64 South Street
Auburn, NY 13021
Phone: 315-253-7301
Fax: 315-253-7306
E-mail: bda@beardsley.com
www.beardsley.com

ADDENDA #1

January 25, 2023

PROJECT:	**Redevelopment of Onoville Marina Park** **Phase 1 Site Improvements** **704 West Perimeter Road, Frewsburg, NY** *BEARDSLEY PROJECT NUMBER – 22034.001*
ARCHITECT:	**BEARDSLEY ARCHITECTS + ENGINEERS** **64 South Street** **Auburn, NY 13021**
OWNER:	**County of Cattaraugus** **Department of Economic Development, Planning and Tourism** **303 Court Street, Little Valley, NY 14755**

The following **clarifications and revisions** to the DRAWINGS AND SPECIFICATIONS shall be considered to be a part of the contract documents herewith:

A.) REVISIONS

ITEM No. 1 SEPARATE PRIME CONTRACTS

The project documents are revised to be bid and constructed as three (3) separate prime contracts. Bid EDPT #2 for General Construction, EDPT #3 for Electrical Construction, and EDPT #4 for Plumbing Construction as outlined below. Please note that the project does not include any Mechanical/HVAC construction scope.

The total project scope illustrated in the bid documents shall be separated as follows, refer to the accompanying Specification Section 01 12 00 (Multiple Contacts Summary), which replaces the original section 01 10 00 (Summary of Work) in its entirety.

Electrical Contract Scope:
Includes all work related to electrical improvements generally including any electrical demolition, excavation and backfill, conduits/raceways, conductors, grounding, electrical equipment, connections (including to sanitary pump station controls installed by the GC), electrical inspections, and all related requirements. Work under the Electrical Contract is illustrated throughout the contract drawing sets as well as specification Divisions 0&1, Division 26, and Section 31 20 00.

Plumbing Contract Scope:
Includes work related to all domestic water system improvements (up to and including the connections to the existing distribution systems) and sanitary sewer improvements within 5’ of the exterior face of concrete foundations for future pre-fabricated structures. Provide a sanitary cleanout at each building at +/- 5’ from the face of foundation under the Plumbing Contract – piping from the cleanout downstream/away from the foundations shall be by the General Contractor. Work under the Plumbing Contract is illustrated throughout the contract drawing

sets as well as specification Divisions 0&1, Section 22 11 13 and Section 22 13 13 (as applicable within 5' of foundations), and Section 31 20 00.

General Contract Scope:
Includes all work not within the Electrical or Plumbing Contracts including but not limited to demolition, grading and drainage improvements, earth moving, concrete, gravel, and asphalt pavements, concrete foundations, the site sanitary sewer system (including pump station and controls – electrical connections to controls is by the electrical contractor) other site improvements, landscaping, and restoration. Work under the General Contract is illustrated throughout the contract drawing sets as well as specification Divisions 0&1, Division 3, Sections 22 13 13 (as applicable 5'+ beyond the face of foundation), 22 13 29, 22 13 53, and Divisions 31-34 in their entirety.

Alternate #1 is included entirely within the General Contract except for electrical connections to the associated alarm controls, similar to the pump station components in the base bid.

Additional bid forms are provided accompanying this Addendum for General, Electrical and Plumbing Contracts respectively. All bidders for all contracts shall provide the required forms and attachments as outlined in the original solicitation. Each prime bid must be submitted in a separate envelope and clearly labeled for the respective contract.

Item No 2. Project Estimate

For informational purposes only, the approximate project estimate values for each contract are as outlined below:

- General Contract: +/- $800,000
- Electrical Contract: +/- $110,000
- Plumbing Contract: +/- $15,000

Item No 3. Geotechnical Report

Specification Section 003100 references a project geotechnical report – that report is now available and provided accompanying this Addendum.

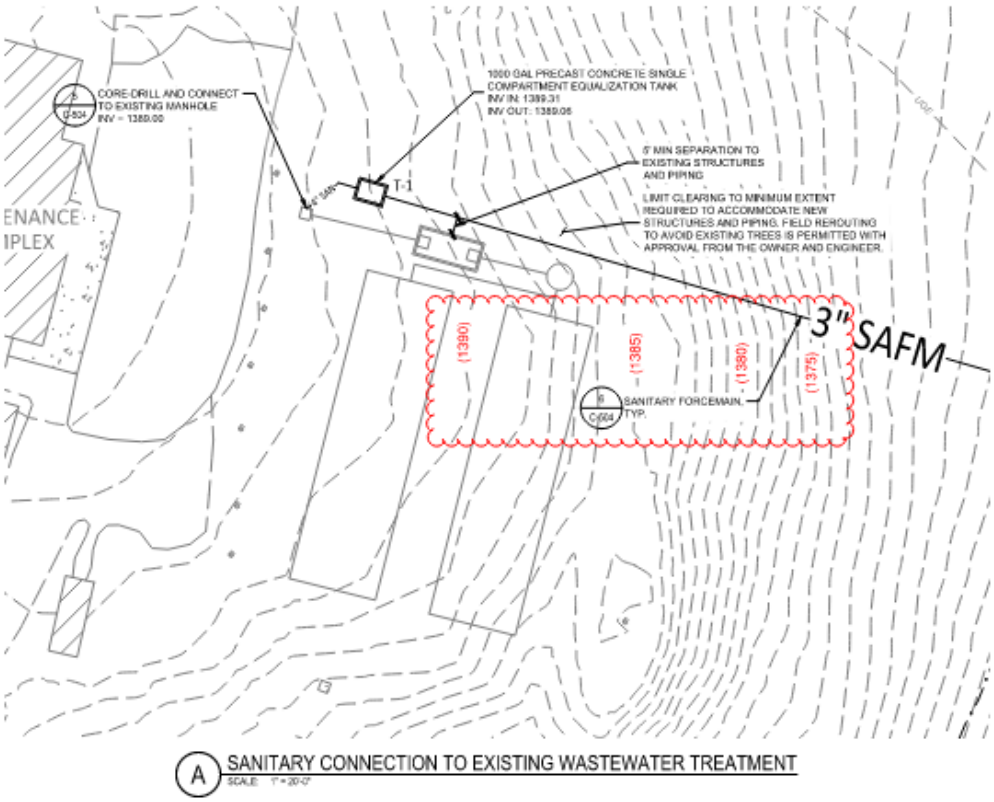
Item No 4. Sanitary Sewer Revisions

Plan B/C-405 depicts an 8" sewer lateral from the East Comfort Station to Sanitary Manhole MH-E3. Likewise B/C-404 depicts an 8" sewer lateral form the West Comfort Station to Sanitary Mahole MH-W4, These segments are revised to be a 4" diameter PVC instead of 8".

Detail 1/C505 depicts the sanitary pump station and valve chamber. To clarify, force main piping from the pump outlets to the point where they connect in the valve chamber shall be 2.5" diameter. The single force main pipe existing the valve chamber shall be 3" diameter.

Item No 5. Detail A/C-406

Enlarged plan did not include labels on the associated contours – see notations below.



Item No 6. Bid Date Extension

Bid Submission shall now be due on Monday, February 13, 2023 at the same time and location as indicated in the Instructions to Bidders.

Final Requests for Information shall be by 3pm on Thursday, February 9, 2023.

END

BID FORM
EDPT #2 - GENERAL CONTRACT

To: John Searles
Cattaraugus County
303 Court Street
Little Valley, New York 14755

In compliance with your Advertisement for Bids, the undersigned:

_____
(Name of firm, partnership or Corporation)

hereby proposes to furnish all supervision, labor, materials, plan, tools, equipment, transportation, overhead and profit, and other facilities related to, proper, for or incidental to the project at the **Redevelopment of Onoville Marina Park – Phase 1 Site Improvements**, in strict accordance with the Project Manual dated January 6, 2023 and the Drawings mentioned therein, and including any subsequently issued addenda for consideration of the following Lump Sum amount:

TOTAL LUMP SUM BASE BID AMOUNT:

DOLLARS: ($_____)

WORDS: _____

ALTERNATES:
Alternate #1: _Deduct Site Sanitary Sewer System and Provide Holding Tanks. See Section 01 23 00 for additional information.

AMOUNT TO BE DEDUCTED FROM THE BASE BID IF ALTERNATE #1 IS ACCEPTED

DOLLARS: ($_____)

WORDS: _____

PROPOSED EQUIVALENTS

The Contractor has included in the Base Bid the following kinds, types, brands, or manufacturers of materials in lieu of those named in the specifications. The Contractor understands that he includes these proposed equivalent items in the Base Bid at his own risk, as they are subject to the approval for the Architect. The Contractor certifies that the following constitute the extent of proposed equivalent items included in the Base Bid are those named in the specifications.

ITEM	SPECIFICATION SECTION & PARAGRAPH(S)	PROPOSED EQUIVALENT

ATTACH ADDITIONAL PROPOSED EQUIVALENT ITEMS TO BID FORM.

The Bidder agrees that this Proposal shall be good and may not be withdrawn for a period of forty-five (45) calendar days from the date of Bid opening. Furthermore, the undersigned will, within ten (10) days of written notice of acceptance of this bid, execute a contract in the form specified and submit specified Performance and Payment Bonds.

The Bidder understands that the Owner specifically reserves the right to reject any and all Bids and to waive any informality therein.

The undersigned agrees to complete the work in accordance with the time period specified in the Supplementary Instructions to Bidders.

Addendum Receipt: The receipt of the following addenda to the Specifications is acknowledged:

Addendum No. _____ Date_____	Addendum No. _____ Date_____
Addendum No. _____ Date_____	Addendum No. _____ Date_____
Addendum No. _____ Date_____	Addendum No. _____ Date_____

Submittals as required by the Instructions/Supplementary Instructions to Bidders, shall be completed and delivered to the Architect, by the tow (2) low bidders, with three (3) working days after the Bid opening.

Dated_____, 20___

_____
Legal name of person, partnership or corporation

(Sign Bid Here) By: _____
Name and Title

Legal Business Address: _____
Street

_____
City and State

_____
Phone Number

BID FORM
EDPT #3 - ELECTRICAL CONTRACT

To: John Searles
Cattaraugus County
303 Court Street
Little Valley, New York 14755

In compliance with your Advertisement for Bids, the undersigned:

_____
(Name of firm, partnership or Corporation)

hereby proposes to furnish all supervision, labor, materials, plan, tools, equipment, transportation, overhead and profit, and other facilities related to, proper, for or incidental to the project at the **Redevelopment of Onoville Marina Park – Phase 1 Site Improvements**, in strict accordance with the Project Manual dated January 6, 2023 and the Drawings mentioned therein, and including any subsequently issued addenda for consideration of the following Lump Sum amount:

TOTAL LUMP SUM BASE BID AMOUNT:

DOLLARS: ($_____)

WORDS: _____

PROPOSED EQUIVALENTS

The Contractor has included in the Base Bid the following kinds, types, brands, or manufacturers of materials in lieu of those named in the specifications. The Contractor understands that he includes these proposed equivalent items in the Base Bid at his own risk, as they are subject to the approval for the Architect. The Contractor certifies that the following constitute the extent of proposed equivalent items included in the Base Bid are those named in the specifications.

ITEM	SPECIFICATION SECTION & PARAGRAPH(S)	PROPOSED EQUIVALENT

ATTACH ADDITIONAL PROPOSED EQUIVALENT ITEMS TO BID FORM.

