The existing pump station structure contains below grade mechanical and pump rooms, and a wet well. According to the plans, the existing station's mat foundation invert is at elevation -19.7 feet, approximately 31 feet below ground surface. The proposed pump station will be founded with the top of foundation mat at elevation -21.5 feet. The structure's mat foundation is anticipated to be on the order of 3 to 5 feet in thickness, which would place a 5 foot thick mat invert at the approximate elevation of -26.5 feet, 38 feet below the ground surface.

There is an existing gravity sewer pipeline within West Water Street, which flows to the existing pump station. In order to maintain sewage flows to the existing station during construction and to increase capacity of the influent sewer, a parallel sewer will be constructed adjacent to the existing sewer that will cross beneath the existing sewer and extend into the proposed pump station. The proposed sewer pipeline will consist of 48 and 60 inch diameter RCP pipe. In order to cross the existing sewer, the invert of the parallel sewer needs to be lowered by approximately 10 feet. Lowering the sewer will also bring it below the invert of the influent sewer that extends beneath the Taunton River from East Water Street. Lowering the sewer will require the construction of three (3) concrete box manhole structures within West Water Street and three (3) standard (change of pipeline direction) manhole structures located adjacent and north of the existing and proposed pump stations, with the elevation of the proposed sewer pipeline dropping at each box manhole structure. The invert elevation of the sewer pipe will be lowered approximately 10 feet from elevation -2.78 feet to elevation -12.30 feet.

Two existing force mains, 20-inch and 24-inch diameter, extend from the existing pump station to the City sewage treatment plant approximately 1/4 mile south. These existing force mains cross under a small stream located within a wooded section of the alignment. New "twin" 24 inch diameter ductile iron force mains will be constructed along the alignment of the existing force mains, which will also cross beneath the stream. It is our understanding that excavation for the proposed force mains at the stream crossing will extend approximately 9 feet below stream bank level.

The objectives of our engineering services were to develop monitor a subsurface exploration program, perform geotechnical engineering analyses, and develop an engineering report with specific earthwork, temporary excavation support, dewatering, and foundation design recommendations.

2.00 GEOLOGY

Surficial Geology - We have reviewed the "Surficial Geology Map of the Taunton Quadrangle, Massachusetts" compiled by Byron D. Stone, Janet R. Stone, Mary L. DiGiacomo-Cohen, and Kevin A. Kincare in 2011. The area in the vicinity of the site primarily consists of fine glacial stratified deposits.

Bedrock Geology - The 1983 Bedrock Geology Map of Massachusetts (E-An Zen) indicates that the bedrock underlying the project site is classified as part of the Rhode Island Formation. This rock reportedly consists of sandstone, graywacke, shale, and conglomerate with minor beds of meta-anthracite and possible plant fossils.

3.00 SUBSURFACE INVESTIGATION PROGRAM

Five test borings (PBA-1 through PBA-5) were performed by New England Boring Contractors (NEB) mobilized out of their Brockton, Massachusetts office from February 28 through March 3, 2017. Two test borings (PBA-1 and PBA-2) were completed at the location of the proposed pump station, one test boring (PBA-3) was completed at the location of proposed structures within West Water Street and two test borings (PBA-4 and PBA-5) were completed at the location of the proposed river crossing. Boring locations were determined by measurements from the existing pump station and existing site features. Boring layout as well as boring observation and logging were performed by a PBA geotechncial engineer. Refer to Figures 2A and 2B, Subsurface Exploration Plan, for the locations of the borings. Refer to Appendix B, Test Boring Logs, for the boring logs.

The borings were advanced with casing and the drive and wash method. PBA-1 and PBA-2 were completed to a depth below ground surface of 74 feet and were terminated in probable bedrock. PBA-3 was advanced to a depth of 50 feet below ground surface and terminated in a stratum of sand and gravel. Test borings PBA-4 and PBA-5 were completed to a depth below the ground surface of 55 feet and terminated in glacial till. Test borings PBA-1, PBA-3 and PBA-4 contain permanent ground water observation wells to determine a stabilized ground water level, and for additional ground water level readings up to the time of construction, if and as necessary.

4.00 SUBSURFACE CONDITIONS

Generalized soil conditions encountered in the subsurface exploration program include the following strata from the ground surface downward (actual soil conditions proceeding away from the test boring will likely vary). Groundwater levels were measured at the times indicated in the text of this report. Refer to the boring logs in Appendix B for more detailed descriptions of the conditions encountered.

4.10 Soil Conditions at the Proposed Pump Station (PBA-1 and PBA-2)

- **Asphalt** - The surface covering of the test borings consisted of approximately 3 inches of asphalt. The asphalt was generally in poor condition. This surface layer was underlain by;

- **Granular Non-Engineered Fill** - Surficial granular fill was observed in both test borings and extended to approximately 17 to 20 feet below the ground surface. The granular fill is generally described as variably loose to dense brown to gray organic SILT, to fine to coarse SAND with little gravel and little silt. Wood was observed within some of the split spoon samples. The granular fill was underlain by;

- **Glacial Outwash 1** - Glacial Outwash 1 stratum was observed within both of the test borings. This stratum of outwash ranged between approximately 10 and 21 feet in thickness and the bottom of Glacial Outwash 1 stratum was encountered at depths of 38.5 to 40 feet below ground surface. The Glacial Outwash 1 stratum is generally described as: medium dense, gray, varved inorganic SILT. The average Glacial Outwash 1 SPT blow count (uncorrected) is $N_{avg}=18$. The average Unified Soil Classification System Group Symbol is ML. The Glacial Outwash 1 stratum is underlain by;

- **Glacial Outwash 2** - Glacial Outwash 2 stratum was observed in both the test borings. This stratum was approximately 28 feet in thickness in both borings and the bottom of Glacial Outwash 2 stratum was encountered at depths of 67 and 68 feet below the ground surface. This stratum is generally described as medium dense to very dense gray fine to coarse SAND with trace gravel, trace silt. The average Glacial Outwash 1 SPT blow count (uncorrected) is $N_{avg}=33$. The average Unified Soil Classification System Group Symbol is SP-SM. The Glacial Outwash 2 stratum is underlain by

- **Glacial Till** - Glacial Till was encountered within both of the test borings. The Glacial Till stratum was approximately 4 feet in thickness and the bottom was encountered at depths of 71 and 72 feet below the ground surface. This stratum is described as fine to coarse SAND and GRAVEL with trace to little silt. The average glacial till SPT blow count (uncorrected) is $N_{avg}=98$. The average Unified Soil Classification System Group Symbol is SP-SM.

- **Possible Bedrock** - Possible bedrock was encountered within both of the test borings. This stratum was encountered at a depth of approximately 71 and 72 feet below the ground surface. A split spoon sample was attempted within both borings at a depth of 74 feet below the ground surface, however spoon refusal was encountered with no penetration. Both borings were terminated at a depth of 74 feet below the ground surface.

4.20 Soil Conditions at Proposed Manholes in West Water Street (PBA-3)

- **Asphalt**- Approximately 4 inches of asphalt was encountered at the ground surface. This surface layer was underlain by;

- **Glacial Outwash 1**- A medium dense glacial outwash stratum consisting of fine to medium SAND, trace silt was encountered underlying the loose silt stratum to a depth of approximately 17 feet below the ground surface. Approximately 24 feet of medium dense gray varved SILT was encountered underlying the glacial outwash stratum at depths 17 to 41 feet below the ground surface. This varved silt stratum was underlain by;

- **Glacial Outwash 2**- Glacial Outwash 2 stratum was approximately encountered at a depth of 41 feet below the ground surface. The stratum was encountered for a thickness of 10 feet and extended to the bottom of the test borings. This stratum is generally described as medium dense gray fine to coarse SAND with trace gravel, trace silt. The average Glacial Outwash 1 SPT blow count (uncorrected) is $N_{avg}=13$. The average Unified Soil Classification System Group Symbol is SP-SM. This boring was terminated at 51 feet.

4.30 Soil Conditions at Stream Crossing (PBA-4 and PBA-5)

- **Forest Mat** - Three inches of organic forest mat was encountered at the ground surface in test borings PBA-4 and PBA-5. This surface layer was underlain by;

- **Glacial Outwash 1** - Glacial Outwash 1 stratum was observed between two stratums of glacial outwash 2 within both of the test borings. This stratum of outwash ranged between approximately 11 and 16 feet in thickness and the bottom of Glacial Outwash 1 stratum was encountered at depths of 28 to 29 feet below ground surface. The Glacial Outwash 1 stratum is generally described as: loose to medium dense, gray, varved silt. The average Glacial Outwash 1 SPT blow count (uncorrected) is $N_{avg}=11$. The average Unified Soil Classification System Group Symbol is ML.

- **Glacial Outwash 2** - Glacial Outwash 2 stratum was observed within two layers in both borings, with one layer overlying and one layer underlying the glacial outwash 1 stratum. This stratum is generally described as medium dense to very dense gray fine to coarse SAND with little gravel, trace silt.

The upper layer of Glacial Outwash 2 was encountered underlying the forest mat and ranged between approximately 13 to 14 feet in thickness. The average Glacial Outwash 1 SPT blow count (uncorrected) is $N_{avg}=15$. The average Unified Soil Classification System Group Symbol is SP-SM. The lower layer of Glacial Outwash 2 was encountered underlying the glacial outwash 1 stratum and ranged between approximately 19 to 20 feet in thickness. The average Glacial Outwash 1 SPT blow count (uncorrected) is $N_{avg}=22$. The average Unified Soil Classification System Group Symbol is SP-SM.

- **Glacial Till** - Glacial Till was encountered within both of the test borings. The Glacial Till stratum was approximately 4 feet to greater than 10 feet in thickness. The bottom was encountered at depth of 52 feet in borings PBA-4 and was not encountered at the bottom of boring PBA-5 which was completed to 58 feet below the ground surface. This stratum is described as fine to coarse SAND with some silt and little to some gravel. The average glacial till SPT blow count (uncorrected) is $N_{avg}=116$. The average Unified Soil Classification System Group Symbol is SM.

- **Possible Bedrock**- Possible bedrock was encountered within test boring PBA-4. This stratum was encountered at a depth of approximately 48 feet below the ground surface. The boring was terminated at a depth of 50 feet below the ground surface in this stratum.

4.40 Groundwater Conditions

Groundwater levels were recorded in the wells installed in boreholes PBA-1, PBA-4 and PBA-5 on Friday, March 3, 2017. The groundwater levels are presented in the table on the following page. It should be noted that ground water fluctuations will occur due to variations in rainfall, temperature, season and other factors occurring since the time a measurement was made.

Boring No.	Approximate Ground Surface Elevation	Approximate Depth to Groundwater Level	Approximate Groundwater Elevation	Date of Groundwater Reading
PBA-1	+11.5	7.21	+4.3	3/3/17
PBA-3	+11.0	5.30	+5.7	3/3/17
PBA-4	+5.5	1.40	+4.1	3/3/17

5.00 LABORATORY TESTING DATA

Three mechanical grain size analyses and four combined sieve / hydrometer analyses were performed on samples obtained from the test borings in accordance with ASTM D421 and D-422. The grain size analyses were performed to obtain soil parameters for the use in dewatering and excavation support design. The results of the laboratory tests are attached in Appendix C and are summarized in the table below.

Boring & Sample Number	Depth	Soil Stratum	Percent Finer than No. 200 Sieve	Soil Description with USCS Classification
PBA-1 S-11, S-12	49'-56'	Glacial Outwash 2	8.3	Fine to coarse SAND, little Gravel, trace Silt (SW-SM)
PBA-2 S-6, S-7	24'-31'	Glacial Outwash 1	98.7	SILT, trace fine Sand (ML)
PBA-2 S-11, S-12	49'-56'	Glacial Outwash 2	14.4	Fine to coarse SAND, little Silt, little Gravel (SW-SM)
PBA-3 S-6, S-7	24'-31'	Glacial Outwash 1	74.4	SILT, some fine to coarse Sand, trace Gravel (ML)
PBA-4 S-2, S-3	4'-11'	Glacial Outwash 2	11.9	Fine to coarse SAND, little Silt, trace Gravel (SP-SM)
PBA-4 S-5	19'-21'	Glacial Outwash 1	95.7	SILT, trace fine Sand (ML)
PBA-5 S-3, S-4	9'-16'	Glacial Outwash 2	17.8	Fine to coarse SAND, little Silt, trace Gravel (SW-SM)

6.00 GEOTECHNICAL EVALUATION & RECOMMENDATIONS

The project consists of the construction of a new pump station in a paved area located adjacent and east of the existing pump station; installation of three (3) box manhole structures within West Water Street, installation of three (3) standard manhole structures located adjacent and north of the existing and proposed pump stations, and the installation of approximately 260 LF of 48 and 60 inch diameter RCP gravity sewer pipe sections. The RCP pipe sections will connect the existing West Main Street influent gravity sewer to the box manhole structures to lower pipeline invert elevation, then connect to the standard manhole structures to change pipeline direction, and finally to connect sewage flow into the proposed pump station. Additionally the project will construct two (2) new "twin" parallel and adjacent 24-inch diameter sewer force mains sending sewage from the proposed pump station to the sewerage treatment plant located approximately ¼ mile to the south.

- Proposed Pump Station: Existing ground surface in the area of the proposed pump station is elevation +11.5 feet. The proposed pump station will have a top of mat foundation at elevation -21.5 feet, approximately 33 feet below the existing ground surface. It is anticipated that the mat foundation will be approximately 3 to 5 feet in thickness. With a 5 foot thick mat, the pump station's foundation invert will be at elevation -26.5 feet, approximately 38 feet below existing ground surface.

  The existing pump station has an invert elevation of -19.7 feet, approximately 31 feet below existing ground surface.

  The stratigraphy encountered in the test borings at the proposed pump station site (PBA-1 and PBA-2) consists of a surficial non-engineered fill stratum, overlying two distinct layers of granular glacial outwash, overlying a very dense and thin glacial till, overlying bedrock with surface at approximately 72 feet below ground surface (elevation -60.5 feet). The glacial outwash stratum consisted of an upper varved silt and a lower sand and gravel layer. The bottom of pump station excavation may extend into the outwash sand and gravel layer immediately below the varved silt, once a bottom-of-excavation working platform layer is factored into the pump station's total excavation depth.

  The proposed pump station will be founded on a mat foundation, based upon subsurface information and the project drawings. Due to the required depth of excavation, and close proximity to the existing and functional pump station and influent sewer pipeline, and the property lines, a relatively deep excavation support and dewatering system will be necessary. The excavation support structure is recommended to be left-in-place. Stabilized groundwater was observed at approximately 7 feet below ground surface, elevation +4.3 feet, during March of 2017.

  Excavation dewatering is a critical aspect of the excavation, excavation support, and pump station construction process. The need for a dewatered dry and stable excavation bottom during the entire pump station construction period cannot be over-emphasized. We recommend and it is common practice to construct a stable working platform at excavation bottom, a mud mat or mud slab typically constructed of unreinforced lean concrete or a similar functioning geotextile, geogrid and crushed stone system, constructed over a dry and stable subgrade immediately following excavation. The choice of a mud slab or reinforced crushed stone working platform is a contractor decision based upon their experience, effectiveness of their dewatering system, and conditions at excavation bottom.

- Proposed West Water Street, three (3) concrete box manhole structures: In order to lower the invert of the influent gravity RCP sewer, and within West Water Street, three (3) concrete box manhole structures will be constructed. Each concrete box manhole structure will lower the gravity pipe invert incrementally for a total invert lowering of almost 10 feet, from an initial sewer pipe invert elevation of -2.78 feet to the new pump station intake pipe invert of elevation of -12.30 feet.

  The stratigraphy observed in the vicinity of the proposed box manhole structures (PBA-3), from top to bottom, consisted of a granular road base layer of engineered fill, overlying glacial outwash soils of alternating varved silt and sand/sand and gravel layers. Excavation depths for the West Main Street structures will range between approximately 22 and 27 feet below road surface. From the boring information, bottom of excavation for all three box manhole structures will be within the varved silt layer. Stabilized groundwater level was measured within the West Water Street PBA-3 monitoring well at a depth of approximately 5.3 feet below the ground surface (March of 2017), at elevation +5.2 feet.

  The West Main Street box manhole structures will require excavation support structures, bottom of excavation working platforms, and construction dewatering due to the depths of the excavations and their in-road locations. All support of excavation structures within West Main Street are recommended to be left-in-place and cut-off below road pavement surface at a minimum to avoid damage to new construction.

- Proposed three (3) standard manhole structures located adjacent and north of the proposed and existing pump stations: Down-stream of the box manhole structures, three (3) proposed standard manhole structures will convey the West Main Street's influent gravity sewerage to the proposed pump station. The manhole structures allow pipeline changes in direction. Excavation for the three manhole structures will extend, on average, approximately 28 feet below ground surface, to elevation -16.5 feet. The bottom-of-excavation for the proposed manhole structures will also be founded within the varved silt layer. Refer to the log of boring PBA-2. Construction of the manhole structures will also require excavation support structures, bottom of excavation working platforms, and construction dewatering due to the depth of excavations and excavation locations within aan active roadway, in close proximity to an existing in-service sewer pipe and surface structures, and the property line. Support of excavation structures are recommended to be left-in-place and cut-off below road pavement surface at a minimum to avoid damage to new construction.

- Proposed 48 and 60 inch diameter gravity RCP sewer pipeline connecting the existing West Water Street influent sewer to the proposed pump station: The RCP sewer pipeline will extend between the box and standard manhole structures approximately 260 LF, and will require excavation depths from west to east of between approximately 15 feet (elevation -4.5) and 25 feet (elevation -13.5) below ground surface. The proposed influent gravity

RCP sewer pipeline will be founded at its up-stream western limits within the glacial outwash sand stratum (refer to PBA-3), and at its eastern limit proposed pump station connection within the varved organic silt stratum (refer to PBA-1). Pipeline construction will require excavation support structures, bottom of excavation working platforms, and construction dewatering. Support of excavation structures are recommended to be left-in-place and cut-off below road pavement surface at a minimum to avoid damage to new construction.

- Proposed two (2) adjacent and parallel "twin" 24 inch diameter ductile iron pipe sewer force mains will be constructed from the proposed pump station to the existing sewage treatment plant located approximately ¼ mile south of the pump station. Along a wooded section of the pipeline alignment, the force mains will extend beneath a stream at the approximate station 11+00. At the stream crossing, it is our understanding that the force mains will be located with inverts approximately 7 feet below the current stream bed, and 9 feet below the stream bank adjacent ground surface, bottom of excavation approximately elevation -3.0 feet.

  The borings performed for the twin pipeline stream crossing (PBA-4 and PBA-5) were located on the adjacent stream banks. The stratigraphy observed within these borings consisted, from top to bottom, of a thin organic forest mat, overlying a variably granular glacial outwash stratum, overlying glacial till. The glacial outwash stratum consisted of upper and lower sand and gravel layers "sandwiching" a varved silt layer. At the stream crossing, the bottom of force mains excavation will be approximately 9 feet below top of stream bank within the upper glacial outwash, sand and gravel, layer. Stabilized groundwater level observed within a stream bank monitoring well, March 2017, indicated groundwater at approximately 1.4 feet below ground surface, approximate elevation -0.4.

  At and adjacent to the stream crossing, construction of the force mains will require the temporary diversion of the stream, excavation dewatering, and is anticipated to utilize a combination of open-cut and excavation support, trench box, due to the depth and length of pipeline excavation required.

Based on our evaluation, the following design recommendations have been developed.

6.10 Design Considerations - Pump Station

Based upon subsurface exploration information and an anticipated depth of structure excavation, on the order of 40 feet below existing ground surface, we anticipate that the pump station excavation will extend close to or into the sand and gravel stratum (Glacial Outwash 2) immediately below the varved silt. We recommend construction of a stable working platform at bottom of excavation consisting of a "mud" slab or crushed stone/geotextile/geogrid system layer

constructed over a dewatered dry and stable subgrade. Dependent upon the ultimate thickness of the pump station's base mat, three feet or more of the varved silt stratum could remain. Consideration may be given to the removal of the varved silt below the structure so as to found the pump station on the sand and gravel stratum. The choice of working platform type, mud mat or reinforced crushed stone, at bottom of excavation is a contractor decision based upon their experience, dewatering system efficiency and conditions at bottom of excavation. Typical mud mat or crushed stone/geosynthetic reinforced working platforms are on the order of 6 to 12 inches in thickness, for an adequately dewatered excavation like that considered. It is recommended that the support of excavation structure, steel sheet piling, be left-in-place and cut-off below finished grade. The steel sheet piling is recommended to be utilized for pump station perimeter concrete wall form work, to resist pump station buoyant uplift force, to avoid damage to new construction, and will have other excavation dewatering benefits.

To resist buoyant uplift force, it is anticipated that the pump station will utilize thickened reinforced concrete perimeter walls, mat, and the left-in-place steel sheet pile system. The steel sheet pile system is recommended to be fitted with interior face shear-studs to couple the sheeting with the pump station's reinforced concrete perimeter walls. In this way, extending the sheet pile system deeper than required for purely excavation support, perhaps as deep as the glacial till layer, can be made economical by reducing excavation dewatering flow volumes and pump-water treatment costs, reducing pump station perimeter reinforced concrete wall and base mat thicknesses, and by reducing the potential dewatering impact on the existing adjacent and functioning pump station that is founded above the proposed structure. Pump station perimeter walls are considered rigid structures, requiring at-rest lateral soil pressure force during design.

Allowable mat bearing pressure for the pump station should not exceed four (4) kips per square foot. Estimated total structure settlement will be less than one inch. Settlement will occur almost immediately during construction as the structure is built within the dewatered and sheeted excavation. We anticipate that the dead weight of the pump station structure and sheet pile system can economically exceed the buoyant up-lift force without the need for additional resistance, complication, cost and specialty contractor employment associated with structure tie-down bedrock anchors. Tie down anchors could be employed if during Final Design the required uplift resistance is not achieved by the concrete and steel structure dead load. It is recommended that structure up-lift and resistance calculations utilize as a minimum:

- The 100-year flood water elevation.
- The dry dead weight of structure and engaged sheet pile system, accounting for sheet pile cut-off below finished grade (typically 5 feet, elevation +6.5 feet) and sheet pile tip at or near glacial till surface (approximately 67 feet below existing grade, elevation -55 feet) .
- Soil-on-steel sheet pile frictional resistance, considering:
  - For the surficial non-engineered fill and varved silt (Glacial Outwash 1) strata, the influence of buoyant weight on the sand and gravel strata below,

but not the frictional soil-on-steel sheet pile resistance within these strata.

- For the varved silt (Glacial Outwash 1) and sand and gravel (Glacial Outwash 2) strata, consider their buoyant weights and frictional soil-on-steel sheet pile resistances, without considering that portion of the sheet pile that penetrates into the Glacial Till stratum.

6.20 Design Considerations - West Water Street

Based on subsurface exploration information and anticipated box and standard manhole structure excavation depths ranging between approximately 22 and 27 feet below pavement surface, bottom of excavation for these structures will be within the varved silt stratum. The connecting 48 and 60 inch diameter RCP pipe will require excavation depths, from west to east, of between approximately 15 to 24 feet below pavement surface. Bottom of excavation for the pipeline, from west to east, will initially be within the glacial outwash sand stratum and will then migrate downward into the varved silt. Given the potential for these strata to be sensitive to disturbance and strength degradation during excavation and construction, we recommend that the manhole structures and influent sewer pipeline be founded on a supportive crushed stone/geotextile/geogrid layer placed on the dewatered dry and stable subgrade. The crushed stone/geosynthetic support layer is recommended to consist of a Mirafi FW 402 geotextile, a Tensar TX160 geogrid and MassDOT M2.01.3 or .4 crushed stone.

Allowable footing bearing pressures for the manhole structures should not exceed four (4) kips per square foot. It is estimated that total settlement for this bearing pressure will be one inch or less, and its anticipated to occur, for all practical purposes, immediately as the dead loads are applied. After the dewatering system is shut down following construction, the structure will be subject to buoyant uplift forces from groundwater. These forces will be resisted by the dead weight of the structure and the backfill soil above and beside the structures. If addition uplift resistance is necessary, structure connection with the left-in-place support of excavation system (steel sheet piling) could be employed similar to that recommended for the proposed pump station.

6.30 Design Considerations - Stream Crossing

The twin sewer force mains at the stream crossing are recommended to be supported on minimum 12 inch thick layer of compacted Gravel Borrow layer placed on the granular glacial outwash subgrade. Gravel Borrow should meet the requirements of MassDOT M1.03 type d. Crushed stone as defined by MassDOT M2.01.3 or .4 may be used in lieu of Gravel Borrow, provided it is separated from in situ soils (enveloped, all sides) with a suitable geotextile, recommended to be Mirafi FW402, to mitigate the potential migration of fine material into the crushed stone. Any unsuitable soil or other materials should be removed from below the twin force main pipelines. Dewatering of these excavations will be required. Any disturbed soil at the foundation bearing level should be removed and replaced with compacted Gravel Borrow.

6.40 Seismic Design Considerations

We have considered seismic design requirements in accordance with the requirements of the eighth edition of The Massachusetts State Building Code. Based on the subsurface data collected, it is our opinion that the site soils are not susceptible to earthquake liquefaction. Based on our interpretation of Table 1613.5.2 in the Building Code, we recommend that a site class of D be utilized for design.

6.50 Engineering Parameters

The table below presents engineering parameters for the soils encountered by the test boring program.

Engineering Parameter	Soil Type			
	Non-engineered Fill	Glacial Outwash 1 (varved silt)	Glacial Outwash 2 (sand/sand and gravel)	Glacial Till
Saturated Unit Weight (pcf) Buoyant Unit Weight (pcf)	128 69	117 53	125 65	132 70
Soil Friction Angle (degrees)	28	30	32	34
Wall Friction Angle (degrees) Soil/Formed Concrete	17	14	18	18
Base Sliding Friction (degrees)	22	17	24	24
Wall Friction, Steel Sheet Pile Against Soil (degrees)	0	0	17	17
At-Rest Soil Pressure Coefficient, Ko (level backfill)	0.53	0.50	0.47	0.44
Active Pressure Coefficient, Ka (level backfill)	0.36	0.33	0.31	0.28
Passive Pressure Coefficient, Kp (level backfill)	2.77	3.00	3.25	3.54

6.60 Excavation Support

All temporary excavation slopes up to a depth of 20 feet in soil should be constructed not steeper than 1.5 horizontal to 1 vertical (33°) and in accordance with the requirements of the latest OSHA standards. OSHA requires slopes for excavations greater than 20 feet in depth or any support of excavation structures to be designed by a Professional Engineer licensed in Massachusetts. Temporary excavation support will be required for steeper slopes. A fabric placed on the exposed slope or similar approved method may be required to prevent soil erosion. Surface water should be diverted away from all slopes and excavations.

The earthwork contractor will have the responsibility for selection of excavation support and/or excavation slope lay-back as part of their means and methods. Specifications should require that the contractor submit a design and supporting calculations for excavation support systems, which is consistent with the assumptions and design of the dewatering submittal. The excavation support submittal should be prepared and submitted by a Professional Engineer licensed in the State of Massachusetts. As part of the project specifications, we would recommend that the Contractor be advised to view all available soil samples prior to bidding.

6.61 Pump Station

Given the close proximity of the property line to the north and south, the existing pump station and influent sewage pipeline to the west; and the proposed pump station excavation plan-view extent and depth, construction of the proposed pump station will require excavation support, which is recommended to be left-in-place.

Based on our experience, the most common method of excavation support for the size of excavation required is an internally braced steel sheet pile system. Typically steel sheet piling is driven with a vibratory hammer extending sufficiently below the proposed excavation bottom to reduce groundwater seepage into the excavation. We are recommending that sheets be fitted with hardened steel shoes and driven to be near or into the dense glacial till or onto the bedrock surface in order to: limit the excavation dewatering volume and required treatment, provide additional pump station dead weight to resist uplift force, and to mitigate potential dewatering impact on the immediately adjacent and functional pump station and influent pipeline. The project plans and specifications should make the contractor aware of the underlying site soils, particularly the prominent varved silt stratum that is sensitive to construction activity. These soils are sensitive to vibration in particular, they can become unstable as a result of flawed construction operations, and can be difficult and time consuming to dewater.

6.62 West Water Street

Given the close proximity of the property line, adjacent in-service utilities, the need to maintain the flow of traffic on West Water Street, and the proposed influent sewer structures and pipeline excavation depths, support of excavation structures will be required. It is further recommended that support of excavation structures be left-in-place and cut-off below pavement grade at a minimum to avoid damage to new construction. Based on our experience, the most common method of excavation support utilized on projects such as this one would be internally braced steel sheet piling. Typically steel sheet piling is driven with a vibratory hammer and would extend sufficiently below the proposed excavation grade to help cut-off seepage into the excavation. At this site we believe it will be necessary to extend the sheets well below the bottom of the excavation to assist in the dewatering effort. The project plans and specifications should make the contractor aware of the underlying site soils, particularly the prominent varved silt stratum that is sensitive to construction activity, vibration in particular, which can become unstable as a result of flawed construction operations, and can be difficult and time consuming to dewater.

6.63 Stream Crossing

At the pipeline crossing, the existing stream will need to be temporarily relocated while the force mains are constructed. Some typical methods for stream relocation can include channel diversion, berm, piped and/or pumped diversion.

Excavation for the stream crossing will extend approximately 9 feet below the stream banks and approximately 7 feet below the stream bed. The stream is locate within a wooded area and there is space to open cut the excavation, if allowed by conservation requirements. In lieu of open cut, pipeline construction at the depths indicated typically utilize a trench box or combination open-cut/trench box for speed, efficiency and safety. If steel sheeting is used for diversion of the stream, and also used for support the excavation, it will be recommended to be left-in-place to avoid damage to new construction.

6.70 Dewatering

All excavation and backfill operations must be completed within a dry and stable excavation. The contractor should be required by the project specifications to provide a dewatering system design, including supporting calculations prepared by a Professional Engineer licensed in the State of Massachusetts. Specifications should also require that the contractor divert surface water runoff away from any excavations so that structures and compacted fill are not undermined or otherwise damaged.

6.71 Pump Station

Groundwater was encountered at approximately 7 feet below the ground surface within the area's monitoring well read in March 2017. Groundwater at the time of construction could be higher. The proposed pump station excavation will extend to a depth of approximately 40 feet below ground surface, with bottom of excavation extending near or into the fine to coarse sand, trace silt glacial outwash stratum. Excavation dewatering will be required to draw groundwater level down into the pervious sand layer, close to 35 feet of draw down.

Significant soil strata encountered on site consist of the varved silt extending to near bottom of proposed excavation, approximately 40 feet below ground surface, underlain by a pervious sand layer that extends down to a dense and relatively impervious glacial till layer initiating at a depth below ground surface of approximately 68 feet. We anticipate that dewatering of the excavation will require a complex dewatering system. The system must include equipment to not only remove the groundwater from the silt, but also to depressurize (reduce the piezometric head) in the underlying fine to coarse sand stratum. This will likely require dewatering equipment operating simultaneously within both strata.

The presence of the fine to coarse sand layer encountered underlying the silt at a depth of approximately 5 feet or less below the bottom of excavation poses a significant complication to the required dewatering. This coarse layer will develop excess pressure head when the excavation inside the steel sheeting is proceeding downward and is being dewatered. As this condition develops, the silt layer will tend be displaced upwards and disturb the foundation subgrade as well as impact the excavation support system. For this reason we are recommending that the contractor be required to extend the dewatering system into the fine to coarse sand layer to depressurize this layer. We would recommend that these wells be taken a minimum of ten feet into this stratum. These wells should be drilled within the sheeted excavation and supplemental wells installed in the silt stratum on the base of the excavation to remove the groundwater from it. The filter pack around the wells must be designed to prevent migration of the silt into the well.

We have recommended that support of excavation steel sheet piling be driven to extend to near the glacial till and be left-in-place to limit the excavation dewatering flow rate, and required treatment, to provide additional pump station dead weight to resist uplift force, and to mitigate potential dewatering impact on the immediately adjacent and functional pump station and influent sewer pipeline.

The uncertainty in estimating the quantity of groundwater flow necessary to dewater an excavation is primarily the result of the fact that it is directly a factor of the value of hydraulic conductivity (permeability). The value of hydraulic conductivity of soils can vary by a very broad range, as much as 13 orders of magnitude. As an example, soil classified as sand can vary by as much as three orders of magnitude. As a result, any estimate of groundwater flow in a heterogeneous soil should be considered to be an approximate value.

We have utilized the soil descriptions in the boring logs along with the results of the grain size analyses to develop estimates of hydraulic conductivity of the soil in the Glacial Outwash 1 and Glacial Outwash 2 strata. Our estimate for the varved silt, Glacial Outwash 1, is approximately 7.2×10^{-6} centimeters per second (cps). Our estimate for the fine to coarse sand, little gravel, Glacial Outwash 2, is approximately 3.4×10^{-3} cps. Utilizing these values we have estimated a flow to an unsheeted excavation could be as much as 200 gallons per minute. This flow rate can be significantly reduced by driving the steel sheeting deeper than that depth purely required for excavation support to provide a groundwater cut-off.

We recommend that a groundwater pump test be performed at the proposed pump station site during the project's design phase, in order to estimate/evaluate the construction dewatering flow rates, ground water treatment options and potential costs, the draw down time and areal draw down extent, to provide data for contractor bidding, and the economics of extending the support of excavation sheeting into the groundwater cut-off glacial till layer.

We recommend that a design phase test pit program be implemented around and adjacent to the existing pump station, to explore for the presence of left-in-place steel sheet piling used for the structure's deep excavation construction. If the presence of steel sheet piling can be verified and exposed, we recommend that sheeting length be investigated by a geophysical technique, termed pulse-echo or impact-response. In this way, we can evaluate the potential impact of left-in-place sheeting length and construction dewatering proposed for the (adjacent and deeper) pump station, on the existing pump station structure. For example, if the existing pump station has sheeting left-in-place extending to bedrock, the proposed dewatering may have little to no impact on the existing structure.

We recommend that construction dewatering draw down and maintain ground water level a minimum of five (5) feet below the deepest excavation level. A minimum of two (2) ground water monitoring wells are recommended to be installed and monitored within the pump station excavation. Excavation should not be allowed to start until ground water level and piezometric head has been drawn down to near final level.

6.72 West Water Street

Groundwater was encountered at approximately 5 feet below the ground surface during March 2017 within the West Water Street monitoring well in borehole PBA-3. Groundwater at the time of construction could be higher. It is our understanding that the box and standard manhole structures within and directly east of West Water Street will require excavation depths of between approximately 22 and 27 feet below pavement surface, and that the intermediate 48 and 60 inch diameter RCP influent sewer pipeline construction will require excavation depths of between approximately 15 and 24 feet below pavement surface.

Stratigraphy below West Water Street is very similar to that observed at the proposed pump station site. The bottom of excavation for the box and standard manhole structures will extend into the

varved silt stratum. The bottom of excavation for the intermediate RCP influent pipeline, from west to east, will extend into the glacial outwash sand at its western limit and into the varved silt stratum through most of its progression eastward to termination at the proposed pump station.

Excavation dewatering will be required to draw groundwater level to a minimum of five (5) feet below the deepest excavation bottom, a maximum ground water draw down of close to 30 feet. It is anticipated that the West Water Street excavation dewatering will be by a well point system. Dewatering the varved silt can be difficult, time consuming and dewatering well points and filter packs need to be precisely designed, based upon the fine grained varved silt gradation in order to prevent clogging. The sand stratum beneath the varved silt is close enough to the proposed excavation bottom that it must be depressurized to preclude an unstable bottom of excavation. These wells should penetrate a minimum of ten feet into the sand stratum and reduce the piezometers head in the sand to the elevation of the lowered head within the varved silt.

At this time, we recommend that construction dewatering draw down and maintain ground water level a minimum of five (5) feet below the deepest excavation level. We recommend that groundwater monitoring wells be installed and a program of well reading initiated prior to excavation start. Manhole structures and pipeline excavation should not be allowed to begin until ground water level has been drawn down to final level.

6.73 Twin Force Mains Stream Crossing

Groundwater was encountered at approximately 1.4 feet below the ground surface (elevation +4.6 feet) during March 2017 within the monitoring well located on the stream bank. Ground/stream water level at the time of construction could be higher. It is our understanding that excavation for the force mains will extend to approximately 9 feet below stream bank level (elevation -3.0 feet), within the glacial outwash sand stratum. Stream crossing excavation for the force mains construction will extend almost 8 feet below groundwater level. The stream crossing is located within an undeveloped wooded area. The soils to be encountered at the bottom of the excavation consist of a fine to coarse sand, trace gravel, trace silt, which may result in relatively large dewatering flow volumes. Groundwater should be lowered to a level of two (2) feet below the bottom of excavation. We anticipate that dewatering of these excavations may be accomplished with a series of gravel packed wells. We anticipate that the force mains construction will advance quicky through the wooded alignment section, advanced by a combination of open cut with trench box use. Temporary stream diversion will be required. The wooded stream crossing is one of the shallowest force main excavation areas.

6.80 Pre/Post Construction Surveys, Vibration and Movement Monitoring

Construction vibrations caused by the installation of the excavation support systems could result in densification of granular soils beneath nearby structures and utilities causing settlement. We recommend that PBA be hired to conduct pre and post-construction surveys of nearby structures prior to and post project construction. Typically these surveys extend to structures located with approximately 200 feet of proposed construction work. A review of the pump station and

West Main Street construction area indicates that there are two structures besides the existing pump station within 200 feet the proposed construction: 740 West Water Street owned by Bay State Crucible and 700 West Water Street owned by Industrial Realty Properties. The purpose of the surveys are to document the existing condition of buildings and other significant structures in the event that these facilities are alleged to have been damaged due to the construction work. The survey results are in the form of documentation photographs, video recordings, sketches and text in a report format.

The Contractor should be required by the specifications to conduct their operations without causing damage to adjacent structures. In addition, they should limit vibrations to levels which are not likely to cause damage to nearby structures, usually a peak particle velocity of 0.5 inch per second for single event vibrations and 0.3 inch per second for continuous vibration events. We recommend that PBA be hired to monitor construction vibrations at the nearest property line during vibration producing construction operations, principally excavation support structure systems. Project specifications should indicate construction vibration threshold values that would trigger construction procedure review or suspension until a satisfactory alternate construction approach can be determined.

Project specifications should include a pre and post-construction survey of adjacent structures, with particular attention paid to the existing and functional pump station and the commercial building located at 700 West Main Street, on the south side of the street. At a minimum, project specifications should include an existing pump station and commercial building monitoring program, by survey and/or other methods, to evaluate and assess structure movement during the proposed construction process. The design of the pump station and West Main Street manhole and pipeline structure's excavation support system, must be integral with the construction dewatering plan and adjacent structure monitoring program.

6.90 Subgrade Preparation and Protection

Subgrade preparation for the below grade sewer structures: pump station and manhole structures within and adjacent to West Main Street are recommended to consist of the construction of a firm and supportive working platform at bottom of excavation, installed over a dewatered dry and stable subgrade base. The working platform is recommended to be a "mud" slab or crushed stone/geotextile/geogrid system. A mud slab is typically constructed of lean concrete. A crushed stone/geosynthetic platform is recommended to consist of components: Mirafi FW 402 geotextile, Tensar TX160 geogrid, and MassDOT M1.03.0 type d Gravel Borrow or MassDOT M2.01.3 or .4 crushed stone. The type and thickness of the working platform, mud slab or reinforced crushed stone system, at bottom of excavation is a contractor decision based upon experience, effectiveness of their dewatering system, and observed conditions at bottom of excavation. The excavation support systems, anticipated to be steel sheet piling, is recommended to remain-in-place for all deep sewer structure and pipeline excavations. The context of deep excavation subgrade preparation and working platform is within a sheeted, adequately dewatered and stable bottom of excavation.

Bottom of excavation subgrade soil will vary with location and excavation depth. The pump station's excavation will extend approximately 40 feet below existing grade and terminate in the varved silt or the sand and gravel stratum. The box and standard manhole structures within and adjacent and east of West Main Street will require excavation depths of between approximately 22 and 27 feet below road surface, and will terminate in a varved silt stratum. The 48 and 60 inch diameter RCP sewer influent pipeline connecting the existing West Main Street sewer and the proposed pump station will require excavation depths between approximately 15 and 24 feet below pavement surface and bottom of excavation will be, from west to east, initially within the glacial outwash sands and predominantly within the organic and non varved silt stratum. At the stream crossing, the twin force mains will require an approximate 9 foot deep excavation below top of stream bank that will terminate within a granular glacial outwash sand.

A word of caution, excavations terminating within the varved silt stratum will not be stable unless adequately dewatered, and the exposed varved silt surface will be very sensitive to degrade with minimal exposure to the elements and/or construction activity. Initial compaction of granular fills directly above the varved silt may need to utilize reduced fill lift thickness and static rolling to maintain excavation bottom stability. The working platform at bottom of excavation should be constructed as soon as possible after subgrade exposure.

All final machine excavation work is recommended to utilize a bucket with smooth, flat leading edge, i.e. no bucket "teeth," to minimize subgrade disturbance.

6.100 Backfill & Compaction Requirements

All structural fill should be placed in horizontal lifts and compacted. Filling underneath structures and pavements should be accomplished with structural fill or crushed stone, as defined below, unless otherwise indicated.

U.S. Standard Sieve Size	Crushed Stone Percent Passing, by Weight	Structural Fill Percent Passing, by Weight
3-inch		100
1-inch	100	
3/4-inch	75-85	
½-inch	10-40	50-85
3/8-inch	0-20	45-80
No. 4	0-5	40-75
No. 40		0-45
No. 200		0-10

Compaction of all fill underlying structures should be to a minimum of 95 percent of the maximum material dry density as determined by ASTM D-1557, the modified Proctor density test. Under

paved areas, fill and backfill should be compacted to 90% of the maximum material dry density, except the top two (2) feet supporting pavement, which should be compacted to 95%. Lift thicknesses should be appropriate for the compaction equipment being utilized. Specifications should require that the Contractor adjust lift thickness to meet required compaction. In no case should lift thickness exceed 12 inches.

All backfill supporting or adjacent to pipelines should be compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D-1557. General trench backfill should be placed in one foot lifts with excavated soil providing that the water content facilitates proper compaction and that any organic soil and/or unsuitable material has been separated and removed. The general trench backfill should be compacted to 92% of the maximum material dry density to within one foot of the subgrade layer. The top foot of backfill supporting pavement should consist of Gravel Borrow and should be compacted to 95% of the maximum material dry density. The remainder of the trench can be backfilled in one foot lifts with excavated soil providing that the water content facilitates proper compaction and that any organic soil and/or unsuitable material has been separated and removed.

6.110 Reuse of Excavated Site Soils

The visual descriptions of the existing site soils to be excavated indicate that these materials will generally not meet structural fill criteria, in particular the ubiquitous varved silt stratum. It should be noted that when the percentages of fines exceed approximately 10 percent by weight, the soil tends to be poorly draining and if the water content when excavated is greater than the optimum compaction water content, then handling and compaction becomes very difficult to accomplish. Drying of these soils to a water content that facilitates compaction can take relatively long periods of time, particularly during wet and cooler/cold seasons. For these reasons reuse of soils with fines exceeding 10 percent are not recommended for structural purposes. Any material proposed for reuse should be tested for compliance with the specification criteria for reuse. On-site granular soils which do not meet the recommended criteria for structural use Fill could be used, for example, as general trench backfill above the sewer force main within the wooded section of the alignment.

7.00 FINAL DESIGN & CONSTRUCTION MONITORING

It is recommended that PBA be allowed the opportunity to perform additional work during the final design and construction phases of this project. The purpose of these recommendations is to assist the design team with construction documents, to review compliance of the construction documents and the construction with these recommendations and document this construction. This work could include the following:

- Preparation or review of excavation support and dewatering specifications.
- It is recommended that a geotechnical engineer be present during below grade construction to monitor the installation of excavation support systems, groundwater levels and dewatering system adequacy.
- Review of contractor submittals for excavation support and dewatering work prior to work performance.
- Monitoring of excavations prior to structure foundation construction to inspect the adequacy of subgrade condition, to ensure that all unsuitable material has been removed, and to monitor the placement and compaction of fill materials.
- Performance of pre and post construction surveys of structures within 200 feet of the proposed construction.
- Performance of construction vibration monitoring during those vibration generating construction facets, e.g. installations of excavation support systems and compaction of soils.

We appreciate to have been of service to you and we trust the information contained in this report is adequate for your needs at this time. Please contact the undersigned if there are questions on these recommendations or if you need additional information.

Very truly yours,

PAUL B. ALDINGER & ASSOCIATES, INC.

