BUFFALO
SEWER AUTHORITY

ATTACHMENT D

ATLANTIC TESTING LABORATORIES
A PHENNA GROUP COMPANY

Buffalo
5167 South Park Ave
Hamburg, NY 14075
716-649-8110 (T)
atlantictesting.com

June 20, 2025

TYLin – Greeley and Hansen Water Solutions
77 Broadway Street – Suite 208
Buffalo, New York 14203

Attn: Walter A. Walker, PE, ENV SP
Program Manager

Re: Subsurface Investigation and Geotechnical Evaluation
Proposed Sewer Line Replacement
Louisiana Street – South Street to Republic Street
Buffalo, New York
ATL Report No. BD240E-01-01-25

Walter Walker:

Enclosed is one (1) electronic copy of the referenced report. ATL appreciates the opportunity to provide geotechnical services for your project.

Please note that upon completion of the subsurface investigation, the borings were backfilled with on-site soils and the surface was patched as appropriate. It is important that the backfilled boring be monitored for settlement or subsidence. This will be the responsibility of TYLin – Greeley and Hansen Water Solutions. ATL assumes no liability for loss or damage resulting from borehole settlement. The soil and bedrock samples obtained during this investigation will be retained for a period of six months and subsequently discarded, unless otherwise instructed.

Please contact our office should you have any questions or comments on this information, or if we may be of further service. We look forward to our continued association to obtain a successful completion of this project.

Sincerely,
ATLANTIC TESTING LABORATORIES, Limited

Thomas R. Seider, PE
Senior Engineer

TRS/sb

Enclosures

SUBSURFACE INVESTIGATION
AND
GEOTECHNICAL EVALUATION

PROPOSED SEWER LINE REPLACEMENT
LOUISIANA STREET – SOUTH STREET TO REPUBLIC STREET
BUFFALO, NEW YORK

TYLIN – GREELEY AND HANSEN WATER SOLUTIONS

PREPARED FOR: **TYLin – Greeley and Hansen Water Solutions**
77 Broadway Street – Suite 208
Buffalo, New York, 14203

PREPARED BY: **Atlantic Testing Laboratories, Limited**
5167 South Park Avenue
Hamburg, New York, 14075

ATL Report No. BD240-01-01-25

June 20, 2025

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GEOTECHNICAL EVALUATION

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BUFFALO, NEW YORK

TYLIN – GREELEY AND HANSEN WATER SOLUTIONS

1.0 INTRODUCTION

At the request of TYLin – Greeley and Hansen Water Solutions (TYLin), and in accordance with our proposal (ATL File No. BD998-095-01-25, dated January 16, 2025), Atlantic Testing Laboratories, Limited (ATL) performed a subsurface investigation and geotechnical evaluation for the above referenced project. The purpose of the investigation was to ascertain the general subsurface soil, bedrock, and groundwater conditions at the site, to evaluate the engineering significance of these findings, and to provide recommendations related to the design and construction of the proposed project.

2.0 PROJECT AND SITE DESCRIPTION

The proposed project is expected to include the replacement of approximately 650 linear feet of existing sewer line piping, along the west side of Louisiana Street, extending from near South Street to near Republic Street. The existing sewer line reportedly consist of a 24-inch diameter pipe, with an invert at a depth of about 10 feet below the existing site grades. The new sewer line is planned to consist of two 60-inch diameter pipes, with an invert near a depth of about 10 feet. The larger pipes will be used to temporarily store flows during wet weather events.

The existing project site conditions generally consist of relatively level, open lawn space, and a concrete sidewalk, along the west side of Louisiana Street. Additional details about the current site conditions are shown on the **Boring Location Plan**, included in **Appendix A**.

Based on a cursory review of historic aerial mapping (www.historicaerials.com), a former water channel extended from the Buffalo River, beneath Ohio Street, and into a water basin to the northwest of the Louisiana Street and Republic Street intersection. This basin appears to have been filled in over serval years during the 1950s and 1960s. In addition, the abandoned rail lines along the south side of Republic Street, previously crossed Louisiana Street, and extended along the west side of Louisiana Street. There also appears to have been a bridge on Louisiana Street that crossed over the rail lines.

3.0 SUBSURFACE INVESTIGATION & SAMPLING METHODOLOGY

3.1 Boring Locations

Three boring locations, designated as B-1 through B-3 were selected by TYLin's subconsultant, JM Davidson Engineering, DPC. ATL used Google Earth to establish the GPS northing and easting coordinates for the boring locations, based on the plans provided. A Trimble Model R8 GPS / GNSS Receiver was then used to locate the borings in the field and to determine the approximate ground surface elevations. The approximate boring locations are shown on the Boring Location Plan, included in Appendix A. The recorded coordinates at the boring locations, along with the approximate ground surface elevations are summarized in **Table 1**, within **Appendix B**.

3.2 Soil and Bedrock Borings

The borings were completed by ATL on May 7th and 8th, 2025, using a Central Mine Equipment (CME) model 550X, all-terrain tire mounted drill rig. The borings were advanced through the overburden soils using hollow stem auger and split spoon soil sampling techniques. Soil sampling and standard penetration testing was performed continuously to a depth of 12 feet and in intervals of five feet or less for the remining depth of the borings. The soil sampling and standard penetration testing was completed utilizing a 2-inch outside diameter split spoon sampler and automatic drop hammer, in accordance with ASTM D 1586.

Boring B-2 was completed to a depth of 25 feet. Borings B-1 and B-3 were both advanced through the overburden soils until encountering auger refusal at the top of apparent bedrock, at depths of 20.6 feet and 32.0 feet, respectively. Following auger refusal within boring B-1, five feet of rock coring was completed, using an NX size core barrel, in accordance with ASTM D 2113.

The collected soil samples were visually classified in the laboratory by a soil technician using the Burmister Soil Classification System. The split spoon sampler does not recover particles larger than 1⅜-inch in nominal dimension; therefore, the soil classifications may not be representative of the entire soil matrix. The recovered rock core was also described, including characteristics such as color, rock type, core recovery and rock quality designation (RQD). The visual classifications and the standard penetration test results are presented on the **Subsurface Investigation Logs,** included in **Appendix C**.

3.3 Groundwater Observation Well

A groundwater observation well was installed within completed boring B-2. The observation well consists of 2-inch diameter PVC machine slot well screen and riser pipe, with filter sand installed around the well screen. The sand pack for the observation well extends from the bottom of the boring at 25 feet, up to about 10.5 feet below the surface. A bentonite chip seal was installed above the sand pack up to about 8.5 feet. A cement-bentonite grout was used to backfill the remainder of the bore hole above the bentonite seal, and a flush-mount protective casing was installed at the surface. Additional details regarding the construction of the observation well are shown on the **Monitoring Well Installation Detail**, following boring log B-2, in **Appendix C**.

4.0 GEOTECHNICAL LABORATORY ANALYSES

Select samples of the overburden indigenous soils were tested in ATL's geotechnical laboratory for the following physical analyses.

- Laboratory Determination of Moisture Content of Soils (ASTM D 2216).
- Particle Size Distribution, both with and without Hydrometer Analyses (ASTM D 422).
- Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D 4318).

The **Laboratory Test Results** for the soil samples are included in **Appendix D**, and are summarized in the Section 5.2 of this report.

5.0 SUBSURFACE CONDITIONS

The following description of subsurface conditions is based on the subsurface soil, bedrock, and groundwater conditions encountered during the subsurface investigation performed on May 7th and 8th, 2025, along with a review of the laboratory test results, and water level measurements in the observation well. Actual subsurface conditions could vary across the project site in both the horizontal and vertical dimensions. More detailed subsurface descriptions are provided on the subsurface investigation logs in Appendix C.

5.1 Surface Conditions and Existing Fill Soils

Topsoil was encountered at the surface of the soil borings, and was reported to have a thickness of about 12 inches at boring B-1, and about 4 inches at boring B-2. The topsoil thickness was not recorded at boring B-3. The topsoil thickness measurements noted by the driller were made at widely spaced locations. In addition, properly measuring the topsoil thicknesses within the split spoon samples and / or boring holes is difficult and can vary depending on the driller's interpretation of topsoil. Accordingly, it should be expected that the topsoil thickness will vary between and away from the boring locations.

Beneath the topsoil, man-placed fill type soils were encountered, which extended to a depth of about 4-feet within each of the three borings. It should be expected that the fill thickness will vary between and away from the boring locations, and will be dependent on the original site topography prior to development. The fill soils will also extend to the bottom of the excavations made for any existing or former structure foundations, utilities, or the previously mentioned nearby water channel and basin.

