DRAFT GEOTECHNICAL INVESTIGATION REPORT

For the Proposed

Overhead Transmission

at the

Arkwright Summit Wind Farm
Town of Arkwright
Chautauqua County, NY

Prepared For:

Arkwright Summit Wind Farm LLC

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1.0 Executive Summary

This draft report presents the geotechnical investigation performed for the Overhead Transmission (OT) component of the Arkwright Summit Windfarm in Chautauqua County, New York. The proposed locations of 31 monopole foundations to support the OT were explored for this investigation.

The wind farm is to be located on the land that rises between the Portage Escarpment to the Allegheny Plateau west of Lake Erie. Ground surface elevations at turbine locations generally range between El. 1300 and El. 1800 feet. The geomorphology of this area is heavily influenced by glaciation, and surficial geology generally includes undifferentiated stratified drift assemblages, kame moraines, and glacial till.

It is our understanding that the OT structures will be supported by two types of foundations: 80-foot timber monopoles for in-line structures, and 80 ft. multi-column steel frames for structures at turning points. Although foundation designs were not available for this report, typically monopoles of this height are supported on drilled shaft foundations.

The test borings encountered subsurface conditions consistent with local surficial geology and typically included undifferentiated stratified glacial drift (glacial drift) overlying glacial till and shale bedrock. The thickness of the glacial drift varied from a few feet to over 50 feet. The glacial drift typically consisted of layers of sand, silty sand, and silty clay. In general, the cohesionless layers in the glacial drift were loose to medium dense, and the cohesive layers were stiff to very stiff. The glacial till generally consisted of hard gravelly lean silty clay with cobbles and boulders. The shale was typically soft to medium hard and horizontally bedded.

The following geotechnical parameters are recommended for design of drilled shafts used to support the OT's:

Stratum	Total Unit Weight (pcf)	Internal Friction Angle	Long Term Cohesion (psf)	Ultimate Skin Friction (psf)
Glacial Drift (to depth of 20 feet)	115	32	0	800
Glacial Drift (20 feet to 40 feet)	125	33	0	1200
Glacial Till	135	32	300	2000
Shale	140	38	1000	4000

Refer to subsequent sections of the report for more details regarding our design recommendations, along with earthwork construction considerations. Please note *italicized* words are further defined in Exhibit A - Terms & Definitions.

2.0 Introduction

2.1 General

Fisher Associates, P.E., L.S., L.A, D.P.C. (Fisher Associates) was retained by Arkwright Summit Wind Farm, LLC (ASWF), to provide geotechnical engineering services for the proposed Arkwright Summit Wind Farm. The proposed wind farm will be located in the Town of Arkwright, Chautauqua County, New York.

Fisher Associates conducted this geotechnical investigation to obtain general subsurface condition information in the proposed area of the Overhead Transmission Lines (OTs). This report presents a data summary of the preliminary subsurface exploration work performed including the field and laboratory data, and a description of the subsurface soil and water conditions encountered at the preliminary test boring locations.

2.2 Site Description

The wind turbines are to be located on the land that rises between the Portage Escarpment to the Allegheny Plateau west of Lake Erie. Ground surface elevations at turbine locations generally range between El. 1300 and El. 1800 feet. The sites are presently either wooded areas or farmland.

2.3 Project Description

The proposed overhead transmission line will connect the substation on Center Road to the Interconnect Area on Webster Road.

3.0 Subsurface Exploration

3.1 Test Borings

The subsurface exploration program consisted of the advancement of 32 test borings. The test borings were performed by Earth Dimensions, Inc., and Nature's Way Environmental Consultants & Contractors, Inc. during the period of April 6, 2015 to May 29, 2015. The test borings were advanced using all-terrain rotary drill rigs equipped with 4-1/4" I.D. hollow stem augers and diamond-bit rock coring barrels. Explorations were advanced to depths of up to 41 feet below ground surface (bgs).

The test boring location and ground surface elevations were established in the field by Fisher Associates' survey personnel and utility clearances were provided by the drillers. The approximate exploration location is shown on Figure No. 2 - Subsurface Exploration Location Plan. Test boring logs prepared by the drilling companies are attached as Appendix A - Test Boring Logs.

3.2 Laboratory Testing

Laboratory testing was performed by testing laboratories retained by the drilling contractors.

Testing was performed upon samples selected by Fisher Associates. Laboratory testing included the performance of Natural Moisture Content Determination (ASTM D-2216), Grain Size Analysis (ASTM D-422), and Atterberg Limits Determination (ASTM D-4518). Laboratory testing results are attached as Appendix B to this report.

3.3 Geophysical Exploration

Geophysical exploration to measure the in-situ shear wave velocity and electrical resistivity of the ground within the wind farm are planned but have not been performed as of the date of publication of this draft report.

4.0 Summary of Subsurface Conditions

4.1 General

The OTs are to be located on the land that rises between the Portage Escarpment to the Allegheny Plateau west of Lake Erie. Ground surface elevations in the area generally range between El. 1300 and El. 1800 feet. The geomorphology of this area is heavily influenced by glaciation, and surficial geology generally includes undifferentiated stratified drift assemblages, kame moraines, and glacial till.

The test borings encountered subsurface conditions consistent with local surficial geology and typically included undifferentiated stratified glacial drift (glacial drift) overlying glacial till and shale bedrock. The thickness of the glacial drift varied from a few feet to over 40 feet. The glacial drift typically consisted of layers of sand, silty sand, and silty clay. In general, the cohesionless layers in the glacial drift were loose to medium dense, and the cohesive layers were stiff to very stiff. The glacial till generally consisted of hard gravelly lean silty clay with cobbles and boulders. The shale was typically soft to medium hard and horizontally bedded. **Table 1 presents a summary of subsurface conditions encountered at each of the OT locations**

The generalized soil profile described below and shown on the test boring logs is intended to convey trends in subsurface conditions. The boundaries between the soil strata are approximate and are based on interpretations between widely spaced explorations. Actual soil transitions and conditions may vary between the subsurface exploration locations. See the attached exploration logs within Appendix A for more details regarding the subsurface conditions.

4.2 Topsoil

A topsoil or organic layer was encountered at the ground surface at each boring location. The thickness of the topsoil encountered ranged from approximately 0.1 feet to 1.0 feet.

4.3 Glacial Drift

Glacial drift was encountered at all of the boring locations. The glacial drift generally consisted of stratified layers of sand, silty sand and silty clay. The drift sometimes included small amounts of gravel. The thickness of the glacial drift varied from 3.2 feet to over 40 feet. Standard Penetration Testing "N" values in the glacial drift varied from 2 blows per foot (bpf) to 78 bpf but were typically between 10 to 30 bpf. The cohesive layers in the glacial drift were typically stiff

and lean.

4.4 Glacial Till

Glacial till was typically encountered below the glacial drift. The glacial till typically consisted of a binder of hard clay and silt with interbedded gravel and sand. Cobbles and boulders may also be present within the glacial till. Standard Penetration Testing "N" values in the glacial till ranged from 13 bpf to over 100 bpf, and typically exceeded 40 bpf. The glacial till typically classified as a lean silty clay during Atterberg limits testing, and generally consisted of approximately 50% silt and clay with the remainder sand and gravel.

4.5 Shale

Shale was occasionally encountered below the glacial drift or glacial till in the test borings. The shallowest depth at which shale was encountered was 4 feet, but more often it was encountered at depths greater than 10 feet. The shale was typically thinly bedded, with a Rock Quality Designation values ranging from 31 to 53. The upper five feet of shale could be augered with the drill rigs utilized during the subsurface investigation.

4.6 Groundwater

Groundwater was not encountered at the completion of the majority of the test borings. Groundwater was detected within the following boreholes:

Boring	Depth to Groundwater (feet)
TL-480	29.9
TL-499	15.9
TL-503	36.3
TL-506	20.2

Long term ground water measurements were not obtained for this study. Groundwater levels may be impacted by regional and local site considerations and may fluctuate over time. The fluctuations can be due to seasonal variations in precipitation and variations in soil conditions between explorations.

5.0 Geotechnical Engineering and Construction Considerations

5.1 Monopole Foundations

We anticipate that the monopoles and multi-pole frames will be supported by a drilled shaft foundation. We assume that the drilled shafts will be constructed using temporary steel casing to support the augered borehole. Loose material should be removed from the bottom of the drilled shaft prior to the placement of concrete. Dewatering should be performed prior to concrete placement if more than 2 feet of water accumulates in the bottom of the shaft. Concrete should be placed in the shafts the same working day that drilling is completed. A dropchute that extends at least 75% of the length of the drilled shaft should be utilized during concrete placement. The top of the fluid concrete placement must be maintained at least 3 feet above the bottom of the

temporary casing as it is being extracted during placement. Reinforcing cages should be supported at the ground surface until the concrete adequately hardens.

The following geotechnical parameters are recommended for design of drilled shafts used to support the OT's:

Stratum	Total Unit Weight (pcf)	Internal Friction Angle	Long Term Cohesion (psf)	Ultimate Skin Friction (psf)
Glacial Drift (to depth of 20 feet)	115	32	0	800
Glacial Drift (20 feet to 40 feet)	125	33	0	1200
Glacial Till	135	32	300	2000
Shale	140	38	1000	4000

5.2 Seismic Site Classification

A seismic investigation is planned for this project but was not initiated at the time of writing of this report. Once we have performed this evaluation, this information will be added to the final report. However, for planning purposes, we developed the *seismic design classification* in accordance with the 2010 Building Code of New York State, was developed based on the test boring information. We recommend that seismic site class "C" be used for the project site. See Exhibit A - Terms & Definitions section at the end of this report for more information regarding the Seismic Site Classification.

6.0 Construction Observation

We recommend that a geotechnical engineer, and/or a qualified engineering technician, working under the direction of the geotechnical engineer, be retained during construction. The Engineer and/or their representative will make observations of the prepared subgrade and bearing surfaces to review that unsuitable materials have been removed. The Engineer or their representative will also observe the subsurface conditions exposed during construction for comparison to the exploration data. This will allow for adjustments that may be necessary to accommodate actual soil conditions revealed at the proposed improvement location.

7.0 Closing

We prepared this report to provide information about potential foundation design and construction considerations for the proposed. Test borings were made as part of this evaluation, and the recommendations provided herein are based on information available from the subsurface explorations. This report presents field observations, data collection and research, results, and professional opinions, and may be subject to modification if Arkwright Summit Wind Farm LLC or any other party develops subsequent information. The report has been prepared in accordance with generally accepted soil and foundation engineering practice, and no other warranty, expressed or implied, is made.

This report has been prepared for the specific and exclusive use of Arkwright Summit Wind Farm LLC, and the design team for this project and site. The report and the findings in the report shall not, in whole or in part, be disseminated or conveyed to any other party, or used or relied upon by any other party, except for the specific purpose and to the specific parties alluded to above, without the prior written consent of Fisher Associates. Fisher Associates would be pleased to discuss the conditions associated with any such additional dissemination, use, or reliance by other parties.

These conclusions and recommendations do not reflect variations in subsurface conditions which could exist in unexplored areas of the site. Regardless of the thoroughness of a subsurface exploration, there is a possibility that conditions between test borings will differ from those at the boring locations, that the conditions are not anticipated by the designers, or that the construction process has altered the soil conditions. Therefore, an experienced geotechnical engineer should evaluate earthwork and foundation construction to verify that the field conditions match those anticipated in design, as recommended above. In the event changes are made in the proposed constructions plans, the recommendations presented in this report shall be reviewed by the geotechnical engineer and the conclusions of this report modified or verified in writing.

EXHIBIT A

Terms and Definitions

Structural Fill: Recommended to consist of Crusher Run Stone or Crushed Gravel and Sand mixture that is free of Clays, Organics, Snow, Ice and friable or deleterious particles. At minimum it should meet the following; New York State DOT specifications Item 304.12 Type 2 material.

Select Granular Fill: Material meeting the requirements of New York State DOT, standard specification Item 203.07 - Select Granular Fill.

Compacted: All fill beneath structural elements, slab-on-grade, pavement areas, and interior walls should be placed in *lifts* and compacted to 95% of maximum dry density as determined by modified proctor test (ASTM D-1557). For exterior areas with no overlying structures, 92% of maximum dry density as determined by modified proctor test (ASTM D-1557) may be used.

Lifts: Placement of fill should occur in nearly horizontal, uniform lifts not exceeding 9-inches in loose thickness and *compacted* with at least three (3) passes of suitable compaction equipment. Fill should also be placed in a stable well engineered condition and should not "pump" or show signs of movement or significant deflection (i.e. unstable conditions) as it is being constructed. All fill should be placed and *compacted* within ±2% of optimum moisture content, and the equipment used to compact the granular materials must be compatible with the material type and lift thickness. The loose lift thickness should be reduced to 6-in. in excavations where hand operated compaction equipment will be utilized.

Excavated soils - may be used for general site grading or trench backfilling in landscape areas, providing they are free of any organics, particles greater than 6-inch diameter, deleterious materials, and can be properly *compacted*. However, as previously noted, they are frost susceptible and sensitive to moisture and, therefore, may be difficult to place and compact. These soils may require drying, prior to placement, to adequately achieve the proper compaction and moisture requirements as noted above.

Densification - The subgrade densification/re-compaction should be performed prior to *proof-rolling*, under the observation of a qualified geotechnical engineer. We recommended that the exposed native soil subgrade surface be densified/re-compaction to a minimum of 95% of its maximum dry density, as determined by the modified proctor moisture-density relationship (ASTM D-1557) and meeting the above moisture requirements. This will require sampling of exposed subgrade soils, prior to commencing this work, and performing laboratory moisture-density relationship testing (ASTM D-1557) on the representative soils to establish proper control densities for the subgrade compaction. We recommend that the subgrades be compacted a minimum of ten (10) sets of overlapping passes of a vibratory compaction equipment weighing at least 10 to 15 tons.

Proper Subgrade Preparation / Proof Rolling: Excavation and removal of all surface materials, topsoil, trees, and loose/soft or wet soils. The prepared subgrade surface should be visually observed, and all deleterious materials and organic matter, should be excavated and removed. The subgrade surface should be proof-rolled with at least three (3) sets of overlapping passes of a smooth-wheel vibratory compaction equipment weighing at least 10 to 15 tons, under the

observation of a qualified geotechnical engineer. Areas that are wet, unstable, or weave excessively during proof-rolling should be excavated and replaced with compacted *structural fill*. A suitable stabilization/separation geotextile, such as Mirafi 500X, should be placed between the soil subgrades and the overlying *structural fill* layer.

Minimize Potential Degradation of the Subgrade Soils - Efforts should be made to maintain the subgrades in a dry and stable condition at all times, and traffic over exposed subgrades should be minimized to the extent practicable during construction. These efforts could include: installation of drainage swales and underdrains (i.e. "French drains") to intercept and divert surface runoff and perched groundwater away from the construction areas; sloping of the subgrade and "sealing" of the surface with a smooth drum roller to promote runoff; and restricting construction equipment traffic from traveling directly over the subgrade surfaces, especially when they are wet. Construction traffic over these subgrade soils, particularly when they are wet may cause the soils to become disturbed, destabilize, and rut/pump. Accordingly any areas that are disturbed should be undercut or over excavated and backfilled with *compacted structural fill*.

Seismic Design Classification - The spectral accelerations for the project site were obtained from the United States Geologic Survey (USGS), U.S. Seismic "Design Maps" Web Application, using the project site for the Arkwright, NY area, for a seismic site class "C". The following accelerations are based on the 2010 ASCE 7 Standard mapping, which makes use of the 2008 USGS seismic hazard data, as published in the 2010 Building Code of New York State.

Short Period Response S_{ms}	1 Second Period Response S_{M1}	5% Damped Design Spectral Response S_{DS}	5% Damped Design Spectral Response S_{D1}
0.181g	0.089g	0.120g	0.059g

TABLE

Table No. 1
Summary of Subsurface Conditions
Arkwright Summit Wind Farm
Town of Arkwright, Chautauqua County, New York

Test Boring Number	Ground Surface Elevation (ft.)	Exploration Total Depth (ft.)	Topsoil	Glacial Drift				Glacial Till				Weathered Bedrock				Apparent Bedrock		
			Thickness (ft.)	Depth to Top (ft.)	Elevation (ft.)	Thickness (ft.)	N-Values	Depth to Top (ft.)	Elevation (ft.)	Thickness (ft.)	N-Values	Depth to Top (ft.)	Elevation (ft.)	Thickness (ft.)	N-Values	Depth to Top (ft.)	Elevation of Top (ft.)	Recovery/ RQD
Wind Turbine Exploration Borings																		
TL-517		40.8	0.3	0.3		3.2	10	3.5		UNKNOWN	15 < N < 70	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-516		41.0	0.3	0.3		3.2	9	3.5		UNKNOWN	12 < N < 84	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-515		19.2	0.4	0.4		4.1	11	NOT ENCOUNTERED				4.5		4.7	GREATER THAN 100	9.2		RUN 1: REC = 98% RQD 48% RUN 2: REC = 86% RQD = 53%
TL-514		20.4	0.2	0.2		8.8	20 < N < 50	9.0		UNKNOWN	32 < N < 100++	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-513		23.3	0.1	0.1		18.9	9 < N < 96	NOT ENCOUNTERED				19.0		UNKNOWN	GREATER THAN 100	NOT ENCOUNTERED		
TL-511		21.3	0.2	0.2		17.8	10 < N < 47	18.0		UNKNOWN	44	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-510		22.1	0.1	0.1		13.9	14 < N < 23	14.0		5.5	24	19.5		UNKNOWN	100++	28.5		RUN 1: REC = 97% RQD 31% RUN 2: REC = 93% RQD = 38%
TL-508		22.7	0.4	0.4		4.0	6 < N < 8	NOT ENCOUNTERED				4.0		UNKNOWN	64 < N < 100++	NOT ENCOUNTERED		
TL-507		23.3	0.3	0.3		3.7	5 < N < 7	4.0		3.5	56 < N < 97	7.5		UNKNOWN	100++	NOT ENCOUNTERED		
TL-506		23.1	0.5	0.5		3.5	5 < N < 19	4.0		15.0	24 < N < 100	19.0		UNKNOWN	100++	NOT ENCOUNTERED		
TL-505		40.2	0.2	0.2		33.8	6 < N < 28	34.0		UNKNOWN	34 < N < 100	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-503		40.0	0.6	0.6		11.9	8 < N < 24	12.5		UNKNOWN	16 < N < 149	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-502		32.1	0.6	0.6		15.4	5 < N < 25	16.0		UNKNOWN	49 < N < 100	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-500		40.3	0.5	0.5		7.5	8 < N < 20	8.0		UNKNOWN	34< N< 145	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-499		33.4	0.7	0.7		26.3	8 < N < 40	27.0		UNKNOWN	100	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-498		41.0	0.8	0.8		25.2	2 < N < 65	26.0		UNKNOWN	28 < N < 100	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-497		37.6	0.3	0.3		31.2	5 < N < 89	31.5		UNKNOWN	100+	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-496		40.5	0.4	0.4		23.6	5 < N < 47	24.0		UNKNOWN	100+	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-495		32.0	0.3	0.3		9.7	11< N < 47	10.0		UNKNOWN	58 < N < 100	NOT ENCOUNTERED				NOT ENCOUNTERED		