Paul B. Aldinger, Ph.D., P.E.
Chief Engineer

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FIGURES

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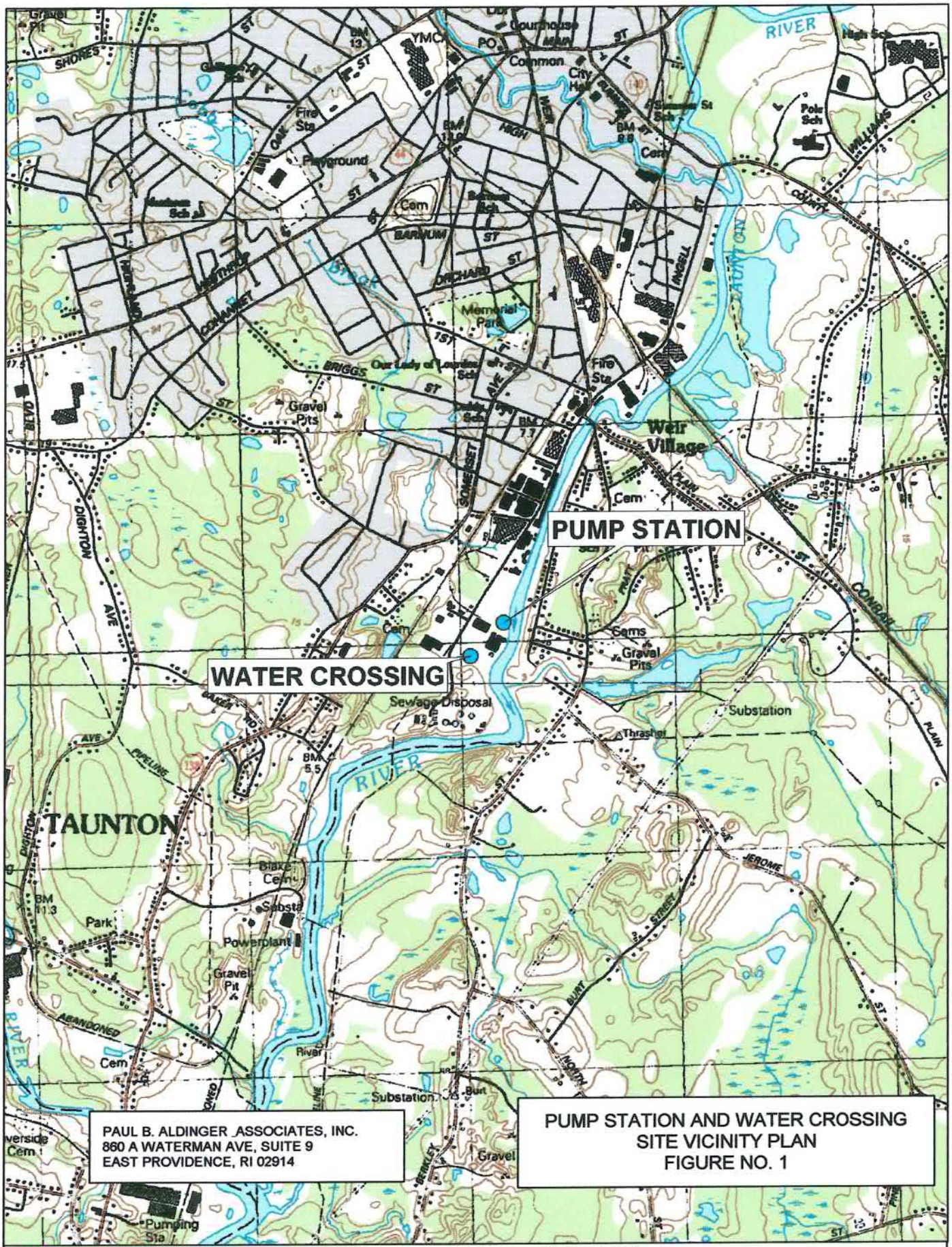
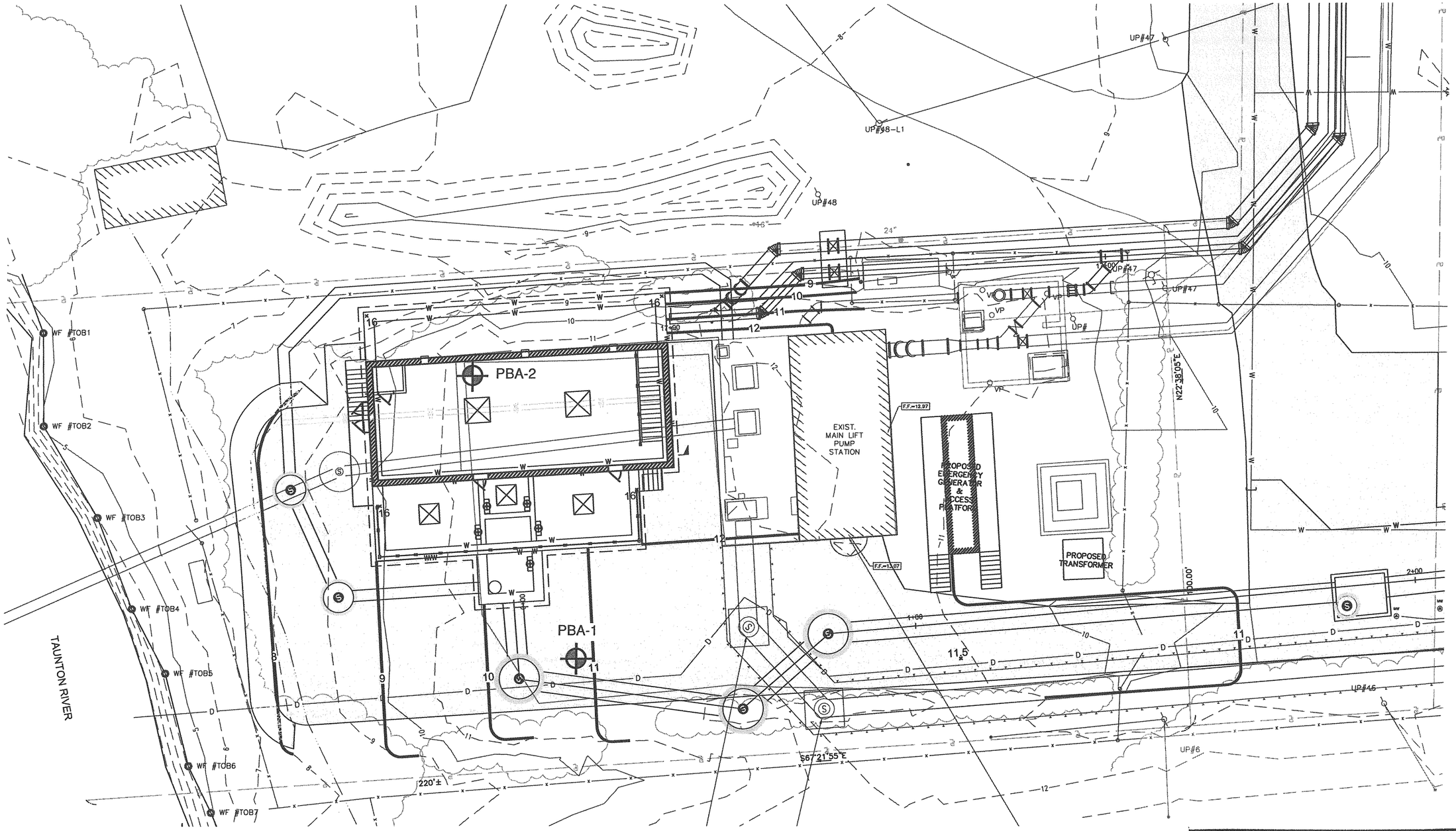


PAUL B. ALDINGER ASSOCIATES, INC.
860 A WATERMAN AVE, SUITE 9
EAST PROVIDENCE, RI 02914

PUMP STATION AND WATER CROSSING
SITE VICINITY PLAN
FIGURE NO. 1



NOTE:

DEVELOPED FROM PLAN TITLED "MAIN LIFT PUMP STATION - SITE GRADING PLAN" DATED MARCH 2017 BY BETA GROUP OF LINCOLN, RI.

LEGEND:

PBA-1 — APPROXIMATE LOCATION OF TEST BORING COMPLETED ON FEBRUARY 27 AND MARCH 3, 2017 BY NEW ENGLAND BORING CONTRACTORS FROM BROCKTON, MA

10 0 10 20

PUMP STATION AND STREAM CROSSING
Taunton, MA

SUBSURFACE EXPLORATION PLAN

PAUL B. ALDINGER AND ASSOCIATES, INC.
Consulting in Geotechnical Engineering and Geohydrology

Scale:	Date:	Figure No:
1" = 20'	AUG 2017	2A

EXIST 24" DI FM

11+00

PBA-5

PBA-4

SEWER LINE (MARKED IN FIELD)

IR(FND)FLUSH

WF #B6

WF #B5

WF #B4

WF #B3

WF #B2

WF #B1

LANDFILL

ST 20" DI FM OUTSIDE
OPOSED FM ALIGNMENT
BE CUT, CAPPED &
ANDONED IN PLACE

STREAM

12+00

PROP. 24" DI FM FROM NEW MAIN LIFT PUMP STATION (TYP OF 2)

WF #UP2

WF #UP3

WF #UP1

WF #A15

WF #A14

WF #A16

WF #UP4

WF #UP9

13+00

WF #UP5

WF #UP8

WF #A17

BIT.

WF #UP6

WF #UP7

UP#50

WF #A18

CONC

740 WATER STREET

WF #A19

WF #A20

WF #A21

WF #A22

20 0 20 40

NOTE:

DEVELOPED FROM A PLAN TITLED "FORCE MAIN 10+00 to 15+00" DATED MARCH 2017 BY BETA GROUP.

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PBA-1

LEGEND:

APPROXIMATE LOCATION OF TEST BORING COMPLETED ON FEBRUARY 27 AND MARCH 3, 2017 BY NEW ENGLAND BORING CONTRACTORS FROM BROCKTON, MA

PUMP STATION AND STREAM CROSSING
Taunton, MA

SUBSURFACE EXPLORATION PLAN

PAUL B. ALDINGER AND ASSOCIATES, INC.
Consulting in Geotechnical Engineering and Geohydrology

Scale:	Date:	Figure No:
1" = 40'	JULY 2017	2B

WHERE ENCOUNTERED DURING THE WORK. SEGREGATE PIPING AND DISPOSE SEPARATELY FROM SOIL

IN
700 W
ASSES

EXIST. MAIN LIFT PUMP STATION

F.F.=12.97

PROPOSED EMERGENCY GENERATOR & ACCESS PLATFORM

F.F.=13.07

CONNECT TO EXISTING WITH 8" X 8" TS&V

RELOCATE EXIST. WATER MAIN

CUT & CAP WATERMAIN UPON SUCCESSFUL DISINFECTION OF NEW MAIN

CONNECT TO EXISTING WITH 8" X 8" TS&V

8" WATER

PBA-3

1+00

2+00

4+

11.5

10" DRAIN

39" RCP

36" RCP

BROKEN LINE

GATE

THICK CEDAR LINE

OVERGROWN BRUSH

UP#6

6"H CLF

UP#NO

GRS

BIT.

PROP. SMH B

PROP. SMH C

PROP. SMH A

CUT & DISPOSE SHEETING AS REQUIRED TO ACCOMMODATE THE NEW WORK

Exist. SMH
Sta. 3+33
Rim = 11.07±
Inv. In (8" PVC S)=2.47
Inv. In (39" RCP W)=-2.78
Inv. Out (39" RCP E)=2.78

40' WIDE RIGHT OF WAY
SEE DEED BOOK 384, PG 695
BENEFITS INDUSTRIAL REALTY PROPERTIES & CITY OF TAUNTON

PROJECT BENCHMARK
XCUT STEP CENTER
ELEV=13.00' (NAVD88)

APPROXIMATE LIMIT OF SHEETING (2' BCL)

N/F
BROCKTON TAUNTON GAS CO

20 0 20 40

NOTE:

DEVELOPED FROM PLAN TITLED "MAIN LIFT PUMP STATION - INFLUENT SEWER PLAN AND PROFILE" DATED MARCH 2017 BY BETA GROUP OF LINCOLN, RI.

LEGEND:

PBA-1 — APPROXIMATE LOCATION OF TEST BORING COMPLETED ON FEBRUARY 27 AND MARCH 3, 2017 BY NEW ENGLAND BORING CONTRACTORS FROM BROCKTON, MA

PUMP STATION AND STREAM CROSSING
Taunton, MA

SUBSURFACE EXPLORATION PLAN

PAUL B. ALDINGER AND ASSOCIATES, INC.
Consulting in Geotechnical Engineering and Geohydrology

Scale:	Date:	Figure No:
1" = 20'	AUG 2017	2C

APPENDIX A

LIMITATIONS

APPENDIX A

LIMITATIONS

A. Explorations

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

2. The generalized soil profiles described in the text and shown on the figures are 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.

3. Water level readings have been made in the drill holes at times and under conditions stated on the boring logs. These data have been reviewed and interpretations have been made in the text of this report; however, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, tide and other factors occurring since the time measurements were made.

B. Review

1. 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 are modified or verified in writing by Paul B. Aldinger & Associates, Inc. It is recommended that this firm be provided the opportunity for a general review of final design and specifications, in order that earthwork and foundation recommendations may be properly interpreted and implemented in the design and specifications.

C. Construction

1. It is recommended that this firm be retained to provide soil engineering services during construction of the excavation and foundation phases of the work. This is to observe compliance with the design concepts, specifications, or recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

D. Use of Report

1. This report has been prepared for the exclusive use of BETA Group, Inc. for specific application to the proposed Pump Station and Stream Crossing in Taunton, Massachusetts in accordance with generally accepted soil and foundation engineering practices. No warranty, express or implied, is made.

2. This report may contain comparative cost estimates for the purpose of evaluating alternative construction schemes. These estimates may also involve approximate quantity evaluations. It should be noted that quantity estimates may not be accurate enough for construction bids. Since Paul B. Aldinger & Associates, Inc. has no control over labor and materials cost and design, the estimates of construction costs have been made on the basis of experience. We cannot guarantee the accuracy of cost estimates as compared to contractors' bids for construction costs.

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APPENDIX B

TEST BORING LOGS

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Client Name	New Hampshire Boring, Inc.	Sheet 1 of 2	Boring No. PBA-1
P. B. Aldinger & Associates	1215 W. Chestnut Street Brockton, MA 02301	NEBC JOB No: 36951	PBA Job No. 17006
City/Town: Taunton, Ma.		PROJECT NAME: Pump Station & Water Crossing	

Location: Pump Station, North	Date & Time Started	Date & Time Completed	Total Hours Worked
Groundwater Depth (Feet): 8.0' E.O.B. 7.2' on 3/3/17	2/27/2017	2/28/2017	
DRILLER: Norman Studdard	HELPER:		
Ground Elevation: +11.5'	Inspector's Name: Bryan Deely	Inspector's Company: P.B. Aldinger	

Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches 0-6	6-12	12-18	18-24	Recovery (inches)	Field Description	Strata Changes
							ASPHALT	3"
S-1	6" - 2'6"	44	33	28	47	12"	Medium dense, brown FINE TO COARSE SAND, little gravel, little inorganic silt (Fill).	
S-2	4'- 6'	26	13	13	8	6"	Medium dense, brown INORGANIC SILT, little fine to coarse sand (Fill).	FILL
S-3	9' - 11'	18	7	3	3	5"	Loose, gray INORGANIC SILT, little fine to coarse sand (Fill).	
S-4	14' - 16'	7	3	2	4/5"	18"	Loose, gray INORGANIC SILT, little fine to coarse sand, WOOD at 16 (Fill)'.	16'
S-5	19' - 19'3"	100/3"				3"	WOOD.	20'
S-6	24' - 26'	26	13	16	26	19"	Medium dense, gray VARVED INORGANIC SILT.	
S-7	29' - 31'	11	13	18	26	14"	Medium dense, gray INORGANIC SILT.	
							Medium dense, brown FINE TO MEDIUM SAND, trace inorganic silt.	
S-8	34' - 36'	8	7	7	6	24"	Medium dense, gray, VARVED INORGANIC SILT.	SILT
S-9	39' - 41'	10	19	17	13	11"	Medium dense, gray INORGANIC SILT.	40'
S-10	44' - 46'	29	27	26	18	12"	Wet, very dense, gray, FINE TO COARSE SAND, trace inorganic silt, trace gravel.	
S-11	49' - 51	27	9	8	7	12"	Medium dense, gray, FINE TO COARSE SAND, little gravel, trace inorganic silt.	FINE TO COARSE SAND

Remarks: E.O.B. = End of boring

Casing Used: HW and NW

Casing Size: 4" and 3"

Hammer Weight 300lbs.

Split Spoon Size: 1 3/8" ID X 24"

Hammer Weight 140lbs.

Drill Rig Type: CME 75 Truck Mount

Penetration Resistance (N) Guide

Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Silts, Clays)	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance
Very Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Medium Dense	10 - 30	Medium Stiff	4 - 8
Dense	30 - 50	Stiff	8 - 15
Very Dense	Over 50	Very Stiff	15 - 30
		Hard	Over 30

N = Sum of Second and Third 6" Blow Counts

Second Entry of Descriptions: and = 35-50%, some = 20-35%, little 10-20%, trace = 10% or less

Client Name	New Hampshire Boring, Inc.	Sheet 2 of 2	Boring No. PBA-1
P. B. Aldinger & Associates	1215 W. Chestnut Street Brockton, MA 02301	NEBC JOB No: 36951	PBA Job No. 17006
City/Town: Taunton, Ma.		PROJECT NAME: Pump Station & Water Crossing	

Location: Pump Station, North	Date & Time Started	Date & Time Completed	Total Hours Worked
Groundwater Depth (Feet): 8.0' E.O.B. 7.2' on 3/3/17	2/27/2017	2/28/2017	
DRILLER: Norman Studdard	HELPER:		
Ground Elevation: +11.5'	Inspector's Name: Bryan Deely	Inspector's Company: P.B. Aldinger	

Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches 0-6	6-12	12-18	18-24	Recovery (inches)	Field Description	Strata Changes
S-12	54' - 56	17	10	11	14	7"	Medium dense, gray FINE TO COARSE SAND, trace inorganic silt.	FINE TO COARSE SAND
S-13	59' - 61'	33	23	38	26	12"	Very dense, gray FINE TO COARSE SAND, some gravel, trace inorganic silt.	63'
S-14	64'- 66'	21	28	39	30	17"	Very dense, gray FINE SAND.	F. SAND 68'
S-15	69' - 71'	42	68	56	51	12"	Very dense, gray FINE TO COARSE SAND AND GRAVEL, trace inorganic silt (Glacial Till).	TILL 72'
S-16	74'	100/0"					Probable Bedrock	BEDROCK 74'
							Bottom of Exploration = 74'	
							Installed Groundwater Monitoring Well to 45 foot depth	
							Stabilized Groundwater reading 7.21 feet below pavement surface, March 3, 2017	

Remarks: E.O.B. = End of Boring

Casing Used: HW and NW

Casing Size: 4" and 3"

Hammer Weight 300lbs.

Split Spoon Size: 1 3/8" ID X 24"

Hammer Weight 140lbs.

Drill Rig Type: CME 75 Truck Mount

Penetration Resistance (N) Guide

Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Silts, Clays)	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance
Very Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Medium Dense	10 - 30	Medium Stiff	4 - 8
Dense	30 - 50	Stiff	8 - 15
Very Dense	Over 50	Very Stiff	15 - 30
		Hard	Over 30

N = Sum of Second and Third 6" Blow Counts

Second Entry of Descriptions: and = 35-50%, some = 20-35%, little 10-20%, trace = 10% or less

Client Name	New Hampshire Boring, Inc.	Sheet 1 of 2	Boring No. PBA-2
P. B. Aldinger & Associates	1215 W. Chestnut Street Brockton, MA 02301	NEBC JOB No: 36951	PBA Job No. 17006
City/Town: Taunton, Ma.		PROJECT NAME: Pump Station & Water Crossing	

Location: Pump Station, South	Date & Time Started	Date & Time Completed	Total Hours Worked
Groundwater Depth (Feet): 8.0' E.O.B.	2/28/2017	3/1/2017	
DRILLER: Norman Studdard	HELPER:		
Ground Elevation: +11.5'	Inspector's Name: Bryan Deely	Inspector's Company: P.B. Aldinger	

Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches 0-6	6-12	12-18	18-24	Recovery (inches)	Field Description	Strata Changes
							ASPHALT	3"
S-1	6" - 2'6"	8	14	17	12	15"	Dense, brown FINE TO COARSE SAND, little gravel, trace inorganic silt, (Fill.)	
S-2	4'- 6'	18	7	7	9	17"	Medium dense, gray FINE TO COARSE SAND, some inorganic silt, little gravel.	FILL
S-3	9' - 11'	8	8	8	11	15"	Medium dense, brown FINE TO MEDIUM SAND, trace inorganic silt, (Fill.)	
S-4	14' - 16'	18	12	13	11	20"	Medium dense, mottled, orange-gray SILT (Fill).	15'
							Medium dense, gray FINE TO COARSE SAND, little silt.	17'
S-5	19' - 21'	13	8	7	11	3"	Medium dense, gray INORGANIC SILT.	
S-6	24' - 26'	16	12	8	9	19"	Medium dense, gray, varved INORGANIC SILT.	SILT
S-7	29' - 31'	7	7	8	9	21"	Wet, medium dense, light brown, varved INORGANIC SILT.	
S-8	34' - 36'	9	8	5	7	23"	Wet, medium dense, light brown, varved INORGANIC SILT.	38.5'
S-9	39' - 41'	31	17	9	12	8	Wet, medium dense, gray FINE TO COARSE SAND AND GRAVEL, some inorganic silt.	
S-10	44' - 46'	15	7	8	9	2"	Wet, medium dense, gray FINE TO COARSE SAND trace inorganic silt.	FINE TO COARSE SAND
S-11	49' - 51'	12	12	15	15	18"	Wet, medium dense, gray FINE TO COARSE SAND, little gravel, trace inorganic silt.	

Remarks: E.O.B. = End of boring

Casing Used: HW and NW

Casing Size: 4" and 3"

Hammer Weight 300lbs.

Split Spoon Size: 1 3/8" ID X 24"

Hammer Weight 140lbs.

Drill Rig Type: CME 75 Truck Mount

Penetration Resistance (N) Guide

Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Silts, Clays)	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance
Very Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Medium Dense	10 - 30	Medium Stiff	4 - 8
Dense	30 - 50	Stiff	8 - 15
Very Dense	Over 50	Very Stiff	15 - 30
		Hard	Over 30

N = Sum of Second and Third 6" Blow Counts

Second Entry of Descriptions: and = 35-50%, some = 20-35%, little 10-20%, trace = 10% or less

Client Name	New Hampshire Boring, Inc.	Sheet 2 of 2	Boring No. PBA-2
P. B. Aldinger & Associates	1215 W. Chestnut Street Brockton, MA 02301	NEBC JOB No: 36951	PBA Job No. 17006
City/Town: Taunton, Ma.		PROJECT NAME: Pump Station & Water Crossing	

Location: Pump Station, South	Date & Time Started	Date & Time Completed	Total Hours Worked
Groundwater Depth (Feet): 8.0' E.O.B.	2/28/2017	3/1/2017	
DRILLER: Norman Studdard	HELPER:		
Ground Elevation: +11.5'	Inspector's Name: Bryan Deely	Inspector's Company: P.B. Aldinger	

Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches 0-6	6-12	12-18	18-24	Recovery (inches)	Field Description	Strata Changes
S-12	54' - 56	5	6	11	12	18"	Medium dense, gray FINE TO COARSE SAND, trace gravel, trace inorganic silt.	FINE TO COARSE SAND
S-13	59' - 61'	22	15	12	15	24"	Medium dense, gray FINE TO COARSE SAND, trace gravel, trace silt.	
S-14	64' - 65'5"	19	47	100/5"		14"	Very dense, gray FINE TO MEDIUM SAND, trace inorganic silt.	67'
S-15	69' - 71'	122	39	32	45	15"	Very dense, gray FINE TO COARSE SAND AND GRAVEL, little inorganic silt (Glacial Till).	TILL 71'
S-16	74'	100/0"					Probable BEDROCK	BEDROCK 74'
							Bottom of Exploration = 74'	

Remarks: E.O.B. = End of boring

Casing Used: HW and NW

Casing Size: 4" and 3"

Hammer Weight 300lbs.

Split Spoon Size: 1 3/8" ID X 24"

Hammer Weight 140lbs.

Drill Rig Type: CME 75 Truck Mount

Penetration Resistance (N) Guide

Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Silts, Clays)	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance
Very Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Medium Dense	10 - 30	Medium Stiff	4 - 8
Dense	30 - 50	Stiff	8 - 15
Very Dense	Over 50	Very Stiff	15 - 30
		Hard	Over 30

N = Sum of Second and Third 6" Blow Counts

Second Entry of Descriptions: and = 35-50%, some = 20-35%, little 10-20%, trace = 10% or less

Client Name	New Hampshire Boring, Inc.	Sheet 1 of 1	Boring No. PBA-3
P. B. Aldinger & Associates	1215 W. Chestnut Street Brockton, MA 02301	NEBC JOB No: 36951	PBA Job No. 17006
City/Town: Taunton, Ma.		PROJECT NAME: Pump Station & Water Crossing	

Location: West Water St. Sewer Structures	Date & Time Started	Date & Time Completed	Total Hours Worked
Groundwater Depth (Feet): 5.0' E.O.B. 5.3' on 3/3/17	3/2/2017	3/2/2017	
DRILLER: Norman Studdard	HELPER:		
Ground Elevation: + 10.5'	Inspector's Name: Bryan Deely	Inspector's Company: P.B. Aldinger	

Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches 0-6	6-12	12-18	18-24	Recovery (inches)	Field Description	Strata Changes
							ASPHALT	4"
S-1	6" - 2'6"	49	27	21	15	15	Dense, gray FINE TO COARSE SAND, some gravel, little inorganic silt, (Fill.)	FILL 4'
S-2	4'- 6'	21	5	2	2	24"	Loose, mottled gray INORGANIC SILT.	SILT 7'
S-3	9' - 11'	12	10	13	15	17"	Medium dense, orange/brown FINE TO MEDIUM SAND, trace coarse sand, trace inorganic silt.	SAND
S-4	14' - 16'	15	12	13	11	17"	Medium dense, gray FINE TO MEDIUM SAND, trace silt.	17'
S-5	19' - 21'	9	11	8	8	23"	Medium dense, gray VARVED INORGANIC SILT.	
S-6	24' - 26'	4	6	6	7	20"	Medium dense, INORGANIC SILT with varves of fine sand.	
S-7	29' - 31'	5	6	6	8	19"	Medium dense, gray VARVED INORGANIC SILT.	SILT
S-8	34' - 36'	6	8	10	11	18"	Medium dense, gray VARVED INGORANIC SILT.	
S-9	39' - 41'	9	5	5	8	20"	Medium dense, gray VARVED INORGANIC SILT.	41'
S-10	44' - 46'	14	6	6	8	12"	Medium dense, gray FINE TO COARSE SAND, trace gravel, trace fine sand.	FINE TO COARSE SAND
S-11	49' - 51'	9	6	9	10	8"	Medium dense, gray FINE TO COARSE SAND, trace gravel, trace inorganic silt.	51'
							Bottom of Exploration = 51'	
							Installed Groundwater Monitoring Well to 45 foot depth	
							Stabilized Groundwater reading 5.3 feet below pavement surface, March 3, 2017	

Remarks: E.O.B. = End of boring

Boring location in West Water Street

Casing Used: HW and NW

Casing Size: 4" and 3"

Hammer Weight 300lbs.

Split Spoon Size: 1 3/8" ID X 24"

Hammer Weight 140lbs.

Drill Rig Type: CME 75 Truck Mount

Penetration Resistance (N) Guide

Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Silts, Clays)	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance
Very Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Medium Dense	10 - 30	Medium Stiff	4 - 8
Dense	30 - 50	Stiff	8 - 15
Very Dense	Over 50	Very Stiff	15 - 30
		Hard	Over 30

N = Sum of Second and Third 6" Blow Counts

Second Entry of Descriptions: and = 35-50%, some = 20-35%, little 10-20%, trace = 10% or less

Client Name	New Hampshire Boring, Inc.	Sheet 1 of 1	Boring No. PBA-4
P. B. Aldinger & Associates	1215 W. Chestnut Street Brockton, MA 02301	NEBC JOB No: 36951	PBA Job No. 17006
City/Town: Taunton, Ma.		PROJECT NAME: Pump Station & Water Crossing	

Location: Water Crossing, North	Date & Time Started	Date & Time Completed	Total Hours Worked
Groundwater Depth (Feet): 2.0' E.O.B. 1.4' on 3/3/17	3/2/2017	3/2/2017	
DRILLER: Norman Studdard	HELPER:		
Ground Elevation:	Inspector's Name: Bryan Deely	Inspector's Company: P.B. Aldinger	

Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches 0-6	6-12	12-18	18-24	Recovery (inches)	Field Description	Strata Changes
							FOREST MAT	3"
S-1	0' - 2'	2	2	3	5	18"	Loose, gray FINE TO COARSE SAND AND SILT, little Gravel.	
S-2	4'- 6'	7	9	10	10	12"	Medium dense mottled orange/gray FINE TO MEDIUM SAND, trace Silt.	FINE TO COARSE SAND
S-3	9' - 11'	3	4	4	6	8"	Loose, orange-brown FINE TO COARSE SAND, trace fine Gravel, trace inorganic Silt	13'
S-4	14' - 16'	4	5	5	4	14"	Medium dense gray INORGANIC SILT	
S-5	19' - 21'	3	4	5	8	17"	Loose, gray varved INORGANIC SILT	SILT
S-6	24' - 26'	4	5	5	7	12"	Medium dense, gray varved INORGANIC SILT	29'
S-7	29' - 31'	6	8	9	9	12"	Medium dense, gray FINE TO COARSE SAND, little Gravel, little inorganic Silt.	
S-8	34' - 36'	9	5	8	11	10"	Medium dense brown FINE TO COARSE SAND AND GRAVEL, little inorganic Silt.	FINE TO COARSE SAND
S-9	39' - 41'	5	6	13	30	12"	Medium dense, brown FINE TO COARSE SAND, little Gravel, little inorganic Silt.	
S-10	44' - 46'	5	10	5	8	13"	Medium dense, gray FINE TO MEDIUM SAND, trace inorganic Silt.	48'
S-11	49' - 50'4"	67	76	48	38	11"	Very dense, gray FINE TO COARSE SAND, some Gravel, little inorganic Silt. (Glacial Till)	TILL 52'
							Possible BEDROCK	BEDROCK 54'
							Bottom of Exploration = 54'	

Remarks: E.O.B. = End of boring
Installed Groundwater Monitoring Well to 15 foot depth

Casing Used: HW and NW

Casing Size: 4" and 3"

Hammer Weight 300lbs.

Split Spoon Size: 1 3/8" ID X 24"

Hammer Weight 140lbs.

Drill Rig Type: CME 75 Truck Mount

Penetration Resistance (N) Guide

Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Silts, Clays)	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance
Very Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Medium Dense	10 - 30	Medium Stiff	4 - 8
Dense	30 - 50	Stiff	8 - 15
Very Dense	Over 50	Very Stiff	15 - 30
		Hard	Over 30

N = Sum of Second and Third 6" Blow Counts

Second Entry of Descriptions: and = 35-50%, some = 20-35%, little 10-20%, trace = 10% or less

Client Name	New Hampshire Boring, Inc.	Sheet 1 of 1	Boring No. PBA-5
P. B. Aldinger & Associates	1215 W. Chestnut Street Brockton, MA 02301	NEBC JOB No: 36951	PBA Job No. 17006
City/Town: Taunton, Ma.		PROJECT NAME: Pump Station & Water Crossing	

Location: Water Crossing, South	Date & Time Started	Date & Time Completed	Total Hours Worked
Groundwater Depth (Feet): 2.0' E.O.B.	3/3/2017	3/3/2017	
DRILLER: Norman Studdard	HELPER:		
Ground Elevation:	Inspector's Name: Bryan Deely	Inspector's Company: P.B. Aldinger	

Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches 0-6	6-12	12-18	18-24	Recovery (inches)	Field Description	Strata Changes
							FOREST MAT	3"
S-1	0' - 2'	2	3	3	2	18"	Loose, brown FINE TO COARSE SAND, little inorganic silt.	
S-2	4'- 6'	6	5	13	14	6"	Medium dense orange/brown INORGANIC SILT, trace fine sand.	FINE TO COARSE SAND
S-3	9' - 11'	3	5	5	6	12"	Medium dense, gray-brown FINE TO COARSE SAND, trace gravel, trace inorganic silt.	
S-4	14' - 16'	12	10	9	13	15"	Medium dense, gray, FINE TO COARSE SAND, trace inorganic silt.	17'
S-5	19' - 21'	5	7	6	6	4"	Medium dense, gray INORGANIC SILT, little fine sand.	SILT
S-6	24' - 26'	5	5	11	18	11"	Medium dense, gray INORGANIC SILT.	28'
S-7	29' - 31'	28	35	20	13	9"	Very dense, gray FINE TO COARSE SAND, little gravel, little inorganic silt.	
S-8	34' - 36'	5	7	5	5	4"	Medium dense, gray FINE TO COARSE SAND, trace gravel, trace inorganic silt.	
S-9	39' - 41'	18	10	12	14	7"	Medium dense, gray FINE TO COARSE SAND, trace inorganic silt.	FINE TO COARSE SAND
S-10	44' - 45'5"	12	23	100/5"		8"	Very dense, gray FINE TO COARSE SAND, little inorganic silt, little gravel	48'
S-11	49' - 51'	67	76	48	38	8"	Very dense, gray FINE TO COARSE SAND, some inorganic silt, little gravel (Glacial Till).	
S-12	54' - 54'11"	55	100/5"			5"	Very dense, gray FINE TO COARSE SAND, some inorganic silt, little gravel (Glacial Till).	TILL
								58'
							Bottom of Exploration = 55'	

Remarks: E.O.B. = End of boring

Casing Used: HW and NW

Casing Size: 4" and 3"

Hammer Weight 300lbs.

Split Spoon Size: 1 3/8" ID X 24"

Hammer Weight 140lbs.

Drill Rig Type: CME 75 Truck Mount

Penetration Resistance (N) Guide

Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Silts, Clays)	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance
Very Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Medium Dense	10 - 30	Medium Stiff	4 - 8
Dense	30 - 50	Stiff	8 - 15
Very Dense	Over 50	Very Stiff	15 - 30
		Hard	Over 30

N = Sum of Second and Third 6" Blow Counts

Second Entry of Descriptions: and = 35-50%, some = 20-35%, little 10-20%, trace = 10% or less

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APPENDIX C

LABORATORY TESTING

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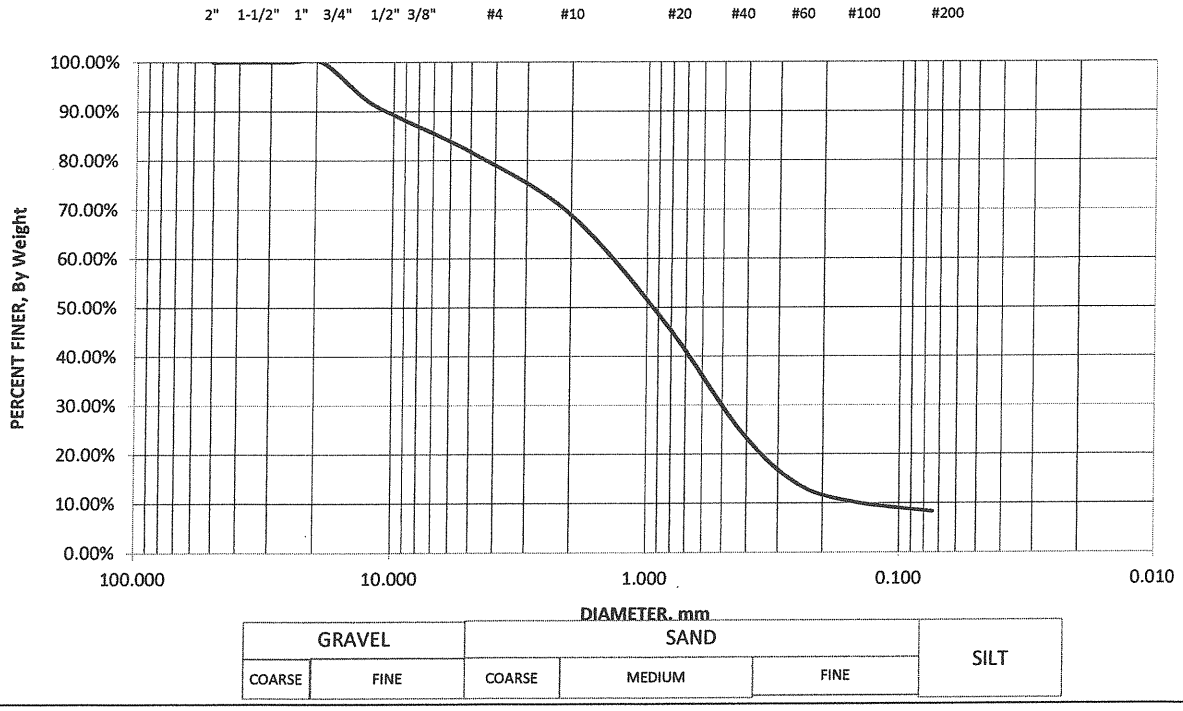
SIEVE ANALYSIS

DESCRIPTION:	Fine to coarse SAND, little Gravel, trace Silt	PROJ:	Pump Station & Water Crossing
		LOCATION:	Taunton, MA
		JOB #:	17006
Sample Location:	Taunton, MA	DATE:	6/9/2017
		CONTAINER #:	47
USCS:	SW-SM	CONT.+ WET SOIL:	636.44
TEST BORING NO.:	PBA-1	CONT.+ DRY SOIL:	585.97
DEPTH:	49'-56'	WGT WATER:	50.47
SAMPLE #:	S-11,S-12	CONT WGT:	177.51
WASH SIEVE	yes	DRY SOIL:	408.46
		% MOIST:	12.36%

SIEVE	OPENING (MM)	WEIGHT RETAINED	ACCUM. RETAINED	PERCENT RETAINED	TOTAL % FINER/WGT	PROJECT SPEC.
3"	76.2	0.00	0.00	0.00%	100.00%	
2"	50.800	0.00	0.00	0.00%	100.00%	
1 ½"	37.500	0.00	0.00	0.00%	100.00%	
1"	25.400	0.00	0.00	0.00%	100.00%	
3/4"	19.100	0.00	0.00	0.00%	100.00%	
1/2"	12.700	31.66	31.66	7.75%	92.25%	
3/8"	9.525	14.25	45.91	11.24%	88.76%	
4	4.750	31.14	77.05	18.86%	81.14%	
10	2.000	50.05	127.10	31.12%	68.88%	
20	0.840	90.57	217.67	53.29%	46.71%	
40	0.420	90.09	307.76	75.35%	24.65%	
60	0.250	43.99	351.75	86.12%	13.88%	
100	0.149	15.03	366.78	89.80%	10.20%	
200	0.074	7.83	374.61	91.71%	8.29%	
Pan	0.000	33.85	408.46	100.00%	0.00%	
TOTAL DRY WT.			408.46			

	% GRAVEL	% SAND	% SILT & CLAY
TOTAL	18.9%	72.8%	8.3%
COARSE	0.0%	12.3%	
MEDIUM		44.2%	
FINE	18.9%	16.4%	

SIEVE ANALYSIS



SIEVE ANALYSIS
USING MECHANICAL AND HYDROMETER METHODS

GENERAL DATA

Project: Pump Station & Water Crossing
Location: Taunton, MA
PBA Job Number: 17006
Date: 6/9/2017

Description: SILT, little Clay, trace fine Sand
USCS Classification: SM
Sample Description: PBA-2
Sample Number: S-6, S-7
Sample Source: Taunton, MA
Tested By: CJP

MECHANICAL ANALYSIS I

Container Number: 41
Container & Wet Soil, g: 576.55
Container & Dry Soil, g: 476.6
Mass of Water, g: 99.95

Container Mass, g: 174.15
Dry Soil Mass, g: 302.45
Moisture Content, %: 33.05%
Control Sieve: #200

Sieve	Opening (mm)	Log Opening	Weight Retain (g)	Accum. Retained	Percent Retained by Mass	Total Percent Finer by Mass
2"	50.8	1.706	0	0.00	0.00%	100.00%
1-1/2"	38.1	1.581	0	0.00	0.00%	100.00%
1"	25.4	1.405	0	0.00	0.00%	100.00%
3/4"	19.1	1.281	0	0.00	0.00%	100.00%
1/2"	12.7	1.104	0	0.00	0.00%	100.00%
3/8"	9.525	0.979	0	0.00	0.00%	100.00%
# 4	4.76	0.678	0	0.00	0.00%	100.00%
# 10	2	0.301	0	0.00	0.00%	100.00%
#20	0.84	-0.076	0.08	0.08	0.03%	99.97%
#40	0.42	-0.377	0.16	0.24	0.08%	99.92%
#60	0.25	-0.602	0.6	0.84	0.28%	99.72%
#100	0.149	-0.827	1.36	2.20	0.73%	99.27%
#200	0.074	-1.131	1.81	4.01	1.33%	98.67%
PAN	0	----	0.01	4.02	1.33%	98.67%

Percent of Sample Lost: 0

HYDROMETER ANALYSIS

Hydrometer Type: 152H
Zero Correction: 4
Meniscus: 1
Dry Mass of Sample, g: 50
Percent Fines: 98.67%

Dispersing Agent: Sodium Hexametaphosphate
Amount: 125 ml at 4 Percent Concentration
Specific Gravity of Solids: 2.65 (Assumed)
Specific Gravity Correction Factor, a: 1
Hygroscopic Correction Factor: 1

Date	Time of Reading	Time (min)	Temp (C)	Act Hyd	Cor Hyd	Act % Finer	Adj % Finer	Min Cor	L	L/t	A	Diameter (mm)	Total % Finer
15-Jun	10:00:00 AM	0	23										
15-Jun	10:00:30 AM	0.5	23	42.0	38.90	77.80%	76.77%	43.0	9.24	18.487	0.01316	0.0566	76.77%
15-Jun	10:01:00 AM	1	23	41.0	37.90	75.80%	74.80%	42.0	9.41	9.408	0.01316	0.0404	74.80%
15-Jun	10:02:00 AM	2	23	39.0	35.90	71.80%	70.85%	40.0	9.74	4.868	0.01316	0.0290	70.85%
15-Jun	10:04:00 AM	4	23	37.0	33.90	67.80%	66.90%	38.0	10.06	2.516	0.01316	0.0209	66.90%
15-Jun	10:08:00 AM	8	23	33.0	29.90	59.80%	59.01%	34.0	10.72	1.340	0.01316	0.0152	59.01%
15-Jun	10:15:00 AM	15	23	29.0	25.90	51.80%	51.11%	30.0	11.38	0.758	0.01316	0.0115	51.11%
15-Jun	10:30:00 AM	30	23	23.0	19.90	39.80%	39.27%	24.0	12.36	0.412	0.01316	0.0084	39.27%
15-Jun	11:00:00 AM	60	23	17.0	13.90	27.80%	27.43%	18.0	13.35	0.222	0.01316	0.0062	27.43%
15-Jun	12:00:00 PM	120	23.2	13.0	9.90	19.80%	19.54%	14.0	14.00	0.117	0.01313	0.0045	19.54%
15-Jun	2:00:00 PM	240	23.7	10.0	6.95	13.90%	13.72%	11.0	14.49	0.060	0.01305	0.0032	13.72%
15-Jun	5:00:00 PM	420	23	9.0	6.08	12.15%	11.99%	10.0	14.66	0.035	0.01316	0.0025	11.99%

Container Number:
Container & Dry Soil, g:

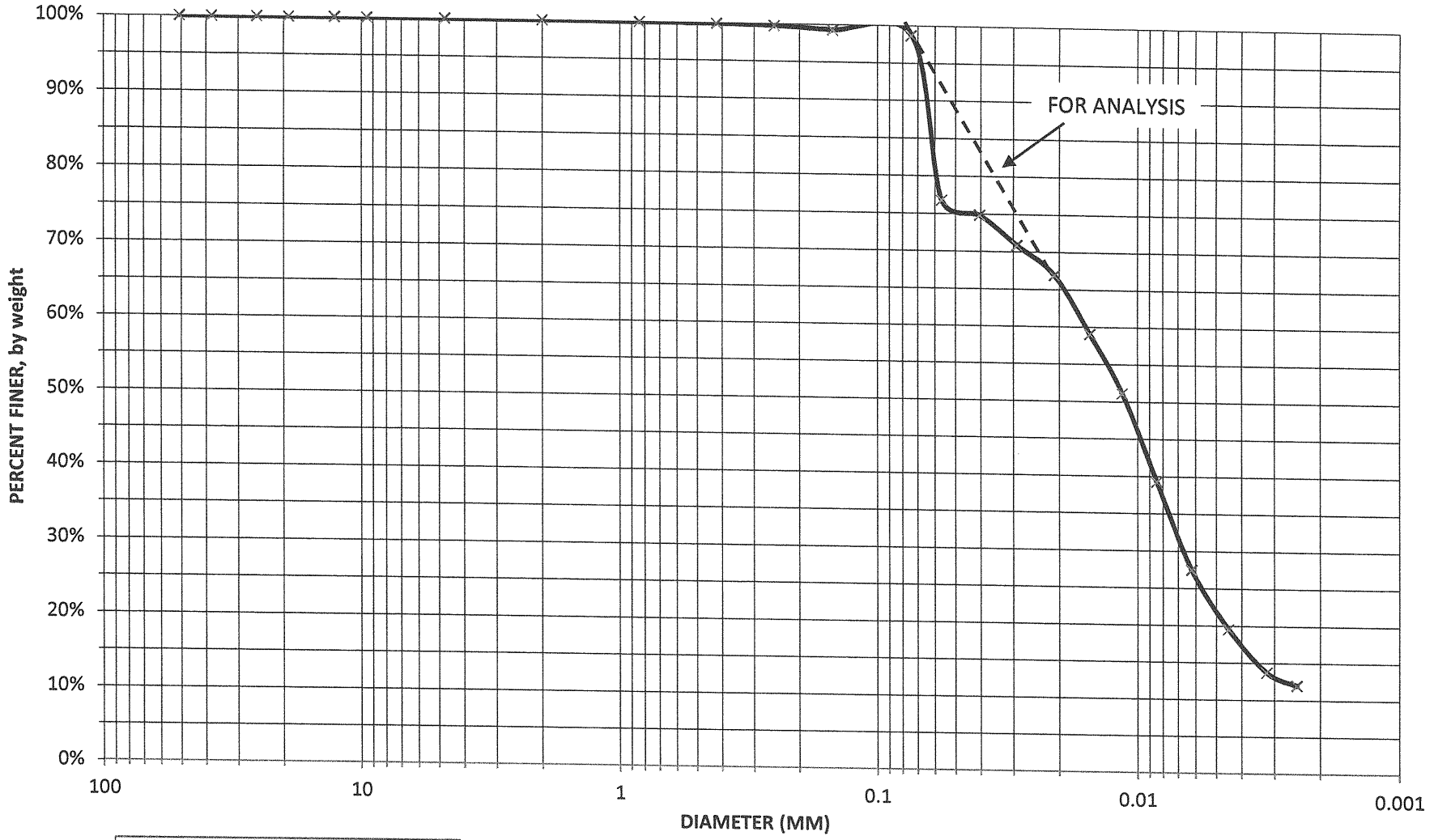
Container Mass, g:
Dry Soil Mass, g:

GRAINSIZE SUMMARY

	Percent Gravel	Percent Sand	Percent Silt	Percent Clay
Coarse	0.00%	0.00%		----
Medium	----	0.08%		----
Fine	0.00%	1.25%		----
Total	0.00%	1.33%	86.69%	11.99%

SIEVE ANALYSIS

17006: PBA-2 SAMPLE 6, SAMPLE 7



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Paul B. Aldinger and Associates, Inc.