The nature of the fill soils varied with location and depth, but can generally be described as a mixture of varying proportions of clays and silts (i.e. fines), sands, and gravels. The fill soils encountered within brings B-1 and B-2 contained a higher percentage of fines, while the fill soils encountered within boring B-3 contained a higher percentage of sand and gravel size particles. Trace amounts of brick fragments, slag, concrete fragments, cinders, and roots, were often observed within the samples of fill soils. The Standard Penetration Test (SPT) "N" values obtained within the fill soils ranged from 7 to 26, indicating the fill soils have a variable relative density of "loose" to "firm" or a variable consistency of "medium" to "very stiff".

5.2 Indigenous Soils

Beneath the existing fill soils and extending to the top of bedrock, the indigenous soils consisted mostly of a medium to high plasticity mixture of clays and silts with varying amounts of intermixed sand and limited amounts of gravel. All of the samples of indigenous soils from boring B-2, and the samples of indigenous soils from 4 to 8 feet at boring B-3, contained trace amounts of root fragments. In addition, trace amounts of wood were observed within the 10 to 12 feet deep sample at boring B-3. The trace amounts of roots and wood observed, appear to be naturally deposited, and not the result of man-placed fill soils. The SPT "N" values obtained within the indigenous soils were generally in the range of 4 to 19, indicating the indigenous soils mostly have a "medium" to "very stiff" consistency.

Several samples of indigenous soils were tested in ATL's geotechnical laboratory for moisture content, particle size distribution, and liquid / plastic limits. The Laboratory Test Results are included in Appendix D, are summarized in the following table, and generally confirm the visual soil classifications.

Geotechnical Laboratory Testing Results - Indigenous Soils

Test Boring	Sample Depth (ft. bgs)	Moisture Content (%)	Particle Size Analysis				PL / LL / PI
			Gravel (%)	Sand (%)	Fines		
					Silt (%)	Clay (%)	
B-1	8 to 10	20.0	0	79	15	6	not tested
B-1	10 to 12	30.4	0	10	90		18 / 47 / 29
B-2	4 to 6	21.6	not tested				not tested
B-2	6 to 8	23.8	0	6	94		19 / 31 / 12
B-2	10 to 12	25.2	0	11	34	55	not tested
B-3	4 to 6	18.9	1	22	43	34	not tested
B-3	6 to 8	20.6	not tested				not tested
B-3	8 to 10	24.9	not tested				not tested
B-3	10 to 12	45.7	not tested				not tested
B-3	15 to 17	17.5	0	0	100		12 / 24 / 12

Notes:

1) ft. bgs = feet below ground surface.

2) PL = Plastic Limit, LL = liquid limit, PI = Plasticity Index.

5.3 Bedrock

Borings B-1 and B-3 were advanced through the overburden fill and indigenous soils until encountering auger refusal conditions at the top of apparent bedrock. Within boring B-1, auger refusal was encountered at a depth of 20.6 feet (approximate elevation 559.2 feet). Within boring B-3, auger refusal was encountered somewhat deeper, at 32.0 feet (approximate elevation 547.2 feet). Subsequent rock coring within boring B-1, confirmed the auger refusal conditions consisted of bedrock. The recovered bedrock core was described as grey, hard, weathered to sound, thinly to thickly bedded, Limestone bedrock, with some fractures. The core recovery was 100%, and the RQD value was 73%, indicating the rock mass quality is “fair”.

5.4 Groundwater

At the completion of overburden drilling at boring B-2, no free standing water was present, and at the completion of overburden drilling at boring B-3, water was recorded at a depth of 20 feet. A water level reading was not obtained within boring B-1 prior to rock coring. Based on the subsequent water level readings obtained at the observation well, it appears the groundwater within completed borings B-2 and B-3 did not have adequate time to fully accumulate and stabilize in the borings, during the relatively short time period that had elapsed from the completion of overburden drilling operations and the time of the measurements.

A groundwater observation well was installed within completed boring B-2, with the well screen and sand pack extending from a depth of 10.5 feet to 25 feet. Water level measurements were obtained at the observation well on three occasions, and are summarized in the following table.

Summary of Water Levels within Observation Well

Observation Well	Ground Surface Elevation (feet)	Date	Groundwater Depth / Elevation (feet)
B-2	579.8	May 9, 2025	15.33 / 564.5
		May 13, 2025	7.20 / 572.6
		May 30, 2025	6.95 / 572.9

The observation well was installed on May 8th, 2025. It appears that the groundwater did not have adequate time to stabilize at the time the May 9th, 2025 water level measurement was made. Based on the two subsequent water level readings, a general groundwater condition was near a depth of 7 feet or elevation 573 feet.

Following the May 13th, 2025 water level reading, approximately five gallons of water was removed from the well. This lowered the water level by about 10.5 feet. The water level recovered by about 4 feet during a 16 minute duration, correlating to a relatively slow recovery rate, which would be expected from predominately fine grained soils in which the observation well is screened.

Following the completion of rock coring within boring B-1, freestanding water was measured at a depth of 11 feet, somewhat deeper than the water level observed within the observation well. Surface water infiltration or possibly some perched or trapped groundwater could be influencing the water level within the overburden observation well. Perched groundwater conditions can be more prevalent following heavy or extended periods of precipitation and during seasonally wet periods. It should be expected that both perched and general groundwater conditions will vary with location and with changes in soil conditions, precipitation and seasonal conditions. Consideration should be given to obtaining additional groundwater depth measurements within the observation well to evaluate for seasonal fluctuations.

6.0 GEOTECHNICAL ENGINEERING DISCUSSION & RECOMMENDATIONS

6.1 General

The geotechnical engineering discussion and recommendations are based on the information provided by TYLin and the subsurface conditions outlined in this report. Based on the proposed sewer piping invert depth, along with the subsurface conditions encountered, the following items should be considered with regard to design and construction of the proposed project.

- Manhole structure support, lateral earth pressures, and uplift resistance.
- Subgrade preparation for new sewer pipes.
- Excavation and shoring requirements.
- Excavation dewatering.
- Protection of existing structures and utilities.

These considerations, along with associated recommendations are discussed in the following sections of this report.

6.2 Manhole Structures

6.2.1 Bearing Capacity

The two proposed 60-inch diameter sewer pipes are expected to have an invert about 10 feet below the existing site grades. At these depths, any new manhole structures will be situated within the “medium” to “stiff” indigenous soils. These soils are adequate to support an allowable net bearing pressure increase of about 1,500 pounds per square foot, which is considered adequate, considering construction of the manhole structures are expected to result in minor to no net bearing pressure increases to the bearing grade soils. This is due to the volume of soil that will be displaced by the manhole structure.

A minimum 12 to 18 inches of bedding stone is recommend beneath any new manholes, which should be separated from the soils with woven stabilization/separation geotextile (i.e. Mirafi 500X or approved suitable equivalent).

6.2.2 Uplift Resistance

Design of the below grade manhole structures should consider the presence of groundwater conditions and hydrostatic lateral and uplift pressures. An overburden groundwater condition appears to exist at a depth of about 7 feet (approximate elevation 573 feet). However, it is recommended for design purposes that groundwater conditions be assumed to exist at the

surface, to account for potentially variable groundwater conditions, and the possibility of surface water accumulation within the more granular soils / stone that will likely be used to backfill the manhole structures.

A lip should be provided at the bottom of the manhole structures in order to help mobilize the soil backfill weight against uplift. The weight of the soil column extending out at an angle of 20 degrees from vertical, above the bottom of the lip of the structure, can be added to the dead weight of the structure in computing the resistance to hydrostatic uplift. A submerged unit weight of 75 pounds per cubic foot can be used, where the junction chamber backfill is Structural Fill, as described in section 7.4 of this report.

6.2.3 Earth Pressures

The design of the below grade manhole structures should be based on the lateral earth pressures caused by the load of backfill against the wall and the surcharge effects from any permanent or temporary adjacent loads. The depressed structure walls (restrained walls), should be designed to resist "at rest" lateral earth pressures generated by the earth backfill and any temporary or permanent surcharge loads, based on the following soil parameters, where the wall backfill is a Structural Fill material.

Recommended Soil Parameters for Below Grade Wall Design

- Coefficient of At-Rest Lateral Earth Pressure – 0.47
- Coefficient of Active Lateral Earth Pressure – 0.31
- Angle of Internal Friction – 32 Degrees
- Moist Unit Weight of Soil – 140 pcf
- Submerged or Buoyant Unit Weight of Soil – 75 pcf
- Surcharge Load Lateral Coefficient – 0.50

The walls should also be designed to resist the hydrostatic pressures as well as the lateral earth pressures acting the walls. In this case, the lateral earth pressure should be computed based on a submerged soil unit weight below the design groundwater level. In addition, the floors or bottom slabs must be designed to resist potential hydrostatic uplift pressure acting on the floors and the structures should also be fully water proofed.