Table No. 1

Summary of Subsurface Conditions

Arkwright Summit Wind Farm

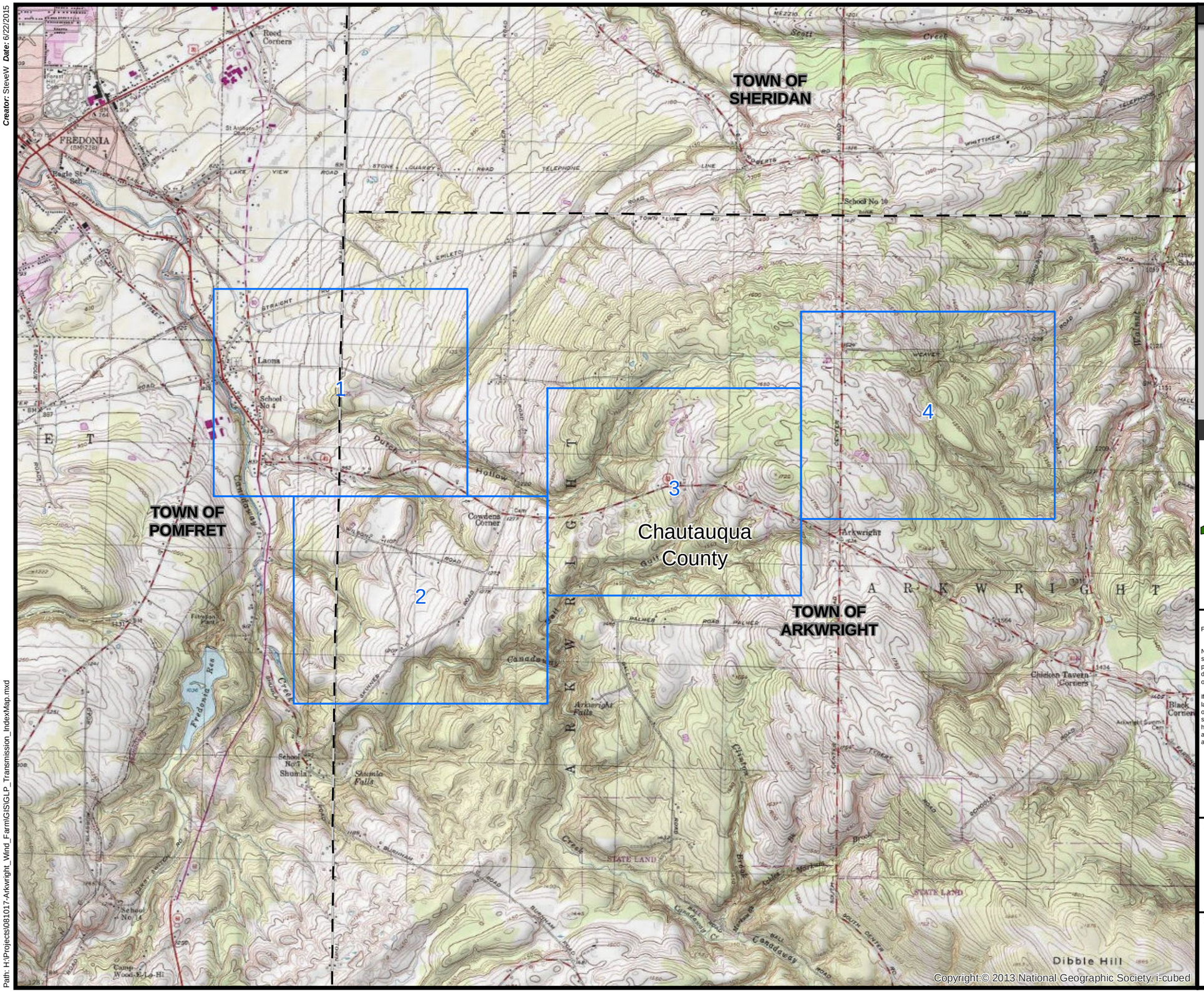
Town of Arkwright, Chautauqua County, New York

Test Boring Number	Ground Surface Elevation (ft.)	Exploration Total Depth (ft.)	Topsoil	Glacial Drift				Glacial Till				Weathered Bedrock				Apparent Bedrock		
			Thickness (ft.)	Depth to Top (ft.)	Elevation (ft.)	Thickness (ft.)	N-Values	Depth to Top (ft.)	Elevation (ft.)	Thickness (ft.)	N-Values	Depth to Top (ft.)	Elevation (ft.)	Thickness (ft.)	N-Values	Depth to Top (ft.)	Elevation of Top (ft.)	Recovery/ RQD
TL-494		41.4	0.4	0.4		15.6	10 < N < 39	16.0		UNKNOWN	18 < N < 44	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-493		41.0	0.5	0.5		9.5	6 < N < 32	10.0		UNKNOWN	13 < N < 54	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-491		41.0	0.3	0.3		27.2	5 < N < 38	27.5		UNKNOWN	25 < N < 42	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-490		41.0	0.3	0.3		UNKNOWN	6 < N < 55	UNKNOWN				NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-489		40.0	0.5	0.5		2.5	6	3.0		UNKNOWN	16 < N < 75	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-485		41.0	0.3	0.3		32.2	7 < N < 42	32.5		UNKNOWN	38 < N < 42	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-483		40.0	0.2	0.2		28.8	6 < N < 25	29.0		UNKNOWN	33 < N < 42	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-482		40.0	0.3	0.3		37.7	7 < N < 38	38.0		UNKNOWN	63 < N < 161	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-480		41.0	0.4	0.4		32.6	8< N < 28	33.0		UNKNOWN	46	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-478		34.9	0.3	0.3		34.2	12 < N < 18	NOT ENCOUNTERED				34.5		UNKNOWN	GREATER THAN 100	NOT ENCOUNTERED		
TL-477		34.9	1.0	1.0		33.5	9 < N < 21	NOT ENCOUNTERED				34.5		UNKNOWN	GREATER THAN 100	NOT ENCOUNTERED		
TL-475		40.0	0.2	0.2		33.8	10 < N < 31	34.0		UNKNOWN	27	NOT ENCOUNTERED				NOT ENCOUNTERED		
TL-473		35.2	0.2	0.2		28.8	19 < N < 78	29.0		UNKNOWN	100+	NOT ENCOUNTERED				NOT ENCOUNTERED		
						18.8												

Notes:

FIGURES

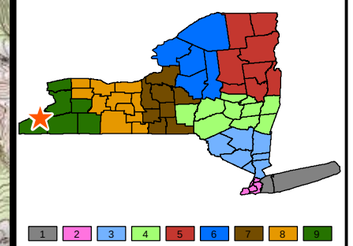
Creator: SteveW Date: 6/22/2015



LEGEND

- Map Tiles
- Municipal Boundary
- Project Location

NYSDEC REGIONS



USGS Quads:
Cassadaga
Dunkirk
Forestville
Hamlet

0 1,500 3,000 Feet

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PROJECT

ARKWRIGHT WIND FARM
CHAUTAUQUA COUNTY, NY

edp renewables
powered by nature

TITLE

TRANSMISSION LINE
SITE LOCATIONS

TILE NO.

INDEX

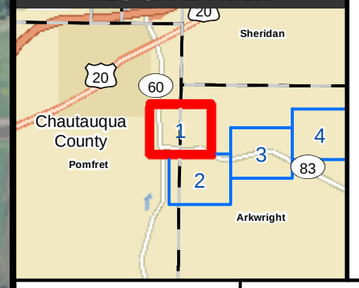
Path: H:\Projects\081017-Arkwright_Wind_Farm\GIS\GLP_Transmission_IndexMap.mxd

Creator: SteveW Date: 6/22/2015

LEGEND

- GDH - Transmission Line
- WTG - Turbine
- Monitoring Well Site
- Contour 20ft
- Municipal Boundary
- Match Line

REGIONAL INDEX



0 350 700 Feet

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WWW.FISHERASSOC.COM

PROJECT

ARKWRIGHT WIND FARM
CHAUTAUQUA COUNTY, NY

edp renewables
powered by nature

TITLE

TRANSMISSION LINE
SITE LOCATIONS

TILE NO.

1 OF 4

Path: H:\Projects\081017-Arkwright_Wind_Farm\GIS\GLP_Transmission_MapSheets.mxd

SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY

Creator: SteveW Date: 6/22/2015

TILE 1

BRAINARD ROAD

GDH 505
N: 878140.82
E: 955921.60
LAT: 42° 24' 28.845"
LON: -79° 17' 44.365"

GDH 507
N: 878377.18
E: 955073.29
LAT: 42° 24' 31.109"
LON: -79° 17' 55.699"

GDH 520
N: 877722.87
E: 956486.34
LAT: 42° 24' 24.763"
LON: -79° 17' 36.790"

GDH 502
N: 877502.10
E: 957234.58
LAT: 42° 24' 22.644"
LON: -79° 17' 26.793"

GDH 503
N: 877885.80
E: 956066.53
LAT: 42° 24' 26.388"
LON: -79° 17' 42.404"

GDH 506
N: 878162.19
E: 955361.62
LAT: 42° 24' 29.010"
LON: -79° 17' 51.831"

ROUTE 83

TILE 3

TOWN OF ARKWRIGHT

BRAINARD ROAD

GDH 493
N: 876182.80
E: 962062.45
LAT: 42° 24' 10.004"
LON: -79° 16' 22.299"

GDH 499
N: 876214.37
E: 958949.27
LAT: 42° 24' 10.064"
LON: -79° 17' 3.795"

GDH 497
N: 876096.08
E: 960458.01
LAT: 42° 24' 9.018"
LON: -79° 16' 43.674"

GDH 500
N: 876236.47
E: 957623.47
LAT: 42° 24' 10.174"
LON: -79° 17' 21.442"

BALL ROAD

GDH 498
N: 876206.43
E: 960341.36
LAT: 42° 24' 10.099"
LON: -79° 16' 45.241"

TOWN OF POMFRET

Chautauqua County

GDH 496
N: 875778.72
E: 960439.84
LAT: 42° 24' 5.882"
LON: -79° 16' 43.888"

GDH 494
N: 875744.63
E: 962011.12
LAT: 42° 24' 5.672"
LON: -79° 16' 22.936"

GDH 495
N: 875751.55
E: 960940.94
LAT: 42° 24' 5.654"
LON: -79° 16' 37.200"

MILLER ROAD

SKINNER ROAD

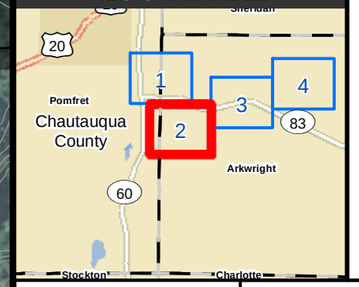
SHUMLA ROAD

1300 1100 1000 900 1200 1400

LEGEND

- GDH - Transmission Line
- WTG - Turbine
- Monitoring Well Site
- Contour 20ft
- Municipal Boundary
- Match Line

REGIONAL INDEX



0 350 700 Feet

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PROJECT

ARKWRIGHT WIND FARM
CHAUTAUQUA COUNTY, NY

edp renewables
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TITLE

TRANSMISSION LINE
SITE LOCATIONS

TILE NO.

2 OF 4

Path: H:\Projects\081017-Arkwright_Wind_Farm\GIS\GLP_Transmission_MapSheets.mxd

SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY

Creator: SteveW Date: 6/22/2015

CABLE ROAD

UNNAMED STREET

UNNAMED STREET

GDH 482
N: 881078.33
E: 965014.16
LAT: 42° 24' 58.597"
LON: -79° 15' 43.479"

GDH 480
N: 881047.06
E: 966017.38
LAT: 42° 24' 58.368"
LON: -79° 15' 30.101"

GDH 478
N: 881023.51
E: 967169.63
LAT: 42° 24' 58.225"
LON: -79° 15' 14.738"

GDH 475
N: 881318.57
E: 970246.55
LAT: 42° 25' 1.378"
LON: -79° 14' 38.749"

GDH 487
N: 878616.82
E: 964071.63
LAT: 42° 24' 34.208"
LON: -79° 15' 55.780"

GDH 485
N: 878836.96
E: 964750.84
LAT: 42° 24' 36.436"
LON: -79° 15' 46.750"

GDH 490
N: 877670.50
E: 963854.30
LAT: 42° 24' 24.843"
LON: -79° 15' 58.576"

GDH 491
N: 876845.83
E: 963599.33
LAT: 42° 24' 16.676"
LON: -79° 16' 1.886"

ROUTE 83

TOWN OF ARKWRIGHT

Chautauqua County

BALL ROAD

TILE 2

TILE 4

43 41 112 115 22

1300 1400 1500 1600 1700

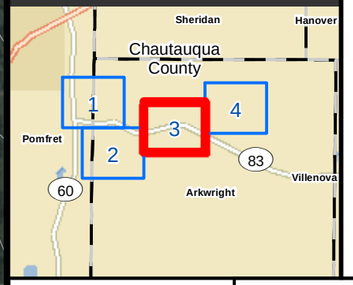
SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY

Path: H:\Projects\081017-Arkwright_Wind_Farm\GIS\GLP_Transmission_MapSheets.mxd

LEGEND

- GDH - Transmission Line
- WTG - Turbine
- Monitoring Well Site
- Contour 20ft
- Municipal Boundary
- Match Line

REGIONAL INDEX



0 350 700 Feet

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PROJECT

ARKWRIGHT WIND FARM
CHAUTAUQUA COUNTY, NY

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TITLE

TRANSMISSION LINE
SITE LOCATIONS

TILE NO.

3 OF 4

Creator: SteveW Date: 6/22/2015

Path: H:\Projects\081017-Arkwright_Wind_Farm\GIS\GLP_Transmission_MapSheets.mxd

UNNAMED STREET

WEAVER ROAD

CENTER ROAD

LIVERMORE ROAD

ROUTE 83

TILE 3

Chautauqua County

TOWN OF ARKWRIGHT

GDH 473
N: 881315.29
E: 972061.13
LAT: 42° 25' 1.484"
LON: -79° 14' 9.558"

GDH 176
N: 880879.85
E: 972237.85
LAT: 42° 24' 57.196"
LON: -79° 14' 7.157"

GDH 177
N: 880908.58
E: 972413.21
LAT: 42° 24' 57.493"
LON: -79° 14' 4.823"

GDH 175
N: 880907.60
E: 972092.36
LAT: 42° 24' 57.459"
LON: -79° 14' 9.100"

GDH 174
N: 880680.83
E: 972093.17
LAT: 42° 24' 55.219"
LON: -79° 14' 9.066"

WTG 30
N: 878941.07
E: 973253.87
LAT: 42° 24' 38.121"
LON: -79° 13' 53.416"

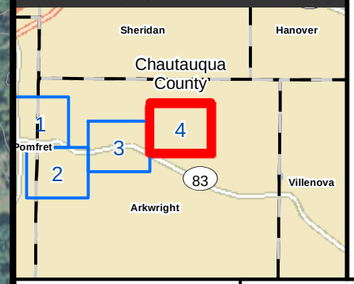
36 32 100 33 29 30 28 27

1200 1300 1400 1500 1600 1700

LEGEND

- GDH - Transmission Line
- WTG - Turbine
- Monitoring Well Site
- Contour 20ft
- Municipal Boundary
- Match Line

REGIONAL INDEX



0 350 700 Feet

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CHAUTAUQUA COUNTY, NY

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TITLE

TRANSMISSION LINE
SITE LOCATIONS

TILE NO.

4 OF 4

SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY

APPENDIX A

Test Boring Logs
As prepared by Nature's Way, Inc. and Earth Dimensions, Inc.

NATURE'S WAY
ENVIRONMENTAL CONSULTANTS & CONTRACTORS, INC

3553 Crittenden Road
Alden, NY 14004
(716) 937- 6527
www.natureswayenvironmental.com

Hole Number: TL 517

DATE: 4/29/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 882462.0130, Easting: 956014.6760

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	4						Moist, dark brown (SILT) topsoil with trace very fine size sand, loose, with fine size roots (0.3)	0.8'	Topsoil to 0.3 foot over clayey lake sediment to 3.5 feet over clayey glacial till to 27.0 feet over silty glacial till to end of boring
		4			8		Moist, highly mottled, brown (CLAYEY-SILT) with some clay, firm, thinly laminated with very thin coarse silt lenses		
			4						
				6				0.7'	
2	4								
		5			10				
			5				(3.5)		
				6			Moist, faintly mottled, brown, shaley (CLAYEY-SILT) with 15 to 30% mostly shale gravel, some clay, very stiff, massive soil structure		
3	9							1.4'	
		10			20				
			10						
				14				1.2'	
4	10								
		12			24				
			12						
				13				0.9'	
5	10								
		11			23				
			12						
				12				0.9'	
6	9								
		10			19				
			9						
				7				0.9'	
7	9								
		13			34				
			21						
				13				0.3'	
8	11								
		20			33				
			13						
				10					
9	7							1.3'	
		13							

LOGGED BY: Dale M. Gramza / Senior Geologist

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3553 Crittenden Road
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Hole Number: TL 517

DATE: 4/29/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 882462.0130, Easting: 956014.6760

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			8		21		Extremely moist, faintly mottled, brown, shaley (CLAYEY-SILT) with 15 to 30% mostly shale gravel, some clay, very stiff, massive soil structure		
				8					
10	7							0.5'	
		7							
			8		15				
				7					
							27.0		
							Moist, gray (SILT) with 1 to 3% fine size gravel, trace clay, very dense, massive soil structure		
11	7							0.9'	
		20							
			50/5"		>70				
				50/4"					
12	11							1.2'	
		20							
			31		51				
				50/4"					
13	25							1.1'	
		29							

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Hole Number: TL 517

DATE: 4/29/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 882462.0130, Easting: 956014.6760

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			34		63		See previous sheet		
				50/4"			40.8 Boring Completed at 40.8' BGS		No Water at Completion

45
50
55
60

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Hole Number: TL 516

DATE: 4/27/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 881554.6610, Easting: 955997.0020

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	2						Moist, dark brown, mucky (SILT) topsoil with trace very fine size sand, loose, with fine size roots (0.3)	1.0'	Topsoil to 0.3 foot over silty slack water sediment with trace clay to 3.5 feet over clayey glacial till to 29.0 feet over silty lake sediment with trace clay to 34.0 feet over silty glacial till to end of boring
		4			8		Moist, faintly mottled, brown (SILT) with trace clay, loose, blocky soil structure		
			4						
				8				0.5'	
2	3								
		3			9				
			6				(3.5)		
				9			Moist, faintly mottled, olive brown, gravelly (CLAYEY-SILT) with 15 to 30% gravel, some clay, very stiff, massive soil structure		
3	9							1.4'	
		13			30				
			17						
				18				1.5'	
4	10								
		10			26				
			16						
				20				1.0'	
5	7								
		10			23				
			13						
				11				0.8'	
6	12								
		8			17				
			9						
				9				1.0'	
7	6								
		6			12				
			6						
				7				1.0'	
8	9								
		9			20				
			11						
				11					
9	11							1.3'	
		13							

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Hole Number: TL 516

DATE: 4/27/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 881554.6610, Easting: 955997.0020

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			10		23		See previous sheet		
				12			21.0		
							Moist, faintly mottled, olive brown, gravelly (CLAYEY-SILT) with 15 to 30% gravel, some clay, very stiff to hard, massive soil structure		
10	10							0.3'	
		17							
			15		32				
				15					
							29.0		
11	8						Moist, faintly mottled, brown (SILT) with trace clay. compact, thinly bedded	1.2'	
		9							
			10		19				
				13					
							34.0		
12	30						Moist, gray (SILT) with 1 to 3% gravel, trace very fine size sand, very dense with brittle consistence, massive soil structure	0.8'	
		34							
			50/5"		>84				
13	9							0.8'	
		33							

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Hole Number: TL 516

DATE: 4/27/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 881554.6610, Easting: 955997.0020

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			50/5"		>83		See previous sheet 41.0 Boring Completed at 41.0' BGS		No Water at Completion

45
50
55
60

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www.natureswayenvironmental.com

Hole Number: TL 515

DATE: 4/30/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 881302.5440, Easting: 955860.0070