The Bidder agrees that this Proposal shall be good and may not be withdrawn for a period of forty-five (45) calendar days from the date of Bid opening. Furthermore, the undersigned will, within ten (10) days of written notice of acceptance of this bid, execute a contract in the form specified and submit specified Performance and Payment Bonds.

The Bidder understands that the Owner specifically reserves the right to reject any and all Bids and to waive any informality therein.

The undersigned agrees to complete the work in accordance with the time period specified in the Supplementary Instructions to Bidders.

Addendum Receipt: The receipt of the following addenda to the Specifications is acknowledged:

Addendum No. _____ Date_____	Addendum No. _____ Date_____
Addendum No. _____ Date_____	Addendum No. _____ Date_____
Addendum No. _____ Date_____	Addendum No. _____ Date_____

Submittals as required by the Instructions/Supplementary Instructions to Bidders, shall be completed and delivered to the Architect, by the tow (2) low bidders, with three (3) working days after the Bid opening.

Dated_____, 20__

_____
Legal name of person, partnership or corporation

(Sign Bid Here) By: _____
Name and Title

Legal Business Address: _____
Street

_____
City and State

_____
Phone Number

BID FORM
EDPT #4 - PLUMBING CONTRACT

To: John Searles
Cattaraugus County
303 Court Street
Little Valley, New York 14755

In compliance with your Advertisement for Bids, the undersigned:

_____
(Name of firm, partnership or Corporation)

hereby proposes to furnish all supervision, labor, materials, plan, tools, equipment, transportation, overhead and profit, and other facilities related to, proper, for or incidental to the project at the **Redevelopment of Onoville Marina Park – Phase 1 Site Improvements**, in strict accordance with the Project Manual dated January 6, 2023 and the Drawings mentioned therein, and including any subsequently issued addenda for consideration of the following Lump Sum amount:

TOTAL LUMP SUM BASE BID AMOUNT:

DOLLARS: ($_____)

WORDS: _____

PROPOSED EQUIVALENTS

The Contractor has included in the Base Bid the following kinds, types, brands, or manufacturers of materials in lieu of those named in the specifications. The Contractor understands that he includes these proposed equivalent items in the Base Bid at his own risk, as they are subject to the approval for the Architect. The Contractor certifies that the following constitute the extent of proposed equivalent items included in the Base Bid are those named in the specifications.

ITEM	SPECIFICATION SECTION & PARAGRAPH(S)	PROPOSED EQUIVALENT

ATTACH ADDITIONAL PROPOSED EQUIVALENT ITEMS TO BID FORM.

The Bidder agrees that this Proposal shall be good and may not be withdrawn for a period of forty-five (45) calendar days from the date of Bid opening. Furthermore, the undersigned will, within ten (10) days of written notice of acceptance of this bid, execute a contract in the form specified and submit specified Performance and Payment Bonds.

The Bidder understands that the Owner specifically reserves the right to reject any and all Bids and to waive any informality therein.

The undersigned agrees to complete the work in accordance with the time period specified in the Supplementary Instructions to Bidders.

Addendum Receipt: The receipt of the following addenda to the Specifications is acknowledged:

Addendum No. _____ Date_____	Addendum No. _____ Date_____
Addendum No. _____ Date_____	Addendum No. _____ Date_____
Addendum No. _____ Date_____	Addendum No. _____ Date_____

Submittals as required by the Instructions/Supplementary Instructions to Bidders, shall be completed and delivered to the Architect, by the tow (2) low bidders, with three (3) working days after the Bid opening.

Dated_____, 20__

_____
Legal name of person, partnership or corporation

(Sign Bid Here) By: _____
Name and Title

Legal Business Address: _____
Street

_____
City and State

_____
Phone Number

SECTION 01 12 00

MULTIPLE CONTRACT SUMMARY

PART 1 - GENERAL

1.1 COORDINATION ACTIVITIES FOR EACH PRIME CONTRACTOR

A. Coordination activities include, but are not limited to, the following:
   1. Provide overall coordination of the Work of Sub-Contractors.
   2. Coordinate shared access to workspaces.
   3. Provide overall coordination of temporary facilities and controls as needed.
   4. Coordinate interruptions of permanent and temporary utilities, including those necessary to make connections for temporary services. All interruptions to be approved by Owner.
   5. Assist in the resolution of scheduling conflict.

      a. Initial Coordination Meeting: At earliest possible date, attend a meeting arranged by the Owner's representative, with prime contractors for sequencing and coordinating the Work; negotiate reasonable adjustments to schedules.
      b. Work with other prime contractors and Owner's representative to create a combined contractors' construction schedule for entire Project. Base schedule on preliminary construction schedule. Secure time commitments for performing critical construction activities from contractors. Show activities of each contract on a separate sheet. Prepare a simplified summary sheet indicating combined construction activities of contracts.

         1) Submit schedules for approval.
   6. Coordinate sequence of activities to accommodate tests and inspections, and coordinate schedule of tests and inspections.
   7. Coordinate protection of the Work.
   8. Coordinate completion of interrelated punch list items.
   9. Coordinate preparation of Project record documents if information from more than one contractor is to be integrated with information from other contractors to form one combined record.

1.2 GENERAL REQUIREMENTS OF CONTRACTS

A. Extent of Contract: Unless the Agreement contains a more specific description of the Work of each Contract, requirements indicated on Drawings and in Specification Sections determine which contract includes a specific element of Project.
   1. Unless otherwise indicated, the work described in this Section for each contract shall be complete systems and assemblies, including products, components, accessories, and installation required by the Contract Documents.
   2. Trenches and other excavation for the work of each contract shall be the work of each contract for its own work.
   3. Blocking, backing panels, sleeves, and metal fabrication supports for the work of each contract shall be the work of each contract for its own work.

4. Furnishing of access panels for the work of each contract shall be the work of each contract for its own work. Installation of access panels shall be the work of each contract for its own work.
5. Equipment pads for the work of each contract shall be the work of each contract for its own work.
6. Cutting and Patching: Provided under each contract for its own work Each contract shall perform its own cutting; patching shall be under the General Construction Contract.
7. Through-penetrations for the work of each contract shall be provided by each contract for its own work.
8. Contractors' Startup Construction Schedule: Within five working days after startup horizontal bar-chart-type construction schedule submittal has been received from General Construction Contractor, submit a matching startup horizontal bar-chart schedule showing construction operations sequenced and coordinated with overall construction.

B. Substitutions: Each contractor shall cooperate with other contractors involved to coordinate approved substitutions with remainder of the work.
   1. The Contractor proposing a substitution shall coordinate that substitution.

C. Temporary Facilities and Controls: In addition to specific responsibilities for temporary facilities and controls indicated in this Section, each contractor is responsible for the following:
   1. Installation, operation, maintenance, and removal of each temporary facility necessary for its own normal construction activity, and costs and use charges associated with each facility, except as otherwise provided for in this Section.
   2. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
   3. Its own field office, complete with necessary furniture, utilities, and telephone service, if desired.
   4. Its own storage and fabrication sheds, if desired.
   5. Temporary enclosures for its own construction activities.
   6. Staging and scaffolding for its own construction activities.
   7. General hoisting facilities for its own construction activities.
   8. Waste disposal facilities, including collection and legal disposal of its own hazardous, dangerous, unsanitary, or other harmful waste materials.
   9. Progress cleaning of work areas affected by its operations on a daily basis.
   10. Secure lockup of its own tools, materials, and equipment.
   11. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.

D. Temporary heating, cooling, or ventilation exceeding the temperature or air change levels defined in Section 01 50 00, is the responsibility of the Contractor requiring this heating, cooling, or ventilation.

1.3 GENERAL CONSTRUCTION CONTRACT

A. Includes all work not within the Electrical or Plumbing Contracts including but not limited to demolition, grading and drainage improvements, earth moving, concrete, gravel, and asphalt pavements, concrete foundations, the site sanitary sewer system (including pump station and

controls – electrical connections to controls is by the electrical contractor) other site improvements, landscaping, and restoration. Work under the General Contract is illustrated throughout the contract drawing sets as well as specification Divisions 0&1, Division 3, Sections 22 13 13 (as applicable 5'+ beyond the face of foundation), 22 13 29, 22 13 53, and Divisions 31-34 in their entirety.

Alternate #1 is included entirely within the General Contract except for electrical connections to the associated alarm controls, similar to the pump station components in the base bid.

B. Temporary facilities and controls in the General Construction Contract include, but are not limited to, the following:
   1. Temporary facilities and controls that are not otherwise specifically assigned to the Plumbing Contract, HVAC Contract and Electrical Contract.
   2. Sediment and erosion control.
   3. Unpiped sewers and drainage, including drainage ditches, dry wells, stabilization ponds, and containers.
   4. Stormwater control.
   5. Unpiped temporary toilet fixtures, wash facilities, and drinking water facilities, including disposable supplies.
   6. Temporary enclosure for building exterior, except as indicated.
   7. Temporary roads and paved areas.
   8. Dewatering facilities and drains.
   9. Excavation support and protection, unless required solely for the Work of another contract.
   10. Project identification signs.
   11. Pest control.
   12. Temporary fire-protection facilities.
   13. Barricades, warning signs, and lights.

14. Site enclosure fence.
15. Covered walkways.
16. Security enclosure and lockup.
17. Environmental protection.

1.4 PLUMBING CONTRACT

A. Includes work related to all domestic water system improvements (up to and including the connections to the existing distribution systems) and sanitary sewer improvements within 5’ of the exterior face of concrete foundations for future pre-fabricated structures. Provide a sanitary cleanout at each building at +/- 5’ from the face of foundation under the Plumbing Contract – piping from the cleanout downstream/away from the foundations shall be by the General Contractor. Work under the Plumbing Contract is illustrated throughout the contract drawing sets as well as specification Divisions 0&1, Section 22 11 13 and Section 22 13 13 (as applicable within 5’ of foundations), and Section 31 20 00.

B. Temporary facilities and controls in the Plumbing Contract include, but are not limited to, the following:
   1. Plumbing connections to existing systems and temporary facilities and controls furnished by all other Contracts.

1.5 HVAC CONTRACT

A. Not Applicable to this Project

1.6 ELECTRICAL CONTRACT

A. Includes all work related to electrical improvements generally including any electrical demolition, excavation and backfill, grounding, conduits/raceways, conductors, electrical equipment, connections (including to sanitary pump station controls installed by the GC), electrical inspections, and all related requirements. Work under the Electrical Contract is illustrated throughout the contract drawing sets as well as specification Divisions 0&1, Division 26, and Section 31 20 00.

B. Temporary facilities and controls in the Electrical Contract include, but are not limited to, the following:
   1. Electric power service and distribution.
   2. Lighting, including site lighting.
   3. Electrical connections to existing systems and temporary facilities and controls furnished by the General Construction Contract, Plumbing Contract, and Electrical Contract.