6.3 Sewer Pipes

Similar to the manhole structures, the new sewer pipes will be situated within the "medium" to "stiff" indigenous soils, and the soils displaced by the larger diameter sewer pipes should result in minor to no net bearing pressure increases to the bearing grade soils. Provided adequate dewatering methods are implemented, the manufacture recommendations for bedding stone should normally be sufficient. However, where softer soils are encountered, the subbase stone should be thickened as necessary, to develop a firm and stable subgrade condition for installation of the pipes.

6.4 Seismic Design Considerations

Based on the subsurface conditions encountered in the borings, the project sites should be classified as Seismic Site Class "D" in accordance with ASCE 7-16, Table 20.3-1, as referenced in the 2020 Building Code of New York State. Therefore, seismic design can be based on this seismic site classification. The spectral response accelerations at the project site were obtained

by ATL using the OSHPD web site application https://seismicmaps.org. Using the site location, the spectral response accelerations are 0.160g for the short period (0.2 second) response (S_S) and 0.044g for the one second response (S_1). For design purposes, these spectral response accelerations must be adjusted for the Seismic Site Class "D" soil profile determined for the project site.

Accordingly, the adjusted spectral response accelerations for Site Class "D" are as follows:

- Short Period Response (S_{MS}) - 0.256g
- 1 Second Period Response (S_{M1}) - 0.106g

The corresponding five percent damped design spectral response accelerations (S_{DS} and S_{D1}) are as follows:

- S_{DS} - 0.171g
- S_{D1} - 0.070g

7.0 CONSTRUCTION CONSIDERATIONS

7.1 Excavation Dewatering

An overburden groundwater condition at the time of our investigation was at a depth of about 7 feet. Accordingly, excavation dewatering will be necessary to allow for construction of the manhole structures and piping to proceed in the dry. These excavations are expected to extend 11 to 13 feet below the surface. The amount of groundwater seepage can depend on the excavation location and depth, type of shoring used and its embedment depth, soil permeability, site drainage, and precipitation conditions at the time of construction.

It is recommended that prior to construction, the Contractor excavate some test pits to help determine requirements for dewatering. Consideration should be given to obtaining additional groundwater depth measurements at the observation well, to evaluate for seasonal fluctuations.

It is generally expected that the excavations can be dewatered with the use of conventional sump and pump methods of dewatering. Placement of a working mat of drainage stone, in the bottom of the excavation, in conjunction with sumps and pumps placed in the drainage layer, will also aid in dewatering excavations, particularly for excavations, which may have to remain open for longer periods. The drainage stone layer would also help to protect the underlying subgrades.

Accordingly, the following would be recommended for the drainage stone drainage layer.

- Undercut the subgrade about 12-inches below the bottom of the manhole and/or pipe bedding layer.
- Place a separation/drainage geotextile (Mirafi 160 N or suitable equivalent) over exposed soil subgrade.
- Place a 12-inch thick drainage stone layer of NYSDOT Size Designation No. 2 or No.1 (or blend of), washed, crushed coarse aggregate. This should be followed by placement of a second geotextile layer to completely encapsulate the drainage stone.
- Place the specified bedding or structural fill over the encapsulated drainage stone layer after dewatering has commenced from the drainage stone layer.
- Continue dewatering until pipe or structure backfill is above groundwater.

More substantial methods of dewatering, such as deep sumps, deep wells and/or vacuum well points, could be necessary at locations where excavations must extend further below the groundwater and/or if relatively clean, free draining cohesionless soils are be encountered in the presence of groundwater.

In all cases, it is recommended that dewatering be implemented prior to excavation below the groundwater. Groundwater conditions should be maintained at least 1 to 2 feet below the excavation bottom until construction is complete and the excavation is backfilled.

Groundwater dewatering plans should include implementation of measures to control erosion, sedimentation, and the migration of soil fines. All dewatering activities should comply with New York State Department of Environmental Conservation (NYSDEC) stormwater discharge requirements and/or applicable federal and local regulations for construction.

7.2 Excavation and Shoring

An open cut excavation could be used where there is sufficient room to cut back the excavation side slopes to safe and stable conditions, provided that any groundwater is depressed below the excavation bottoms. The excavation sidewalls must be adequately sloped back in accordance with OSHA requirements as a minimum. The soil / bedrock conditions could vary away from the test boring locations. Accordingly, the Contractor should confirm the OSHA soil classification and excavation requirements at the time of construction based on actual soil, bedrock, and groundwater conditions present. The Contractor shall be solely responsible for all excavation safety, including the design of all excavation support systems.

Properly braced, or tied back shoring should be required at locations where existing structures, utilities, and roadways must be protected from potential detrimental soil movement as the result of soil relaxation/stress relief. It is noted that the use of cantilevered sheet piling (unbraced tight sheeting) or trench boxes will not be sufficient to prevent soil relaxation/stress relief (i.e. soil deformation) as excavations takes place.

Excavation support systems should be designed by a registered Professional Engineer, who is experienced in the design of earth support systems. The design requirements at each location must consider the subsurface conditions, the potential for undercutting subgrades, utilities, structures, construction sequence, lateral earth pressures, hydrostatic conditions, and surcharge effects associated with excavation wall and bottom stability. In addition, driving sheet piles can cause detrimental damage to nearby structures, surface features, and underground utilities and must be considered during design and construction. Removal of excavation support systems should also be properly evaluated so as not to affect the integrity of the adjacent infrastructure.

7.3 Testing and Inspection

The final plans and project specifications should be reviewed by ATL, as the Geotechnical Engineer of Record, to verify that there has not been a misinterpretation of this report and/or ATL's understanding of the project.

The manhole structures and pipeline construction should be continuously monitored by a Geotechnical Engineer to verify the stability and uniformity of the subgrades, to identify the presence of deleterious fill, and to ensure that adequate bearing capacity is obtained.

We recommend that ATL, as the Geotechnical Engineer of Record, be retained to perform inspections in accordance with the plans. An ATL geotechnical representative familiar with the findings and recommendations of this report will be able to assess the subsurface conditions encountered during construction, provide necessary remedial recommendations, and verify that adequate soil conditions and bearing capacities are achieved.

7.4 Structural Fill

Structural Fill which is placed beneath the manhole structures or used as excavation backfill should consist of a crushed ledge-rock, which is free of clay, organics and friable or deleterious particles. The material should comply with NYSDOT Standard Specifications, Item No. 304.12 - Type 2 Subbase. The Structural Fill should have the following gradation requirements.

Item 304.12 – Type 2 Subbase (crushed ledge-rock)	
Sieve Size Distribution	Percent Finer by Weight
2 inch ¼ inch no. 40 no. 200	100 25 to 60 5 to 40 0 to 10

The Structural Fill should be compacted to a minimum of 95 percent of the maximum dry density as measured by the modified Proctor test (ASTM D1557). Placement of fill should not exceed a maximum loose lift thickness of 8 to 10 inches. The loose lift thickness should be reduced in conjunction with the compaction equipment used so that the required density is attained. The Structural Fill / Subbase Stone should have a moisture content within two percent of the optimum moisture content, or as directed by the Geotechnical Engineer, at the time of compaction.

8.0 LIMITATIONS

The subsurface investigation logs and this report in its entirety should be provided to the designers and contractors for information and interpretation. The subsurface investigation logs may not be representative of the entire sites subsurface condition, but only what was encountered at the individual test locations at the time of the investigation. The subsurface soil, bedrock, and groundwater conditions encountered at the time of construction may be different from those described on the subsurface investigation logs.

This report was prepared to present the findings of our subsurface investigation and engineering evaluation, and to outline concepts to be utilized in foundation design and construction. These concepts may require alterations to meet the specific design and economic considerations for this project.

Prepared by:

Thomas R. Seider, PE
Senior Engineer

Reviewed by:

Brian T. Barnes, PE
Senior Engineer

TRS/BTB/sb

APPENDIX A

BORING LOCATION PLAN

North

Note: Figure developed Google Earth

Boring Location Plan	Drawn by: TRS	Scale: Not to scale	Project No.: BD 240	Date: 05-23-2025

Proposed Sewer Line Replacement
Louisiana Street – South Street to Republic Street
Buffalo, New York

***ATLANTIC TESTING LABORATORIES*, Limited**

Albany, NY	Binghamton, NY	Buffalo, NY	Canton, NY
Elmira, NY	Plattsburgh, NY	Poughkeepsie, NY	Syracuse, NY
Rochester, NY	Utica, NY	Watertown, NY	

APPENDIX B

TABLE 1
APPROXIMATE BORING LOCATIONS AND GROUND SURFACE ELEVATIONS

TABLE 1

Approximate Boring Locations and Ground Surface Elevations

Proposed Sewer Line Replacement
Louisiana Street - South Street to Republic Street
Buffalo, New York

Boring Number	Approximate Boring Locations GPS Coordinates		Approximate Ground Surface Elevation
	Latitude (Northing)	Longitude (Easting)	(feet)
B-1	42° 51' 55.19"	78° 52' 00.36"	579.8
B-2	42° 51' 58.25"	78° 51' 59.33"	580.0
B-3	42° 52' 01.16"	78° 51' 58.43"	579.2