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	1						Extremely moist, dark brown (SILT) topsoil with trace clay, loose (0.4)	1.1'	Topsoil to 0.4 foot over clayey lake sediment to 4.5 feet over weathered shale rock to 9.2 feet over shale bedrock to end of coring
		4			9		Extremely moist, faintly mottled, olive brown to brown (CLAYEY-SILT) with some clay, thinly laminated with very thin coarse silt lenses and nearly vertical gray desiccation cracks		
			5						
				8					
2	1							1.5'	
		6							
			5		11				
				6					
3	16						(4.5)	0.5'	
		50/4"			>50		Shale rock, gray and rusty brown, fissile, weathered		
4	50/5"							0.3'	
5	50/4"						(9.2)	0.3'	
		RUN					Shale rock, gray to light gray, moderately hard, can be etched with a knife, very thin to thinly bedded, 1/2" to 5" thick, with occasional thin hard siltstone layers 1/2" to 1" thick below 12.0'		No Water in Boring prior to coring with 4 1/4" HSA at 9.2' BGS
			# 1						
		RUN					(19.2)		
			# 2				Coring Completed at 19.2' BGS		

CORE DATA

Run#	Interval (ft)	Length (ft)	Rec (ft)	Rec %	RQD %
1	9.2 to 14.2	5.0	4.9	98	48
2	14.2 to 19.2	5.0	4.3	86	53

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Hole Number: TL 514

DATE: 4/27/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 881313.1880, Easting: 954771.8300

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	2						Moist, dark brown (SILT) topsoil with trace very fine size sand, loose 0.2	1.0'	Topsoil to 0.3 foot over loamy glacial drift to 8.0 feet over silty glacial till to end of boring
		3			8		Moist, faintly mottled, brown, gravelly (SAND-SILT-CLAY) with 20 to 40% gravel with channers, little clay and very fine size sand, massive soil structure to weakly thinly bedded		
			5						
				9				1.5'	
2	17								
		11			20				
			9						
				22				1.0'	
3	9								
		11							Note: First attempt refusal was hit at 7.5' BGS, moved 3.0' south for second attempt and refusal was hit at 7.7' BGS, moved 3.0' south again for third attempt and refusal was hit at 20.4' BGS
			13		24				
				14				0.7'	
4	9								
		50/5"			>50				
							8.0		
5	12						Moist, gray (SILT) with 5 to 15% gravel, trace very fine size sand, dense to very dense, massive soil structure	1.3'	
		12							
			24		36				
				50/3"				1.7'	
6	15								
		16							
			16		32				
				24					
7	32							0.3'	
		39							
			41		80				
				50/3"					
8	48							0.5'	
		40							
			50/4"		>90				

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Hole Number: TL 514

DATE: 4/27/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 881313.1880, Easting: 954771.8300

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
							Moist, gray (SILT) with 5 to 15% gravel, trace very fine size sand, dense to very dense, massive soil structure (20.4)		No Water at Completion
							Auger Refusal at 20.4' BGS		

25
30
35
40

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Hole Number: TL 513

DATE: 4/24/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 880942.3660, Easting: 954759.3820

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	3						Extremely moist, dark brown (SILT) topsoil with trace very fine size sand, loose (0.1)	1.0'	Topsoil to 0.1 foot over loamy glacial drift to 6.0 feet over water sorted and deposited sand and gravel with little silt to 10.0 feet over silty slack water sediment with trace sand to 19.0 feet over shale rock to refusal
		4							
			4		8		Extremely moist, faintly mottled, brown, gravelly (SAND-SILT-CLAY) with 15 to 25% gravel, little clay and very fine size sand, loose to dense, weakly thinly bedded		
				6				0.8'	
2	2								
		4			9				
			5						
				7				0.7'	
3	12								
		15							
			16		31				
				17			(6.0)		
4	7						Wet, brown, very gravelly (SILTY-SAND) with 40 to 50% gravel, very fine to fine size sand, little silt, dense in place, stratified	1.0'	
		14							
			24		38				
				31				1.3'	
5	9								
		14							
			19		33				
				27			(10.0)		
6	13						Extremely moist, faintly mottled, gray (SILT) with trace very fine size sand, dense to very dense in place, weakly thinly bedded	1.7'	
		17							
			22		39				
				35				1.5'	
7	29								
		52							
			44		96				
				35				1.3'	
8	29								
		37							
			40		77				
				50/3"			(19.0)		
9	50/5"						Shale rock, gray, moderately hard, wet	0.2'	▼ Water Level at 18.9' BGS at Completion

LOGGED BY: Dale M. Gramza / Senior Geologist

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Hole Number: TL 513

DATE: 4/24/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 880942.3660, Easting: 954759.3820

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
							Shale rock, gray, moderately hard, wet		
							23.3		
							Auger Refusal at 23.3' BGS		

25
30
35
40

LOGGED BY: Dale M. Gramza / Senior Geologist

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Hole Number: TL 511

DATE: 4/21/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 880037.0830, Easting: 954731.6110

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	2						Extremely moist, dark brown (SILT) topsoil with trace very fine size sand, loose, with fine size roots (0.2)	0.7'	Topsoil to 0.2 foot over silty slack water sediment to 1.5 feet over water sorted and deposited sand with some gravel to 4.0 feet over silty lake sediment with trace clay to 18.0 feet over silty glacial till to refusal
		4			11		Moist, faintly mottled, brown (SILT) with trace very fine size sand, compact, thinly bedded (1.5)		
			7					0.3'	
				21			Extremely moist, faintly mottled, brown, gravelly (SILTY-SAND) with 20 to 40% gravel, very fine size sand, little silt, compact, stratified (4.0)		
2	3				11				
		5						1.5'	
			6				Moist, becoming wet below 12.0', brown and gray (SILT) with trace clay, loose to dense, bedded		
				9					
3	2								
		2			10				
			8					1.7'	
				6					
4	9								
		9			21				
			12						
				14				1.8'	
5	15								
		20			43				
			23						
				44					
6	17							1.5'	
		21			47				
			26						
				42					
7	9							1.3'	
		7			17				
			10						
				10					
8	7							1.3'	
		10			21				
			11						
				10					
							(18.0)		
							Extremely moist, gray (SILT) with 5 to 15% gravel, trace very fine size sand, very dense, massive soil structure	0.8'	
9	17								
		24							

LOGGED BY: Dale M. Gramza / Senior Geologist

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ENVIRONMENTAL CONSULTANTS & CONTRACTORS, INC

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Alden, NY 14004
(716) 937- 6527
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Hole Number: TL 511

DATE: 4/21/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 880037.0830, Easting: 954731.6110

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			20		44		Extremely moist, gray (SILT) with 5 to 15% gravel, trace very fine size sand, very dense, massive soil structure		
				50/4"			21.3		
							Auger Refusal at 21.3' BGS		No Water at Completion

25
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35
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LOGGED BY: Dale M. Gramza / Senior Geologist

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Hole Number: TL 510

DATE: 4/22/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 880035.0040, Easting: 955059.1880

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	4						Moist, dark brown (SANDY-SILT) topsoil with little very fine size sand, loose (0.1)	0.7'	Topsoil to 0.1 foot over loamy glacial drift to 6.5 feet over silty lake sediment with trace clay to 10.0 feet over silty glacial drift to 12.5 feet over silty lake sediment with trace sand to 14.0 feet over silty glacial till to 19.5 feet over apparent shale rock to refusal
		7			22		Moist, faintly mottled, brown, gravelly (SAND-SILT-CLAY) with 20 to 40% gravel, little clay and very fine size sand, compact, weakly stratified		
			15						
				16					
2	7							0.3'	
		6			15				
			9						
				14					
3	8							1.3'	
		8			17				
			9						
				7					
4	8						(6.5)	1.2'	
		7			14		Extremely moist, faintly mottled, brown (SILT) with trace clay, compact, thinly bedded		
			7						
				5					
5	9							1.7'	
		9			18				
			9						
				11					
6	9						(10.0)	1.3'	
		12			25		Extremely moist to wet, olive brown, gravelly (CLAYEY-SILT) with 20 to 40% gravel, little clay, very stiff, weakly stratified		
			13						
				16					
7	11						(12.5)	1.2'	
		11			23		Extremely moist, rusty brown (SILT) with trace very fine size sand, compact, thinly bedded		
			12						
				9			(14.0)		
8	6						Extremely moist, gray (SILT) with 5 to 10% gravel, trace to little clay, compact to very dense, massive soil structure	1.2'	
		12			24				
			12						
				14					
9	31						(19.5)	0.5'	
		50/5"					Shale rock, gray, weathered		

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Hole Number: TL 510

DATE: 4/22/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 880035.0040, Easting: 955059.1880

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
					>50		Shale rock, gray, weathered		
							22.1		
							Auger Refusal at 22.1' BGS		No Water at Completion

25
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35
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Hole Number: TL 508

DATE: 4/17/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 879352.9060, Easting: 955080.4690

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	3						Extremely moist, dark brown (CLAYEY-SILT) topsoil with little clay (0.4)	0.3'	Topsoil to 0.4 foot over silty lake sediment with little clay to 4.0 feet over shale rock to refusal
		4							
			4		8		Extremely moist, brown (CLAYEY-SILT) with little clay, soft, thinly laminated with very thin coarse silt lenses		
				4					
2	2							1.0'	
		3							
			3		6				
				5					
3	11						(4.0)	1.2'	
		29					Shale rock, gray, moderately soft to soft, fissile		
			35		64				
				47					
4	41							0.7'	
		50/5"			>50				
5	50/5"							0.3'	
6	44							0.8'	
		50/5"			>50				
7	50/2"							0.0'	
8	50/5"							0.4'	
9	50/4"							0.3'	

0 5 10 15 20

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Hole Number: TL 508

DATE: 4/17/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 879352.9060, Easting: 955080.4690

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
							Shale rock, gray, moderately soft to soft, fissile		
							22.7 Auger Refusal at 22.7' BGS		No Water at Completion

25
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Hole Number: TL 507

DATE: 4/20/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 878377.1790, Easting: 955073.2860

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	1						Extremely moist, dark brown, mucky (SILT) topsoil with trace very fine size sand, loose (0.3)	1.2'	Topsoil to 0.3 foot over clayey lake sediment to 4.0 feet over clayey glacial till to 7.5 feet over shale rock to refusal
		2			5		Moist, highly mottled, olive brown (CLAYEY-SILT) with some clay, firm to stiff, blocky soil structure		
			3						
				5					
2	2							0.5'	
		4			7				
			3						
				6			(4.0)		
3	27						Moist, olive brown, gravelly (CLAYEY-SILT) with 20 to 40% gravel, some clay, hard, massive soil structure	1.5'	
		30							
			26		56				
				29					
4	27							0.8'	
		47							
			50/4"		>97		(7.5)		
							Shale rock, gray, moderately soft to soft, fissile		
5	48							0.4'	
		50/5"							
					>50				
6	48							0.3'	
		50/2"							
					>50				
7	50/2"							0.1'	
8	50/1"							0.05'	
9	50/4"							0.3'	

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Hole Number: TL 507

DATE: 4/20/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 878377.1790, Easting: 955073.2860

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
							Shale rock, gray, moderately soft to soft, fissile		
							23.3		
							Auger Refusal at 23.3' BGS		No Water at Completion

25
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Hole Number: TL 506

DATE: 4/20/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 878162.1930, Easting: 955361.6170

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	1						Extremely moist, dark gray, mucky (SILT) topsoil with trace clay, loose, with partially decomposed fibrous wood material (0.5)	1.4'	Topsoil to 0.5 foot over silty slack water sediment with trace gravel to 4.0 feet over silty glacial till to 19.0 feet over shale rock to refusal
		2			6				
			4						
				6					
2	2						Extremely moist, faintly mottled, brown (SILT) with 5 to 10% gravel, trace very fine size sand, loose, weakly thinly bedded	0.8'	
		3			8				
			5						
				5			(4.0)		
3	19						Moist, gray to grayish brown (SILT) with 5 to 15% gravel, trace very fine size sand, compact to dense, massive soil structure	0.7'	
		8							
			16		24				
				22					
4	9							1.5'	
		14							
			23		37				
				27					
5	17							1.8'	
		16							
			13		29				
				22					
6	10							1.3'	
		15							
			17		32				
				21					
7	23							0.9'	
		31							
			50/5"		>81				
8	21							0.5'	
		50/5"							
					>50				
9	37						(19.0)	0.8'	
		50/4"					Shale rock, gray, soft, fissile, wet		

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Hole Number: TL 506

DATE: 4/20/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 878162.1930, Easting: 955361.6170

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
					>50		Shale rock, gray, soft, fissile, wet		▼ Water Level at 20.2' BGS at Completion
							23.1		
							Auger Refusal at 23.1' BGS		

25
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35
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Hole Number: TL 505

DATE: 4/6/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 878140.8230, Easting: 955921.5960

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	1						Extremely moist, dark brown (SILT) topsoil with trace very fine size sand, loose, with fine size roots 0.2	0.5'	Topsoil to 0.2 foot over silty glacial drift to 4.0 feet over clayey glacial drift with some gravel to 8.0 feet over apparent water sorted and deposited sand and gravel with little to some silt to 14.0 feet over water sorted and deposited sand with little to some silt to 26.0 feet over silty lake sediment with trace clay to 34.0 feet over clayey glacial till to end of boring
		2			6				
			4						
				8					
2	8						Moist, rusty brown, gravelly (SILT) with 15 to 25% gravel, trace clay, loose to compact, weakly thinly bedded	0.5'	
		9			18				
			9						
				8					
3	4						4.0		
		5					Extremely moist, faintly mottled, brown, gravelly (CLAYEY-SILT) with 20 to 40% gravel, some clay, stiff to very stiff, weakly thinly bedded	1.7'	
			6		11				
				8					
4	6							0.8'	
		9							
			11		20				
				12			8.0		
5	8						Moist, brown, very gravelly (SILTY-SAND) with 40 to 50% gravel, very fine size sand, little to some silt, compact in place, weakly stratified	0.4'	
		10							
			15		25				
				15					
6	6							0.0'	
		5							
			7		12				
				8					
7	7							0.1'	
		9							
			10		19				
				11			14.0		
8	3						Extremely moist, brown (SILTY-SAND) with very fine size sand, little to some silt, compact, thinly bedded	0.3'	
		6							
			8		14				
				14					
9	11							1.7'	
		10							

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Hole Number: TL 505

DATE: 4/6/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 878140.8230, Easting: 955921.5960

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			10		20		Extremely moist, brown (SILTY-SAND) with very fine size sand, little to some silt, compact, thinly bedded		
				14					
10	6							1.8'	
		7							
			10		17				
				11			26.0		
							Extremely moist, gray (SILT) with trace clay, very stiff, weakly thinly laminated		
11	9							1.7'	
		14							
			14		28				
				13					
12	11						34.0	1.5'	
		13					Moist, gray (CLAYEY-SILT) with 5 to 15% gravel, some clay, hard, massive soil structure		
			21		34				
				32					
13	49							0.7'	
		50/4"					Boring Completed at 40.2' BGS		No Water at Completion
							40.2		

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Hole Number: TL 503

DATE: 4/6/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 877885.7970, Easting: 956066.5320

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	2						Moist, dark brown (SILT) topsoil with trace very fine size sand, loose (0.3)	0.6'	Topsoil to 0.3 foot over silty lake sediment with trace sand to 3.5 feet over clayey glacial drift to 6.0 feet over water sorted and deposited sand and gravel with some silt to 10.0 feet over silty lake sediment (possible glacial till) to 39.0 feet over water sorted and deposited sand with little silt to end of boring
		1			5		Moist, faintly mottled, brown (SILT) with trace very fine size sand, loose to compact, thinly bedded		
			4						
				3				1.5'	
2	3								
		6			16				
			10				(3.5)		
				7			Extremely moist, faintly mottled, brown, gravelly (CLAYEY-SILT) with 20 to 40% gravel, some clay, stiff to very stiff, weakly thinly bedded	1.3'	
3	5								
		6							
			7		13				
				10			(6.0)		
4	11						Wet, faintly mottled, brown, very gravelly (SILTY-SAND) with 40 to 50% gravel, very fine size sand, some silt, compact, stratified	0.7'	
		13							
			12		25				
				12				1.3'	
5	12								
		10							
			9		19				
				11			(10.0)		
6	5						Moist, gray (SILT) with trace clay, very stiff to hard, weakly thinly bedded	1.0'	
		5							
			10		15				
				8				1.5'	
7	10								
		41							
			32		73				
				35				1.3'	
8	18								
		30							
			25		55				
				33					
9	18							1.0'	
		47							

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Hole Number: TL 503

DATE: 4/6/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 877885.7970, Easting: 956066.5320

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			50/3"		>97				
10	49							0.7'	
		50/3"			>50				
11	50/4"						Moist, gray (SILT) with trace clay, hard, weakly thinly bedded	0.3'	
12	50/5"							0.0'	▼ Water Level at 36.3' BGS at Completion
							38.0		
13	27						Wet, gray (SILTY-SAND) with very fine size sand, little silt, very dense in place, thinly bedded	0.8'	
		50/3"			>50		Boring Completed at 40.0' BGS		
							40.0		

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Hole Number: TL 502

DATE: 4/8/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 877502.1010, Easting: 957234.5780

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	3						Moist, dark brown (SILT) topsoil with trace very fine size sand, loose, with fine size roots (0.6)	0.8'	Topsoil to 0.6 foot over silty glacial drift to 8.0 feet over silty lake sediment with trace clay to 16.0 feet over silty glacial till to end of boring
		4			13				
			9						
				14					
2	18						Moist, distinctly mottled, brown, gravelly (CLAYEY-SILT) with 15 to 30% gravel, little clay, stiff to very stiff, weakly thinly bedded	1.8'	
		9			18				
			9						
				7					
3	2							0.5'	
		2			9				
			7						
				7					
4	10							1.0'	
		8			15				
			7						
				6					
5	5						(8.0)	1.8'	
		10			25		Moist, brown to gray (SILT) with trace clay, compact, thinly bedded		
			15						
				12					
6	11							2.0'	
		10			23				
			13						
				14					
7	14							1.3'	
		1			5				
			4						
				15					
8	8							1.9'	
		10			20				
			10						
				10			(16.0)		
							Moist, gray (SILT) with 10 to 15% gravel, trace very fine size sand, very dense, massive soil structure		
9	12							1.0'	
		40							

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Hole Number: TL 502

DATE: 4/8/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 877502.1010, Easting: 957234.5780

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			50/5"		>90				
10	20						Moist, gray (SILT) with 10 to 15% gravel, trace very fine size sand, very dense to dense, massive soil structure	1.6'	
		23							
			26		49				
				37					
11	50/5"							0.4'	
							32.1		
							Boring Completed at 32.1' BGS		No Water at Completion

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Hole Number: TL 500

DATE: 4/8/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 876236.4710, Easting: 957625.4730

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	2						Moist, dark brown (SILT) topsoil with trace very fine size sand, loose, with fine size roots (0.5)	1.5'	Topsoil to 0.5 foot over silty lake sediment with trace clay to 8.0 feet over silty glacial till to 24.0 feet over sandy glacial drift to 29.0 feet over loamy glacial till to end of boring
		2			4				
			2						
				5					
2	2						Moist, distinctly mottled, brown (SILT) with trace clay, soft to firm, thinly laminated with very thin coarse silt lenses	1.2'	
		3			8				
			5						
				6					
3	17							0.3'	
		12			20				
			8						
				9					
4	8							1.8'	
		6			15				
			9						
							(8.0)		
5	8						Moist, gray (SILT) with 5 to 10% gravel, trace very fine size sand, dense, massive soil structure	1.7'	
		14			34				
			20						
				20					
6	9							1.3'	
		14			30				
			16						
				20					
7	8							1.2'	
		17			41				
			24						
				29					
8	32							0.5'	
		33			>83				
			50/4"						
9	19							0.2'	
		18							

LOGGED BY: Dale M. Gramza / Senior Geologist

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Hole Number: TL 500

DATE: 4/8/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 876236.4710, Easting: 957625.4730

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			24		42		Moist, gray (SILT) with 5 to 10% gravel, trace very fine size sand, dense, massive soil structure		
				31					
							24.0		
10	26						Extremely moist to wet, gray, gravelly (SILTY-SAND) with 15 to 25% gravel, very fine size sand, little silt, very dense in place, weakly stratified	0.3'	
		24							
25			29		53				
				36					
							29.0		
11	21						Moist, gray (SAND-SILT-CLAY) with 15 to 25% gravel, little clay and very fine size sand, very dense to dense, massive soil structure	0.7'	
		50/5"							
30					>50				
12	15							1.2'	
		19							
35			30		49				
				50/5"					
13	36							0.8'	
		45							
40									

