Foundation Design, P.C.

SOIL ● BEDROCK ● GROUNDWATER

March 2, 2023

The CPL Team
255 Woodcliff Drive, Suite 200
Fairport, New York 14450

Attention: Andrew R. Kosa, P.E.

Reference: Chautauqua County Industrial Park – Ripley, NY
Shortman Road, Ripley, New York
Pre-development Geotechnical Assessment, 5342.0

Dear Mr. Kosa:

This report summarizes our *Pre-development Geotechnical Assessment* for the referenced project. We understand that the Chautauqua County IDA plans to create a Shovel-Ready Industrial Park northeast of Shortman Road. The Park would be developed in two Phases. Phase 1 would contain roughly 400,000 square feet of building pad with the installation of 4,000 lineal feet of roadway and supporting utilities for the proposed development. Two large stormwater treatment ponds are envisioned. Phase 2 would contain roughly 1,225,000 square feet of building pad with the installation of 2,000 lineal feet of roadway and supporting utilities for the proposed development. Four additional stormwater treatment ponds are envisioned. The proposed infrastructure improvements would include new gas, water, electric, stormwater, and sanitary lines. The CPL Team retained Foundation Design, P.C. to provide this preliminary geotechnical assessment in accordance with our December 2, 2022 *Geotechnical Services Proposal, P5238.0*. We base this report on our review of U.S.G.S. topographic and geologic mapping; National Resource Conservation Service (NRCS) mapping; new exploration and laboratory testing; and consultation with the design team. This report is preliminary and discusses general site conditions for use in design of infrastructure and assessing potential use of the parcel; additional exploration, testing, and engineering analysis will be required to finalize a building design. We intended this report exclusively for use in assessing the feasibility of this project.

The proposed Chautauqua County IDA Park lies northeast of Shortman Road in Ripley, New York. The site currently consists of farm fields separated by hedge rows and drainage swales. A *General Location Plan*, showing the site on 2019 U.S.G.S. topographic mapping, is attached to this report. The surface grades drop

about 25 feet from the south (high) to north (low). The site drains through a series of stormwater pipes running under Interstate I-90.

Our exploration program consisted of soil borings B23-1 through B23-6, IT23-1 through IT23-9, and Well-1 through Well-3. Nothnagle Drilling provided a CME-55 track-mounted drill rig, equipped hollow stem auger casings and an automated safety hammer, between January 30 and February 6, 2023 for the exploration work. The drillers sampled the soil borings in accordance with ASTM D-1586, with samples recovered continuously to 10 feet, then in five-foot intervals until sample spoon or auger refusal in shale bedrock. At soil borings B23-3 and B23-4, five feet of NX-size rock core was recovered in accordance with ASTM D-2113. The soil borings ranged from 5.3 to 21.2 feet deep. Our staff logged the subsurface profiles, documented groundwater conditions, and recovered representative soil samples. We established the soil boring locations using a hand-held GPS unit, using the coordinates provided by your staff. The soil boring logs and a *Boring Location Plan* are attached to this report.

As part of the scope of services, you requested NYS DEC Stormwater Infiltration tests in accordance with Appendix D of the Stormwater Design Manual be performed at nine locations. During the SPT sampling adjacent to these test locations, we encountered either groundwater conditions within the upper four feet of the soil profile or high shale bedrock conditions (within five feet of the test elevation). Where test pipes were installed, water levels in the pipes rose overnight. Based on these findings, the infiltration testing was not performed.

We selected representative soil samples for laboratory testing. The testing program consisted of eight sieve analyses (ASTM D-1140), nine moisture content tests (ASTM D-2216), and one liquid/plastic limit determinations (ASTM D-4318). The test results are discussed in detail below. The Foundation Design, P.C. laboratory test report is enclosed.

The following interpretations of the soil, bedrock, and groundwater conditions are based on the soil borings and our site observations. See the attached logs for soil descriptions at the test locations. Variations from the inferred profile are possible. Contact us immediately if variations are found during construction so we may evaluate the impact on our recommendations.

We encountered a subsurface profile consisting of topsoil, over glacial lake deposits, glacial till, then bedrock. The surface topsoil ranges from 7 to 14 inches thick, averaging 10 inches thick. The overburden soil is a glacial lake deposit, ranging from sandy silt with gravel (ML), silty sand with gravel (SM), and silty gravel with sand (GM). These soils are loose to firm and extend two to thirteen feet below grade, becoming thicker towards the north end of the parcel. A very thin mantle of glacial till (clayey silt with sand and gravel) overlies the bedrock surface.

Shale bedrock was encountered at each of the soil boring locations. The upper portion of the shale is weathered and easily augered through by the drilling equipment. More intact bedrock lies within five to sixteen feet of the ground surface, with the bedrock surface becoming deeper towards the north. We recovered five feet of rock core at two of the soil boring locations. We recovered 92 to 95 percent of the 60 inch core runs. The RQD measurements (recovered core longer than 4-inches in length) was 0 percent at both locations.

We identified the recovered rock core as the Northeast and Shumla Members of the Canadaway Formation. The Northeast Member is a medium gray shale. The Shumla Member is a light gray siltstone. These layers are interbedded; the auger refusal likely occurred on thicker, more intact siltstone layers.

To document the groundwater table, we installed observation wells labeled Well-1 through Well-3. Table No. 1 below summarizes the groundwater depths documented.

Table No. 1 – Groundwater Depth/Elevation

Well Number	Date		
	02.06.2023	02.13.2023	03.02.2023
Well-1	2.1 ft.	1.6 ft.	1.3 ft.
Well-2	2.1 ft.	1.8 ft.	1.5 ft.
Well-3	3.7 ft.	2.6 ft.	2.4 ft.

As part of this evaluation, we performed laboratory testing to assess the corrosive environment on-site. This testing consisted of soluble chloride concentrations, soluble sulfates concentrations, pH determinations, lab resistivity testing and DIPRA tests. Table No. 2 below summarizes the test results.

Table No. 2 - DIPRA Test Results							
Boring Location	**Sample Number**	**Lab Resistivity (Ω-cm)**	**pH**	**Sulfides (ppm)**	**Moisture Content**	**Redox Potential (mV)**	**Total DIPRA Points**
B23-1	S-1	29,000	4.5	Negative	Moist	117	1
	S-2	28,000	4.1	Negative	Moist	132	1
	S-3	52,000	4.3	Negative	Moist	182	1
Well-3	S-1	32,000	4.2	Negative	Dry	202	0
	S-3	15,000	4.2	Negative	Moist	171	1
	S-4	3,200	5.3	Negative	Moist	137	2
IT23-5	S-1	43,000	4.2	Negative	Moist	185	1
	S-2	12,000	4.6	Negative	Moist	210	2

While it is our opinion that the site is suitable for the proposed warehouse/distribution center development, there are challenges with developing the parcel. The site contains both high bedrock and high groundwater conditions. We believe that the upper portion of the bedrock can be excavated with large equipment, allowing for installation of shallow underground utility lines (depending on site grading). The ground surface drops 25 feet across the parcel, allowing for drainage improvement to be installed. Installing a series of deep swales, cut into the bedrock to improve site drainage will aid in drying up large portions of the site for development. Once dried, the on-site soil can be utilized for cuts/fills to create building pads. (NOTE: Drying the site might have adverse impacts on any wetlands present on the parcel.)

Below are our recommendations for the infrastructure improvements for the project:

1. It is critical to develop site drainage in advance of any other part of the site development work. Establishing site drainage will aid in drying up the site, allowing for topsoil to be stripped more cost effectively, decreasing groundwater encountered in utility trench excavation, and allowing for reuse of more of the on-site soil. Attached to this report is a *Conceptual Swale Layout Plan* for your consideration and fine tuning. The intent is to excavate a series of deep north/south trenches with east/west laterals around the proposed building pads to cut off water flowing across the site through the soil, allowing the soil to dry out. These trenches should extend at least into the weathered shale rock zone (see Table No. 3 below).

   The entire site drains through pipes running under Interstate I-90. As part of the drainage improvements, check to make sure that these pipes are open and not partially blocked with sediment. It is possible that water is backing up on the parcel due to silt build-up in the pipes. If needed, have NYSDOT clean out the pipes as part of the site development work.

2. Table No. 3 below summarizes the depth to the weathered shale surface and depth to auger refusal; assume excavation deeper than the refusal depths will require hoe-ramming or blasting to penetrate the bedrock. It is our opinion that the weathered rock zone can be excavated with large equipment equipped with rock or tiger teeth.

Table No. 3 – Bedrock Depths

Boring	Weathered Shale Depth	Boring Refusal Depth
B23-1	2.8	8.0
B23-2	2.8	6.2
B23-3	9.6	16.2
B23-4	4.5	14.3
B23-6	4.3	9.6
IT23-1	2.0	5.3
IT23-2	6.0	10.0
IT23-3	2.8	6.7
IT23-4	6.0	12.0
IT23-5	4.4	7.4
IT23-6	2.8	5.3
IT23-7	4.0	10.7
IT23-8	2.0	5.9
IT23-9	8.0	10.0
Well 1	5.2	10.0
Well 2	1.8	6.8
Well 3	13.0	16.0

3. Once dried out, it is our opinion that the on-site soils are suitable for reuse as structural fill required for roadways and building areas and for backfill of underground utility trenches. The silty overburden material will be moisture sensitive and frost susceptible, limiting its effective use to drier summer months, say May through October. Place the new structural fill in lifts not exceeding 12 inches in loose thickness. Compact each lift to at least 95 percent of maximum dry density as determined by the Modified Proctor test method (ASTM D-1557). Perform density testing on mass fill placed for roadways at 75 foot intervals along the road right of way, staggering the tests across the road profile. Perform one density test per 50 lineal feet of underground utility trench on alternating lifts.

4. We believe that the buildings can be founded on spread footings bearing on the native soil, new structural fill placed for the building pad construction, or directly on the shale bedrock surface. Allowable bearing pressures would be contingent on the bearing strata and column loads being applied.

5. Based on the DIPRA testing, it is our opinion that the on-site soils are not likely to develop a corrosive environment for buried pipe; no corrosion protection should be required.

6. The NYS Building Code identifies various seismic design criteria for this project. Based on the N-values documented, we identify the site as having a Site Classification of C (Very Dense Soil). Based on the ASCE-7-2016 guidelines, we recommend using the following seismic design parameters.

Table No. 4 – Seismic Design Parameters – Site Class C					
Spectral Response Acceleration		**Mapped Spectral Response Acceleration**		**Design Spectral Response Acceleration**	
S_S	**S_1**	**S_{MS}**	**S_{M1}**	**SD_s**	**SD_1**
0.105g	0.039g	0.137g	0.058g	0.091g	0.039g

Where the weathered bedrock surface lies within 10 feet of the final surface grades developed, a Site Classification of A (Hard Rock) would exist. The following seismic design parameters would apply to these areas (consult with the geotechnical engineer prior to applying these values).

Table No. 5 – Seismic Design Parameters – Site Class A					
Spectral Response Acceleration		**Mapped Spectral Response Acceleration**		**Design Spectral Response Acceleration**	
S_S	**S_1**	**S_{MS}**	**S_{M1}**	**SD_s**	**SD_1**
0.105g	0.039g	0.084g	0.031g	0.056g	0.021g

7. The new pavement subgrade will likely be in both cut and fill areas. The resulting subgrade soil conditions will vary across the site. Plan for pavement and subgrade slopes of 1.5 to 2.0 percent to help facilitate drainage out of the subbase material. Install 25 foot stone weeps off the catch basins to facilitate water flow out of the subbase and into the stormwater system.

   For preliminary cost estimating, we offer the pavement section below for the proposed entrance roadway assuming a high tractor trailer truck count.

Table No. 6 – Heavy Duty Section	
1.5"	Asphalt Top
2.5"	Asphalt Binder
6.0"	Asphalt Base
12.0"	Imported Item 4 Crushed Gravel Subbase
	BX-1200 Bi-Axial Geogrid
	Subgrade

8. With the site still in a conceptual phase, we point out that additional geotechnical consultation will be required as the project progresses and specific building designs are being developed. Once the exact building location, uses, column/floor and equipment loads as well as site grades are established, a formal geotechnical investigation and evaluation should be completed. This will allow for our interpretations between the widely spaced soil borings to be checked with additional soil borings and/or test pits.