APPENDIX C

SUBSURFACE INVESTIGATION LOGS

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Report No.: **BD240E-01-09-25**

Client: **TYLin - Greeley & Hansen**

Boring Location: **See Boring Location Plan**

Project: **Subsurface Investigation**
Louisiana Street - Sewer Line Replacement
Buffalo, New York

Louisiana ST/South ST Intersection - NW Corner

Start Date: **5/7/2025** Finish Date: **5/7/2025**

Boring No.: **B-1** Sheet **1** of **2**

Groundwater Observations

Date	Time	Depth	Casing
5/7/2025	**AM**	***11.0'**	**20.6'**

Coordinates
Latitude
Longitude

Sampler Hammer
Weight: **140** lbs.
Fall: **30** in.
Hammer Type: **Automatic**

Ground Elev.: **579.8'**

Boring Advance By: **4 1/4" Auger/NX Core**

***May be affected by water utilized to advance the borehole.**

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL (f - fine; m - medium; c - coarse; and - 35-50%; some - 20-35%; little - 10-20%; trace - 0-10%)	Recovery (Inches)
1	AUGER	1	0.5	2.0	SS	3 10 16	1.0	12" TOPSOIL & ORGANIC MATERIAL	18
2		2	2.0	4.0	SS	6 4 3 4		Brown SILT & CLAY; and cmf Sand; some f Gravel; trace Debris (brick, slag, concrete fragments); trace Organic Material (roots) (moist, low plasticity) Fill	14
3									
4							4.0	Brown CLAY & SILT; and cmf Sand; little f Gravel; trace Debris (slag, brick, concrete fragments) (moist, medium plasticity) Fill	
4		3	4.0	6.0	SS	3 4 5 6			3
5								Brown CLAY & SILT; little cmf Sand; trace f Gravel (moist, medium plasticity)	
6		4	6.0	8.0	SS	4 5 6 6		Brown Silty CLAY; and cmf Sand (moist, high plasticity)	3
7							8.0		
8		5	8.0	10.0	SS	7 9 7 5		Brown mf Sand; some Clayey Silt (wet, slight plasticity) w = 20.0%	22
9							10.0		
10		6	10.0	12.0	SS	2 3 3 5		Brown Silty CLAY; trace f Sand (wet, high plasticity) w = 30.4%, LL = 47, PL = 18, PI = 29	24
11									
12									
13									
14									
15		7	15.0	17.0	SS	5 9 11 15		Brown CLAY & SILT; trace cmf Sand; trace f Gravel (moist, medium plasticity)	22
16									
17									
18									
19									
20								Brown Silty CLAY; little cmf Sand; little cf Gravel (moist, high plasticity) WEATHERED ROCK Fragments	
20		8	20.0	20.6	SS	2 50/1"	20.6		6
21	NX CORE (WFT)		~~20.6~~	~~25.6~~	NX	RUN 1		Encountered auger refusal at 20.6 feet and began coring.	~~60~~
22								Grey LIMESTONE	
23								Hard; Weathered to Sound; Thin Bedded to Thick Bedded; Some Fractures	
24								60" or 100% Recovery	
25								RQD = 73%	

SS Split Spoon Sample
NX Rock Core
SH Undisturbed Sample (Shelby Tube)
Estimated Groundwater

Drillers: **Steve Wolkiewicz JR; Phil D'Aurizio**

Inspector:

ATL-LOG1 LL BD240 TYLIN - GREELEY & HANSEN - BUFFALO.GPJ ATL4-08.GDT 6/20/25

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Boring No.: **B-1** Report No.: **BD240E-01-09-25** Sheet **2** of **2**

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL	RECOVERY (inches)
							25.6	f - fine m - medium c - course and - 35-50% some - 20-35% little - 10-20% trace - 0-10%	

Boring terminated at 25.6 feet.

Notes:
1. Borehole backfilled with cement-bentonite grout to 20.6 feet and on-site soils to the surface.

ATL-LOG1 LL BD240 TYLIN - GREELEY & HANSEN - BUFFALO.GPJ ATL4-08.GDT 6/20/25

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Report No.: **BD240E-01-09-25**

Client: **TYLin - Greeley & Hansen**

Boring Location: **See Boring Location Plan**

Project: **Subsurface Investigation**
Louisiana Street - Sewer Line Replacement
Buffalo, New York

Louisiana ST - West Shoulder

Start Date: **5/8/2025** Finish Date: **5/8/2025**

Boring No.: **B-2** Sheet **1** of **2**

Groundwater Observations

Date	Time	Depth	Casing
5/8/2025	AM	DRY	25.0'
5/9/2025	AM	15.3'	MW@24.2'
5/13/2025	AM	7.2'	MW@24.2'

Coordinates
Latitude
Longitude

Sampler Hammer
Weight: **140** lbs.
Fall: **30** in.
Hammer Type: **Automatic**

Ground Elev.: **580.0'**

Boring Advance By: **4 1/4" Auger**

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL	Recovery (Inches)
								f - fine; m - medium; c - coarse; and - 35-50%; some - 20-35%; little - 10-20%; trace - 0-10%	
1	AUGER	1	0.0	2.0	SS	1 6 9 7	0.3	4" TOPSOIL & ORGANIC MATERIAL	12
2								Brown Clayey SILT; some cmf Sand; some cf Gravel; trace Debris (concrete fragments); trace Organic Material (grass, roots) (moist, slight plasticity) Fill	
3		2	2.0	4.0	SS	5 6 8 7			18
4							4.0	Brown CLAY & SILT; little cmf Sand; trace f Gravel; trace Debris (slag, brick fragments) (moist, medium plasticity) Fill	
5		3	4.0	6.0	SS	3 4 4 8			7
6								Brown SILT & CLAY; some cmf Sand, trace f Gravel; trace Organic Material (roots) (moist, low plasticity)	
7		4	6.0	8.0	SS	8 9 7 7		w = 21.6%	18
8								Brown CLAY & SILT; trace f Sand; trace Organic Material (roots) (moist, medium plasticity)	
9		5	8.0	10.0	SS	7 7 4 6		w = 23.8%, LL = 31, PL = 19, PI = 12	12
10								Brown CLAY & SILT; and cmf Sand; little cf Gravel; trace Organic	
11		6	10.0	12.0	SS	4 6 10 10		Material (roots) (moist, medium plasticity)	12
12								Brown CLAY & SILT; little mf Sand; trace Organic Material (roots) (moist, medium plasticity) w = 25.2%	
13									
14									
15		7	15.0	17.0	SS	4 8 11 11		Brown CLAY & SILT; trace cmf Sand; trace Organic Material	24
16								(roots) (moist, medium plasticity)	
17									
18									
19									
20		8	20.0	21.5	SS	3 4 4		Brown CLAY & SILT; trace cmf Sand; trace Organic Material	18
21								(roots) (wet, medium plasticity)	
22									
23		9	23.0	25.0	SS	4 4 4 4		Brown CLAY & SILT; little cmf Sand; trace f Gravel; trace Organic	18
24								Material (roots) (wet, medium plasticity)	
25							25.0		

SS Split Spoon Sample
NX Rock Core
SH Undisturbed Sample (Shelby Tube)
Estimated Groundwater

Drillers: **Steve Wolkiewicz JR; Owen Penfold**

Inspector:

ATL-LOG1 LL BD240 TYLIN - GREELEY & HANSEN - BUFFALO.GPJ ATL4-08.GDT 6/20/25

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Boring No.: **B-2** Report No.: **BD240E-01-09-25** Sheet **2** of **2**

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL	RECOVERY (inches)
								f - fine m - medium c - course and - 35-50% some - 20-35% little - 10-20% trace - 0-10%	
26								Boring terminated at 25.0 feet.	
27									
28								Notes:	
29								1. Monitor Well MW-B-2 was installed within the borehole at a depth of 24.2 feet. See MW-B-2 monitor well diagram.	
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									

ATLANTIC TESTING LABORATORIES, Limited

Monitor Well Installation

Report No.: **BD240E-01-09-25**

Client: **TYLin - Greeley & Hansen**

Well Location: **See Boring Location Plan**

Project: **Monitor Well Installation**

Louisiana ST - West Shoulder

Louisiana Street - Sewer Line Replacement

Buffalo, New York

Start Date: **5/8/2025** Finish Date: **5/8/2025**

Monitoring Well No.: **MW-B-2** Sheet **1** of **1**

Groundwater Observations

Date	Time	Depth	Casing at
5/8/2025	AM	DRY	25.0'
5/9/2025	AM	15.3'	MW@24.2'
5/13/2025	AM	7.2'	MW@24.2'