END OF SECTION

ECS New York, PLLC

Geotechnical Engineering Report

Onoville Marina Park Site Improvements

704 West Perimeter Road
Frewsburg, Cattaraugus County, New York

ECS New York Project Number 95:1054

January 19, 2023

January 19, 2023

Ms. Chelsea Bush
Beardsley Design Associates
5789 Widewaters Parkway
DeWitt, NY 13214

ECS New York PLLC Project No. 95:1054

Reference: Geotechnical Engineering Report
Onoville Marina Park Site Improvements
Frewsburg, New York

Dear Ms. Bush:

ECS New York, PLLC has completed the subsurface exploration and geotechnical engineering analyses for the above-referenced project. Our services were performed in general accordance with our Proposal No. 95:1114-GP, dated December 12, 2022. This report presents our understanding of the geotechnical aspects of the project, results of the field exploration, laboratory testing, and our design and construction recommendations.

It has been our pleasure to be of service to Beardsley Design Associates during this phase of this project. We would appreciate the opportunity to remain involved during the continuation of the design phase and to provide our services during construction phase operations as well to verify the assumptions of subsurface conditions made for this report. Should you have any questions concerning the information contained in this report, or if we can be of further assistance to you, please contact us.

Respectfully submitted,
ECS New York, PLLC

David B. Sabol, P.E.
Group Manager
dsabol@ecslimited.com

J. Matthew Carroll, P.E. (PA, MA, VT, RI, NH)
Principal Engineer
mcarroll@ecslimited.com

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- Site Location Diagram
- Exploration Location Diagram
- Subsurface Cross-Section A-A'
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- Subsurface Exploration Procedure: Standard Penetration Testing (SPT)
- Boring Logs B-01 through B-05

Appendix C – Laboratory Testing

- Laboratory Test Results Summary
- Plasticity Chart

Appendix D – Supplemental Report Documents

- French Drain Installation Procedure

EXECUTIVE SUMMARY

The following summarizes the main findings of the exploration, particularly those that may have a cost impact on the planned development. Further, our principal foundation recommendations are summarized. Information gleaned from the Executive Summary should not be utilized in lieu of reading the entire geotechnical report.

- The relatively lightly loaded prefabricated concrete buildings foundations can be supported by a haunched or turned down slab. We recommend that the footings bear on undisturbed natural soils and/or newly placed engineered fil and be proportioned for a maximum allowable bearing pressure of 2,000 psf. The base of the haunched building footing should be a minimum of 16 inches wide to allow for construction and to aid in preventing punching shear, even if the bearing pressure is less than the recommended values.

- Groundwater seepage into our borings was not observed during our exploration at the depths explored.

- Up to approximately 2 to 3-1/2 feet of existing fill was noted within the proposed building footprints in the vicinity of borings B-03 and B-05 during the subsurface exploration. Due to the presence of fill on-site, select over-excavation of unsuitable fill material may be required at some footing locations, and within some locations within the building pad where proof-compaction/proofrolling reveals instability.

- Natural deposits of soils that meet the definition of Satisfactory Structural Fill appear to be present on the site at possible excavation depths.

Refer to the text of the report for site specific design and construction recommendations.

1.0 INTRODUCTION

The purpose of this study was to provide geotechnical information for design and construction of five precast concrete structures at the project site. The recommendations developed for this report are based on project information supplied by Beardsley Design Associates, including the undated, *Overall Site Plan,* drawing number *C-101*.

Our services were provided in general accordance with the ECS New York PLLC Proposal No. 95:1114-GP, dated December 12, 2022. Authorization to perform this exploration and analysis was in the form of a Beardsley Design Professional Consultant Services Agreement, which was executed on December 22, 2022, and includes mutually agreed to Terms and Conditions of Service.

This report contains the results of our subsurface exploration, site characterization, laboratory testing, engineering analyses, and recommendations for the design and construction of the proposed development.

This report includes the following:

- A review of area and site geologic conditions.
- A review of surface topographical features and site conditions.
- A brief review and description of our field procedures.
- A brief review and description of our field and laboratory test procedures and the results of testing conducted.
- A review of subsurface soil stratigraphy with pertinent available physical properties.
- Final copies of our boring logs.
- Recommendations for site preparation and construction of compacted fills, including an evaluation of on-site soils for use as compacted fills and identification of potentially unsuitable soils and/or soils exhibiting excessive moisture at the time of sampling.
- Recommended foundation type and allowable bearing pressure for foundation design.
- Discussion of parameters for slab on grade construction and modulus of subgrade reaction (k).
- Recommendations for seismic site classification and site seismic design coefficients based on the 2020 NYSBC (2018 IBC) and ASCE 7-16 parameters.
- Evaluation and recommendations relative to groundwater.

2.0 PROJECT INFORMATION

2.1 PROJECT LOCATION

The project site is located at the physical address of 704 West Perimeter Road in Frewsburg (South Valley), Cattaraugus County, New York. The sites of each of the proposed buildings are located within the existing Onoville Marina Park and generally consist of grassy areas and/or asphaltic concrete pavement drives. At the time of exploration, the footprints of each proposed building generally had limited total topographic relief on the order of approximately less than 2 feet each. Overall, the park contained rolling terrain that primarily sloped gradually downward towards the Allegheny Reservoir

It should be noted that near boring B-2 and near the existing restroom at that location, the surrounding concrete sidewalks were observed cracked and displaced up to 1 to 1-1/2 inches. However, no distress cracking was observed within the exterior masonry walls for the restroom superstructure.

Refer to Figure 2.1.A and the Site Location Map in Appendix A for a detailed depiction of the project site location.

Figure 2.1.A – Site Location

2.2 PROPOSED CONSTRUCTION

Based on the undated "Overall Site Plan" Plan, by Beardsley Design Associates, we understand that the proposed development consists of construction of 5 single-story precast concrete structures having approximate building footprint areas ranging from 75 square feet to 375 square feet each. No other site developments are included within this study. The following information explains our understanding of the structures and assumed loads:

DESIGN VALUES	
SUBJECT	**DESIGN INFORMATION / EXPECTATIONS**
Approximate Building Footprints	Range from approximate 75 sf to 375 sf
# of Stories	1 story above grade
Usage	Restrooms, Contact Station and/or Camp Store
Type of Construction	Pre-cast Concrete Units
Total Loads	40 kips to 125 Kips
Finish Floor Elevation (FFE)	Not Provided–Assume ±1 ft of existing grade at each location

3.0 FIELD EXPLORATION AND LABORATORY TESTING

Our exploration procedures are explained in greater detail in Appendix B including the insert titled Subsurface Exploration Procedure. Our scope of work included drilling a total of five (5) geotechnical borings. Our borings were located with a handheld GPS unit and their approximate locations are shown on the Exploration Location Plan in Appendix A.

3.1 SUBSURFACE CHARACTERIZATION

The following sections provide generalized characterizations of the soil strata. Please refer to both the Subsurface Cross-Section in Appendix A and the boring logs in Appendix B.

SUBSURFACE STRATIGRAPHY	
Stratum	**Description**
n/a	*Surficial Material*: B-1, B-2, B-3 & B-4 3.0 to 10.0 inches of topsoil B-5 Asphalt Thickness 9.5 inches Gravel Thickness 4.0 inches
I	FILL Materials, loose to medium dense SAND with GRAVEL (SP), moist
II	Granular Soils: medium dense to loose, SAND with SILT (SP-SM), SAND with GRAVEL (SP), SAND (SP), SAND with SILT AND GRAVEL (SP), SAND with CLAY and GRAVEL (SP-SC) and/or CLAYEY SAND with GRAVEL (SC), moist to wet
III	Cohesive Soils: Stiff gray Lean CLAY (CL), moist to wet

3.2 SITE GEOLOGY

The project site located in Frewsburg, Cattaraugus County, New York area is located within the glaciated portion of the Appalachian Uplands physiographic province. As noted on the 1988 "Surficial Geologic Map of New York", surface soils in the area generally consist of Lacustrine silt and clay and/or kame deposits. Bedrock in the general site area is part of the Paleozoic upper Devonian age Conneaut Group, which consists of the Ellicott and Dexterville Formations' shale and siltstone. The major landscape features originated from the differential weathering and the long history of erosion. The main product of pre-glacial landscape development is predominantly through physiographic features such as upland and lowland areas and partly buried stream networks.

3.3 SOIL SURVEY MAPPING

Based on our review of the Soil Survey (USDA - Natural Resources Conservation Service (websoilsurvey.ncrs.usda.gov), the site soils are mapped Portville silty clay loam, 3 to 8 percent slopes. This soil type is described as having the following properties:

SOIL MAPPING SUMMARY						
Mapped Soil Unit	**Soil Unit Symbol**	**Origin/ Type**	**Depth to Restrictive Feature**	**Depth to Water Table**	**Hydrologic Soil Group**	**KSat (in/hr)**
Portville silty clay loam, 3 to 8 percent slopes	89B	Loamy colluvium derived from interbedded shale, siltstone, and sandstone	12 to 36 inches to fragipan	About 6 to 18 inches	C/D	(0.06 – 0.57)

3.4 GROUNDWATER OBSERVATIONS

At the time of soil drilling, groundwater seepage into our borings was not observed during our exploration at the depths explored as noted in the following table. For safety purposes, the boreholes were backfilled at the time of drilling completion. It should also be recognized that the below observed borehole caving depths may be an indicator of groundwater presence, although based on the close proximity to the lake, the water table elevation is expected to be at around EL 1315

GROUNDWATER READINGS				
Location	**Existing Grade (Feet, MSL)[1]**	**Approximate Groundwater Depth (Feet)**	**Approximate Groundwater Elevation (Feet, MSL)**	**Approximate Bore Hole Cave Depth (Feet)**
B-01	1348.5	Not Encountered	N/A	18.0
B-02	1351.0	Not Encountered	N/A	15.8
B-03	1339.0	Not Encountered	N/A	16.5
B-04	1342.0	Not Encountered	N/A	15.5
B-05	1348.0	Not Encountered	N/A	15.5

Note[1]: Please note that the ground surface was not surveyed by a licensed surveyor; these elevations were interpolated by the provided plan; therefore, elevation ranges are approximate +/- half a foot.

These observations represent the groundwater conditions at the time of measurement and may not be indicative of other times. However, **discontinuous zones of perched water may exist within the shallower overburden materials** and the builder should anticipate surface and subsurface seepage into any subsurface excavations during high moisture periods of the year. Variations in groundwater levels should be expected seasonally, annually, and from location to location.

3.5 LABORATORY TESTING

The laboratory testing consisted of selected tests performed on samples obtained during our field exploration operations. Limited classification and index property tests were performed on representative soil samples.

Each sample was visually classified on the basis of texture and plasticity in accordance with ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedures) and including USCS classification symbols. After classification, the samples were grouped in the major zones noted on the boring logs in Appendix B. The group symbols for each soil type are indicated in parentheses along with the soil descriptions. The stratification lines between strata on the logs are approximate; in situ, the transitions may be gradual.

4.0 DESIGN RECOMMENDATIONS

4.1 FOUNDATION DESIGN

We understand five buildings will be located on site. It is understood that these buildings are prefabricated concrete structures and weigh from about 40 to 125 kips. The prefabricated concrete buildings are expected to be supported by a haunched or turned down slab. The slab is typically structurally connected to the foundations and placed monolithically.

Based on the boring data, the site appears suitable for relatively lightly loaded prefabricated concrete building foundations provided subgrades and Structural Fills are prepared as discussed herein. We recommend that the footings bear on undisturbed natural soils and/or newly placed engineered fill The footings can be proportioned for an allowable bearing pressure of 2,000 psf; based on the load information stated above. The base of the haunched building footing should be a minimum of 16 inches wide to allow for construction and to aid in preventing punching shear, even if the bearing pressure is less than the recommended values. We estimate settlement of the building foundations may be about ½ to 1 inch, with differential settlement of about half of the total settlement.