SIEVE ANALYSIS
USING MECHANICAL AND HYDROMETER METHODS

GENERAL DATA

Project: Pump Station & Water Crossing

Location: Taunton, MA

PBA Job Number: 17006

Date: 6/9/2017

Description: SILT, some fine to coarse Sand, trace Clay, trace Gravel

USCS Classification: ML
Sample Description: PBA-3
Sample Number: S-6, S-7
Sample Source: Taunton, MA

Tested By: CJP

MECHANICAL ANALYSIS I

Container Number: 60
Container & Wet Soil, g: 573.89
Container & Dry Soil, g: 486.35
Mass of Water, g: 87.54

Container Mass, g: 104.73
Dry Soil Mass, g: 381.62
Moisture Content, %: 22.94%
Control Sieve: #200

Sieve	Opening (mm)	Log Opening	Weight Retain (g)	Accum. Retained	Percent Retained by Mass	Total Percent Finer by Mass
2"	50.8	1.706	0	0.00	0.00%	100.00%
1-1/2"	38.1	1.581	0	0.00	0.00%	100.00%
1"	25.4	1.405	0	0.00	0.00%	100.00%
3/4"	19.1	1.281	0	0.00	0.00%	100.00%
1/2"	12.7	1.104	0	0.00	0.00%	100.00%
3/8"	9.525	0.979	0	0.00	0.00%	100.00%
# 4	4.76	0.678	2.05	2.05	0.54%	99.46%
# 10	2	0.301	6.85	8.90	2.33%	97.67%
#20	0.84	-0.076	14.63	23.53	6.17%	93.83%
#40	0.42	-0.377	12.81	36.34	9.52%	90.48%
#60	0.25	-0.602	19.22	55.56	14.56%	85.44%
#100	0.149	-0.827	26.29	81.85	21.45%	78.55%
#200	0.074	-1.131	16.05	97.90	25.65%	74.35%
PAN	0	----	3.7	101.60	26.62%	73.38%

Percent of Sample Lost: 0

HYDROMETER ANALYSIS

Hydrometer Type: 152H
Zero Correction: 5
Meniscus: 1
Dry Mass of Sample, g: 50
Percent Fines: 74.35%

Dispersing Agent: Sodium Hexametaphosphate
Amount: 125 ml at 4 Percent Concentration
Specific Gravity of Solids: 2.65 (Assumed)
Specific Gravity Correction Factor, a: 1
Hygroscopic Correction Factor: 1

Date	Time of Reading	Time (min)	Temp (C)	Act Hyd	Cor Hyd	Act % Finer	Adj % Finer	Min Cor	L	L/t	A	Diameter (mm)	Total % Finer
15-Jun	8:55:00 AM	0	22.5										
15-Jun	8:55:30 AM	0.5	22.5	30.0	25.78	51.55%	38.33%	31.0	11.21	22.426	0.01324	0.0627	38.33%
15-Jun	8:56:00 AM	1	22.5	28.0	23.78	47.55%	35.35%	29.0	11.54	11.541	0.01324	0.0450	35.35%
15-Jun	8:57:00 AM	2	22.5	27.0	22.78	45.55%	33.86%	28.0	11.71	5.853	0.01324	0.0320	33.86%
15-Jun	8:59:00 AM	4	22.5	26.0	21.78	43.55%	32.38%	27.0	11.87	2.967	0.01324	0.0228	32.38%
15-Jun	9:03:00 AM	8	22.5	25.0	20.78	41.55%	30.89%	26.0	12.03	1.504	0.01324	0.0162	30.89%
15-Jun	9:10:00 AM	15	22.5	24.0	19.78	39.55%	29.40%	25.0	12.20	0.813	0.01324	0.0119	29.40%
15-Jun	9:25:00 AM	30	22.7	21.0	16.78	33.55%	24.94%	22.0	12.69	0.423	0.01321	0.0086	24.94%
15-Jun	9:55:00 AM	60	23	18.0	13.83	27.65%	20.56%	19.0	13.18	0.220	0.01316	0.0062	20.56%
15-Jun	10:55:00 AM	120	23	14.0	9.90	19.80%	14.72%	15.0	13.84	0.115	0.01316	0.0045	14.72%
15-Jun	12:55:00 PM	240	23.5	11.0	6.90	13.80%	10.26%	12.0	14.33	0.060	0.01308	0.0032	10.26%
15-Jun	4:55:00 PM	480	25	8.0	4.03	8.05%	5.98%	9.0	14.82	0.031	0.01286	0.0023	5.98%
16-Jun	8:55:00 AM	1440	22.5	7.0	3.40	6.80%	5.06%	8.0	14.99	0.010	0.01324	0.0014	5.06%

Container Number:
Container & Dry Soil, g:

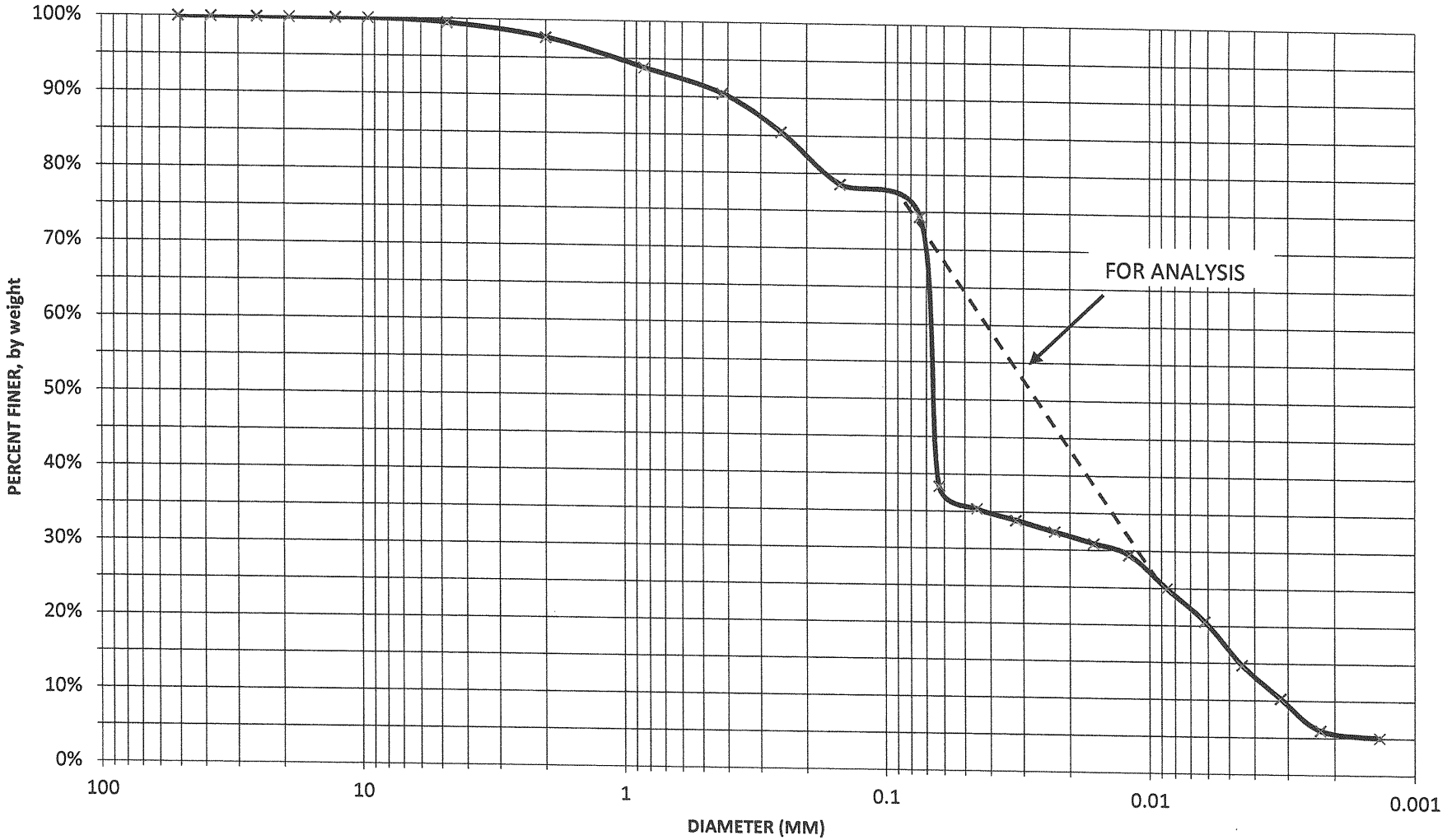
Container Mass, g:
Dry Soil Mass, g:

GRAINSIZE SUMMARY

	Percent Gravel	Percent Sand	Percent Silt	Percent Clay
Coarse	0.00%	1.79%		----
Medium	----	7.19%		----
Fine	0.54%	16.13%		----
Total	0.54%	25.12%	68.36%	5.98%

SIEVE ANALYSIS

17006: PBA-3 SAMPLE 6, SAMPLE 7



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Paul B. Aldinger and Associates, Inc.

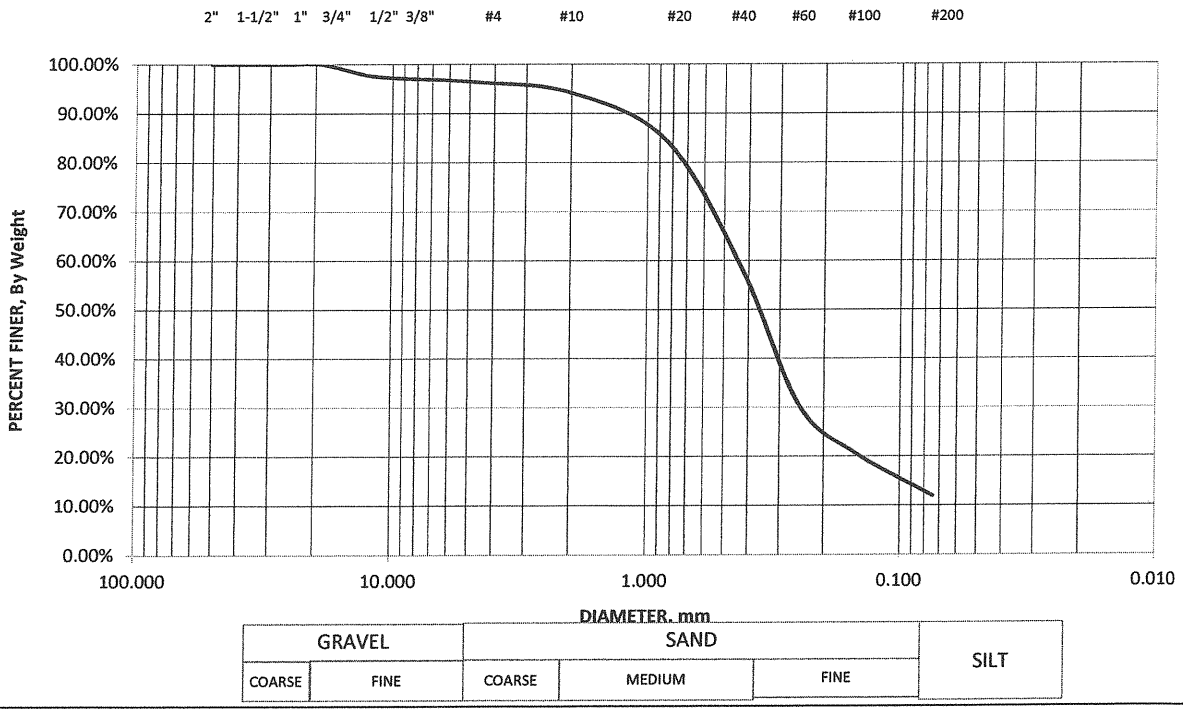
SIEVE ANALYSIS

DESCRIPTION:	Fine to coarse SAND, little Silt, trace Gravel	PROJ:	Pump Station & Water Crossing
		LOCATION:	Taunton, MA
		JOB #:	17006
Sample Location:	Taunton, MA	DATE:	6/9/2017
		CONTAINER #:	43
USCS:	SP-SM	CONT.+ WET SOIL:	408.24
TEST BORING NO.:	PBA-4	CONT.+ DRY SOIL:	357.79
DEPTH:	4'-11'	WGT WATER:	50.45
SAMPLE #:	S-2, S-3	CONT WGT:	102.83
WASH SIEVE	yes	DRY SOIL:	254.96
		% MOIST:	19.79%

SIEVE	OPENING (MM)	WEIGHT RETAINED	ACCUM. RETAINED	PERCENT RETAINED	TOTAL % FINER/WGT	PROJECT SPEC.
3"	76.2	0.00	0.00	0.00%	100.00%	
2"	50.800	0.00	0.00	0.00%	100.00%	
1 ½"	37.500	0.00	0.00	0.00%	100.00%	
1"	25.400	0.00	0.00	0.00%	100.00%	
3/4"	19.100	0.00	0.00	0.00%	100.00%	
1/2"	12.700	5.58	5.58	2.19%	97.81%	
3/8"	9.525	1.59	7.17	2.81%	97.19%	
4	4.750	2.02	9.19	3.60%	96.40%	
10	2.000	5.66	14.85	5.82%	94.18%	
20	0.840	25.21	40.06	15.71%	84.29%	
40	0.420	67.37	107.43	42.14%	57.86%	
60	0.250	69.98	177.41	69.58%	30.42%	
100	0.149	25.02	202.43	79.40%	20.60%	
200	0.074	22.09	224.52	88.06%	11.94%	
Pan	0.000	30.44	254.96	100.00%	0.00%	
TOTAL DRY WT.			254.96			

	% GRAVEL	% SAND	% SILT & CLAY
TOTAL	3.6%	84.5%	11.9%
COARSE	0.0%	2.2%	
MEDIUM		36.3%	
FINE	3.6%	45.9%	

SIEVE ANALYSIS



SIEVE ANALYSIS
USING MECHANICAL AND HYDROMETER METHODS

GENERAL DATA

Project: Pump Station & Water Crossing

Location: Taunton, MA

PBA Job Number: 17006

Date: 6/9/2017

Description: SILT, little fine to coarse Sand, little Clay

USCS Classification: ML

Sample Description: PBA-4

Sample Number: S-5

Sample Source: Taunton, MA

Tested By: CJP

MECHANICAL ANALYSIS I

Container Number: 43
Container & Wet Soil, g: 408.24
Container & Dry Soil, g: 357.79
Mass of Water, g: 50.45

Container Mass, g: 102.83
Dry Soil Mass, g: 254.96
Moisture Content, %: 19.79%
Control Sieve: #200

Sieve	Opening (mm)	Log Opening	Weight Retain (g)	Accum. Retained	Percent Retained by Mass	Total Percent Finer by Mass
2"	50.8	1.706	0	0.00	0.00%	100.00%
1-1/2"	38.1	1.581	0	0.00	0.00%	100.00%
1"	25.4	1.405	0	0.00	0.00%	100.00%
3/4"	19.1	1.281	0	0.00	0.00%	100.00%
1/2"	12.7	1.104	0	0.00	0.00%	100.00%
3/8"	9.525	0.979	0	0.00	0.00%	100.00%
# 4	4.76	0.678	0	0.00	0.00%	100.00%
# 10	2	0.301	4.24	4.24	1.66%	98.34%
#20	0.84	-0.076	4.37	8.61	3.38%	96.62%
#40	0.42	-0.377	4.88	13.49	5.29%	94.71%
#60	0.25	-0.602	5.58	19.07	7.48%	92.52%
#100	0.149	-0.827	6.29	25.36	9.95%	90.05%
#200	0.074	-1.131	5.93	31.29	12.27%	87.73%
PAN	0	----	4.3	35.59	13.96%	86.04%

Percent of Sample Lost: 0

HYDROMETER ANALYSIS

Hydrometer Type: 152H
Zero Correction: 5
Meniscus: 1
Dry Mass of Sample, g: 50
Percent Fines: 87.73%

Dispersing Agent: Sodium Hexametaphosphate
Amount: 125 ml at 4 Percent Concentration
Specific Gravity of Solids: 2.65 (Assumed)
Specific Gravity Correction Factor, a: 1
Hygroscopic Correction Factor: 1

Date	Time of Reading	Time (min)	Temp (C)	Act Hyd	Cor Hyd	Act % Finer	Adj % Finer	Min Cor	L	L/t	A	Diameter (mm)	Total % Finer
15-Jun	9:15:00 AM	0	22.5										
15-Jun	9:15:30 AM	0.5	22.5	45.0	40.78	81.55%	71.54%	46.0	8.75	17.503	0.01324	0.0554	71.54%
15-Jun	9:16:00 AM	1	22.5	43.0	38.78	77.55%	68.03%	44.0	9.08	9.080	0.01324	0.0399	68.03%
15-Jun	9:17:00 AM	2	22.5	41.0	36.78	73.55%	64.52%	42.0	9.41	4.704	0.01324	0.0287	64.52%
15-Jun	9:19:00 AM	4	22.5	40.0	35.78	71.55%	62.77%	41.0	9.57	2.393	0.01324	0.0205	62.77%
15-Jun	9:23:00 AM	8	22.5	38.0	33.78	67.55%	59.26%	39.0	9.90	1.238	0.01324	0.0147	59.26%
15-Jun	9:30:00 AM	15	22.7	33.0	28.78	57.55%	50.49%	34.0	10.72	0.715	0.01321	0.0112	50.49%
15-Jun	9:45:00 AM	30	23	28.0	23.83	47.65%	41.80%	29.0	11.54	0.385	0.01316	0.0082	41.80%
15-Jun	10:15:00 AM	60	23	21.0	16.90	33.80%	29.65%	22.0	12.69	0.211	0.01316	0.0061	29.65%
15-Jun	11:15:00 AM	120	23	15.0	10.90	21.80%	19.12%	16.0	13.67	0.114	0.01316	0.0044	19.12%
15-Jun	1:15:00 PM	240	23.5	12.0	7.90	15.80%	13.86%	13.0	14.17	0.059	0.01308	0.0032	13.86%
15-Jun	5:15:00 PM	480	25	10.0	6.03	12.05%	10.57%	11.0	14.49	0.030	0.01286	0.0022	10.57%

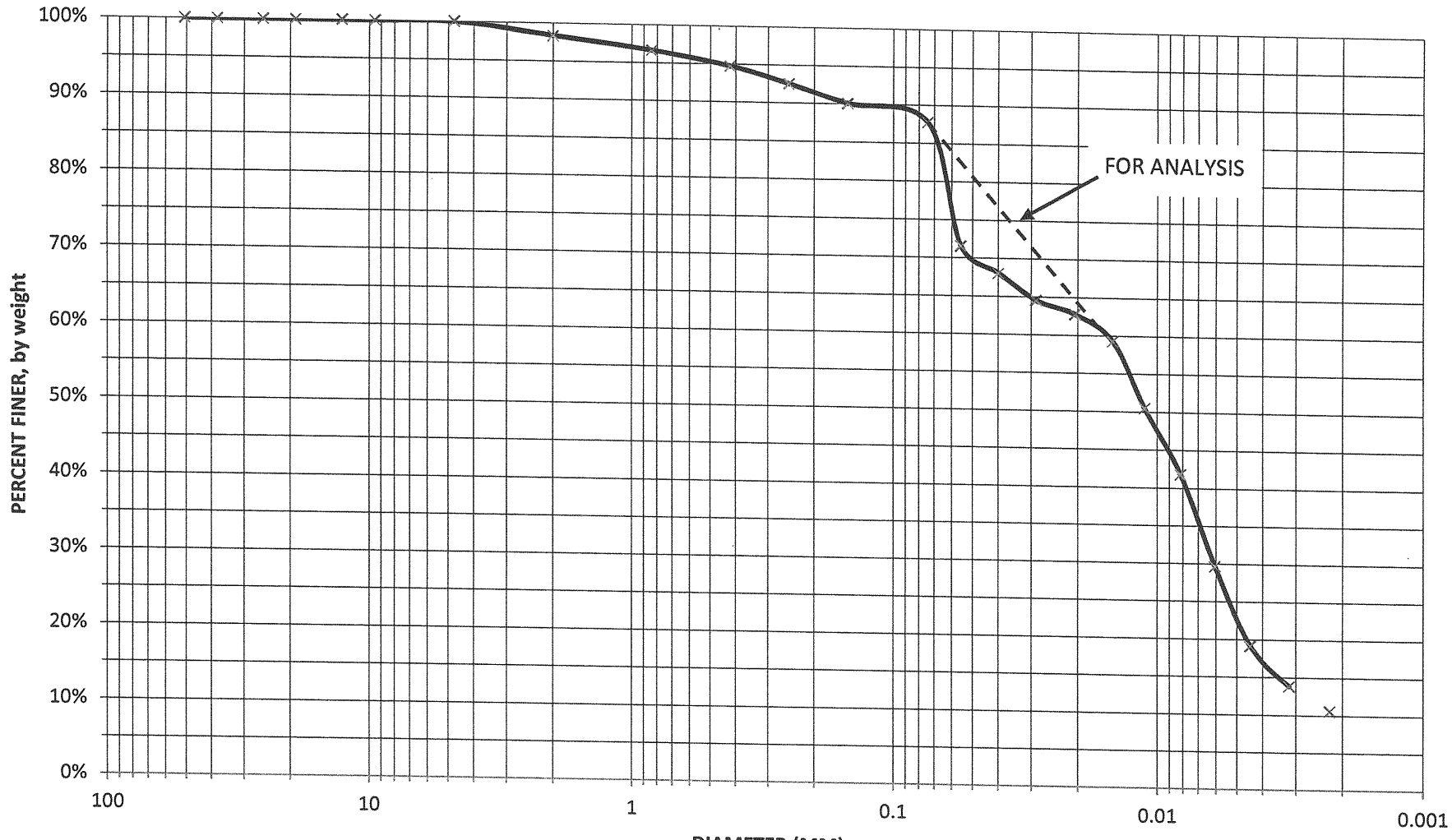
Container Number:
Container & Dry Soil, g:

Container Mass, g:
Dry Soil Mass, g:

GRAINSIZE SUMMARY

	Percent Gravel	Percent Sand	Percent Silt	Percent Clay
Coarse	0.00%	1.66%		----
Medium	----	3.63%		----
Fine	0.00%	6.98%		----
Total	0.00%	12.27%	77.16%	10.57%

SIEVE ANALYSIS
17006: PBA-4 SAMPLE 5



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Paul B. Aldinger and Associates, Inc.

SIEVE ANALYSIS
USING MECHANICAL AND HYDROMETER METHODS

GENERAL DATA

Project: Pump Station & Water Crossing

Location: Taunton, MA

PBA Job Number: 17006

Date: 6/9/2017

Description: Fine to coarse SAND, little Silt, little Clay, trace Gravel

USCS Classification: SM
Sample Description: PBA-5
Sample Number: S-3, S-4
Sample Source: Taunton, MA

Tested By: CJP

MECHANICAL ANALYSIS I

Container Number: 45
Container & Wet Soil, g: 660.94
Container & Dry Soil, g: 582.73
Mass of Water, g: 78.21

Container Mass, g: 104.88
Dry Soil Mass, g: 477.85
Moisture Content, %: 16.37%
Control Sieve: #200

Sieve	Opening (mm)	Log Opening	Weight Retain (g)	Accum. Retained	Percent Retained by Mass	Total Percent Finer by Mass
2"	50.8	1.706	0	0.00	0.00%	100.00%
1-1/2"	38.1	1.581	0	0.00	0.00%	100.00%
1"	25.4	1.405	0	0.00	0.00%	100.00%
3/4"	19.1	1.281	0	0.00	0.00%	100.00%
1/2"	12.7	1.104	6.5	6.50	1.36%	98.64%
3/8"	9.525	0.979	16.8	23.30	4.88%	95.12%
# 4	4.76	0.678	19.47	42.77	8.95%	91.05%
# 10	2	0.301	24.28	67.05	14.03%	85.97%
#20	0.84	-0.076	53.99	121.04	25.33%	74.67%
#40	0.42	-0.377	139.73	260.77	54.57%	45.43%
#60	0.25	-0.602	81.4	342.17	71.61%	28.39%
#100	0.149	-0.827	27.35	369.52	77.33%	22.67%
#200	0.074	-1.131	23.11	392.63	82.17%	17.83%
PAN	0	----	13.75	406.38	85.04%	14.96%

Percent of Sample Lost: 0

HYDROMETER ANALYSIS

Hydrometer Type: 152H
Zero Correction: 5
Meniscus: 1
Dry Mass of Sample, g: 12.09
Percent Fines: 17.83%

Dispersing Agent: Sodium Hexametaphosphate
Amount: 125 ml at 4 Percent Concentration
Specific Gravity of Solids: 2.65 (Assumed)
Specific Gravity Correction Factor, a: 1
Hygroscopic Correction Factor: 1

Date	Time of Reading	Time (min)	Temp (C)	Act Hyd	Cor Hyd	Act % Finer	Adj % Finer	Min Cor	L	L/t	A	Diameter (mm)	Total % Finer
15-Jun	8:45:00 AM	0	23.5										
15-Jun	8:45:30 AM	0.5	23.5	12.0	8.03	66.38%	11.84%	13.0	14.17	28.333	0.01308	0.0696	11.84%
15-Jun	8:46:00 AM	1	23.5	11.0	7.03	58.11%	10.36%	12.0	14.33	14.331	0.01308	0.0495	10.36%
15-Jun	8:47:00 AM	2	23.5	10.0	6.03	49.83%	8.89%	11.0	14.49	7.247	0.01308	0.0352	8.89%
15-Jun	8:49:00 AM	4	23.5	10.0	6.03	49.83%	8.89%	11.0	14.49	3.624	0.01308	0.0249	8.89%
15-Jun	8:53:00 AM	8	23.5	9.0	5.03	41.56%	7.41%	10.0	14.66	1.832	0.01308	0.0177	7.41%
15-Jun	9:00:00 AM	15	23.5	8.0	4.03	33.29%	5.94%	9.0	14.82	0.988	0.01308	0.0130	5.94%
15-Jun	9:15:00 AM	30	23.5	7.0	3.03	25.02%	4.46%	8.0	14.99	0.500	0.01308	0.0092	4.46%
15-Jun	9:45:00 AM	60	23.5	6.0	2.03	16.75%	2.99%	7.0	15.15	0.253	0.01308	0.0066	2.99%
15-Jun	10:45:00 AM	120	23.5	6.0	2.03	16.75%	2.99%	7.0	15.15	0.126	0.01308	0.0046	2.99%
15-Jun	12:45:00 PM	240	23.7	5.0	1.03	8.48%	1.51%	6.0	15.32	0.064	0.01305	0.0033	1.51%
15-Jun	4:45:00 PM	480	24.9	4.5	0.58	4.76%	0.85%	5.5	15.40	0.032	0.01286	0.0023	0.85%

Container Number:
Container & Dry Soil, g:

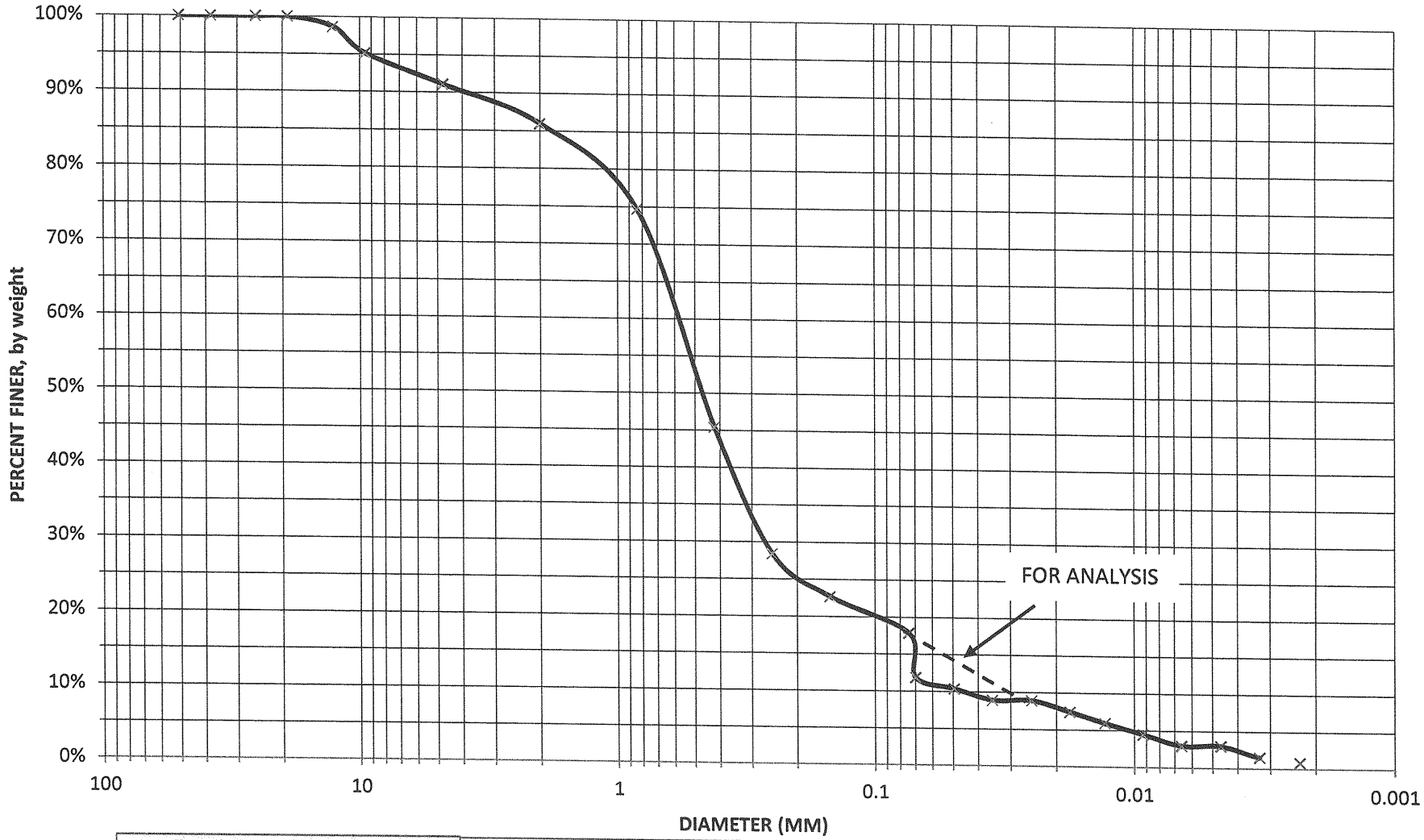
Container Mass, g:
Dry Soil Mass, g:

GRAINSIZE SUMMARY

	Percent Gravel	Percent Sand	Percent Silt	Percent Clay
Coarse	0.00%	5.08%		----
Medium	----	40.54%		----
Fine	8.95%	27.59%		----
Total	8.95%	73.22%	16.99%	0.85%

SIEVE ANALYSIS

17006: PBA-5 SAMPLE 3, SAMPLE 4



Paul B. Aldinger and Associates, Inc.

APPENDIX 2

CONSERVATION COMMISSION

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Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 - Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

provided by massdep
SE73-2721
massdep file number:

edep transaction #

Taunton
city/town

a.general information

from: Taunton
1. conservation commission

2. This issuance is for (check one): a. ☑ Order of Conditions b. ☐ Amended Order of Conditions

3. to: applicant:

Fred
a. first name

Cornaglia
b. last name

City of Taunton/DPW
c. organization

90 Ingell Street
d. mailing address

Taunton
e. city/town

MA
f. state

02780
g. zip code

4. property owner (if different from applicant):

a. first name

b. last name

c. organization

d. mailing address

e. city/town

f. state

g. zip code

5. project location:

West Water Street
a. street address

Taunton
b. city/town

106
c. assessors map/plat number

5
d. parcel/lot number

latitude and longitude:

d m s
c. latitude

d m s
f. longitude

A.General Information (cont.)

6. property recorded at the registry of deeds for (attach additional information if more than one parcel):

a.county | b. certificate (if registered land)

c. book | d. page

7. dates: 08/31/2017 a. date notice of intent filed | 09/18/2017 b. date public hearing closed | 09/21/2017 c. date of issuance

8. Final Approved Plans and Other Documents (attach additional plan or document references as needed):

NOI Plan
a. plan title

Beta Group, Inc.
b. prepared by

Joseph Federico, Jr.
c. signed and stamped by

d. final revision date

1"=20'
e. scale

f. additional plan or document title

08/31/2017
g. date

B. Findings

1. Findings pursuant to the Massachusetts Wetlands Protection Act:
Following the review of the above-referenced Notice of Intent and based on the information provided in this application and presented at the public hearing, this Commission finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act (the Act). Check all that apply:

a. ☐ Public Water Supply	b. ☐ Land Containing Shellfish	c. ☑ Prevention of Pollution
d. ☑ Private Water Supply	e. ☐ Fisheries	f. ☐ Protection of Wildlife Habitat
g. ☑ Groundwater Supply	h. ☑ Storm Damage Prevention	i. ☐ Flood Control

2. This Commission hereby finds the project, as proposed, is: (check one of the following boxes)

Approved subject to:

a. ☑ the following conditions which are necessary in accordance with the performance standards set forth in the wetlands regulations. This Commission orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.

B. Findings (cont.)

Denied because:

b. ☐ the proposed work cannot be conditioned to meet the performance standards set forth in the wetland regulations. Therefore, work on this project may not go forward unless and until a new Notice of Intent is submitted which provides measures which are adequate to protect the interests of the Act, and a final Order of Conditions is issued. **A description of the performance standards which the proposed work cannot meet is attached to this Order.**

c. ☐ the information submitted by the applicant is not sufficient to describe the site, the work, or the effect of the work on the interests identified in the Wetlands Protection Act. Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides sufficient information and includes measures which are adequate to protect the Act's interests, and a final Order of Conditions is issued. **A description of the specific information which is lacking and why it is necessary is attached to this Order as per 310 CMR 10.05(6)(c).**

3. ☐ Buffer Zone Impacts: Shortest distance between limit of project disturbance and wetland resource area specified in 310 CMR 10.02(1)(a) _____ a. linear feet

Inland Resource Area Impacts: Check all that apply below. (For Approvals Only)

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
4. ☑ Bank	40 a. linear feet	40 b. linear feet	_____ c. linear feet	_____ d. linear feet
5. ☑ Bordering Vegetated Wetland	13,246 a. square feet	13,246 b. square feet	_____ c. square feet	_____ d. square feet
6. ☑ Land Under Waterbodies and Waterways	449 a. square feet	449 b. square feet	_____ c. square feet	_____ d. square feet
	31 e. cu.yd dredged	31 f. cu.yd dredged		
7. ☑ Bordering Land Subject to Flooding	30,149 a. square feet	30,149 b. square feet	_____ c. square feet	_____ d. square feet
Cubic Feet Flood Storage	9,990 e. cubic feet	86,400 f. cubic feet	_____ g. cubic feet	_____ h. cubic feet
8. ☐ Isolated Land Subject to Flooding	_____ a. square feet	_____ b. square feet		
Cubic Feet Flood Storage	_____ c. square feet	_____ d. square feet	_____ e. cubic feet	_____ f. cubic feet
9. ☑ Riverfront area	2,628 a. total sq. fee	2,628 b. total sq. fee		
Sq ft within 100 ft	_____ c. square feet	_____ d. square feet	_____ e. square feet	_____ f. square feet
sq ft between 100-200 ft	_____ g. square feet	_____ h. square feet	_____ i. square feet	_____ j. square feet

B. Findings (cont.)

Coastal Resource Area Impacts: Check all that apply below. (For Approvals Only)

	Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
10.	☐ Designated Port Areas	Indicate size under Land Under the Ocean, below			
11.	☐ Land Under the Ocean	a. square feet	b. square feet		
		c. cu.yd dredged	d. cu.yd dredged		
12.	☐ Barrier Beaches	Indicate size under Coastal Beaches and/or Coastal Dunes below			
13.	☐ Coastal Beaches	a. square feet	b. square feet	c. c/y nourishment.	d. c/y nourishment.
14.	☐ Coastal Dunes	a. square feet	b. square feet	c. c/y nourishment.	d. c/y nourishment.
15.	☐ Coastal Banks	a. linear feet	b. linear feet		
16.	☐ Rocky Intertidal Shores	a. square feet	b. square feet		
17.	☐ Salt Marshes	a. square feet	b. square feet	c. square feet	d. square feet
18.	☐ Land Under Salt Ponds	a. square feet	b. square feet		
		c. cu.yd dredged	d. cu.yd dredged		
19.	☐ Land Containing Shellfish	a. square feet	b. square feet	c. square feet	d. square feet
20.	☐ Fish Runs	Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above			
		a. cu.yd dredged	b. cu.yd dredged		
21.	☐ Land Subject to Coastal Storm Flowage	a. square feet	b. square feet		

*#22 If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.5.c (BVW) or B.17.c (Salt Marsh) above please enter the additional amount here

B. Findings (cont.)

22. ☐ Restoration / Enhancement

a. square feet of bvw

b. square feet of salt marsh

23. ☐ Stream Crossing(s)

a. number of new stream crossings

b. number of replacement stream crossings

C. General Conditions Under Massachusetts Wetlands Protection Act

The following conditions are only applicable to Approved projects.

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.

2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.

3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.

4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
   a. the work is a maintenance dredging project as provided for in the Act; or
   b. the time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.

5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order.

6. If this Order constitutes an Amended Order of Conditions, this Amended Order of Conditions does not extend the issuance date of the original Final Order of Conditions and the Order will expire on _____ unless extended in writing by the Department.

7. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.

8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work.

10. A sign shall be displayed at the site not less then two square feet or more than three square feet in size bearing the words,

"Massachusetts Department of Environmental Protection" [or, "MassDEP"]

"File Number SE73-2721"

11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before MassDEP.

12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.

13. The work shall conform to the plans and special conditions referenced in this order.

14. Any change to the plans identified in Condition #13 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.

15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.

16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.

17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.

NOTICE OF STORMWATER CONTROL AND MAINTENANCE REQUIREMENTS

19. **The work associated with this Order (the "Project") is (1) ☑ is not (2) ☐ subject to the Massachusetts Stormwater Standards. If the work is subject to the Stormwater Standards, then the project is subject to the following conditions:**

a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Construction General Permit as required by Stormwater Condition 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.

b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that:
i. all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures;
ii. as-built final construction BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized;
iii. any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10;
iv. all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition;
v. any vegetation associated with post-construction BMPs is suitably established to withstand erosion.

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

c) The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 18(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement) for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMP Operation and Maintenance Plan ("O&M Plan") and certifying the following: i.) the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and ii.) the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.

d) Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Multi-Sector General Permit.

e) Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 18(f) through 18(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 18(f) through 18(k) with respect to that BMP shall be a violation of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.

f) The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

g) The responsible party shall:

1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.

h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.
i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.
j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.
k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.

l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.

Special Conditions (if you need more space for additional conditions, please attach a text document):

D. Findings Under Municipal Wetlands Bylaw or Ordinance

1. Is a municipal wetlands bylaw or ordinance applicable? ☑ Yes ☐ No

2. The Taunton hereby finds (check one that applies):
   Conservation Commission

   a. ☐ that the proposed work cannot be conditioned to meet the standards set forth in a municipal ordinance or bylaw specifically:

   _____ (1. Municipal Ordinance or Bylaw) _____ (2. Citation)

   Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides measures which are adequate to meet these standards, and a final Order of Conditions is issued.

   b. ☑ that the following additional conditions are necessary to comply with a municipal ordinance or bylaw:

   Taunton Conservation Ordinance (1. Municipal Ordinance or Bylaw) — Chapter 16, Sections 30-38 (2. Citation)

3. The Commission orders that all work shall be performed in accordance with the following conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, the conditions shall control.

The special conditions relating to municipal ordinance or bylaw are as follows

See page 13

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
SE 73-2721
MassDEP File #

eDEP Transaction #

Taunton
City/Town

E. Signatures

This Order is valid for three years, unless otherwise specified as a special condition pursuant to General Conditions #4, from the date of issuance.

9/21/17
1. Date of Issuance

Please indicate the number of members who will sign this form.
This Order must be signed by a majority of the Conservation Commission.

5
2. Number of Signers

The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate Department of Environmental Protection Regional Office, if not filing electronically, and the property owner, if different from applicant.

Signatures:

9/18/17

☐ by hand delivery on

Date

☑ by certified mail, return receipt requested, on 9/21/17

Date

F. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate MassDEP Regional Office to issue a Superseding Order of Conditions. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request of Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order, or providing written information to the Department prior to issuance of a Superseding Order.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40), and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal ordinance or bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.

G. Recording Information

Prior to commencement of work, this Order of Conditions must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on this page shall be submitted to the Conservation Commission listed below.

Taunton
Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

To:

Taunton
Conservation Commission

Please be advised that the Order of Conditions for the Project at:

West Water Street
Taunton
Project Location

SE73-2721
MASS DEP File Number

Has been recorded at the Registry of Deeds of:

County | Book | Page

for:

Property Owner

and has been noted in the chain of title of the affected property in:

Book | Page

In accordance with the Order of Conditions issued on:

09/21/2017
Date

If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number

Signature of Applicant

Special Conditions

SC1 – Any change in the plans or any change in construction from the proposed plans shall require the Applicant to file a notice of project change with this Commission via a written inquiry as to whether the change is significant enough to require filing an amendment or a new Notice of Intent. If a minor/insignificant revision, no meeting will be required. Should the house footprint be changed without permission, or found by TCC to be changed in any way from the approved plan, all work shall immediately cease until approved by the TCC. Noncompliance with this condition shall automatically stop any permit process by this office for this Applicant.
SC2 – A copy of this Order of Conditions and the Plans of Record shall be available on site at all times until the project is completed.
SC3 – Best management practices as referenced by the Commission and the City Engineer shall be used to prevent any form of flooding to adjacent properties, wetlands, or watersheds as a result of this project's work. The Applicant shall be fully responsible for any damage due to improper construction or poor engineering on the site, and shall take immediate steps to correct any flooding problems resulting from work on this project. Corrective measures shall be approved by this Commission on an emergency basis if needed.
SC4 – Any debris, fill, or excavated material shall be stockpiled on the upland side of the siltation barriers and at a location which prevents sediment from entering the wetlands.
SC5 – All disturbed areas on this site shall be permanently stabilized either by sodding, loaming and seeding, loaming and hydro-seeding, mulching and planting, or by stone placement or other method approved by the Commission. Vegetative or other site stabilization must be uniform and complete before a final Certificate of Compliance is issued.
SC19 – Siltation barrier to be installed and inspected prior to construction.
SC21 - Evidence of recording within 40 days of issuance.
SC25 – The Applicant shall notify this Commission in writing of the name, address, business and home telephone numbers of the Project Supervisor and/or Contractor who shall be responsible for ensuring compliance with this Order, and who shall notify this Commission in writing at least three (3) days before any activity commences on the project site.
SC26 – A CD with a PDF file of the plans should be submitted prior to the release of the Order of Conditions.
SC27 – A CD with a PDF file of the AS-Built plan should be submitted when submitting a Request for Certificate of Compliance.

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APPENDIX 3

ENVIRONMENTAL REPORT

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Taunton, Massachusetts

Main Lift Pump Station

August 11, 2017

Limited Subsurface Investigation Report

BETA
6 Blackstone Valley Place
Suite 101
Lincoln, Rhode Island 02865
401.333.2382
www.BETA-Inc.com

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APPENDICES

1.0 Introduction

BETA Group, Inc. (BETA) has prepared this Limited Subsurface Investigation (LSI) Report for the Main Lift Pump Station project located off of West Water Street in Taunton, Massachusetts (the Site, see Figure 1). This LSI was performed at the Main Lift Pump Station property and portions of 740 West Water Street and 825 West Water Street located in Taunton, Massachusetts (the Site, see Figures 1 and 2). The Taunton Assessor's office identifies the Main Lift Pump Station as Parcel ID 106-191 consisting of 0.55 acres and owned by the City. No specific address is assigned to the pump station. The Taunton Assessor's Office identifies the property at 740 West Water Street as Parcel ID 106-5 consisting of approximately 4.0 acres of land and owned by Bay State Crucible Co. The Taunton Assessor's office identifies 825 West Water Street as Parcel ID 105-159 consisting of 60 acres of land and owned by the City of Taunton. The property at 825 West Water Street consists of the City of Taunton's Wastewater Treatment Plant, the Taunton Animal Shelter, and the wastewater treatment plants former sludge landfill. Figure 1 shows the location of the Site and Figure 2 depicts the project area.

Please note the LSI was performed within the Main Lift Pump Station project area which is shown on Figure 2 and defined as follows:

- The Main Lift Pump Station Parcel: An approximate 13,500 square foot area (90' x 150');
- The Right-of-Way: An approximate 3,000 square foot area (20' wide x 150' long) from West Water Street to the Main Lift Pump Station property. The Right-of-Way project area is owned by Bay State Crucible;
- Bay State Crucible Property (740 West Water Street): An approximate 9,000 square foot area (20' wide x 450' long) running from the Main Lift Pump Station property boundary west of the Bay State Crucible building to the southern property boundary; and,
- Wastewater Treatment Plant (825 West Water Street): An approximate 25,000 square foot area (20' wide x 1,250' long) from the northern property boundary abutting 740 West Water Street, along the northwestern edge of the Taunton Sludge Landfill to the Taunton Animal Shelter, and south to the wastewater treatment plant.