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Hole Number: TL 500

DATE: 4/8/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 876236.4710, Easting: 957625.4730

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			50/4"		>95		See previous sheet 40.3 Boring Completed at 40.3' BGS		No Water at Completion

45
50
55
60

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Hole Number: TL 499

DATE: 4/9/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 876214.3740, Easting: 958949.2690

Depth	SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
0	1	2						Extremely moist, dark brown (SILT) topsoil with trace very fine size sand, loose, with fine size roots (0.7)	0.7'	Topsoil to 0.7 foot over silty lake sediment with trace clay to 10.0 feet over loamy glacial drift to 12.0 feet over water sorted and deposited sand and gravel with little silt to 21.0 feet over silty lake sediment to 27.0 feet over silty glacial till to refusal
			3			8		Extremely moist, brown, becoming gray below 8.0' (SILT) with trace clay, compact to loose, thinly bedded	0.3'	
				5						
					7					
	2	4							1.3'	
			6			11				
				5						
					9					
	3	4								
			4			10				
5				6						
					7				1.5'	
	4	5								
			5			9				
				4						
					6				1.2'	
	5	4								
			6			13				
				7						
					9			(10.0)		
10	6	5						Moist, gray (SAND-SILT-CLAY) with 5 to 10% gravel, compact, massive soil structure to weakly thinly bedded	1.7'	
			7			22				
				15						
					17			(12.0)		
	7	10						Wet, gray, very gravelly (SILTY-SAND) with 40 to 50% gravel, very fine to fine size sand, little silt, compact, stratified	1.5'	
			9			22				
				13						
					10				0.8'	
	8	5								
			7			18				
15				11						
					9					▼ Water Level at 15.9' BGS at Completion
	9	21							0.2'	
			22							
20										

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Hole Number: TL 499

DATE: 4/9/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 876214.3740, Easting: 958949.2690

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			18		40		See previous sheet		
				26			21.0		
							Extremely moist, gray (SILT) with trace clay, compact, thinly bedded		
10	10							1.5'	
		12							
			15		27				
				23					
							27.0		
							Moist, gray (CLAYEY-SILT) with 5 to 15% gravel, little clay, very dense, massive soil structure		
11	50/5"							0.4'	
							33.4		
							Auger Refusal at 33.4' BGS		

25 30 35 40

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Hole Number: TL 498

DATE: 4/9/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 876206.4320, Easting: 960341.3580

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	3						Moist, dark brown (SILT) topsoil with trace clay, loose, with fine size roots 0.8	2.0'	Topsoil to 0.8 foot over clayey slack water sediment with some clay to 4.0 feet over water sorted and deposited sand with some silt to 6.0 feet over silty slack water sediment with trace clay to 8.0 feet over water sorted and deposited sand with little to some silt to 12.0 feet over silty slack water sediment to 17.0 feet over coarse silty glacial drift to 26.0 feet over silty glacial till to end of boring
		3			7		Moist, faintly mottled, brown (CLAYEY-SILT) with some clay, stiff, blocky soil structure		
			4						
				10					
2	2							1.5'	
		4			9				
			5						
				6			4.0		
3	3						Wet, brown (SILTY-SAND) with very fine size sand, some silt, loose, thinly bedded	1.5'	
		2			6				
			4						
				4			6.0		
4	2						Moist, brown (SILT) with trace clay, loose, thinly bedded	1.8'	
		2			4				
			2						
				4			8.0		
5	4						Wet, brown (SILTY-SAND) with very fine to fine size sand, little to some silt, very loose to loose, thinly bedded	2.0'	
		1			2				
			1						
				1					
6	1							1.9'	
		3			6				
			3						
				5			12.0		
7	2						Moist, brown (SILT) with 3 to 5% gravel, trace clay, loose to dense, weakly thinly bedded	2.0'	
		2			6				
			4						
				9				1.7'	
8	9								
		14			41				
			27						
				38					
							17.0		
							Moist, faintly mottled, brown, gravelly (SANDY-SILT) with 15 to 25% gravel, little very fine size sand, very dense, massive soil structure to weakly thinly bedded		
9	43							0.7'	
		33							

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Hole Number: TL 498

DATE: 4/9/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 876206.4320, Easting: 960341.3580

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			32		65		Moist, faintly mottled, brown, gravelly (SANDY-SILT) with 15 to 25% gravel, little very fine size sand, very dense to compact, massive soil structure to weakly thinly bedded		
				21					
10	7							1.2'	
		7							
			13		20				
				27			26.0		
							Extremely moist, gray (SILT) with 5 to 15% gravel, trace very fine size sand, compact to dense, massive soil structure to weakly thinly bedded, with occasional thin wet (SILTY-SAND) layers		
11	20							1.0'	
		16							
			12		28				
				15					
12	21							0.3'	
		22							
			25		47				
				36					
13	15							0.6'	
		50/3"							

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Hole Number: TL 498

DATE: 4/9/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 876206.4320, Easting: 960341.3580

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
					>50		See previous sheet		
							41.0		
							Boring Completed at 41.0' BGS		No Water at Completion

45
50
55
60

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Hole Number: TL 497

DATE: 4/10/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 876096.0780, Easting: 960458.0120

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	2						Extremely moist, dark brown (SILT) topsoil 0.3	1.5'	Topsoil to 0.3 foot over silty slack water sediment with trace sand to 9.0 feet over water sorted and deposited sand with little silt to 10.0 feet over silty glacial drift to 29.0 feet over water sorted and deposited sand and gravel with little silt to 31.5 feet over silty glacial till to end of boring
		2			5		with trace clay, loose		
			3				Moist, faintly mottled, brown (SILT) with trace very fine size sand, loose to compact, thinly bedded		
				2				1.2'	
2	3								
		3			7				
			4						
				5				1.7'	
3	7								
		5			11				
			6						
				6				1.7'	
4	3								
		2			5				
			3						
				5				0.8'	
5	4								
		8			18		9.0		
			10				Wet, faintly mottled, brown (SILTY-SAND) with very fine size sand, little silt, compact, thinly bedded 10.0		
				22				1.3'	
6	17						Extremely moist, brown to gray (CLAYEY-SILT) with 5 to 15% gravel, little clay, hard, massive soil structure to weakly thinly bedded		
		38							
			50/5"		>88				
7	14							0.3'	
		16							
			20		36				
				32					
8	12							1.3'	
		20							
			13		33				
				11					
9	42							0.7'	
		50/3"							

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Hole Number: TL 497

DATE: 4/10/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 876096.0780, Easting: 960458.0120

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
					>50				
10	36						Extremely moist, gray (CLAYEY-SILT) with 5 to 15% gravel, little clay, hard, massive soil structure to weakly thinly bedded	1.0'	
		39							
			50/4"		>89				
							29.0		
11	9						Wet, gray, very gravelly (SILTY-SAND) with 40 to 50% gravel, very fine size sand, little silt, compact, stratified	0.7'	
		12							
			15		27				
				27					
							31.5		
							Moist, gray (SILT) with 5 to 15% gravel, trace very fine size sand, very dense, massive soil structure		
12	50							0.8'	
		50/5"			>50				
							37.6		
							Auger Refusal at 37.6' BGS		No Water at Completion

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Hole Number: TL 496

DATE: 4/10/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 875778.7250, Easting: 960439.3380

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	2						Extremely moist, dark brown (SILT) topsoil with trace very fine size sand, loose 0.4	0.7'	Topsoil to 0.4 foot over silty slack water sediment with trace sand to 4.0 feet over silty glacial drift with trace gravel to 12.0 feet over water sorted and deposited sand with some gravel to 14.0 feet over silty glacial drift to 24.0 feet over silty glacial till to end of boring
		2			5		Extremely moist, faintly mottled, brown (SILT) with trace very fine size sand, loose, weakly thinly bedded		
			3						
				5				1.2'	
2	2								
		3			8				
			5						
				6			4.0		
3	10						Moist, faintly mottled, brown (CLAYEY-SILT) with 5 to 15% gravel, little clay, hard to stiff, weakly thinly bedded	1.2'	
		32							
			15		47				
				17					
4	7							2.0'	
		6							
			6		12				
				10					
5	11							1.7'	
		8							
			14		22				
				14					
6	10							1.3'	
		11							
			14		25				
				16			12.0		
7	21						Wet, faintly mottled, brown, gravelly (SILTY-SAND) with 20 to 40% gravel, very fine size sand, little to some silt, compact in place, stratified	1.3'	
		14							
			14		28				
				23			14.0		
8	10						Extremely moist, brown (SILT) with 5 to 10% gravel, little clay, dense, massive soil structure to weakly thinly bedded	1.2'	
		16							
			16		32				
				14					
9	13							0.3'	
		15							

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Hole Number: TL 496

DATE: 4/10/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 875778.7250, Easting: 960439.3380

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			17		32		Extremely moist, brown (SILT) with 5 to 10% gravel, little clay, dense, massive soil structure to weakly thinly bedded		
				21					
10	15						24.0	1.2'	
		43					Moist to extremely moist, gray (SILT) with 5 to 10% gravel, trace very fine size sand, very dense, massive soil structure to weakly thinly bedded		
			50/3"		>93				
11	21							1.2'	
		50							
			50/5"		>100				
12	21							1.3'	
		43							
			50/4"		>93				
13	44							0.7'	
		50/4"							

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Hole Number: TL 496

DATE: 4/10/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 875778.7250, Easting: 960439.3380

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
					>50		See previous sheet		
							40.5		
							Boring Completed at 40.5' BGS		No Water at Completion

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Hole Number: TL 495

DATE: 4/13/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 875751.5540, Easting: 960940.9380

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	3						Moist, dark brown (SILT) topsoil, with trace clay, compact (0.3)	1.3'	Topsoil to 0.3 foot over silty slack water sediment with trace clay to 6.0 feet over silty glacial drift to 10.0 feet over silty glacial till to end of boring
		3			12		Moist, brown (SILT) with trace clay, compact, weakly thinly bedded		
			9						
				12				1.0'	
2	3								
		5			11				
			6						
				10				0.3'	
3	5								
		5			13				
			8						
				8			(6.0)		
4	30						Moist, brown, becoming gray below 8.0' (SILT) with 5 to 15% gravel, trace clay, dense, massive soil structure to weakly thinly bedded	2.0'	
		17			47				
			30						
				43				1.6'	
5	15								
		15			43				
			28						
				37			(10.0)		
6	23						Moist to extremely moist, gray (CLAYEY-SILT) with 5 to 15% gravel, little clay, hard, massive soil structure	1.5'	
		32			58				
			26						
				36				1.2'	
7	22								
		33			>83				
			50/4"						
								1.7'	
8	27								
		37			83				
			46						
				50/5"					
9	17							1.1'	
		39							

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Hole Number: TL 495

DATE: 4/13/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 875751.5540, Easting: 960940.9380

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			50/5"		>89				
10	37						Moist to extremely moist, gray (CLAYEY-SILT) with 5 to 15% gravel, little clay, hard, massive soil structure	0.8'	
		50/4"			>50				
11	42							0.6'	
		50/5"			>50				
							32.0 Auger Refusal at 32.0' BGS		No Water at Completion

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Hole Number: TL 494

DATE: 4/14/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 875744.6260, Easting: 962011.1160

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	2						Extremely moist, dark brown (SILT) topsoil with trace very fine size sand, loose, with fine size roots (0.4)	1.7'	Topsoil to 0.4 foot over silty slack water sediment with trace clay to 1.5 feet over water sorted and deposited sand with little gravel and silt to 4.0 feet over clayey lake sediment to 12.0 feet over water sorted and deposited sand with little silt to 14.0 feet over water sorted and deposited sand and gravel with little silt to 16.0 feet over silty glacial till to end of boring
		2			9				
			7						
				12			Extremely moist, faintly mottled, brown (SILT) with trace clay, loose (1.5)		
2	12						Extremely moist, faintly mottled, brown, gravelly (SILTY-SAND) with 15 to 25% gravel, very fine size sand, little silt, dense in place, stratified	0.3'	
		23			39				
			16						
				22			(4.0)		
3	7						Moist, faintly mottled, brown (CLAYEY-SILT) with some clay, stiff to very stiff, weakly thinly laminated	1.3'	
		6							
			4		10				
				9					
4	5							1.2'	
		6							
			9		15				
				12					
5	6							1.7'	
		9							
			16		25				
				19					
6	4							1.3'	
		7							
			8		15				
				12			(12.0)		
7	8						Wet, gray (SILTY-SAND) with very fine size sand, little silt, compact, thinly bedded	1.7'	
		10							
			12		22				
				13			(14.0)		
8	8						Wet, gray, very gravelly (SILTY-SAND) with 40 to 50% gravel, very fine size sand, little silt, dense, stratified	0.8'	
		15							
			20		35				
				26			(16.0)		
							Extremely moist, gray (CLAYEY-SILT) with 5 to 15% gravel, little clay, very stiff, massive soil structure		
9	10							1.2'	
		13							

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Hole Number: TL 494

DATE: 4/14/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 875744.6260, Easting: 962011.1160

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			15		28				
				15					
10	7							1.3'	
		7							
			11		18				
				13					
11	12						Extremely moist, gray (CLAYEY-SILT) with 5 to 15% gravel, little clay, very stiff to hard, massive soil structure	1.2'	
		16							
			14		30				
				13					
12	15							1.5'	
		15							
			16		31				
				15					
13	17							1.2'	
		21							

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Hole Number: TL 494

DATE: 4/14/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 875744.6260, Easting: 962011.1160

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			23		44		See Previous sheet		
				19			41.0		
							Boring Completed at 41.0' BGS		No Water at Completion

45
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Hole Number: TL 494

DATE: 4/14/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 875744.6260, Easting: 962011.1160

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	2						Extremely moist, dark brown (SILT) topsoil with trace very fine size sand, loose, with fine size roots (0.4)	1.7'	Topsoil to 0.4 foot over silty slack water sediment with trace clay to 1.5 feet over water sorted and deposited sand with little gravel and silt to 4.0 feet over clayey lake sediment to 12.0 feet over water sorted and deposited sand with little silt to 14.0 feet over water sorted and deposited sand and gravel with little silt to 16.0 feet over silty glacial till to end of boring
		2			9				
			7						
				12			Extremely moist, faintly mottled, brown (SILT) with trace clay, loose (1.5)		
2	12						Extremely moist, faintly mottled, brown, gravelly (SILTY-SAND) with 15 to 25% gravel, very fine size sand, little silt, dense in place, stratified	0.3'	
		23			39				
			16						
				22			(4.0)		
3	7						Moist, faintly mottled, brown (CLAYEY-SILT) with some clay, stiff to very stiff, weakly thinly laminated	1.3'	
		6							
			4		10				
				9					
4	5							1.2'	
		6							
			9		15				
				12					
5	6							1.7'	
		9							
			16		25				
				19					
6	4							1.3'	
		7							
			8		15				
				12			(12.0)		
7	8						Wet, gray (SILTY-SAND) with very fine size sand, little silt, compact, thinly bedded	1.7'	
		10							
			12		22				
				13			(14.0)		
8	8						Wet, gray, very gravelly (SILTY-SAND) with 40 to 50% gravel, very fine size sand, little silt, dense, stratified	0.8'	
		15							
			20		35				
				26			(16.0)		
							Extremely moist, gray (CLAYEY-SILT) with 5 to 15% gravel, little clay, very stiff, massive soil structure		
9	10							1.2'	
		13							

LOGGED BY: Dale M. Gramza / Senior Geologist

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Hole Number: TL 494

DATE: 4/14/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 875744.6260, Easting: 962011.1160

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			15		28				
				15					
10	7							1.3'	
		7							
			11		18				
				13					
11	12						Extremely moist, gray (CLAYEY-SILT) with 5 to 15% gravel, little clay, very stiff to hard, massive soil structure	1.2'	
		16							
			14		30				
				13					
12	15							1.5'	
		15							
			16		31				
				15					
13	17							1.2'	
		21							

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Hole Number: TL 494

DATE: 4/14/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 875744.6260, Easting: 962011.1160

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			23		44		See Previous sheet		
				19			41.0		
							Boring Completed at 41.0' BGS		No Water at Completion

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LOGGED BY: Dale M. Gramza / Senior Geologist

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Hole Number: TL 493

DATE: 4/14/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 876182.8030, Easting: 962062.4520

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	13						Moist, brown (CLAYEY-SILT) topsoil with little to some clay, compact, with fine size roots (0.5)	1.3'	Topsoil to 0.5 foot over clayey lake sediment to 6.0 feet over silty glacial drift to 10.0 feet over silty glacial till to end of boring
		10			22				
			12						
				10					
2	5						Extremely moist, distinctly mottled, brown (CLAYEY-SILT) with some clay, very stiff to stiff, becoming firm below 4.0', blocky soil structure	1.3'	
		6			13				
			7						
				5					
3	4							1.7'	
		2							
			4		6				
				4			(6.0)		
4	8						Moist, faintly mottled, brown (SILT) with 5 to 10% gravel, trace clay, dense to compact, weakly thinly bedded	1.4'	
		10			32				
			22						
				28					
5	13							1.8'	
		15							
			12		27				
				15			(10.0)		
6	10						Moist, gray, gravelly (SILT) with 15 to 25% gravel, trace clay, compact, massive soil structure to weakly thinly bedded	1.5'	
		14							
			16		30				
				17					
7	8							1.7'	
		7							
			10		17				
				7					
8	4							1.3'	
		5							
			8		13				
				12					
9	13							1.0'	
		10							

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Hole Number: TL 493

DATE: 4/14/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 876182.8030, Easting: 962062.4520

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			20		30				
				24					
10	15							0.6'	
		19							
			25		44				
				31					
11	11						Moist, gray, gravelly (SILT) with 15 to 25% gravel, trace clay, dense to very dense, massive soil structure to weakly thinly bedded	1.3'	
		16							
			21		37				
				24					
12	25							1.5'	
		29							
			23		52				
				24					
13	22							1.3'	
		24							

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Hole Number: TL 493

DATE: 4/14/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 876182.8030, Easting: 962062.4520

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			30		54		See previous sheet		
				33			41.0		
							Boring Completed at 41.0' BGS		No Water at Completion

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Hole Number: TL 491

DATE: 4/15/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 876845.8280, Easting: 963599.3290

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	3						Extremely moist, dark brown (SILT) topsoil with trace very fine size sand, loose, with fine size roots (0.4)	1.7'	Topsoil to 0.4 foot over silty slack water sediment with trace clay to 10.0 feet over loamy glacial drift to 19.0 feet over coarse silty glacial drift with some gravel to 27.5 feet over apparent silty glacial till to end of boring
		2			5		Moist, faintly mottled, brown (SILT) with trace clay, loose to compact, weakly thinly bedded		
			3					1.3'	
				11					
2	3								
		5			11				
			6						
				9				1.8'	
3	7								
		11			21				
			10						
				7				1.5'	
4	6								
		8			16				
			8						
				8				1.0'	
5	5								
		5			10				
			5						
				9			(10.0)	0.8'	
6	5						Moist, faintly mottled, brown, gravelly (SAND-SILT-CLAY) with 15 to 25% gravel, little clay and very fine size sand, compact, massive soil structure to weakly thinly bedded		
		7			17				
			10						
				11				0.7'	
7	27								
		19			38				
			19						
				14				1.3'	
8	7								
		17			32				
			15						
				19					
9	12						(19.0) See next sheet	0.7'	
		18							

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Hole Number: TL 491

DATE: 4/15/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 876845.8280, Easting: 963599.3290