Northing: _____ Easting: _____

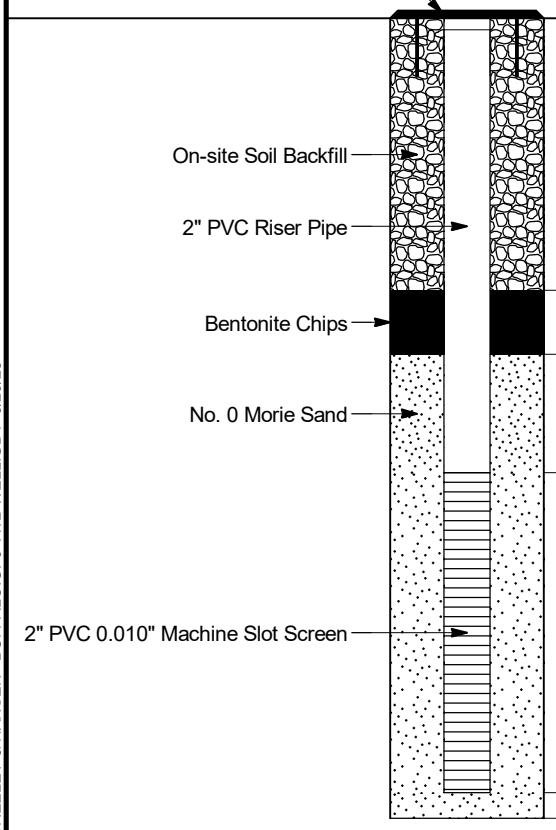
Ground Elevation: **580.0'**

Top of Casing Elevation: _____

PVC Elevation: _____

Boring Advanced By: **4 1/4" Auger**

INSTALLATION DETAILS



DEPTH (feet)

8.5

10.5

14.2

24.2

25.0

CLASSIFICATION OF MATERIALS

f - fine
m - medium
c - course

and - 35-50%
some - 20-35%
little - 10-20%
trace - 0-10%

4" TOPSOIL & ORGANIC MATERIAL

Brown Clayey SILT; some cmf Sand; some cf Gravel; trace Debris (concrete fragments); trace Organic Material (grass, roots) (moist, slight plasticity) Fill

Brown CLAY & SILT; little cmf Sand; trace f Gravel; trace Debris (slag, brick fragments) (moist, medium plasticity) Fill

Brown SILT & CLAY; some cmf Sand, trace f Gravel; trace Organic Material (roots) (moist, low plasticity)
w = 21.6%

Brown CLAY & SILT; trace f Sand; trace Organic Material (roots) (moist, medium plasticity)
w = 23.8%, LL = 31, PL = 19, PI = 12

Brown CLAY & SILT; and cmf Sand; little cf Gravel; trace Organic Material (roots) (moist, medium plasticity)

Brown CLAY & SILT; little mf Sand; trace Organic Material (roots) (moist, medium plasticity) w = 25.2%

Brown CLAY & SILT; trace cmf Sand; trace Organic Material (roots) (moist, medium plasticity)

Brown CLAY & SILT; trace cmf Sand; trace Organic Material (roots) (wet, medium plasticity)

Brown CLAY & SILT; little cmf Sand; trace f Gravel; trace Organic Material (roots) (wet, medium plasticity)

Boring terminated at 25.0 feet.

Notes:
1. Monitor Well MW-B-2 was installed within the borehole at a depth of 24.2 feet. See MW-B-2 monitor well diagram.

Drillers: **Steve Wolkiewicz JR; Owen Penfold**

Inspector: _____

ATL-MW BD240 TYLIN - GREELEY & HANSEN - BUFFALO.GPJ ATL-WELL.GDT 6/20/25

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Report No.: **BD240E-01-09-25**

Client: **TYLin - Greeley & Hansen**

Boring Location: **See Boring Location Plan**

Project: **Subsurface Investigation**
Louisiana Street - Sewer Line Replacement
Buffalo, New York

Louisiana ST - West Shoulder at Republic ST
Intersection

Start Date: **5/7/2025** Finish Date: **5/7/2025**

Boring No.: **B-3** Sheet **1** of **2**

Groundwater Observations

Date	Time	Depth	Casing
5/7/2025	PM	20.0'	32.0'

Coordinates
Latitude _____
Longitude _____

Sampler Hammer
Weight: **140** lbs.
Fall: **30** in.
Hammer Type: **Automatic**

Ground Elev.: **579.2'**

Boring Advance By:
4 1/4" Auger

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL (f - fine; m - medium; c - coarse; and - 35-50%; some - 20-35%; little - 10-20%; trace - 0-10%)	Recovery (Inches)
1	AUGER	1	0.0	2.0	SS	3 3 4 5		Brown cmf SAND; and Silt & Clay; some f Gravel; trace Debris (cinders) (moist, low plasticity) FILL	15
2									
3		2	2.0	4.0	SS	2 3 4 4		Similar Soil; trace Organic Material (grass, roots) (moist, low plasticity) Fill	10
4							4.0		
5		3	4.0	6.0	SS	3 4 4 4		Brown CLAY & SILT; some cmf Sand; trace f Gravel; trace Organic Material (roots) (moist, medium plasticity) w = 18.9%	19
6									
7		4	6.0	8.0	SS	5 4 5 5		Brown CLAY & SILT; little cmf Sand; trace Organic Material (roots) (moist, medium plasticity) w = 20.6%	23
8									
9		5	8.0	10.0	SS	WH 2 2 3		Brown CLAY & SILT; some cmf Sand (moist, medium plasticity) w = 24.9%	12
10									
11		6	10.0	12.0	SS	6 4 2 2		Brown CLAY & SILT; some cmf Sand; trace f Gravel; trace Organic Material (wood fragments) (moist, medium plasticity) w = 45.7%	22
12									
13									
14									
15		7	15.0	17.0	SS	3 5 5 6		Brown CLAY & SILT (moist, medium plasticity) w = 17.5%, LL = 24, PL = 12, PI = 12	23
16									
17									
18									
19									
20		8	20.0	22.0	SS	WH/12" 2 2		Brown CLAY & SILT; little cmf Sand (wet, medium plasticity)	15
21									
22									
23		9	23.0	25.0	SS	2 2 2 2		Similar Soil (wet, medium plasticity)	15
24									
25									

SS Split Spoon Sample
NX Rock Core
SH Undisturbed Sample (Shelby Tube)
Estimated Groundwater

Drillers: **Steve Wolkiewicz JR; Phil D'Aurizio**

Inspector: _____

ATL-LOG1 LL BD240 TYLIN - GREELEY & HANSEN - BUFFALO.GPJ ATL4-08.GDT 6/20/25

ATLANTIC TESTING LABORATORIES, Limited

Subsurface Investigation

Boring No.: **B-3** Report No.: **BD240E-01-09-25** Sheet **2** of **2**

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE From	DEPTH OF SAMPLE To	SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL	RECOVERY (inches)
								f - fine; m - medium; c - course; and - 35-50%; some - 20-35%; little - 10-20%; trace - 0-10%	
26									
27							27.0		
28									
29									
30		10	30.0	31.7	SS	25 28 38 50/2"		Brown SILT & CLAY; and cmf Sand; some f Gravel (moist, low plasticity)	18
31									
32							32.0	Boring terminated at 32.0 feet due to auger refusal on possible bedrock.	
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									

Notes:
1. Borehole backfilled with on-site soils.

ATL-LOG1 LL BD240 TYLIN - GREELEY & HANSEN - BUFFALO.GPJ ATL4-08.GDT 6/20/25

APPENDIX D

LABORATORY TEST RESULTS

ATLANTIC TESTING LABORATORIES

LABORATORY DETERMINATION OF MOISTURE CONTENT OF SOILS

ASTM D 2216

PROJECT INFORMATION

Client: TY Lin - Greeley and Hansen Water Solutions
Project: B.S.A - Proposed Sewer Line Replacement
Louisianan Street

ATL Report No.: BD240SL-01-6-25
Report Date: June 9, 2025
Date Received: May 29, 2025

TEST DATA

Boring No.	Sample No.	Depth (ft)	Moisture Content (%)
B-1	S - 5	8.0 - 10.0	20.0
B-1	S - 6	10.0 - 12.0	30.4
B-2	S - 3	4.0 - 6.0	21.6
B-2	S - 4	6.0 - 8.0	23.8
B-2	S - 6	10.0 - 12.0	25.2
B-3	S - 3	4.0 - 6.0	18.9
B-3	S - 4	6.0 - 8.0	20.6
B-3	S - 5	8.0 - 10.0	24.9
B-3	S - 6	10.0 - 12.0	45.7
B-3	S - 7	15.0 - 17.0	17.5

REMARKS

1. No material was excluded from the test sample.

Reviewed By: P.Gregorczyk Date: 6-12-2025

ATLANTIC TESTING LABORATORIES

WBE certified company

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOIL
ASTM D 4318

PROJECT INFORMATION

Client: TY Lin - Greeley and Hansen Water Solutions
Project: B.S.A. - Proposed Sewer Line Replacement
Louisiana Street