This report summarizes the results of the LSI that BETA conducted as part of the design phase for a new Main Lift pump station and associated piping. The purpose of the initial investigation was to assess soil and groundwater for possible impacts from a former underground storage tank (UST) at the Main Lift Pump Station Parcel as well as release sites located adjacent to the property.

2.0 Background

To assess the potential for impact to the project area, BETA conducted a review of the Massachusetts Department of Environmental Protection (MassDEP) database of known releases in the area adjacent to the project area in the City of Taunton, Massachusetts. Based on the information available on the MassDEP website, the following properties have known releases proximate to the proposed project area:

690 West Water Street: RTN: 4-13818-Main Lift Pump Station

On April 17, 1998, a release of No. 2 fuel oil from a 5,000-gallon UST occurred at the Main Lift Pump Station property. The UST was not in service at the time of the release and was removed on June 17, 1998. During removal of the UST, 120 cubic yards of petroleum impacted soil was removed from the Site as part of an Immediate Response Action (IRA). Resource Controls, Inc. (RCI) completed confirmatory soil sampling upon removal of the UST and identified polynuclear aromatic hydrocarbons (PAHs) in one sample above Method 1 S-1 standards. RCI attributed the PAHs to coal ash present in the soil from fill material.

During the UST removal, groundwater was encountered at five feet below grade. Groundwater samples were collected from the base of the excavation and no compounds were detected above Method 1 GW-2 or GW-3 standards. RCI submitted an IRA completion and a class B-1 Response Action Outcome (RAO) statement in August 1998 and determined a level of No Significant Risk existed at the property. BETA concludes that residual contamination from this release could potentially impact soil and/or groundwater proximate to the Main Lift Pump Station project area.

600 West Water Street: RTN:4-165

This property, the former Taunton Gas Works, was historically used as a coal gas manufacturing plant. Historic site plans for the property depict oil tanks, gas tanks, and a tar plant east of the Right-of-Way and Main Lift Pump Station project areas. Site assessment and cleanup activities have occurred at the property since 1979.

In April 1995, ENSR submitted a Phase I Site Assessment to MassDEP. This report documented subsurface investigations in the Right-of-Way project area. Soil samples collected from a test pit within the Right-of-Way and a soil boring adjacent to the Right-of-Way contained concentrations of PAHs and cyanide in soil. Concentrations of PAHs were above current RCS-2 reportable concentrations. In October 1995, ENSR submitted a Phase II Site Assessment to MassDEP. Additional soil sampling identified concentrations of PAHs and cyanide within the Right-of-Way project area. Concentrations of PAHs and cyanide were below current RCS-2 reportable concentrations. Groundwater sampling identified concentrations of cyanide and VOCs above current RCGW-2 reportable concentrations in a monitoring well adjacent to the Right-of-Way project area.

In November 2009, ESS Group, Inc. (ESS) submitted a Phase V Remedial Monitoring Report to MassDEP. This report documented groundwater sampling completed in the Right-of-Way adjacent to the southern boundary of 600 West Water Street. This area is within the Right-of-Way portion of the project area. In

August 2003, an air sparging and soil vapor extraction groundwater treatment system was installed in the Right-of-Way along the southern boundary. The groundwater treatment system was operated from August 2003 to September 2005 and is currently inactive. Groundwater sampling was conducted in the Right-of-Way by ESS in April 2007, December 2007, and August 2008. Concentrations of naphthalene and styrene in two monitoring wells along the Right-of-Way exceeded their respective Method 1 GW-2 standards. Other detected compounds were below their respective Method 1 GW-2 or GW-3 standard, or the exposure point concentration established in the Method 3 Risk Characterization for the property. ESS recommended the Right-of-Way be included in an RAO for the property, assuming a level of no significant risk was determined for indoor air.

Mr. Mark Casey of EBI Consulting, the current licensed site professional (LSP) for the property, provided BETA with a plan depicting the disposal site boundary for the property. EBI's disposal site boundary for 600 West Water Street includes the Right-of-Way project area. A copy of this plan is included as Figure 4. The groundwater treatment system is located within the Right-of-Way project area. BETA concludes that contamination within the Right-of-Way will likely affect the project. Additionally, the excavations for the project will affect wells and piping in this area.

600 West Water Street: RTN 4-165-Main Lift Pump Station

As part of the work conducted at 600 West Water Street, subsurface investigations were conducted by ENSR at the Main Lift Pump Station property from 1994 to 1998. These investigations identified concentrations of PAHs and cyanide in soil and groundwater at the Main Lift Pump Station property above current MassDEP RCS-1 reportable concentrations. ENSR conducted a Release Abatement Measure (RAM) for PAH-contaminated soil in the southeast corner of the 600 West Water Street property and the eastern portion of the Main Lift Pump Station property. As part of the RAM, approximately 900 cubic yards of soil was excavated and removed from the two properties. During excavation of the contaminated soil, ENSR determined that the limits of contaminated material extended beyond the excavation. ENSR ceased excavation and conducted additional subsurface investigations to further delineate the contamination at the Main Lift Pump Station property.

In December 2000, ENSR submitted a class A-2 Response Action Outcome (RAO) Statement for the Main Lift Pump Station property. ENSR identified PAHs and physiologically available cyanide (PAC) in soil and PAC, PAHs, benzene, toluene, ethylbenzene, xylenes and styrene in groundwater at the Main Lift Pump Station property above current MassDEP RCS-1 reportable concentrations. ENSR concluded that achieving background conditions in soil at the Main Lift Pump Station property was infeasible and groundwater posed a level of No Significant Risk. ENSR concluded that the approximately 150 cubic yards of soil excavated as part of the RAM activities achieved a level of No Significant Risk at the Main Lift Pump Station property.

Based on this information, BETA believes that residual contamination could affect the planned work at the Main Lift Pump Station.

700 West Water Street: RTN: 4-12797

In September 1996, ENSTRAT performed a preliminary subsurface investigation at this property. The investigation identified volatile organic compounds (VOCs), PAHs, and total petroleum hydrocarbons (TPH) in soil and groundwater at the property above the applicable MassDEP reportable concentrations. ENSTRAT determined the release was associated with the abutting property at 600 West Water Street, which was historically used by the Taunton Gas Manufacturing Plant.

ENSTRAT's report also described soil borings advanced at this property by ENSR in 1995 on the northeast and northwest portion of the property. The borings completed on the property by ENSR were associated with assessment activities for 600 West Water Street and identified cyanide, PAHs, and lead in the soil sample from the northwest boring.

This property is located south of the Right-of-Way project area and west of the Bay State Crucible project area. Based on this information, BETA believes that residual contamination could affect the planned work at the Main Lift Pump Station.

Taunton Sludge Landfill, 825 West Water Street

The Taunton Sludge Landfill is located at 825 West Water Street, north of the City of Taunton's Wastewater Treatment Plant. The landfill received sludge from the wastewater treatment plant and was closed and capped in 2001. Four groundwater monitoring wells (Well #1 through Well #4) were installed as part of the landfill closure and are sampled semi-annually at the property. Groundwater sampling conducted by Veolia in April 2015 and 2016 did not identify any VOCs in groundwater samples from the monitoring wells. Sampling conducted in September 2015 identified chloroform above laboratory method detection limits in Well #1. Benzene, chlorobenzene, and 1,4-dichlorobenzene were detected above laboratory method detection limits in Well #4. Sampling performed in September 2016 identified chloroform in Well #1 and chlorobenzene in Well #4 above laboratory method detection limits. These compounds were below the applicable Method 1 GW-3 standards.

Well #1 is located approximately 150 feet southwest of the Wastewater Treatment Plant project area. Well #4 is located approximately 700 feet east of the Wastewater Treatment Plant project area. BETA concludes that the sludge landfill could potentially impact soil and groundwater within the Wastewater Treatment Plant property along the proposed force main alignment.

3.0 Soil

On April 10 and May 9, 2017, BETA oversaw the advancement of soil borings within the project area. The following details the advancement of these borings and the sampling of soil at the Site.

3.1 Preparation

Prior to initiating any investigatory activities at the Site, BETA performed the following activities in preparation of the implementation of the field work for this investigation:

- Marked out the proposed boring locations in the field for utility locations purposes;
- More than 72 hours prior to the start of the drilling activities, notified "Digsafe" and the City of Taunton to mark utilities in the vicinity of the proposed boring locations; and,
- Reviewed Site plans and attempted to locate borings away from on-site utility lines.

3.2 Soil Borings

BETA oversaw the advancement of fourteen soil borings on April 10 and May 9, 2017 (see below for a description of boring locations). Drilling activities were completed by Technical Drilling Services, Inc. (TDS) of Sterling, Massachusetts using a track-mounted Geoprobe drill rig. Soil samples were collected continuously at each boring location during drilling operations using a core sampler from grade to a depth of up to 35 feet below grade. Soil boring locations are depicted on Figure 2 and are described as follows:

Main Lift Pump Station Parcel:

The following soil borings were completed on April 10, 2017:

- B-9: In the paved area east of the pump station;
- B-10: In the paved area east of the pump station;
- B-11: In the paved area southeast of the pump station and south of boring B-12;
- B-12: In the paved area southeast of the pump station, west of boring B-11;
- B-13: In the paved driveway north of the pump station; and,

The following soil boring was completed on May 9, 2017

- B-8: Approximately three feet south of the former transformer pad

Right-of-Way project area:

The following soil borings were completed on May 9, 2017:

- B-14: In the Right-of-Way northwest of the existing pump station, adjacent to the former groundwater treatment system.

Bay State Crucible Property (740 West Water Street):

The soil borings completed on the Bay State Crucible property were completed on May 9, 2017.

- B-6: In the grass area approximately 55 feet west of the southwest corner of the Bay State Crucible building west of the Bay State Crucible building; and,
- B-7: In the grass area approximately 30 feet east from the northeast corner of the building at 700 West Water.

Wastewater Treatment Plant (Proposed Force Main Alignment):

The following soil borings were completed on May 9, 2017:

- B-1: In the grass area north of the City's wastewater treatment plant;
- B-2: In the West Water Street Right-of-Way, approximately 65 feet south of the Taunton Animal Shelter;
- B-3: North of the Taunton Animal Shelter;
- B-4: East of boring B-3, along the northwestern edge of the Taunton Sludge Landfill;
- B-5: East of boring B-4, along the northwestern edge of the Taunton Sludge Landfill;

Soil samples were field screened for the presence of total volatile organic compounds (TVOCs) using a photoionization detector (PID) calibrated to measure TVOCs in parts per million by volume (ppm_v). Headspace readings ranged from 0.0 ppm_v to 546.8 ppm_v. The boring logs in Appendix B include the PID readings for each sample. BETA submitted soil samples to Alpha Analytical, Inc. (Alpha) of Westborough, Massachusetts for the following analyses:

Main Lift Pump Station Parcel:

- B-8 (0-2'): Polychlorinated biphenyls (PCBs) by EPA method 8082
- B-8 (2-4'): EPH with target PAHs by MassDEP methodology, VPH with target VOCs by MassDEP methodology, PCBs by EPA method 8082, total cyanide, and RCRA 8 metals by various EPA methods;
- B-10 (10-14'): RCRA 8 metals by various EPA methods, VPH by MassDEP methodology, and EPH with target PAHs by MassDEP methodology;
- B-11 (10-13'): RCRA 8 metals by various EPA methods, VPH by MassDEP methodology, and EPH with target PAHs by MassDEP methodology; and,
- B-12 (20-23'): VOCs by EPA method 8260, Semi-volatile organic compounds (SVOCS) by EPA method 8270, PCBs by EPA method 8082, TPH by EPA method 8100M, conductivity, and RCRA 5 metals (As, Cd, Cr, Pb, and Hg) by various EPA methods.

Right-of-Way:

- B-14 (17-19'): VOCs by EPA method 8260, SVOCs by EPA Method 8270, PCBs by EPA method 8082, total cyanide, conductivity, and TPH by EPA Method 8100M.

Bay State Crucible Property (740 West Water Street):

- B-6 (10-12'): EPH with target PAHs by MassDEP methodology, VPH with target VOCs by MassDEP methodology, and RCRA 8 metals by various EPA methods;
- B-7 (13-15'): EPH with target PAHs by MassDEP methodology, VPH with target VOCs by MassDEP methodology, and RCRA 8 metals by various EPA methods;

Wastewater Treatment Plant (Proposed Force Main Alignment):

- B-3 (6-8'): Extractable petroleum hydrocarbons (EPH) with target polycyclic aromatic hydrocarbons (PAHs) by MassDEP methodology, volatile petroleum hydrocarbons (VPH) with target VOCs by MassDEP methodology, and the Resource Conservation and Recovery Act (RCRA) eight metals by various EPA methods;
- B-4 (8-10'): EPH with target PAHs by MassDEP methodology, VPH with target VOCs by MassDEP methodology, and RCRA 8 metals by various EPA methods;
- B-5 (2-4'): EPH with target PAHs by MassDEP methodology, VPH with target VOCs by MassDEP methodology, and RCRA 8 metals by various EPA methods;

Table 1 summarizes the detected compounds from these analyses and Appendix A contains the laboratory certificates of analysis.

3.3 Surficial Soil Sampling

On April 24, 2017, BETA collected surficial soil samples from around the former transformer pad within the Main Lift Pump Station. During site reconnaissance, BETA observed transformers on the transformer pad south of the pump station that were most likely manufactured prior to 1979 and possibly contained PCBs. To determine if a possible release had occurred from the transformers, BETA collected four surficial soil samples (SS-1 to SS-4) and submitted these samples to Alpha for analysis of PCBs by EPA method 8082. Figure 2 depicts the sample locations. Table 1 summarizes the laboratory data and Appendix A contains the laboratory certificates of analysis.

3.4 Bay State Crucible Stockpile Sampling

On April 28, 2017, BETA collected samples from stockpiled waste material at the Bay State Crucible property at 740 West Water Street (see Figure 3). BETA collected twelve grab samples (S-1 to S-12). Grab sample S-4 was submitted to Alpha for analysis of VOCs by EPA method 8260. The grab samples were then composited into one sample (Comp-1) and submitted to Alpha for analysis of SVOCs by EPA method 8270, RCRA 8 metals by various EPA methods, PCBs by EPA method 8082, TPH by EPA method 8100, organochlorine pesticides, chlorinated herbicides, conductivity, reactivity, ignitability, and corrosivity. Table 2 summarizes the laboratory data and Appendix A contains the laboratory certificates of analysis.

On June 22, 2017, BETA collected an additional twelve grab samples (SS-13 to SS-24) from the stockpile and composited them into one sample (Comp-2). The composite sample was then submitted to Alpha for analysis of toxaphene and pyridine. The additional sample was collected and submitted for these analyses as required by the disposal facility. Table 2 summarizes the laboratory data and Appendix A contains the laboratory certificates of analysis.

3.5 Soil Category

Pursuant to 310 CMR 40.0361, soil samples obtained within 500 feet of a residential dwelling were compared to RCS-1 reportable concentrations. Soil samples obtained within the Main Lift Pump Station project area were within 500 feet of a residential dwelling. Soil samples collected from borings B-8, B-10, B-11, B-12, and B-13 are within 500 feet of a residential dwelling and were compared to RCS-1 reportable concentrations. Soil samples collected from borings B-3, B-4, B-5, B-6, B-7, and B-14 are greater than 500 feet from a residential dwelling and were compared to RCS-2 reportable concentrations.

3.6 Soil Analytical Data

3.6.1 Soil Boring Analytical Data

As can be seen in Table 1, the following target PAHs were detected above the MassDEP RCS-1 reportable concentrations:

- The concentration of naphthalene in the sample from B-10 (10-14') [9.14 milligrams per kilogram (mg/kg)] exceeds the MassDEP RCS-1 reportable concentration of 4 mg/kg; and,
- The concentration of 2-methylnaphthalene in the samples from B-10 (10-14') (1.72 mg/kg) and B-11 (10-13') (0.832 mg/kg) exceed the MassDEP RCS-1 reportable concentration of 0.7 mg/kg.

As can be seen in Table 1, the following VOCs were detected above the MassDEP RCS-2 reportable concentrations:

- The concentration of naphthalene in the sample from B-14 (17-19') (22 mg/kg) exceeds the MassDEP RCS-2 reportable concentrations of 20 mg/kg.

As can be seen in Table 1, the following target VOC was detected above the MassDEP RCS-1 reportable concentrations:

- The concentration of naphthalene in the samples from B-10 (10-14') (49.1 mg/kg) and B-11 (10-13') (4.06 mg/kg) exceed the MassDEP RCS-1 reportable concentration of 4 mg/kg.

All other detected compounds were below MassDEP RCS-1 and RCS-2 reportable concentrations.

3.6.2 Surficial Soil Analytical Data

As can be seen in Table 1, the concentration of the PCB fraction Aroclor 1260 in the sample from SS-4 (2.93 mg/kg) exceeds the MassDEP RCS-1 reportable concentration of 1 mg/kg. All other detected compounds were below MassDEP RCS-1 and RCS-2 reportable concentrations.

3.6.3 Bay State Crucible Stockpile Analytical Data

As can be seen in Table 2, concentrations of pesticides, PCBs, metals, TPH, and SVOCs were detected above the laboratory method detection limits in the stockpile sample. This data has been used to obtain approval for disposal of this material at the Taunton Sanitary Landfill.

4.0 Groundwater

As part of this LSI, BETA oversaw the installation of three monitoring wells at the Site. The following details the installation of these wells and the sampling of groundwater at the Site.

4.1 Groundwater Monitoring Wells

During the advancement of the soil borings on April 10, and May 9, 2017, BETA oversaw the installation of three monitoring wells. Monitoring wells were installed in soil borings B-5, B-12, and B-14. These wells are depicted on Figure 2 as MW-1, MW-2, and MW-3. Each monitoring well was completed using schedule 40 PVC material and an appropriate amount of 0.010 slotted screen and riser material. Monitoring well MW-1 was finished with a stand pipe and monitoring wells MW-2 and MW-3 were completed with a flush mounted road box. Soil boring logs are included in Appendix B.

4.2 Groundwater Monitoring Well Development and Sampling

On May 25, 2017, in accordance with state and federal protocols, the monitoring wells were developed appropriately to remove fine silt and sand from the well and to ensure a proper connection between the wells and the surrounding aquifer prior to the collection of groundwater samples. BETA used the overpumping method to develop the wells.

On June 2, 2017, the depth to groundwater was gauged and a sample was collected from each of the three newly installed monitoring wells. The EPA's low-flow methodology was used to collect groundwater sample from the monitoring wells. During development, an odor was noted in the purge water from monitoring wells MW-2 and MW-3.

BETA submitted these groundwater samples to Alpha for analysis of VOCs by EPA Method 8260, dissolved RCRA 8 metals by various EPA methods, EPH by MassDEP methodology, and VPH by MassDEP Methodology. Due to their proximity to areas of the 600 West Water Street parcel where cyanide was identified, groundwater samples from monitoring well MW-2 and MW-3 were also submitted for analysis of total cyanide. Table 3 summarizes the detected compounds from these analyses and Appendix A contains the laboratory certificates of analysis. Well sampling logs are included in Appendix C.

4.3 Groundwater Category

Pursuant to 310 CMR 40.0362, groundwater analytical results have been compared to RCGW-2 reportable concentrations as none of the monitoring wells are within a Current Drinking Water Source Area or a Potential Drinking Water Source Area.

4.4 Groundwater Analytical Data

Table 3 summarizes the groundwater analytical data. Groundwater results have been compared to MassDEP RCGW-2 reportable concentrations. As can be seen in Table 3, Alpha identified the following compounds above MassDEP RCGW-2 reportable concentrations:

- The concentration of total cyanide in the samples from MW-2 [0.072 milligrams per liter (mg/L)] and MW-3 (0.524 mg/L) exceeds the RCGW-2 reportable concentration of 0.03 mg/L.

The following target PAH was detected above the RCGW-2 reportable concentration in the groundwater sample from MW-3:

- The concentration of naphthalene [3.02 milligrams per liter (mg/L)] exceeds the RCGW-2 reportable concentration of 0.7 mg/L].

The following VOCs were detected above the RCGW-2 reportable concentrations in the groundwater sample from MW-3:

- The concentration of benzene (5.40 mg/L) exceeds the RCGW-2 reportable concentration of 1 mg/L;
- The concentration of p/m-xylene (8 mg/L) exceeds the RCGW-2 reportable concentration of 3 mg/L;
- The concentration of o-xylene (3.2 mg/L) exceeds the RCGW-2 reportable concentration of 3 mg/L;
- The concentration of styrene (2.5 mg/L) exceeds the RCGW-2 reportable concentration of 0.1 mg/L; and,
- The concentration of naphthalene (7.3 mg/L) exceeds the RCGW-2 reportable concentration of 0.7 mg/L;

The following VPH fraction and target VOCs were detected above the RCGW-2 reportable concentration in the groundwater sample from MW-3:

- The concentration of C_9-C_{10} aromatics (9.35 mg/L) exceeds the RCGW-2 reportable concentration of 4 mg/L;
- The concentration of benzene (3.82 mg/L) exceeds the RCGW-2 reportable concentration of 1 mg/L;
- The concentration of p/m-xylene (6.28 mg/L) exceeds the RCGW-2 reportable concentration of 3 mg/L; and,
- The concentration of naphthalene (6.6 mg/L) exceeds the RCGW-2 reportable concentration of 0.7 mg/L.

No other detected compounds exceeded the RCGW-2 reportable concentrations.

4.5 Taunton Wastewater Discharge Limits

During the new Main Lift Pump Station construction, dewatering will occur due to the depths of excavation. BETA compared the groundwater data to the City of Taunton's wastewater discharge limits for potential discharge during construction activities. The concentration of cyanide in the sample from MW-3 (0.524 mg/L) exceeds the City's wastewater discharge limit of 0.37 mg/L. During groundwater sampling, pH was measured in the field using a YSI 8260. The City's wastewater discharge limit prohibits a pH of less than 5.5. The pH of monitoring well MW-3 (5.39) at the time of sampling is below the acceptable pH. The pH of monitoring well MW-3 is similar to the pH of monitoring wells located within the right-of way from previous investigations. All other detected compounds were below the City's wastewater discharge limits. Please note that concentrations of VOCs are not included in the City's wastewater discharge limits. Veolia, the City's wastewater treatment plant operator conducts a review of VOC concentrations on a case by case basis to

determine if discharge to the system is acceptable. Total VOCs in the sample from MW-3 were 54.62 mg/L and total VOCs in the sample from MW-2 were 0.0864 mg/L. Please note, groundwater samples were not analyzed for BOD, TSS, or TPH which are included in the City's wastewater discharge limits. TPH was calculated using VPH and EPH concentrations. The concentration of TPH in the sample from MW-2 (0.34 mg/L) is below the wastewater discharge limit of 5 mg/L. The concentration of TPH in the sample from MW-3 (16.67 mg/L) exceeds the wastewater discharge limit of 5 mg/L. Table 3 summarizes the groundwater data and Appendix D contains the city's wastewater discharge limits.

4.5 Salinity Sampling

On July 20, 2017, BETA conducted groundwater sampling at the Main Lift Pump Station and surface water sampling in the Taunton River. BETA collected two groundwater samples from monitoring well MW-2, one from the top of the water table [MW-2 (Shallow)] and one approximately one foot from the bottom of the well [MW-2 (Deep)]. BETA collected one surface water sample (River) from the Taunton River These samples were submitted to Alpha for analysis of salinity. As can be seen in Table 2, salinity was not detected above laboratory method detection limits in the samples. Since the concentration of salinity was below laboratory method detection limits, groundwater at the Site is determined fresh water. Laboratory certificates of analysis are included in Appendix A.

5.0 Conclusions

BETA makes the following conclusions regarding reviewed reports for releases in the project vicinity:

- Upon review of the MassDEP database of known releases, BETA identified releases that could potentially impact the Main Lift Pump Station project. A class B-1 RAO statement was submitted for the Main Lift Pump Station property due to the release of No. 2 fuel oil from a UST. This release could potentially affect the Main Lift Pump Station project area.
- The property at 600 West Water Street is north of the Main Lift Pump Station and abuts the Right-of-Way project area and the Main Lift Pump Station project area. This property historically operated as the Taunton Gas Works, a coal gas manufacturing plant. Site assessment activities have been ongoing since 1979 and included a groundwater treatment system in the Right-of-Way. Previous subsurface investigations within the Right-of-Way identified concentrations of PAHs and cyanide in soil within the Right-of-Way. Groundwater sampling conducted at 600 West Water Street adjacent to the Right-of-Way identified cyanide and VOCs. Groundwater sampling identified naphthalene and styrene above Method 1 GW-2 standards within the limits of the Right-of-Way treatment system. This release could potentially affect the Main Lift Pump Station and Right-of-Way project areas.
- A RAM was performed on a portion of the Main Lift Pump Station property for the removal of PAH contaminated soil associated with the property at 600 West Water Street. A class A-2 RAO statement was submitted for the Main Lift Pump Station property under RTN 4-165 associated with the property at 600 West Water Street. The RAO identified a release of cyanide and PAHs in soil and PAHs, cyanide, benzene, toluene, ethylbenzene, xylenes and styrene were identified in groundwater at the Main Lift Pump Station property. This release could potentially affect the Main Lift Pump Station project area.
- During a previous preliminary subsurface investigation at 700 West Water Street, soil and groundwater samples identified VOCs, PAHs, and TPH. Soil borings completed at this property as part of an assessment for 600 West Water Street also identified cyanide, PAHs, and lead in soil. This property is located south of the Right-of-Way project area and northwest of the Bay State Crucible project area. This release could potentially affect the Main Lift Pump Station and Right-of-Way project areas.
- The Taunton Sludge Landfill, located north of the City's wastewater treatment plant received sludge from the plant and closed in 2001. Semi-annual groundwater sampling identified chloroform above laboratory detection limits in one well located approximately 150' from the wastewater treatment plant project area. This could potentially affect the proposed force main alignment.

BETA conducted a Limited Subsurface Investigation for the project area and makes the following conclusions based on the results of the investigation:

- Laboratory analysis of soil samples identified naphthalene and 2-methylnaphthalene compounds above the applicable MassDEP reportable concentrations in soil samples B-10 (10-14') and B-11 (10-13'). Samples B-10 (10-14') and B-11 (10-13') were collected from the Main Lift Pump Station

project area. These compounds appear to be consistent with the Class A-2 RAO filed for this area and are likely associated with former activities at the abutting 600 West Water Street property;

- Laboratory analysis of soil samples identified naphthalene and 2-methylnaphthalene compounds above the applicable MassDEP reportable concentrations in the soil sample from B-14 (17-19'). Sample B-14 (17-19') was collected from the Right-of-Way project area. These compounds appear to be consistent with the results of previous investigations in this area in conjunction with response actions at 600 West Water Street;
- Four surficial soil samples were collected from around the former transformer pad area adjacent to the Main Lift Pump Station. Laboratory analysis of surficial soil samples identified Aroclor 1260 above the applicable MassDEP reportable concentration in sample SS-4. All other detected compounds were below MassDEP reportable concentrations. The detection of PCBs in these samples appears to be a condition not previously investigated and is likely associated with the former transformers;
- Laboratory analysis of samples from the waste material identified concentrations of dieldrin, the PCB fraction Aroclor 1260, and benzo(a)pyrene above laboratory method detection limits in the Bay State Crucible waste material stockpile. This material is currently stockpiled at the Bay State Crucible property and will be disposed at the Taunton Landfill;
- Laboratory analysis of groundwater identified total cyanide in monitoring well MW-2 above MassDEP RCGW-2 reportable concentrations. Monitoring well MW-2 is located within the Main Lift Pump Station project area. All other detected compounds from groundwater sample MW-2 were below MassDEP RCGW-2 reportable concentrations. These compounds appear to be consistent with the Class A-2 RAO filed for this area and are likely associated with former activities at the abutting 600 West Water Street property;
- Laboratory analysis of groundwater from monitoring well MW-3 identified concentrations of total cyanide, naphthalene, benzene, xylenes, styrene, and C_9-C_{10} aromatics above MassDEP RCGW-2 reportable concentrations. Monitoring well MW-3 is located within the Right-of-Way project area. All other detected compounds were below MassDEP RCGW-2 reportable concentrations. These compounds appear to be consistent with the results of previous investigations in this area in conjunction with response actions at 600 West Water Street;
- Laboratory analysis of groundwater from monitoring well MW-1 did not identify any concentrations above MassDEP reportable concentrations.

6.0 Recommendations

Based on the conclusions, BETA makes the following recommendations:

- Soil samples collected within the Right-of-Way project area contained VOCs above RCS-1 reportable concentrations. A groundwater sample collected contained exceedances of VOCs, total cyanide, and C_9-C_{10} Aromatics. Based on these exceedances contaminated soil and groundwater will likely be encountered during excavation. To ensure worker health and safety and to meet the requirements of the Massachusetts Contingency Plan (310 CMR 40.0000 et seq.), BETA recommends preparing and conducting a Utility-related Abatement Measure (URAM) for the construction work at properties not owned by the City of Taunton (740 West Water Street property). Pursuant to 310 CMR 40.0464, the following performance standards shall be met for all URAMs:
    - Contamination at the disposal site shall not be exacerbated as a result of the Utility-related Abatement Measure or as a result of structures placed within an area of identified contamination;
    - Construction workers, surrounding human populations and environmental receptors shall be reasonably protected from exposure to oil and/or hazardous materials during and following construction activities; and,
    - Contaminated soil, contaminated groundwater, and other Remediation Wastes removed from the disposal site and construction area shall be managed in compliance with the provisions of 310 CMR 40.0030 and all applicable federal, state, and local laws. Contaminated soil that is geotechnically suitable for backfill may be used as backfill under the provisions of the URAM. Excess soil will be handled and disposed of appropriately.
    - Pursuant to 310 CMR 40.0462, MassDEP must be notified of the intention to conduct the URAM. Subsequently, URAM status reports are required after the first 120 days and every 6 months thereafter. Upon completion of the URAM, a URAM completion report must be submitted to MassDEP.
- Soil samples collected on the City's Main Lift Pump Station property contained exceedances of PAHs and PCBs above RCS-1 reportable concentrations. Monitoring well MW-2 on City-owned property contained total cyanide above RCGW-2 reportable concentrations. The City is responsible for reporting the concentrations of PCBs (within 120 days) and conducting response actions regarding these exceedances. Subsequent to reporting to MassDEP, BETA recommends conducting additional investigation to delineate the extent of PCBs at this property. BETA also recommends that a RAM Plan be implemented to address the presence of soil and groundwater contamination within the area of the Main Lift Pump Station during construction of the new Main Lift Pump Station. The RAM plan is necessary to address contaminated soil and groundwater that may be encountered during the sewer and pump station improvements.
- The concentrations of PAHs and cyanide detected at the Main Lift Pump Station property do not require reporting to MassDEP as they were previously reported under RTNs associated with 600 West Water Street (4-165) and a UST removal at the Main Lift Pump Station property (4-13818).
- Based on the sampling conducted within the Wastewater Treatment Plant and Bay State Crucible Property project areas and around the Taunton Sludge Landfill, no further action is necessary in those areas.

Limitations

This report has been prepared for the sole and exclusive use of the Client and is subject to and issued in connection with the Agreement and the provisions thereof. Any use or reliance in this report, without the specific written authorization of the Client and BETA, shall be at the User's sole risk.

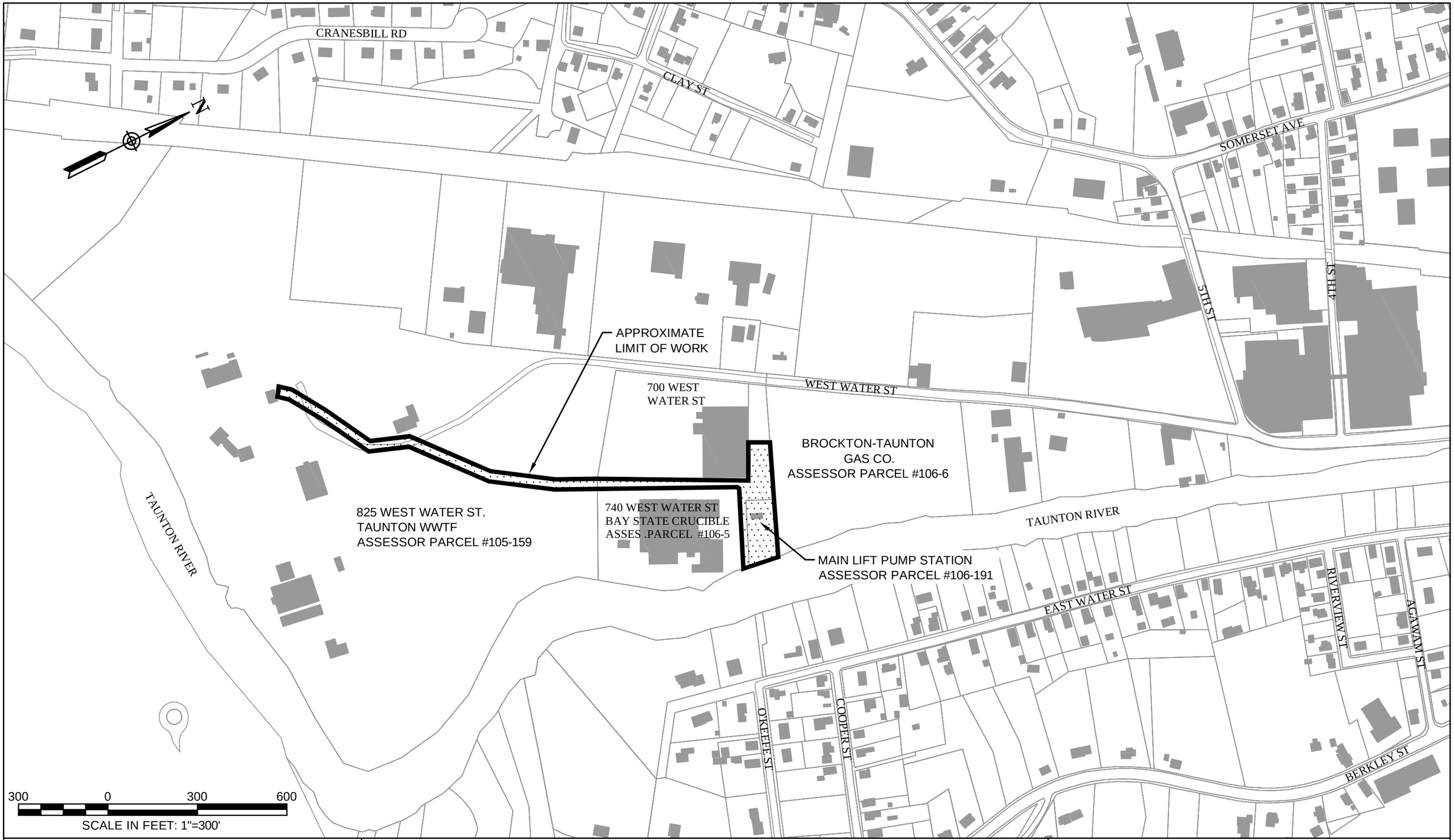
This LSI Report has been prepared to document information gathered at those "suspect" locations; therefore, the following limitations apply:

- BETA cannot warrant that additional subsurface contamination is not present at inaccessible areas of the Site and/or at intermediate locations between the LSI subsurface locations investigated to date.
- This report does not include an assessment of the suitability of Site soil for development/construction.

The findings, observations and conclusions presented in this report, including the extent of subsurface explorations and other tests, are limited by the scope of services outlined in our Agreement. The detection of a compound in air, soil, or groundwater does not mean that its extent has been determined. Additional investigations may be warranted to define the nature and extent of contaminants at the site.

No attempt has been made to assess the compliance status of any past or present Owner or Operator of the Site with any federal, state or local laws or regulations.

This LSI has been performed in accordance with generally accepted engineering practices. No other warranty, expressed or implied, is made.



J:\TAUNTON\MAIN LIFT PUMP STATION\ENVIRONMENTAL\ACAD\FIGURE 1.DWG

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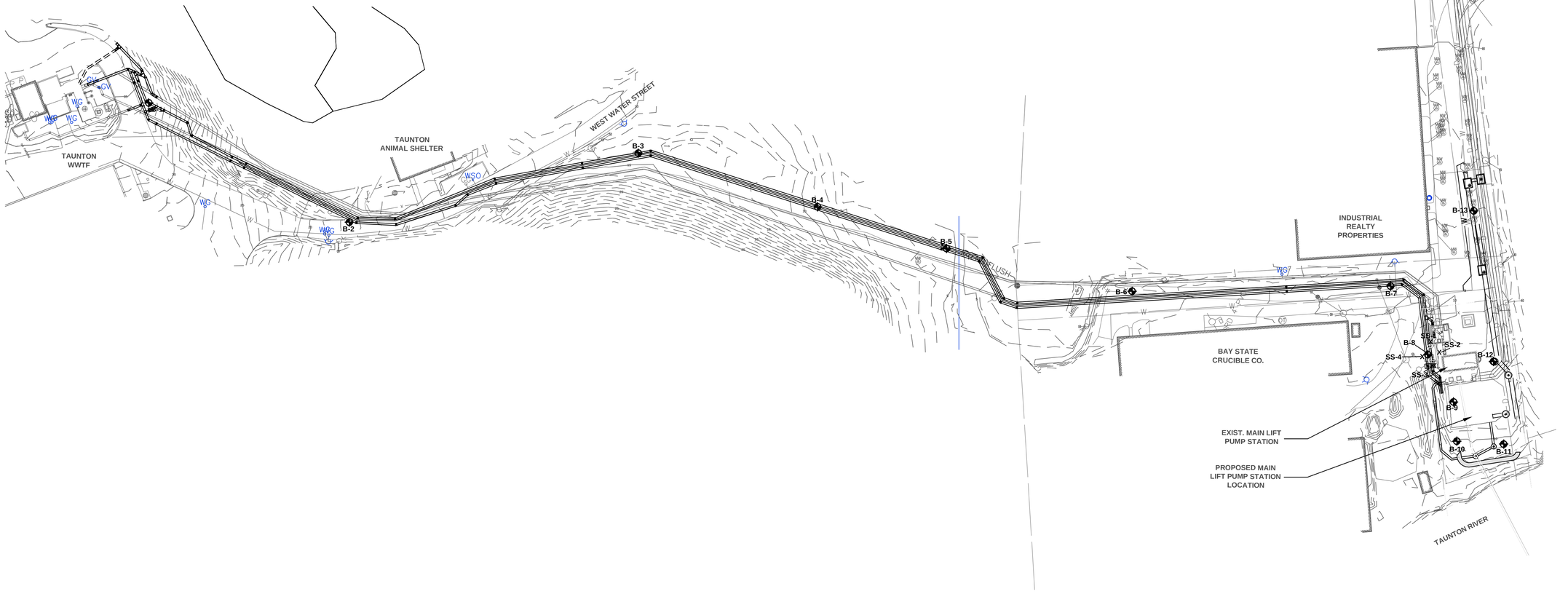
Main Lift Pump Station
Taunton, MA

FIGURE 1
SITE LOCUS MAP
Scale = 1:300



PREPARED BY

BETA
www.BETA-Inc.com

REGISTERED PROFESSIONAL

SUBCONSULTANT

PROJECT

MAIN LIFT

PUMP STATION

TAUNTON, MA

TITLE

FIGURE 2
SITE PLAN

NO.	REVISIONS	DATE

DRAWN BY: MD

DESIGNED BY:

CHECKED BY: JRM

ISSUE DATE: 00/00/15

BETA JOB NO.: 5530-000

SCALE

60 0 60 120

SCALE IN FEET: 1"=60'

SHEET NO.