Attached is a Geoprofessional Business Association paper entitled *Important Information about This Geotechnical Engineering Report*. This paper describes risks inherent in geotechnical engineering and how, in light of those risks, we intend this evaluation to be used. We will continue to work cooperatively with the project principals and interested parties to achieve win/win solutions that benefit all.

This concludes our Pre-development Geotechnical Assessment. Forward a more specific site development plans and we will develop a proposal to finalize the geotechnical design. It has been a pleasure working with you on the initial phase of this project. We look forward to hearing from you as the project proceeds toward the next phase.

Very truly yours,

FOUNDATION DESIGN, P.C.

Jeffrey D. Netzband, P.E., P.G.
Vice President
Enc.

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

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Chautauqua County IDA - Ripley

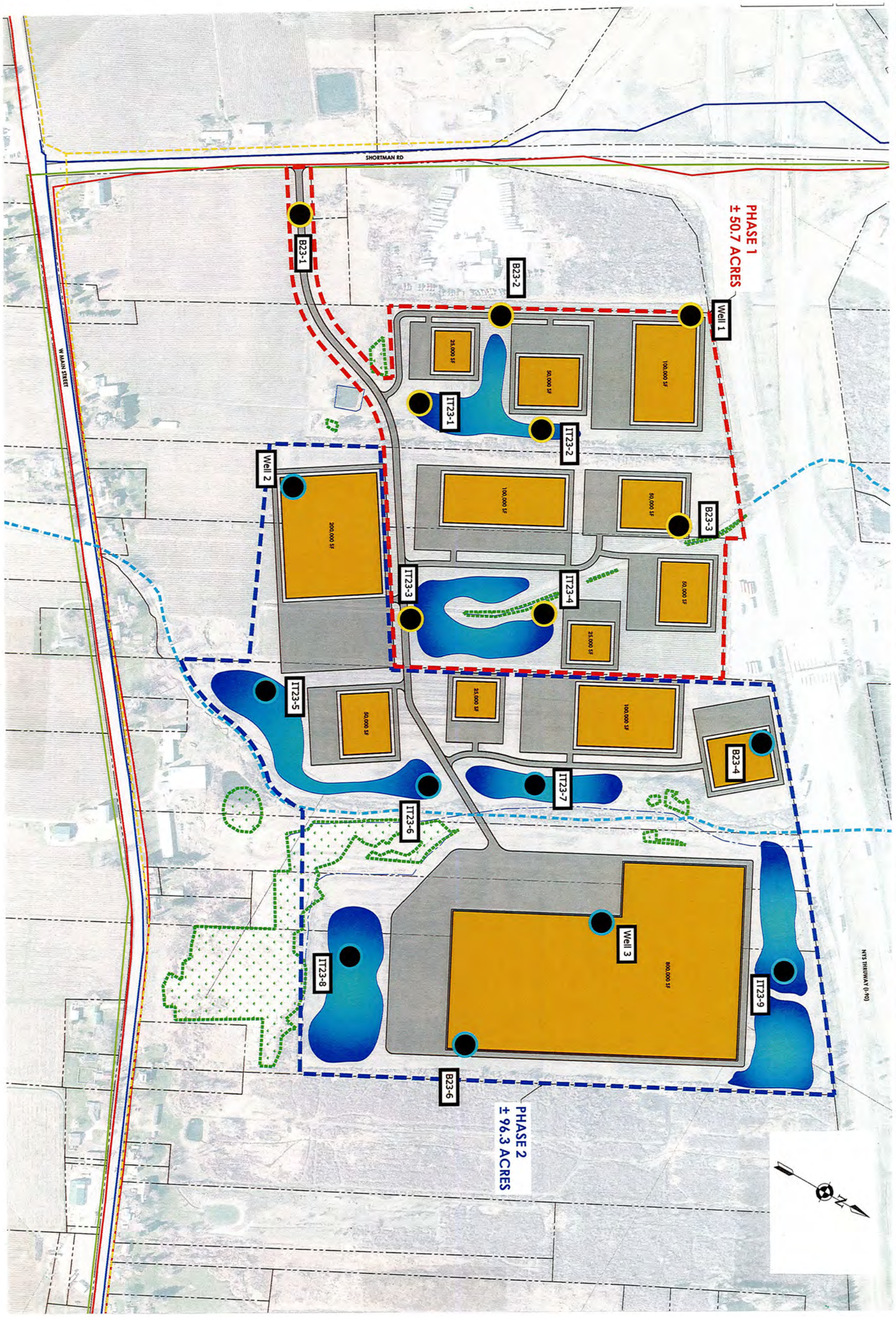
Shortman Road, Ripley, New York

General Location Plan

Adapted from: USGS Topographical Mapping

2019 Northeast OE N, PA, NY and Ripley, NY Quadrangles

CHECKED BY: JDN	1" = 2000'	**DATE:** 1/24/2023
DRAWN BY: TJB		**JOB NO.:** 5342.0



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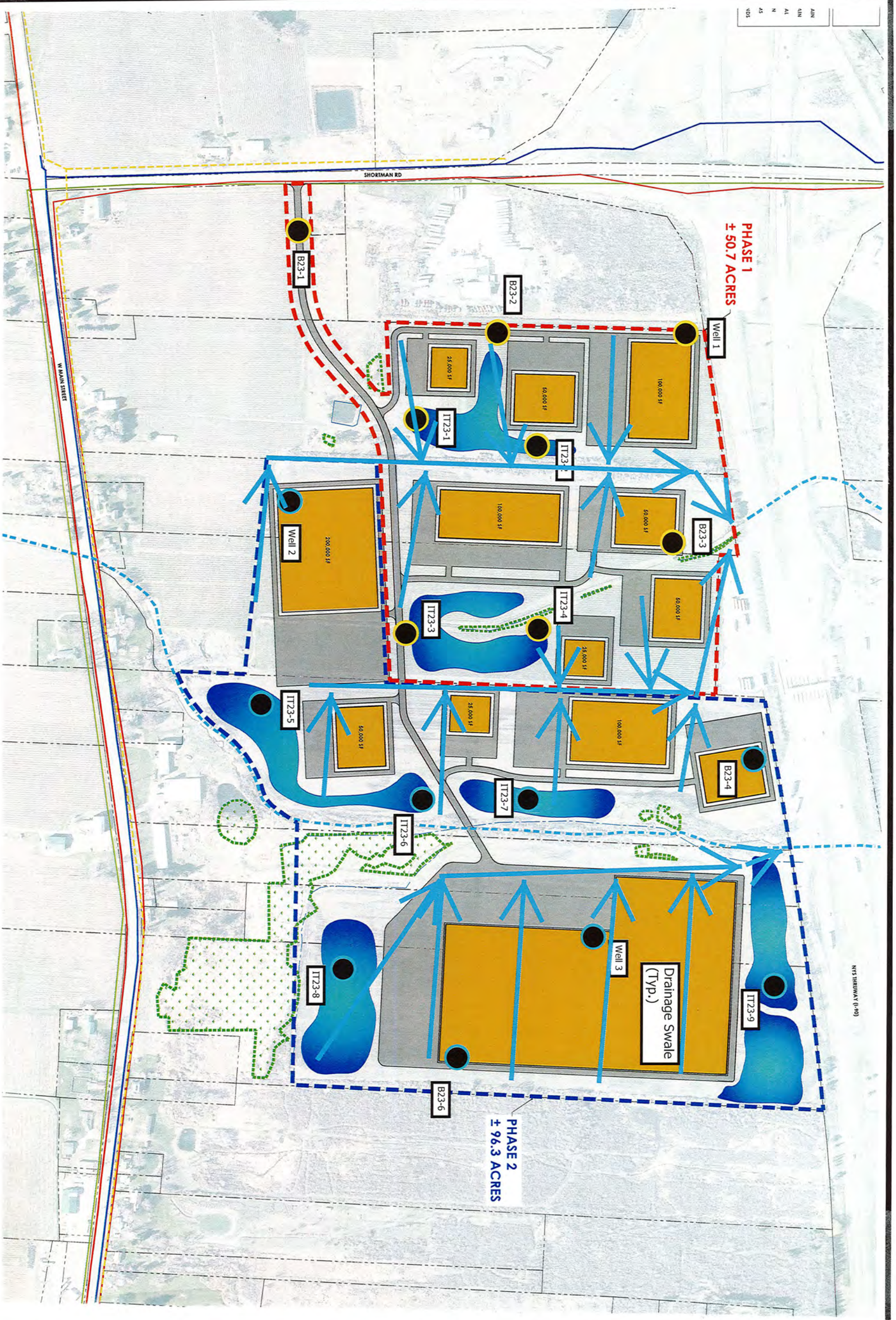
Chautauqua County IDA - Ripley
Shortman Road, Ripley, New York
Boring Location Plan
Adapted from: The CPL Team
Concept Site Plan – March 2022

CHECKED BY:	JDN	Scale 1" = 400'	DATE: 2-14-23
DRAWN BY:	TJB		JOB NO.: 5342.0



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Chautauqua County IDA - Ripley
Shortman Road, Ripley, New York
Conceptual Swale Layout Plan
Adapted from: The CPL Team
Concept Site Plan – March 2022

CHECKED BY:	JDN	Scale 1" = 400'	DATE: 2-14-23
DRAWN BY:	TJB		JOB NO.: 5342.0

Foundation Design, P.C.

SOIL • BEDROCK • GROUNDWATER

SOIL DESCRIPTIONS

COHESIVE SOIL

Very fine grained soils. Plastic soils that can be rolled into a thin thread if moist. Clays and silty clays show cohesion.

DESCRIPTION	SPT –BLOWS/FOOT
Very Soft	0-2
Soft	3-5
Medium	6-15
Stiff	16-25
Hard	26 or more

NON-COHESIVE SOIL

Soils composed of silt, sand and gravel, showing no cohesion or very slight cohesion

DESCRIPTION	SPT –BLOWS/FOOT
Loose	0-10
Firm	11-25
Compact	26-40
Dense	41-50
Very Dense	51 or more

SOIL COMPOSITION	DESCRIPTION	ESTIMATED PERCENTAGE
	and	50
	some	30-49
	little	11-29
	trace	0-10

MOISTURE CONDITIONS Dry, Damp, Moist, Wet, Saturated
Groundwater measured in the boring or test pit may not have reached equilibrium

SOIL STRATA:	TERM	DESCRIPTION
	layer	Soil deposit more than 6" thick
	seam	Soil deposit less than 6" thick
	parting	Soil deposit less than 1/8" thick
	varved	Horizontal uniform layers or seams of soil

GRAIN SIZE

MATERIAL		SIEVE SIZE
Boulder		Larger than 12 inches
Cobble		3 inches to 12 inches
Gravel	- coarse	1 inch to 3 inches
	- medium	3/8 inch to 1 inch
	- fine	No. 4 to 3/8 inch
Sand	- coarse	No. 10 to No. 4
	- medium	No. 40 to No. 10
	- fine	No. 200 to No. 40
Silt and Clay		Less than No. 200

Standard Penetration Test: The number of blows required to drive a split spoon sampler into the soil with a 140 pound hammer dropped 30 inches. The number of blows required for each 6-inches of penetration is recorded. The total number of blows required for the second and third 6-inches of penetration is termed the penetration resistance, or the "N" value.

Split Spoon Sampler: Typically a 2-foot long, 2-inch diameter hollow steel tube that breaks apart or splits in two down the tube length.

Refusal: Depth in the boring where more than 100 blows per 5-inches are needed to advance the sample spoon.

Core Recovery (%): The total length of rock core recovered divided by the total core run.

RQD (%): Rock Quality Designation – the total length of all the pieces of the rock core longer than 4-inches divided by the total length of the rock core run.

Foundation Design, P.C.