ATL Report No.: BD240SL-01-06-25
Report Date: June 11, 2025
Date Received: May 29, 2025

TEST DATA

Boring No.	Sample No.	As Received Moisture Content (%)	LL	PL	PI
B-1	S-6	30.4	47	18	29
B-2	S-4	23.8	31	19	12
B-3	S-7	17.5	24	12	12

SAMPLE INFORMATION

Boring No.	Sample No.	Maximum Grain Size (mm)	Estimated Amount of Sample Retained on No. 40 Sieve (%)	Preparation	Method of Removing Oversized Material
B-1	S-6	2	0	Oven Dry	Pulverizing and Screening
B-2	S-4	2	0	Oven Dry	Pulverizing and Screening
B-3	S-7	2	0	Oven Dry	Pulverizing and Screening

EQUIPMENT INFORMATION

Liquid Limit Procedure:	Multipoint - Method A	X	Single Point - Method B	
Liquid Limit Apparatus:	Manual	X	Motor Driven	
Liquid Limit Grooving Tool Material:	Plastic		Metal	X
Liquid Limit Grooving Tool Shape:	Flat	X	Curved (AASHTO Only)	
Plastic Limit:	Hand Rolled	X	Mechanical Rolling Device	

Reviewed By: P.Gregorczyk

Date: 6-12-2025

ATLANTIC TESTING LABORATORIES

Particle Size Distribution Report

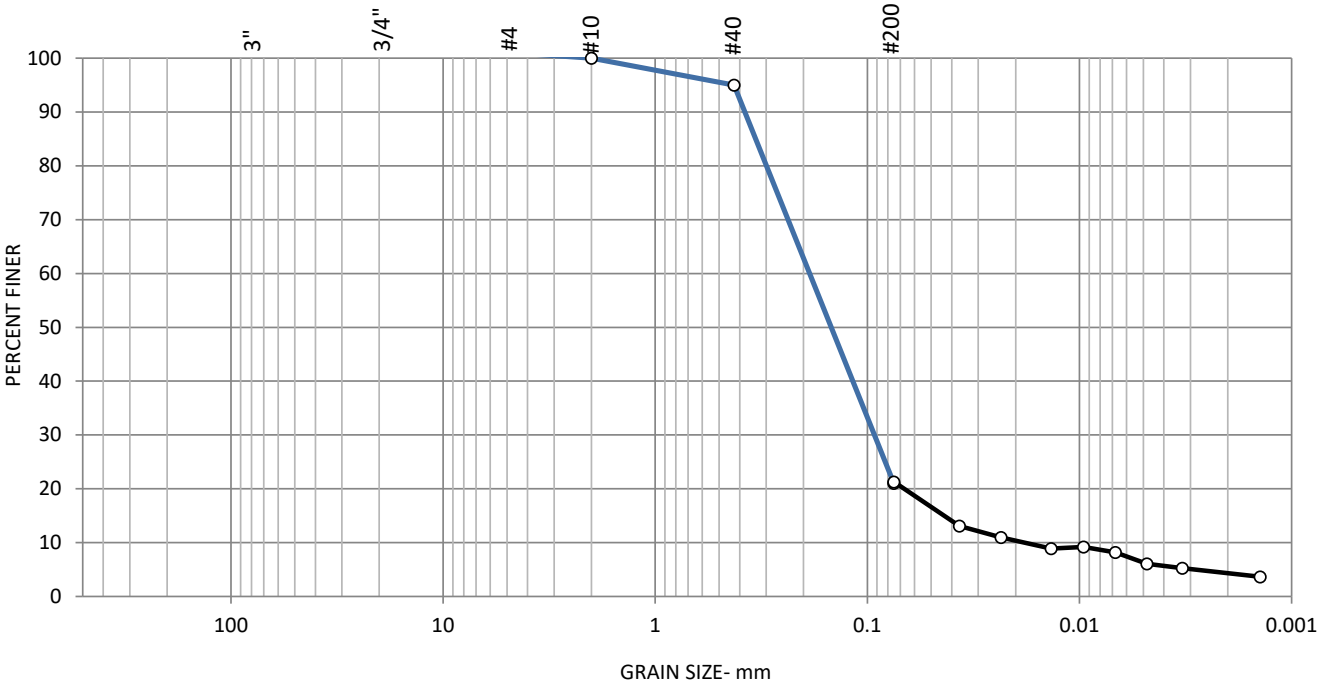
ASTM D 422

Project: B.S.A. - Proposed Sewer Line Replacement **Report No.:** BD240SL-01-06-25

Client: TY Lin - Greeley and Hansen Water Solutions **Test Date:** 6/5/2025

Sample No: B-1, S-5 **Source of Sample:** Boring Sample

Location: In-place **Elev./Depth (ft):** 8.0'-10.0'



% Cobbles	% Gravel		% Sand			% Fines	
						21	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
				5	74	15	6

SIEVE SIZE	PERCENT FINER	SPEC. PERCENT	OUT OF SPEC.
4"			
3"			
2"			
1"			
3/4"			
1/2"			
#4			
#10	100		
#40	95		
#200	21		

Soil Description

Brown mf SAND; some Clayey Silt

Moisture Content = 20.0%

Atterburg Limits

PL= LL= PI=

Coefficients

D_{60}= D_{30}= D_{10}=

C_u= C_c=

Classification

USCS= AASHTO=

Remarks

ATLANTIC TESTING LABORITORIES, LIMITED

Reviewed by: P.Gregorczyk Date: 6-12-2025

ATLANTIC TESTING LABORATORIES

Particle Size Distribution Report

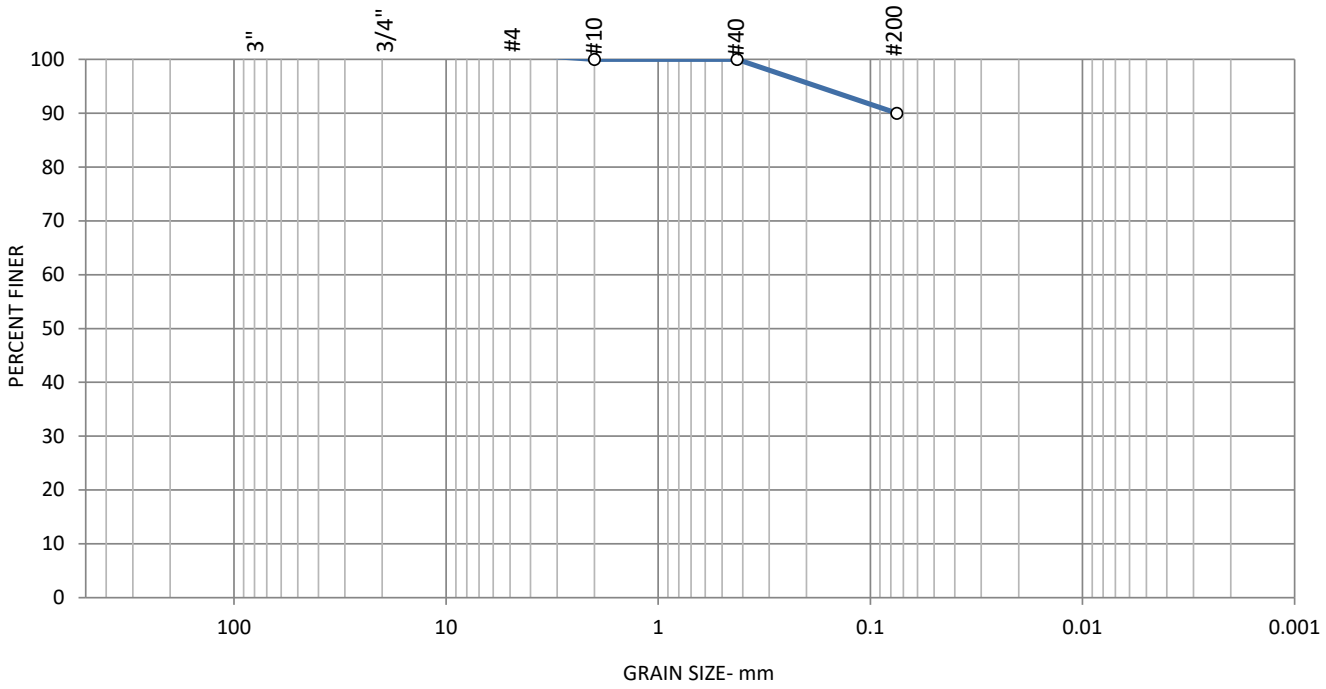
ASTM D 422

Project: B.S.A. - Proposed Sewer Line Replacement **Report No.:** BD240SL-01-06-25