5/4/2017 10:22 AM J:\TAUNTON\MAIN LIFT PUMP STATION\ENVIRONMENTAL\ACAD\BORINGS (MAIN LIFT & FM ALIGNMENT).DWG

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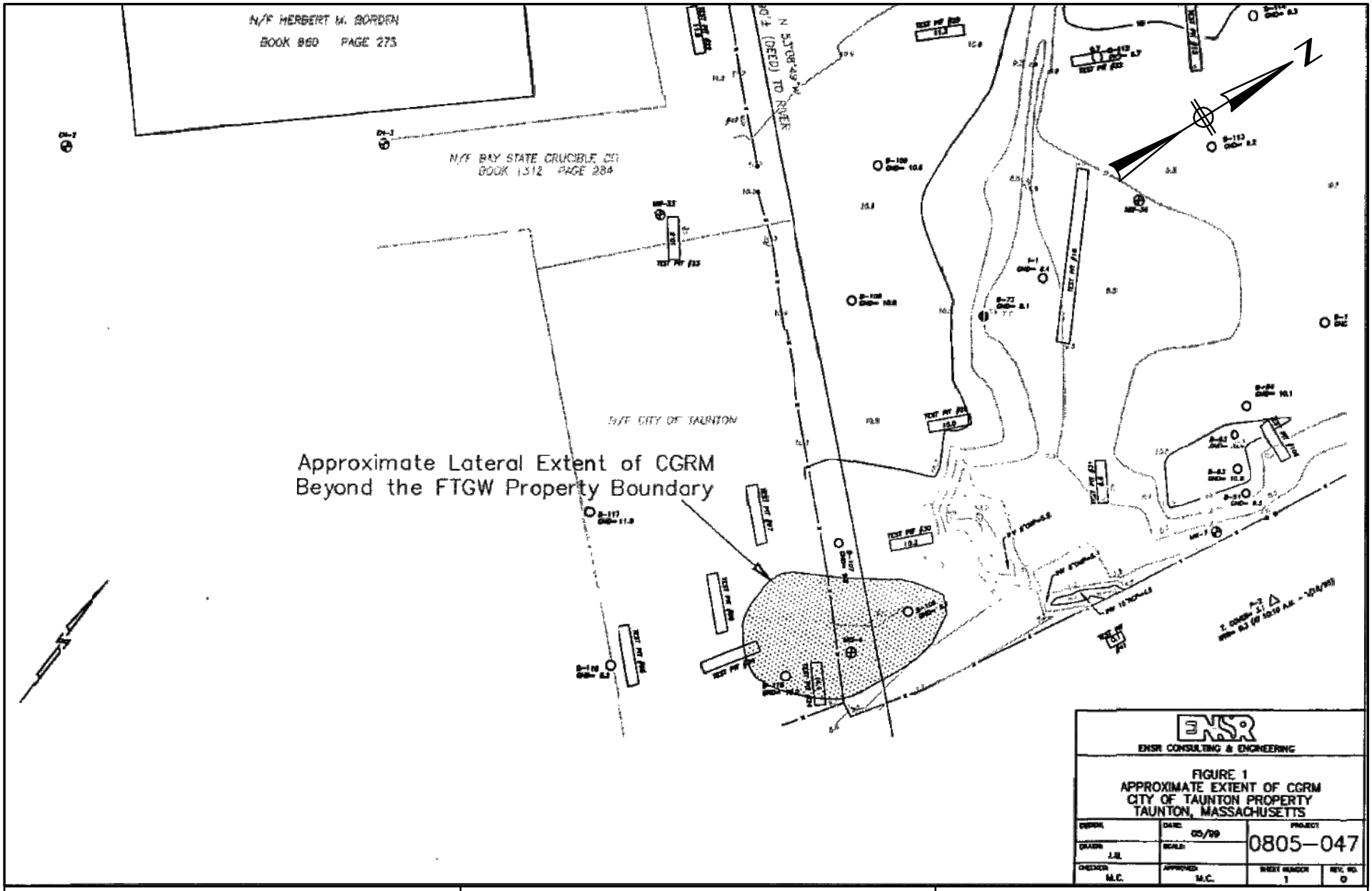
Main Lift Pump Station
Taunton, Massachusetts

FIGURE 3
BAY STATE CRUCIBLE SAMPLING PLAN
SCALE = NONE



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Main Lift Pump Station
Taunton, Massachusetts

FIGURE 4
600 WEST WATER STREET
DISPOSAL SITE BOUNDARY
SCALE = NONE

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Table 1
Soil Analytical Data
Taunton Main Lift PS
Taunton, Massachusetts

LOCATION	B-3 (6-8')	B-4 (8-10')	B-5 (2-4')	B-6 (10-12')	B-7 (13-15')	B-8 (0-2')	B-8 (2-4')	B-10(10-14')	B-11(10-13')	B-12(20-23')	B-13(14-15')	B-14 (17-19')	SS-1	SS-2	SS-3	SS-4	RCS-1-14	RCS-2-14
SAMPLING DATE	5/9/2017	5/9/2017	5/9/2017	5/9/2017	5/9/2017	5/9/2017	5/9/2017	4/10/2017	4/10/2017	4/10/2017	4/10/2017	5/9/2017	4/24/2017	4/24/2017	4/24/2017	4/24/2017		
General Chemistry																		
Specific Conductance @ 25 C	-	-	-	-	-	-	-	-	-	37	-	12	-	-	-	-	NE	NE
Solids, Total	83.7	88.9	83.3	76.8	82	80.7	82.8	75.3	70.6	86.9	82.6	77.9	50.9	75.4	65.9	40.9	NE	NE
Total Cyanide, mg/kg																		
Cyanide, Total	-	-	-	-	-	-	**6.8**	-	-	-	-	1.2 U	-	-	-	-	30	100
Extractable Petroleum Hydrocarbons, mg/kg																		
C9-C18 Aliphatics	7.58 U	7.33 U	7.54 U	8.42 U	7.93 U	-	7.65 U	**176**	**406**	-	**15.2**	-	-	-	-	-	1,000	3,000
C19-C36 Aliphatics	7.58 U	15.7	7.54 U	8.42 U	7.93 U	-	7.65 U	**105**	**220**	-	**11.6**	-	-	-	-	-	3,000	5,000
C11-C22 Aromatics	7.58 U	7.33 U	7.54 U	8.42 U	7.93 U	-	7.65 U	**114**	**227**	-	**26.1**	-	-	-	-	-	NE	NE
C11-C22 Aromatics, Adjusted	7.58 U	7.33 U	7.54 U	8.42 U	7.93 U	-	7.65 U	**99**	**216**	-	**19.6**	-	-	-	-	-	1,000	3,000
Naphthalene	0.379 U	0.366 U	0.377 U	0.421 U	0.396 U	-	0.382 U	**9.14**	**2.44**	-	0.385 U	-	-	-	-	-	4	20
2-Methylnaphthalene	0.379 U	0.366 U	0.377 U	0.421 U	0.396 U	-	0.382 U	**1.72**	**0.832**	-	0.385 U	-	-	-	-	-	0.7	80
Acenaphthylene	0.379 U	0.366 U	0.377 U	0.421 U	0.396 U	-	0.382 U	0.437 U	0.447 U	-	0.385 U	-	-	-	-	-	1	10
Acenaphthene	0.379 U	0.366 U	0.377 U	0.421 U	0.396 U	-	0.382 U	**0.986**	**1.16**	-	0.385 U	-	-	-	-	-	4	3,000
Fluorene	0.379 U	0.366 U	0.377 U	0.421 U	0.396 U	-	0.382 U	**0.62**	**1.26**	-	0.385 U	-	-	-	-	-	1,000	3,000
Phenanthrene	0.379 U	0.366 U	0.377 U	0.421 U	0.396 U	-	0.382 U	**1.34**	**2.15**	-	**0.548**	-	-	-	-	-	10	1,000
Anthracene	0.379 U	0.366 U	0.377 U	0.421 U	0.396 U	-	0.382 U	0.437 U	**0.666**	-	0.385 U	-	-	-	-	-	1,000	3,000
Fluoranthene	0.379 U	0.366 U	0.377 U	0.421 U	0.396 U	-	0.382 U	**0.848**	**1.32**	-	**1.44**	-	-	-	-	-	1,000	3,000
Pyrene	0.379 U	0.366 U	0.377 U	0.421 U	0.396 U	-	0.382 U	**0.727**	**1.14**	-	**1.35**	-	-	-	-	-	1,000	3,000
Benzo(a)anthracene	0.379 U	0.366 U	0.377 U	0.421 U	0.396 U	-	0.382 U	0.437 U	0.447 U	-	**0.502**	-	-	-	-	-	7	40
Chrysene	0.379 U	0.366 U	0.377 U	0.421 U	0.396 U	-	0.382 U	0.437 U	0.447 U	-	**0.502**	-	-	-	-	-	70	400
Benzo(b)fluoranthene	0.379 U	0.366 U	0.377 U	0.421 U	0.396 U	-	0.382 U	0.437 U	0.447 U	-	**0.45**	-	-	-	-	-	7	40
Benzo(k)fluoranthene	0.379 U	0.366 U	0.377 U	0.421 U	0.396 U	-	0.382 U	0.437 U	0.447 U	-	**0.437**	-	-	-	-	-	70	400
Benzo(a)pyrene	0.379 U	0.366 U	0.377 U	0.421 U	0.396 U	-	0.382 U	0.437 U	0.447 U	-	**0.479**	-	-	-	-	-	2	7
Indeno(1,2,3-cd)Pyrene	0.379 U	0.366 U	0.377 U	0.421 U	0.396 U	-	0.382 U	0.437 U	0.447 U	-	**0.396**	-	-	-	-	-	7	40
Dibenzo(a,h)anthracene	0.379 U	0.366 U	0.377 U	0.421 U	0.396 U	-	0.382 U	0.437 U	0.447 U	-	0.385 U	-	-	-	-	-	0.7	4
Benzo(ghi)perylene	0.379 U	0.366 U	0.377 U	0.421 U	0.396 U	-	0.382 U	0.437 U	0.447 U	-	**0.402**	-	-	-	-	-	1,000	3,000
Polychlorinated Biphenyls, mg/kg																		
Aroclor 1016						0.0406 U	0.0398 U	-	-	0.0369 U	-	0.042 U	0.065 U	0.0433 U	0.0499 U	0.402 U	1	4
Aroclor 1221						0.0406 U	0.0398 U	-	-	0.0369 U	-	0.042 U	0.065 U	0.0433 U	0.0499 U	0.402 U	1	4
Aroclor 1232						0.0406 U	0.0398 U	-	-	0.0369 U	-	0.042 U	0.065 U	0.0433 U	0.0499 U	0.402 U	1	4
Aroclor 1242						0.0406 U	0.0398 U	-	-	0.0369 U	-	0.042 U	0.065 U	0.0433 U	0.0499 U	0.402 U	1	4
Aroclor 1248						0.0406 U	0.0398 U	-	-	0.0369 U	-	0.042 U	0.065 U	0.0433 U	0.0499 U	0.402 U	1	4
Aroclor 1254						0.0406 U	0.0398 U	-	-	0.0369 U	-	0.042 U	0.065 U	0.0433 U	0.0499 U	0.402 U	1	4
Aroclor 1260						0.0406 U	0.0398 U	-	-	0.0369 U	-	0.042 U	**0.311**	0.0433 U	**0.505**	**2.93**	1	4
Aroclor 1262						0.0406 U	0.0398 U	-	-	0.0369 U	-	0.042 U	0.065 U	0.0433 U	0.0499 U	0.402 U	1	4
Aroclor 1268						0.0406 U	0.0398 U	-	-	0.0369 U	-	0.042 U	0.065 U	0.0433 U	0.0499 U	0.402 U	1	4
PCBs, Total						0.0406 U	0.0398 U	-	-	0.0369 U	-	0.042 U	**0.311**	0.0433 U	**0.505**	**2.93**	1	4
Semivolatile Organic Compounds, mg/kg																		
Acenaphthene	-	-			-	-	-	-	-	**0.21**	-	0.17 U	-	-	-	-	4	3,000
Fluoranthene	-	-			-	-	-	-	-	**0.79**	-	**0.4**	-	-	-	-	1,000	3,000
Naphthalene	-	-			-	-	-	-	-	**0.23**	-	**13**	-	-	-	-	4	20
Benzo(a)anthracene	-	-			-	-	-	-	-	**0.28**	-	0.12 U	-	-	-	-	7	40
Benzo(a)pyrene	-	-			-	-	-	-	-	**0.21**	-	0.17 U	-	-	-	-	2	7
Benzo(b)fluoranthene	-	-			-	-	-	-	-	**0.24**	-	**0.18**	-	-	-	-	7	40
Benzo(k)fluoranthene	-	-			-	-	-	-	-	0.11 U	-	0.12 U	-	-	-	-	70	400
Chrysene	-	-			-	-	-	-	-	**0.26**	-	0.13	-	-	-	-	70	400
Acenaphthylene	-	-			-	-	-	-	-	0.15 U	-	0.17 U	-	-	-	-	1	10
Anthracene	-	-			-	-	-	-	-	**0.25**	-	0.12 U	-	-	-	-	1,000	3,000
Benzo(ghi)perylene	-	-			-	-	-	-	-	0.15 U	-	0.17 U	-	-	-	-	1,000	3,000
Fluorene	-	-			-	-	-	-	-	**0.25**	-	0.21 U	-	-	-	-	1,000	3,000
Phenanthrene	-	-			-	-	-	-	-	**0.49**	-	**0.56**	-	-	-	-	10	1,000
Pyrene	-	-			-	-	-	-	-	**0.82**	-	**0.39**	-	-	-	-	1,000	3,000
Aniline	-	-			-	-	-	-	-	0.23 U	-	0.25 U	-	-	-	-	1,000	10,000
2-Methylnaphthalene	-	-			-	-	-	-	-	0.23 U	-	**1.8**	-	-	-	-	0.7	80
Total Metals, mg/kg																		
Arsenic, Total	**1.1**	**1.2**	**1**	**0.71**	0.48 U	-	**2.4**	**3.3**	**5**	**3.4**	**3.8**	**1.4**	-	-	-	-	20	20
Barium, Total	**14**	**15**	**13**	**21**	**5.2**	-	**29**	**32**	**25**	-	**23**	-	-	-	-	-	1,000	3,000
Cadmium, Total	0.46 U	0.44 U	0.47 U	0.49 U	0.48 U	-	0.46 U	0.51 U	0.54 U	0.44 U	0.48 U	0.5 U	-	-	-	-	70	100
Chromium, Total	**7.1**	**6**	**7.6**	**10**	**3**	-	**9.9**	**15**	**10**	**6.3**	**10**	**4.8**	-	-	-	-	100	200
Lead, Total	**4.2**	**3.6**	**3.8**	**4.1**	2.4 U	-	**12**	**6.5**	**15**	**8.3**	**9.8**	**3.1**	-	-	-	-	200	600
Mercury, Total	0.075 U	0.076 U	0.078 U	0.087 U	0.077 U	-	0.078 U	0.083 U	0.094 U	0.072 U	0.079 U	0.08 U	-	-	-	-	20	30
Selenium, Total	2.3 U	2.2 U	2.3 U	2.5 U	2.4 U	-	2.3 U	2.6 U	2.7 U	-	2.4 U	-	-	-	-	-	400	700
Silver, Total	0.46 U	0.44 U	0.47 U	0.49 U	0.48 U	-	0.46 U	0.51 U	0.54 U	-	0.48 U	-	-	-	-	-	100	200
Volatile Organic Compounds, mg/kg																		
Methylene chloride	-	-	-	-	-	-	-	-	-	1.2 U	-	2.4 U	-	-	-	-	0.1	4
1,1-Dichloroethane	-	-	-	-	-	-	-	-	-	0.17 U	-	0.36 U	-	-	-	-	0.4	9
Chloroform	-	-	-	-	-	-	-	-	-	0.17 U	-	0.36 U	-	-	-	-	0.2	0.2
Carbon tetrachloride	-	-	-	-	-	-	-	-	-	0.12 U	-	0.24 U	-	-	-	-	5	5
1,2-Dichloropropane	-	-	-	-	-	-	-	-	-	0.4 U	-	0.85 U	-	-	-	-	0.1	0.1
Dibromochloromethane	-	-	-	-	-	-	-	-	-	0.12 U	-	0.24 U	-	-	-	-	0.005	0.03
1,1,2-Trichloroethane	-	-	-	-	-	-	-	-	-	0.17 U	-	0.36 U	-	-	-	-	0.1	2
Tetrachloroethene	-	-	-	-	-	-	-	-	-	0.12 U	-	0.24 U	-	-	-	-	1	10
Chlorobenzene	-	-	-	-	-	-	-	-	-	0.12 U	-	0.24 U	-	-	-	-	1	3
Trichlorofluoromethane	-	-	-	-	-	-	-	-	-	0.46 U	-	0.97 U	-	-	-	-	1,000	10,000
1,2-Dichloroethane	-	-	-	-	-	-	-	-	-	0.12 U	-	0.24 U	-	-	-	-	0.1	0.1
1,1,1-Trichloroethane	-	-	-	-	-	-	-	-	-	0.12 U	-	0.24 U	-	-	-	-	30	600
Bromodichloromethane	-	-	-	-	-	-	-	-	-	0.12 U	-	0.24 U	-	-	-	-	0.1	0.1
trans-1,3-Dichloropropene	-	-	-	-	-	-	-	-	-	0.12 U	-	0.24 U	-	-	-	-	0.01	0.4
cis-1,3-Dichloropropene	-	-	-	-	-	-	-	-	-	0.12 U	-	0.24 U	-	-	-	-	0.01	0.4
1,3-Dichloropropene, Total	-	-	-	-	-	-	-	-	-	0.12 U	-	0.24 U	-	-	-	-	0.01	0.4
1,1-Dichloropropene	-	-	-	-	-	-	-	-	-	0.46 U	-	0.97 U	-	-	-	-	NE	NE
Bromoform	-	-	-	-	-	-	-	-	-	0.46 U	-	0.97 U	-	-	-	-	0.1	1
1,1,2,2-Tetrachloroethane	-	-	-	-	-	-	-	-	-	0.12 U	-	0.24 U	-	-	-	-	0.005	0.02
Benzene	-	-	-	-	-	-	-	-	-	0.12 U	-	**0.29**	-	-	-	-	2	200
Toluene	-	-	-	-	-	-	-	-	-	0.17 U	-	**0.54**	-	-	-	-	30	1,000
Ethylbenzene	-	-	-	-	-	-	-	-	-	0.12 U	-	**1.7**	-	-	-	-	40	1,000
1,4-Dichlorobenzene	-	-	-	-	-	-	-	-	-	0.46 U	-	0.97 U	-	-	-	-	0.7	1
Methyl tert butyl ether	-	-	-	-	-	-	-	-	-	0.23 U	-	0.48 U	-	-	-	-	0.1	100
p/m-Xylene	-	-	-	-	-	-	-	-	-	0.23 U	-	**6.8**	-	-	-	-	100	100
o-Xylene	-	-	-	-	-	-	-	-	-	0.23 U	-	**3.7**	-	-	-	-	100	100
Xylenes, Total	-	-	-	-	-	-	-	-	-	0.23 U	-	**11**	-	-	-	-	100	100
cis-1,2-Dichloroethene	-	-	-	-	-	-	-	-	-	0.12 U	-	0.24 U	-	-	-	-	0.1	0.1
Acetone	-	-	-	-	-	-	-	-	-	4.2 U	-	8.7 U	-	-	-	-	6	50
Methyl isobutyl ketone	-	-	-	-	-	-	-	-	-	1.2 U	-	2.4 U	-	-	-	-	0.4	50
1,2-Dibromoethane	-	-	-	-	-	-	-	-	-	0.46 U	-	0.97 U	-	-	-	-	0.1	0.1
1,3-Dichloropropane	-	-	-	-	-	-	-	-	-	0.46 U	-	0.97 U	-	-	-	-	500	5,000
1,1,1,2-Tetrachloroethane	-	-	-	-	-	-	-	-	-	0.12 U	-	0.24 U	-	-	-	-	0.1	0.1
Bromobenzene	-	-	-	-	-	-	-	-	-	0.58 U	-	1.2 U	-	-	-	-	100	1,000
n-Butylbenzene	-	-	-	-	-	-	-	-	-	0.12 U	-	**0.25**	-	-	-	-	NE	NE
Naphthalene	-	-	-	-	-	-	-	-	-	**0.49**	-	**22**	-	-	-	-	4	20
1,3,5-Trimethylbenzene	-	-	-	-	-	-	-	-	-	0.46 U	-	**3.5**	-	-	-	-	10	100
1,2,4-Trimethylbenzene	-	-	-	-	-	-	-	-	-	0.46 U	-	**8.3**	-	-	-	-	1,000	10,000
1,4-Dioxane	-	-	-	-	-	-	-	-	-	4.6 U	-	9.7 U	-	-	-	-	0.2	6
Petroleum Hydrocarbon Quantitation, mg/kg																		
TPH	-	-	-	-	-	-	-	-	-	**754**	-	**214**	-	-	-	-	1,000	3,000
Volatile Petroleum Hydrocarbons, mg/kg																		
C5-C8 Aliphatics	6.94 U	6.23 U	6.43 U	6.88 U	7.23 U	-	6.63 U	15.3 U	16.6 U	-	6.43 U	-	-	-	-	-	NE	NE
C9-C12 Aliphatics	6.94 U	6.23 U	6.43 U	6.88 U	7.23 U	-	6.63 U	**47.2**	**57.4**	-	**11.2**	-	-	-	-	-	NE	NE
C9-C10 Aromatics	6.94 U	6.23 U	6.43 U	6.88 U	7.23 U	-	6.63 U	**33.7**	**44.7**	-	**6.83**	-	-	-	-	-	100	500
C5-C8 Aliphatics, Adjusted	6.94 U	6.23 U	6.43 U	6.88 U	7.23 U	-	6.63 U	15.3 U	16.6 U	-	6.43 U	-	-	-	-	-	100	500
C9-C12 Aliphatics, Adjusted	6.94 U	6.23 U	6.43 U	6.88 U	7.23 U	-	6.63 U	15.3 U	16.6 U	-	6.43 U	-	-	-	-	-	1,000	3,000
Benzene	0.278 U	0.249 U	0.257 U	0.275 U	0.289 U	-	0.265 U	0.61 U	0.664 U	-	0.257 U	-	-	-	-	-	2	200
Toluene	0.278 U	0.249 U	0.257 U	0.275 U	0.289 U	-	0.265 U	0.61 U	0.664 U	-	0.257 U	-	-	-	-	-	30	1,000
Ethylbenzene	0.278 U	0.249 U	0.257 U	0.275 U	0.289 U	-	0.265 U	**0.782**	0.664 U	-	0.257 U	-	-	-	-	-	40	1,000
p/m-Xylene	0.278 U	0.249 U	0.257 U	0.275 U	0.289 U	-	0.265 U	**0.703**	0.664 U	-	0.257 U	-	-	-	-	-	100	100
o-Xylene	0.278 U	0.249 U	0.257 U	0.275 U	0.289 U	-	0.265 U	0.61 U	0.664 U	-	0.257 U	-	-	-	-	-	100	100
Methyl tert butyl ether	0.139 U	0.125 U	0.128 U	0.138 U	0.145 U	-	0.133 U	0.305 U	0.332 U	-	0.129 U	-	-	-	-	-	0.1	100
Naphthalene	0.556 U	0.498 U	0.514 U	0.551 U	0.578 U	-	0.531 U	**49.1**	**4.06**	-	0.514 U	-	-	-	-	-	4	20

Notes:
BOLD = Detection
BOLD and SHADED = Exceeds Applicable Standard
NE - Standard not established
U - Not detected above the listed detection limit
- = Compound not analyzed for

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Table 2
Groundwater Analytical Data
Main Lift Pump Station
Taunton, Massachusetts

LOCATION	MW-1		MW-2		MW-3		RCGW-2-P14
SAMPLING DATE	6/2/2017		6/2/2017		6/2/2017		
Extractable Petroleum Hydrocarbons, mg/L							
C9-C18 Aliphatics	0.1	U	0.1	U	2	U	5
C19-C36 Aliphatics	0.1	U	0.1	U	2	U	50
C11-C22 Aromatics	0.1	U	**0.189**		**4.72**		NE
C11-C22 Aromatics, Adjusted	0.1	U	**0.136**		2	U	5
Naphthalene	0.01	U	**0.0113**		**3.02**		0.7
2-Methylnaphthalene	0.01	U	0.01	U	**0.229**		2
Acenaphthylene	0.01	U	**0.0151**		0.2	U	0.04
Acenaphthene	0.01	U	**0.0269**		0.2	U	10
Fluorene	0.01	U	0.01	U	0.2	U	0.04
Phenanthrene	0.01	U	0.01	U	0.2	U	10
Anthracene	0.01	U	0.01	U	0.2	U	0.03
Fluoranthene	0.01	U	0.01	U	0.2	U	0.2
Pyrene	0.01	U	0.01	U	0.2	U	0.02
Benzo(a)anthracene	0.01	U	0.01	U	0.2	U	1
Chrysene	0.01	U	0.01	U	0.2	U	0.07
Benzo(b)fluoranthene	0.01	U	0.01	U	0.2	U	0.4
Benzo(k)fluoranthene	0.01	U	0.01	U	0.2	U	0.1
Benzo(a)pyrene	0.01	U	0.01	U	0.2	U	0.5
Indeno(1,2,3-cd)Pyrene	0.01	U	0.01	U	0.2	U	0.1
Dibenzo(a,h)anthracene	0.01	U	0.01	U	0.2	U	0.04
Benzo(ghi)perylene	0.01	U	0.01	U	0.2	U	0.02
Dissolved Metals, mg/L							
Arsenic, Dissolved	0.005	U	0.005	U	**0.005**		0.9
Barium, Dissolved	**0.033**		**0.045**		**0.025**		50
Cadmium, Dissolved	0.004	U	0.004	U	0.004	U	0.004
Chromium, Dissolved	0.01	U	0.01	U	0.01	U	0.3
Lead, Dissolved	0.01	U	0.01	U	0.01	U	0.01
Mercury, Dissolved	0.0002	U	0.0002	U	0.0002	U	0.02
Selenium, Dissolved	0.01	U	0.01	U	0.01	U	0.1
Silver, Dissolved	0.007	U	0.007	U	0.007	U	0.007
General Chemistry, mg/L							
Cyanide, Total	-		**0.072**		**0.524**		0.03
Volatile Organic Compounds, mg/L							
Chloroform	0.001	U	0.001	U	0.1	U	0.05
Carbon tetrachloride	0.001	U	0.001	U	0.1	U	0.002
1,2-Dichloropropane	0.001	U	0.001	U	0.1	U	0.003
Dibromochloromethane	0.001	U	0.001	U	0.1	U	0.02
Tetrachloroethene	0.001	U	0.001	U	0.1	U	0.05
1,2-Dichloroethane	0.001	U	0.001	U	0.1	U	0.005
Bromodichloromethane	0.001	U	0.001	U	0.1	U	0.006
trans-1,3-Dichloropropene	0.0005	U	0.0005	U	0.05	U	0.01
cis-1,3-Dichloropropene	0.0005	U	0.0005	U	0.05	U	0.01
1,3-Dichloropropene, Total	0.0005	U	0.0005	U	0.05	U	0.01
1,1,2,2-Tetrachloroethane	0.001	U	0.001	U	0.1	U	0.009
Benzene	0.0005	U	**0.0056**		**5.4**		1
Toluene	0.001	U	0.001	U	**11**		40
Ethylbenzene	0.001	U	**0.046**		**4.4**		5
Bromomethane	0.002	U	0.002	U	0.2	U	0.007
Vinyl chloride	0.001	U	0.001	U	0.1	U	0.002
1,1-Dichloroethene	0.001	U	0.001	U	0.1	U	0.08
trans-1,2-Dichloroethene	0.001	U	0.001	U	0.1	U	0.08
Trichloroethene	0.001	U	0.001	U	0.1	U	0.005
1,4-Dichlorobenzene	0.001	U	0.001	U	0.1	U	0.06
Methyl tert butyl ether	0.002	U	0.002	U	0.2	U	50
p/m-Xylene	0.002	U	0.002	U	**8**		3
o-Xylene	0.001	U	**0.0053**		**3.2**		3
Xylene (Total)	0.001	U	**0.0053**		**11**		3
cis-1,2-Dichloroethene	0.001	U	0.001	U	0.1	U	0.02
1,2-Dichloroethene (total)	0.001	U	0.001	U	0.1	U	NE
Styrene	0.001	U	0.001	U	**2.5**		0.1
1,2-Dibromoethane	0.002	U	0.002	U	0.2	U	0.002
1,3-Dichloropropane	0.002	U	0.002	U	0.2	U	50
1,1,1,2-Tetrachloroethane	0.001	U	0.001	U	0.1	U	0.01
Hexachlorobutadiene	0.0006	U	0.0006	U	0.06	U	0.05
Isopropylbenzene	0.002	U	**0.0032**		0.2	U	100
Naphthalene	0.002	U	**0.019**		**7.3**		0.7
1,2,4-Trichlorobenzene	0.002	U	0.002	U	0.2	U	0.2
1,3,5-Trimethylbenzene	0.002	U	0.002	U	**0.52**		1
1,2,4-Trimethylbenzene	0.002	U	0.002	U	**1.3**		100
1,4-Dioxane	0.25	U	0.25	U	25	U	6
Volatile Petroleum Hydrocarbons, mg/L							
C5-C8 Aliphatics	0.05	U	0.05	U	**14.6**		NE
C9-C12 Aliphatics	0.05	U	**0.245**		**26.3**		NE
C9-C10 Aromatics	0.05	U	**0.204**		**9.35**		4
C5-C8 Aliphatics, Adjusted	0.05	U	0.05	U	**2.54**		3
C9-C12 Aliphatics, Adjusted	0.05	U	0.05	U	**4.78**		5
Benzene	0.002	U	**0.00387**		**3.82**		1
Toluene	0.002	U	0.002	U	**8.28**		40
Ethylbenzene	0.002	U	**0.0385**		**3.45**		5
p/m-Xylene	0.002	U	0.002	U	**6.28**		3
o-Xylene	0.002	U	**0.00539**		**2.44**		3
Methyl tert butyl ether	0.003	U	0.003	U	0.15	U	50
Naphthalene	0.004	U	**0.0195**		**6.6**		0.7

Notes:
BOLD = Detection
BOLD and SHADED = Exceeds Applicable Standard
NE - Standard not established
U - Not detected above the listed detection limit
- = Compound not analyzed for

Soil Analytical Data
Bay State Crucible Stockpile
Taunton, Massachusetts

LOCATION	COMP-1	S-4	COMP-2	Lined Landfill	RCS-1	RCS-2
SAMPLING DATE	4/28/2017	4/28/2017	6/22/2017			
General Chemistry						
Specific Conductance @ 25 C	20	-	-	8,000	NE	NE
Solids, Total	83.2	83.2	95.1	NE	NE	NE
pH (H)	6.6	-	-	NE	NE	NE
Cyanide, Reactive	10 U	-	-	NE	NE	NE
Sulfide, Reactive	10 U	-	-	NE	NE	NE
Ignitability	NI	-	-	NE	NE	NE
Chlorinated Herbicides, mg/kg						
MCPP	4 U	-	-	NE	NE	NE
MCPA	4 U	-	-	NE	100	1,000
Dalapon	0.04 U	-	-	NE	NE	NE
Dicamba	0.04 U	-	-	NE	500	5,000
Dichloroprop	0.04 U	-	-	NE	NE	NE
2,4-D	0.04 U	-	-	NE	100	1,000
2,4-DB	0.04 U	-	-	NE	100	1,000
2,4,5-T	0.04 U	-	-	NE	100	1,000
2,4,5-TP (Silvex)	0.04 U	-	-	NE	100	1,000
Dinoseb	0.04 U	-	-	NE	500	5,000
Organochlorine Pesticides, mg/kg						
Delta-BHC	0.00961 U	-	-	NE	10	100
Lindane	0.0032 U	-	-	NE	0.003	0.5
Alpha-BHC	0.004 U	-	-	NE	50	500
Beta-BHC	0.00961 U	-	-	NE	10	100
Heptachlor	0.0048 U	-	-	NE	0.3	2
Aldrin	0.00961 U	-	-	NE	0.08	0.5
Heptachlor epoxide	0.018 U	-	-	NE	0.1	0.9
Endrin	0.004 U	-	-	NE	10	20
Endrin ketone	0.00961 U	-	-	NE	NE	NE
Dieldrin	**0.107**	-	-	NE	0.08	0.5
4,4'-DDE	0.00961 U	-	-	NE	6	30
4,4'-DDD	0.00961 U	-	-	NE	8	40
4,4'-DDT	0.018 U	-	-	NE	6	30
Endosulfan I	0.00961 U	-	-	NE	0.5	1
Endosulfan II	0.00961 U	-	-	NE	0.5	1
Endosulfan sulfate	0.004 U	-	-	NE	NE	NE
Methoxychlor	0.018 U	-	-	NE	200	400
Chlordane	0.0781 U	-	-	NE	5	30
Hexachlorobenzene	0.00961 U	-	-	NE	0.7	0.8
Toxaphene	-	-	0.154 U	NE	10	100
Polychlorinated Biphenyls, mg/kg						
Aroclor 1016	0.195 U	-	-	NE	1	4
Aroclor 1221	0.195 U	-	-	NE	1	4
Aroclor 1232	0.195 U	-	-	NE	1	4
Aroclor 1242	0.195 U	-	-	NE	1	4
Aroclor 1248	0.195 U	-	-	NE	1	4
Aroclor 1254	0.195 U	-	-	NE	1	4
Aroclor 1260	**1.74**	-	-	NE	1	4
Aroclor 1262	0.195 U	-	-	NE	1	4
Aroclor 1268	0.195 U	-	-	NE	1	4
PCBs, Total	**1.74**	-	-	2	1	4
Semivolatile Organic Compounds, mg/kg						
Acenaphthene	**0.22**	-	-	NE	4	3,000
Fluoranthene	**5**	-	-	NE	1,000	3,000
Naphthalene	**0.2**	-	-	NE	4	20
Benzo(a)anthracene	**2.4**	-	-	NE	7	40
Benzo(a)pyrene	**2.4**	-	-	NE	2	7
Benzo(b)fluoranthene	**2.9**	-	-	NE	7	40
Benzo(k)fluoranthene	**1**	-	-	NE	70	400
Chrysene	**2.1**	-	-	NE	70	400
Acenaphthylene	**0.4**	-	-	NE	1	10
Anthracene	**0.94**	-	-	NE	1,000	3,000
Benzo(ghi)perylene	**1.3**	-	-	NE	1,000	3,000
Fluorene	**0.31**	-	-	NE	1,000	3,000
Phenanthrene	**3.9**	-	-	NE	10	1,000
Dibenzo(a,h)anthracene	**0.33**	-	-	NE	0.7	4
Indeno(1,2,3-cd)pyrene	**1.3**	-	-	NE	7	40
Pyrene	**4.2**	-	-	NE	1,000	3,000
Dibenzofuran	**0.27**	-	-	NE	100	1,000
Pyridine	-	-	0.18 U	NE	500	5,000
Total SVOCs	**29.17**	-	-	100	NE	NE
Total Metals, mg/kg						
Arsenic, Total	**10**	-	-	40	20	20
Barium, Total	**25**	-	-	NE	1,000	3,000
Cadmium, Total	0.48 U	-	-	80	70	100
Chromium, Total	**12**	-	-	1,000	100	200
Lead, Total	**40**	-	-	2,000	200	600
Mercury, Total	0.078 U	-	-	10	20	30
Selenium, Total	2.4 U	-	-	NE	400	700
Silver, Total	0.48 U	-	-	NE	100	200
Volatile Organic Compounds, mg/kg						
Total VOCs	-	ND	-	10	NE	NE
Total Petroleum Hydrocarbons, mg/kg						
TPH	**219**	-	-	5,000	1,000	3,000

Notes:
BOLD = Detection
BOLD and SHADED = Exceeds Applicable Standard
ND - Compound not detected
NE - Standard not established
U - Not detected above the listed detection limit
- = Compound not analyzed for

Appendix A
Laboratory Certificates of Analysis

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Available Upon Request

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Appendix B
Soil Boring Logs

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SOIL BORING REPORT

PROJECT:	Main Lift PS	BORING NO.	B-1
LOCATION:	Taunton, MA	PAGE 1 OF	1
DRILLING CO:	TDS	DATE STARTED:	5/9/2017
EQUIPMENT:	Geoprobe	DATE FINISHED:	5/9/2017
DRILLED BY:	Al	SURFACE ELEVATION:	
INSPECTED BY:	MD		

GROUNDWATER OBSERVATIONS

NOT ENCOUNTERED: ____

DEPTH	STABILIZATION TIME
7'	

	CASING	SAMPLER	CORE BARREL
TYPE:			
SIZE ID:			
HAMMER WT:			
HAMMER FALL:			

SAMPLE DATA

DEPTH (ft)	SAMPLING DEPTH FROM - TO	HAMMER BLOWS ON SAMPLER (inches) 0-6	6-12	12-18	18-24	STRATA CHANGE (ft)	LITHOLOGY (Description of materials)	SAMPLE ID	PEN/ RECOV (in./in.)	HNU (ppm_v) Lamp 10.6 eV.
5.0										
									38/60	
	5-7'					▽	Tan, medium fine sand, some gravel	5-7'		0.0
	7-9'						Tan, medium fine sand, some gravel, wet at 7'	7-9'		0.0
10.0										
									39/60	
	9-11'						Tan, wet, medium fine sand, some gravel	9-11'		0.0
	11-13'						Tan, wet, medium fine sand, some gravel	11-13'		0.0
15.0	13-15'						Tan, wet, medium fine sand, some gravel	13-15'		0.0
							End of boring at 15'			
20.0										

Notes: Boring pre-cleared for utilities to 5'. Boring began at 5'

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SOIL BORING REPORT

PROJECT:	Main Lift PS	BORING NO.	B-2
LOCATION:	Taunton, MA	PAGE 1 OF	1
DRILLING CO:	TDS	DATE STARTED:	5/9/2017
EQUIPMENT:	Geoprobe	DATE FINISHED:	5/9/2017
DRILLED BY:	Al	SURFACE ELEVATION:	
INSPECTED BY:	MD		

GROUNDWATER OBSERVATIONS

NOT ENCOUNTERED: ____

DEPTH	STABILIZATION TIME
6'	

	CASING	SAMPLER	CORE BARREL
TYPE:			
SIZE ID:			
HAMMER WT:			
HAMMER FALL:			

SAMPLE DATA

DEPTH (ft)	SAMPLING DEPTH FROM - TO	HAMMER BLOWS ON SAMPLER (inches) 0-6	6-12	12-18	18-24	STRATA CHANGE (ft)	LITHOLOGY (Description of materials)	SAMPLE ID	PEN/ RECOV (in./in.)	HNU (ppm,) Lamp 10.6 eV.
									36/60	
	0-2'						Tan, silty sand, some gravel	0-2'		0.0
	2-4'						Tan, medium fine sand, little gravel	2-4'		0.0
5.0										
	4-6'					▽	Tan, medium fine sand, little gravel	4-6'	24/60	0.0
	6-8'						Tan moist, medium fine sand	6-8'		0.0
10.0	8-10'						Tan, wet, medium fine sand	8-10'		0.0
							End of boring at 10'			
15.0										
20.0										

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SOIL BORING REPORT

PROJECT:	Main Lift PS	BORING NO.	B-3
LOCATION:	Taunton, MA	PAGE 1 OF	1
DRILLING CO:	TDS	DATE STARTED:	5/9/2017
EQUIPMENT:	Geoprobe	DATE FINISHED:	5/9/2017
DRILLED BY:	Al	SURFACE ELEVATION:	
INSPECTED BY:	MD		

GROUNDWATER OBSERVATIONS

NOT ENCOUNTERED: ____

DEPTH	STABILIZATION TIME
3'	

	CASING	SAMPLER	CORE BARREL
TYPE:			
SIZE ID:			
HAMMER WT:			
HAMMER FALL:			

SAMPLE DATA

DEPTH (ft)	SAMPLING DEPTH FROM - TO	HAMMER BLOWS ON SAMPLER (inches) 0-6	6-12	12-18	18-24	STRATA CHANGE (ft)	LITHOLOGY (Description of materials)	SAMPLE ID	PEN/ RECOV (in./in.)	HNU (ppm,) Lamp 10.6 eV.
	0-2'						Tan/brown, silty sand, little gravel	0-2'	42/60	0.3
	2-4'					▽	Tan, silty sand, wet at 3'	2-4'		1.1
5.0										
	4-6'						Gray, wet, medium fine sand	4-6'	43/60	1.1
	6-8'						Gray, wet, medium fine sand	6-8'		1.6
10.0	8-10'						Gray, wet, medium fine sand	8-10'		1.0
							End of boring at 10'			
15.0										
20.0										

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SOIL BORING REPORT

PROJECT:	Main Lift PS	BORING NO.	B-4
LOCATION:	Taunton, MA	PAGE 1 OF	1
DRILLING CO:	TDS	DATE STARTED:	5/9/2017
EQUIPMENT:	Geoprobe	DATE FINISHED:	5/9/2017
DRILLED BY:	Al	SURFACE ELEVATION:	
INSPECTED BY:	MD		

GROUNDWATER OBSERVATIONS

NOT ENCOUNTERED: ____

DEPTH	STABILIZATION TIME
3'	

	CASING	SAMPLER	CORE BARREL
TYPE:			
SIZE ID:			
HAMMER WT:			
HAMMER FALL:			

SAMPLE DATA

DEPTH (ft)	SAMPLING DEPTH FROM - TO	HAMMER BLOWS ON SAMPLER (inches) 0-6	6-12	12-18	18-24	STRATA CHANGE (ft)	LITHOLOGY (Description of materials)	SAMPLE ID	PEN/ RECOV (in./in.)	HNU (ppm,) Lamp 10.6 eV.
	0-2'						Tan. silty sand	0-2'	32/60	0.0
	2-4'					▽	Tan, medium fine sand	2-4'		0.6
5.0										
	4-6'						Tan, wet, medium fine sand	4-6'	43/60	1.0
	6-8'						Tan, wet, medium fine sand	6-8'		0.7
10.0	8-10'						Tan, wet medium fine sand	8-10'		1.5
							End of boring at 10'			
15.0										
20.0										

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SOIL BORING REPORT

PROJECT:	Main Lift PS	BORING NO.	B/MW-5
LOCATION:	Taunton, MA	PAGE 1 OF	1
DRILLING CO:	TDS	DATE STARTED:	5/9/2017
EQUIPMENT:	Geoprobe	DATE FINISHED:	5/9/2017
DRILLED BY:	Al	SURFACE ELEVATION:	
INSPECTED BY:	MD		

GROUNDWATER OBSERVATIONS

NOT ENCOUNTERED: ____

DEPTH	STABILIZATION TIME
2'	

	CASING	SAMPLER	CORE BARREL
TYPE:			
SIZE ID:			
HAMMER WT:			
HAMMER FALL:			

SAMPLE DATA

DEPTH (ft)	SAMPLING DEPTH FROM - TO	HAMMER BLOWS ON SAMPLER (inches) 0-6	6-12	12-18	18-24	STRATA CHANGE (ft)	LITHOLOGY (Description of materials)	SAMPLE ID	PEN/ RECOV (in./in.)	HNU (ppm_v) Lamp 10.6 eV.
	0-2'						Tan, wet, silty sand	0-2'	30/60	0.6
						▽				
	2-4'						Tan, wet, medium fine sand	2-4'		0.6
5.0										
	4-6'						Gray, wet, medium coarse sand	4-6'	26/60	0.3
	6-8'						Gray, wet, medium coarse sand	6-8'		0.4
10.0	8-10'						Gray, wet, medium coarse sand	8-10'		0.3
	10-12'						Gray, wet, medium coarse sand	10-12'		0.3
	12-15'						Gray, wet, medium fine sand	12-15'		0.5
15.0										
							End of boring at 15'			
20.0										

Notes: Monitoring well set at 15', 10' of screen, 5' riser material. Completed with stand pipe. 2" diameter PVC

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SOIL BORING REPORT

PROJECT:	Main Lift PS	BORING NO.	B-6
LOCATION:	Taunton, MA	PAGE 1 OF	1
DRILLING CO:	TDS	DATE STARTED:	5/9/2017
EQUIPMENT:	Geoprobe	DATE FINISHED:	5/9/2017
DRILLED BY:	Al	SURFACE ELEVATION:	
INSPECTED BY:	MD		

GROUNDWATER OBSERVATIONS

NOT ENCOUNTERED: ____

DEPTH	STABILIZATION TIME
4'	

	CASING	SAMPLER	CORE BARREL
TYPE:			
SIZE ID:			
HAMMER WT:			
HAMMER FALL:			

SAMPLE DATA

DEPTH (ft)	SAMPLING DEPTH FROM - TO	HAMMER BLOWS ON SAMPLER (inches) 0-6	6-12	12-18	18-24	STRATA CHANGE (ft)	LITHOLOGY (Description of materials)	SAMPLE ID	PEN/ RECOV (in./in.)	HNU (ppm,) Lamp 10.6 eV.
	0-2'						Tan, silty sand	0-2'	19/60	0.4
	2-4'						Tan, silty sand, wet at 4'	2-4'		0.2
5.0						▽				
	4-6'						Tan, silty sand	4-6'	27/60	0.5
	6-8'						Tan, wet, medium coarse sand	6-8'		2.0
10.0	8-10'						Gray, wet, medium fine sand	8-10'		4.0
	10-12'						Gray, wet, medium fine sand	10-12'	48/60	2.4
	12-15'						Gray, wet, medium fine sand	12-15'		1.5
15.0							End of boring at 15'			
20.0										

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SOIL BORING REPORT

PROJECT:	Main Lift PS	BORING NO.	B-7
LOCATION:	Taunton, MA	PAGE 1 OF	1
DRILLING CO:	TDS	DATE STARTED:	5/9/2017
EQUIPMENT:	Geoprobe	DATE FINISHED:	5/9/2017
DRILLED BY:	Al	SURFACE ELEVATION:	
INSPECTED BY:	MD		

GROUNDWATER OBSERVATIONS

NOT ENCOUNTERED: ____

DEPTH	STABILIZATION TIME

	CASING	SAMPLER	CORE BARREL
TYPE:			
SIZE ID:			
HAMMER WT:			
HAMMER FALL:			

SAMPLE DATA

DEPTH (ft)	SAMPLING DEPTH FROM - TO	HAMMER BLOWS ON SAMPLER (inches) 0-6	6-12	12-18	18-24	STRATA CHANGE (ft)	LITHOLOGY (Description of materials)	SAMPLE ID	PEN/ RECOV (in./in.)	HNU (ppm,) Lamp 10.6 eV.
5.0						▽				
	5-7'						Gray/tan, wet, silty sand	5-7'	47/60	0.0
	7-9'						Tan, wet, medium fine sand	7-9'		0.0
10.0										
	9-11'						Tan, wet, medium fine sand	9-11'		0.3
	11-13'						Gray, wet, medium fine sand	11-13'		1.5
15.0	13-15'						Gray, wet, medium fine sand	13-15'		5.7
							End of boring at 15'			
20.0										

Notes: Boring pre-cleared to 5'

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SOIL BORING REPORT

PROJECT:	Main Lift PS	BORING NO.	B-8
LOCATION:	Taunton, MA	PAGE 1 OF	1
DRILLING CO:	TDS	DATE STARTED:	5/9/2017
EQUIPMENT:	Geoprobe	DATE FINISHED:	5/9/2017
DRILLED BY:	Al	SURFACE ELEVATION:	
INSPECTED BY:	MD		

GROUNDWATER OBSERVATIONS

NOT ENCOUNTERED: ____

DEPTH	STABILIZATION TIME
3'	

	CASING	SAMPLER	CORE BARREL
TYPE:			
SIZE ID:			
HAMMER WT:			
HAMMER FALL:			

SAMPLE DATA

DEPTH (ft)	SAMPLING DEPTH FROM - TO	HAMMER BLOWS ON SAMPLER (inches) 0-6	6-12	12-18	18-24	STRATA CHANGE (ft)	LITHOLOGY (Description of materials)	SAMPLE ID	PEN/ RECOV (in./in.)	HNU (ppm,) Lamp 10.6 eV.
	0-2'						Topsoil, brown silty sand, little gravel	0-2'	36/60	0.6
	2-4'					▽	Brown/gray, silty sand, moist at 3'	2-4'		0.7
5.0									26/60	
	4-6'						Gray, wet, silty sand	4-6'		0.5
	6-8'						Gray, wet, silty sand	6-8'		0.6
10.0	8-10'						Gray, wet, silty sand, little coarse sand, solvent odor	8-10'		0.6
	10-12'						Gray, wet, silty sand	10-12'	22/60	0.6
	12-14'						Gray, wet, silty sand	12-14'		0.3
15.0	14-15'						Gray, wet, silty sand	14-15'		0.9
20.0							End of boring at 15'			

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SOIL BORING REPORT

PROJECT:	Main Lift PS	BORING NO.	B-9
LOCATION:	Taunton, MA	PAGE 1 OF	1
DRILLING CO:	TDS	DATE STARTED:	4/10/2017
EQUIPMENT:	Geoprobe	DATE FINISHED:	4/10/2017
DRILLED BY:	Matt	SURFACE ELEVATION:	
INSPECTED BY:	MD		

GROUNDWATER OBSERVATIONS

NOT ENCOUNTERED: ____

DEPTH	STABILIZATION TIME
3.5'	

	CASING	SAMPLER	CORE BARREL
TYPE:			
SIZE ID:			
HAMMER WT:			
HAMMER FALL:			

SAMPLE DATA

DEPTH (ft)	SAMPLING DEPTH FROM - TO	HAMMER BLOWS ON SAMPLER (inches) 0-6	6-12	12-18	18-24	STRATA CHANGE (ft)	LITHOLOGY (Description of materials)	SAMPLE ID	PEN/ RECOV (in./in.)	HNU (ppm,) Lamp 10.6 eV.
	0-1'						Asphalt 0-2". Brown, medium fine SAND, some gravel	0-1'	51/60	0.1
	1-3'						Brown, silty SAND, some gravel	1-3'		0.9
						▽				
5.0	3-5'						Brown, wet, medium fine SAND	3-5'		0.4
	5-9'						Gray, wet, silty SAND	5-9'	48/60	2.7
10.0	9-10'						Gray, wet, silty SAND, with odor	9-10'		1.4
15.0	10-15'						Gray, wet, silty SAND, with brick. Petroleum odor.	10-15'	47-60	4.4
20.0	15-20'						Gray/brown, wet, silty SAND, with wood and brick fragments. Odor	15-20'	46/60	25.5
	20-25'						Gray, wet, silty SAND, with odor		38/60	4.2
25.0										
30.0	25-30'						Gray, wet, silty SAND, with odor	25-30	37/60	5.0
35.0	30-35'						Gray, wet, medium coarse SAND	30-35'	50/60	9.6

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SOIL BORING REPORT

PROJECT:	Main Lift PS	BORING NO.	B-10
LOCATION:	Taunton, MA	PAGE 1 OF	1
DRILLING CO:	TDS	DATE STARTED:	4/10/2017
EQUIPMENT:	Geoprobe	DATE FINISHED:	4/10/2017
DRILLED BY:	Matt	SURFACE ELEVATION:	
INSPECTED BY:	MD		

GROUNDWATER OBSERVATIONS

NOT ENCOUNTERED: ____

DEPTH	STABILIZATION TIME
5'	

	CASING	SAMPLER	CORE BARREL
TYPE:			
SIZE ID:			
HAMMER WT:			
HAMMER FALL:			