Boring Log

Project No.	5342.0	**Page** 1 **of** 1		**Test Boring No.**	B23-1
Project Name	Chautauqua County IDA Park, Shortman Road, Ripley, New York				
Client	The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York 14450				
Elevation		**Weather**	Snow 20s	**Engineer**	T. Beyer
Date Started	1/30/2023	**Completed**	1/30/2023	**Driller**	T. Mangefrida
Drilling Company:	Nothnagle Drilling Inc.			**Drilling Equipment:**	CME 55 LCX track rig

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Rec	Visual Soil and Rock Classifications / Remarks
	2	4							TOPSOIL 0'9"
			5	7	9	S-1	0'-2'	14"	Loose tan-brown moist SAND, some silt, little to trace gravel, trace clay
	9	11							2'9"
			14	18	25	S-2	2'-4'	24"	Firm tan-gray moist SHALE, (weathered rock – sample classifies as SAND, some silt, little gravel, trace clay
5	8	14							(Auger Refusal at 6'0")
			28	24	42	S-3	4'-6'	24"	S-4: Very dense, gray, saturated
	21	38							8'0"
			35	41	73	S-4	6'-8'	24"	Boring Terminated at 8'0" (Spoon Refusal)
10									
15									
20									
25									
30									

Notes:
1. Water at 6'0" upon completion.
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Auto Size Rod: 2"

Foundation Design, P.C.

Boring Log

Project No.	5342.0	**Page** 1 **of** 1		**Test Boring No.**	B23-2
Project Name	Chautauqua County IDA Park, Shortman Road, Ripley, New York				
Client	The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York 14450				
Elevation		**Weather**	Snow 20s	**Engineer**	T. Beyer
Date Started	1/30/2023	**Completed**	1/30/2023	**Driller**	T. Mangefrida
Drilling Company:	Nothnagle Drilling Inc.			**Drilling Equipment:**	CME 55 LCX track rig

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Rec	Visual Soil and Rock Classifications / Remarks
	WH	2							TOPSOIL 1'2"
			3	2	5	S-1	0'-2'	19"	Loose brown moist SAND, some silt, trace gravel, trace clay 2'9"
	4	8							Compact to dense gray moist SAND, little silt little gravel, trace clay (highly weathered shale layers)
			25	50/5	33	S-2	2'-3'11"	20"	
5	18	42							
			50	50/3	92	S-3	4'-5'9"	17"	6'2"
									Boring Terminated at 8'0" (Auger Refusal)
10									
15									
20									
25									
30									

Notes:
1. Dry upon completion.
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Auto Size Rod: 2"

Foundation Design, P.C.

Boring Log

Project No.	5342.0	**Page** 1 **of** 1		**Test Boring No.**	B23-3
Project Name	Chautauqua County IDA Park, Shortman Road, Ripley, New York				
Client	The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York 14450				
Elevation		**Weather**	Cloudy 20s	**Engineer**	T. Beyer
Date Started	1/31/2023	**Completed**	1/31/2023	**Driller**	T. Mangefrida
Drilling Company:	Nothnagle Drilling Inc.			**Drilling Equipment:**	CME 55 LCX track rig

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Rec	Visual Soil and Rock Classifications / Remarks
	1	2							TOPSOIL 0'7"
			2	4	4	S-1	0'-2'	21"	Loose tan-gray moist SILT, some sand, trace gravel, trace clay
	4	5							
			6	8	11	S-2	2'-4'	20"	
5	4	7							
			5	9	12	S-3	4'-6'	19"	
	11	15							S-4: Compact, wet 7'10"
			15	11	30	S-4	6'-8'	22"	Firm gray saturated SAND, some gravel, little silt 9'7"
	5	5							
10			6	12	11	S-5	8'-10'	16"	Firm gray damp SHALE (weathered rock, sample classifies as SAND, some silt, little gravel, trace clay)
	5	3							
15			5	7	8	S-6	13'-15'	18"	S-6: Loose, saturated (Auger Refusal) 16'2"
									Hard gray SHALE, horizontal fractures silt seams
						Run #1	16'2" – 21'2"		
									REC: 55"/60" = 92% RQD: 0"/60" = 0%
20									
									21'2" Boring Terminated at 21'2"
25									
									Notes: 1. Water at 8'0" upon completion. 2. Advanced hole using hollow stem augers. 3. Bore hole backfilled using auger spoils.
30									

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Auto Size Rod: 2"

Foundation Design, P.C.

Boring Log

Project No.	5342.0	**Page** 1 **of** 1		**Test Boring No.**	B23-4
Project Name	Chautauqua County IDA Park, Shortman Road, Ripley, New York				
Client	The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York 14450				
Elevation		**Weather**	Cloudy 20s	**Engineer**	J. Goggin
Date Started	2/1/2023	**Completed**	2/1/2023	**Driller**	T. Mangefrida
Drilling Company:	Nothnagle Drilling Inc.			**Drilling Equipment:**	CME 55 LCX track rig

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Rec	Visual Soil and Rock Classifications / Remarks
	1	2							TOPSOIL 0'9"
			3	4	5	S-1	0'-2'	16"	Loose yellow-brown moist SILT, little sand, little fine gravel
	6	4							
			4	20	8	S-2	2'-4'	18"	S-2: Wet
5	5	19							4'6"
			35	17	54	S-3	4'-6'	9"	Very dense gray damp SHALE (weathered rock – sample classifies as SAND, some silt, little gravel, trace clay)
	13	17							
			17	13	34	S-4	6'-8'	20"	S-4: Compact
	24	24							
10			20	20	44	S-5	8'-10'	2"	S-5: Dense, poor recovery
	13	15							
15			50/3		65/9	S-6	13'-14'3"	12"	
						Run #1	14'3" – 19'3		(Auger Refusal) 14'3"
									Hard gray SHALE, horizontal fractures silt seams
									Recovered: 55"/60" 95%
									RQD: 0"/60" 0%
20									19'3"
									Boring Terminated at 19'3"
25									
30									

Notes:
1. Dry upon completion.
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Auto Size Rod: 2"

Foundation Design, P.C.

Boring Log

Project No.	5342.0	**Page** 1 **of** 1		**Test Boring No.**	B23-6
Project Name	Chautauqua County IDA Park, Shortman Road, Ripley, New York				
Client	The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York 14450				
Elevation		**Weather**	Cloudy 10s	**Engineer**	T. Beyer
Date Started	2/3/2023	**Completed**	2/3/2023	**Driller**	T. Mangefrida
Drilling Company:	Nothnagle Drilling Inc.			**Drilling Equipment:**	CME 55 LCX track rig

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Rec	Visual Soil and Rock Classifications / Remarks
	3	2							TOPSOIL 0'7"
			2	2	4	S-1	0'-2'	14"	Loose tan-gray moist SILT, some sand, trace gravel, trace clay
	4	4							
			5	8	9	S-2	2'-4'	17"	
5	9	16							4'4"
			20	14	36	S-3	4'-6'	23"	Compact gray damp SAND, some silt, some gravel, trace clay (highly weathered shale layers)
	23	17							
			22	18	39	S-4	6'-8'	20"	8'0"
	33	50/3			50/3	S-5	8'-8'9"	7"	Very dense gray damp SAND, some silt, little gravel, trace clay (weathered shale)
10									9'7"
									Boring Terminated at 9'7" (Auger Refusal)
15									
20									
25									
30									

Notes:
1. Dry upon completion.
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Auto Size Rod: 2"

Foundation Design, P.C.

Boring Log

Project No.	5342.0	**Page** 1 **of** 1		**Test Boring No.**	IT23-1
Project Name	Chautauqua County IDA Park, Shortman Road, Ripley, New York				
Client	The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York 14450				
Elevation		**Weather**	Cloudy 20s	**Engineer**	T. Beyer
Date Started	1/30/2023	**Completed**	1/30/2023	**Driller**	T. Mangefrida
Drilling Company:	Nothnagle Drilling Inc.			**Drilling Equipment:**	CME 55 LCX track rig

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Rec	Visual Soil and Rock Classifications / Remarks
	WH	2							TOPSOIL 0'8"
			5	14	7	S-1	0'-2'	18"	Loose tan-brown moist SAND, some silt, little to trace gravel, trace clay
	24	24							(Highly weathered shale layers) 2'0"
			43	42	67	S-2	2'-4'	24"	Very dense gray wet SAND, little gravel, little silt, trace clay
5	35	44							(Highly weathered shale layers)
			50/4		94/10	S-3	4'-5'4"	16"	S-3: Saturated
									5'4"
									Boring Terminated at 5'4" (Spoon Refusal)
10									
15									
20									
25									
30									

Notes:
1. Water at 2'2" upon completion.
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Auto Size Rod: 2"

Foundation Design, P.C.

Boring Log

Project No.	5342.0	**Page** 1 **of** 1		**Test Boring No.**	IT23-2
Project Name	Chautauqua County IDA Park, Shortman Road, Ripley, New York				
Client	The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York 14450				
Elevation		**Weather**	Snow 20s	**Engineer**	T. Beyer
Date Started	1/30/2023	**Completed**	1/30/2023	**Driller**	T. Mangefrida
Drilling Company:	Nothnagle Drilling Inc.			**Drilling Equipment:**	CME 55 LCX track rig

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Rec	Visual Soil and Rock Classifications / Remarks
	2	2							TOPSOIL 0'10"
			4	4	6	S-1	0'-2'	19"	Loose brown wet SAND, some silt, trace gravel
	4	10							
			9	12	19	S-2	2'-4'	21"	S-2: Firm, brown-gray
5	1	4							4'0"
			5	4	9	S-3	4'-6'	15"	Loose gray wet SAND, some to little gravel, little silt, trace clay
	7	22							6'0"
			15	14	37	S-4	6'-8'	22"	Compact gray damp SHALE (weathered rock – sample classifies as SAND, some silt, little gravel, trace clay)
	11	16							
10			30	50/2	46	S-5	8'-9'8"	18"	S-5 Very dense
									10'0"
									Boring Terminated at 10'0" (Auger Refusal)
15									
20									
25									
30									

Notes:
1. Water at 2'6" on completion.
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Auto Size Rod: 2"

Foundation Design, P.C.

Boring Log

Project No.	5342.0	**Page** 1 **of** 1		**Test Boring No.**	IT23-3
Project Name	Chautauqua County IDA Park, Shortman Road, Ripley, New York				
Client	The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York 14450				
Elevation		**Weather**	Snow 20s	**Engineer**	T. Beyer
Date Started	2/1/2023	**Completed**	2/1/2023	**Driller**	T. Mangefrida
Drilling Company:	Nothnagle Drilling Inc.			**Drilling Equipment:**	CME 55 LCX track rig

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Rec	Visual Soil and Rock Classifications / Remarks
	4	4							TOPSOIL 1'0"
			4	5	8	S-1	0'-2'	4"	Loose tan-brown moist SAND, some silt, trace gravel, trace clay
	11	12							2'10"
			16	50/5	28	S-2	2'-4'	21"	Compact to dense gray moist SAND, some gravel, little silt, trace clay (highly weathered shale layers)
5	7	29							
			49	44	78	S-3	4'-6'	24"	
	29	50/2			50/2	S-4	6'-6'8"	8"	6'8"
									Boring Terminated at 6'8" (Auger Refusal)
10									
15									
20									
25									
30									

Notes:
1. Water at 6'0" upon completion.
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Auto Size Rod: 2"

Foundation Design, P.C.

Boring Log

Project No.	5342.0	**Page** 1 **of** 1		**Test Boring No.**	IT23-4
Project Name	Chautauqua County IDA Park, Shortman Road, Ripley, New York				
Client	The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York 14450				
Elevation		**Weather**	Snow 20s	**Engineer**	T. Beyer
Date Started	2/1/2023	**Completed**	2/1/2023	**Driller**	T. Mangefrida
Drilling Company:	Nothnagle Drilling Inc.			**Drilling Equipment:**	CME 55 LCX track rig

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Rec	Visual Soil and Rock Classifications / Remarks
	1	3							TOPSOIL 1′0″
			2	2	5	S-1	0′-2′	20″	Loose tan-brown wet SILT, trace fine sand 3′0″
	4	6							Firm brown saturated SILT, little sand, trace gravel 4′6″
			6	8	12	S-2	2′-4′	20″	
5	4	14							Compact tan moist SILT, some gravel, little sand 6′0″
			13	14	17	S-3	4′-6′	18″	
	16	23							Compact gray damp SHALE (weathered rock – sample classifies as SAND, some silt, little gravel, trace clay)
			27	32	50	S-4	6′-8′	22″	
	33	42							S-4: Dense, damp
10			48	50/5	90	S-5	8′-9′11″	1″	S-5: Very dense, no recovery, rock in shoe 12′0″
									Boring terminated at 12′0″ (Auger Refusal)
15									
20									
25									
30									Notes: 1. Water at 11′0″ upon completion. 2. Advanced hole using hollow stem augers. 3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2″ Spoon 12″ with 140 lb. Wt. 30″ Ea. Blow Hammer: Auto Size Rod: 2″

Foundation Design, P.C.