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			23		41		Extremely moist to wet, olive gray, gravelly (SANDY-SILT) with 20 to 40% gravel, some very fine size sand, dense, weakly stratified		
				19					
10	8							1.0'	
		11							
			16		27				
				13					
							27.5		
							Extremely moist, gray (SILT) with 5 to 15% gravel, trace clay, dense to compact, massive soil structure to weakly thinly bedded		
11	12							0.2'	
		22							
			20		42				
				23					
12	11							1.3'	
		14							
			11		25				
				18					
13	26							0.0'	
		21							

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Hole Number: TL 491

DATE: 4/15/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 876845.8280, Easting: 963599.3290

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			19		40		See previous sheet		
				21			41.0		
							Boring Completed at 41.0' BGS		No Water at Completion

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Hole Number: TL 490

DATE: 4/15/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 877670.4950, Easting: 963854.3030

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	2						Moist, dark brown (SILT) topsoil with little clay, loose, with fine size roots 0.3	0.8'	Topsoil to 0.3 foot over silty slack water sediment with trace clay to 6.0 feet over silty glacial drift to 12.0 feet over silty lake sediment with little clay to 24.0 feet over silty glacial drift to end of boring
		2							
			4		6		Moist, faintly mottled, brown (SILT) with 3 to 5% gravel, trace clay, loose to compact, weakly thinly bedded		
				12				0.3'	
2	3								
		4							
			6		10				
				8				0.4'	
3	10								
		10							
			12		22				
				11			6.0		
4	7						Moist, faintly mottled, brown (CLAYEY-SILT) with 5 to 15% gravel, little clay, very stiff, weakly thinly bedded	0.8'	
		8							
			12		20				
				11				1.1'	
5	6								
		9							
			13		22				
				15				1.2'	
6	7								
		10							
			10		20				
				14			12.0		
7	9						Moist, gray (CLAYEY-SILT) with little clay, stiff, thinly laminated with very thin coarse silt lenses	1.6'	
		6							
			7		13				
				11				1.8'	
8	4								
		5							
			6		11				
				8					
9	6							1.5'	
		21							

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Hole Number: TL 490

DATE: 4/15/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 877670.4950, Easting: 963854.3030

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			22		43		Moist, gray (CLAYEY-SILT) with little clay, stiff, thinly laminated with very thin coarse silt lenses		
				24					
							24.0		
10	7						Moist, gray, gravelly (SILT) with 15 to 25% gravel, trace very fine size sand, dense to very dense, massive soil structure to weakly thinly bedded	0.8'	
		19							
25			17		36				
				19					
11	23							1.1'	
		29							
30			26		55				
				33					
12	16							1.7'	
		15							
35			21		36				
				27					
13	13							1.3'	
		13							
40									

LOGGED BY: Dale M. Gramza / Senior Geologist

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Hole Number: TL 490

DATE: 4/15/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 877670.4950, Easting: 963854.3030

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			23		36		See previous sheet		
				27			41.0		
							Boring Completed at 41.0' BGS		No Water at Completion

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LOGGED BY: Dale M. Gramza / Senior Geologist

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10B13a HOLE NO. GLP-54n-15 SURF. ELEVATION —

PROJECT Arkwright Summit Wind Farm – Wind Turbine Project LOCATION Survey ID 489, Northing:878508.64450900000

Town of Arkwright, Chautauqua Co., NY Easting: 964091.07506000000

CLIENT Fisher Associates DATE STARTED 05/29/15 COMPLETED 05/29/15

DEPTH IN FT	SN REC	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL (1) (2)	WATER TABLE AND REMARKS
	1	2						Extremely moist dark brown (CLAYEY-SILT) topsoil with 1 to 5% gravel, little organic matter and clay, trace sand, soft, granular soil structure, (ML-CL).		← 0.5'
	20		2			6		0.5		← 2.0
				4				Extremely moist distinctly mottled olive brown (CLAYEY-SILT) with 10 to 15% gravel, some clay, firm, very stiff below 1.5 feet with nearly vertical gray desiccation cracks, (CL).		(1) TOPSOIL FILL
					9			grades downward to 3.0		(2) CONCRETE
	2	11						Extremely moist distinctly mottled olive brown gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, trace sand, very stiff and hard with nearly vertical gray desiccation cracks, (CL).		Silty topsoil with little organic matter and clay, trace gravel and sand to 0.5 feet over clayey glacial drift with little gravel to 3.0 feet over clayey glacial till to 9.5 feet over silty glacial till to 10.0 feet over water sorted and deposited sand with little to some gravel, little silt and clay to 12.0 feet over clayey glacial till to 18.0 feet over silty glacial till to end of boring.
	18		11			19		grades downward to 9.5		
				8				Extremely moist olive gray (CLAYEY-SILT) with 5 to 10% gravel, little clay, trace sand, very stiff, massive soil structure, (ML-CL).		
					9			grades downward to 10.0		
	3	5						Wet olive gray gravelly (SAND-SILT-CLAY) with 15 to 40% mostly subrounded gravel, little silt and clay, very stiff, stratified, (SC).		Note: advanced bore hole with 4 1/4 inch ID x 8 inch OD hollow stem auger casing with continuous split spoon sampling to 16.0 feet. Continued below with auger with 5 foot interval sampling to 40.0 feet.
5	22		13			31		12.0		
				18				Extremely moist olive gray gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, very stiff, massive soil structure, (CL).		
					12			grades downward to 18.0		
	4	8						Extremely moist olive gray gravelly (SAND-SILT-CLAY) with 15 to 40% gravel, little sand and clay, very stiff, massive soil structure, (ML-CL).		
	22		11			20				
				9						
					10					
	5	5								
	20		8			16				
				8						
					10					
10	6	10								
	24		11			24				
				13						
					12					
	7	9								
	22		10			20				
				10						
					12					
	8	6								
15	24		8			17				
				9						
					11					
	9	4								
	18		9			18				
				9						
20					13					

CUTTINGS BACKFILL

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Don Owens, CPSS; Kyle Shearing,Geologist, (mw)

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10B13a HOLE NO. GLP-54n-15 SURF. ELEVATION _

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project LOCATION Survey ID 489, Northing:878508.64450900000
Town of Arkwright, Chautauqua Co., NY Easting: 964091.07506000000

CLIENT Fisher Associates DATE STARTED 05/29/15 COMPLETED 05/29/15

DEPTH IN FT	SN REC	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL	WATER TABLE AND REMARKS
								Extremely moist olive gray gravelly (SAND-SILT-CLAY) with 15 to 40% gravel, little sand and clay, very stiff, massive soil structure, (ML-CL).		
								grades downward to 23.0		
	10	10						Extremely moist olive gray gravelly (SAND-SILT-CLAY) with 15 to 40% mostly subangular gravel, little sand and clay, hard, massive soil structure, (ML-CL).		
	8		38			75				
				37						
25					38					
	11	15								
	22		20			42				
				22						
30					16					
	12	5								
	20		16			32				
				16						
35					15					
	13	5								
	12		19			38				No water at completion.
				19						
40					15			Boring completed at 40.0 feet. 40.0	CUTTINGS BACKFILL	← 40.0'

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Don Owens, CPSS; Kyle Shearing,Geologist, (mw)

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Hole Number: TL 485

DATE: 4/16/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 878836.9570, Easting: 964750.8370

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1	4						Moist, dark brown (SILT) topsoil with trace very fine size sand, loose, with fine size roots (0.3)	0.8'	Topsoil to 0.3 foot over silty slack water sediment with trace to little clay to 2.0 feet over water sorted and deposited sand with little silt to 10.0 feet over water sorted and deposited sand with little gravel to 12.0 feet over silty lake sediment with trace sand to 32.5 feet over silty glacial till to end of boring
		1			8		Moist, distinctly mottled, brown (SILT) with trace to little clay, loose, thinly bedded (2.0)		
			7					1.0'	
				4					
2	2						Moist to extremely moist, distinctly mottled, brown (SILTY-SAND) with very fine size sand, little silt, loose to compact, thinly bedded		
		5							
			5		10				
				6				1.2'	
3	11								
		6							
			6		12				
				6				1.3'	
4	2								
		3							
			4		7				
				6					
5	3							1.4'	
		4							
			6		10				
				6					
							(10.0)		
6	5						Wet, brown, gravelly (SILTY-SAND) with 15 to 25% gravel, very fine size sand, little to some silt, loose, stratified	1.7'	
		3							
			4		7				
				5					
							(12.0)		
7	16						Extremely moist, gray (SILT) with trace very fine size sand, compact, thinly bedded	1.3'	
		11							
			14		25				
				15					
8	11							1.5'	
		11							
			11		22				
				11					
9	11							1.2'	
		11							

LOGGED BY: Dale M. Gramza / Senior Geologist

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Hole Number: TL 485

DATE: 4/16/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 878836.9570, Easting: 964750.8370

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			12		23				
				13					
10	19						Extremely moist, gray (SILT) with trace very fine size sand, compact to dense, thinly bedded	1.3'	
		14							
			17		31				
				21					
11	15							1.6'	
		18							
			24		42				
				27					
							32.5		
							Moist, gray, gravelly (SILT) with 15 to 25% gravel, trace very fine size sand, dense, massive soil structure		
12	17							1.7'	
		18							
			20		38				
				22					
13	20							1.4'	
		21							

LOGGED BY: Dale M. Gramza / Senior Geologist

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Hole Number: TL 485

DATE: 4/16/15 ELEVATION:

PROJECT: Subsurface Investigation for Arkwright Summit Wind Farm
Arkwright, NY

PREPARED FOR: Fisher Associates

BORING LOCATION: Northing: 878836.9570, Easting: 964750.8370

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
			21		42		See previous sheet		
				26			41.0		
							Boring Completed at 41.0' BGS		No Water at Completion

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LOGGED BY: Dale M. Gramza / Senior Geologist

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10B13a HOLE NO. GLP-60-15 SURF. ELEVATION _

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project LOCATION Survey ID 483, Northing: 880377.184258

Town of Arkwright, Chautauqua Co., NY Easting: 964995.181058

CLIENT Fisher Associates DATE STARTED 04/22/15 COMPLETED 04/22/15

DEPTH IN FT	SN REC	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL (1) (2)	WATER TABLE AND REMARKS
	1	2						Extremely moist black (MUCK), granular soil structure, (OL).		← 0.5'
	16		2			11		0.2		← 2.0'
				9				Extremely moist highly mottled brown (SANDY-SILT) with 5 to 10% gravel, little sand, very loose, blocky soil structure, (ML).		(1) TOPSOIL FILL
					14			clear transition to 0.8		(2) CONCRETE
	2	6						Extremely moist distinctly mottled olive brown gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, little clay, trace sand, very stiff with nearly vertical gray desiccation cracks, (ML-CL).		Note: GLP-60-15 drilled 7.0 feet north of staked location.
	18		7			17		grades downward to 4.0		
				10				Extremely moist distinctly mottled olive brown gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, trace sand, stiff, very stiff below 6.0 feet with nearly vertical gray desiccation cracks, (CL).		Organic rich mucky surface to 0.2 feet over coarse silty glacial drift with trace gravel, little sand to 0.8 feet over silty glacial drift with little to some gravel, little clay, trace sand to 4.0 feet over clayey glacial drift with little to some gravel, trace sand to 8.0 feet over water sorted and deposited silt with little to some gravel, little sand and clay to 18.0 feet over water sorted and deposited sand with some silt to 18.5 feet over water sorted and deposited sand with some gravel to 18.8 feet over water sorted and deposited sand with some silt to 23.0 feet over water sorted and deposited sand to 28.0 feet over water sorted and deposited sand with little to some gravel, little silt and clay to 29.0 feet over clayey glacial till to end of boring.
					13			clear transition to 8.0		
5	24		6			13		Extremely moist faintly mottled olive grayish brown gravelly (SAND-SILT-CLAY) with 15 to 40% gravel, little sand and clay, firm and stiff, weakly stratified, (SC).		
				7						
					12					
	4	8								
	22		12			24				
				12						
					16					
	5	2								
	18		3			6				
				3						
					3					
10	6	3								
	18		4			10				
				6						
					6					
	7	4								
	16		4			8				
				4						
					3					
	8	3								
15	16		3			6				
				3						
					4					
								grades downward to 18.0		
	9	1								
	17		2			6				
				4						
20					4			See next sheet.		

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Don Owens, CPSS; Kyle Shearing, Geologist, (mw) SHEET 1 OF 2

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Soil and Hydrogeologic Investigations • Wetland Delineations
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10B13a HOLE NO. GLP-60-15 SURF. ELEVATION —

PROJECT Arkwright Summit Wind Farm – Wind Turbine Project
Town of Arkwright, Chautauqua Co., NY

LOCATION Survey ID 483, Northing: 880377.184258
Easting: 964995.181058

CLIENT Fisher Associates

DATE STARTED 04/22/15 COMPLETED 04/22/15

DEPTH IN FT	SN REC	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL	WATER TABLE AND REMARKS
								Extremely moist faintly mottled grayish brown (SILTY-SAND), very fine size sand with some silt, very loose, thinly bedded, (SM). 18.5		Note: advanced bore hole with 4 1/4 inch ID x 8 inch OD hollow stem auger casing with continuous split spoon sampling to 16.0 feet. Continued below with auger with 5 foot interval sampling to 40.0 feet.
	10 21	10	12	13		25		Wet gray gravelly (SAND) with 20 to 40% mostly subrounded gravel, fine to very coarse size sand, very loose, stratified, (SW). 18.8		
25					15			Extremely moist faintly mottled grayish brown (SILTY-SAND), very fine size sand with some silt, very loose, thinly bedded, (SM). grades downward to 23.0		
	11 24	13	20	22		42		Extremely moist brownish gray (SAND), very fine to coarse size, compact, stratified, (SW). grades downward to 28.0		
30					21			Extremely moist faintly mottled olive gray gravelly (SAND-SILT-CLAY) with 15 to 40% mostly subrounded gravel, very fine to very coarse size sand, little silt and clay, hard, stratified, (SC). 29.0		
	12 24	10	16	17		33		Extremely molist olive gray gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, trace sand, hard, massive soil structure, (CL).	CUTTINGS BACKFILL	
35					17					
	13 18	12	15	22		37				No water at completion.
40					20			Boring completed at 40.0 feet. 40.0		← 40.9'

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Don Owens, CPSS; Kyle Shearing,Geologist, (mw)

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10B13a HOLE NO. GLP-62-15 SURF. ELEVATION —

PROJECT Arkwright Summit Wind Farm – Wind Turbine Project LOCATION Survey ID 482, Northing: 881076.686859

Town of Arkwright, Chautauqua Co., NY Easting: 965021.564962

CLIENT Eisher Associates DATE STARTED 04/21/15 COMPLETED 04/21/15

DEPTH IN FT	SN REC	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL (1) (2)	WATER TABLE AND REMARKS
	1	2						Extremely moist black (SANDY-SILT) topsoil with little organic matter and sand, very loose, granular soil structure, (ML).		← 0.5'
	20		3			7		0.3		← 2.0'
				4				Extremely moist distinctly mottled olive brown gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, trace sand, stiff, weakly blocky soil structure, (CL).		Note: GLP-62-15 drilled 1.0 foot southeast of staked location.
					6					
	2	10								
	24		9			17				
				8						
					7					
	3	4								
5	22		5			15		clear transition to 2.0		(1) TOPSOIL FILL (2) CONCRETE
				10						
					8					
	4	5						Extremely moist distinctly mottled olive brown gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, trace sand, very stiff with nearly vertical gray desiccation cracks, (CL).		Coarse silty topsoil with little organic matter and sand to 0.3 feet over clayey glacial drift with little to some gravel, trace sand to 15.5 feet over loamy glacial drift with little to some gravel, little sand and clay to 23.0 feet over water sorted and deposited coarse silt with trace gravel and clay, little to some sand to 23.5 feet over clayey glacial drift with little to some gravel, trace sand to 28.0 feet over silty glacial drift with little to some gravel, little sand and clay to 28.8 feet over water sorted and deposited sand and gravel with little silt and clay to 33.0 feet over water sorted and deposited sand with trace gravel and silt to 38.0 feet over clayey glacial till to end of boring.
	24		8			17				
				9						
					14					
	5	8								
	8		11			25				
				14						
10					17			clear transition to 10.5		
	6	10								
	22		15			29		Extremely moist olive gray gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, trace sand, very stiff, massive soil structure, (CL).		
				14						
					16					
	7	6								
	24		10			24				
				14						
					16					
	8	7								
15	24		14			31		clear transition to 15.5		
				17						
					20			Extremely moist faintly mottled olive brown gravelly (SAND-SILT-CLAY) with 15 to 40% gravel, little sand and clay, very stiff, weakly stratified, (SC).		Note: advanced bore hole with 4 1/4 inch ID x 8 inch OD hollow stem auger casing with continuous split spoon sampling to 16.0 feet. Continued below with auger with 5 foot interval sampling to 40.0 feet.
	9	11								
	12		10			19				
				9						
20					13					

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Don Owens, CPSS; Kyle Shearing,Geologist, (mw)

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10B13a HOLE NO. GLP-62-15 SURF. ELEVATION —

PROJECT Arkwright Summit Wind Farm – Wind Turbine Project LOCATION Survey ID 482, Northing: 881076.686859

Town of Arkwright, Chautauqua Co., NY Easting: 965021.564962

CLIENT Fisher Associates DATE STARTED 04/21/15 COMPLETED 04/21/15

DEPTH IN FT	SN REC	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL	WATER TABLE AND REMARKS
								Extremely moist faintly mottled olive brown gravelly (SAND-SILT-CLAY) with 15 to 40% gravel, little sand and clay, very stiff, weakly stratified, (SC).		
								grades downward to 23.0		
	10	3						Extremely moist distinctly mottled brownish olive gray (SANDY-SILT) with 5 to 10% gravel, little to some sand, trace clay, loose, weakly stratified, (ML).		
	17		6			12				
				6						
25					9					
								grades downward to 23.5		
								Extremely moist olive gray gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, trace sand, stiff, massive soil structure, (CL).		
	11	11								
	24		15							
				23		38				
30					40					
								grades downward to 28.0		
								Extremely moist faintly mottled olive brown gravelly (SAND-SILT-CLAY) with 15 to 40% mostly subangular gravel, little sand and clay, stiff, massive soil structure, (ML-CL).		
								clear transition to 28.8		
								Extremely moist faintly mottled brownish gray very gravelly (SAND-SILT-CLAY) with 40 to 60% mostly subrounded gravel, little silt and clay, hard, weakly stratified, (SC).		
	12	24								
	24		70			161				
				91						
35					76					
								grades downward to 33.0		
								Extremely moist highly mottled brownish gray (SAND) with 5 to 10% gravel, very fine to very coarse size sand, trace silt, very dense, stratified, (SW).		
								grades downward to 38.0		
	13	22						Extremely moist olive gray gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, trace sand, hard, massive soil structure, (CL).		
	23		34			63				
				29						
40					46					
								Boring completed at 40.0 feet. 40.0		

CUTTINGS BACKFILL

No water at completion.