SAMPLE DATA

DEPTH (ft)	SAMPLING DEPTH FROM - TO	HAMMER BLOWS ON SAMPLER (inches) 0-6	6-12	12-18	18-24	STRATA CHANGE (ft)	LITHOLOGY (Description of materials)	SAMPLE ID	PEN/ RECOV (in./in.)	HNU (ppm,) Lamp 10.6 eV.
	0-1'						Asphalt/gravel-no sample collected	0-1'	46/60	
	1-3'						Tan, medium fine SAND, little gravel	1-3'		0.2
5.0	3-5'					▽	Tan, medium fine SAND	3-5'		1.1
	5-8'						Brown, wet, medium fine SAND	5-8'	58/60	1.0
10.0	8-10'						Tan, wet, silty SAND, with brick, odor	8-10'		52.9
	10-14'						Gray, wet, silty SAND, odor	10-14'	54/60	546.8
15.0	14-15'						Gray, wet, medium coarse SAND	14-15'		100.9
	15-18'						Gray, medium coars SAND, some gravel	15-18'	55/60	39.4
20.0	18-20'						Gray, silty SAND, little clay, odor	18-20'		3.3
	20-25'						Gray, wet, silty SAND, some clay, odor	20-25'	50/60	2.5
25.0										
	25-30'						Gray, wet, medium fine SAND, faint odor	25-30'	60/60	1.7
30.0										
	30-35'						Gray, wet, medium fine SAND, faint odor	30-35'	60/60	0.8
35.0										

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SOIL BORING REPORT

PROJECT:	Main Lift PS	BORING NO.	B-9
LOCATION:	Taunton, MA	PAGE 1 OF	1
DRILLING CO:	TDS	DATE STARTED:	4/10/2017
EQUIPMENT:	Geoprobe	DATE FINISHED:	4/10/2017
DRILLED BY:	Matt	SURFACE ELEVATION:	
INSPECTED BY:	MD		

GROUNDWATER OBSERVATIONS

NOT ENCOUNTERED: ____

DEPTH	STABILIZATION TIME
4'	

	CASING	SAMPLER	CORE BARREL
TYPE:			
SIZE ID:			
HAMMER WT:			
HAMMER FALL:			

SAMPLE DATA

DEPTH (ft)	SAMPLING DEPTH FROM - TO	HAMMER BLOWS ON SAMPLER (inches) 0-6	6-12	12-18	18-24	STRATA CHANGE (ft)	LITHOLOGY (Description of materials)	SAMPLE ID	PEN/ RECOV (in./in.)	HNU (ppm,) Lamp 10.6 eV.
	0-1'						Asphalt/gravel-no sample collected	0-1'		
	1-3'						Brown, medium fine SAND	1-3'		3.1
						▽				
5.0	3-5'						Tan, wet, medium coarse Sand	3-5'		4.2
	5-9'						Tan, wet, silty SAND	5-9'	59/60	4.4
10.0	9-10'						Tan, wet, silty SAND, Black material with odor at 9.5'	9-10'		45.9
	10-13'						Black, wet, silty SAND, some gray silty sand, odor	10-13'	39/60	373.2
15.0	13-15'						Gray, wet, silty SAND, some coarse sand, with gravel	13-15'		4.0
	15-20'						Gray, wet, medium fine SAND, odor	15-20'	59/60	1.1
20.0										
	20-25'						Gray, wet, silty SAND, faint odor	20-25'	60/60	0.4
25.0										
	25-30'						Gray, wet, silty SAND	25-30'	54/60	0.0
30.0										
	30-35'						Tan, wet, medium coarse SAND, little gravel	30-35'	60/60	4.4
35.0										

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SOIL BORING REPORT

PROJECT:	Main Lift PS	BORING NO.	B/MW-12
LOCATION:	Taunton, MA	PAGE 1 OF	1
DRILLING CO:	TDS	DATE STARTED:	4/10/2017
EQUIPMENT:	Geoprobe	DATE FINISHED:	4/10/2017
DRILLED BY:	Matt	SURFACE ELEVATION:	
INSPECTED BY:	MD		

GROUNDWATER OBSERVATIONS

NOT ENCOUNTERED:

DEPTH	STABILIZATION TIME
4'	

	CASING	SAMPLER	CORE BARREL
TYPE:			
SIZE ID:			
HAMMER WT:			
HAMMER FALL:			

SAMPLE DATA

DEPTH (ft)	SAMPLING DEPTH FROM - TO	HAMMER BLOWS ON SAMPLER (inches) 0-6	6-12	12-18	18-24	STRATA CHANGE (ft)	LITHOLOGY (Description of materials)	SAMPLE ID	PEN/ RECOV (in./in.)	HNU (ppm,) Lamp 10.6 eV.
	0-6"						Gravel,asphalt		51/60	
	1-3'						Tan, medium fine SAND, some gravel	1-3'		0.0
5.0	3-5'					▽	Tan, medoim fine SAND, some silty sand	3-5'		0.0
	5-8'						Tan, wet, silty SAND	5-8'	37/60	2.8
10.0	8-10'						Black/gray, wet, silty SAND	9-10'		43.3
	10-13'						Black/gray silty SAND, odor	10-13'	41/60	15.8
15.0	13-15'						Dark gray, wet, silty SAND, odor	13-15'		39.8
	15-19'						Black, wet, silty SAND, little tan silty sand, petroleum odor	15-19'	60/60	42.8
20.0	19-20'						Tan, wet, silty SAND, odor	19-20'		4.9
	20-23'						Gray, wet, silty SAND, sheen on water, odor	20-23'	60/60	46.7
25.0	23-25'						Gray, wet, clay, odor	23-25'		0.6
	25-30'						Gray, silty SAND, some clay	25-30'	54/60	0.1
30.0										
	30-35'						Gray, wet, medium coarse SAND	30-35'	32/60	1.9
35.0										

Notes: Refusal at 13' during first attempt, encountered tree roots. Boring was moved 2' south and sampling resumed at 13'. Monitoring well set at 35'. 2' of PVC riser. 2" diameter PVC. Completed with 4" flush mounted roadbox

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SOIL BORING REPORT

PROJECT:	Main Lift PS	BORING NO.	B-13
LOCATION:	Taunton, MA	PAGE 1 OF	1
DRILLING CO:	TDS	DATE STARTED:	4/10/2017
EQUIPMENT:	Geoprobe	DATE FINISHED:	4/10/2017
DRILLED BY:	Matt	SURFACE ELEVATION:	
INSPECTED BY:	MD		

GROUNDWATER OBSERVATIONS

NOT ENCOUNTERED: ____

DEPTH	STABILIZATION TIME
3.5'	

	CASING	SAMPLER	CORE BARREL
TYPE:			
SIZE ID:			
HAMMER WT:			
HAMMER FALL:			

SAMPLE DATA

DEPTH (ft)	SAMPLING DEPTH FROM - TO	HAMMER BLOWS ON SAMPLER (inches) 0-6	6-12	12-18	18-24	STRATA CHANGE (ft)	LITHOLOGY (Description of materials)	SAMPLE ID	PEN/ RECOV (in./in.)	HNU (ppm,) Lamp 10.6 eV.
	0-2'						Asphalt,some gravel. Tan, medium fine SAND	0-2'	50/60	0.0
	2-4'					▽	Tan, medium fine SAND, some silty sand	2-4'		0.0
5.0										
	4-6'						Tan, wet, medium coarse SAND	4-6'		0.0
	6-9'						Tan, wet, medium coarse SAND	6-9'	58/60	0.0
10.0	9-10'						Gray, wet, silty SAND, odor	9-10'		
	10-14'						Gray, wet, silty SAND, odor	10-14'	36/60	7.3
15.0	14-15'						Black material, some gray silty SAND, odor	14-15'		27.3
	15-17'						Tan, wet, silty SAND	15-17'	60/60	0.0
20.0	17-20'						Brown/gray, wet, silty SAND, odor	17-20'		26.7
							End of boring at 20'			
25.0										

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SOIL BORING REPORT

PROJECT:	Main Lift PS	BORING NO.	B/MW-14
LOCATION:	Taunton, MA	PAGE 1 OF	1
DRILLING CO:	TDS	DATE STARTED:	5/9/2017
EQUIPMENT:	Geoprobe	DATE FINISHED:	5/9/2017
DRILLED BY:	Al	SURFACE ELEVATION:	
INSPECTED BY:	MD		

GROUNDWATER OBSERVATIONS

NOT ENCOUNTERED: ____

DEPTH	STABILIZATION TIME
7'	

	CASING	SAMPLER	CORE BARREL
TYPE:			
SIZE ID:			
HAMMER WT:			
HAMMER FALL:			

SAMPLE DATA

DEPTH (ft)	SAMPLING DEPTH FROM - TO	HAMMER BLOWS ON SAMPLER (inches) 0-6	6-12	12-18	18-24	STRATA CHANGE (ft)	LITHOLOGY (Description of materials)	SAMPLE ID	PEN/ RECOV (in./in.)	HNU (ppm,) Lamp 10.6 eV.
5.0										
	5-7'					▽	Tan, medium coarse sand, little gravel, solvent odor	5-7'	24/60	69.2
	7-9'						Gray,wet, medium fine sand, little gravel, solvent odor	7-9'		111.1
10.0										
	9-11'						Gray,wet, medium fine sand, little gravel, solvent odor	9-11'	42/60	57.5
	11-13'						Gray, wet, medium fine sand, solvent odor	11-13'		33.8
15.0	13-15'						Gray, wet, medium fine sand, solvent odor	13-15'		83.1
	15-17'						Gray, wet, medium fine sand, solvent odor	15-17'	16/60	72.3
	17-19'						Gray, wet, medium fine sand, solvent odor	17-19'		134
20.0	19-20'						Gray, wet, medium fine sand, solvent odor	19-20'		128.2
							End of boring at 20'			

Notes: Boring pre-cleared to 5'. Monitoring well set at 20', 15 of screen, 5' of PVC riser. Completed with flush mounted roadbox. 2" diameter well

Appendix C
Well Sampling Logs

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WELL SAMPLING LOG

ENGINEERING SUCCESS TOGETHER

Project No.	5530
Well ID	MW-1
Page #	1
Date	6/2/2017
Sampler	MD

Equipment Used: Geotech pump and YSI 6820

Calibratrion Performed (Ask for zero calib of DO)

A: Set Up:

Well/Road Box condition: Good

Well Gauging Reference Point: (i.e. road box, PVC casing): Top of PVC

Well Screen Depth Interval Reference Point:

Bottom Depth (if known, if not known do not measure as it will increase turbidity): 17.35'

Initial Groundwater Depth from reference point: 4.34'

Pump Intake Depth:

B: Flow Rate

B-1 - Calculated Allowable Drawdown

Calculated Depth not to exceed:

B-2 - Measure Flow Rate (generally 100 to 500 ml/min) (VOA Vials are 40 ml)

Volume/Time= 40 mL/15 seconds

Allowable Drawdown Exceeded (Y/N)?

(if water table was in screen interval, allowable drawdown can be exceeded if at lowest flow setting

C: Stabilization

C-1 - Calculate Time Interval for Independent Water Quality Readings

(Flow-thru cell volume approx. 400 ml) (Cell volume/flow rate generally 2-4 min.)

Cell Volume/Flow Rate=

C-2 - Measure Stabilized Water Quality parameters and Turbidity

Time	Temperature	SpCond	DO	pH	ORP	Turbidity	Water Depth	Flow	Comments
hr:min	Celsius	uS/cm	mg/L	units	mV	NTU	ft.	ml/min	
Criteria		3%	10% or 0.2	0.2	20 mV	10% or <1			
8:30	**12.51**	**278**	**2.66**	**7.51**	**82.9**	**-0.7**	**4.36**		
8:35	**11.69**	**270**	**0.92**	**6.79**	**91.8**	**-0.5**	**4.36**		
8:40	**11.49**	**267**	**0.53**	**6.46**	**94.2**	**1.0**	**4.36**		
8:45	**11.34**	**266**	**0.45**	**6.25**	**96.4**	**0.8**	**4.36**		
8:50	**11.33**	**267**	**0.55**	**6.17**	**96.4**	**0.5**	**4.36**		
8:55	**11.29**	**267**	**0.55**	**6.12**	**96.7**	**0.7**	**4.36**		

). Sample Collection

Sample from pump discharge line (if not disconnected from flow thru cell, decon and filed bland are needed)

Appearance of sample water: Clear

Sample Time: 8:55

WELL SAMPLING LOG

ENGINEERING SUCCESS TOGETHER

Project No.	5530
Well ID	MW-2
Page #	1
Date	6/2/2017
Sampler	MD

Equipment Used: Geotech pump and YSI 6820

Calibratrion Performed (Ask for zero calib of DO)

A: Set Up:

Well/Road Box condition: Good

Well Gauging Reference Point: (i.e. road box, PVC casing): Top of PVC

Well Screen Depth Interval Reference Point:

Bottom Depth (if known, if not known do not measure as it will increase turbidity): 34.29'

Initial Groundwater Depth from reference point: 7.09'

Pump Intake Depth:

B: Flow Rate

B-1 - Calculated Allowable Drawdown

Calculated Depth not to exceed:

B-2 - Measure Flow Rate (generally 100 to 500 ml/min) (VOA Vials are 40 ml)

Volume/Time= 40 mL/16 seconds

Allowable Drawdown Exceeded (Y/N)?

(if water table was in screen interval, allowable drawdown can be exceeded if at lowest flow setting

C: Stabilization

C-1 - Calculate Time Interval for Independent Water Quality Readings

(Flow-thru cell volume approx. 400 ml) (Cell volume/flow rate generally 2-4 min.)

Cell Volume/Flow Rate=

C-2 - Measure Stabilized Water Quality parameters and Turbidity

Time	Temperature	SpCond	DO	pH	ORP	Turbidity	Water Depth	Flow	Comments
hr:min	Celsius	uS/cm	mg/L	units	mV	NTU	ft.	ml/min	
Criteria		3%	10% or 0.2	0.2	20 mV	10% or <1			
9:38	**13.69**	**659**	**6.45**	**5.99**	**28**	**11.4**	**7.18**	**150**	
9:43	**13.12**	**667**	**1.25**	**6.02**	**-2.3**	**-0.7**	**7.20**	**150**	
9:48	**13.11**	**668**	**0.71**	**6.07**	**-9.1**	**-0.5**	**7.20**	**150**	
9:53	**13.12**	**669**	**0.51**	**6.10**	**-14.5**	**1.2**	**7.20**	**150**	
9:58	**13.16**	**669**	**0.83**	**6.12**	**-16.5**	**-0.2**	**7.20**	**150**	
10:03	**13.20**	**670**	**0.69**	**6.13**	**-17.9**	**-0.6**	**7.21**	**150**	
10:08	**13.26**	**671**	**0.63**	**6.13**	**-20.9**	**-1.4**	**7.21**	**150**	

). Sample Collection

Sample from pump discharge line (if not disconnected from flow thru cell, decon and filed bland are needed)

Appearance of sample water: Clear

Sample Time: 10:08

WELL SAMPLING LOG

ENGINEERING SUCCESS TOGETHER

Project No.	5530
Well ID	MW-3
Page #	1
Date	6/2/2017
Sampler	MD

Equipment Used: Geotech pump and YSI 6820

Calibratrion Performed (Ask for zero calib of DO)

A: Set Up:

Well/Road Box condition

Well Gauging Reference Point: (i.e. road box, PVC casing) Top of PVC

Well Screen Depth Interval Reference Point 4.92'-19.92'

Bottom Depth (if known, if not known do not measure as it will increase turbidity): 19.92'

Initial Groundwater Depth from reference point: 4.63'

Pump Intake Depth approx 12.42'

B: Flow Rate

B-1 - Calculated Allowable Drawdown

Calculated Depth not to exceed:

B-2 - Measure Flow Rate (generally 100 to 500 ml/min) (VOA Vials are 40 ml)

Volume/Time= 40 mL/16 seconds

Allowable Drawdown Exceeded (Y/N)?

(if water table was in screen interval, allowable drawdown can be exceeded if at lowest flow setting

C: Stabilization

C-1 - Calculate Time Interval for Independent Water Quality Readings

(Flow-thru cell volume approx. 400 ml) (Cell volume/flow rate generally 2-4 min.)

Cell Volume/Flow Rate=

C-2 - Measure Stabilized Water Quality parameters and Turbidity

Time	Temperature	SpCond	DO	pH	ORP	Turbidity	Water Depth	Flow	Comments
hr:min	Celsius	uS/cm	mg/L	units	mV	NTU	ft.	ml/min	
Criteria		3%	10% or 0.2	0.2	20 mV	10% or <1			
10:39	**16.29**	**868**	**2.16**	**5.63**	**12.2**	**19.6**	**4.65**	**150**	
10:44	**14.94**	**849**	**0.51**	**5.54**	**5.6**	**24.7**	**4.65**	**150**	
10:49	**14.59**	**854**	**0.45**	**5.52**	**3.7**	**7.8**	**4.65**	**150**	
10:54	**14.48**	**887**	**0.43**	**5.49**	**6.0**	**5.8**	**4.65**	**150**	
10:59	**14.50**	**902**	**0.42**	**5.46**	**5.8**	**4.3**	**4.65**	**150**	
11:04	**14.60**	**914**	**0.44**	**5.41**	**8.5**	**4.2**	**4.65**	**150**	
11:09	**14.66**	**926**	**0.46**	**5.39**	**10.3**	**4.0**	**4.65**	**150**	

). Sample Collection

Sample from pump discharge line (if not disconnected from flow thru cell, decon and filed bland are needed)

Appearance of sample water Clear

Sample Time: 11:09

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Appendix D

City of Taunton Wastewater Discharge Limits

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WASTEWATER DISCHARGE LIMITS

All users of the Publicly Owned Treatment Works (POTW) for the City of Taunton must comply with the prohibitions and limitations specified in the City of Taunton Sewer Use Ordinance and all applicable State and Federal laws, including the Clean Water Act and the General Pretreatment Regulations.

PROHIBITIONS (complete list of prohibitions specified in Section 2 of the Sewer Use Ordinance)

Wastewater having a pH less than 5.5 or otherwise causing corrosive structural damage to the POTW or equipment. If a continuous pH chart recorder is being used, any occurrence of pH over 9.5 but under 10.5 for a period of thirty minutes or more per day is prohibited. Any occurrence of pH between 10.5 and 11.0 for more than 15 minutes per day is prohibited. Any pH occurrence over 11.0 is prohibited. If a continuous pH chart recorder is not being used, any occurrence of pH over 9.5 is prohibited. At no time shall any discharge cause the pH of the influent at the POTW headworks to go above 9.5.

Petroleum oil, nonbiodegradable cutting oil, products of mineral oil origin, or any other oil, in excess of 5 mg/l or in amounts that will cause interference or pass through.

Waters or wastes containing fats, wax, grease or oils, (not specifically prohibited above), in excess of 100 mg/l or containing other substances which may solidify or become viscous between 32 degrees Fahrenheit or 0 degrees Centigrade, and 150 degrees Fahrenheit or 65 degrees Centigrade.

LOCAL LIMITS (Section 2.4 of the Sewer Use Ordinance):

Pollutant	Limitation
Arsenic	1.21 mg/l
BOD_5	922 mg/l
Cadmium	0.098 mg/l
Chromium	1.0 mg/l
Copper	0.58 mg/l
Cyanide	0.37 mg/l
Lead	0.88 mg/l
Mercury	0.0005 mg/l
Nickel	1.0 mg/l
Silver	0.041 mg/l
Total Suspended Solids	660 mg/l
Zinc	2.80 mg/l

Darlene Domingos, Project Manager

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APPENDIX 4

Taunton WWTF Industrial Pre-treatment Discharge Limits

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PART 1 - EFFLUENT LIMITATIONS

A. During the period of **June 4, 2019 to December 31, 2019**, the permittee is authorized to discharge treated groundwater from the excavation site at the Main Lift Pumping Station at 690 West Water Street in Taunton to the City of Taunton sewer system. Treated groundwater must be sampled from the outfall listed below.

Description of sampling outfall:

Outfall	Description
001	A sample port located after the effluent flow meter and prior to discharge to the sewer.

B. During the period of **June 4, 2019 to December 31, 2019,** the discharge from outfall 001 shall not exceed the following effluent limitations.

EFFLUENT LIMITATIONS

PARAMETER	DAILY MAXIMUM (mg/l)
TPH	5.0
Arsenic	1.21
Cadmium	0.098
Chromium	1.0
Copper	0.58
Cyanide	0.37
Lead	0.88
Mercury	0.0005
Nickel	1.0
Silver	0.041
Zinc	2.80
BOD	922
TSS	660
Oil & Grease	100
VOC	2.13
SVOC	2.13

C. A pH below 5.5 is prohibited. Where a continuous pH chart recorder is being used any occurrence of pH over 9.5 but under 10.5 for a period of thirty minutes or more per day is prohibited. Any occurrence of pH between 10.5 and 11.0 for more than 15 minutes per day is prohibited. Any pH occurrence over 11.0 is prohibited. If a continuous pH chart recorder is not being used, any occurrence of pH over 9.5 is prohibited.

D. All discharges shall comply with all other applicable laws, regulations, standards, and requirements contained in **Section 19.23** of the Sewer Use Ordinance and any applicable State and Federal pretreatment laws, regulations, standards, and requirements including any such laws, regulations, standards, or requirements that may become effective during the term of this permit.

PART 2 - MONITORING REQUIREMENTS

A. From the period of the effective date of the permit until **December 31, 2019**, the permittee shall monitor outfall **001** for the following parameters, at the indicated frequency:

Parameter	Sample Type	Sample Frequency	Reporting Frequency	Monitoring Location
Flow	Meter (1)	Continuous	Monthly	001
pH	Grab	(2)	Monthly	001
TPH	Grab	(4)	Monthly	001
Copper (3)	Grab	(4)	Monthly	001
Lead (3)	Grab	(4)	Monthly	001
VOC	Grab	(4)	Monthly	001
SVOC	Grab	(4)	Monthly	001

Notes:

1. Flow shall be measured from an effluent flow meter and reported as daily maximum, daily total and monthly average.

2. The pH shall be monitored on site with a portable pH meter. This pH meter shall be calibrated weekly. Calibrations must be recorded into a bound log book and be available for review during on-site inspections. During the first seven days of discharge, three grab samples will be taken and pH recorded. Depending on the results, after the first week the pH sampling may be reduced to one per day.

3. Metals shall be analyzed for total metals

4. These samples shall be collected within the first twenty-four hours of discharge and must meet the permit limitations to continue. Additional samples must be collected during each 24-hour period that a discharge is occurring during the first three days of operation. If permit limits are met, weekly samples shall be collected for the first month of discharge, followed by monthly sampling thereafter.

B. All handling and preservation of collected samples and laboratory analyses of samples shall be performed in accordance with 40 CFR Part 136 and amendments thereto unless specified otherwise in the monitoring conditions of this permit.

C. Effluent sampling reported to the Control Authority must be analyzed by a Massachusetts DEP Certified Lab.

D. Although monitoring for all of the pollutants that are specified as local limits in the City of Taunton Sewer Use Ordinance is not requested at this time, compliance with all local limitations is required.

PART 3 - REPORTING REQUIREMENTS

A. Monitoring Reports

Monitoring results obtained shall be summarized and reported on an approved Self-Monitoring Report Form once per month. No later than the last day of each month, the permittee shall provide to the City of Taunton the self-monitoring report for the previous month. For example, the self-monitoring report for the month of July is due by the last day of August. The report shall indicate the nature and concentration of all pollutants in the effluent for which sampling and analyses were performed during the reporting period calendar month, including required flow data. A completed chain of custody form shall be submitted with analytical data.

B. If the permittee monitors any pollutant more frequently than required by this permit, using test procedures prescribed in 40 CFR Part 136 or amendments thereto, or otherwise approved by EPA or as specified in this permit, the results of such monitoring shall be included in any calculations of actual daily maximum or monthly average pollutant discharge and results shall be reported in the monthly report submitted to the City of Taunton. Such increased monitoring frequency shall also be indicated in the monthly report.

C. Automatic Resampling

If the results of the permittee's wastewater analysis indicate that a violation of this permit has occurred, the permittee must:

1. **Inform the City of Taunton of the violation within 24 hours; and**

2. Repeat the sampling and pollutant analysis within 30 days of the violation and submit, in writing, the results of this second analysis within 30 days of the sample date. This sampling is in addition to and not in place of, self-monitoring requirements as written in this permit.

D. Accidental Discharge Report

1. The permittee shall notify the **City of Taunton** immediately upon the occurrence of an accidental discharge of substances prohibited by the Sewer Use Ordinance or any slug loads or spills that may enter the public sewer. The **City of Taunton Wastewater Treatment Plant** must be notified by telephone at **508-823-3582**. In the event of a potentially dangerous spill or slug to the sewer system, the City of Taunton Police Department shall be notified also. The notification shall include location of discharge, date and time thereof, type of waste, including concentration and volume, and corrective actions taken. The permittee's notification of accidental releases in accordance with this section does not relieve it of any expense, loss, damage, or other liability which may be incurred as a result of damage to the POTW, fish kills, or any other damage to person or property; or shall such notification relieve the permittee of any fines, civil penalties, or other liability which may be imposed by this section or other applicable law.

2. Within five days following an accidental discharge, the permittee shall submit to the City of Taunton a detailed written report. The report shall specify:

   a. Description and cause of the upset, slug load or accidental discharge, the cause thereof, and the impact on the permittee's compliance status. The description shall also include location of discharge, type, concentration and volume of waste.

   b. Duration of noncompliance, including exact dates and times of noncompliance and, if the noncompliance is continuing, the time by which compliance is reasonably expected to occur.

   c. All steps taken or to be taken to reduce, eliminate, and/or prevent recurrence of such an upset, slug load, accidental discharge, or other conditions of noncompliance.

E. All reports and notifications required by this permit to be submitted to the **City of Taunton** shall be sent to the following address:

Pretreatment Coordinator
Veolia Water North America
Taunton Wastewater Treatment Plant
825 West Water St.
Taunton, MA 02780 Telephone #: 508-823-3582

F. In accordance with title 40 of the code of Federal Regulations Part 403 Section 403.14, information and data provided by the permittee which identifies the nature and frequency of discharge shall be available to the public without restriction. Requests for confidential treatment of other information shall be governed by procedures specified in 40 CFR Part 2.

PART 4 - SPECIAL CONDITIONS

SECTION 1 – REOPENER CLAUSE

See Section A.4 in the standard conditions.

SECTION 2 – SEWER USER FEES

The monthly flow data will be forwarded to the City of Taunton, Department of Public Works, 90 Ingell St, Taunton, Attention: Katherine Nunes, for sewer billing purposes.

SECTION 3 – DISPOSAL OF WASTES

The recovered separate phase petroleum shall be removed by haulers and disposed of at an off-site facility that is licensed to manage such wastes. The name of the hauler and location of final disposal shall be provided to the Pretreatment Coordinator prior to the first discharge.

SECTION 4 – SLUG CONTROL PLAN

In accordance with 40 CFR 403.8 (f)(2)(v) the POTW must evaluate the need for a slug control plan at least one time. This will be done during the first site inspection.

STANDARD CONDITIONS

SECTION A. GENERAL CONDITIONS AND DEFINITIONS

1. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

2. Duty to Comply

The permittee must comply with all conditions of this permit. Failure to comply with the requirements of this permit may be grounds for administrative action, or enforcement proceedings including civil or criminal penalties, injunctive relief, and summary abatements.

3. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or correct any adverse impact to the public treatment plant or the environment resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

4. Permit Modification

This permit may be modified for good causes including, but not limited to, the following:

a) To incorporate any new or revised Federal, State, or local pretreatment standards or requirements

b) Material or substantial alterations or additions to the discharger's operation processes, or discharge volume or character which were not considered in drafting the effective permit

c) A change in any condition in either the industrial user or the POTW that requires either a temporary or permanent reduction or elimination of the authorized discharge

d) Information indicating that the permitted discharge poses a threat to the Control Authority's collection and treatment systems, POTW personnel or the receiving waters

e) Violation of any terms or conditions of the permit

f) Misrepresentation or failure to disclose fully all relevant facts in the permit application or in any required reporting

g) Revision of or a grant of variance from such categorical standards pursuant to 40 CFR 403.13; or

h) To correct typographical or other errors in the permit

i) To reflect transfer of the facility ownership and/or operation to a new owner/operator
j) Upon request of the permittee, provided such request does not create a violation of any applicable requirements, standards, laws, or rules and regulations.

The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

5. Permit Termination

This permit may be terminated for, but not limited to, the following reasons:

a) Falsifying self-monitoring reports
b) Tampering with monitoring equipment
c) Refusing to allow timely access to the facility premises and records
d) Failure to meet effluent limitations
e) Failure to pay fines
f) Failure to pay sewer charges
g) Failure to meet compliance schedules.

6. Permit Appeals

The permittee may petition to appeal the terms of this permit within thirty (30) days of the notice.

This petition must be in writing; failure to submit a petition for review shall be deemed to be a waiver of the appeal. In its petition, the permittee must indicate the permit provisions objected to, the reasons for this objection, and the alternative condition, if any, it seeks to be placed in the permit.

The effectiveness of this permit shall not be stayed pending reconsideration by the City. The City's decision not to reconsider a final permit shall be considered final administrative action for purposes of judicial review. The permittee seeking judicial review of the City's final action must do so by filing a complaint with the Taunton Superior Court within sixty (60) days of the City's' decision.

7. Property Rights

The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any violation of Federal, State, or local laws or regulations.

8. Limitation on Permit Transfer

Permits may be reassigned or transferred to a new owner and/or operator with prior approval of the Commissioner:

a) The permittee must give at least thirty (30) days advance notice to the Commissioner.

b) The notice must include a written certification by the new owner which:

(i) States that the new owner has no immediate intent to change the facility's operations and processes

(ii) Identifies the specific date on which the transfer is to occur

(iii) Acknowledges full responsibility for complying with the existing permit.

9. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must submit an application for a new permit at least 90 days before the expiration date of this permit unless other special conditions apply.

10. Continuation of Expired Permits

An expired permit will continue to be effective and enforceable until the permit is reissued if:

a) The permittee has submitted a complete permit application at least ninety (90) days prior to the expiration date of the user's existing permit.

b) The failure to reissue the permit, prior to expiration of the previous permit, is not due to any act or failure to act on the part of the permittee.

11. Dilution

The permittee shall not increase the use of potable or process water or, in any way, attempt to dilute an effluent as a partial or complete substitute for adequate treatment to achieve compliance with the limitations contained in this permit.

12. Definitions

a) Daily Maximum - The maximum allowable discharge of pollutant during a calendar day. Where daily maximum limitations are expressed in units of mass, the daily discharge is the total mass discharged over the course of the day. Where daily maximum limitations are expressed in terms of a concentration, the daily discharge is the arithmetic average measurement of the pollutant concentration derived from all measurements taken that day.

b) Composite Sample - A sample that is collected over time, formed either by continuous sampling or by mixing discrete samples. The sample shall be composited as a flow proportional composite sample: collected either as a constant sample volume at time intervals proportional to stream flow, or collected by varying the volume, based on stream flow, at constant time intervals. A time proportioned composite sample is collected at constant volumes at constant time intervals.

c) Grab Sample - An individual sample collected in less than 15 minutes, without regard for flow or time.

d) Instantaneous Maximum Concentration - The maximum concentration allowed in any single grab sample.

e) Cooling Water -

(1) Uncontaminated: Water used for cooling purposes only which has no direct contact with any raw material, intermediate, or final product and which does not contain a level of contaminants detectably higher than that of the intake water.

(2) Contaminated: Water used for cooling purposes only which may become contaminated either through the use of water treatment chemicals used for corrosion inhibitors or biocides, or by direct contact with process materials and/or wastewater.

f) Monthly Average - The arithmetic mean of the values for effluent samples collected during a calendar month or specified 30 day period (as opposed to a rolling 30 day window).

g) Weekly Average - The arithmetic mean of the values for effluent samples collected over a period of seven consecutive days.

h) Bi-Weekly - Once every other week.

i) Bi-Monthly - Once every other month.

j) Upset - Means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee, excluding such factors as operational error, improperly designed or inadequate treatment facilities, or improper operation and maintenance or lack thereof.

k) Bypass - Means the intentional diversion of wastes from any portion of a treatment facility.

13. General Prohibitive Standards

The permittee shall comply with all the general prohibitive discharge standards in the Sewer Use Ordinance. Namely, the industrial user shall not discharge wastewater to the sewer system:

a) Having a temperature higher than 150 degrees F;

b) Containing more than 100 ppm by weight of fats, oils, and grease;

c) Containing any gasoline, benzene, naphtha, fuel oil or other flammable or explosive liquids, solids or gases; and in no case pollutants with a closed cup flashpoint of less than one hundred forty (140) degrees Fahrenheit (60 C), or pollutants which cause an exceedance of 10 percent of the Lower Explosive Limit (LEL) at any point within the POTW.

d) Containing any garbage that has not been ground by household type or other suitable garbage grinders;

e) Containing any ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, paunch, manure, or any other solids or viscous

substances capable of causing obstructions or other interference with proper operation of the sewer system;

f) Having a pH lower than 5.5 or otherwise causing corrosive structural damage to the POTW or equipment. If a continuous pH chart recorder is being used, any occurrence of pH over 9.5 but under 10.5 for a period of thirty minutes or more per day is prohibited. Any occurrence of pH between 10.5 and 11.0 for than fifteen minutes per day is prohibited. If a continuous pH chart recorder is not being used, any occurrence of pH over 9.5 is prohibited. Any pH occurrence over 11.0 is prohibited. At no time shall any discharge cause the pH of the influent at the POTW head works to go above 9.5.

g) Containing toxic or poisonous substances in sufficient quantity to injure or interfere with any wastewater treatment process, to constitute hazards to humans or animals, or to create any hazard in waters which receive treated effluent from the sewer system treatment plant. Toxic wastes shall include, but are not limited to wastes containing cyanide, chromium, cadmium, mercury, copper, and nickel ions;

h) Containing noxious or malodorous gases or substances capable of creating a public nuisance; including pollutants which result in the presence of toxic gases, vapors, or fumes;

i) Containing solids of such character and quantity that special and unusual attention is required for their handling;

j) Containing any substance which may affect the treatment plant's effluent and cause violation of the NPDES permit requirements;

k) Containing any substance which would cause the treatment plant to be in noncompliance with sludge use, recycle or disposal criteria pursuant to guidelines or regulations developed under section 405 of the Federal Act, the Solid Waste Disposal

Act, the Clean Air Act, the Toxic Substances Control Act or other regulations or criteria for sludge management and disposal as required by the State;

l) Containing color that is not removed in the treatment processes;

m) Containing any medical or infectious wastes;

n) Containing any radioactive wastes or isotopes; or

o) Containing any pollutant, including BOD pollutants, released at a flow rate and/or pollutant concentration that would cause interference with the treatment plant.

14. Compliance with Applicable Pretreatment Standards and Requirements

Compliance with this permit does not relieve the permittee from its obligations regarding compliance with any and all applicable local, State and Federal pretreatment standards and requirements including any such standards or requirements that may become effective during the term of this permit.

SECTION B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes but is not limited to: effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process back-up controls, including appropriate quality assurance procedures. This provision requires the operation of or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

2. Duty to Halt or Reduce Activity

Upon reduction of efficiency of operation, or loss or failure of all or part of the treatment facility, the permittee shall, to the extent necessary to maintain compliance with its permit, control its production or discharges (or both) until operation of the treatment facility is restored or an alternative method of treatment is provided. This requirement applies, for example, when the primary source of power of the treatment facility fails or is reduced. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

3. Bypass of Treatment Facilities

a) Bypass is prohibited.

b) The permittee may allow bypass to occur only with the authority and permission of the City.

c) Notification of bypass:

(1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior written notice, at least ten days before the date of the bypass, to the City of Taunton.

(2) Unauthorized bypass. The permittee shall immediately notify the City of Taunton Wastewater Treatment Plant and submit a written notice to the POTW within 5 days. This report shall specify:

(i) A description of the bypass, and its cause, including its duration;

(ii) Whether the bypass has been corrected; and

(iii) The steps being taken or to be taken to reduce, eliminate and prevent a reoccurrence of the bypass.

4. Removed Substances

All solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in accordance with applicable federal and state laws and regulations including but not limited to, the State and Federal Acts, the Massachusetts Hazardous Waste Management Act, M.G.L. c. 21C, and the Federal Resource Conservation and Recovery Act, 42 U.S.C. s. 6901 et. seq. 310 CMR 19.00 and 30.00 and other applicable regulations.

SECTION C. MONITORING AND RECORDS

1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring points specified in this permit and, unless otherwise specified, before the effluent joins or is diluted by any other wastestream, body of water or substance. All equipment used for sampling and analysis must be routinely calibrated, inspected and maintained to ensure their accuracy. Monitoring points shall not be changed without notification to and the approval of the City of Taunton.

2. Flow Measurements

Flow measurement is required by this permit. The appropriate flow measurement devices and methods consistent with approved scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated, and maintained to ensure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than 10 percent from true discharge rates throughout the range of expected discharge volumes. At a minimum, meters must be calibrated and certified semi-annually.

3. Analytical Methods to Demonstrate Continued Compliance

All sampling and analysis required by this permit shall be performed in accordance with the techniques prescribed in 40 CFR Part 136 and amendments thereto, otherwise approved by EPA, or as specified in this permit.

4. Additional Monitoring by the Permittee

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures identified in Section C.3, the results of this monitoring shall be included in the permittee's self-monitoring reports.

5. Inspection and Entry

The permittee shall allow the City of Taunton, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

a) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit;

d) Sample or monitor, for the purposes of assuring permit compliance, any substances or parameters at any location; and

e) Inspect any production, manufacturing, fabricating, or storage area where pollutants, regulated under the permit, could originate, be stored, or be discharged to the sewer system.

6. Retention of Records

a) The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application.

This period may be extended by request of the City of Taunton at any time.

b) All records that pertain to matters that are the subject of special orders or any other enforcement or litigation activities brought by the City of Taunton shall be retained and preserved by the permittee until all enforcement activities have concluded and all periods of limitation with respect to any and all appeals have expired.

7. Record Contents

Records of sampling and analyses shall include:

a) The date, exact place, time, and methods of sampling or measurements, and sample preservation techniques or procedures;

b) Who performed the sampling or measurements;

c) The date(s) analyses were performed;

d) Who performed the analyses;

e) The analytical techniques or methods used; and

f) The results of such analyses.

8. Falsifying Information

Knowingly making any false statement on any report or other document required by this permit or knowingly rendering any monitoring device or method inaccurate is a crime and may result in the imposition of criminal sanctions and/or civil penalties.

SECTION D. ADDITIONAL REPORTING REQUIREMENTS

1. Planned Changes

The permittee shall give notice to the City of Taunton, 90 days prior to any facility expansion, production increase, or process modification that result in new or substantially increased discharges

or a change in the nature of the discharge.

2. Anticipated Noncompliance

The permittee shall give advance notice to the City of Taunton of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

3. Automatic Resampling

If the results of the permittee's wastewater analysis indicate that a violation has occurred, the permittee must notify the City of Taunton within 24 hours of becoming aware of the violation and repeat the sampling and pollutant analysis and submit, in writing, the results of this repeat analysis within 30 days after becoming aware of the violation.

4. Duty to Provide Information

The permittee shall furnish to the City of Taunton, within three (3) days any information which the City of Taunton may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also, upon request, furnish to the City of Taunton within three (3) days, copies of any records required to be kept by this permit.

5. Signatory Requirements

All applications, reports, or information submitted to the City of Taunton must contain the following certification statement and be signed as required in Sections (a), (b), (c) or (d) below:

> "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

a) By a responsible corporate officer, if the Industrial User submitting the reports is a corporation. For the purpose of this paragraph, a responsible corporate officer means:

   (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or;
   (ii) the manager of one or more manufacturing, production, or operation facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

b) By a general partner or proprietor if the Industrial User submitting the reports is a partnership or sole proprietorship respectively.

c) The principal executive officer or director having responsibility for the overall operation of the discharging facility if the Industrial User submitting the reports is a Federal, State, or local governmental entity, or their agents.

d) By a duly authorized representative of the individual designated in paragraph (a), (b), or (c) of this section if:

(i) the authorization is made in writing by the individual described in paragraph (a), (b), or (c);

(ii) the authorization specifies either an individual or a position having responsibility for the overall operation of the facility from which the Industrial Discharge originates, such as the position of plant manager, operator of a well, or a well field superintendent, or a position of equivalent responsibility, or having overall responsibility for the pretreatment program for the company; and

(iii) the written authorization is submitted to the City.

e) If an authorization under paragraph (d) of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, or overall responsibility for the pretreatment program for the company, a new authorization satisfying the requirements of paragraph (d) of this section must be submitted to the City prior to or together with any reports to be signed by an authorized representative.

6. Operating Upsets

Any permittee that experiences an upset in operations that places the permittee in a temporary state of noncompliance with the provisions of either this permit or with the Sewer Use Ordinance shall inform the City of Taunton Wastewater Treatment Plant immediately of becoming aware of the upset at 508-823-3582.

A written follow-up report of the upset shall be filed by the permittee with the City of Taunton within five days. The report shall specify:

a) Description of the upset, the cause(s) thereof and the upset's impact on the permittee's compliance status;

b) Duration of noncompliance, including exact dates and times of noncompliance, and if not corrected, the anticipated time the noncompliance is expected to continue; and

c) All steps taken or to be taken to reduce, eliminate and prevent recurrence of such an upset.

7. Annual Publication

A list of all industrial users which were in Significant Noncompliance during the twelve (12) previous months shall be annually published by the City of Taunton in any newspaper of general circulation within the jurisdiction that provides meaningful public notice within the jurisdiction served by the POTW as cited in Federal Regulation 40 CFR 403.8(f)(2)(viii). Accordingly, the permittee is apprised that noncompliance with this permit may lead to an enforcement action and may result in publication

of its name in an appropriate newspaper in accordance with this section.

8. Civil and Criminal Liability

Nothing in this permit shall be construed to relieve the permittee from civil and/or criminal penalties for noncompliance under Section 19.32 of the Sewer Use Ordinance or State or Federal laws or regulations.

9. Penalties for Violations of Permit Conditions

State Law provides that any person who violates a permit condition may be subject to a civil penalty of at least five thousand (5000) dollars per day per violation. Any person who willfully or negligently violates permit conditions is subject to criminal penalties of a fine of up to five thousand (5000) per day of violation, or by imprisonment, or both. The permittee may also be subject to other sanctions under State and/or Federal law.

10. Recovery of Costs Incurred

In addition to civil and criminal liability, the permittee violating any of the provisions of this permit or Sewer Use Ordinance or causing damage to or otherwise inhibiting the City of Taunton wastewater disposal system shall be liable to the City of Taunton for any expense, loss, or damage caused by such violation or discharge. The City of Taunton shall bill the permittee for the costs incurred by the City of Taunton for any cleaning, repair, or replacement work caused by the violation or discharge. Refusal to pay the assessed costs may subject the permittee to Judicial Enforcement and Civil Penalties.

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APPENDIX 5

Supplemental Environmental Information

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AECOM
250 Apollo Drive
Chelmsford, MA 01824
aecom.com

September 24, 2020

Mr. Peter LaGoy
EH&S Office
NiSource
4 Technology Drive, Suite250
Westboro,MA 01581

Investigation Summary Results
Bay State Gas, Taunton
(AECOM Project No. 60238965)

Dear Peter,

AECOM Technical Services, Inc. (AECOM) has completed the Site Investigation and sampling at the Bay State Gas Taunton I Site in Taunton, Massachusetts. Investigation activities took place in the area the City has planned excavation to better evaluate the nature and extent of MGP residuals in site media under the MCP. A summary of the results and recommendations is below. Boring logs and analytical results are attached.

Investigation Results

AECOM conducted a field investigation on August 28, 2020 and September 4, 2020. in the area of the City's planned excavation. Investigation included the collection of soil and groundwater samples from locations within the planned area of trenching. A series of five (5) investigation locations were selected based on locations where the City is excavating and where there are known MGP impacts (Figure 1). Soil borings were installed at each of the locations to an approximate depth of 20 feet below ground surface (bgs) using a direct push technology rig, i.e. a Geoprobe®. Each of the locations was pre-cleared to a depth of at least 1-meter bgs, with actual depth based on the results of geophysical survey and other investigations, using an air knife, a vacuum truck, and/or hand digging. The collected samples were analyzed by a CMA –approved, contract laboratory for a set of chemical constituents that are traditionally associated with residual material from MGP processes and for parameters required for disposal purposes, as well as aqueous effluent limitations related to the groundwater treatment system.

Soil samples were analyzed in accordance with USEPA SW-846 analytical methods for the following parameters:

- Flashpoint by 1010A
- Ignitability via method SW-846 1030
- pH via method SW-846 9045D
- Diesel Range Organics by 5015D
- Gasoline Range Organics by 8015D
- PCBs via method SW-846 8082A
- SVOCs by 8270D

- Total Metals via method SW-846 6010C
- Mercury in soil via method SW-846 7471B
- Mercury in liquid via method SW-846 7470A
- Cyanide by 9012A
- Sulfide by 9034
- TCL Volatiles LL via method SW-846 8260C

The expected landfill disposal requirements (lined vs. unlined) are provided in the attached analytical table. The laboratory results are summarized in Table 1. The key points are as follows

- VOCs were detected in soil borings SB-1 through SB-4. These borings all had concentrations of benzene, toluene, ethylbenzene, and xylenes (BTEX) and naphthene with a total VOC concentration of 0.028, .223, .076 and .186 mg/kg respectively. VOC's in boring SB-5 were ND. Therefore, each individual boring and therefore the average concentration from all borings is less than the unlined landfill disposal criteria of 4 mg/kg.

- SVOCs were detected in all samples from borings SB-1 through SB-5 with concentrations of Total SVOC's ranging from 3.6 mg/kg to 64.3 mg/kg with both the unlined and lined landfill disposal criteria at 100 mg/kg. Therefore, each individual boring and therefore the average concentration from all borings is less than the unlined landfill disposal criteria.

- Total Petroleum Hydrocarbons (TPH) were detected in all soil borings. Concentrations from SB-1 through SB-5 were 203, 2755, 323, 529 and 3546 mg/kg respectively. The landfill disposal criteria for TPH is 2500 mg/kg for unlined and 5000 mg/kg for lined landfills. Therefore, while the individual results in SB-2 and SB5 are above the unlined landfill criteria, the average concentration in these borings (1,471 mg/kg) is below the disposal criteria.