The perimeter haunched foundation and any interior haunched foundation areas should be embedded at least 48 inches below the final exterior grade for frost protection. Exterior foundation excavation of sidewalls should also be maintained near vertical to reduce the risk of frost heave.

Most of the soils at the foundation bearing elevation are anticipated to be suitable for support of the proposed structure. If soft soils or otherwise unsuitable soils are observed at the footing bearing elevations, the unsuitable soils should be undercut and removed. Lean concrete (f'c=1,000 psf) should be used to backfill the undercut and the excavation should be 6 inches larger than the footing on each side so no additional lateral over-excavation is necessary.

4.2 FLOOR SLABS

The proposed buildings slab-on-grades may be supported on natural soils, qualified existing man-placed fill materials, and/or compacted engineered fill placed over a natural soil subgrade, provided the upper soils have been proof-rolled and compacted with a minimum fifteen (15) ton smooth drum, vibratory roller, operating in the vibratory mode to confirm their suitability.

To provide uniform bearing support, it is recommended that prior to placing stone and reinforcement for the monolithic slab, the base of the excavation be subjected to surface compaction to the extent that a minimum of 8 inches of the material underlying the subgrade surface achieve a minimum in-place density of 95 percent of the maximum density determined by the ASTM Standard Method D-1557 (modified Proctor). Precautions must be taken in the design of the rigid utility lines that connect to the structure so that that the lines are flexible enough to absorb some settlement without impairment of its proper function. In addition, to provide uniform subgrade reaction beneath the proposed floor slab-on-grades, we recommend that floor slabs be underlain by a minimum of 6 inches of free-draining (a maximum particle size of ¾-inch with less than 5 percent material passing the no. 200 sieve), well-graded crushed aggregate course.

The following graphic depicts our soil-supported slab recommendations:

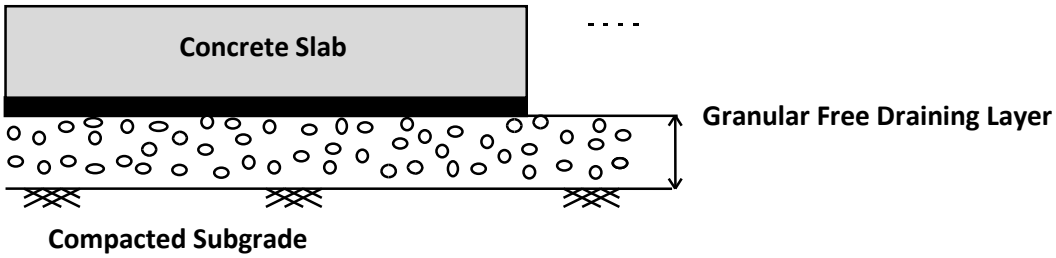


Figure 4.2.A

1. Drainage Layer Thickness: 6 inches minimum
2. Drainage Layer Material: Coarse Graded Aggregate
3. Subgrade compacted to ***95%*** maximum dry density in Accordance with ASTM D1557

Soft or yielding soils may be encountered in some areas. Those soils should be over-excavated down to a firm subgrade and replaced with compacted Structural Fill in accordance with the recommendations included in this report.

Subgrade Modulus: Provided the Structural Fill and Granular Layer are constructed in accordance with our recommendations, the slab may be designed assuming a modulus of subgrade reaction, k_1 of 100 pci (lbs./cu. inch). The modulus of subgrade reaction value is based on a 1 ft by 1 ft plate load test basis.

Slab Isolation: Since the structural configuration prevents the use of a free-floating slab such as in a drop-down footing/monolithic slab configuration, *the slab should be designed with suitable reinforcement and load transfer devices to preclude overstressing of the slab.*

4.3 SEISMIC DESIGN CHARACTERISTICS

The 2020 New York State Building Code (NYSBC) is an adaption/incorporates the International Building Code (IBC) 2018 and requires site classification for seismic design be based on the upper 100 feet of a soil profile. At least two methods are utilized in classifying sites, namely the shear wave velocity (v_s) method and the Standard Penetration Resistance (N-value) method. The latter method (Standard Penetration Resistance) was used in classifying this site.

SEISMIC SITE CLASSIFICATION			
Site Class	**Soil Profile Name**	**Shear Wave Velocity, Vs, (ft./s)**	**N value (bpf)**
A	Hard Rock	Vs > 5,000 fps	N/A
B	Rock	2,500 < Vs ≤ 5,000 fps	N/A
C	Very dense soil and soft rock	1,200 < Vs ≤ 2,500 fps	>50
D	Stiff Soil Profile	600 ≤ Vs ≤ 1,200 fps	15 to 50
E	Soft Soil Profile	Vs < 600 fps	<15

Based upon our interpretation of the subsurface conditions, the appropriate **Seismic Site Classification is "D"** as shown in the preceding table.

Ground Motion Parameters: In addition to the seismic site classification noted above, ECS New York PLLC has determined the design spectral response acceleration parameters following the NYSBC 2020 (IBC 2018) and ASCE 7-16 methodology. The Mapped Reponses were estimated from the free seismic design maps available from *Structural Engineers Association of California (SEAOC) (http://seismicmaps.org*). The design responses for the short (0.2 sec, S_{DS}) and 1-second period (S_{D1}) are noted in bold at the far-right end of the following table.

GROUND MOTION PARAMETERS [IBC 2018 METHOD]								
Period (sec)	**Mapped Spectral Response Accelerations (g)**		**Values of Site Coefficient for Site Class**		**Maximum Spectral Response Acceleration Adjusted for Site Class (g)**		**Design Spectral Response Acceleration (g)**	
Reference	Figures 1613.2.1 (1) & (2)		Tables 1613.2.3 (1) & (2)		Eqs. 16-37 & 16-38		Eqs. 16-39 & 16-40	
0.2	S_S	0.106	F_a	1.6	$S_{MS}=F_aS_s$	0.169	$S_{DS}=2/3\ S_{MS}$	0.113
1.0	S_1	0.039	F_v	2.4	$S_{M1}=F_vS_1$	0.093	$S_{D1}=2/3\ S_{M1}$	0.062

The Site Class definition should not be confused with the Seismic Design Category designation which the Structural Engineer typically assesses. If a higher site classification is beneficial to the project, we can provide additional testing methods that may yield more favorable results.

5.0 SITE CONSTRUCTION RECOMMENDATIONS

5.1 SUBGRADE PREPARATION

5.1.1 Stripping and Grubbing

The subgrade preparation should consist of stripping all vegetation, root mat, topsoil, unsuitable existing fill, asphalt, and other soft or unsuitable materials from the 10-foot expanded building and 5 feet beyond the toe of any Structural Fills. Borings performed in "undisturbed" areas of the site contained an observed approximately 3 to 10 inches of topsoil. Within the pavement area, approximately 9-1/2 inches of asphalt overlaying approximately 4 inch of aggregate base was also observed. Deeper topsoil or organic laden soils may be present in wet, low-lying, and poorly drained areas. In any wooded areas, the root balls can extend as deep as about 2 feet and can require additional localized stripping depth to completely remove the organics. ECS should be retained to verify that topsoil and unsuitable surficial materials have been removed prior to the placement of Structural Fill or construction of structures.

5.1.2 Proofrolling/Proof-Compaction

Prior to fill placement or other construction on subgrades, the subgrades should be evaluated by an ECS field technician. The exposed subgrade should be thoroughly proofrolled with construction equipment having a minimum axle load of 10 tons [e.g., fully loaded tandem-axle dump truck. Proofrolling should be traversed in two perpendicular directions with overlapping passes of the vehicle under the observation of an ECS technician. As an alternative, proof-compaction operations can be performed using a minimum 10 to 15-ton smooth drum vibratory roller, operating in the vibratory mode. Proof rolling operations should be observed by the geotechnical engineer of record or an ECS technician and should continue until a firm and unyielding condition exists (typically less than ¾'s inch ruts). These procedures are intended to assist in identifying localized yielding materials.

Where proofrolling/proof-compaction identifies areas that are unstable or "pumping" subgrade those areas should be repaired prior to the placement of subsequent Structural Fill or other construction materials. Methods of stabilization include undercutting, moisture conditioning, or chemical stabilization. The situation should be discussed with ECS New York PLLC to determine the appropriate procedure. Test pits may be excavated to explore the shallow subsurface materials to help in determining the cause of the observed unstable materials, and to assist in the evaluation of appropriate remedial actions to stabilize the subgrade.

5.1.3 Site Temporary Dewatering

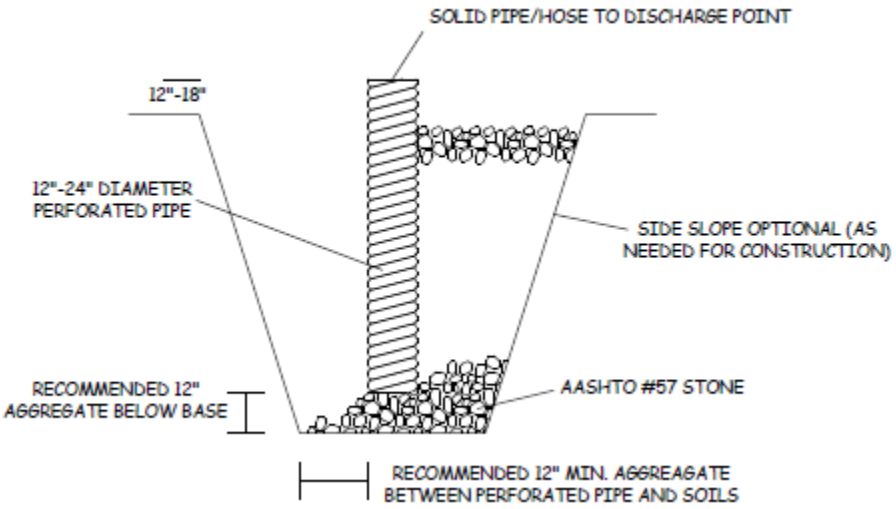
The contractor shall make their own assessment of temporary dewatering needs based upon the limited subsurface groundwater information presented in this report. Soil sampling is not continuous, and thus soil and groundwater conditions may vary between sampling intervals (typically 5 feet). If the contractor believes additional subsurface information is needed to assess dewatering needs, they should obtain such information at their own expense. ECS makes no warranties or guarantees regarding the adequacy of the provided information to determine dewatering requirements; such recommendations are beyond our scope of services.

Dewatering systems are a critical component of many construction projects. Dewatering systems must be selected, designed, and maintained by a qualified and experienced (specialty or other) contractor familiar

with the succinct geotechnical and other aspects of the project. The failure to properly design and maintain a dewatering system for a given project can result in delayed construction, unnecessary foundation subgrade undercuts, detrimental phenomena such as 'running sand' conditions, internal erosion (i.e., 'piping'), the migration of 'fines' down-gradient towards the dewatering system, localized settlement of nearby infrastructure, foundations, slabs-on-grade and pavements, etc. Water discharged from a site dewatering system shall be discharged in accordance with all local, state and federal requirements.