Boring Log

Project No.	5342.0	**Page** 1 **of** 1		**Test Boring No.**	IT23-5
Project Name	Chautauqua County IDA Park, Shortman Road, Ripley, New York				
Client	The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York 14450				
Elevation		**Weather**	Sunny 30s	**Engineer**	T. Beyer
Date Started	2/2/2023	**Completed**	2/1/2023	**Driller**	T. Mangefrida
Drilling Company:	Nothnagle Drilling Inc.			**Drilling Equipment:**	CME 55 LCX track rig

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Rec	Visual Soil and Rock Classifications / Remarks
	1	3							TOPSOIL 0'8"
			4	7	7	S-1	0'-2'	16"	Loose brown wet SILT, some sand, trace gravel, trace clay
	4	8							2'0"
			8	8	16	S-2	2'-4'	15"	Firm brown saturated SAND, some silt, little to trace gravel
5	14	18							4'5"
			33	43	51	S-3	4'-6'	19"	Very dense gray damp SHALE (weathered rock – sample classifies as SAND, some silt, little gravel, trace clay) 7'5"
	39	48							
			50/5		98/11	S-4	6'-7'5"	17"	Boring Terminated at 7'5" (Spoon Refusal)
10									
15									
20									
25									
30									

Notes:
1. Water at 1'10" upon completion.
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Auto Size Rod: 2"

Foundation Design, P.C.

Boring Log

Project No.	5342.0	**Page** 1 **of** 1		**Test Boring No.**	IT23-6
Project Name	Chautauqua County IDA Park, Shortman Road, Ripley, New York				
Client	The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York 14450				
Elevation		**Weather**	Snow 20s	**Engineer**	T. Beyer
Date Started	2/1/2023	**Completed**	2/1/2023	**Driller**	T. Mangefrida
Drilling Company:	Nothnagle Drilling Inc.			**Drilling Equipment:**	CME 55 LCX track rig

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Rec	Visual Soil and Rock Classifications / Remarks
	2	2							TOPSOIL 0'10"
			3	4	5	S-1	0'-2'	4"	Loose tan-brown moist SAND, some silt, trace gravel, trace clay
	8	10							2'10"
			23	30	33	S-2	2'-4'	21"	Compact gray damp SHALE, (weathered rock – sample classifies as SAND, some silt, little gravel trace clay)
5	34	48							5'4"
			50/4		98/10	S-3	4'-5'4"	15"	Boring Terminated at 5'4" (Auger Refusal)
10									
15									
20									
25									
30									

Notes:
1. Water at 3'5" upon completion.
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Auto Size Rod: 2"

Foundation Design, P.C.

Boring Log

Project No.	5342.0	**Page** 1 **of** 1		**Test Boring No.**	IT23-7
Project Name	Chautauqua County IDA Park, Shortman Road, Ripley, New York				
Client	The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York 14450				
Elevation		**Weather**	Sunny 30s	**Engineer**	T. Beyer
Date Started	2/2/2023	**Completed**	2/2/2023	**Driller**	T. Mangefrida
Drilling Company:	Nothnagle Drilling Inc.			**Drilling Equipment:**	CME 55 LCX track rig

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Rec	Visual Soil and Rock Classifications / Remarks
	3	3							TOPSOIL 0'7"
			3	3	6	S-1	0'-2'	11"	Loose brown moist SILT, some sand, trace gravel, trace clay
	3	11							
			8	50/2	19	S-2	2'-3'8"	12"	S-2: Firm
5	2	23							4'0"
			27	30	50	S-3	4'-6'	19"	Dense gray moist SAND, some silt, little gravel (highly weathered shale layers)
	51	29							
			30	32	59	S-4	6'-8'	22"	6'0"
	16	25							Very dense gray damp SHALE (weathered rock – sample classifies as SAND, some silt, little gravel , trace clay)
10			50/5		75/11	S-5	8'-9'5"	12"	
									10'8"
									Boring Terminated at 10'8" (Auger Refusal)
15									
20									
25									
30									

Notes:
1. Water at 3'0" upon completion.
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Auto Size Rod: 2"

Foundation Design, P.C.

Boring Log

Project No.	5342.0	**Page** 1 **of** 1		**Test Boring No.**	IT23-8
Project Name	Chautauqua County IDA Park, Shortman Road, Ripley, New York				
Client	The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York 14450				
Elevation		**Weather**	Cloudy 30s	**Engineer**	T. Beyer
Date Started	2/6/2023	**Completed**	2/6/2023	**Driller**	T. Mangefrida
Drilling Company:	Nothnagle Drilling Inc.			**Drilling Equipment:**	CME 55 LCX track rig

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Rec	Visual Soil and Rock Classifications / Remarks
	3	3							TOPSOIL 0'8"
			8	5	11	S-1	0'-2'	16"	Firm tan-brown wet SILT, some sand, trace gravel 2'0"
	10	31							Very dense gray damp SAND, some silt little gravel (highly weathered shale layers) 4'0"
			30	42	61	S-2	2'-4'	24"	
5	8	26							
			49	50/4	75	S-3	4'-6'	19"	Very dense gray damp SHALE (weathered rock – sample classifies as SAND, some silt, little gravel, trace clay) 5'11"
									Boring Terminated at 5'11" (Auger Refusal)
10									
15									
20									
25									
30									Notes: 1. Water at 3'0" upon completion. 2. Advanced hole using hollow stem augers. 3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Auto Size Rod: 2"

Foundation Design, P.C.

Boring Log

Project No.	5342.0	**Page** 1 **of** 1		**Test Boring No.**	IT23-9
Project Name	Chautauqua County IDA Park, Shortman Road, Ripley, New York				
Client	The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York 14450				
Elevation		**Weather**	Cloudy 10s	**Engineer**	T. Beyer
Date Started	2/3/2023	**Completed**	2/3/2023	**Driller**	T. Mangefrida
Drilling Company:	Nothnagle Drilling Inc.			**Drilling Equipment:**	CME 55 LCX track rig

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Rec	Visual Soil and Rock Classifications / Remarks
	1	3							TOPSOIL 0'8"
			3	4	6	S-1	0'-2'	15"	Loose tan-gray moist SILT, little sand, trace clay
	5	4							
			5	6	9	S-2	2'-4'	20"	4'0"
5	2	2							Loose gray saturated SAND, little silt
			2	2	4	S-3	4'-6'	12"	6'10"
	2	2							Loose gray saturated SILT, some sand, trace gravel, trace clay
			2	10	4	S-4	6'-8'	22"	8'0"
	4	7							Firm gray damp SHALE (weathered rock – sample classifies as SAND, some silt,
10			14	44	21	S-5	8'-10'	17"	little gravel, trace clay) 10'0"
									Boring Terminated at 10'0" (Auger Refusal)
15									
20									
25									
30									

Notes:
1. Water at 3'0" upon completion.
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Auto Size Rod: 2"

Foundation Design, P.C.

Boring Log

Project No.	5342.0	**Page** 1 **of** 1		**Test Boring No.**	Well 1
Project Name	Chautauqua County IDA Park, Shortman Road, Ripley, New York				
Client	The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York 14450				
Elevation		**Weather**	Cloudy 20s	**Engineer**	T. Beyer
Date Started	1/31/2023	**Completed**	1/31/2023	**Driller**	T. Mangefrida
Drilling Company:	Nothnagle Drilling Inc.			**Drilling Equipment:**	CME 55 LCX track rig

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Rec	Visual Soil and Rock Classifications / Remarks
	WH	2							TOPSOIL 0'10"
			3	2	5	S-1	0'-2'	4"	Loose tan wet SAND, some silt, trace gravel, trace clay
	3	3							
			4	5	7	S-2	2'-4'	21"	
5	2	12							5'2"
			14	20	26	S-3	4'-6'	24"	Compact gray damp SHALE (weathered rock – sample classifies as SAND, some silt, little gravel, trace clay)
	17	19							
			20	17	39	S-4	6'-8'	19"	
	9	18							
10			16	50/4	34	S-5	8'-9'10"	20"	10'0"
									Boring Terminated at 10'0" (Auger Refusal)
15									
20									
25									
30									

Notes:
1. Water at 2.1' on 2/6/23.
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.
4. Installed a 2-inch diameter PVC well. Well consisted of 5 feet of slotted pipe, then 5 feet of riser pipe surrounded by a sand pack, topped with a bentonite seal and then auger cuttings. A steel protective case was installed on top with a 2 x 2 feet concrete apron.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Auto Size Rod: 2"

Foundation Design, P.C.

Boring Log

Project No.	5342.0	**Page** 1 **of** 1		**Test Boring No.**	Well 2
Project Name	Chautauqua County IDA Park, Shortman Road, Ripley, New York				
Client	The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York 14450				
Elevation		**Weather**	Cloudy 20s	**Engineer**	T. Beyer
Date Started	2/1/2023	**Completed**	2/1/2023	**Driller**	T. Mangefrida
Drilling Company:	Nothnagle Drilling Inc.			**Drilling Equipment:**	CME 55 LCX track rig

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Rec	Visual Soil and Rock Classifications / Remarks
	2	2							TOPSOIL 0'10"
			4	9	6	S-1	0'-2'	10"	Loose tan-gray moist SILT, little sand, trace clay
									1'10"
	18	16							Dense gray damp SHALE (weathered rock – sample classifies as SAND,
			28	28	44	S-2	2'-4'	24"	some silt, little gravel, trace clay)
5	9	37							
			26	40	63	S-3	4'-6'	24"	S-3: Very dense
	32	50/4			50/4	S-4	6'-6'10"	8"	
									Auger refusal at 6'6"
									6'10"
									Boring Terminated at 6'10" (Spoon Refusal)
10									
15									
20									
25									
30									

Notes:
1. Water at 2.1' on 2/6/23.
2. Advanced hole using hollow stem augers.
3. Bore hole backfilled using auger spoils.
4. Installed a 2-inch diameter PVC well. Well consisted of 3 feet of slotted pipe, then 4 feet of riser pipe surrounded by a sand pack, topped with a bentonite seal, and then auger cuttings. A steel protective case was installed on top with a 2 x 2 feet concrete apron.

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Auto Size Rod: 2"

Foundation Design, P.C.

Boring Log

Project No.	5342.0	**Page** 1 **of** 1		**Test Boring No.**	Well 3
Project Name	Chautauqua County IDA Park, Shortman Road, Ripley, New York				
Client	The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York 14450				
Elevation		**Weather**	Cloudy 20s	**Engineer**	T. Beyer
Date Started	2/6/2023	**Completed**	2/6/2023	**Driller**	T. Mangefrida
Drilling Company:	Nothnagle Drilling Inc.			**Drilling Equipment:**	CME 55 LCX track rig

Ft.	Blows Per Six Inches 0"/6"	6"/12"	12"/18"	18"/24"	N Value	Sample No.	Depth	Rec	Visual Soil and Rock Classifications / Remarks
	5	2							TOPSOIL 0'7"
			3	3	5	S-1	0'-2'	14"	Loose brown moist SAND, some silt, trace gravel
	8	9							
			9	7	18	S-2	2'-4'	17"	S-2: Firm, wet, little silt
5	3	4							S-3: Loose, saturated
			5	5	9	S-3	4'-6'	15"	
	4	3							6'7"
			6	14	9	S-4	6'-8'	24"	Loose tan-gray SILT, some sand 8'6"
	2	6							Firm gray saturated SAND, little silt, little to trace gravel
10			6	6	12	S-5	8'-10'	16"	
									13'0"
	1	1							Loose gray damp SHALE (weathered rock – sample classifies as SAND, some silt, little gravel, trace clay)
15			1	4	2	S-6	13'-15'	20"	
									16'0"
									Boring Terminated at 16'0" (Auger Refusal)
20									
25									Notes: 1. Water at 3.7' upon completion. 2. Advanced hole using hollow stem augers. 3. Bore hole backfilled using auger spoils. 4. Installed a 2-inch diameter PVC well. Well consisted of 8 feet of slotted pipe, then 10 feet of riser pipe surrounded by a sand pack, topped with a bentonite seal, then auger cuttings. A steel protective case was installed on top with a 2 x 2 feet concrete apron.
30									

N=No. of blows to Drive 2" Spoon 12" with 140 lb. Wt. 30" Ea. Blow Hammer: Auto Size Rod: 2"

Foundation Design, P.C.