- All the other compounds including PCB's if detected, were below the unlined landfill disposal criteria

Field work also included one round of groundwater sampling from temporary monitoring points in the borings installed as well as in existing well MW-3. Groundwater samples were analyzed in accordance with USEPA SW-846 analytical methods for the following parameters:

- VOCs via method SW-846 8260B
- SVOCs by 8270D
- Cyanide via method SW-846 9012
- pH via method SW-846 9045
- Iron via method SW-846 6010
- TPH by 1664
- Arsenic by EPA 600/200/335 series
- Cadmium by EPA 600/200/335 series
- Chromium by EPA 600/200/335 series
- Copper by EPA 600/200/335 series
- Lead by EPA 600/200/335 series
- Mercury by EPA 600/200/335 series

- Nickel by EPA 600/200/335 series
- Silver by EPA 600/200/335 series
- Zinc by EPA 600/200/335 series
- BOD (5-day)
- Total Suspended Solids (TSS)
- Oil & Grease by 1664

AECOM has tabulated the laboratory results as shown in Table 2.
Groundwater samples were collected from GWSB-4 and GWSB-5 on August 28, 2020 and from MW-3 on September 4, 2020, for use as the basis of design for the groundwater dewatering system to comply with the POTW discharge limits. The expected POTW discharge limits are provided in Attachment A. The laboratory results are summarized in Tables 2 and 3. The key points are as follows

- VOCs were detected in the GWSB-4 and -5 and MW-3, all had concentrations of benzene, toluene, ethylbenzene, and xylenes (BTEX) and naphthene with a total VOC concentration of 0.926, 3.76, and 9.9 ppm respectively. Therefore, the average concentration from GWSB-4 and -5 is 2.34 mg/l, which is above the discharge limit of 2.13 mg/L. But with higher concentration of VOCs in MW-3, it is assumed the inlet concentration will be higher than the average concentration in GWSB-4 and -5, therefore treatment is required before discharge to the POTW.

- SVOCs were detected in the GWSB-4 and -5 and MW-3, all had concentrations of naphthene of 0.89, 1.8, and 4.4 ppm respectively. Therefore, the average concentration of the three samples 2.36 mg/l, which is above the discharge limit of 2.13 mg/L. Therefore, treatment of the SVOCs may be required before discharge to the POTW.

- The three groundwater samples, GWSB-4 and -5 and MW-3, had concentration of total cyanide of 1.2, 0.24, and 0.23 ppm and TSS of 758, 178 and 72 mg/l, respectively. Since the sample form GWSB-4 is above the POTW discharge limit of 0.37 mg/l, with the elevated TSS number, further analysis is needed to determine what the dissolved cyanide concentration are. Therefore treatment of cyanide to meet the POTW discharge requirements may be required.

- All the other compounds (metals, oil & grease, TPH, TSS, pH, BOD etc), if detected, were below the POTW discharge limits

Although the VOCs impacts are only slightly above the POTW discharge limits, without a variance to the discharge limits, AECOM recommends that the groundwater from the excavation be treated prior to discharge to the POTW. There could be additional impacted groundwater that may be pulled into the excavation during dewatering that was not represented in the three groundwater samples collected. However, based on the previous groundwater treatment, AECOM recommends having more detailed discussions with Beta regarding the source of groundwater, as in the previous groundwater removal effort, treatment for VOCs was not required because of substantial dilution from deeper groundwater.

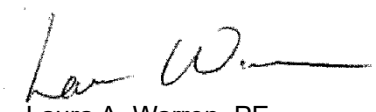
As AECOM understands the dewatering system will be designed to treat up to 300 gpm, it is assumed that the Contractor will remove sediment to less than 5 micron in size, and AECOM will treat the dissolved phase contaminates of concern. If AECOM were designing a groundwater treatment system, we would recommend the following approach. This approach does not consider fouling by iron bacteria, which was an issue during the previous groundwater treatment. The treatment system will consist of a 10K tank, duplex pump skids and controls, duplex bag filers, and three sets of 2,000-pound LGACs (rated for 100 gpm each) operated in parallel with each set consisting of two vessels in series. This would allow for each set to be operated in a lead/lag configuration, therefore once the first vessel is spent (based on the mid-fluent samples results), the lead vessel would be changed out and the lag vessel would become the lead vessel. This would ensure the LGAC is completely spent before conducting a change out. Based on the average concentration in the three groundwater samples collected, mass loading would be approximately 320 pounds per day. It is expected that groundwater concentration will decrease after several pore

volumes of groundwater are removed and water from the nearby river is pulled into the excavation, so LGAC changes outs will be as needed. Utilizing 2K vessels will allow for additional vessels to be shipped to the site full of carbon, while the spent carbon and vessel(s) can be removed and the carbon be removed/regenerated off site, therefore minimizing down time of the treatment system. The vessels would be connected via hose to facilitate both lead/lag operations but allows to allow for backwashing if the LGACs get collaged during operations. A flow meter will be located after the LGACs to monitor the flow rate and gallons pumped to the POTW. The backwash system would consist of a 3K tank, which would be clean water, and a pump with hoses to allow one set of LGAC vessels to taken offline and manually backwashed. The backwash water would be directed to the Contractors tanks for settling or a separate backwash settling tank could be supplied. This process would all two sets of LGACs to continue operating, while one set was backwashed, therefore minimizing the system downtime.

The treatment system will be permitted to discharge to the POTW, and monthly reports will be submitted as required. AECOM has also recommends an operator to be onsite for up to ten hours per day, Monday through Friday, with office support by the project manager and engineer for 2 and 4 hours per week, respectively. It has been assumed that dewatering actives will be conducted over four weeks.

If you have any questions or need further assistance, please contact Laura Warren at 978-905-2449.

Sincerely,



Laura A. Warren, PE
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AECOM
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enclosures:

cc:

Tables

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Table 1
Taunton I Soil Investigation Results

							Sample ID	SB-1-(13-15)_082820	SB-5-(4-6)_082820	SB-5-(4-6)_082820_DL	SB-2B (8-11) 082820	SB-3 (15-17) 082820	SB-4 (18-20) 082820
							Sampled By						
							Sample Collection Date	08/28/2020 10:00	08/28/2020 11:00	08/28/2020 11:00	08/28/2020 11:30	08/28/2020 12:30	08/28/2020 13:33
							Sample Interval						
							Comments						
Parameter	**Reporting Units**	**Landfill**	**Landfill**	**S2GW2**	**S2GW3**	**S3GW2**	**S3GW3**						
Volatiles by 8260C		**Lined**	**Unlined**										
1,1,1-Trichloroethane	ug/kg			600000	1000000	600000	3000000	< 3.7	< 190		< 5.7	< 3.4	< 5.1
1,1,2,2-Tetrachloroethane	ug/kg			20	50000	20	400000	< 3.7	**< 190**		**< 5.7**	< 3.4	**< 5.1**
1,1,2-Trichloro-1,2,2-trifluoroethane	ug/kg			NA	NA	NA	NA	< 3.7	< 190		< 5.7	< 3.4	< 5.1
1,1,2-Trichloroethane	ug/kg			2000	200000	2000	500000	< 3.7	**< 190**		< 5.7	< 3.4	< 5.1
1,1-Dichloroethane	ug/kg			9000	1000000	9000	1000000	< 3.7	< 190		< 5.7	< 3.4	< 5.1
1,1-Dichloroethene	ug/kg			40000	1000000	40000	3000000	< 3.7	< 190		< 5.7	< 3.4	< 5.1
1,2,4-Trichlorobenzene	ug/kg			6000	3000000	6000	5000000	< 3.7	< 190		< 5.7	< 3.4	< 5.1
1,2-Dibromo-3-Chloropropane	ug/kg			NA	NA	NA	NA	< 3.7	< 190		< 5.7	< 3.4	< 5.1
1,2-Dibromoethane	ug/kg			100	5000	100	40000	< 3.7	**< 190**		< 5.7	< 3.4	< 5.1
1,2-Dichlorobenzene	ug/kg			100000	300000	100000	300000	< 3.7	< 190		< 5.7	< 3.4	< 5.1
1,2-Dichloroethane	ug/kg			100	100000	100	300000	< 3.7	**< 190**		< 5.7	< 3.4	< 5.1
1,2-Dichloropropane	ug/kg			100	100000	100	1000000	< 3.7	**< 190**		< 5.7	< 3.4	< 5.1
1,3-Dichlorobenzene	ug/kg			200000	500000	200000	500000	< 3.7	< 190		< 5.7	< 3.4	< 5.1
1,4-Dichlorobenzene	ug/kg			1000	400000	1000	2000000	< 3.7	< 190		< 5.7	< 3.4	< 5.1
2-Butanone (MEK)	ug/kg			50000	400000	50000	400000	< 19	< 950		18J	< 17	< 25
2-Hexanone	ug/kg			NA	NA	NA	NA	< 19	< 950		< 29	< 17	< 25
4-Methyl-2-pentanone (MIBK)	ug/kg			50000	400000	50000	400000	< 19	**< 950**		< 29	< 17	< 25
Acetone	ug/kg			50000	400000	50000	400000	22	< 950		80	20	32
Benzene	ug/kg			200000	200000	400000	1000000	0.65J	< 190		7.5	5.9	30
Bromodichloromethane	ug/kg			100	100000	100	500000	< 3.7	**< 190**		< 5.7	< 3.4	< 5.1
Bromoform	ug/kg			1000	800000	1000	800000	< 3.7	**< 190**		< 5.7	< 3.4	< 5.1
Bromomethane	ug/kg			500	30000	500	30000	< 3.7	< 190		< 5.7	< 3.4	< 5.1
Carbon disulfide	ug/kg			NA	NA	NA	NA	< 3.7	< 190		< 5.7	< 3.4	< 5.1
Carbon tetrachloride	ug/kg			5000	100000	5000	1000000	< 3.7	< 190		< 5.7	< 3.4	< 5.1
Chlorobenzene	ug/kg			3000	100000	3000	100000	< 3.7	< 190		< 5.7	< 3.4	< 5.1
Chloroethane	ug/kg			NA	NA	NA	NA	< 3.7	< 190		< 5.7	< 3.4	< 5.1
Chloroform	ug/kg			200	1000000	200	1000000	< 3.7	< 190		< 5.7	< 3.4	< 5.1
Chloromethane	ug/kg			NA	NA	NA	NA	< 3.7	< 190		< 5.7	< 3.4	< 5.1
cis-1,2-Dichloroethene	ug/kg			100	500000	100	500000	< 3.7	**< 190**		< 5.7	< 3.4	< 5.1
cis-1,3-Dichloropropene	ug/kg			NA	NA	NA	NA	< 3.7	< 190		< 5.7	< 3.4	< 5.1
Cyclohexane	ug/kg			NA	NA	NA	NA	< 3.7	< 190		1.5J	< 3.4	< 5.1
Dibromochloromethane	ug/kg			30	100000	30	500000	< 3.7	**< 190**		**< 5.7**	< 3.4	**< 5.1**
Dichlorodifluoromethane	ug/kg			NA	NA	NA	NA	< 3.7	< 190		< 5.7	< 3.4	< 5.1
Ethylbenzene	ug/kg			1000000	1000000	1000000	3000000	3.0J	< 190		50	16	38
Isopropylbenzene	ug/kg			NA	NA	NA	NA	0.97J	< 190		8.0	0.74J	1.9J
Methyl acetate	ug/kg			NA	NA	NA	NA	< 19	< 950		< 29	< 17	< 25
Methyl tert-butyl ether	ug/kg			100000	500000	100000	500000	< 3.7	**< 190**		< 5.7	< 3.4	< 5.1
Methylcyclohexane	ug/kg			NA	NA	NA	NA	0.64J	< 190		6.5	1.1J	1.4J
Methylene Chloride	ug/kg			4000	700000	4000	700000	< 3.7	**< 190**		< 5.7	< 3.4	< 5.1
Styrene	ug/kg			4000	300000	4000	2000000	< 3.7	< 190		3.0J	2.1J	3.6J
Tetrachloroethene	ug/kg			10000	200000	10000	1000000	< 3.7	< 190		< 5.7	< 3.4	< 5.1
Toluene	ug/kg			1000000	1000000	2000000	3000000	< 3.7	< 190		1.4J	1.0J	6.6
trans-1,2-Dichloroethene	ug/kg			1000	1000000	1000	3000000	< 3.7	< 190		< 5.7	< 3.4	< 5.1
trans-1,3-Dichloropropene	ug/kg			NA	NA	NA	NA	< 3.7	< 190		< 5.7	< 3.4	< 5.1
Trichloroethene	ug/kg			300	60000	300	60000	< 3.7	< 190		< 5.7	< 3.4	< 5.1
Trichlorofluoromethane	ug/kg			NA	NA	NA	NA	< 3.7	< 190		< 5.7	< 3.4	< 5.1
Vinyl chloride	ug/kg			700	7000	700	60000	< 3.7	< 190		< 5.7	< 3.4	< 5.1
Xylenes, Total	ug/kg			100000	1000000	100000	3000000	0.88J	< 380		54	29	72
TOTAL VOC's	mg/kg	10	4					**0.02814**	**ND**	**ND**	**0.2299**	**0.07584**	**0.1855**
GC Volatiles by 8015D													

Table 1
Taunton I Soil Investigation Results

Semivolatiles by 8270D													
2,4,5-Trichlorophenol	ug/kg			1000000	600000	1000000	600000	< 200	< 190		< 980	< 990	< 1100
2,4,6-Trichlorophenol	ug/kg			20000	20000	20000	20000	< 200	< 190		**< 980**	**< 990**	**< 1100**
2,4-Dichlorophenol	ug/kg			60000	40000	60000	40000	< 200	< 190		**< 980**	**< 990**	**< 1100**
2,4-Dimethylphenol	ug/kg			100000	1000000	100000	1000000	< 200	< 190		**< 980**	**< 990**	**< 1100**
2,4-Dinitrophenol	ug/kg			50000	100000	50000	100000	< 2000	< 1900		**< 9500**	**< 9700**	**< 11000**
2,4-Dinitrotoluene	ug/kg			10000	10000	50000	80000	< 200	< 190		**< 980**	**< 990**	**< 1100**
2,6-Dinitrotoluene	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100
2-Chloronaphthalene	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100
2-Chlorophenol	ug/kg			100000	300000	100000	300000	< 390	< 370		**< 1900**	**< 1900**	**< 2100**
2-Methylnaphthalene	ug/kg			80000	500000	80000	500000	< 200	< 190		**< 980**	**< 990**	**< 1100**
2-Methylphenol	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100
2-Nitroaniline	ug/kg			NA	NA	NA	NA	< 390	< 370		< 1900	< 1900	< 2100
2-Nitrophenol	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100
3,3'-Dichlorobenzidine	ug/kg			20000	20000	100000	100000	< 390	< 370		< 1900	< 1900	< 2100
3-Nitroaniline	ug/kg			NA	NA	NA	NA	< 390	< 370		< 1900	< 1900	< 2100
4,6-Dinitro-2-methylphenol	ug/kg			NA	NA	NA	NA	< 390	< 370		< 1900	< 1900	< 2100
4-Bromophenyl phenyl ether	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100
4-Chloro-3-methylphenol	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100
4-Chloroaniline	ug/kg			40000	3000	40000	3000	< 200	< 190		< 980	< 990	**< 1100**
4-Chlorophenyl phenyl ether	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100
4-Methylphenol	ug/kg			NA	NA	NA	NA	< 390	< 370		< 1900	< 1900	< 2100
4-Nitroaniline	ug/kg			NA	NA	NA	NA	< 390	< 370		< 1900	< 1900	< 2100
4-Nitrophenol	ug/kg			NA	NA	NA	NA	< 390	< 370		< 1900	< 1900	< 2100
Acenaphthene	ug/kg			3000000	3000000	5000000	5000000	170J	2500		2800	< 990	< 1100
Acenaphthylene	ug/kg			600000	10000	600000	10000	75J	890		**1800**	590J	370J
Acetophenone	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100
Anthracene	ug/kg			3000000	3000000	5000000	5000000	210	3600		2300	410J	430J
Atrazine	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100
Benzaldehyde	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100
Benzo[a]anthracene	ug/kg			40000	40000	300000	300000	210	2400		3200	1400	810J
Benzo[a]pyrene	ug/kg			7000	7000	30000	30000	190J	1900		**3100**	860J	800J
Benzo[b]fluoranthene	ug/kg			40000	40000	300000	300000	250	1800		3700	2700	1600
Benzo[g,h,i]perylene	ug/kg			3000000	3000000	5000000	5000000	230	1300		3000	1900	1000J
Benzo[k]fluoranthene	ug/kg			400000	400000	3000000	3000000	120J	930		1400	800J	660J
Biphenyl	ug/kg			6000	3000000	6000	5000000	**< 200**	**630**		**690J**	**< 990**	**< 1100**
bis (2-chloroisopropyl) ether	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100
Bis(2-chloroethoxy)methane	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100
Bis(2-chloroethyl)ether	ug/kg			700	8000	700	80000	< 200	< 190		**< 980**	**< 990**	**< 1100**
Bis(2-ethylhexyl) phthalate	ug/kg			600000	600000	2000000	2000000	< 200	< 190		< 980	< 990	< 1100
Butyl benzyl phthalate	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100
Caprolactam	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100
Carbazole	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100
Chrysene	ug/kg			400000	400000	3000000	3000000	220	2300		3300	1600	1000J
Dibenz(a,h)anthracene	ug/kg			4000	4000	30000	30000	39J	350		610J	470J	220J
Dibenzofuran	ug/kg			NA	NA	NA	NA	< 200	1300		1700	< 990	< 1100
Diethyl phthalate	ug/kg			200000	300000	200000	300000	< 200	< 190		< 980	< 990	< 1100
Dimethyl phthalate	ug/kg			50000	600000	50000	600000	< 200	< 190		**< 980**	**< 990**	**< 1100**
Di-n-butyl phthalate	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100
Di-n-octyl phthalate	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100
Fluoranthene	ug/kg			3000000	3000000	5000000	5000000	770		7900	9100	2000	2000
Fluorene	ug/kg			3000000	3000000	5000000	5000000	150J	2400		3100	290J	310J
Hexachlorobenzene	ug/kg			800	800	800	800	< 200	< 190		**< 980**	**< 990**	**< 1100**
Hexachlorobutadiene	ug/kg			100000	100000	100000	100000	< 200	< 190		< 980	< 990	< 1100
Hexachlorocyclopentadiene	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100
Hexachloroethane	ug/kg			3000	200000	3000	200000	< 200	< 190		**< 980**	**< 990**	**< 1100**
Indeno[1,2,3-cd]pyrene	ug/kg			40000	40000	300000	300000	180J	1200		2500	1700	930J
Isophorone	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100

Table 1
Taunton I Soil Investigation Results

Naphthalene	ug/kg			20000	1000000	20000	3000000	32J	< 190		1200	560J	850J
Nitrobenzene	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100
N-Nitrosodi-n-propylamine	ug/kg			NA	NA	NA	NA	< 200	< 190		< 980	< 990	< 1100
N-Nitrosodiphenylamine	ug/kg			NA	NA	NA	NA	< 200	1000		1200	< 990	< 1100
Pentachlorophenol	ug/kg			20000	10000	70000	10000	< 390	< 370		< 1900	< 1900	< 2100
Phenanthrene	ug/kg			1000000	1000000	3000000	3000000	< 200		**11000**	7600	620J	590J
Phenol	ug/kg			50000	20000	50000	20000	< 200	< 190		< 980	< 990	**< 1100**
Pyrene	ug/kg			3000000	3000000	5000000	5000000	790		7800	12000	2300	2000
Total SVOC's	mg/kg	100	100					**3.636**	**24.5**	**26.7**	**64.3**	**18.2**	**13.57**
GC Semivolatiles by 8015D													
Diesel Range Organics [C10-C28]	mg/kg			NA	NA	NA	NA	170	3500		2700	320	520
Gasoline Range Organics (GRO)-C6	mg/kg			NA	NA	NA	NA	33	46		55	2.8J	9.3J
Total Petroleum Hydrocarbons	mg/kg	5000	2500	3000	3000	5000	5000	**203**	**3546**		**2755**	**323**	**529**
GC Semivolatiles by 8082A													
PCB-1016	mg/kg			NA	NA	NA	NA	< 0.25	< 0.24		< 0.27	< 0.21	< 0.29
PCB-1221	mg/kg			NA	NA	NA	NA	< 0.25	< 0.24		< 0.27	< 0.21	< 0.29
PCB-1232	mg/kg			NA	NA	NA	NA	< 0.25	< 0.24		< 0.27	< 0.21	< 0.29
PCB-1242	mg/kg			NA	NA	NA	NA	< 0.25	< 0.24		< 0.27	< 0.21	< 0.29
PCB-1248	mg/kg			NA	NA	NA	NA	< 0.25	< 0.24		< 0.27	< 0.21	< 0.29
PCB-1254	mg/kg			NA	NA	NA	NA	< 0.25	< 0.24		< 0.27	< 0.21	< 0.29
PCB-1260	mg/kg			NA	NA	NA	NA	< 0.25	< 0.24		< 0.27	< 0.21	< 0.29
TOTAL PCBs	mg/kg	2	2	4	4	4	4	**ND**	**ND**		**ND**	**ND**	**ND**
Metals by 6010C													
Arsenic	mg/kg	40	40	20	20	50	50	4.7	2.3		3.9	3.0	5.2
Barium	mg/kg	NA	NA	3000	3000	5000	5000	33.2^	16.6^		23.5^	49.4^	35.7^
Cadmium	mg/kg	80	30	100	100	100	100	0.083J	0.081J		0.061J	0.070J	0.27
Chromium	mg/kg	1,000	1,000	200	200	200	200	14.4	18.3		12.0	24.7	18.8
Lead	mg/kg	2,000	1,000	600	600	600	600	8.4	4.4		11.0	12.6	15.6
Selenium	mg/kg	NA	NA	700	700	700	700	< 5.0	< 4.6		< 4.7	< 5.0	< 5.0
Silver	mg/kg	NA	NA	200	200	200	200	< 0.75	< 0.68		< 0.70	< 0.75	< 0.75
Metals by 7471B													
Mercury	mg/kg	10	10	30	30	30	30	< 0.019	< 0.014		0.020J	0.011J	0.028
Wet Chemistry by 1010A													
Flashpoint	degrees f	> 140		NA	NA	NA	NA	>180	>180		>180	>180	>180
Wet Chemistry by 1030													
Ignitability	mm/sec			NA	NA	NA	NA	NB	NB		NB	NB	NB
Wet Chemistry by 9012													
Cyanide, Reactive	mg/kg			NA	NA	NA	NA	< 10	< 10		< 10	< 10	< 10
Wet Chemistry by 9034													
Sulfide, Reactive	mg/kg			NA	NA	NA	NA	< 10	100		120	< 10	< 10
Wet Chemistry by 9045D													
pH	su	2 < pH < 12.5		NA	NA	NA	NA	5.6HF	5.3HF		5.4HF	5.1HF	4.7HF
Temperature	degrees c			NA	NA	NA	NA	21.5HF	21.4HF		21.2HF	21.1HF	21.0HF

Notes:
degrees c - degrees c
degrees f - degrees fahrenheit
mg/kg - milligrams per kilogram
mm/sec - millimeter per second
su - standard unit
ug/kg - micrograms per killogram
^ - ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC is outside acceptance limits.
HF - Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Table 1
Taunton I Soil Investigation Results

U - Indicates the analyte was analyzed for but not detected.
S1 - Concentrations based on sensitive uses of the property and accessible soil, either currently or in the foreseeable future.
S2 - Concentrations based on property uses associated with moderate exposure and accessible soil, either currently or in the foreseeable future.
S3 - Concentrations based on restricted access and property with limited potential for exposure, either currently or in the foreseeable future.
RC - Reportable Concentrations define notification requirements for contamination discovered in soil and groundwater.
RQ - Reportable Quantities define notification requirements for sudden releases (or spills) of oil or hazardous materials to the environment.

TestAmerica's TotalAccess, is our online data management tool. Features include, a cross-tab view displaying each analyte
as a row across sample columns, an intuitive analyte trending tool, auto-fill search functions and exports data into Excel, while keeping its original format.
Other features include a redesign and simplification in selecting regulatory limits, Work Order and Results page layout redesign, and available data columns in the Results and Budgets pages.
The regulatory comparison tool allows users to compare their analytical data against a number of regulatory compound lists and associated limits.
This feature now encompasses over 786 regulatory lists from 34 States and the U.S. EPA, covering 91,529 individual analyte comparison limits.
The benefits of TotalAccess are offered free of charge to all TestAmerica clients, Clients can sign up for TotalAccess
on the TestAmerica home page at www.testamericainc.com.

More information @ http://www.mass.gov/eea/agencies/massdep/cleanup/regulations/massachusetts-contingency-plan.html

Table 2
Taunton I Groundwater Investigation Results

						Sample ID	SB-1-(13-15)_082820	SB-5-(4-6)_082820	GWSB-5 (082820)	SB-2B (8-11) 082820	GWSB-4 (082820)	GWSB-4 (082820)_DL	SB-3 (15-17) 082820	SB-4 (18-20) 082820
						Sampled By								
						Sample Collection Date	08/28/2020 10:00	08/28/2020 11:00	08/28/2020 12:00	08/28/2020 11:30	08/28/2020 14:45	08/28/2020 14:45	08/28/2020 12:30	08/28/2020 13:33
						Laboratory Order Number	480-174456-1	480-174456-2	480-174456-3	480-174456-4	480-174456-5	480-174456-5_DL	480-174456-6	480-174456-7
Parameter	**Reporting Units**	**GW1**	**GW2**	**RCGW1**	**RCGW2**									
Volatiles by 624.1														
1,1,1-Trichloroethane	ug/l	200	4000	200	4000				< 5.0		< 10			
1,1,2,2-Tetrachloroethane	ug/l	2	9	2	9				**< 5.0**		**< 10**			
1,1,2-Trichloroethane	ug/l	5	900	5	900				**< 25**		**< 50**			
1,1-Dichloroethane	ug/l	70	2000	70	2000				< 5.0		< 10			
1,1-Dichloroethene	ug/l	7	80	7	80				< 5.0		**< 10**			
1,2-Dichlorobenzene	ug/l	600	8000	600	2000				< 5.0		< 10			
1,2-Dichloroethane	ug/l	5	5	5	5				< 5.0		**< 10**			
1,2-Dichloropropane	ug/l	5	3	3	3				**< 5.0**		**< 10**			
1,3-Dichlorobenzene	ug/l	100	6000	100	6000				< 5.0		< 10			
1,4-Dichlorobenzene	ug/l	5	60	5	60				< 5.0		**< 10**			
2-Chloroethyl vinyl ether	ug/l	NA	NA	NA	NA				< 25		< 50			
Acrolein	ug/l	NA	NA	NA	NA				< 100		< 200			
Acrylonitrile	ug/l	NA	NA	NA	NA				< 50		< 100			
Benzene	ug/l	5	1000	5	1000				**240**		**1300**			
Bromoform	ug/l	4	700	4	700				**< 25**		**< 50**			
Carbon tetrachloride	ug/l	5	2	2	2				**< 5.0**		**< 10**			
Chlorobenzene	ug/l	100	200	100	200				< 5.0		< 10			
Chlorodibromomethane	ug/l	2	20	2	20				**< 5.0**		**< 10**			
Chloroethane	ug/l	NA	NA	NA	NA				< 5.0		< 10			
Chloroform	ug/l	70	50	50	50				< 5.0		< 10			
Chloromethane	ug/l	NA	NA	NA	NA				< 5.0		< 10			
cis-1,2-Dichloroethene	ug/l	70	20	20	20				< 5.0		< 10			
cis-1,3-Dichloropropene	ug/l	NA	NA	NA	NA				< 25		< 50			
Dichlorobromomethane	ug/l	3	6	3	6				**< 5.0**		**< 10**			
Ethylbenzene	ug/l	700	20000	700	5000				10		330			
Methyl tert-butyl ether	ug/l	70	50000	70	5000				< 5.0		< 10			
Methylene Chloride	ug/l	5	2000	5	2000				**< 25**		**< 50**			
Naphthalene	ug/l	140	700	140	700				**650**		**1400**			
Tetrachloroethene	ug/l	5	50	5	50				< 5.0		**< 10**			
Toluene	ug/l	1000	50000	1000	40000				4.7J		110			
trans-1,2-Dichloroethene	ug/l	100	80	80	80				< 5.0		< 10			
trans-1,3-Dichloropropene	ug/l	NA	NA	NA	NA				< 25		< 50			
Trichloroethene	ug/l	5	5	5	5				< 5.0		**< 10**			
Trichlorofluoromethane	ug/l	NA	NA	NA	NA				< 5.0		< 10			
Vinyl chloride	ug/l	2	2	2	2				**< 5.0**		**< 10**			
Xylenes, Total	ug/l	10000	3000	3000	3000				26		620			
									926		3760			
Semivolatiles by 625.1														
1,2,4-Trichlorobenzene	ug/l	70	200	70	200				**< 100**		**< 100**			
1,2-Dichlorobenzene	ug/l	600	8000	600	2000				< 100		< 100			
1,2-Diphenylhydrazine	ug/l	NA	NA	NA	NA				< 100		< 100			
1,3-Dichlorobenzene	ug/l	100	6000	100	6000				< 100		< 100			
1,4-Dichlorobenzene	ug/l	5	60	5	60				**< 100**		**< 100**			
2,2'-oxybis[1-chloropropane]	ug/l	NA	NA	NA	NA				< 50		< 50			
2,4,6-Trichlorophenol	ug/l	10	5000	10	500				**< 50**		**< 50**			
2,4-Dichlorophenol	ug/l	10	30000	10	2000				**< 50**		**< 50**			
2,4-Dimethylphenol	ug/l	60	40000	60	40000				36J		< 50			
2,4-Dinitrophenol	ug/l	200	50000	200	20000				< 100		< 100			
2,4-Dinitrotoluene	ug/l	30	20000	30	20000				**< 100**		**< 100**			

Table 2
Taunton I Groundwater Investigation Results

2,6-Dinitrotoluene	ug/l	NA	NA	NA	NA			< 50		< 50			
2-Chloronaphthalene	ug/l	NA	NA	NA	NA			< 50		< 50			
2-Chlorophenol	ug/l	10	20000	10	7000			**< 50**		**< 50**			
2-Nitrophenol	ug/l	NA	NA	NA	NA			< 50		< 50			
3,3'-Dichlorobenzidine	ug/l	80	NA	80	2000			< 50		< 50			
4,6-Dinitro-2-methylphenol	ug/l	NA	NA	NA	NA			< 100		< 100			
4-Bromophenyl phenyl ether	ug/l	NA	NA	NA	NA			< 50		< 50			
4-Chloro-3-methylphenol	ug/l	NA	NA	NA	NA			< 50		< 50			
4-Chlorophenyl phenyl ether	ug/l	NA	NA	NA	NA			< 50		< 50			
4-Nitrophenol	ug/l	NA	NA	NA	NA			< 150		< 150			
Acenaphthene	ug/l	20	NA	20	6000			**< 50**		12J			
Acenaphthylene	ug/l	30	10000	30	40			15J		**36J**			
Anthracene	ug/l	60	NA	30	30			**< 50**		**< 50**			
Benzidine	ug/l	NA	NA	NA	NA			< 800		< 800			
Benzo[a]anthracene	ug/l	1	NA	1	1000			**< 50**		**< 50**			
Benzo[a]pyrene	ug/l	0.2	NA	0.2	500			**< 50**		**< 50**			
Benzo[b]fluoranthene	ug/l	1	NA	1	400			**< 50**		**< 50**			
Benzo[g,h,i]perylene	ug/l	50	NA	20	20			**< 50**		**< 50**			
Benzo[k]fluoranthene	ug/l	1	NA	1	100			**< 50**		**< 50**			
Bis(2-chloroethoxy)methane	ug/l	NA	NA	NA	NA			< 50		< 50			
Bis(2-chloroethyl)ether	ug/l	30	30	30	30			**< 50**		**< 50**			
Bis(2-ethylhexyl) phthalate	ug/l	6	NA	6	50000			**< 100**		**< 100**			
Butyl benzyl phthalate	ug/l	NA	NA	NA	NA			< 50		< 50			
Chrysene	ug/l	2	NA	2	70			**< 50**		**< 50**			
Dibenz(a,h)anthracene	ug/l	0.5	NA	0.5	40			**< 50**		**< 50**			
Diethyl phthalate	ug/l	2000	50000	2000	9000			< 50		< 50			
Dimethyl phthalate	ug/l	300	50000	300	50000			< 50		< 50			
Di-n-butyl phthalate	ug/l	NA	NA	NA	NA			< 50		< 50			
Di-n-octyl phthalate	ug/l	NA	NA	NA	NA			< 50		< 50			
Fluoranthene	ug/l	90	NA	90	200			< 50		< 50			
Fluorene	ug/l	30	NA	30	40			19J		**< 50**			
Hexachlorobenzene	ug/l	1	1	1	1			**< 50**		**< 50**			
Hexachlorobutadiene	ug/l	0.6	50	0.6	50			**< 50**		**< 50**			
Hexachlorocyclopentadiene	ug/l	NA	NA	NA	NA			< 100		< 100			
Hexachloroethane	ug/l	8	100	8	100			**< 50**		**< 50**			
Indeno[1,2,3-cd]pyrene	ug/l	0.5	NA	0.5	100			**< 50**		**< 50**			
Isophorone	ug/l	NA	NA	NA	NA			< 50		< 50			
Naphthalene	ug/l	140	700	140	700			**890**			**1800**		
Nitrobenzene	ug/l	NA	NA	NA	NA			< 50		< 50			
N-Nitrosodimethylamine	ug/l	NA	NA	NA	NA			< 100		< 100			
N-Nitrosodi-n-propylamine	ug/l	NA	NA	NA	NA			< 50		< 50			
N-Nitrosodiphenylamine	ug/l	NA	NA	NA	NA			< 50		< 50			
Pentachlorophenol	ug/l	1	NA	1	200			**< 100**		**< 100**			
Phenanthrene	ug/l	40	NA	40	10000			**42J**		**< 50**			
Phenol	ug/l	1000	50000	1000	2000			< 50		< 50			
Pyrene	ug/l	60	NA	20	20			**< 50**		**< 50**			
Metals by 200.7 Rev 4.4													
Arsenic	mg/l	0.01	NA	0.01	0.9			**0.020**		0.0094J			
Cadmium	mg/l	0.005	NA	0.004	0.004			< 0.0020		< 0.0020			
Chromium	mg/l	0.1	NA	0.1	0.3			0.012		0.039			
Copper	mg/l	NA	NA	NA	NA			0.014		0.041			
Lead	mg/l	0.015	NA	0.01	0.01			< 0.010		**0.019**			
Nickel	mg/l	0.1	NA	0.1	0.2			0.026		0.023			
Silver	mg/l	0.1	NA	0.007	0.007			< 0.0060		< 0.0060			
Zinc	mg/l	5	NA	0.9	0.9			0.13		0.17			

Table 2
Taunton I Groundwater Investigation Results

Metals by 245.1													
Mercury	mg/l	0.002	NA	0.002	0.02			< 0.00020		< 0.00020			
Metals by 6010C TCLP													
Arsenic	mg/l	0.01	NA	0.01	0.9	**0.015**	**0.011J**		**0.015**			0.0083J	**0.013J**
Barium	mg/l	2	NA	2	50	0.19J ^	0.25J ^		0.23J ^			0.35J ^	0.34J ^
Cadmium	mg/l	0.005	NA	0.004	0.004	< 0.0020	< 0.0020		0.00057J			0.00063J	0.0022
Chromium	mg/l	0.1	NA	0.1	0.3	< 0.020	< 0.020		0.011J			< 0.020	< 0.020
Lead	mg/l	0.015	NA	0.01	0.01	0.0078J	**0.014J**		**0.046**			**0.028**	**0.067**
Selenium	mg/l	0.05	NA	0.05	0.1	< 0.025	< 0.025		< 0.025			< 0.025	< 0.025
Silver	mg/l	0.1	NA	0.007	0.007	< 0.0060	< 0.0060		< 0.0060			< 0.0060	< 0.0060
Metals by 7470A TCLP													
Mercury	mg/l	0.002	NA	0.002	0.02	< 0.00020	< 0.00020		< 0.00020			< 0.00020	< 0.00020
Wet Chemistry by 1664B													
Oil & Grease	mg/l	NA	NA	NA	NA			3.2J		3.0J			
Total Petroleum Hydrocarbons (SGT-	mg/l	NA	NA	NA	NA			2.4J		2.1J			
Wet Chemistry by 335.4													
Cyanide, Total	mg/l	0.2	NA	0.03	0.03			**0.24**		**1.2**			
Wet Chemistry by SM 2540D													
Total Suspended Solids	mg/l	NA	NA	NA	NA			178		758			
Wet Chemistry by SM 4500 H+ B													
pH	su	NA	NA	NA	NA			5.2HF		5.5HF			
Temperature	degrees c	NA	NA	NA	NA			21.2HF		21.4HF			
Wet Chemistry by SM 5210B													
Biochemical Oxygen Demand	mg/l	NA	NA	NA	NA			< 60.0		7.4			

Notes:
degrees c - degrees c
mg/l - milligrams per liter
su - standard unit
ug/l - micrograms per liter
H b - Result Detected in the Unseeded Control blank (USB).
HF - Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
J ^ - ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC is outside acceptance limits.
U - Indicates the analyte was analyzed for but not detected.
GW1 - Concentrations based on the use of groundwater as drinking water, either currently or in the foreseeable future.
GW2 - Concentrations based on the potential for volatile material to migrate into indoor air.
GW3 - Concentrations based on the potential environmental effects resulting from contaminated groundwater discharging to surface water.
RC - Reportable Concentration
UCL - Upper Concentration Limits in groundwater and soil are promulgated to minimize potential risks associated with uncontrolled environmental contamination, and the costs associated with cumulative anthropogenic contributions to background.

TestAmerica's TotalAccess, is our online data management tool. Features include, a cross-tab view displaying each analyte
as a row across sample columns, an intuitive analyte trending tool, auto-fill search functions and exports data into Excel, while keeping its original format.
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More information @ http://www.mass.gov/eea/agencies/massdep/cleanup/regulations/massachusetts-contingency-plan.html

Table 3
Taunton I Monitoring Well MW-3 Sampling Results

					Sample ID	MW-3 (090420)	MW-3 (090420)_DL
					Sampled By		
					Sample Collection Date	09/04/2020 14:50	09/04/2020 14:50
					Laboratory Order Number	480-174776-1	480-174776-1_DL
Parameter	**Reporting Units**	**GW1**	**GW2**	**RCGW1**	**RCGW2**		
Volatiles by 624.1							
1,1,1-Trichloroethane	ug/l	200	4000	200	4000	< 200	
1,1,2,2-Tetrachloroethane	ug/l	2	9	2	9	**< 200**	
1,1,2-Trichloroethane	ug/l	5	900	5	900	**< 200**	
1,1-Dichloroethane	ug/l	70	2000	70	2000	**< 200**	
1,1-Dichloroethene	ug/l	7	80	7	80	**< 200**	
1,2-Dichlorobenzene	ug/l	600	8000	600	2000	< 200	
1,2-Dichloroethane	ug/l	5	5	5	5	**< 200**	
1,2-Dichloroethene, Total	ug/l	NA	NA	NA	NA	< 400	
1,2-Dichloropropane	ug/l	5	3	3	3	**< 200**	
1,3-Dichlorobenzene	ug/l	100	6000	100	6000	**< 200**	
1,4-Dichlorobenzene	ug/l	5	60	5	60	**< 200**	
2-Chloroethyl vinyl ether	ug/l	NA	NA	NA	NA	< 1000	
Acrolein	ug/l	NA	NA	NA	NA	< 4000	
Acrylonitrile	ug/l	NA	NA	NA	NA	< 2000	
Benzene	ug/l	5	1000	5	1000	**3800**	
Bromoform	ug/l	4	700	4	700	**< 200**	
Bromomethane	ug/l	10	7	7	7	**< 200**	
Carbon tetrachloride	ug/l	5	2	2	2	**< 200**	
Chlorobenzene	ug/l	100	200	100	200	**< 200**	
Chlorodibromomethane	ug/l	2	20	2	20	**< 200**	
Chloroethane	ug/l	NA	NA	NA	NA	< 200	
Chloroform	ug/l	70	50	50	50	**< 200**	
Chloromethane	ug/l	NA	NA	NA	NA	< 200	
cis-1,3-Dichloropropene	ug/l	NA	NA	NA	NA	< 200	
Dichlorobromomethane	ug/l	3	6	3	6	**< 200**	
Ethylbenzene	ug/l	700	20000	700	5000	**3200**	
Methylene Chloride	ug/l	5	2000	5	2000	**< 200**	
Tetrachloroethene	ug/l	5	50	5	50	**< 200**	
Toluene	ug/l	1000	50000	1000	40000	**2900F1**	
trans-1,2-Dichloroethene	ug/l	100	80	80	80	**< 200**	
trans-1,3-Dichloropropene	ug/l	NA	NA	NA	NA	< 200	
Trichloroethene	ug/l	5	5	5	5	**< 200**	
Vinyl chloride	ug/l	2	2	2	2	**< 200**	
Semivolatiles by 625.1							
1,2,4-Trichlorobenzene	ug/l	70	200	70	200	**< 190**	
1,2-Dichlorobenzene	ug/l	600	8000	600	2000	< 190	
1,2-Diphenylhydrazine	ug/l	NA	NA	NA	NA	< 190	
1,3-Dichlorobenzene	ug/l	100	6000	100	6000	**< 190**	
1,4-Dichlorobenzene	ug/l	5	60	5	60	**< 190**	
2,2'-oxybis[1-chloropropane]	ug/l	NA	NA	NA	NA	< 95	
2,4,6-Trichlorophenol	ug/l	10	5000	10	500	**< 95**	
2,4-Dichlorophenol	ug/l	10	30000	10	2000	**< 95**	
2,4-Dimethylphenol	ug/l	60	40000	60	40000	**< 95**	
2,4-Dinitrophenol	ug/l	200	50000	200	20000	< 190	
2,4-Dinitrotoluene	ug/l	30	20000	30	20000	**< 190**	
2,6-Dinitrotoluene	ug/l	NA	NA	NA	NA	< 95	
2-Chloronaphthalene	ug/l	NA	NA	NA	NA	< 95	
2-Chlorophenol	ug/l	10	20000	10	7000	**< 95**	
2-Nitrophenol	ug/l	NA	NA	NA	NA	< 95	
3,3'-Dichlorobenzidine	ug/l	80	NA	80	2000	**< 95**	
4,6-Dinitro-2-methylphenol	ug/l	NA	NA	NA	NA	< 190	
4-Bromophenyl phenyl ether	ug/l	NA	NA	NA	NA	< 95	
4-Chloro-3-methylphenol	ug/l	NA	NA	NA	NA	< 95	
4-Chlorophenyl phenyl ether	ug/l	NA	NA	NA	NA	< 95	
4-Nitrophenol	ug/l	NA	NA	NA	NA	< 290	
Acenaphthene	ug/l	20	NA	20	6000	**< 95**	
Acenaphthylene	ug/l	30	10000	30	40	29J	
Anthracene	ug/l	60	NA	30	30	**< 95**	
Benzidine	ug/l	NA	NA	NA	NA	< 1500	
Benzo[a]anthracene	ug/l	1	NA	1	1000	**< 95**	
Benzo[a]pyrene	ug/l	0.2	NA	0.2	500	**< 95**	
Benzo[b]fluoranthene	ug/l	1	NA	1	400	**< 95**	
Benzo[g,h,i]perylene	ug/l	50	NA	20	20	**< 95**	
Benzo[k]fluoranthene	ug/l	1	NA	1	100	**< 95**	
Bis(2-chloroethoxy)methane	ug/l	NA	NA	NA	NA	< 95	
Bis(2-chloroethyl)ether	ug/l	30	30	30	30	**< 95**	
Bis(2-ethylhexyl) phthalate	ug/l	6	NA	6	50000	**< 190**	
Butyl benzyl phthalate	ug/l	NA	NA	NA	NA	< 95	
Chrysene	ug/l	2	NA	2	70	**< 95**	
Dibenz(a,h)anthracene	ug/l	0.5	NA	0.5	40	**< 95**	
Diethyl phthalate	ug/l	2000	50000	2000	9000	< 95	
Dimethyl phthalate	ug/l	300	50000	300	50000	< 95	
Di-n-butyl phthalate	ug/l	NA	NA	NA	NA	< 95	
Di-n-octyl phthalate	ug/l	NA	NA	NA	NA	< 95	

Table 3
Taunton I Monitoring Well MW-3 Sampling Results

					Sample ID	MW-3 (090420)	MW-3 (090420)_DL
					Sampled By		
					Sample Collection Date	09/04/2020 14:50	09/04/2020 14:50
					Laboratory Order Number	480-174776-1	480-174776-1_DL
Parameter	**Reporting Units**	**GW1**	**GW2**	**RCGW1**	**RCGW2**		
Volatiles by 624.1							
Fluoranthene	ug/l	90	NA	90	200	**< 95**	
Fluorene	ug/l	30	NA	30	40	**< 95**	
Hexachlorobenzene	ug/l	1	1	1	1	**< 95**	
Hexachlorobutadiene	ug/l	0.6	50	0.6	50	**< 95**	
Hexachlorocyclopentadiene	ug/l	NA	NA	NA	NA	< 190	
Hexachloroethane	ug/l	8	100	8	100	**< 95**	
Indeno[1,2,3-cd]pyrene	ug/l	0.5	NA	0.5	100	**< 95**	
Isophorone	ug/l	NA	NA	NA	NA	< 95	
Naphthalene	ug/l	140	700	140	700		**4400**
Nitrobenzene	ug/l	NA	NA	NA	NA	< 95	
N-Nitrosodimethylamine	ug/l	NA	NA	NA	NA	< 190	
N-Nitrosodi-n-propylamine	ug/l	NA	NA	NA	NA	< 95	
N-Nitrosodiphenylamine	ug/l	NA	NA	NA	NA	< 95	
Pentachlorophenol	ug/l	1	NA	1	200	**< 190**	
Phenanthrene	ug/l	40	NA	40	10000	**< 95**	
Phenol	ug/l	1000	50000	1000	2000	< 95	
Pyrene	ug/l	60	NA	20	20	**< 95**	
Metals by 200.7 Rev 4.4							
Arsenic	mg/l	0.01	NA	0.01	0.9	**0.027**	
Cadmium	mg/l	0.005	NA	0.004	0.004	< 0.0020	
Chromium	mg/l	0.1	NA	0.1	0.3	0.0037J	
Copper	mg/l	NA	NA	NA	NA	< 0.010	
Lead	mg/l	0.015	NA	0.01	0.01	**0.017**	
Nickel	mg/l	0.1	NA	0.1	0.2	0.0043J	
Silver	mg/l	0.1	NA	0.007	0.007	0.0022J	
Zinc	mg/l	5	NA	0.9	0.9	0.020	
Metals by 245.1							
Mercury	mg/l	0.002	NA	0.002	0.02	< 0.00020	
Wet Chemistry by 1664B							
Oil & Grease	mg/l	NA	NA	NA	NA	3.2J	
Total Petroleum Hydrocarbons (SGT	mg/l	NA	NA	NA	NA	3.1J	
Wet Chemistry by 335.4							
Cyanide, Total	mg/l	0.2	NA	0.03	0.03	**0.23**	
Wet Chemistry by SM 2540D							
Total Suspended Solids	mg/l	NA	NA	NA	NA	72.0	
Wet Chemistry by SM 4500 H+ B							
pH	su	NA	NA	NA	NA	6.3HF	
Temperature	degrees c	NA	NA	NA	NA	15.9HF	
Wet Chemistry by SM 5210B							
Biochemical Oxygen Demand	mg/l	NA	NA	NA	NA	19.2*	

Notes:
degrees c - degrees c
mg/l - milligrams per liter
su - standard unit
ug/l - micrograms per liter
* - LCS or LCSD is outside acceptance limits.
F1 - MS and/or MSD recovery exceeds control limits.
HF - Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U - Indicates the analyte was analyzed for but not detected.
U *1 - LCS/LCSD RPD exceeds control limits.
GW1 - Concentrations based on the use of groundwater as drinking water, either currently or in the foreseeable future.
GW2 - Concentrations based on the potential for volatile material to migrate into indoor air.
GW3 - Concentrations based on the potential environmental effects resulting from contaminated groundwater discharging to surface water.
RC - Reportable Concentration

UCL - Upper Concentration Limits in groundwater and soil are promulgated to minimize potential risks associated with uncontrolled environmental contamination, and the costs associated with cumulative anthropogenic contributions to background.
TestAmerica's TotalAccess, is our online data management tool. Features include, a cross-tab view displaying each analyte
as a row across sample columns, an intuitive analyte trending tool, auto-fill search functions and exports data into Excel, while keeping its original format.