Strategies for Addressing any Perched Groundwater:

The typical primary strategy for addressing any perched groundwater seeping into excavations is pumping from trench (or French) and sump pits with sump pumps. A typical sump pump drain (found in a sump pit or along a French drain) is depicted below. The inlet of the sump pump is placed at the bottom of the corrugated pipe and the discharge end of the sump is directed to an appropriate stormwater drain.



Sump Pit/Pump Diagram

Details of a typical French drainage installation are included in Appendix D. A typical French drain consists of an 18 to 24-inch wide by 18 to 24-inch deep bed of AASHTO #57 (or similar open graded aggregate) aggregate wrapped in a medium duty, non-woven geotextile and (sometimes) containing a 6-inch diameter, Schedule 40 PVC perforated or slotted pipe. Actual dimensions should be as determined necessary by ECS during construction. After the installation has been completed, the geotextile should be wrapped over the top of the aggregate and pipe followed by placement of backfill. The top of the drain should be positioned at least 18 inches below the design subgrade elevations. Drains should not be routed within the expanded building limits.

Pumping wells or a vacuum system could also be used to address perched groundwater. These techniques often are only effective during the initial depletion of the perched water quantity and may quickly be ineffective at addressing accumulation of water from rain, snow, etc.

5.2 EARTHWORK OPERATIONS

5.2.1 Existing Man-Placed Fill

Fill Content: Up to approximately 2 to 3-1/2 feet of existing fill was noted within the proposed building footprint in the vicinity of borings B-03 and B-05 during the subsurface exploration. Due to the presence of fill on-site, select over-excavation of unsuitable fill material may be anticipated at some footing locations, and at some locations within the building pad where proofrolling reveals instability. Field conditions will dictate the extent of any needed over-excavations.

5.2.2 Structural Fill Materials

Prior to placement of Structural Fill, representative bulk samples (about 50 pounds) of on-site and/or off-site borrow should be submitted to ECS for laboratory testing, which will typically include Atterberg limits, natural moisture content, grain-size distribution, and moisture-density relationships (i.e., Proctors) for compaction. Import materials should be tested prior to being hauled to the site to determine if they meet project specifications.

Satisfactory Structural Fill Materials: Materials satisfactory for use as Structural Fill should consist of inorganic soils with the following engineering properties and compaction requirements.

STRUCTURAL FILL INDEX PROPERTIES	
Subject	**Property**
Building and Pavement Areas	LL < 40, PI <20
Max. Particle Size	3 inches
Minimum Dry Density	105 pcf

STRUCTURAL FILL COMPACTION REQUIREMENTS	
Subject	**Requirement**
Compaction Standard	Standard Proctor, ASTM D-1557
Required Compaction	95% of Max. Dry Density
Moisture Content	±2 % points of the soil's optimum value
Loose Thickness	8 inches prior to compaction

On-Site Borrow Suitability: Natural deposits of soils that meet the definition of Satisfactory Structural Fill do not appear to be present on the site at possible excavation depths.

Fill Placement: Fill materials should not be placed on frozen soils, on frost-heaved soils, and/or on excessively wet soils. Borrow fill materials should not contain frozen materials at the time of placement, and all frozen or frost-heaved soils should be removed prior to placement of Structural Fill or other fill soils and aggregates. Excessively wet soils or aggregates should be scarified, aerated, and moisture conditioned.

5.2.3 Proposed Fill Slopes, if required

Slopes comprised of Structural Fill may be constructed at a slope of 3(H):1(V) or flatter. Slopes steeper than 3(H):1(V) should be evaluated by ECS. All slopes should be properly vegetated to reduce the likelihood of surficial erosion and sloughing.

5.2.4 Subgrade Protection

The near surface soils present at this site are somewhat sensitive to softening due to rainfall and traffic. When damp or wet, it is our experience that these soils tend to rut under rubber tire vehicle traffic. If the near surface soils become wet and disturbed, they should be disced, aerated and re-compacted to restore stable conditions or undercut and replaced. In some instances, during wet or cool seasons, it is advantageous to place a working course of compacted graded aggregate base over areas subjected to construction traffic. The graded aggregate base may need to be replenished periodically depending on weather and traffic conditions during construction.

5.3 FOUNDATION AND SLAB OBSERVATIONS

Protection of Foundation Excavations: Exposure to the environment may weaken the soils at the footing bearing level if the foundation excavations remain open for too long a time. Therefore, foundation concrete should be placed the same day that excavations are made. If the bearing soils are softened by surface water intrusion or exposure, the softened soils must be removed from the foundation excavation bottom immediately prior to placement of concrete. If the excavation must remain open overnight, or if rainfall becomes imminent while the bearing soils are exposed, a 1 to 3-inch thick “mud mat” of “lean” concrete should be placed on the bearing soils before the placement of reinforcing steel.

Footing Subgrade Observations: Most of the soils at the foundation bearing elevation are anticipated to be suitable for support of the proposed structure. It is important to have ECS observe the foundation subgrade prior to placing foundation concrete, to confirm the bearing soils are what was anticipated.

Slab Subgrade Verification: Prior to placement of a granular free draining layer, the subgrade should be prepared in accordance with the recommendations found in **Section 5.1.2 Proofrolling/Proof-Compaction**.

5.4 UTILITY INSTALLATIONS

Utility Subgrades: The soils encountered in our exploration are expected to be generally suitable for support of utility pipes. The pipe subgrades should be observed and probed for stability by ECS. Loose or unsuitable materials encountered should be removed and replaced with suitable compacted Structural Fill, or pipe stone bedding material.

Utility Backfilling: The granular bedding material (often AASHTO #57 stone) should be at least 4 inches thick, but not less than that specified by the civil engineer’s project drawings and specifications. We recommend that the bedding materials be placed up to the springline of the pipe. Fill placed for support of the utilities, as well as backfill over the utilities, should satisfy the requirements for Structural Fill and Fill Placement.

Utility Excavation Dewatering: It is possible that perched water may be encountered by utility excavations which extend below existing grades. It is expected that removal of perched water which seeps into

excavations could be accomplished by pumping from sumps excavated in the trench bottom and which are backfilled with AASHTO No. 57 Stone or open graded bedding material. Should water conditions beyond the capability of sump pumping be encountered, the contractor should submit a Dewatering Plan in accordance with project specifications.

Excavation Safety: All excavations and slopes should be constructed and maintained in accordance with OSHA excavation safety standards. The contractor is solely responsible for designing, constructing, and maintaining stable temporary excavations and slopes. The contractor's responsible person, as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations. ECS is providing this information solely as a service to our client. ECS is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

6.0 CLOSING

ECS New York, PLLC has prepared this report to guide the geotechnical-related design and construction aspects of the project. We performed these services in accordance with the standard of care expected of professionals in the industry performing similar services on projects of like size and complexity at this time in the region. No other representation expressed or implied, and no warranty or guarantee is included or intended in this report.

The description of the proposed project is based on information provided to ECS by Beardsley Design Associates. If any of this information is inaccurate, either due to our interpretation of the documents provided or if the site's design changed, ECS should be contacted immediately to review the report in light of the changes and provide additional or alternate recommendations as required to reflect the proposed construction.

We recommend that ECS review the project plans and specifications so we can confirm that those plans/specifications are in accordance with the recommendations of this geotechnical report.

Field observations, and quality assurance testing during earthwork and foundation installation are an extension of, and integral to, the geotechnical design. We recommend that ECS be retained to apply our expertise throughout the geotechnical phases of construction, and to provide consultation and recommendation should issues arise.

ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

APPENDIX A – Drawings & Reports

Site Location Diagram
Exploration Location Diagram
Subsurface Cross-Section A-A’
Geology Map
Soil Survey Map

SITE LOCATION DIAGRAM
ONOVILLE MARINA PARK SITE IMPROVEMENTS

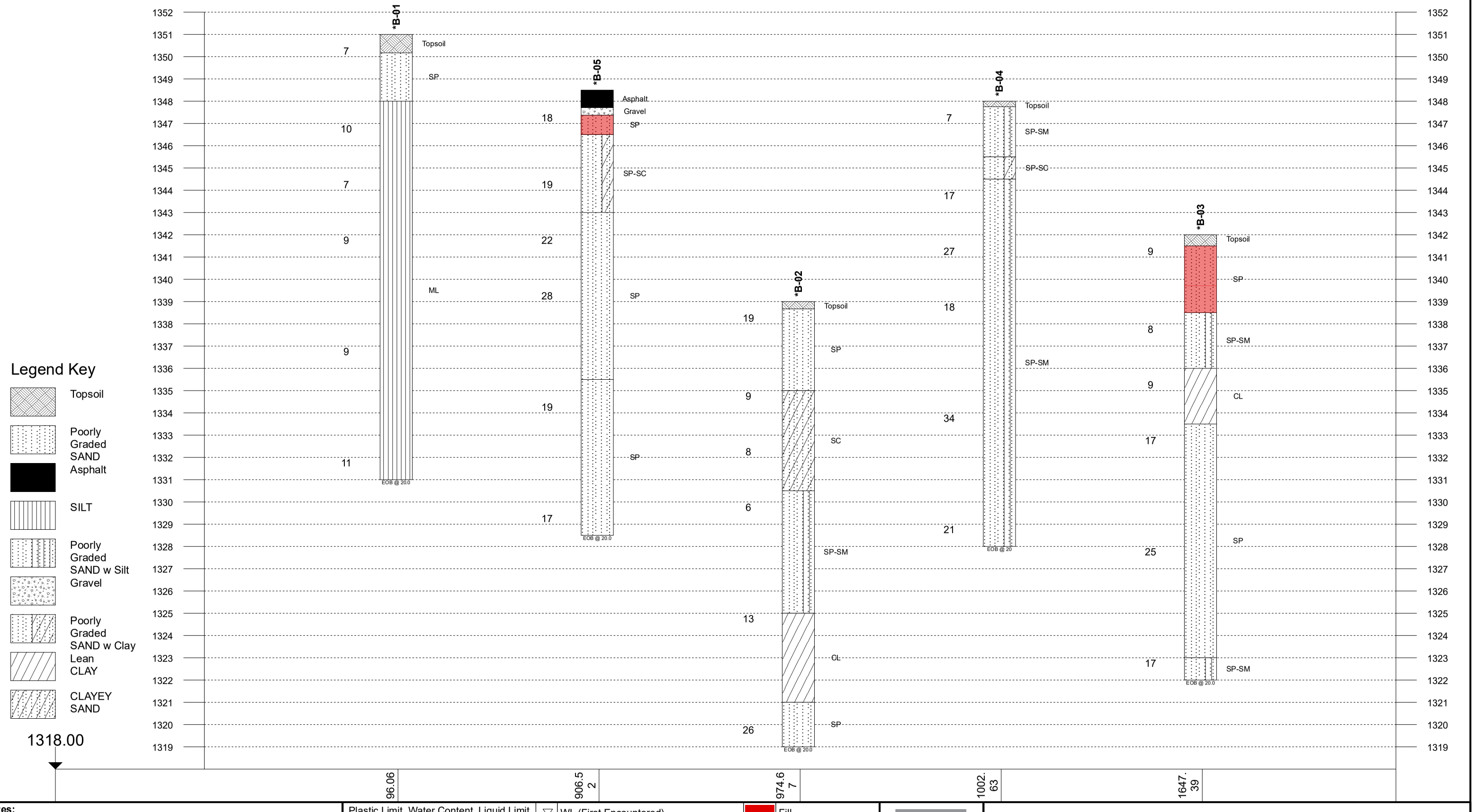
704 WEST PERIMETER ROAD, FREWSBURG, NEW YORK
BEARDSLEY DESIGN ASSOCIATES

ENGINEER	JMC2
SCALE	AS NOTED
PROJECT NO.	95:1054
FIGURE	1 OF 1
DATE	12/23/2022

EXPLORATION LOCATION DIAGRAM
ONOVILLE MARINA PARK SITE IMPROVEMENTS

704 WEST PERIMETER ROAD, FREWSBURG, NEW YORK
BEARDSLEY DESIGN ASSOCIATES

ENGINEER	JMC2
SCALE	AS NOTED
PROJECT NO.	95:1054
FIGURE	1 OF 1
DATE	1/18/2023



Legend Key

- Topsoil
- Poorly Graded SAND
- Asphalt
- SILT
- Poorly Graded SAND w Silt Gravel
- Poorly Graded SAND w Clay
- Lean CLAY
- CLAYEY SAND

Notes:

1- EOB: END OF BORING AR: AUGER REFUSAL SR: SAMPLER REFUSAL.
2- THE NUMBER BELOW THE STRIPS IS THE DISTANCE ALONG THE BASELINE.
3- SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL INFORMATION.
4- STANDARD PENETRATION TEST RESISTANCE (LEFT OF BORING) IN BLOWS PER FOOT (ASTM D1586).
5- NOT TO SCALE IN THE HORIZONTAL DIRECTION.