SOIL • BEDROCK • GROUNDWATER

February 14, 2023

The CPL Team
255 Woodcliff Drive, Suite 200
Fairport, New York 14450

Attention: Andrew R. Kosa, P.E.

Reference: Chautauqua County IDA Park
Shortman Road, Ripley, New York
Laboratory Test Results, 5342.0

Dear Mr. Kosa:

Foundation Design, P.C. is pleased to present the following results of the laboratory testing performed on the referenced project. The testing was performed in accordance with the following ASTM test methods:

8	Sieve Analysis	ASTM D-1140
9	Moisture Content Test	ASTM D-2216
1	Plastic Limits/Liquid Limits/Plasticity Index	ASTM D-4318

We appreciate the opportunity to provide these testing services and look forward to hearing from you again in the near future.

Very truly yours,

FOUNDATION DESIGN, P.C

Jay A. Goggin
Laboratory Manager

Foundation Design, P.C.

Chautauqua County IDA Park
Shortman Road, Ripley, New York
5342.0

2-14-2023

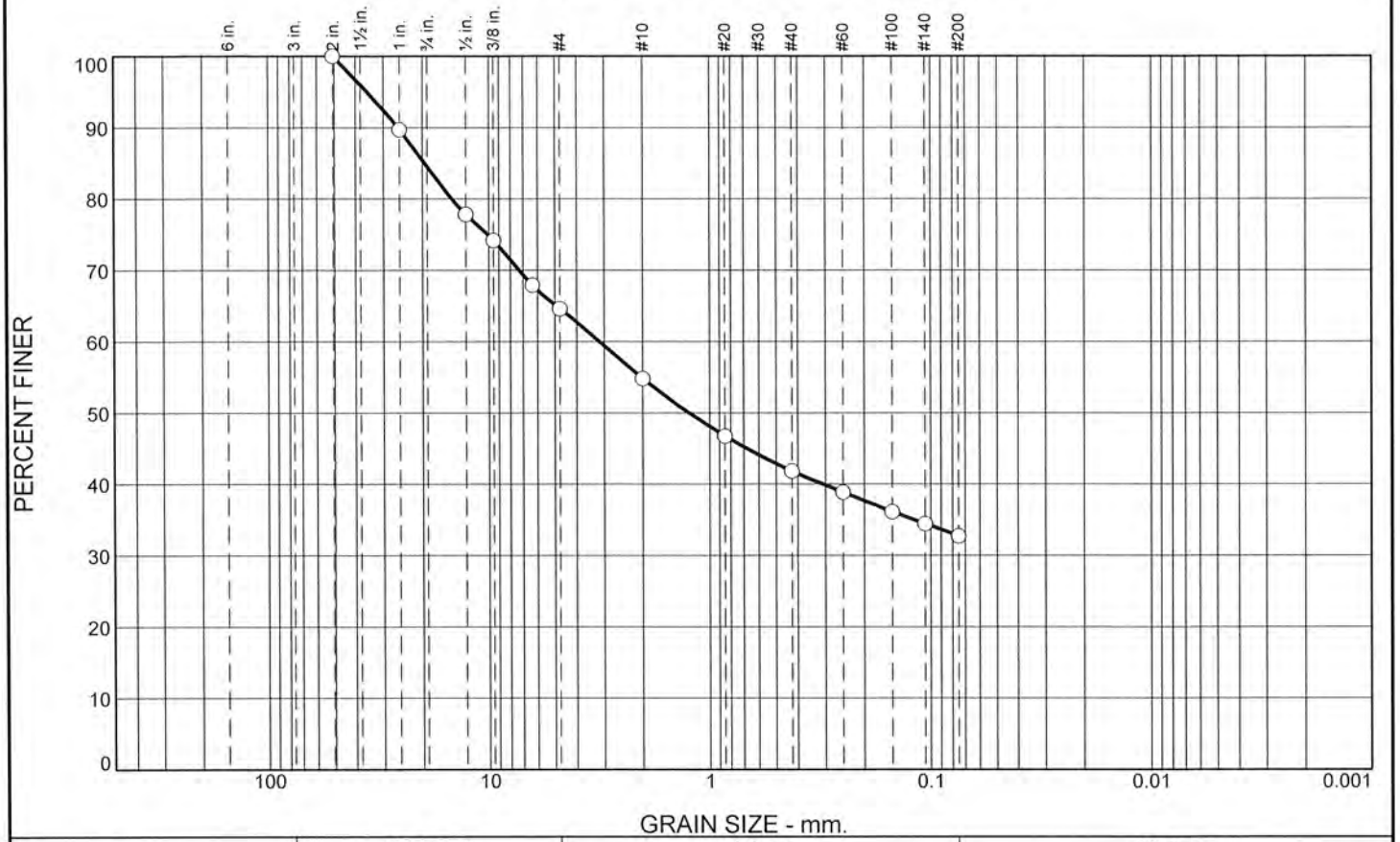
Moisture Content Test Report
(ASTM D-2216)

Moisture Content Test Results			
Boring Number	Well 1	B23-3	B23-4
Sample Number	S-3	S-3	S-2
Depth	4′-6′	4′-6′	2′-4′
Moisture Content (%)	**8.5**	**20.1**	**17.5**

Moisture Content Test Results			
Boring Number	B23-6	IT23-2	IT23-4
Sample Number	S-2	S-2	S-2
Depth	2′-4′	2′-4′	2′-4′
Moisture Content (%)	**14.6**	**13.2**	**16.5**

Moisture Content Test Results			
Boring Number	IT23-7	IT23-9	IT23-9
Sample Number	S-2	S-2	S-4
Depth	2′-4′	2′-4′	6′-8′
Moisture Content (%)	**8.8**	**23.0**	**11.5**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	16	19	10	13	9	33	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2"	100		
1"	90		
1/2"	78		
3/8"	74		
1/4"	68		
#4	65		
#10	55		
#20	47		
#40	42		
#60	39		
#100	36		
#140	34		
#200	33		

* (no specification provided)

Soil Description

GM: Gray silty gravel with sand per ASTM D2488

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 25.8666 D_{85}= 19.5840 D_{60}= 3.1515
D_{50}= 1.2402 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Test performed on 250.20 grams of oven dried sample

Source of Sample: Well 1 **Depth:** 4'-6'
Sample Number: S-3

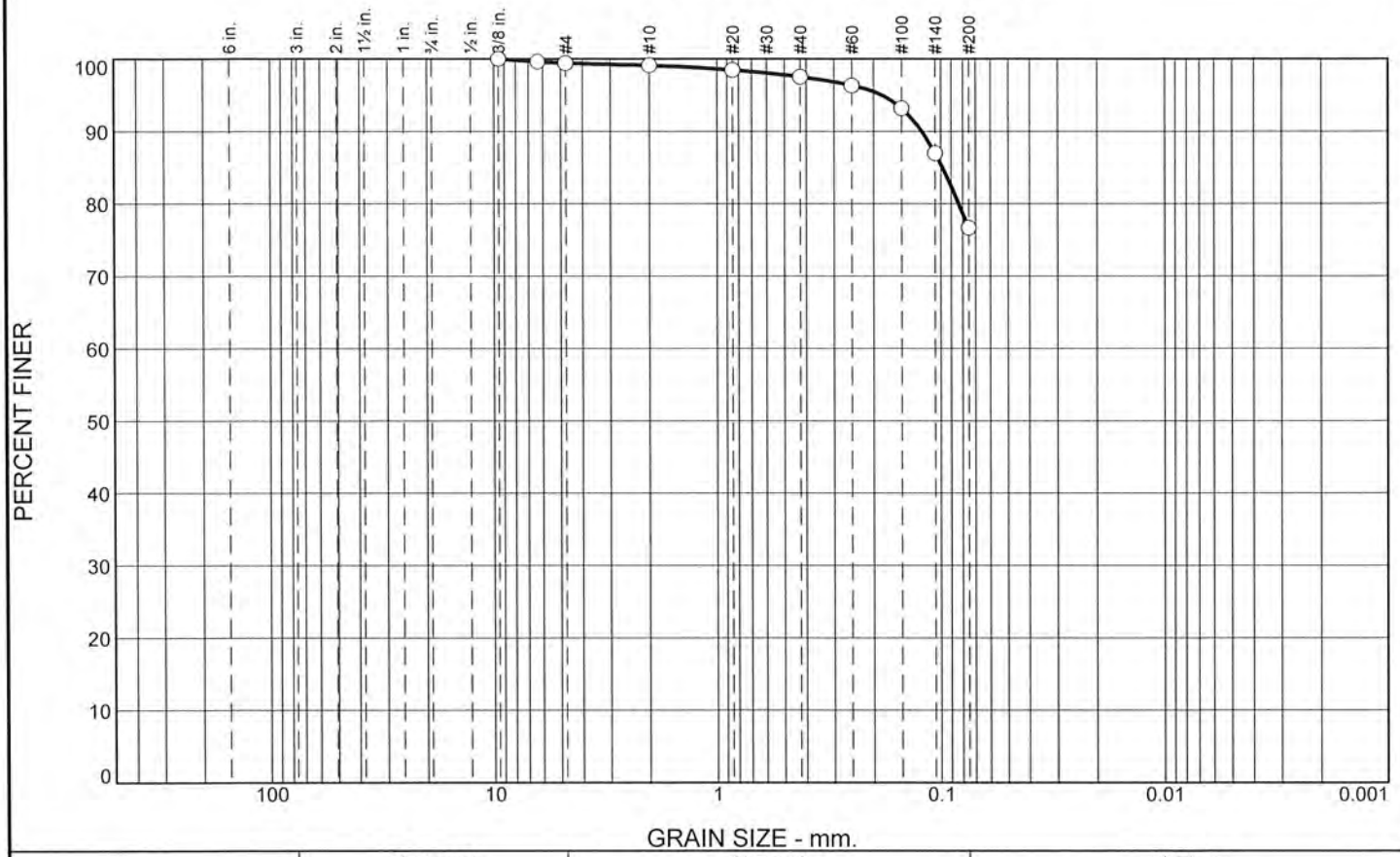
Date: 2-14-2023

Foundation Design, P.C.