← 40.0'

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Don Owens, CPSS; Kyle Shearing,Geologist, (mw)

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10B13a HOLE NO. GLP-64-15 SURF. ELEVATION —

PROJECT Arkwright Summit Wind Farm – Wind Turbine Project LOCATION Survey ID 480, Northing: 881054.260773

Town of Arkwright, Chautauqua Co., NY Easting: 965984.851068

CLIENT Fisher Associates DATE STARTED 04/23/15 COMPLETED 04/23/15

DEPTH IN FT	SN REC	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL (1) (2)	WATER TABLE AND REMARKS
	1	2						Extremely moist black (MUCK), granular soil structure, (OL).		← 0.5'
	12		2			4		0.4		
				2				Extremely moist brown (SANDY-SILT) with 3 to 5% gravel, little sand, trace clay, very loose, blocky soil structure, (ML).		← 2.0'
					4					
	2	4								
	16		6			16				(1) TOPSOIL FILL
				10						(2) CONCRETE
					12					
	3	6						grades downward to 1.5		
5	16		9			17		Extremely moist faintly mottled brown gravelly (SANDY-SILT) with 15 to 40% mostly subangular gravel, little sand, trace clay, compact with brittle consistence, massive soil structure, (SM).		Note: GLP-64-15 drilled 5.0 feet northwest of staked location.
				8						
					10					
	4	4								
	10		8			13				Organic rich mucky surface to 0.4 feet over coarse silty slack water sediment with trace gravel and clay, little sand to 1.5 feet over loamy glacial drift with little to some gravel dominated by silt, little sand, trace gravel to 8.0 feet over sandy glacial drift with little to some gravel, little silt and clay to 12.0 feet over water sorted and deposited sand with little to some gravel, little silt, trace clay to 13.0 feet over silty slack water sediment with little clay to 14.0 feet over water sorted and deposited sand with some gravel, trace silt and clay to 23.5 feet over coarse silty slack water sediment with little sand to 28.0 feet over clayey glacial drift with trace gravel and sand to 33.0 feet over clayey glacial till to end of boring.
				5						
					4			grades downward to 8.0		
	5	2						Extremely moist distinctly mottled grayish brown gravelly (SAND-SILT-CLAY) with 15 to 30% gravel, little silt and clay, stiff, massive soil structure, (SC).		
	8		3			8				
				5						
10					4					
	6	6								
	20		5			10				
				5						
					5			12.0		
	7	3						Extremely moist faintly mottled grayish brown gravelly (SILTY-SAND) with 15 to 40% mostly subrounded gravel, very fine to very coarse size sand, little silt, trace clay, compact, stratified, (SM).		
	22		6			11				
				5						
					7					
	8	2								
15	16		5			10				
				5						
					6			13.0		
								Extremely moist faintly mottled grayish brown (CLAYEY-SILT) with little clay, stiff, thinly laminated, (ML-CL).		
								14.0		
	9	4								
	20		9			26				
				17						
20					14			See next sheet.		

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Don Owens, CPSS; Kyle Shearing,Geologist, (mw)

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10B13a HOLE NO. GLP-64-15 SURF. ELEVATION _

PROJECT Arkwright Summit Wind Farm – Wind Turbine Project
Town of Arkwright, Chautauqua Co., NY

LOCATION Survey ID 480, Northing: 881054.260773
Easting: 965984.851068

CLIENT Fisher Associates

DATE STARTED 04/23/15 COMPLETED 04/23/15

DEPTH IN FT	SN REC	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL	WATER TABLE AND REMARKS
								Extremely moist brownish gray gravelly (SAND) with 20 to 40% mostly subrounded gravel, very fine to very coarse size sand, trace silt and clay, loose, compact below 18.5 feet, stratified with occasional thin coarse silt seam below 18.0 feet, (SW).		
	10	4								
	22		13			28				
				15						
25					12					
								23.5		
								Extremely moist olive gray (SANDY-SILT) with little sand, compact, thinly bedded, (ML).		
								grades downward to 28.0		
	11	1						Extremely moist olive gray gravelly (CLAYEY-SILT) with 5 to 10% gravel, some clay, trace sand, stiff, massive soil structure, (CL).		
	12		4			11				
				7						
30					8					
								grades downward to 33.0		
	12	5						Extremely moist olive gray gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, very stiff, hard below 39.5 feet, massive soil structure, (CL).		
	16		7			17				
				10						
35					11					
	13	5								
40	16		21							

CUTTINGS BACKFILL

Water level at 29.9 feet below ground surface at completion.

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Don Owens, CPSS; Kyle Shearing,Geologist, (mw)

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10B13a HOLE NO. GLP-64-15 SURF. ELEVATION _

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project LOCATION Survey ID 480, Northing: 881054.260773
Town of Arkwright, Chautauqua Co., NY Easting: 965984.851068

CLIENT Fisher Associates DATE STARTED 04/23/15 COMPLETED 04/23/15

DEPTH IN FT | BLOWS ON SAMPLER

SN REC	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL	WATER TABLE AND REMARKS
			25		46		Extremely moist olive gray gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, hard, massive soil structure, (CL).		← CUTTINGS BACKFILL
				36			41.0		← 41.0'
							Boring completed at 41.0 feet.		

45 50 55 60

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Don Owens, CPSS; Kyle Shearing,Geologist, (mw) SHEET 3 OF 3

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10B13a HOLE NO. GLP-67-15 SURF. ELEVATION —

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project LOCATION Survey ID 478, Northing: 881026.669357

Town of Arkwright, Chautauqua Co., NY Easting: 967170.007803

CLIENT Fisher Associates DATE STARTED 04/20/15 COMPLETED 04/21/15

DEPTH IN FT	SN REC	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL (1) (2)	WATER TABLE AND REMARKS
	1	WH						Wet dark olive gray (CLAYEY-SILT) topsoil with little organic matter, some clay, very soft, granular soil structure, (CL). 0.3		← 0.5'
	20		2			4				← 2.0
				2						
					5					(1) TOPSOIL FILL
	2	5								(2) CONCRETE
	24		6			12		Extremely moist dark brown (SAND-SILT-CLAY) topsoil with little organic matter, silt and clay, soft, granular soil structure, (SC). 1.5		
				6						
					8					
	3	3								WH: Sampler penetration with weight of rods and hammer.
5	24		6			12		Extremely moist distinctly mottled olive brown (CLAYEY-SILT) with 10 to 15% gravel, some clay, trace sand, stiff with nearly vertical gray desiccation cracks, (CL).		
				6						
					8					
	4	4								
	24		7			17				Augers left in bore hole over night at 33.0 feet, no water in bore hole the next morning.
				10						
					11			grades downward to 2.0		
	5	5								
	24		7			15		Extremely moist distinctly mottled olive brown gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, trace sand, stiff, very stiff below 6.5 feet with nearly vertical gray desiccation cracks, (CL).		
				8						
10					7					
	6	4								
	20		6			15				
				9						
					13			grades downward to 9.0		
	7	4								
	22		6			14		Extremely moist olive gray gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, trace sand, stiff, massive soil structure, (CL). 14.0		
				8						
					14					
	8	5								
15	17		7			14		Wet olive gray gravelly (SAND) with 15 to 40% mostly subrounded gravel, very fine to very coarse size sand, trace silt, compact, stratified, (SW). 15.5		
				7						
					9					
	9	4						Wet olive gray gravelly (CLAYEY-SILT) with 15 to 20% gravel, little clay, trace sand, stiff, massive soil structure, (ML-CL).		
	22		9			18				
				9				grades downward to 18.0		
20					8			See next sheet.		

CUTTINGS BACKFILL

Clayey topsoil with little organic matter to 0.3 feet over sandy topsoil with little organic matter, silt and clay to 1.5 feet over clayey glacial drift with little gravel, trace sand to 2.0 feet over clayey glacial drift with little to some gravel, trace sand to 14.0 feet over water sorted and deposited sand with little to some gravel, trace silt to 15.5 feet over silty glacial drift with little gravel and clay, trace sand to 18.0 feet over water sorted and deposited sand with little silt to 19.5 feet over silty glacial drift with little to some gravel, little clay, trace sand to 28.0 feet over clayey glacial drift with little to some gravel, trace clay to 34.5 feet over siltstone rock to refusal.

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Don Owens, CPSS; Kyle Shearing,Geologist, (mw)

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10B13a HOLE NO. GLP-67-15 SURF. ELEVATION _

PROJECT Arkwright Summit Wind Farm – Wind Turbine Project
Town of Arkwright, Chautauqua Co., NY

LOCATION Survey ID 478, Northing: 881026.669357
Easting: 967170.007803

CLIENT Fisher Associates

DATE STARTED 04/20/15 COMPLETED 04/21/15

DEPTH IN FT	SN REC	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL	WATER TABLE AND REMARKS
								Wet olive gray (SILTY-SAND), very fine size sand with little silt, compact, tends to liquefy when disturbed, thinly bedded, (SM).		Note: advanced bore hole with 4 1/4 inch ID x 8 inch OD hollow stem auger casing with continuous split spoon sampling to 16.0 feet. Continued below with auger with 5 foot interval sampling to 34.9 feet.
								grades downward to 19.5		
	10 16	5	6	10	13	16		Extremely moist olive gray gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, little clay, trace sand, very stiff, massive soil structure, (ML-CL).		EDI Rock Hardness Classification
25										Medium hardness: can be easily etched with knife.
								grades downward to 28.0		
	11 22	4	8	10	13	18		Extremely moist olive gray gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, trace sand, very stiff, massive soil structure, (CL).		
30										
	12	7	19	100/5				34.5		
35								Olive gray siltstone rock, medium hardness.		← 34.9'
								34.9		
								Split spoon refusal at 34.9 feet.		
40										

CUTTINGS BACKFILL

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Don Owens, CPSS; Kyle Shearing,Geologist, (mw)

EARTH DIMENSIONS, INC.

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10B13a HOLE NO. GLP-70-15 SURF. ELEVATION —

PROJECT Arkwright Summit Wind Farm – Wind Turbine Project LOCATION Survey ID 477, Northing: 881360.298842

Town of Arkwright, Chautauqua Co., NY Easting: 968575.582833

CLIENT Fisher Associates DATE STARTED 04/20/15 COMPLETED 04/20/15

DEPTH IN FT	SN REC	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL (1) (2)	WATER TABLE AND REMARKS
	1	2								
	13		3			6		Extremely moist dark brown (SAND-SILT-CLAY) topsoil with 5 to 10% gravel, little organic matter, sand and clay, firm, granular soil structure, (ML-CL).		← 0.5'
				3						
					4					← 2.0
	2	7						1.0		
	20		8			16		Extremely moist distinctly mottled olive brown (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, trace sand, very stiff, stiff below 4.0 feet with nearly vertical gray desiccation cracks, (CL).		(1) TOPSOIL FILL
				8						(2) CONCRETE
					7					
	3	3								
5	18		4			9				Silty topsoil with little organic matter, sand and clay, trace gravel to 1.0 feet over clayey glacial drift with little to some gravel, trace sand to 6.0 feet over silty glacial drift with little to some gravel, little sand and clay to 15.0 feet over clayey glacial drift with little to some gravel, trace sand to 34.5 feet over shale rock to refusal.
				5						
					8					
	4	4						grades downward to 6.0		
	22		5			12		Extremely moist olive gray gravelly (SAND-SILT-CLAY) with 15 to 40% mostly subangular gravel, little sand and clay, stiff and very stiff, massive soil structure, (ML-CL).		
				7						
					6					
	5	3								
	16		5			15				
				10						
10					8					
	6	5								
	22		8			19				
				11						
					18					
	7	8								
	12		10			21				
				11						
					17					
	8	4								
15	24		5			13		grades downward to 15.0		
				8				Extremely moist olive gray gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, trace sand, stiff, massive soil structure, (CL).		
					9					
	9	3								
	22		6			13				
				7						
20					15					

CUTTINGS BACKFILL

Note: advanced bore hole with 4 1/4 inch ID x 8 inch OD hollow stem auger casing with continuous split spoon sampling to 16.0 feet. Continued below with auger with 5 foot interval sampling to 34.9 feet.

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Don Owens, CPSS; Kyle Shearing,Geologist, (mw)

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(716) 655-1717 • FAX (716) 655-2915

10B13a HOLE NO. GLP-70-15 SURF. ELEVATION —

PROJECT Arkwright Summit Wind Farm – Wind Turbine Project
Town of Arkwright, Chautauqua Co., NY

LOCATION Survey ID 477, Northing: 881360.298842
Easting: 968575.582833

CLIENT Eisher Associates

DATE STARTED 04/20/15 COMPLETED 04/20/15

DEPTH IN FT	SN REC	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL	WATER TABLE AND REMARKS
								Extremely moist olive gray gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, trace sand, stiff, massive soil structure, (CL).	CUTTINGS BACKFILL	EDI Rock Hardness Classification --- Medium hardness: can be easily etched with knife.
	10 23	4	6	8	9	14				
25										
	11 24	4	6	9	10	15				
30										
	12 20	3	5	7	100/5	12		34.5 Olive gray shale rock, medium hardness. 34.9 Split spoon refusal at 34.9 feet.		No water at completion. ← 34.9'
35										
40										

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Don Owens, CPSS; Kyle Shearing, Geologist, (mw)

EARTH DIMENSIONS, INC.

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10B13a HOLE NO. GLP-75-15 SURF. ELEVATION —

PROJECT Arkwright Summit Wind Farm – Wind Turbine Project
Town of Arkwright, Chautauqua Co., NY

LOCATION Survey ID 475, Northing: 881333.616189
Easting: 970318.967759

CLIENT Fisher Associates

DATE STARTED 04/23/15 COMPLETED 04/24/15

DEPTH IN FT	SN REC	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL (1) (2)	WATER TABLE AND REMARKS
	1	2						Extremely moist black mucky (SANDY-SILT) topsoil with some organic matter, little sand, very loose, granular soil structure, (ML) tending towards (OL).		← 0.5'
	17		2			8		0.2		← 2.0'
				6				Moist faintly mottled orangish brown (SANDY-SILT) with 5 to 10% gravel, little sand, very loose, weakly blocky soil structure, (ML).		(1) TOPSOIL FILL
					10			clear transition to 1.5		(2) CONCRETE
	2	8						Extremely moist faintly mottled olive brown gravelly (CLAYEY-SILT) with 15 to 20% mostly subangular gravel, some clay, trace sand, very stiff, blocky soil structure, (CL).		Note: GLP-75-15 drilled 7.5 feet south of staked location.
	21		9			18		grades downward to 2.0		
				9				Extremely moist faintly mottled olive brown gravelly (SAND-SILT-CLAY) with 15 to 40% mostly subangular gravel, little sand and clay, very stiff with nearly vertical gray desiccation cracks, (ML-CL) tending towards (SC).		Augers left in bore hole over night at 40.0 feet, water level the next morning was 10.2 feet below ground surface.
					11			grades downward to 5.0		
	3	7						Extremely moist distinctly mottled olive brown (CLAYEY-SILT) with 10 to 15% gravel, little clay, trace sand, stiff, massive soil structure, (ML-CL).		Organic rich coarse silty topsoil with some organic matter, little sand to 0.2 feet over coarse silty glacial drift with little sand, trace gravel to 1.5 feet over clayey glacial drift with little gravel, trace sand to 2.0 feet over loamy glacial drift with little to some gravel to 5.0 feet over silty glacial drift with little gravel to 10.0 feet over loamy glacial drift with little to some gravel to 10.5 feet over silty glacial drift with little to some gravel to 18.0 feet over loamy glacial drift with little to some gravel to 34.0 feet over clayey glacial till to end of boring.
5	8		7			14		grades downward to 6.0		
				7				Extremely moist distinctly mottled olive brown gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, little clay, trace sand, stiff, very stiff below 8.0 feet, massive soil structure, (ML-CL).		Note: advanced bore hole with 4 1/4 inch ID x 8 inch OD hollow stem auger casing with continuous split spoon sampling to 16.0 feet. Continued below with auger with 5 foot interval sampling to 40.0 feet.
					7			grades downward to 10.0		
	4	2								
	18		5			10				
				5						
					6					
	5	8								
	8		11			23				
				12						
10					16					
	6	9								
	18		16			31				
				15						
					12					
	7	5								
	24		9			17				
				8						
					7					
	8	3								
15	22		7			17				
				10						
					12					
	9	5								
	23		9			18				
				9						
20					10			See next sheet.		

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Don Owens, CPSS; Kyle Shearing, Geologist, (mw)

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10B13a HOLE NO. GLP-75-15 SURF. ELEVATION _

PROJECT Arkwright Summit Wind Farm – Wind Turbine Project
Town of Arkwright, Chautauqua Co., NY

LOCATION Survey ID 475, Northing: 881333.616189
Easting: 970318.967759

CLIENT Eisher Associates

DATE STARTED 04/23/15 COMPLETED 04/24/15

DEPTH IN FT	SN REC	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL	WATER TABLE AND REMARKS
								Extremely moist distinctly mottled olive brown gravelly (SAND-SILT-CLAY) with 15 to 40% mostly subangular gravel, little sand and clay, hard, very stiff below 12.0 feet, massive soil structure, (ML-CL) tending towards (SC).		
								clear transition to 10.5		
	10	3								
	18		6							
				10		16				
25					11			Extremely moist olive gray gravelly (SAND-SILT-CLAY) with 15 to 40% mostly subangular gravel, trace to little sand and clay, very stiff, massive soil structure, (ML-CL).		
								grades downward to 18.0		
								Extremely moist olive gray gravelly (SAND-SILT-CLAY) with 15 to 40% mostly subangular gravel, little sand and clay, very stiff, massive soil structure, (SC).		
	11	4								
	19		9							
				15		24				
30					18					
	12	3								
	20		7					grades downward to 34.0		
				13		20		Extremely moist olive gray gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, trace sand, very stiff, massive soil structure, (CL).		
35					17					
	13	5								
	18		11							
				16		27				
40					23			Boring completed at 40.0 feet. 40.0	CUTTINGS BACKFILL	← 40.0'

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Don Owens, CPSS; Kyle Shearing,Geologist, (mw)

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10B13a HOLE NO. GLP-80-15 SURF. ELEVATION _

PROJECT Arkwright Summit Wind Farm - Wind Turbine Project LOCATION Survey ID 473, Northing: 881307.118584

Town of Arkwright, Chautauqua Co., NY Easting: 972050.262077

CLIENT Fisher Associates DATE STARTED 04/24/15 COMPLETED 04/24/15

DEPTH IN FT	SN REC	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N
	1	1				
	14		2			7
				5		
					6	
	2	9				
	21		9			19
				10		
					10	
	3	3				
5	24		9			22
				13		
					14	
	4	4				
	24		7			20
				13		
					15	
	5	13				
	24		19			42
				23		
10					29	
	6	7				
	24		22			45
				23		
					23	
	7	12				
	24		19			38
				19		
					17	
	8	5				
	22		9			19
15				10		
					16	
	9	7				
	24		11			24
				13		
20					27	

LITH

DESCRIPTION AND CLASSIFICATION

Extremely moist to wet dark gray mucky (SANDY-SILT) topsoil with little to some organic matter, little sand, very loose, granular soil structure, (ML) tending towards (OL). 0.2

Extremely moist faintly mottled dark gray (CLAYEY-SILT) topsoil with 5 to 10% gravel, little organic matter and clay, soft, granular soil structure, (ML-CL). 0.7

Extremely moist distinctly mottled olive brown gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, trace sand, very stiff, hard below 13.5 feet with nearly vertical gray desiccation cracks, (CL).

grades downward to 13.0

Extremely moist faintly mottled olive brown gravelly (SILTY-SAND) with 15 to 40% mostly subrounded gravel, very fine to very coarse size sand, little silt, dense, stratified, (SM). 14.0

Extremely moist faintly mottled brown (SANDY-SILT) with little very fine size sand, compact, thinly bedded, (ML).

grades downward to 15.5

See next sheet.

WELL (1) (2) CUTTINGS BACKFILL

WATER TABLE AND REMARKS

← 0.5'

← 2.0'

(1) TOPSOIL FILL
(2) CONCRETE

Organic rich coarse silty topsoil with little to some organic matter, little sand to 0.2 feet over silty topsoil with little organic matter and clay to 0.7 feet over clayey glacial till to 13.0 feet over water sorted and deposited sand with little to some gravel, little silt to 14.0 feet over coarse silty slack water sediment with little sand to 15.5 feet over silty slack water sediment with little clay to 19.5 feet over clayey glacial till to 23.0 feet over water sorted and deposited coarse silt with little to some gravel, some sand to 29.0 feet over silty glacial till to refusal.

Note: advanced bore hole with 4 1/4 inch ID x 8 inch OD hollow stem auger casing with continuous split spoon sampling to 16.0 feet. Continued below with auger with 5 foot interval sampling to 35.2 feet.