Plastic Limit Water Content Liquid Limit
X———●———△
[FINES CONTENT %]

BOTTOM OF CASING
LOSS OF CIRCULATION

WL (First Encountered)
WL (Completion)
WL (Estimated Seasonal High Water)
WL (Stabilized)

Fill
Possible Fill
Probable Fill
Rock

GENERALIZED SUBSURFACE SOIL PROFILE A-A'

Onoville Marina Park Site Improvements
Beardsley Design Associates
704 West Perimeter Road, Frewsburg, New York, 14738

Project No: 95:1054 Date: 01/19/2023

GEOLOGY MAP
ONOVILLE MARINA PARK SITE IMPROVEMENTS

704 WEST PERIMETER ROAD, FREWSBURG, NEW YORK
BEARDSLEY DESIGN ASSOCIATES

ENGINEER	JMC2
SCALE	AS NOTED
PROJECT NO.	95:1054
FIGURE	1 OF 1
DATE	12/23/2022

SOIL SURVEY MAP
ONOVILLE MARINA PARK SITE IMPROVEMENTS

704 WEST PERIMETER ROAD, FREWSBURG, NEW YORK
BEARDSLEY DESIGN ASSOCIATES

DRAFTER	MDH
SCALE	NTS
PROJECT NO.	95:1054
DATE	1/18/2023
SOURCE	Web Soil Survey https://websoilsurvey.nrcs.usda.gov

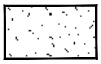
APPENDIX B – Field Operations

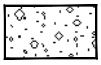
Reference Notes for Boring Logs
Subsurface Exploration Procedures: Standard Penetration Testing (SPT)
Boring Logs B-01 through B-05

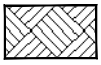
REFERENCE NOTES FOR BORING LOGS

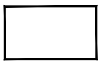
MATERIAL[1,2]

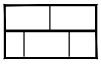

ASPHALT


CONCRETE


GRAVEL

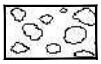

TOPSOIL

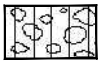

VOID


BRICK

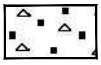

AGGREGATE BASE COURSE

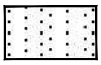

GW **WELL-GRADED GRAVEL**
gravel-sand mixtures, little or no fines

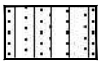

GP **POORLY-GRADED GRAVEL**
gravel-sand mixtures, little or no fines


GM **SILTY GRAVEL**
gravel-sand-silt mixtures

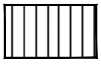

GC **CLAYEY GRAVEL**
gravel-sand-clay mixtures

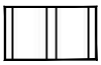

SW **WELL-GRADED SAND**
gravelly sand, little or no fines

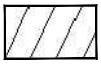

SP **POORLY-GRADED SAND**
gravelly sand, little or no fines


SM **SILTY SAND**
sand-silt mixtures

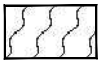

SC **CLAYEY SAND**
sand-clay mixtures

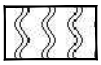

ML **SILT**
non-plastic to medium plasticity

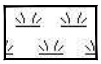

MH **ELASTIC SILT**
high plasticity


CL **LEAN CLAY**
low to medium plasticity


CH **FAT CLAY**
high plasticity


OL **ORGANIC SILT or CLAY**
non-plastic to low plasticity


OH **ORGANIC SILT or CLAY**
high plasticity


PT **PEAT**
highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS

SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION

DESIGNATION		PARTICLE SIZES
Boulders		12 inches (300 mm) or larger
Cobbles		3 inches to 12 inches (75 mm to 300 mm)
Gravel:	Coarse	¾ inch to 3 inches (19 mm to 75 mm)
	Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand:	Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
	Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
	Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")		<0.074 mm (smaller than a No. 200 sieve)

COHESIVE SILTS & CLAYS

UNCONFINED COMPRESSIVE STRENGTH, Q_P[4]	SPT[5] (BPF)	CONSISTENCY[7] (COHESIVE)
<0.25	<2	Very Soft
0.25 - <0.50	2 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

GRAVELS, SANDS & NON-COHESIVE SILTS

SPT[5]	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

RELATIVE AMOUNT[7]	COARSE GRAINED (%)[8]	FINE GRAINED (%)[8]
Trace	≤5	≤5
With	10 - 20	10 - 25
Adjective *(ex: "Silty")*	25 - 45	30 - 45

WATER LEVELS[6]

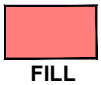

WL (First Encountered)


WL (Completion)


WL (Seasonal High Water)


WL (Stabilized)

FILL AND ROCK


FILL


POSSIBLE FILL


PROBABLE FILL


ROCK

[1]Classifications and symbols per ASTM D 2488-17 (Visual-Manual Procedure) unless noted otherwise.

[2]To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

[3]Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

[4]Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

[5]Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf). SPT correlations per 7.4.2 Method B and need to be corrected if using an auto hammer.

[6]The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

[7]Minor deviation from ASTM D 2488-17 Note 14.

[8]Percentages are estimated to the nearest 5% per ASTM D 2488-17.

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SUBSURFACE EXPLORATION PROCEDURE: STANDARD PENETRATION TESTING (SPT) ASTM D 1586 Split-Barrel Sampling

Standard Penetration Testing, or **SPT**, is the most frequently used subsurface exploration test performed worldwide. This test provides samples for identification purposes, as well as a measure of penetration resistance, or N-value. The N-Value, or blow counts, when corrected and correlated, can approximate engineering properties of soils used for geotechnical design and engineering purposes.

SPT Procedure:

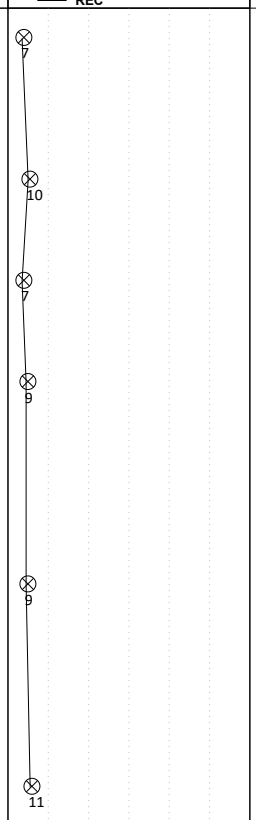
- Involves driving a hollow tube (split-spoon) into the ground by dropping a 140-lb hammer a height of 30-inches at desired depth
- Recording the number of hammer blows required to drive split-spoon a distance of 18-24 inches (in 3 or 4 Increments of 6 inches each)

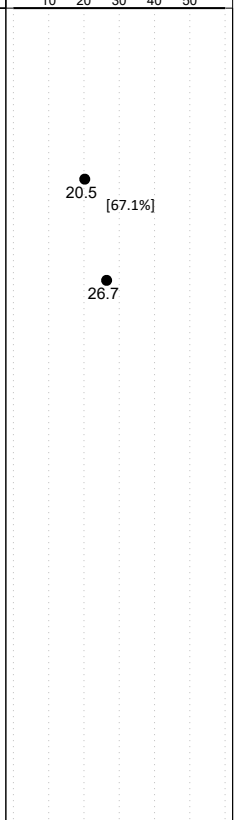
- Auger is advanced* and an additional SPT is performed
- One SPT typically performed for every two to five feet. An approximate 1.5 inch diameter soil sample is recovered.

**Drilling Methods May Vary*— The predominant drilling methods used for SPT are open hole fluid rotary drilling and hollow-stem auger drilling.

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Beardsley Design Associates	**95:1054**	**B-01**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Onoville Marina Park Site Improvements	**Chatfield Drilling Inc.**		
SITE LOCATION: **704 West Perimeter Road, Frewsburg, New York, 14738**			LOSS OF CIRCULATION
NORTHING: **1195569.9**	EASTING: **-722877.9**	STATION:	SURFACE ELEVATION: **1351**
			BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0	S-1	SS	18	18	Topsoil Thickness[10.00"]			2-3-4 (7)
					(SP) SAND WITH GRAVEL, brown, moist, loose			
					(ML) SANDY SILT, brown, moist to wet, loose to medium dense			
5	S-2	SS	18	18			1346	4-4-6 (10)
	S-3	SS	18	18				2-3-4 (7)
10	S-4	SS	18	18			1341	2-3-6 (9)
15	S-5	SS	18	18			1336	3-4-5 (9)
20	S-6	SS	18	18	**END OF BORING AT 20.0 FT**		1331	4-4-7 (11)
25							1326	
30							1321	





THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	**N/E**	BORING STARTED:	**Jan 05 2023**	CAVE IN DEPTH:	**18.00**
WL (Completion)	**N/E**	BORING COMPLETED:	**Jan 05 2023**	HAMMER TYPE:	**Auto**
WL (Seasonal High Water)	**N/E**	EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	**3.25" HSA**
WL (Stabilized)		**Deidrick D-50**	**DBS1**		

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Beardsley Design Associates	**95:1054**	**B-02**	**1 of 1**

PROJECT NAME:	DRILLER/CONTRACTOR:
Onoville Marina Park Site Improvements	**Chatfield Drilling Inc.**