Other features include a redesign and simplification in selecting regulatory limits, Work Order and Results page layout redesign, and available data columns in the Results and Budgets pages.
The regulatory comparison tool allows users to compare their analytical data against a number of regulatory compound lists and associated limits.
This feature now encompasses over 786 regulatory lists from 34 States and the U.S. EPA, covering 91,529 individual analyte comparison limits.
The benefits of TotalAccess are offered free of charge to all TestAmerica clients, Clients can sign up for TotalAccess
on the TestAmerica home page at www.testamericainc.com.

More information @ http://www.mass.gov/eea/agencies/massdep/cleanup/regulations/massachusetts-contingency-plan.html

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Figures

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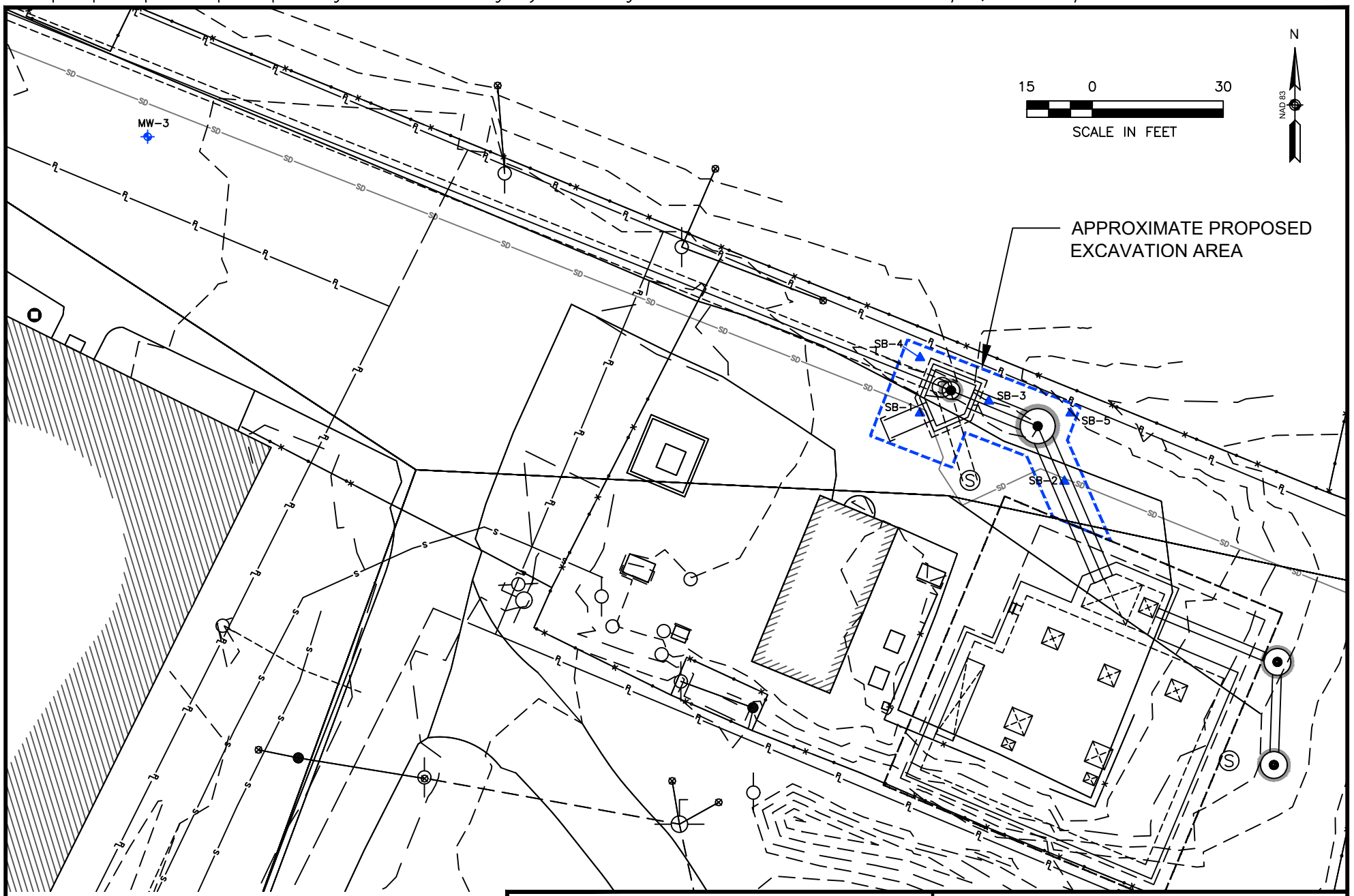
File: C:\Users\warrenr\Documents\Taunton\Soil Boring Locations 09-17-20.dwg Layout: Soil Boring Locations 08-28-20 User: WarrenR Plotted: Sep 25, 2020 - 1:42pm Xref's:



AECOM

TAUNTON MAIN LIFT STATION
TAUNTON, MA

INVESTIGATION LOCATIONS 08-28-2020

DATE: 09/21/20	DRWN: RCW			**FIGURE 1**

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Attachment A POTW Requirements

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VEOLIA
WATER

INDUSTRIAL USER PERMIT
TRANSMITTAL LETTER

RETURN OF DOCUMENT RECEIPT FORM IS REQUIRED

Mr. Chris Mulligan
Hart Engineering
800 Scenic View Drive
Cumberland, RI 02864

RE: Issuance of Significant Industrial User Permit to Hart Engineering
Permit No. 40-2019

Dear Mr. Chris Mulligan:

Your request for an industrial user pretreatment permit has been reviewed and processed in accordance with **Section 19.26** of the City of Taunton Sewer Use Ordinance.

The enclosed **Permit #40-2019** covers the discharge of treated groundwater from the excavation site for the new Main Lift Pumping Station at **690 West Water Street, Taunton, MA, 02780** into the City of Taunton sewer system. All discharges from the excavation site and actions and reports relating thereto shall be in accordance with the terms and conditions of this permit.

If you wish to appeal or challenge any conditions imposed in this permit, a petition shall be filed for modification or reissuance of this permit in accordance with the requirements of **Section 19.26.3** of the Sewer Use Ordinance, within 30 days of your receipt of this correspondence. Pursuant to **Section 19.26.3(A)** of the Sewer Use Ordinance, failure to petition for reconsideration of the permit within the allotted time is deemed a waiver by the permittee of his right to challenge the terms of this permit.

By: _____
Fred Cornaglia
DPW Commissioner

_____
Jonathan Mongie
Project Director

Issued this 22nd day of March, 2019

INDUSTRIAL USER PERMIT

In accordance with the provisions of **Section 19.23** of the Sewer Use Ordinance

Mr. Chris Mulligan
Hart Engineering
800 Scenic View Drive
Cumberland, RI 02864

is hereby authorized to discharge treated groundwater from the excavation site for the new Main Lift Pumping Station at 690 West Water Street, Taunton through the outfall identified herein into the City of Taunton sewer system in accordance with the conditions set forth in this permit. Compliance with this permit does not relieve the permittee of its obligation to comply with any or all applicable pretreatment regulations, standards or requirements under local, State, and Federal laws, including any such regulations, standards, requirements, or laws that may become effective during the term of this permit.

Noncompliance with any term or condition of this permit shall constitute a violation of the City of Taunton Sewer Use Ordinance.

This permit shall become effective on **March 22, 2019** and shall expire on midnight, **December 31, 2019**.

If the permittee wishes to continue to discharge after the expiration date of this permit, an application must be filed for a renewal permit in accordance with the requirements of **Section 19.25.6** of the Sewer Use Ordinance, a minimum of 90 days prior to the expiration date.

By: _____
Fred Cornaglia
DPW Commissioner

_____
Jonathan Mongie
Project Director

Issued this 22nd day of March, 2019

PART 1 - EFFLUENT LIMITATIONS

A. During the period of **March 27, 2019 to December 31, 2019**, the permittee is authorized to discharge treated groundwater from the excavation site at the Main Lift Pumping Station at 690 West Water Street in Taunton to the City of Taunton sewer system. Treated groundwater must be sampled from the outfall listed below.

Description of sampling outfall:

Outfall	Description
001	A sample port located after the effluent flow meter and prior to discharge to the sewer.

B. During the period of **March 27, 2019 to December 31, 2019,** the discharge from outfall 001 shall not exceed the following effluent limitations.

EFFLUENT LIMITATIONS

PARAMETER	DAILY MAXIMUM (mg/l)
TPH	5.0
Arsenic	1.21
Cadmium	0.098
Chromium	1.0
Copper	0.58
Cyanide	0.37
Lead	0.88
Mercury	0.0005
Nickel	1.0
Silver	0.041
Zinc	2.80
BOD	922
TSS	660
Oil & Grease	100
VOC	2.13
SVOC	2.13

C. A pH below 5.5 is prohibited. Where a continuous pH chart recorder is being used any occurrence of pH over 9.5 but under 10.5 for a period of thirty minutes or more per day is prohibited. Any occurrence of pH between 10.5 and 11.0 for more than 15 minutes per day is prohibited. Any pH occurrence over 11.0 is prohibited. If a continuous pH chart recorder is not being used, any occurrence of pH over 9.5 is prohibited.

D. All discharges shall comply with all other applicable laws, regulations, standards, and requirements contained in **Section 19.23** of the Sewer Use Ordinance and any applicable State and Federal pretreatment laws, regulations, standards, and requirements including any such laws, regulations, standards, or requirements that may become effective during the term of this permit.

PART 2 - MONITORING REQUIREMENTS

A. From the period of the effective date of the permit until **December 31, 2019**, the permittee shall monitor outfall **001** for the following parameters, at the indicated frequency:

Parameter	Sample Type	Sample Frequency	Reporting Frequency	Monitoring Location
Flow	Meter (1)	Continuous	Monthly	001
pH (2)	Meter	Continuous	Monthly	001
TPH	Grab	(4)	Monthly	001
Copper (3)	Grab	(4)	Monthly	001
Lead (3)	Grab	(4)	Monthly	001
VOC	Grab	(4)	Monthly	001
SVOC	Grab	(4)	Monthly	001

Notes:

1. Flow shall be measured from an effluent flow meter and reported as daily maximum, daily total and monthly average.

2. The pH shall be continuously monitored on site with an in-line pH meter. This pH meter shall be calibrated weekly. Calibrations must be recorded into a bound log book and be available for review during on-site inspections.

3. Metals shall be analyzed for total metals

4. These samples shall be collected within the first twenty-four hours of discharge and must meet the permit limitations to continue. Additional samples must be collected during each 24-hour period that a discharge is occurring during the first week of operation. If permit limits are met, weekly samples shall be collected for the first month of discharge, followed by monthly sampling thereafter.

B. All handling and preservation of collected samples and laboratory analyses of samples shall be performed in accordance with 40 CFR Part 136 and amendments thereto unless specified otherwise in the monitoring conditions of this permit.

C. Effluent sampling reported to the Control Authority must be analyzed by a Massachusetts DEP Certified Lab.

D. Although monitoring for all of the pollutants that are specified as local limits in the City of Taunton Sewer Use Ordinance is not requested at this time, compliance with all local limitations is required.

PART 3 - REPORTING REQUIREMENTS

A. Monitoring Reports

Monitoring results obtained shall be summarized and reported on an approved Self-Monitoring Report Form once per month. No later than the last day of each month, the

permittee shall provide to the City of Taunton the self-monitoring report for the previous month. For example, the self-monitoring report for the month of July is due by the last day of August. The report shall indicate the nature and concentration of all pollutants in the effluent for which sampling and analyses were performed during the reporting period calendar month, including required flow data. A completed chain of custody form shall be submitted with analytical data.

B. If the permittee monitors any pollutant more frequently than required by this permit, using test procedures prescribed in 40 CFR Part 136 or amendments thereto, or otherwise approved by EPA or as specified in this permit, the results of such monitoring shall be included in any calculations of actual daily maximum or monthly average pollutant discharge and results shall be reported in the monthly report submitted to the City of Taunton. Such increased monitoring frequency shall also be indicated in the monthly report.

C. Automatic Resampling

If the results of the permittee's wastewater analysis indicate that a violation of this permit has occurred, the permittee must:

1. **Inform the City of Taunton of the violation within 24 hours; and**

2. Repeat the sampling and pollutant analysis within 30 days of the violation and submit, in writing, the results of this second analysis within 30 days of the sample date. This sampling is in addition to and not in place of, self-monitoring requirements as written in this permit.

D. Accidental Discharge Report

1. The permittee shall notify the **City of Taunton** immediately upon the occurrence of an accidental discharge of substances prohibited by the Sewer Use Ordinance or any slug loads or spills that may enter the public sewer. The **City of Taunton Wastewater Treatment Plant** must be notified by telephone at **508-823-3582**. In the event of a potentially dangerous spill or slug to the sewer system, the City of Taunton Police Department shall be notified also. The notification shall include location of discharge, date and time thereof, type of waste, including concentration and volume, and corrective actions taken. The permittee's notification of accidental releases in accordance with this section does not relieve it of any expense, loss, damage, or other liability which may be incurred as a result of damage to the POTW, fish kills, or any other damage to person or property; or shall such notification relieve the permittee of any fines, civil penalties, or other liability which may be imposed by this section or other applicable law.

2. Within five days following an accidental discharge, the permittee shall submit to the City of Taunton a detailed written report. The report shall specify:

   a. Description and cause of the upset, slug load or accidental discharge, the cause thereof, and the impact on the permittee's compliance status. The description shall also include location of discharge, type, concentration and volume of waste.

   b. Duration of noncompliance, including exact dates and times of noncompliance

and, if the noncompliance is continuing, the time by which compliance is reasonably expected to occur.

c. All steps taken or to be taken to reduce, eliminate, and/or prevent recurrence of such an upset, slug load, accidental discharge, or other conditions of noncompliance.

E. All reports and notifications required by this permit to be submitted to the **City of Taunton** shall be sent to the following address:

Pretreatment Coordinator
Veolia Water North America
Taunton Wastewater Treatment Plant
825 West Water St.
Taunton, MA 02780 Telephone #: 508-823-3582

F. In accordance with title 40 of the code of Federal Regulations Part 403 Section 403.14, information and data provided by the permittee which identifies the nature and frequency of discharge shall be available to the public without restriction. Requests for confidential treatment of other information shall be governed by procedures specified in 40 CFR Part 2.

PART 4 - SPECIAL CONDITIONS

SECTION 1 – REOPENER CLAUSE

See Section A.4 in the standard conditions.

SECTION 2 – SEWER USER FEES

The monthly flow data will be forwarded to the City of Taunton, Department of Public Works, 90 Ingell St, Taunton, Attention: Katherine Nunes, for sewer billing purposes.

SECTION 3 – DISPOSAL OF WASTES

The recovered separate phase petroleum shall be removed by haulers and disposed of at an off-site facility that is licensed to manage such wastes. The name of the hauler and location of final disposal shall be provided to the Pretreatment Coordinator prior to the first discharge.

SECTION 4 – SLUG CONTROL PLAN

In accordance with 40 CFR 403.8 (f)(2)(v) the POTW must evaluate the need for a slug control plan at least one time. This will be done during the first site inspection.

STANDARD CONDITIONS

SECTION A. GENERAL CONDITIONS AND DEFINITIONS

1. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of

any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

2. Duty to Comply

The permittee must comply with all conditions of this permit. Failure to comply with the requirements of this permit may be grounds for administrative action, or enforcement proceedings including civil or criminal penalties, injunctive relief, and summary abatements.

3. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or correct any adverse impact to the public treatment plant or the environment resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

4. Permit Modification

This permit may be modified for good causes including, but not limited to, the following:

a) To incorporate any new or revised Federal, State, or local pretreatment standards or requirements

b) Material or substantial alterations or additions to the discharger's operation processes, or discharge volume or character which were not considered in drafting the effective permit

c) A change in any condition in either the industrial user or the POTW that requires either a temporary or permanent reduction or elimination of the authorized discharge

d) Information indicating that the permitted discharge poses a threat to the Control Authority's collection and treatment systems, POTW personnel or the receiving waters

e) Violation of any terms or conditions of the permit

f) Misrepresentation or failure to disclose fully all relevant facts in the permit application or in any required reporting

g) Revision of or a grant of variance from such categorical standards pursuant to 40 CFR 403.13; or

h) To correct typographical or other errors in the permit

i) To reflect transfer of the facility ownership and/or operation to a new owner/operator

j) Upon request of the permittee, provided such request does not create a violation of any applicable requirements, standards, laws, or rules and regulations.

The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

5. Permit Termination

This permit may be terminated for, but not limited to, the following reasons:

a) Falsifying self-monitoring reports
b) Tampering with monitoring equipment
c) Refusing to allow timely access to the facility premises and records
d) Failure to meet effluent limitations
e) Failure to pay fines
f) Failure to pay sewer charges
g) Failure to meet compliance schedules.

6. Permit Appeals

The permittee may petition to appeal the terms of this permit within thirty (30) days of the notice.

This petition must be in writing; failure to submit a petition for review shall be deemed to be a waiver of the appeal. In its petition, the permittee must indicate the permit provisions objected to, the reasons for this objection, and the alternative condition, if any, it seeks to be placed in the permit.

The effectiveness of this permit shall not be stayed pending reconsideration by the City. The City's decision not to reconsider a final permit shall be considered final administrative action for purposes of judicial review. The permittee seeking judicial review of the City's final action must do so by filing a complaint with the Taunton Superior Court within sixty (60) days of the City's' decision.

7. Property Rights

The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any violation of Federal, State, or local laws or regulations.

8. Limitation on Permit Transfer

Permits may be reassigned or transferred to a new owner and/or operator with prior approval of the Commissioner:

a) The permittee must give at least thirty (30) days advance notice to the Commissioner.

b) The notice must include a written certification by the new owner which:

(i) States that the new owner has no immediate intent to change the facility's operations and processes

(ii) Identifies the specific date on which the transfer is to occur

(iii) Acknowledges full responsibility for complying with the existing permit.

9. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must submit an application for a new permit at least 90 days before the expiration date of this permit unless other special conditions apply.

10. Continuation of Expired Permits

An expired permit will continue to be effective and enforceable until the permit is reissued if:

a) The permittee has submitted a complete permit application at least ninety (90) days prior to the expiration date of the user's existing permit.

b) The failure to reissue the permit, prior to expiration of the previous permit, is not due to any act or failure to act on the part of the permittee.

11. Dilution

The permittee shall not increase the use of potable or process water or, in any way, attempt to dilute an effluent as a partial or complete substitute for adequate treatment to achieve compliance with the limitations contained in this permit.

12. Definitions

a) Daily Maximum - The maximum allowable discharge of pollutant during a calendar day. Where daily maximum limitations are expressed in units of mass, the daily discharge is the total mass discharged over the course of the day. Where daily maximum limitations are expressed in terms of a concentration, the daily discharge is the arithmetic average measurement of the pollutant concentration derived from all measurements taken that day.

b) Composite Sample - A sample that is collected over time, formed either by continuous sampling or by mixing discrete samples. The sample shall be composited as a flow proportional composite sample: collected either as a constant sample volume at time intervals proportional to stream flow, or collected by varying the volume, based on stream flow, at constant time intervals. A time proportioned composite sample is collected at constant volumes at constant time intervals.

c) Grab Sample - An individual sample collected in less than 15 minutes, without regard for flow or time.

d) Instantaneous Maximum Concentration - The maximum concentration allowed in any single grab sample.

e) Cooling Water -

(1) Uncontaminated: Water used for cooling purposes only which has no direct contact with any raw material, intermediate, or final product and which does not contain a level of contaminants detectably higher than that of the intake water.

(2) Contaminated: Water used for cooling purposes only which may become

contaminated either through the use of water treatment chemicals used for corrosion inhibitors or biocides, or by direct contact with process materials and/or wastewater.

f) Monthly Average - The arithmetic mean of the values for effluent samples collected during a calendar month or specified 30 day period (as opposed to a rolling 30 day window).

g) Weekly Average - The arithmetic mean of the values for effluent samples collected over a period of seven consecutive days.

h) Bi-Weekly - Once every other week.

i) Bi-Monthly - Once every other month.

j) Upset - Means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee, excluding such factors as operational error, improperly designed or inadequate treatment facilities, or improper operation and maintenance or lack thereof.

k) Bypass - Means the intentional diversion of wastes from any portion of a treatment facility.

13. General Prohibitive Standards

The permittee shall comply with all the general prohibitive discharge standards in the Sewer Use Ordinance. Namely, the industrial user shall not discharge wastewater to the sewer system:

a) Having a temperature higher than 150 degrees F;

b) Containing more than 100 ppm by weight of fats, oils, and grease;

c) Containing any gasoline, benzene, naphtha, fuel oil or other flammable or explosive liquids, solids or gases; and in no case pollutants with a closed cup flashpoint of less than one hundred forty (140) degrees Fahrenheit (60 C), or pollutants which cause an exceedance of 10 percent of the Lower Explosive Limit (LEL) at any point within the POTW.

d) Containing any garbage that has not been ground by household type or other suitable garbage grinders;

e) Containing any ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, paunch, manure, or any other solids or viscous substances capable of causing obstructions or other interference with proper operation of the sewer system;

f) Having a pH lower than 5.5 or otherwise causing corrosive structural damage to the POTW or equipment. If a continuous pH chart recorder is being used, any occurrence of pH over 9.5 but under 10.5 for a period of thirty minutes or more per day is prohibited. Any occurrence of pH between 10.5 and 11.0 for than fifteen minutes per

day is prohibited. If a continuous pH chart recorder is not being used, any occurrence of pH over 9.5 is prohibited. Any pH occurrence over 11.0 is prohibited. At no time shall any discharge cause the pH of the influent at the POTW head works to go above 9.5.

g) Containing toxic or poisonous substances in sufficient quantity to injure or interfere with any wastewater treatment process, to constitute hazards to humans or animals, or to create any hazard in waters which receive treated effluent from the sewer system treatment plant. Toxic wastes shall include, but are not limited to wastes containing cyanide, chromium, cadmium, mercury, copper, and nickel ions;

h) Containing noxious or malodorous gases or substances capable of creating a public nuisance; including pollutants which result in the presence of toxic gases, vapors, or fumes;

i) Containing solids of such character and quantity that special and unusual attention is required for their handling;

j) Containing any substance which may affect the treatment plant's effluent and cause violation of the NPDES permit requirements;

k) Containing any substance which would cause the treatment plant to be in noncompliance with sludge use, recycle or disposal criteria pursuant to guidelines or regulations developed under section 405 of the Federal Act, the Solid Waste Disposal

Act, the Clean Air Act, the Toxic Substances Control Act or other regulations or criteria for sludge management and disposal as required by the State;

l) Containing color that is not removed in the treatment processes;

m) Containing any medical or infectious wastes;

n) Containing any radioactive wastes or isotopes; or

o) Containing any pollutant, including BOD pollutants, released at a flow rate and/or pollutant concentration that would cause interference with the treatment plant.

14. Compliance with Applicable Pretreatment Standards and Requirements

Compliance with this permit does not relieve the permittee from its obligations regarding compliance with any and all applicable local, State and Federal pretreatment standards and requirements including any such standards or requirements that may become effective during the term of this permit.

SECTION B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes but is not

limited to: effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process back-up controls, including appropriate quality assurance procedures. This provision requires the operation of or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

2. Duty to Halt or Reduce Activity

Upon reduction of efficiency of operation, or loss or failure of all or part of the treatment facility, the permittee shall, to the extent necessary to maintain compliance with its permit, control its production or discharges (or both) until operation of the treatment facility is restored or an alternative method of treatment is provided. This requirement applies, for example, when the primary source of power of the treatment facility fails or is reduced. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

3. Bypass of Treatment Facilities

a) Bypass is prohibited.

b) The permittee may allow bypass to occur only with the authority and permission of the City.

c) Notification of bypass:

(1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior written notice, at least ten days before the date of the bypass, to the City of Taunton.

(2) Unauthorized bypass. The permittee shall immediately notify the City of Taunton Wastewater Treatment Plant and submit a written notice to the POTW within 5 days. This report shall specify:

(i) A description of the bypass, and its cause, including its duration;

(ii) Whether the bypass has been corrected; and

(iii) The steps being taken or to be taken to reduce, eliminate and prevent a reoccurrence of the bypass.

4. Removed Substances

All solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in accordance with applicable federal and state laws and regulations including but not limited to, the State and Federal Acts, the Massachusetts Hazardous Waste Management Act, M.G.L. c. 21C, and the Federal Resource Conservation and Recovery Act, 42 U.S.C. s. 6901 et. seq. 310 CMR 19.00 and 30.00 and other applicable regulations.

SECTION C. MONITORING AND RECORDS

1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring points specified in

this permit and, unless otherwise specified, before the effluent joins or is diluted by any other wastestream, body of water or substance. All equipment used for sampling and analysis must be routinely calibrated, inspected and maintained to ensure their accuracy. Monitoring points shall not be changed without notification to and the approval of the City of Taunton.

2. Flow Measurements

Flow measurement is required by this permit. The appropriate flow measurement devices and methods consistent with approved scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated, and maintained to ensure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than 10 percent from true discharge rates throughout the range of expected discharge volumes. At a minimum, meters must be calibrated and certified semi-annually.

3. Analytical Methods to Demonstrate Continued Compliance

All sampling and analysis required by this permit shall be performed in accordance with the techniques prescribed in 40 CFR Part 136 and amendments thereto, otherwise approved by EPA, or as specified in this permit.

4. Additional Monitoring by the Permittee

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures identified in Section C.3, the results of this monitoring shall be included in the permittee's self-monitoring reports.

5. Inspection and Entry

The permittee shall allow the City of Taunton, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

a) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit;

d) Sample or monitor, for the purposes of assuring permit compliance, any substances or parameters at any location; and

e) Inspect any production, manufacturing, fabricating, or storage area where pollutants, regulated under the permit, could originate, be stored, or be discharged to the sewer system.

6. Retention of Records

a) The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application.

This period may be extended by request of the City of Taunton at any time.

b) All records that pertain to matters that are the subject of special orders or any other enforcement or litigation activities brought by the City of Taunton shall be retained and preserved by the permittee until all enforcement activities have concluded and all periods of limitation with respect to any and all appeals have expired.

7. Record Contents

Records of sampling and analyses shall include:

a) The date, exact place, time, and methods of sampling or measurements, and sample preservation techniques or procedures;

b) Who performed the sampling or measurements;

c) The date(s) analyses were performed;

d) Who performed the analyses;

e) The analytical techniques or methods used; and

f) The results of such analyses.

8. Falsifying Information

Knowingly making any false statement on any report or other document required by this permit or knowingly rendering any monitoring device or method inaccurate is a crime and may result in the imposition of criminal sanctions and/or civil penalties.

SECTION D. ADDITIONAL REPORTING REQUIREMENTS

1. Planned Changes

The permittee shall give notice to the City of Taunton, 90 days prior to any facility expansion, production increase, or process modification that result in new or substantially increased discharges or a change in the nature of the discharge.

2. Anticipated Noncompliance

The permittee shall give advance notice to the City of Taunton of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

3. Automatic Resampling

If the results of the permittee's wastewater analysis indicate that a violation has occurred, the permittee must notify the City of Taunton within 24 hours of becoming aware of the violation and repeat the sampling and pollutant analysis and submit, in writing, the results of this repeat analysis within 30 days after becoming aware of the violation.

4. Duty to Provide Information

The permittee shall furnish to the City of Taunton, within three (3) days any information which the City of Taunton may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also, upon request, furnish to the City of Taunton within three (3) days, copies of any records required to be kept by this permit.

5. Signatory Requirements

All applications, reports, or information submitted to the City of Taunton must contain the following certification statement and be signed as required in Sections (a), (b), (c) or (d) below:

> "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

a) By a responsible corporate officer, if the Industrial User submitting the reports is a corporation. For the purpose of this paragraph, a responsible corporate officer means:

   (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or;
   (ii) the manager of one or more manufacturing, production, or operation facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

b) By a general partner or proprietor if the Industrial User submitting the reports is a partnership or sole proprietorship respectively.

c) The principal executive officer or director having responsibility for the overall operation of the discharging facility if the Industrial User submitting the reports is a Federal, State, or local governmental entity, or their agents.

d) By a duly authorized representative of the individual designated in paragraph (a), (b), or (c) of this section if:

(i) the authorization is made in writing by the individual described in paragraph (a), (b), or (c);

(ii) the authorization specifies either an individual or a position having responsibility for the overall operation of the facility from which the Industrial Discharge originates, such as the position of plant manager, operator of a well, or a well field superintendent, or a position of equivalent responsibility, or having overall responsibility for the pretreatment program for the company; and

(iii) the written authorization is submitted to the City.

e) If an authorization under paragraph (d) of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, or overall responsibility for the pretreatment program for the company, a new authorization satisfying the requirements of paragraph (d) of this section must be submitted to the City prior to or together with any reports to be signed by an authorized representative.

6. Operating Upsets

Any permittee that experiences an upset in operations that places the permittee in a temporary state of noncompliance with the provisions of either this permit or with the Sewer Use Ordinance shall inform the City of Taunton Wastewater Treatment Plant immediately of becoming aware of the upset at 508-823-3582.

A written follow-up report of the upset shall be filed by the permittee with the City of Taunton within five days. The report shall specify:

a) Description of the upset, the cause(s) thereof and the upset's impact on the permittee's compliance status;

b) Duration of noncompliance, including exact dates and times of noncompliance, and if not corrected, the anticipated time the noncompliance is expected to continue; and

c) All steps taken or to be taken to reduce, eliminate and prevent recurrence of such an upset.

7. Annual Publication

A list of all industrial users which were in Significant Noncompliance during the twelve (12) previous months shall be annually published by the City of Taunton in any newspaper of general circulation within the jurisdiction that provides meaningful public notice within the jurisdiction served by the POTW as cited in Federal Regulation 40 CFR 403.8(f)(2)(viii). Accordingly, the permittee is apprised that noncompliance with this permit may lead to an enforcement action and may result in publication of its name in an appropriate newspaper in accordance with this section.

8. Civil and Criminal Liability

Nothing in this permit shall be construed to relieve the permittee from civil and/or criminal penalties for noncompliance under Section 19.32 of the Sewer Use Ordinance or State or Federal laws or regulations.

9. Penalties for Violations of Permit Conditions

State Law provides that any person who violates a permit condition may be subject to a civil penalty of at least five thousand (5000) dollars per day per violation. Any person who willfully or negligently violates permit conditions is subject to criminal penalties of a fine of up to five thousand (5000) per day of violation, or by imprisonment, or both. The permittee may also be subject to other sanctions under State and/or Federal law.

10. Recovery of Costs Incurred

In addition to civil and criminal liability, the permittee violating any of the provisions of this permit or Sewer Use Ordinance or causing damage to or otherwise inhibiting the City of Taunton wastewater disposal system shall be liable to the City of Taunton for any expense, loss, or damage caused by such violation or discharge. The City of Taunton shall bill the permittee for the costs incurred by the City of Taunton for any cleaning, repair, or replacement work caused by the violation or discharge. Refusal to pay the assessed costs may subject the permittee to Judicial Enforcement and Civil Penalties.

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Attachment B -Boring Logs

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AECOM
250 Apollo Drive, Chelmsford MA 01824
(978) 905-2100 - office

SB-1

Project Name: Bay State Gas - Taunton MA	**Drilling Company: Drilex**	**Surface Comp: Flush ☐ Stick Up ☐ Height: 2'**
Project Number: 60238965	**Drilling Method: Direct Push Technology**	**Bentonite (bgs): NA**
Date Started Drilling: 8/28/2020	**Rig Type: Geoprobe, 6620DT**	**Pre Pack Filter Pack (bgs): NA**
Date Finished Drilling: 8/28/2020	**Date Pre-Cleared: 8/28/2020**	**Riser (bgs):**
Location: 740 W Water Street, Taunton	**Water Level While Drilling (bgs): 11'**	**Well Scrn: Depth (bgs):**
Logged By: C. Callahan	**Total Depth of Boring (bgs): 20'**	***No well installed.***

(Note: bgs = below ground surface)

Depth Range (feet)	Soft Dig Depth	Recovery (in/in)	PID Depth (feet)	10.6 PID (ppm)	
0-5	0-5	-	4	0.6	SILT and SAND (FILL): medium brown, silty SAND with some gravel, loose, topsoil, no odors.
5-10	-	15/60	5-6 6-7 7-10	0.0 0.0 0.0	SILT and SAND (FILL): medium brown, silty SAND with some gravel, loose, topsoil, no odors Asphalt Silt and SAND: medium brown silty SAND with some gravel, loose, iron modeling, no odors
10-15	-	10/60	10-13 13-15	0.3 0.3	SAND and GRAVEL: medium grey/brown, silty SAND, some GRAVEL, loose, slight odors SAA w/ 50% gravel, slight black staining
15-20	-	-	-	-	No recovery.

End of boring at 20'
No Refusal Encountered

Sample Collected	**Comments:**
SB-1 (13-15)_082820	NR = No Recovery ND = Non Detect NA = Not Applicable due to Hand Clearing NM = Not Measured Fill = brick/ceramic/coal/ash/wood fragments SAA = Same As Above F = Fine, M = Medium, C = Coarse, S = Sand

AECOM
250 Apollo Drive, Chelmsford MA 01824
(978) 905-2100 - office

SB-2

Project Name: Bay State Gas - Taunton MA	**Drilling Company: Drilex**	**Surface Comp: Flush ☐ Stick Up ☐ Height: 2'**
Project Number: 60238965	**Drilling Method: Direct Push Technology**	**Bentonite (bgs): NA**
Date Started Drilling: 8/28/2020	**Rig Type: Geoprobe**	**Pre Pack Filter Pack (bgs): NA**
Date Finished Drilling: 8/28/2020	**Date Pre-Cleared: 8/28/2020**	**Riser (bgs):**
Location: 740 W Water Street, Taunton	**Water Level While Drilling (bgs): 8'**	**Well Scrn: Depth (bgs):**
Logged By: C. Callahan	**Total Depth of Boring (bgs): 15'**	***No well installed.***

(Note: bgs = below ground surface)

Depth Range (feet)	Soft Dig Depth	Recovery (in/in)	PID Depth (feet)	10.6 PID (ppm)	
0-5	0-5	-	4-5'	0.0	SAND and GRAVEL: brown, medium to fine SAND and GRAVEL throughout, no odor, dry, FILL.
5-10	-	38/60	5-8' 8-10'	0.3 13.2	SAA 1/2" black stained lense, drain-pipe-like lense, followed by grey/black stained, medium to coarse SAND, medium odors, wet.
10-15	-	0/60	-	-	No recovery.

End of boring at 15' bgs, hole collapsed at 15' bgs
No Refusal Encountered (See SB-2B)

Sample Collected	**Comments:**
No sample.	NR = No Recovery ND = Non Detect NA = Not Applicable due to Hand Clearing NM = Not Measured Fill = brick/ceramic/coal/ash/wood fragments SAA = Same As Above F = Fine, M = Medium, C = Coarse, S = Sand

AECOM

SB-2B

250 Apollo Drive, Chelmsford MA 01824
(978) 905-2100 - office

Project Name: Bay State Gas - Taunton MA	**Drilling Company: Drilex**	**Surface Comp: Flush ☐ Stick Up ☐ Height: 2'**
Project Number: 60238965	**Drilling Method: Direct Push Technology**	**Bentonite (bgs): NA**
Date Started Drilling: 8/28/2020	**Rig Type: Geoprobe**	**Pre Pack Filter Pack (bgs): NA**
Date Finished Drilling: 8/28/2020	**Date Pre-Cleared: 8/28/2020**	**Riser (bgs):**
Location: 740 W Water Street, Taunton	**Water Level While Drilling (bgs): N/A**	**Well Scrn: Depth (bgs):**
Logged By: C. Callahan	**Total Depth of Boring (bgs): 15'**	***No well installed.***

(Note: bgs = below ground surface)

Depth Range (feet)	Soft Dig Depth	Recovery (in/in)	PID Depth (feet)	10.6 PID (ppm)	
0-5	-	-	-	-	Not Sampled
5-10	-	-	-	-	Not Sampled
10-15	-	34/60	10-12 12-14 14-15	13.2 1.4 0.6	SAND: grey/black stained, medium to coarse SAND, moderate odors, wet SAND and SILT: grey, medium to coarse SAND, some SILT, trace odors, loose SILTY SAND: grey, fine SAND and SILT, medium tightness, no odors

End of boring at 15' bgs, hole collapsed at 15' bgs

Sample Collected	**Comments:**
SB-2B (9-11) _082820	NR = No Recovery ND = Non Detect NA = Not Applicable due to Hand Clearing NM = Not Measured Fill = brick/ceramic/coal/ash/wood fragments SAA = Same As Above F = Fine, M = Medium, C = Coarse, S = Sand

AECOM
250 Apollo Drive, Chelmsford MA 01824
(978) 905-2100 - office

SB-3

Project Name: Bay State Gas - Taunton MA	**Drilling Company: Drilex**	**Surface Comp: Flush ☐ Stick Up ☐ Height: 2'**
Project Number: 60238965	**Drilling Method: Direct Push Technology**	**Bentonite (bgs): NA**
Date Started Drilling: 8/28/2020	**Rig Type: Geoprobe**	**Pre Pack Filter Pack (bgs): NA**
Date Finished Drilling: 8/28/2020	**Date Pre-Cleared: 8/28/2020**	**Riser (bgs):**
Location: 740 W Water Street, Taunton	**Water Level While Drilling (bgs): 16'**	**Well Scrn: Depth (bgs):**
Logged By: M. Carvalho	**Total Depth of Boring (bgs): 20'**	***No well installed.***

(Note: bgs = below ground surface)

Depth Range (feet)	Soft Dig Depth	Recovery (in/in)	PID Depth (feet)	10.6 PID (ppm)	
0-5	0-5	-	4-5	0.1	TOPSOIL/LOAM: medium brown, silty fine SAND with little GRAVEL, loose
5-10	-	44/60	5-6 7-8 8-9	0.0 0.3 0.0	SAND and SILT: red/brown silty fine SAND, with little gravel SAND and ORGANICS: grey/brown, fine silty SAND, orange streaking with 1" of black decomposed organics WOOD and GRAVEL: brown WOOD and trace GRAVEL
10-15	-	14/60	10-11	0.6	SAND and SILT: light brown fine SAND with some SILT and trace GRAVEL, black MGP material and odor at 11 ft bgs
15-20	-	43/60	115-16.5 16.5-18	0.6	SAND and SILT: black/coal tar like material, fine silty SAND with orange streaking at 16.5 ft bgs SILT: grey/brown SILT, dense

End of boring at 20' bgs, hole collapsed at 20' bgs
No Refusal Encountered

Sample Collected
SB-3(15-17)_082820

Comments:

NR = No Recovery
ND = Non Detect
NA = Not Applicable due to Hand Clearing
NM = Not Measured
Fill = brick/ceramic/coal/ash/wood fragments
SAA = Same As Above
F = Fine, M = Medium, C = Coarse, S = Sand

AECOM
250 Apollo Drive, Chelmsford MA 01824
(978) 905-2100 - office

SB-4

Project Name: Bay State Gas - Taunton MA	**Drilling Company: Drilex**	**Surface Comp: Flush ☐ Stick Up ☐ Height: 2'**
Project Number: 60238965	**Drilling Method: Direct Push Technology**	**Bentonite (bgs): NA**
Date Started Drilling: 8/28/2020	**Rig Type: Geoprobe**	**Pre Pack Filter Pack (bgs): NA**
Date Finished Drilling: 8/28/2020	**Date Pre-Cleared: 8/28/2020**	**Riser (bgs):**
Location: 740 W Water Street, Taunton	**Water Level While Drilling (bgs): 16'**	**Well Scrn: Depth (bgs): 18.5'**
Logged By: M. Carvalho	**Total Depth of Boring (bgs): 20'**	***Temporary well installed***

(Note: bgs = below ground surface)

Depth Range (feet)	Soft Dig Depth	Recovery (in/in)	PID Depth (feet)	10.6 PID (ppm)	
0-5	0-5	-	4-5	0.2	SAND and SILT (FILL): brown, topsoil, fine to medium SAND with some SILT and trace GRAVEL
5-10	-	50/60	5-5.5 5.5-9	0.4 0.0	SAND, SILT and WOOD: light brown fine SAND with trace SILT strip of tree/wood ORGANICS and SAND: dark brown organics, fine to medium silty SAND
10-15	-	37/60	10-11 11-13	0.2	SAND and SILT: light brown fine SAND with little SILT, trace GRAVEL WOOD and SAND: shard of wood/tree and dark brown silty fine SAND with MGP odor
15-20	-	29/60	15-16 16-17 17-17.5	2.0 0.0 0.0	SAND and SILT: medium brown, fine silty SAND GRAVEL and ROCK: grey, crushed gravel and rock fragments observe SILT and WOOD: black MGP material with wood/tree shards, wet, oily, fine SILT

End of boring at 20' bgs, hole collapsed at 20' bgs
No Refusal Encountered

Sample Collected	**Comments:**
SB-4 (18-20) 082820, GW SB-4_082820	NR = No Recovery ND = Non Detect NA = Not Applicable due to Hand Clearing NM = Not Measured Fill = brick/ceramic/coal/ash/wood fragments SAA = Same As Above F = Fine, M = Medium, C = Coarse, S = Sand

AECOM
250 Apollo Drive, Chelmsford MA 01824
(978) 905-2100 - office

SB-5

Project Name: Bay State Gas - Taunton MA	**Drilling Company: Drilex**	**Surface Comp: Flush ☐ Stick Up ☐ Height: 2'**
Project Number: 60238965	**Drilling Method: Direct Push Technology**	**Bentonite (bgs): NA**
Date Started Drilling: 8/28/2020	**Rig Type: Geoprobe**	**Pre Pack Filter Pack (bgs): NA**
Date Finished Drilling: 8/28/2020	**Date Pre-Cleared: 8/28/2020**	**Riser (bgs):**
Location: 740 W Water Street, Taunton	**Water Level While Drilling (bgs): 2'**	**Well Scrn: Depth (bgs): 10'**
Logged By: C. Callahan	**Total Depth of Boring (bgs): 15'**	***Temporary well installed***

(Note: bgs = below ground surface)

Depth Range (feet)	Soft Dig Depth	Recovery (in/in)	PID Depth (feet)	10.6 PID (ppm)	
0-5	0-5	-	4-5	31.7	SILT and SAND: grey with black staining, SILT with trace fine SAND, some GRAVEL, moderate MGP odors, wet.
5-10	-	25/60	5-6 6-8 8-10	57.5 13.3 2.1	SAND and SILT: grey with black stained coarse SAND and SILT, moderate MGP-like odors, wet SAND: brown/red coarse to medium SAND, trace GRAVEL, slight MGP-like odors SAND and SILT:tan fine SAND and SILT, slight MGP-like odors, wet
10-15	-	34/60	10-15	4.6	3" SAA, transitions to grey fine SAND and SILT, loose, slight MGP-like odoers, wet.

End of boring at 15' bgs, hole collapsed
No Refusal Encountered

Sample Collected
SB-5(4-6)_082820, GW SB-5_082820

Comments:

NR = No Recovery
ND = Non Detect
NA = Not Applicable due to Hand Clearing
NM = Not Measured
Fill = brick/ceramic/coal/ash/wood fragments
SAA = Same As Above
F = Fine, M = Medium, C = Coarse, S = Sand