Client: The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York
Project: Chautauqua County IDA Park
Shortman Road, Ripley, New York
Project No: 5342.0 **Figure**

Tested By: TJB **Checked By:** JAG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	1	0	1	21	77	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100		
1/4"	100		
#4	99		
#10	99		
#20	98		
#40	98		
#60	96		
#100	93		
#140	87		
#200	77		

* (no specification provided)

Soil Description

ML: Gray silt with sand perASTM D2488

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1218 D_{85}= 0.0983 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Testperformed on 219.57 grams of oven dried sample

Source of Sample: B23-3 **Depth:** 4'-6'
Sample Number: S-3

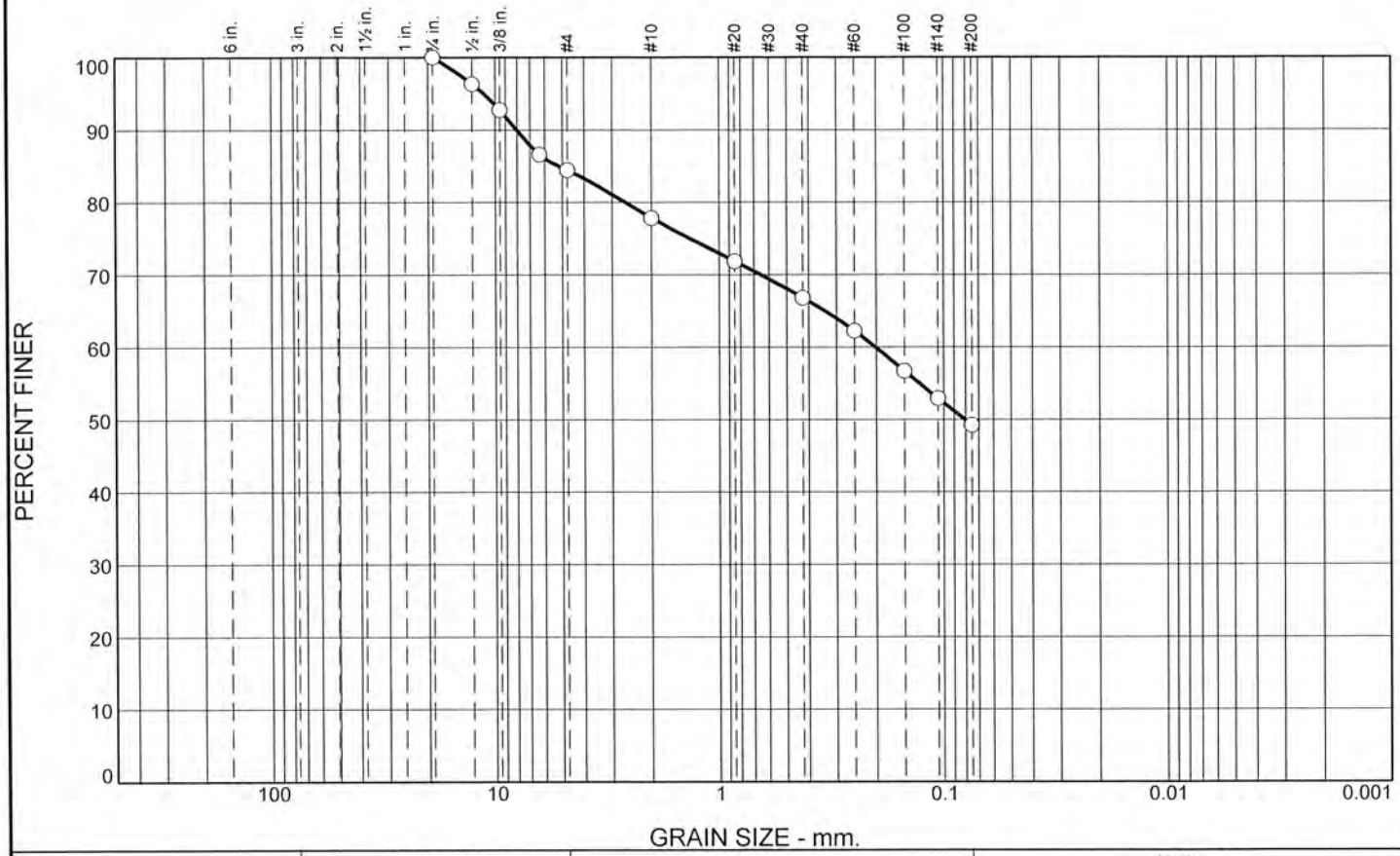
Date: 2-14-2023

Foundation Design, P.C.

Client: The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York
Project: Chautauqua County IDA Park
Shortman Road, Ripley, New York
Project No: 5342.0 **Figure**

Tested By: JAG **Checked By:** JAG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	16	6	11	18	49	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100		
1/2"	96		
3/8"	93		
1/4"	87		
#4	84		
#10	78		
#20	72		
#40	67		
#60	62		
#100	57		
#140	53		
#200	49		

* (no specification provided)

Soil Description

SM: Tan-brown silty sand with gravel per ASTM D2488

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 8.0342 D_{85}= 5.2208 D_{60}= 0.2021
D_{50}= 0.0809 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Test performed on 233.55 grams of oven dried sample

Source of Sample: B23-4 **Depth:** 2'-4'
Sample Number: S-2

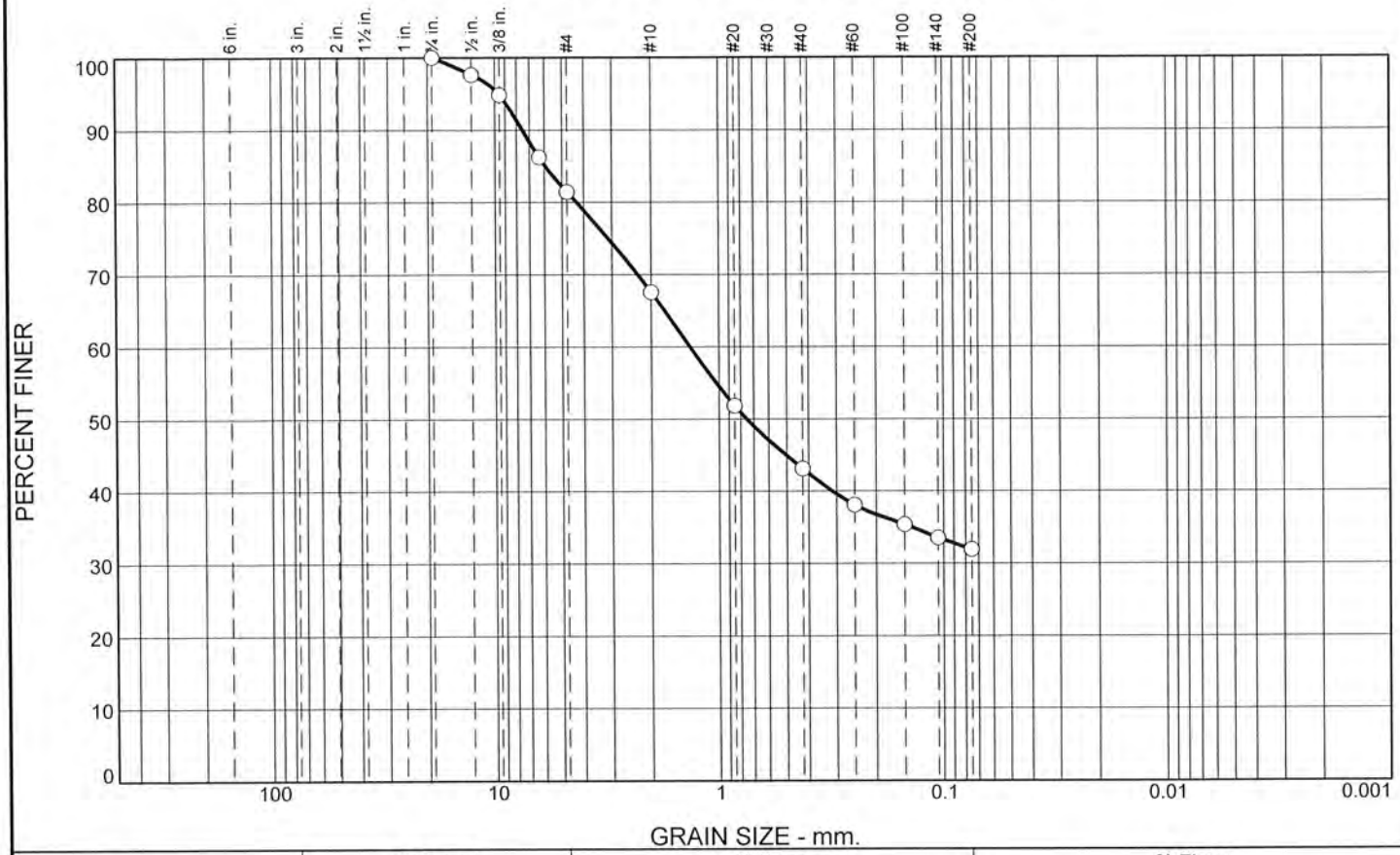
Date: 2-14-2023

Foundation Design, P.C.

Client: The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York
Project: Chautauqua County IDA Park
Shortman Road, Ripley, New York
Project No: 5342.0 **Figure**

Tested By: TJB **Checked By:** JAG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	19	13	25	11	32	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100		
1/2"	98		
3/8"	95		
1/4"	86		
#4	81		
#10	68		
#20	52		
#40	43		
#60	38		
#100	35		
#140	34		
#200	32		

* (no specification provided)

Soil Description

SM: Gray-brown silty sand with gravel per ASTM D2488

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 7.5229 D_{85}= 5.9542 D_{60}= 1.3450
D_{50}= 0.7524 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Test performed on 207.88 grams of oven dried sample

Source of Sample: B23-6 **Depth:** 2'-4'
Sample Number: S-2

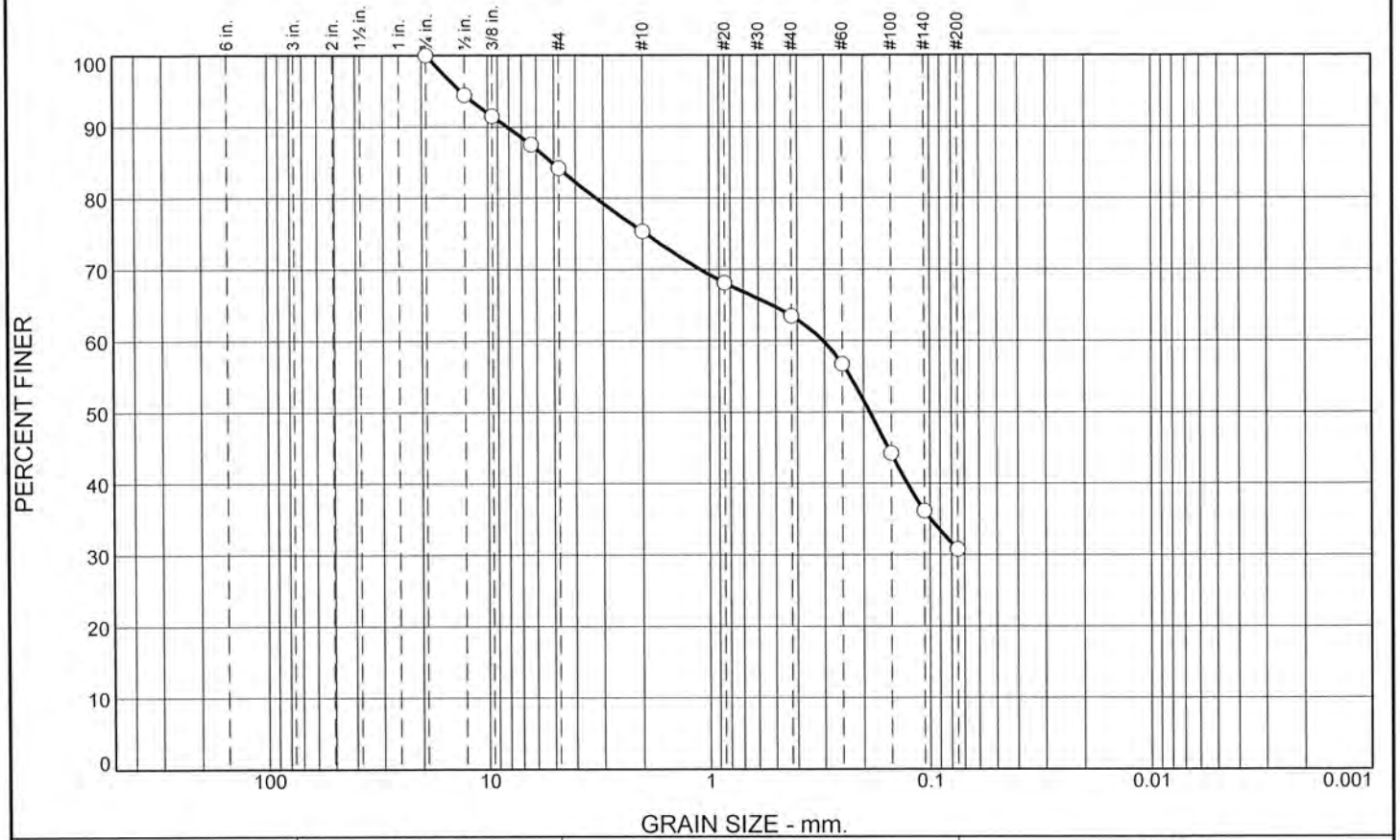
Date: 2-14-2023

Foundation Design, P.C.