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Don Owens, CPSS; Kyle Shearing,Geologist, (mw)

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10B13a HOLE NO. GLP-80-15 SURF. ELEVATION —

PROJECT Arkwright Summit Wind Farm – Wind Turbine Project
Town of Arkwright, Chautauqua Co., NY

LOCATION Survey ID 473, Northing: 881307.118584
Easting: 972050.262077

CLIENT Eisher Associates

DATE STARTED 04/24/15 COMPLETED 04/24/15

DEPTH IN FT	SN REC	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WELL	WATER TABLE AND REMARKS
								Extremely moist faintly mottled olive brown (CLAYEY-SILT) with little clay, very stiff, thinly laminated, (ML-CL).		
								grades downward to 19.5		
	10	4						Extremely moist distinctly mottled olive brown gravelly (CLAYEY-SILT) with 15 to 40% mostly subangular gravel, some clay, hard, massive soil structure, (CL).		
	8		22			78				
				56						
25					63					
								Extremely moist faintly mottled grayish brown gravelly (SANDY-SILT) with 15 to 40% mostly subrounded gravel, some sand, very dense, stratified, (SM).		
								grades downward to 29.0		
	11	6						Extremely moist olive gray gravelly (SAND-SILT-CLAY) with 15 to 40% mostly subangular gravel and occasional channer, little sand and clay, hard, massive soil structure, (ML-CL).		
	12		17							
30				100/5						
	12	27								
	15		55							
				100/4						
35								35.2		No water at completion. ← 35.2'
								Auger refusal at 35.2 feet.		
40										

CUTTINGS BACKFILL

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Don Owens, CPSS; Kyle Shearing,Geologist, (mw)

APPENDIX B

Laboratory Test Results
As prepared by Glynn Group

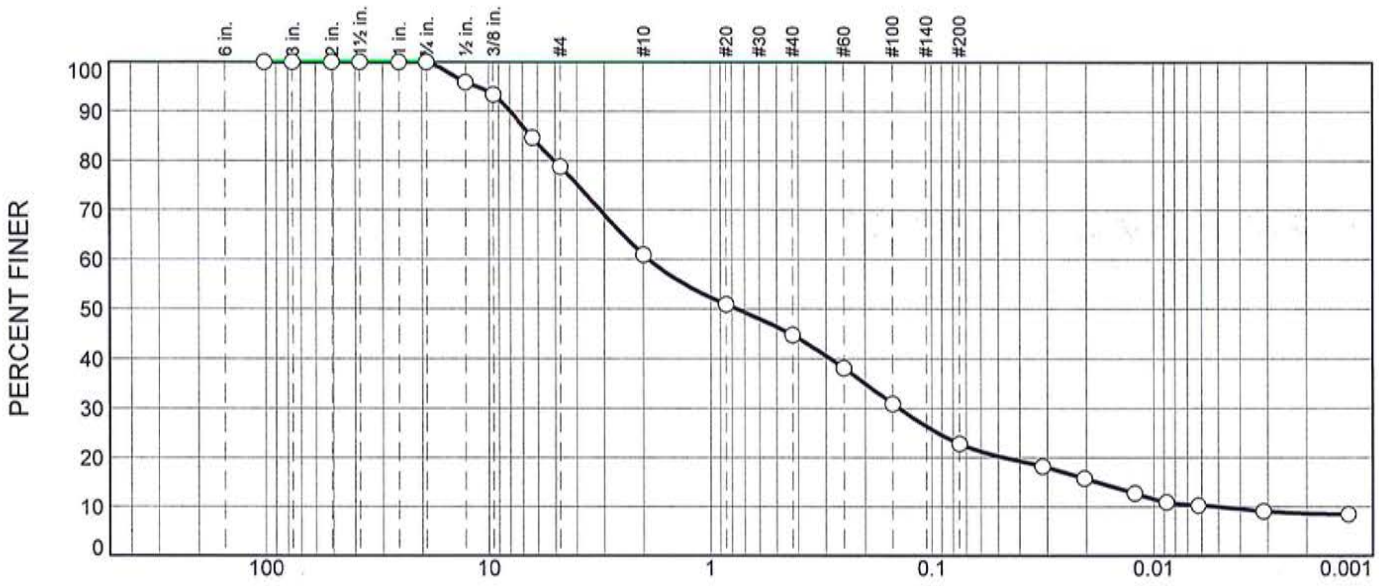
a member of the GLYNN GROUP

GRAIN SIZE ANALYSIS
ASTM D-422

Project: Arkwright **Project No.:** 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: 174 (S3)
Sample Number: 15-28 **Depth:** 4 - 6 ft **Date:** 06.13.15



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	21.2	17.9	16.2	21.9	12.8	10.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	95.9		
3/8"	93.4		
1/4"	84.7		
#4	78.8		
#10	60.9		
#20	50.9		
#40	44.7		
#60	38.1		
#100	30.9		
#200	22.8		

* (no specification provided)

Material Description

silty sand with gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{85}= 6.4382 D_{60}= 1.8949 D_{50}= 0.7597
D_{30}= 0.1404 D_{15}= 0.0179 D_{10}= 0.0051
C_u= 371.46 C_c= 2.04

Classification

USCS= SM AASHTO= A-1-b

Remarks

Figure

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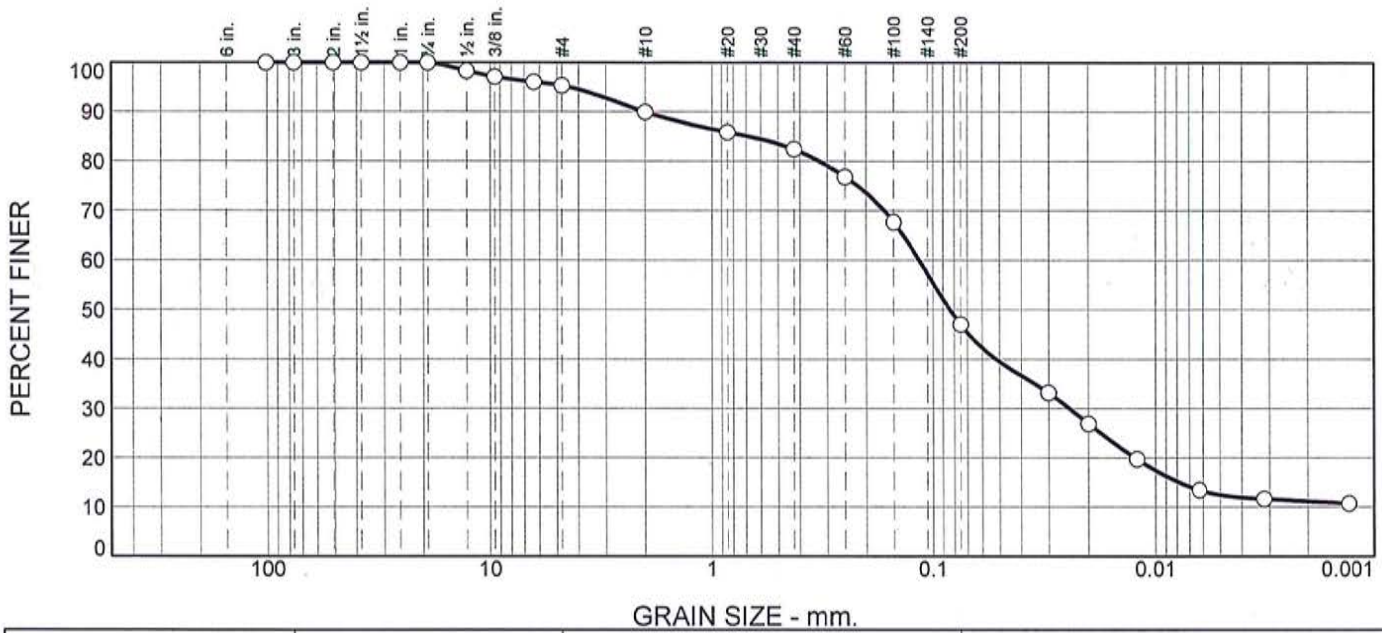
GRAIN SIZE ANALYSIS
ASTM D-422

Project: Arkwright **Project No.:** 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-485 (S4)
Sample Number: 15-31 **Depth:** 6 - 8 ft **Date:** 06.13.15



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.7	5.3	7.6	35.4	34.6	12.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	98.3		
3/8"	97.1		
1/4"	96.1		
#4	95.3		
#10	90.0		
#20	85.8		
#40	82.4		
#60	76.8		
#100	67.7		
#200	47.0		

* (no specification provided)

Material Description

silty sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{85}= 0.6841 D_{60}= 0.1153 D_{50}= 0.0837
D_{30}= 0.0243 D_{15}= 0.0078 D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

Figure

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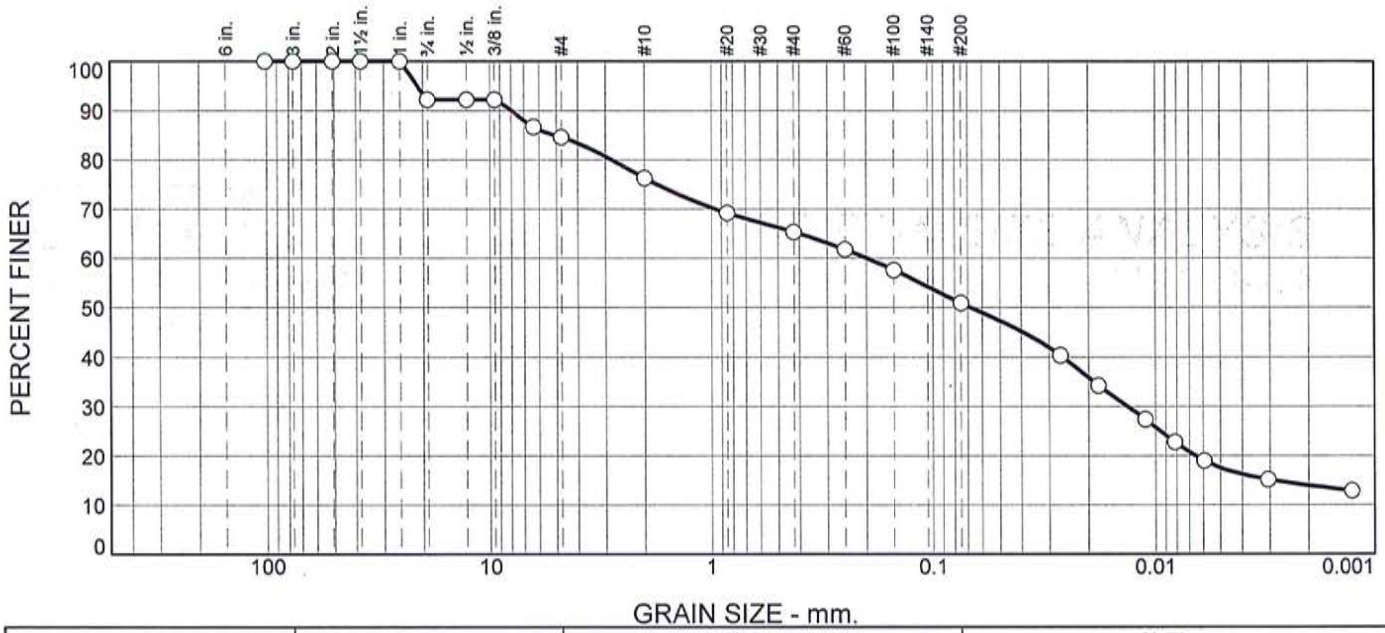
GRAIN SIZE ANALYSIS
ASTM D-422

Project: Arkwright **Project No.:** 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-487 (S3)
Sample Number: 15-34 **Depth:** 4 - 6 ft **Date:** 06.13.15



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.8	7.5	8.4	11.0	14.4	33.3	17.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	92.2		
1/2"	92.2		
3/8"	92.2		
1/4"	86.7		
#4	84.7		
#10	76.3		
#20	69.2		
#40	65.3		
#60	61.8		
#100	57.6		
#200	50.9		

* (no specification provided)

Material Description

Atterberg Limits
PL= LL= PI=

Coefficients
D_{85}= 5.0286 D_{60}= 0.1989 D_{50}= 0.0677
D_{30}= 0.0134 D_{15}= 0.0029 D_{10}=
C_u= C_c=

Classification
USCS= AASHTO=

Remarks
Atterberg testing not performed.

Figure

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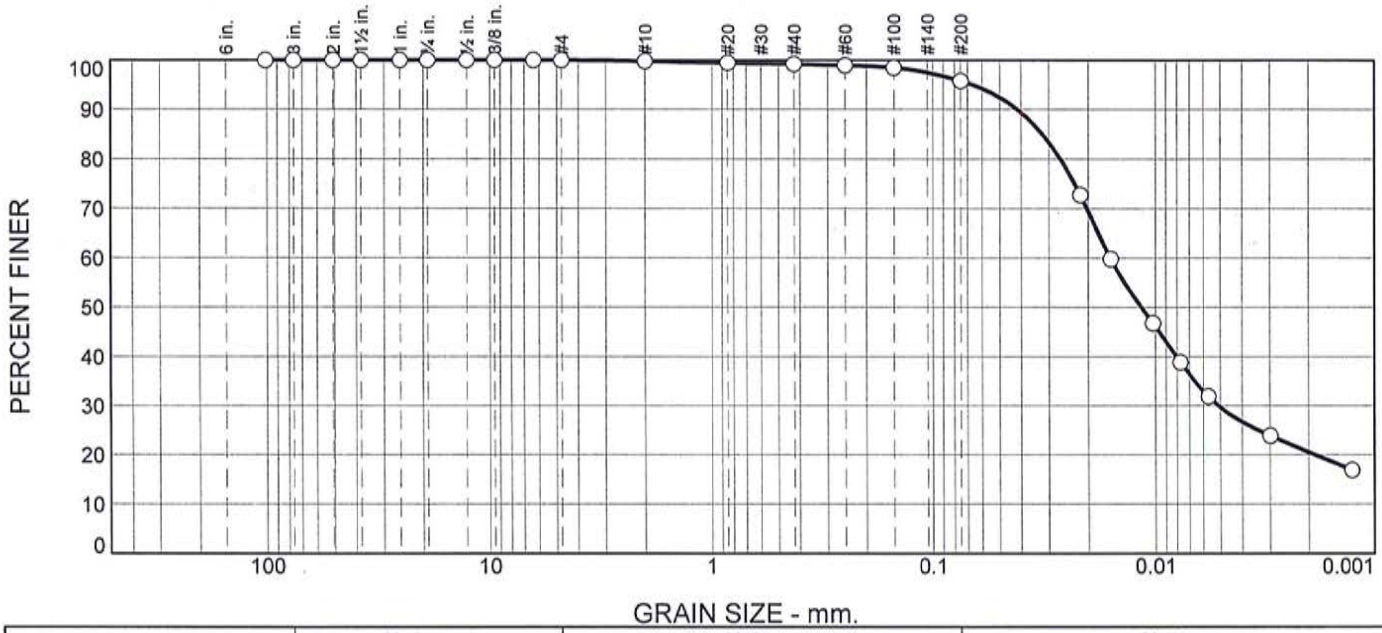
GRAIN SIZE ANALYSIS
ASTM D-422

Project: Arkwright **Project No.:** 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-490 (S8)
Sample Number: 15-37 **Depth:** 14 - 16 ft **Date:** 06.13.15



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	0.6	3.4	66.2	29.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
1/4"	100.0		
#4	100.0		
#10	99.8		
#20	99.5		
#40	99.2		
#60	99.0		
#100	98.5		
#200	95.8		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.0321 D_{60}= 0.0160 D_{50}= 0.0116
D_{30}= 0.0051 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Atterberg testing not performed.

Figure

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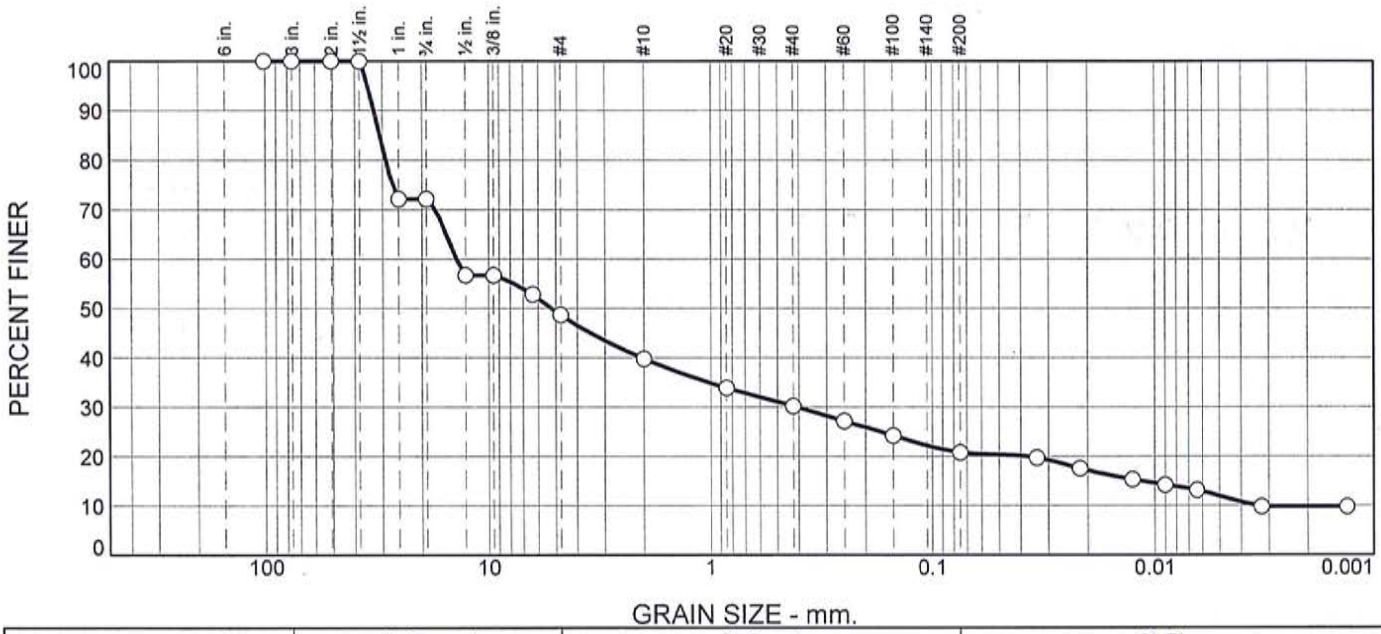
GRAIN SIZE ANALYSIS
ASTM D-422

Project: Arkwright **Project No.:** 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-491 (S7)
Sample Number: 15-40 **Depth:** 12 - 14 ft **Date:** 06.13.15



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	27.8	23.5	8.9	9.6	9.4	8.9	11.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	72.2		
3/4"	72.2		
1/2"	56.7		
3/8"	56.7		
1/4"	52.9		
#4	48.7		
#10	39.8		
#20	33.9		
#40	30.2		
#60	27.2		
#100	24.2		
#200	20.8		

* (no specification provided)

Material Description

silty gravel with sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{85}= 30.8652 D_{60}= 13.9711 D_{50}= 5.2304
D_{30}= 0.4103 D_{15}= 0.0114 D_{10}= 0.0034
C_u= 4115.27 C_c= 3.55

Classification

USCS= GM AASHTO= A-1-b

Remarks

Figure

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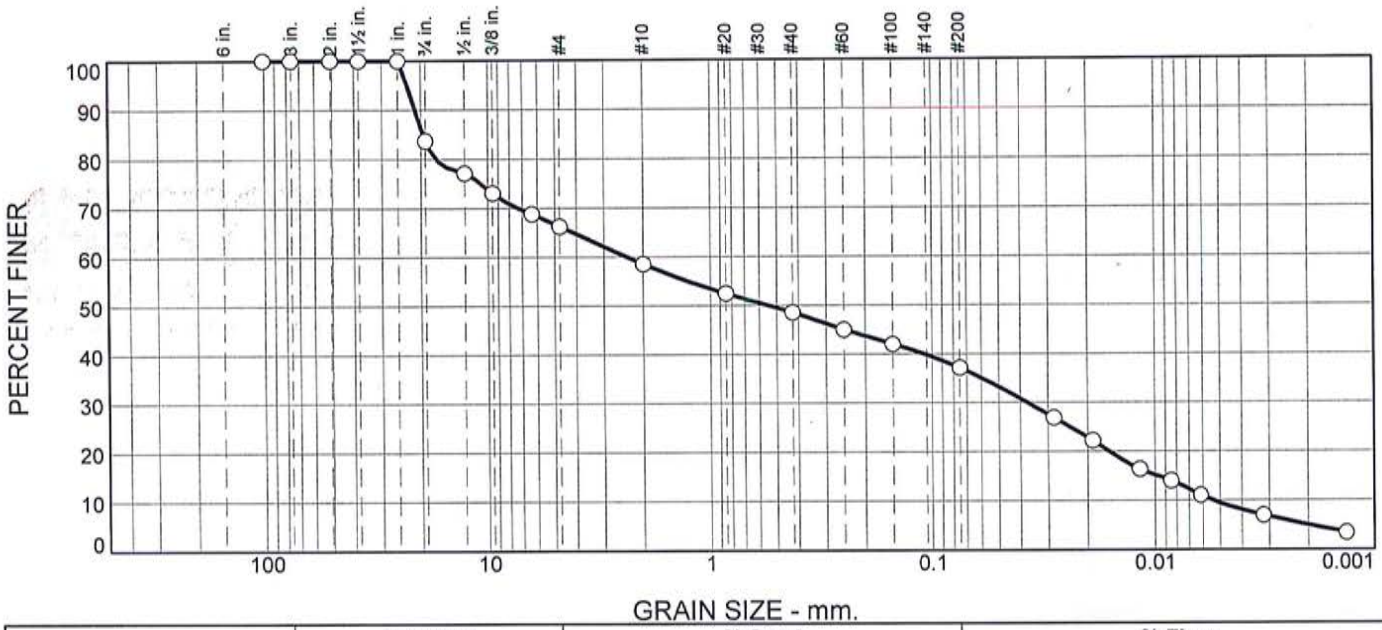
GRAIN SIZE ANALYSIS
ASTM D-422

Project: Arkwright

Project No.: 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL 493 (S3)
Sample Number: 15-43 **Depth:** 4 - 6 ft **Date:** 06.23.15



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	16.3	17.4	7.7	10.0	11.5	27.6	9.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	83.7		
1/2"	77.2		
3/8"	73.1		
1/4"	68.8		
#4	66.3		
#10	58.6		
#20	52.5		
#40	48.6		
#60	45.1		
#100	42.0		
#200	37.1		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 19.5520 D_{60}= 2.3676 D_{50}= 0.5436
D_{30}= 0.0373 D_{15}= 0.0097 D_{10}= 0.0054
C_u= 438.81 C_c= 0.11

Classification

USCS= AASHTO=

Remarks

Atterberg testing not performed.