SITE LOCATION: **704 West Perimeter Road, Frewsburg, New York, 14738**

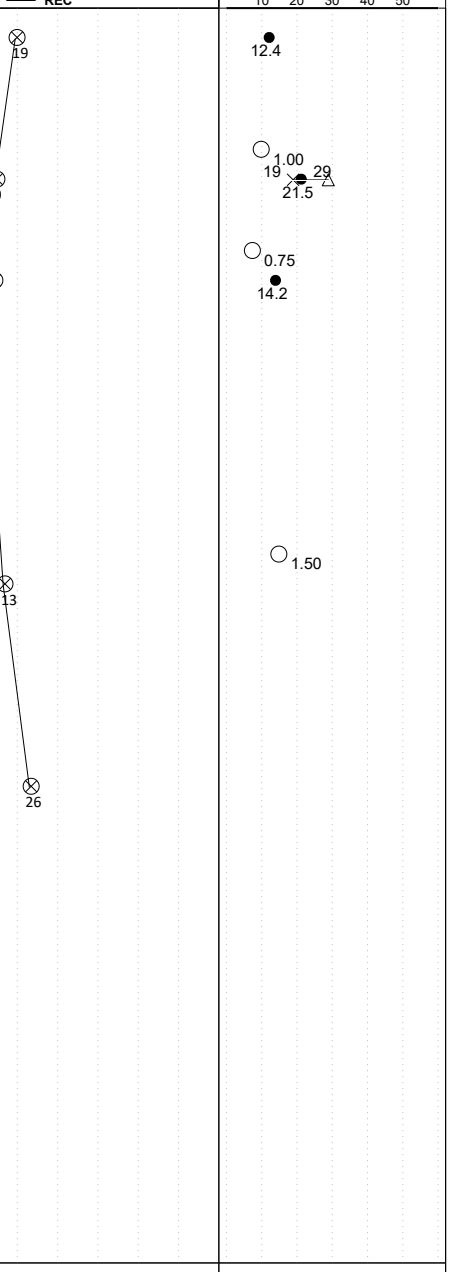
LOSS OF CIRCULATION

NORTHING:	EASTING:	STATION:	SURFACE ELEVATION:	BOTTOM OF CASING
1195653.6	**-722000.8**		**1339**	

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0	S-1	SS	18	18	Topsoil Thickness[4.00"] (SP) SAND WITH GRAVEL, brown, moist, medium dense			5-10-9 (19)
	S-2	SS	18	16	(SC) CLAYEY SAND WITH GRAVEL, grayish brown, moist to wet, loose, roots noted at 3.5'			5-5-4 (9)
5	S-3	SS	18	11			1334	4-4-4 (8)
	S-4	SS	18	6	(SP-SM) SAND WITH SILT, grayish brown, moist to wet, loose			3-3-3 (6)
10							1329	
	S-5	SS	18	14	(CL) LEAN CLAY, gray, moist to wet, stiff			6-6-7 (13)
15							1324	
	S-6	SS	18	18	(SP) SAND WITH GRAVEL, brown, moist, medium dense, contains rock fragments			11-9-17 (26)
20					**END OF BORING AT 20.0 FT**		1319	
25							1314	
30							1309	

STANDARD PENETRATION BLOWS/FT (20 40 60 80 100)
ROCK QUALITY DESIGNATION & RECOVERY
RQD
REC

LIQUID LIMIT
PLASTIC LIMIT
CALIBRATED PENETROMETER TSF (1 2 3 4 5)
WATER CONTENT %
[FINES CONTENT] % (10 20 30 40 50)



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	**N/E**	BORING STARTED:	**Jan 05 2023**	CAVE IN DEPTH:	**15.80**
WL (Completion)	**N/E**	BORING COMPLETED:	**Jan 05 2023**	HAMMER TYPE:	**Auto**
WL (Seasonal High Water)	**N/E**	EQUIPMENT:	**Deidrick D-50**	LOGGED BY: **DBS1**	DRILLING METHOD: **3.25" HSA**
WL (Stabilized)					

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Beardsley Design Associates	**95:1054**	**B-03**	**1 of 1**

PROJECT NAME:	DRILLER/CONTRACTOR:
Onoville Marina Park Site Improvements	**Chatfield Drilling Inc.**

SITE LOCATION: **704 West Perimeter Road, Frewsburg, New York, 14738**

LOSS OF CIRCULATION

NORTHING:	EASTING:	STATION:	SURFACE ELEVATION:	BOTTOM OF CASING
1195579.0	**-721326.5**		**1342**	

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0	S-1	SS	18	15	Topsoil Thickness[6.00"] (SP FILL) FILL, SAND WITH GRAVEL, brown, moist, loose			2-3-6 (9)
	S-2	SS	18	18	(SP-SM) SAND WITH SILT AND GRAVEL, brown, moist, loose, roots noted at 3.5'		1337	4-4-4 (8)
5	S-3	SS	18	18	(CL) LEAN CLAY, gray, moist to wet, stiff			4-4-5 (9)
	S-4	SS	18	18	(SP) SAND WITH GRAVEL, brown, moist, medium dense		1332	9-9-8 (17)
10								
	S-5	SS	18	18			1327	10-12-13 (25)
15								
	S-6	SS	18	18	(SP-SM) SAND WITH SILT, brown, moist, medium dense		1322	7-8-9 (17)
20					**END OF BORING AT 20.0 FT**			
25							1317	
30							1312	

STANDARD PENETRATION BLOWS/FT (20 40 60 80 100)
ROCK QUALITY DESIGNATION & RECOVERY
RQD
REC

LIQUID LIMIT
PLASTIC LIMIT
CALIBRATED PENETROMETER TSF (1 2 3 4 5)
WATER CONTENT %
[FINES CONTENT] % (10 20 30 40 50)

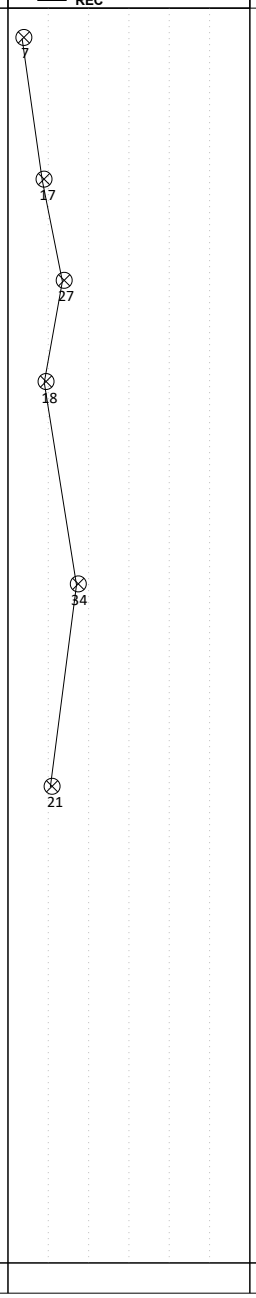
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

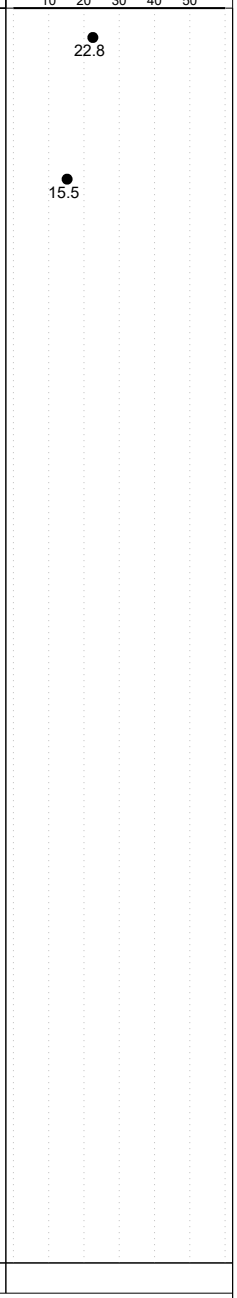
WL (First Encountered)	**N/E**	BORING STARTED:	**Jan 05 2023**	CAVE IN DEPTH:	**16.50**
WL (Completion)	**N/E**	BORING COMPLETED:	**Jan 05 2023**	HAMMER TYPE:	**Auto**
WL (Seasonal High Water)	**N/E**	EQUIPMENT:	**Diedrick D-50**	LOGGED BY: **DBS1**	DRILLING METHOD: **3.25" HSA**
WL (Stabilized)					

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Beardsley Design Associates	**95:1054**	**B-04**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Onoville Marina Park Site Improvements	**Chatfield Drilling Inc.**		
SITE LOCATION: **704 West Perimeter Road, Frewsburg, New York, 14738**			LOSS OF CIRCULATION
NORTHING: **1195917.5**	EASTING: **-721978.3**	STATION:	SURFACE ELEVATION: **1348**
			BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0	S-1	SS	18	18	Topsoil Thickness[3.00"] (SP-SM) SAND WITH SILT, grayish brown, moist, loose			WOH-2-5 (7)
					(SP-SC) SAND WITH CLAY AND GRAVEL, gray, moist, roots noted at 3'			
	S-2	SS	18	18	(SP-SM) SAND WITH SILT AND GRAVEL, brown, moist, medium dense to dense			8-3-14 (17)
5	S-3	SS	18	15			1343	5-12-15 (27)
	S-4	SS	18	15				7-9-9 (18)
10	S-5	SS	18	18			1338	10-15-19 (34)
15	S-6	SS	18	18			1333	7-8-13 (21)
20					**END OF BORING AT 20 FT**		1328	
25							1323	
30							1318	





THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	**N/E**	BORING STARTED:	**Jan 05 2023**	CAVE IN DEPTH:	**15.50**
WL (Completion)	**N/E**	BORING COMPLETED:	**Jan 05 2023**	HAMMER TYPE:	**Auto**
WL (Seasonal High Water)	**N/E**	EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	**3.25" HSA**
WL (Stabilized)		**Diedrick D-50**	**DBS1**		

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Beardsley Design Associates	**95:1054**	**B-05**	**1 of 1**

PROJECT NAME:	DRILLER/CONTRACTOR:
Onoville Marina Park Site Improvements	**Chatfield Drilling Inc.**

SITE LOCATION: **704 West Perimeter Road, Frewsburg, New York, 14738**

LOSS OF CIRCULATION

NORTHING:	EASTING:	STATION:	SURFACE ELEVATION:	BOTTOM OF CASING
1195902.1	**-722074.1**		**1348.5**	

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0	S-1	SS	18	18	Asphalt Thickness[9.50"] Gravel Thickness[4.00"] (SP FILL) FILL, SAND WITH GRAVEL, brown, moist, medium dense			6-8-10 (18)
5	S-2	SS	18	10	(SP-SC) SAND WITH CLAY AND GRAVEL, brown, moist to wet, medium dense		1344	4-7-12 (19)
	S-3	SS	18	18	(SP) SAND WITH GRAVEL, brown, moist, medium dense			5-10-12 (22)
10	S-4	SS	18	18			1339	7-12-16 (28)
15	S-5	SS	18	14	(SP) SAND WITH GRAVEL, brown, moist, medium dense, contains rock fragments		1334	10-10-9 (19)
20	S-6	SS	18	18	**END OF BORING AT 20.0 FT**		1329	8-9-8 (17)
25							1324	
30							1319	

STANDARD PENETRATION BLOWS/FT (20 40 60 80 100)
ROCK QUALITY DESIGNATION & RECOVERY
RQD
REC
18 19 22 28 19 17

LIQUID LIMIT
PLASTIC LIMIT
CALIBRATED PENETROMETER TSF (1 2 3 4 5)
WATER CONTENT %
[FINES CONTENT] % (10 20 30 40 50)
14.5 20.3

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	**N/E**	BORING STARTED: **Jan 05 2023**	CAVE IN DEPTH: **15.50**	
WL (Completion)	**N/E**	BORING COMPLETED: **Jan 05 2023**	HAMMER TYPE: **Auto**	
WL (Seasonal High Water)	**N/E**	EQUIPMENT: **Diedrick D-50**	LOGGED BY: **DBS1**	DRILLING METHOD: **3.25" HSA**
WL (Stabilized)				