Client: The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York
Project: Chautauqua County IDA Park
Shortman Road, Ripley, New York
Project No: 5342.0 **Figure**

Tested By: JAG **Checked By:** JAG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	16	9	12	32	31	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100		
1/2"	94		
3/8"	91		
1/4"	87		
#4	84		
#10	75		
#20	68		
#40	63		
#60	57		
#100	44		
#140	36		
#200	31		

* (no specification provided)

Soil Description

SM: Gray silty sand with gravel per ASTM D2488

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 8.1606 D_{85}= 5.1072 D_{60}= 0.3053
D_{50}= 0.1872 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Test performed on 272.12 grams of oven dried sample

Source of Sample: IT23-2 **Depth:** 2'-4'
Sample Number: S-2

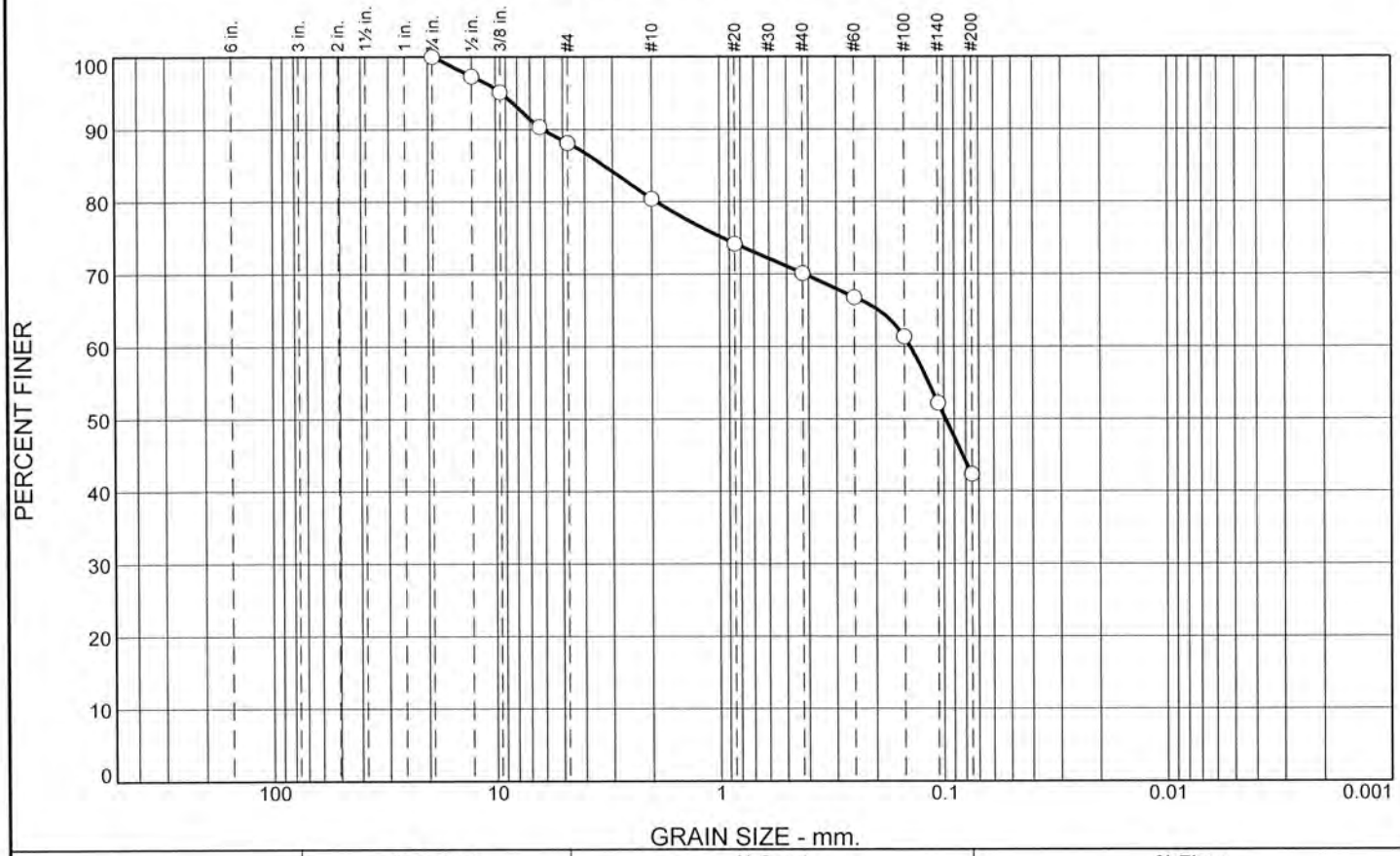
Date: 2-14-2023

Foundation Design, P.C.

Client: The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York
Project: Chautauqua County IDA Park
Shortman Road, Ripley, New York
Project No: 5342.0 **Figure**

Tested By: JAG **Checked By:** JAG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	12	8	10	28	42	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100		
1/2"	97		
3/8"	95		
1/4"	90		
#4	88		
#10	80		
#20	74		
#40	70		
#60	67		
#100	61		
#140	52		
#200	42		

* (no specification provided)

Soil Description

SM: Gray-brown silty sand per ASTM D2488

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 6.1378 D_{85}= 3.2801 D_{60}= 0.1412
D_{50}= 0.0983 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Test performed on 232.78 grams of oven dried sample

Source of Sample: IT23-4 **Depth:** 2'-4'
Sample Number: S-2

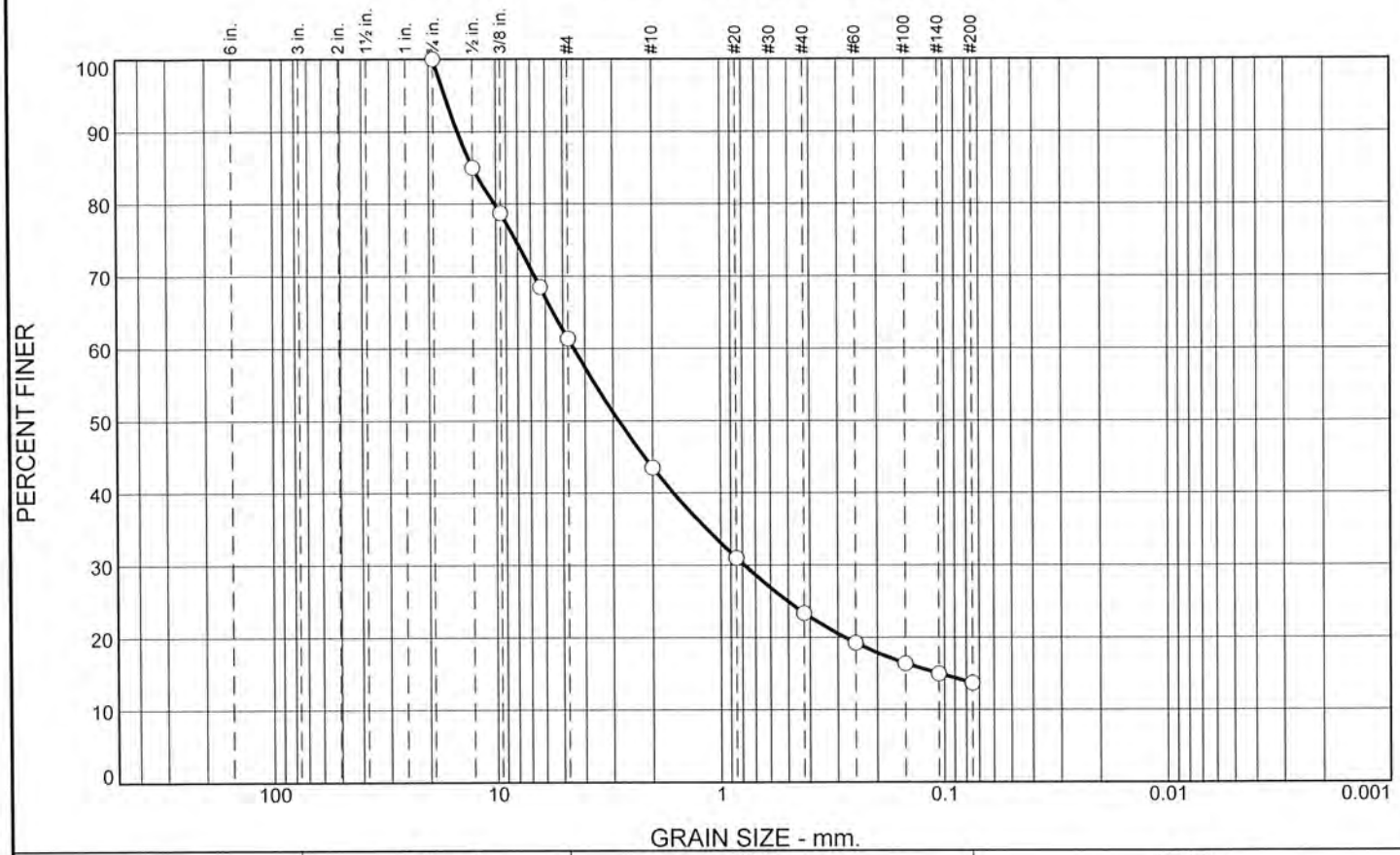
Date: 2-14-2023

Foundation Design, P.C.

Client: The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York
Project: Chautauqua County IDA Park
Shortman Road, Ripley, New York
Project No: 5342.0 **Figure**

Tested By: JAG **Checked By:** JAG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	39	17	21	9	14	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100		
1/2"	85		
3/8"	79		
1/4"	68		
#4	61		
#10	44		
#20	31		
#40	23		
#60	19		
#100	16		
#140	15		
#200	14		

* (no specification provided)

Soil Description

SM: Tan-brown silty sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 14.8392 D_{85}= 12.6981 D_{60}= 4.4810
D_{50}= 2.8245 D_{30}= 0.7848 D_{15}= 0.1066
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Test performed on 315.42 grams of oven dried sample

Source of Sample: IT23-7 **Depth:** 2'-4'
Sample Number: S-2

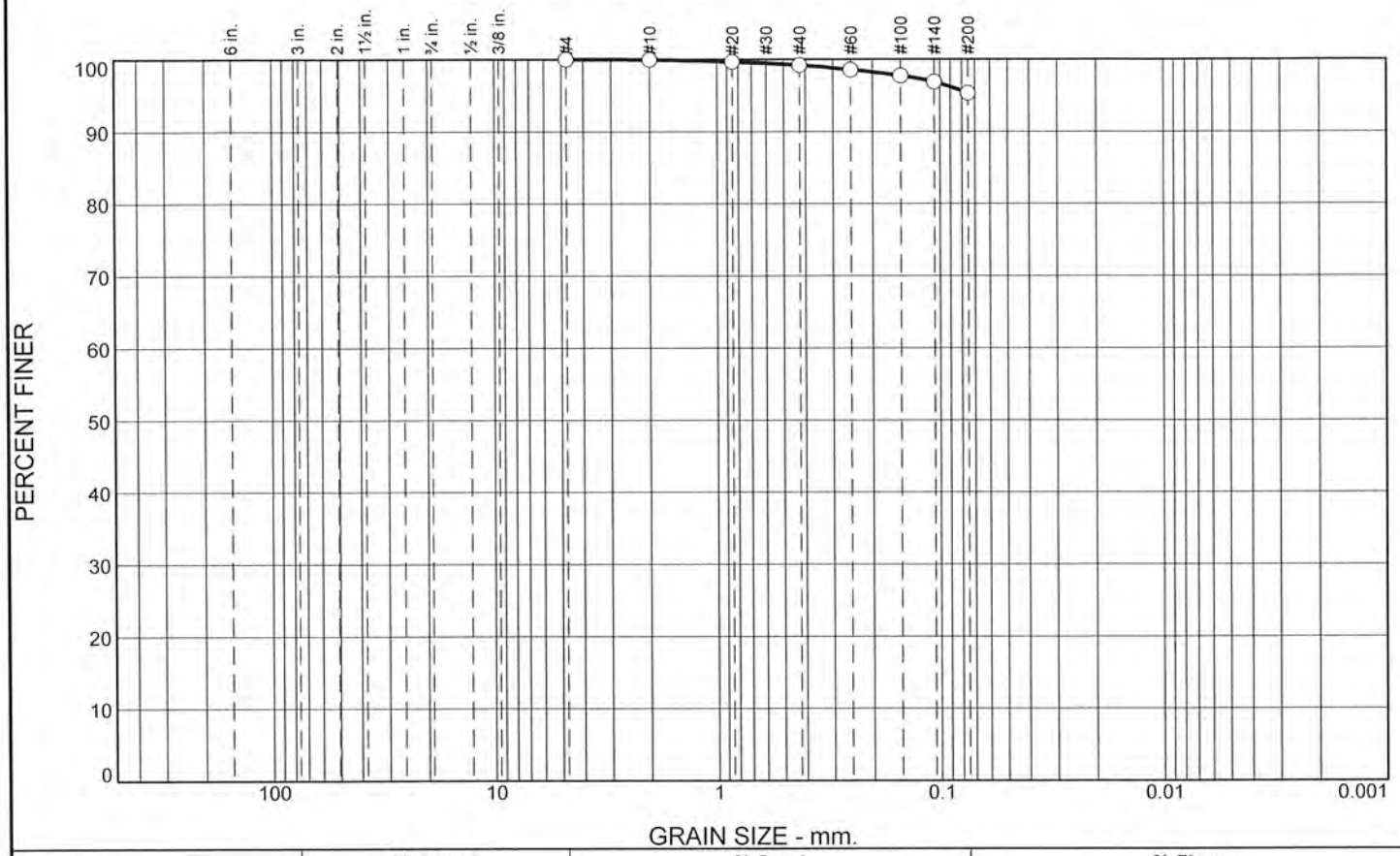
Date: 2-14-2023

Foundation Design, P.C.