Client: TY Lin - Greeley and Hansen Water Solutions **Test Date:** 6/10/2025

Sample No: B-1 S-6 **Source of Sample:** Boring Sample

Location: in-place **Elev./Depth (ft):** 10'-12'



% Cobbles	% Gravel		% Sand			% Fines	
						90	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
					10		

SIEVE SIZE	PERCENT FINER	SPEC. PERCENT	OUT OF SPEC.
4"			
3"			
2"			
1"			
3/4"			
1/2"			
#4	100		
#10	100		
#40	100		
#200	90		

Soil Description

Brown Silty CLAY; trace f Sand

Moisture Content = 30.4%

Atterburg Limits

PL= 18 LL= 47 PI= 29

Coefficients

D_{60}= D_{30}= D_{10}=

C_u= C_c=

Classification

USCS= AASHTO=

Remarks

ATLANTIC TESTING LABORITORIES, LIMITED

Reviewed by: P.Gregorczyk Date: 6-12-2025

ATLANTIC TESTING LABORATORIES

Particle Size Distribution Report

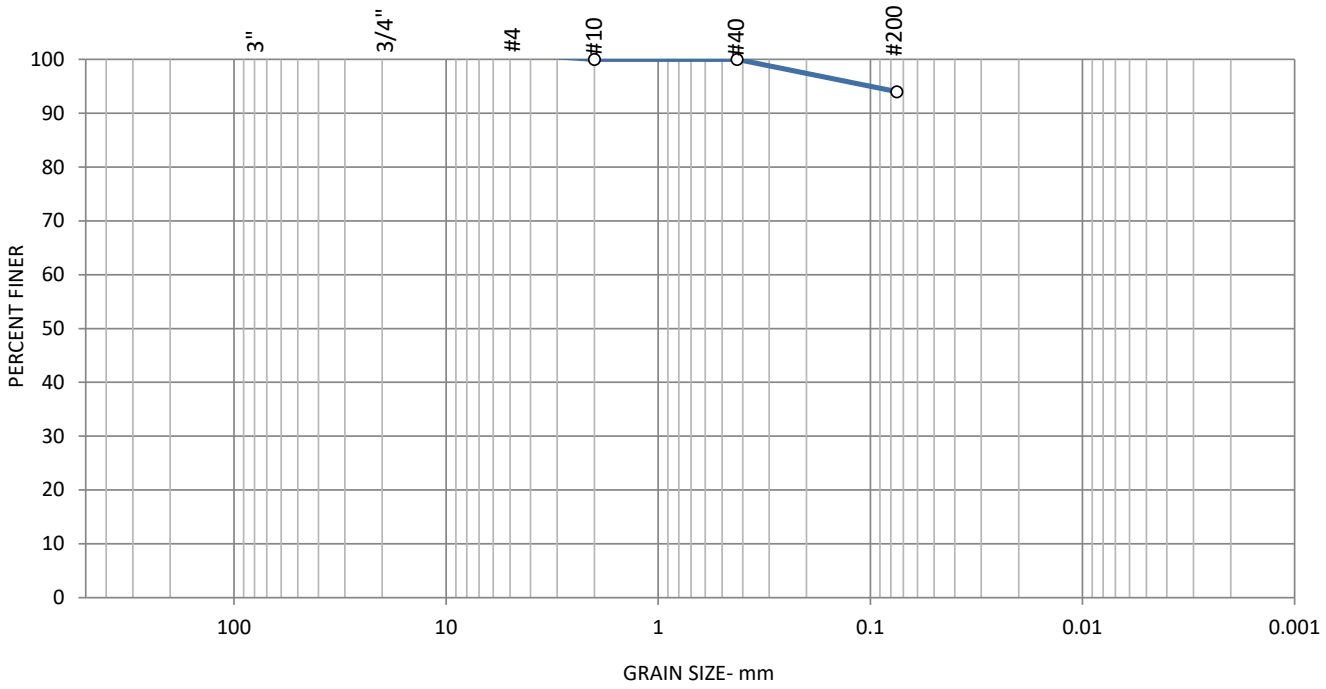
ASTM D 422

Project: B.S.A - Proposed Sewer Line Replacement **Report No.:** BD240SL-01-06-25

Client: TY Lin - Greeley and Hansen Water Solutions **Test Date:** 6/10/2025

Sample No: B-2 S-4 **Source of Sample:** Boring Sample

Location: in-place **Elev./Depth (ft):** 6.0'-8.0'



% Cobbles	% Gravel		% Sand			% Fines	
						94	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
					6		

SIEVE SIZE	PERCENT FINER	SPEC. PERCENT	OUT OF SPEC.
4"			
3"			
2"			
1"			
3/4"			
1/2"			
#4	100		
#10	100		
#40	100		
#200	94		

Soil Description

Brown CLAY & SILT; trace f Sand; trace Organics (roots)

Moisture Content = 23.8%

Atterburg Limits

PL= 19 LL= 31 PI= 12

Coefficients

D_{60}= D_{30}= D_{10}=

C_u= C_c=

Classification

USCS= AASHTO=

Remarks

ATLANTIC TESTING LABORITORIES, LIMITED

Reviewed by: P.Gregorczyk Date: 6-12-2025

ATLANTIC TESTING LABORATORIES

Particle Size Distribution Report

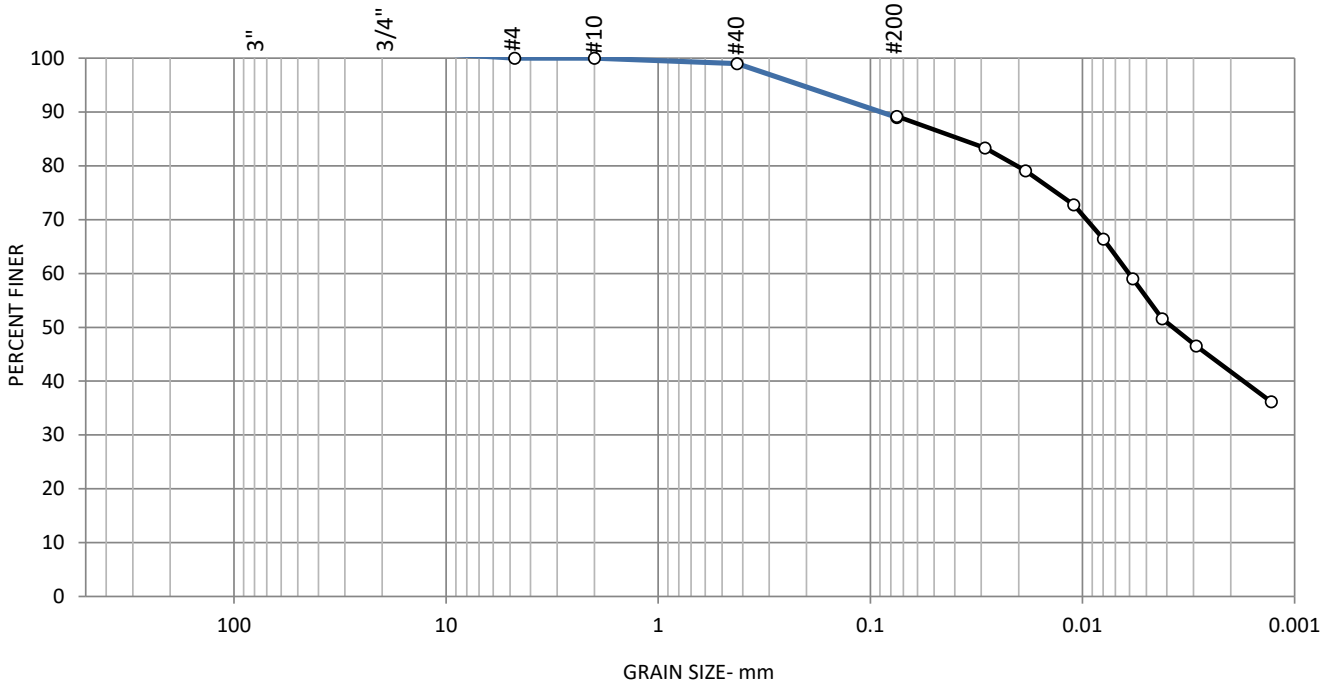
ASTM D 422

Project: B.S.A. - Proposed Sewer Line Replacement **Report No.:** BD240SL-01-06-25

Client: TY Lin - Greeley and Hansen Water Solutions **Test Date:** 6/5/2025

Sample No: B-2, S-6 **Source of Sample:** Boring Sample

Location: In-place **Elev./Depth (ft):** 10.0'-12.0'



% Cobbles	% Gravel		% Sand			% Fines	
						89	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
				1	10	34	55

SIEVE SIZE	PERCENT FINER	SPEC. PERCENT	OUT OF SPEC.
4"			
3"			
2"			
1"			
3/4"			
1/2"			
#4	100		
#10	100		
#40	99		
#200	89		