GEOTECHNICAL BOREHOLE LOG

APPENDIX C – Laboratory Testing

Laboratory Test Results Summary
Plasticity Chart

Laboratory Testing Summary

Sample Location	Sample Number	Depth (feet)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
B-01	S-2	3.5-5	20.5					67.1					
B-01	S-3	6-7.5	26.7										
B-02	S-1	0-1.5	12.4										
B-02	S-2	3.5-5	21.5		29	19	10						
B-02	S-3	6-7.5	14.2										
B-03	S-2	3.5-5	14.0										
B-03	S-3	6-7.5	24.1		31	20	11						
B-04	S-1	0-1.5	22.8										
B-04	S-2	3.5-5	15.5										
B-05	S-1	0.5-2	14.5										

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

Project: Onoville Marina Park Site Improvements
Client: Beardsley Design Associates

Project No.: 95:1054
Date Reported: 1/18/2023

Office / Lab	Address	Office Number
ECS New York, PLLC	14026 Thunderbolt Pl., Suite 1250 Chantilly, VA 20151	(571)299-6000

Tested by	Checked by	Approved by	Date Received
JGates		mhartman	

Laboratory Testing Summary

Sample Location	Sample Number	Depth (feet)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
B-05	S-2	3.5-5	20.3										

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

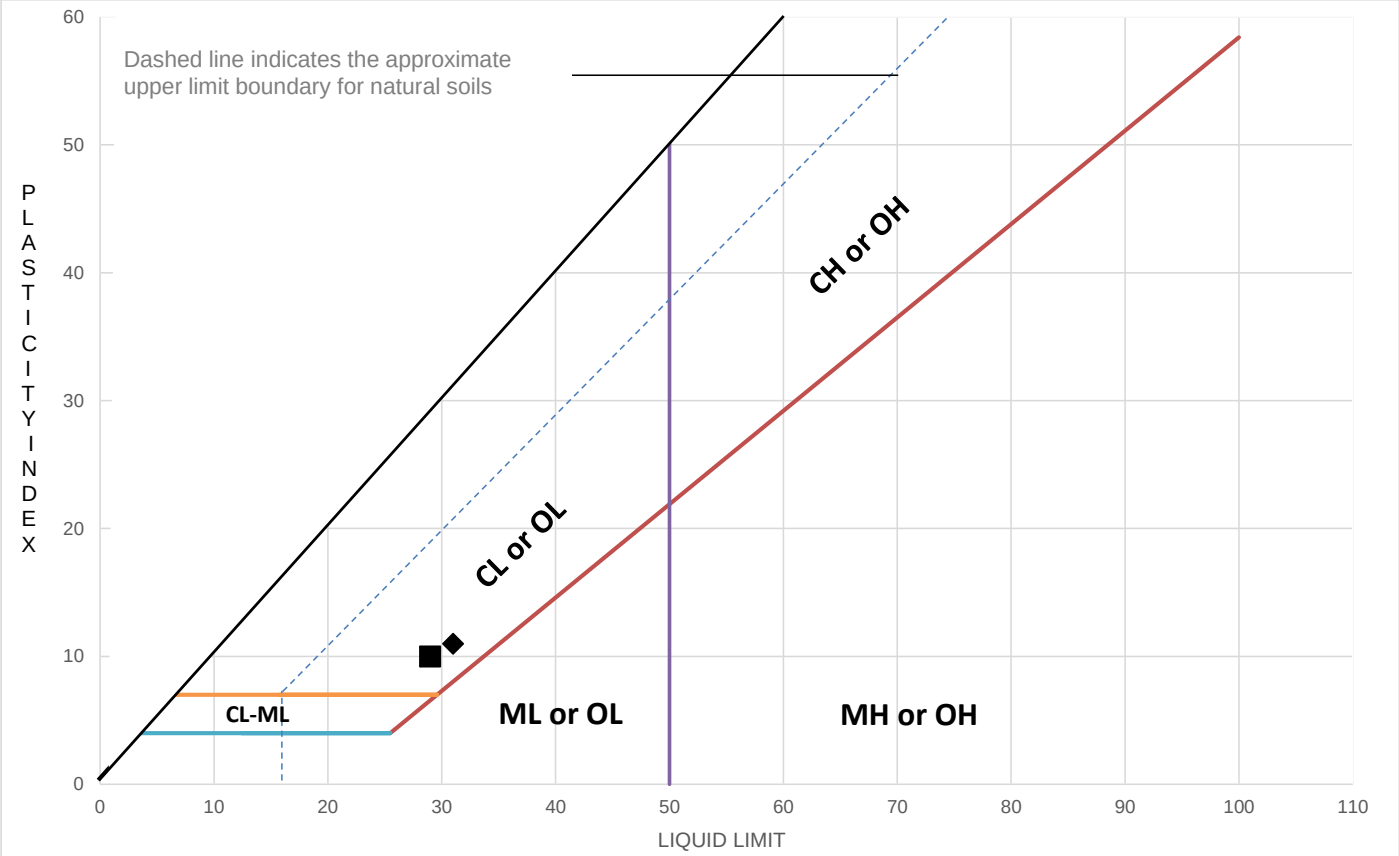
Project: Onoville Marina Park Site Improvements
Client: Beardsley Design Associates

Project No.: 95:1054
Date Reported: 1/18/2023

Office / Lab	Address	Office Number
ECS New York, PLLC	14026 Thunderbolt Pl., Suite 1250 Chantilly, VA 20151	(571)299-6000

Tested by	Checked by	Approved by	Date Received
JGates		mhartman	

LIQUID AND PLASTIC LIMITS TEST REPORT



TEST RESULTS (ASTM D4318-10 (MULTIPOINT TEST))

	Sample Location	Sample Number	Sample Depth (ft)	LL	PL	PI	%<#40	%<#200	AASHTO	USCS	Material Description
■	B-02	S-2	3.5-5	29	19	10					
◆	B-03	S-3	6-7.5	31	20	11					

Project: Onoville Marina Park Site Improvements
Client: Beardsley Design Associates

Project No.: 95:1054
Date Reported: 1/18/2023

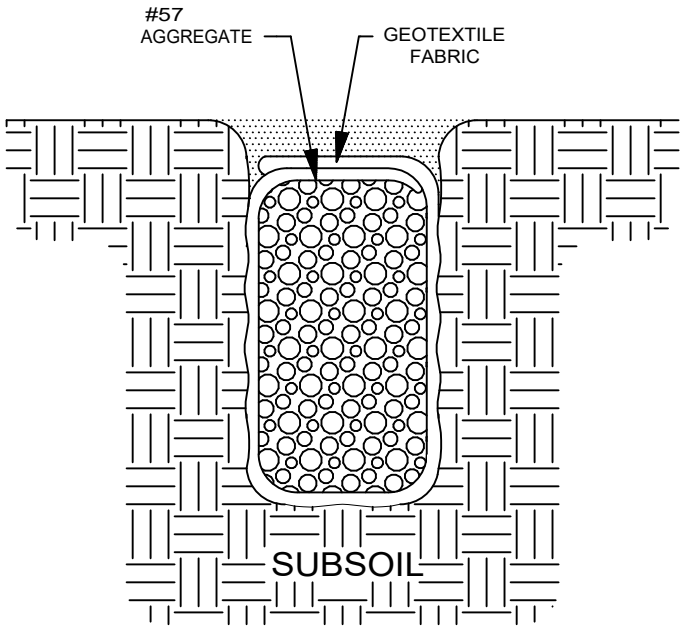
Office / Lab	Address	Office Number
ECS New York, PLLC	14026 Thunderbolt Pl., Suite 1250 Chantilly, VA 20151	(571)299-6000

Tested by	Checked by	Approved by	Date Received
JGates		mhartman	

APPENDIX D – Supplemental Report Documents

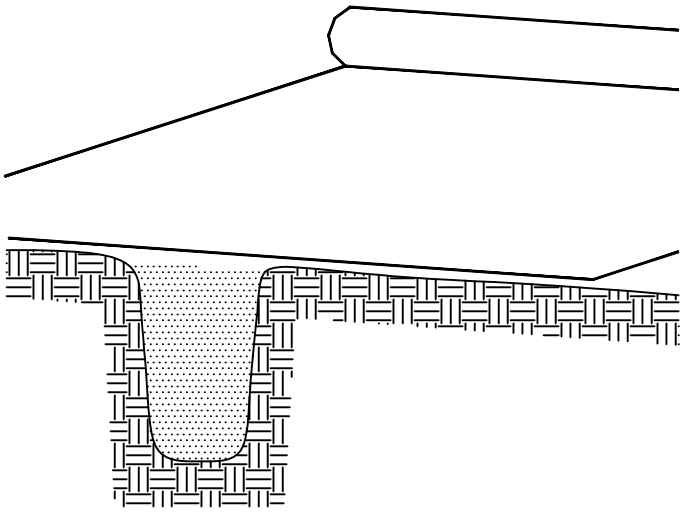
French Drain Installation Procedure

FINAL CONFIGURATION



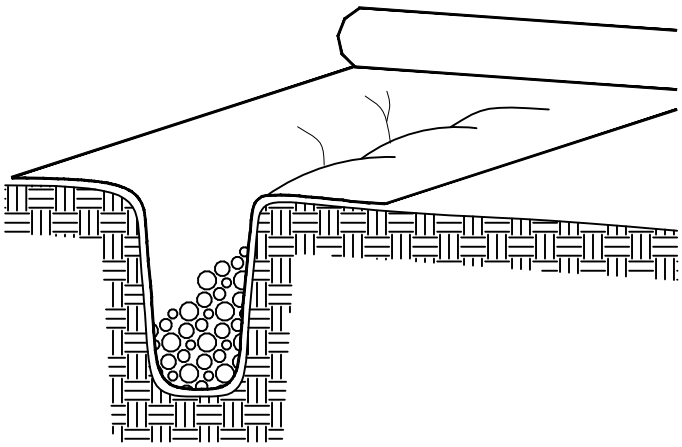
SUBDRAIN USING FILTER FABRIC

STEP 1



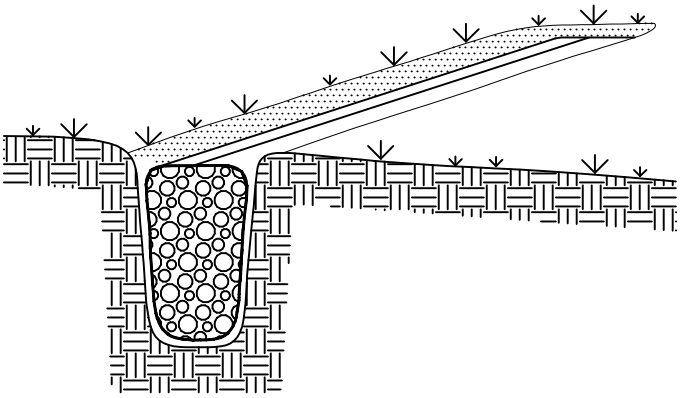
FABRIC IS UNROLLED DIRECTLY OVER TRENCH

STEP 2



THE TRENCH IS FILLED WITH AGGREGATE

STEP 3



THE FABRIC IS LAPPED CLOSED AND
COVERED WITH BASE STONE

ECS NEW YORK, PLLC

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FRENCH DRAIN TYPICAL DETAIL

INSTALLATION PROCEDURE

NTS