Client: The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York
Project: Chautauqua County IDA Park
Shortman Road, Ripley, New York
Project No: 5342.0 **Figure**

Tested By: JAG **Checked By:** JAG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	1	4	95	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	100		
#40	99		
#60	99		
#100	98		
#140	97		
#200	95		

* (no specification provided)

Soil Description

ML: Tan-brown silt per ASTM D2488

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Test performed on 194.22 grams of oven dried sample

Source of Sample: IT23-9 **Depth:** 2'-4'
Sample Number: S-2

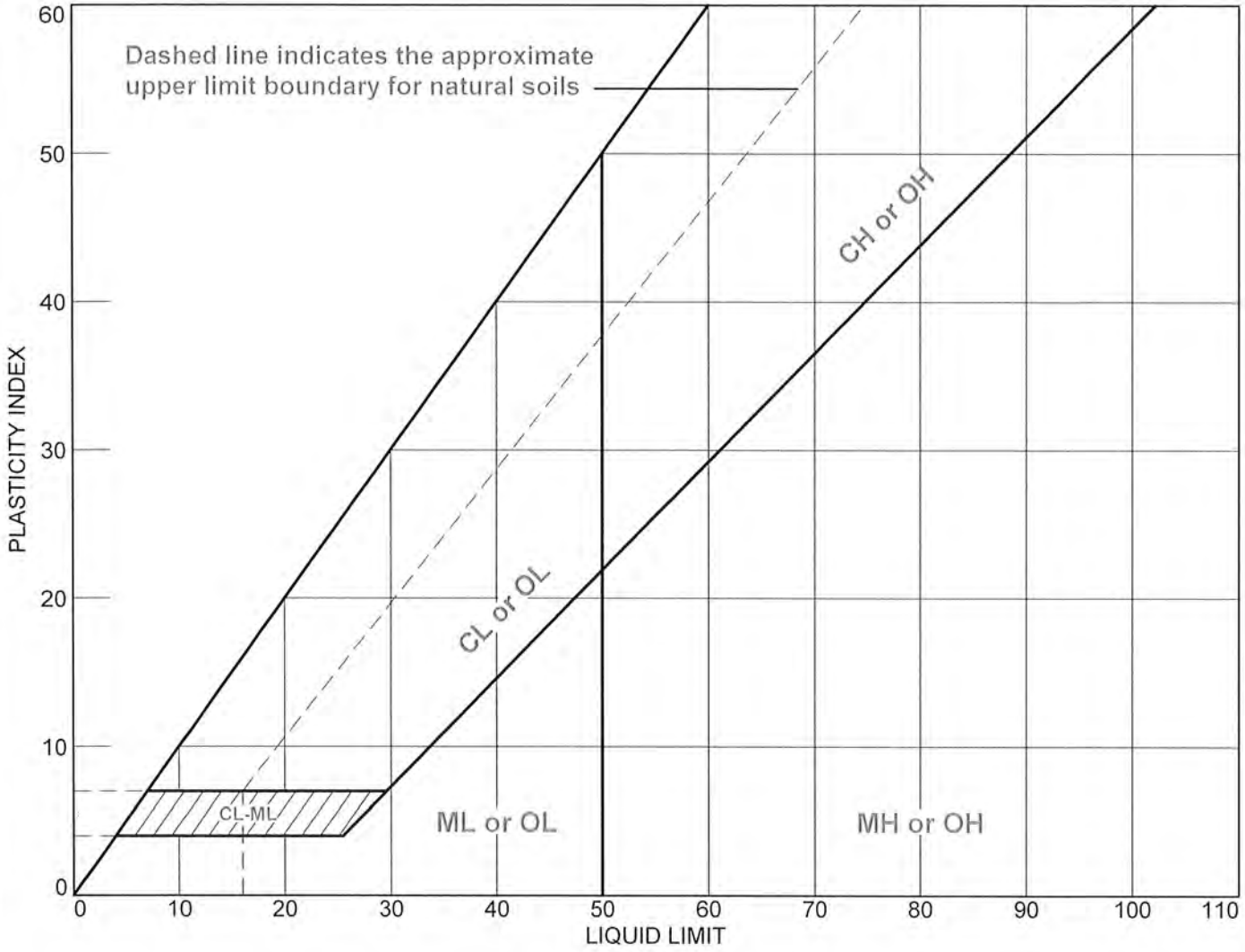
Date: 2-14-2023

Foundation Design, P.C.

Client: The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York
Project: Chautauqua County IDA Park
Shortman Road, Ripley, New York
Project No: 5342.0 **Figure**

Tested By: JAB **Checked By:** JAG

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	IT23-9	S-4	6'-8'	11.5	NP			SM per ASTM D2488

Foundation Design, P.C.

Client: The CPL Team, 255 Woodcliff Drive, Suite 200, Fairport, New York

Project: Chautauqua County IDA Park
Shortman Road, Ripley, New York

Project No.: 5342.0 **Figure**

Tested By: JAG **Checked By:** JAG

CME Associates, Inc.

491 Elmgrove Road, Suite 600
Rochester, New York 14606
(585) 254-8740
(585) 254-1351 (Fax)

www.cmeassociates.com

TRANSMITTAL

Date: February 20, 2023

To: Foundation Design
46A Sager Drive
Rochester, NY 14607

Via Agile

Attn: Jim Baker

Re: Laboratory Testing Services

Gentlepeople:

Enclosed you will find. . . .

Number of Copies	Report Number
1	39470L-10

Respectfully Submitted,
CME Associates, Inc.

Michael Bedet
Laboratory Supervisor

CME Associates, Inc.

Peter A. Schedel, ICC- MSI
Division Manager

/cl

cc: Jeff Netzband, Jon Strussenberg – Foundation Design

CME Associates, Inc.

491 Elmgrove Road, Suite 600
Rochester, New York 14606
(585) 254-8740
(585) 254-1351 (Fax)
www.cmeassociates.com

February 17, 2023

Foundation Design
46A Sager Drive
Rochester, New York 14607

Attn: James Baker

Re: **DIPRA Testing of Soil Samples**
Laboratory Testing Services
CME Report No.: 39470L-10

Gentlepeople:

As requested, CME performed soil testing following the 10 Point System of evaluating soils for corrosion potential established by the Ductile Iron Pipe Research Association (DIPRA). Testing was performed in accordance with Appendix A of ANSI/AWWA C105/A21.5. The samples were collected by a representative of the client and were delivered to CME's AMRL[1] Accredited Rochester, NY Laboratory for analysis on 2/14/2023. Test results are as follows:

Sample No.	Sample Location	General Description
RL-13994 1	Ripley B23-1 S-1 0'-2' 2-4-5-7	Brown- SAND, SILT/CLAY, GRAVEL, Non-Plastic
RL-13994 2	Ripley B23-1 S-2 2'-4' 9-11-14-18	Brown/Gray- SILT/CLAY, GRAVEL, Non-Plastic
RL-13994 3	Ripley Well 3 S-2 2'-4' 8-9-9-7	Brown- SAND, SILT/CLAY, GRAVEL, Non-Plastic

[1] **AASHTO** – American Association of State Highway & Transportation Officials (AASHTO) Materials Reference Laboratory a Federal Agency having jurisdiction to assess Laboratory competency according to the Standards of the United States. **CME**'s Rochester accreditation includes tests of Portland Cement Concrete, Concrete Aggregate, Masonry and Soil Materials. www.aashtoresource.org

CME Associates, Inc.

RL-13994 4	Ripley Well 3 S-1 0'-2' 5-2-3-3	Brown- SAND, SILT/CLAY, GRAVEL, Non-Plastic
RL-13994 5	Ripley IT 23-5 S-1 0'-2' 1-3-4-7	Brown- SAND, SILT/CLAY, GRAVEL, Non-Plastic
RL-13994 6	Ripley IT 23-5 S-2 2'-4' 4-8-8-8	Brown/Gray- SAND, SILT/CLAY, GRAVEL, Non-Plastic
RL-13994 7	Ripley Well 3 S-4 6'-8' 4-3-6-14	Brown/Gray- SILT/CLAY, SAND, Non-Plastic
RL-13994 8	Ripley Well 3 S-3 4'-6' 3-4-5-5	Brown- SAND, SILT/CLAY, GRAVEL, Non-Plastic

Sample No.	Resistivity ohm-cm.	Redox Potential (mv)	pH	Sulfides	Moisture	DIPRA Points
RL-13994 1	29,000	117	4.5	Negative	Moist	1
RL-13994 2	28,000	132	4.1	Negative	Moist	1
RL-13994 3	52,000	182	4.3	Negative	Moist	1
RL-13994 4	32,000	202	4.2	Negative	Dry	0
RL-13994 5	43,000	185	4.2	Negative	Moist	1

RL-13994 6	12,000	210	4.6	Negative	Wet	2
RL-13994 7	3,200	137	5.3	Negative	Moist	2
RL-13994 8	15,000	171	4.2	Negative	Moist	1

For a given soil sample, each parameter is evaluated and assigned points as outlined in the attached form. A point total of 10 or more indicates the soil is corrosive to ductile iron pipe and protective measures should be continued.
Thank you for allowing **CME** Rochester Branch the opportunity to provide these services. Please contact us if you have any questions.

Respectfully submitted,
CME Associates, Inc.

Michael J. Bedet
Laboratory Supervisor

CME Associates, Inc.

Soil Test Evaluation for Ductile Iron Pipe

(10-Point System)*

Soil Characteristics	*Points*
Resistivity (ohm-cm)**	
<1,500	10
≥1,500-1,800	8
>1,800-2,100	5
>2,100-2,500	2
>2,500-3,000	1
>3,000	0
pH	
0-2	5
2-4	3
4-6.5	0
6.5-7.5	0***
7.5-8.5	0
>8.5	3
Redox potential	
>+100mv	0
+50 to +100mv	3.5
0 to +50mv	4
Negative	5
Sulfides	
Positive	3.5
Trace	2
Negative	0
Moisture	
Poor drainage, continuously wet	2
Fair drainage, generally moist	1
Good drainage, generally dry	0

*Ten points-corrosive to Ductile Iron Pipe. Protection is indicated.

**Based on water-saturated soil box. This method is designed to obtain the lowest- and most accurate-resistivity reading.

***If sulfides are present; and low (<100mv) or negative redox-potential results are obtained, 3 points should be given for this range.

Note: DIPRA recommends that the soils sample used in the 10-point evaluation to be taken at pipe depth rather than at the surface. Soil corrosivity readings can vary substantially from the surface to pipe depth.