Soil Description

Brown CLAY & SILT; little mf Sand; trace Organic Material (roots)

Moisture Content = 25.2%

Atterburg Limits

PL= LL= PI=

Coefficients

D_{60}= D_{30}= D_{10}=

C_u= C_c=

Classification

USCS= AASHTO=

Remarks

ATLANTIC TESTING LABORITORIES, LIMITED

Reviewed by: P.Gregorczyk Date: 6-12-2025

ATLANTIC TESTING LABORATORIES

Particle Size Distribution Report

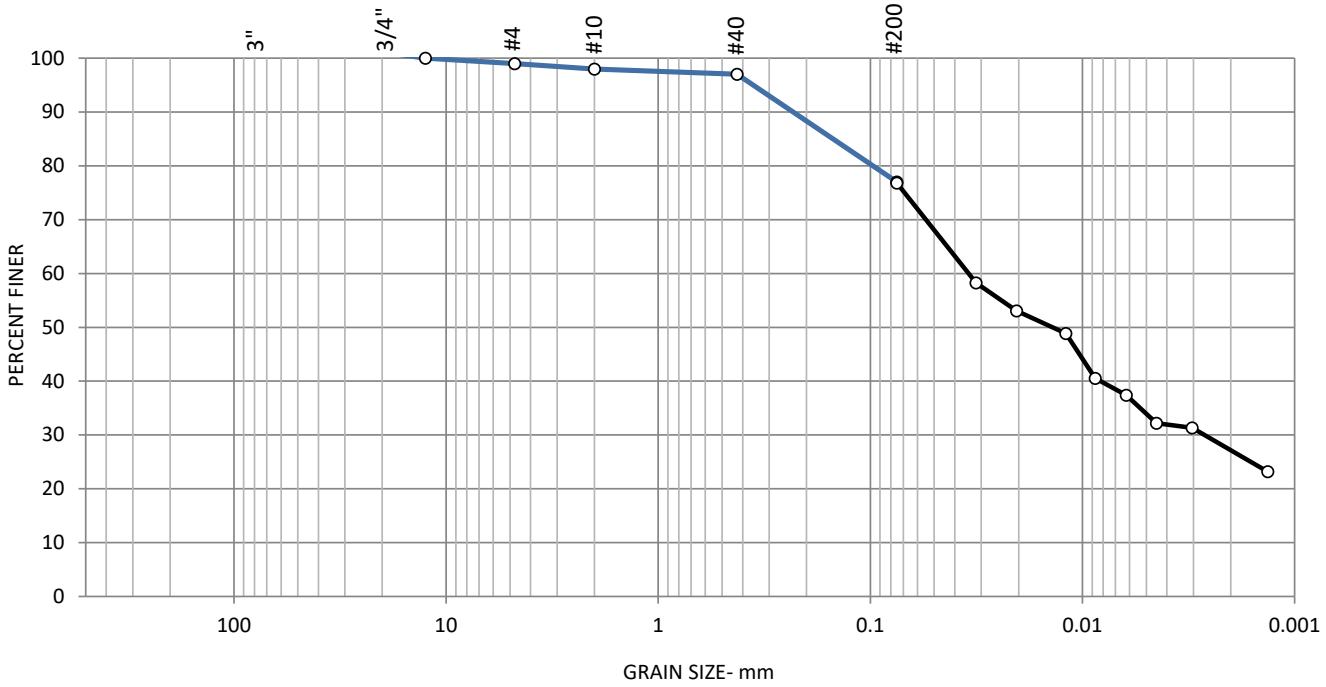
ASTM D 422

Project: B.S.A. - Proposed Sewer Line Replacement **Report No.:** BD240SL-01-06-25

Client: TY Lin - Greeley and Hansen Water Solutions **Test Date:** 6/5/2025

Sample No: B-3, S-3 **Source of Sample:** Boring Sample

Location: In-place **Elev./Depth (ft):** 4.0'-6.0'



% Cobbles	% Gravel		% Sand			% Fines	
						77	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
		1	1	1	20	43	34

SIEVE SIZE	PERCENT FINER	SPEC. PERCENT	OUT OF SPEC.
4"			
3"			
2"			
1"			
3/4"			
1/2"	100		
#4	99		
#10	98		
#40	97		
#200	77		

Soil Description

Brown CLAY & SILT; some cmf Sand; trace f Gravel; trace Organic Material (roots)

Moisture Content = 18.9%

Atterburg Limits

PL= LL= PI=

Coefficients

D_{60}= D_{30}= D_{10}=

C_u= C_c=

Classification

USCS= AASHTO=

Remarks

ATLANTIC TESTING LABORITORIES, LIMITED

Reviewed by: P.Gregorczyk Date: 6-12-2025

ATLANTIC TESTING LABORATORIES

Particle Size Distribution Report

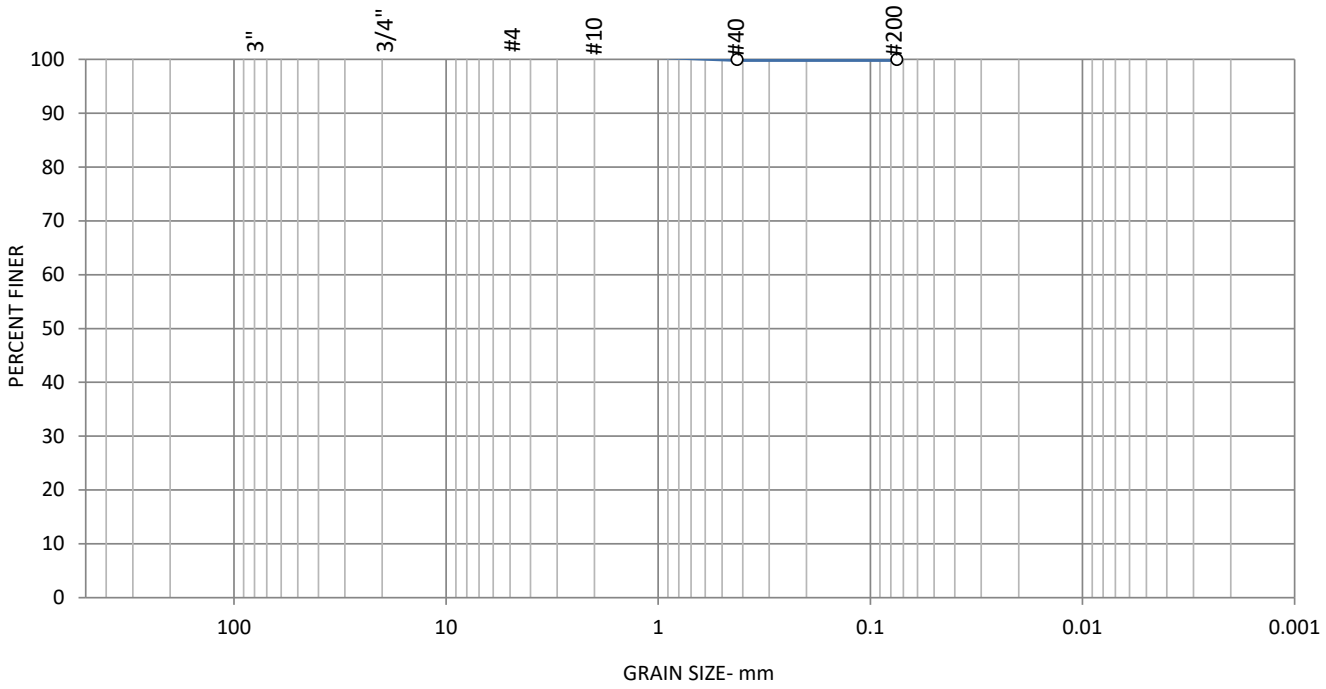
ASTM D 422

Project: B.S.A. - Proposed Sewer Line Replacement **Report No.:** BD240SL-01-06-25

Client: TY Lin - Greeley and Hansen Water Solutions **Test Date:** 6/10/2025

Sample No: B-3 S-7 **Source of Sample:** Boring Sample

Location: in-place **Elev./Depth (ft):** 15.0'-17.0'



% Cobbles	% Gravel		% Sand			% Fines	
						100	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

SIEVE SIZE	PERCENT FINER	SPEC. PERCENT	OUT OF SPEC.
4"			
3"			
2"			
1"			
3/4"			
1/2"			
#4	100		
#10	100		
#40	100		
#200	100		

Soil Description

Brown CLAY & SILT

Moisture Content = 17.5%

Atterburg Limits

PL= 12 LL= 24 PI= 12

Coefficients

D_{60}= D_{30}= D_{10}=

C_u= C_c=

Classification

USCS= AASHTO=

Remarks

ATLANTIC TESTING LABORITORIES, LIMITED

Reviewed by: P.Gregorczyk Date: 6-12-2025