Figure

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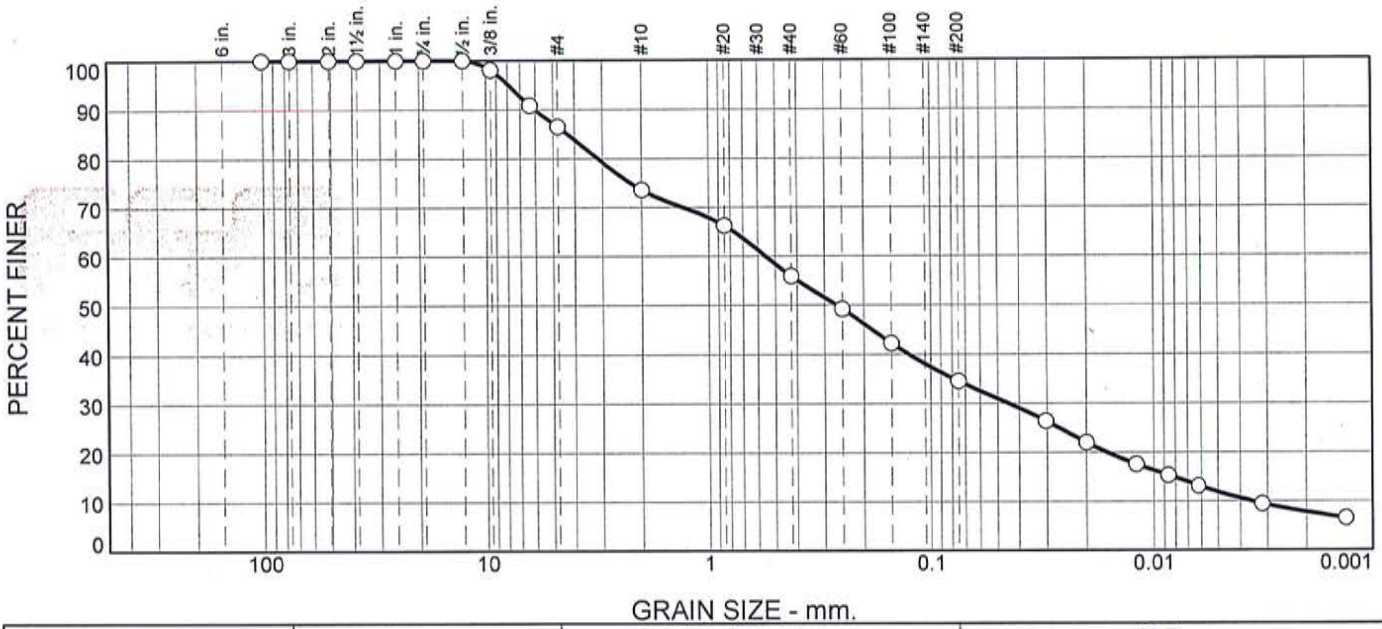
GRAIN SIZE ANALYSIS
ASTM D-422

Project: Arkwright

Project No.: 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-494 (S5)
Sample Number: 15-46 **Depth:** 8 - 10 ft **Date:** 06.23.15



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	13.5	12.9	17.7	21.3	22.7	11.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	98.1		
1/4"	90.9		
#4	86.5		
#10	73.6		
#20	66.3		
#40	55.9		
#60	49.3		
#100	42.2		
#200	34.6		

* (no specification provided)

Material Description

silty sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{85}= 4.2893 D_{60}= 0.5537 D_{50}= 0.2652
D_{30}= 0.0447 D_{15}= 0.0081 D_{10}= 0.0035
C_u= 156.66 C_c= 1.02

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Figure

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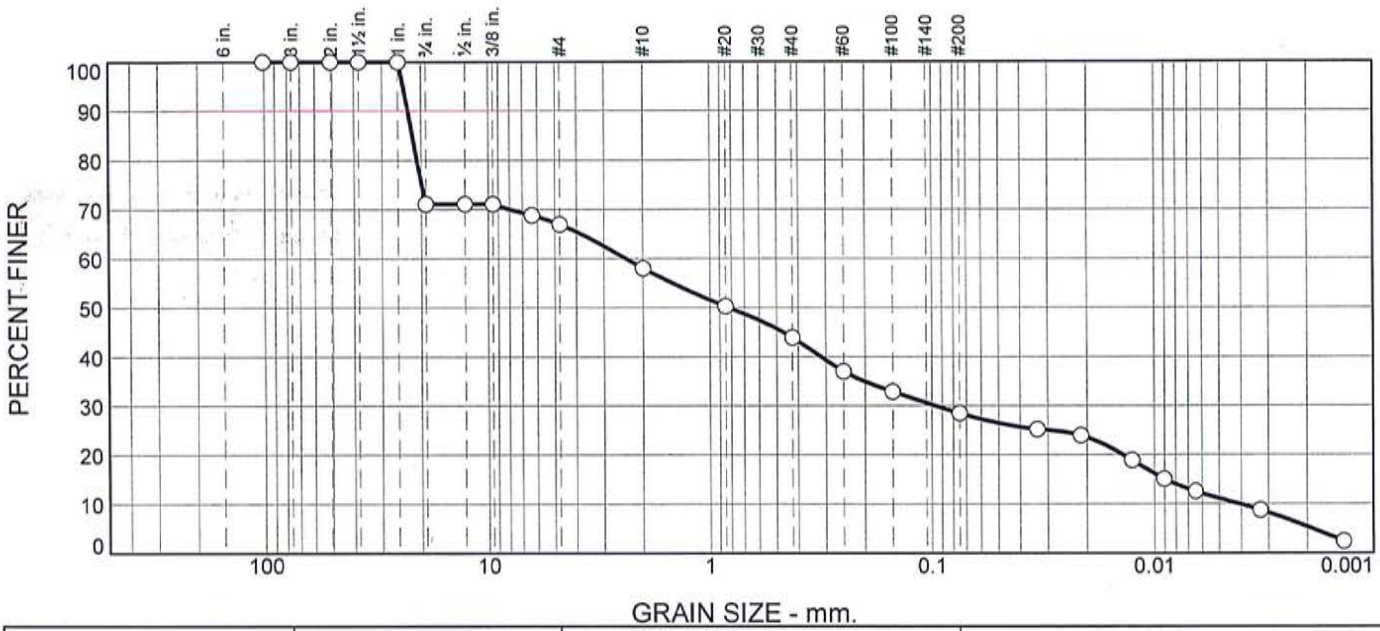
GRAIN SIZE ANALYSIS
ASTM D-422

Project: Arkwright **Project No.:** 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-495 (S2)
Sample Number: 15-49 **Depth:** 2 - 4 ft **Date:** 06.23.15



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	28.9	4.1	9.0	14.1	15.5	17.3	11.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	71.1		
1/2"	71.1		
3/8"	71.1		
1/4"	68.8		
#4	67.0		
#10	58.0		
#20	50.3		
#40	43.9		
#60	37.0		
#100	32.9		
#200	28.4		

* (no specification provided)

Material Description

silty sand with gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{85}= 21.8908 D_{60}= 2.3924 D_{50}= 0.8229
D_{30}= 0.0971 D_{15}= 0.0090 D_{10}= 0.0041
C_u= 587.86 C_c= 0.97

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Figure

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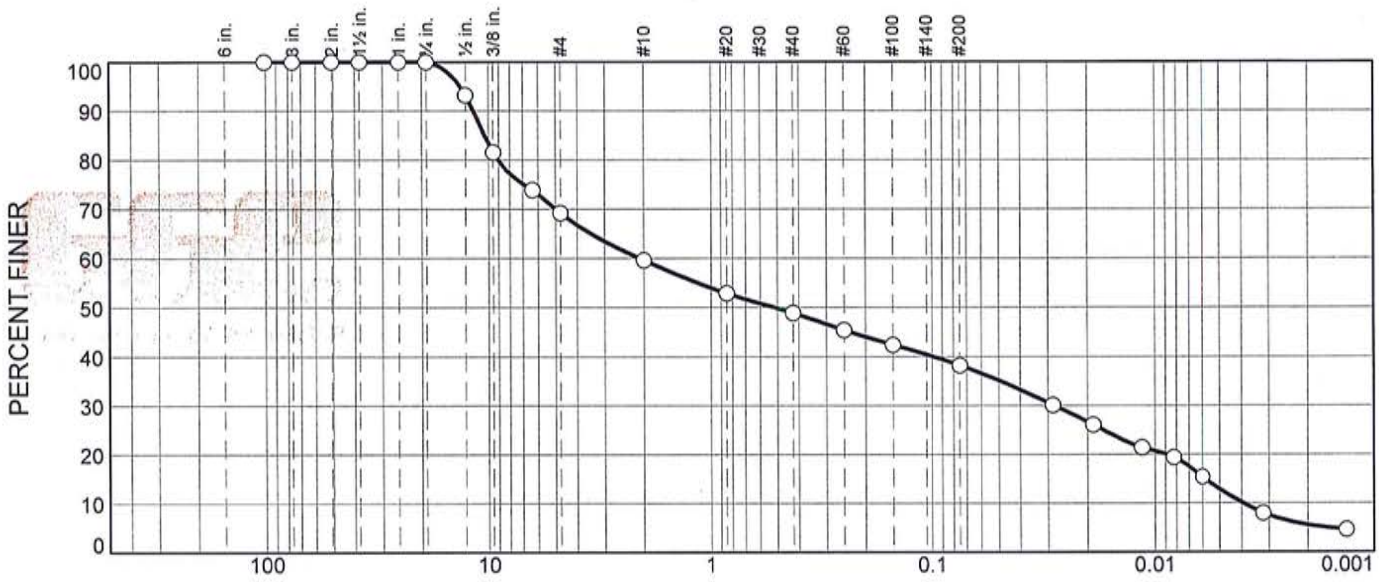
GRAIN SIZE ANALYSIS
ASTM D-422

Project: Arkwright **Project No.:** 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-496 (S4)
Sample Number: 15-52 **Depth:** 6 - 8 ft **Date:** 06.23.15



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	30.8	9.6	10.7	10.7	25.4	12.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	93.2		
3/8"	81.6		
1/4"	73.8		
#4	69.2		
#10	59.6		
#20	52.9		
#40	48.9		
#60	45.4		
#100	42.4		
#200	38.2		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 10.4083 D_{60}= 2.0867 D_{50}= 0.5149
D_{30}= 0.0282 D_{15}= 0.0059 D_{10}= 0.0039
C_u= 528.68 C_c= 0.10

Classification

USCS= AASHTO=

Remarks

Atterberg testing not performed.

Figure

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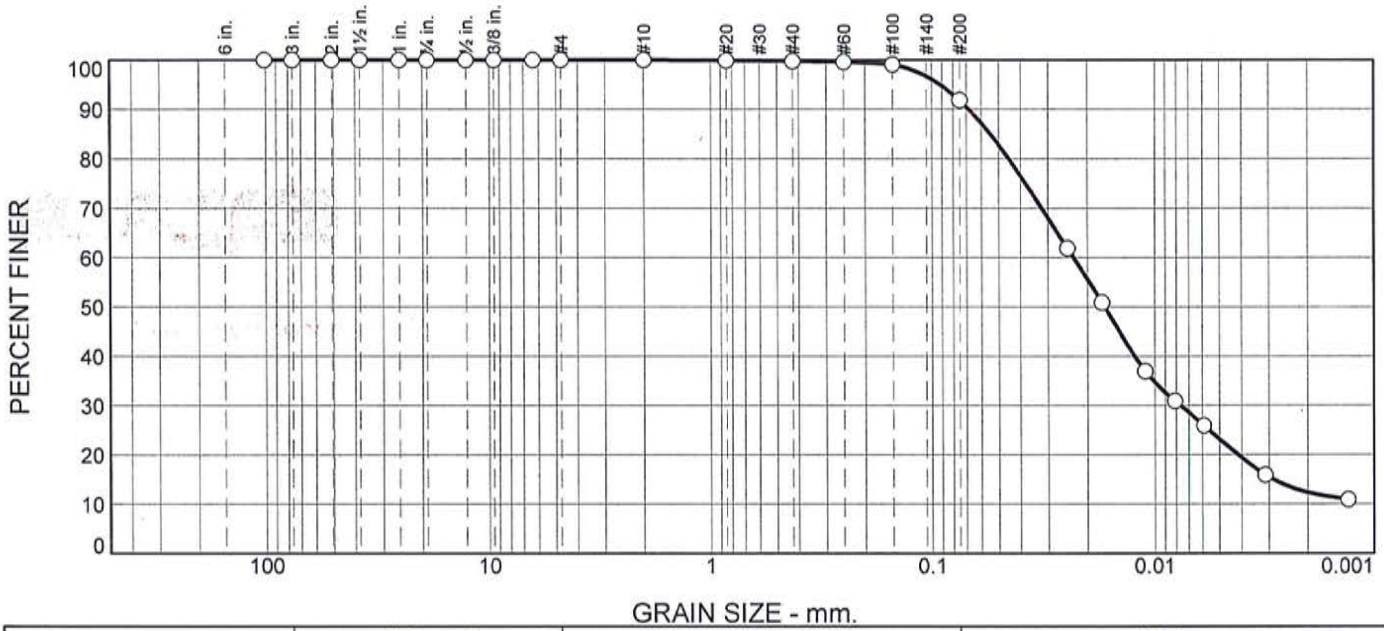
GRAIN SIZE ANALYSIS
ASTM D-422

Project: Arkwright **Project No.:** 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-497 (S4)
Sample Number: 15-55 **Depth:** 8 - 10 ft **Date:** 06.23.15



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	8.0	68.7	23.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
1/4"	100.0		
#4	100.0		
#10	100.0		
#20	99.9		
#40	99.8		
#60	99.6		
#100	99.1		
#200	91.8		

* (no specification provided)

Material Description

silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{85}= 0.0547 D_{60}= 0.0231 D_{50}= 0.0167
D_{30}= 0.0077 D_{15}= 0.0029 D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Figure

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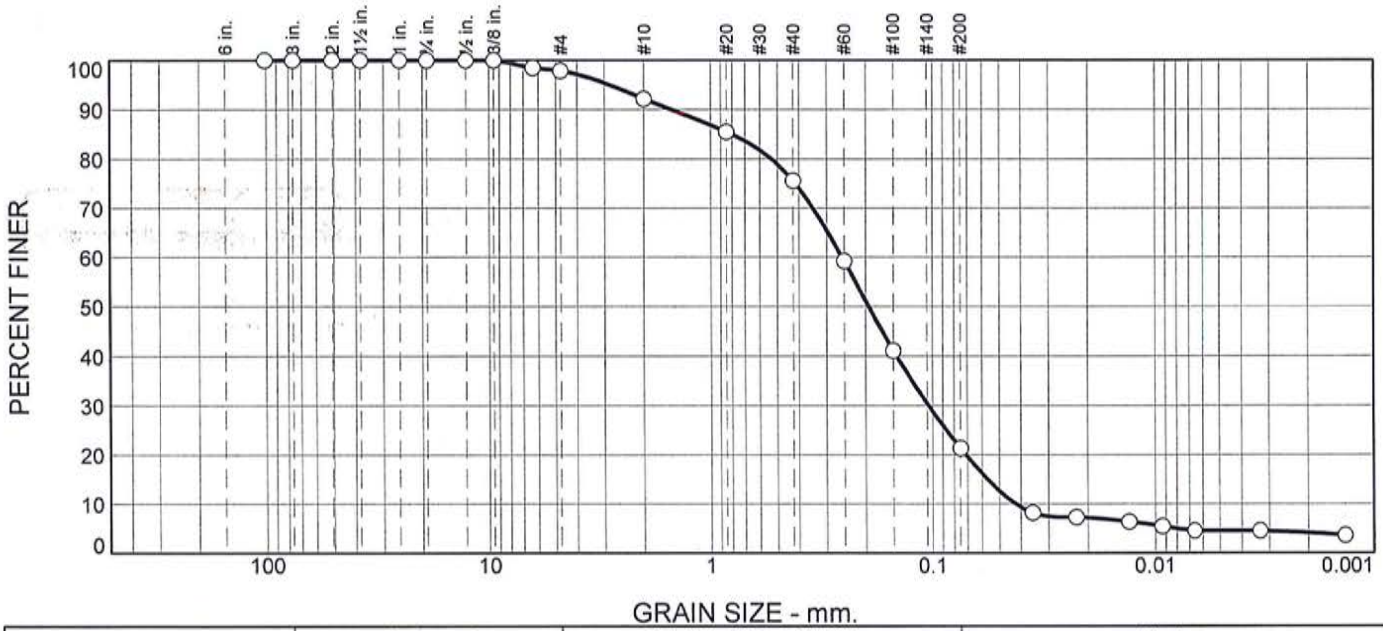
GRAIN SIZE ANALYSIS
ASTM D-422

Project: Arkwright **Project No.:** 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-498 (S5)
Sample Number: 15-58 **Depth:** 8 - 10 ft **Date:** 06.23.15



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.1	5.7	16.6	54.2	16.9	4.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
1/4"	98.5		
#4	97.9		
#10	92.2		
#20	85.5		
#40	75.6		
#60	59.2		
#100	41.1		
#200	21.4		

* (no specification provided)

Material Description

silty sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{85}= 0.8031 D_{60}= 0.2558 D_{50}= 0.1937
D_{30}= 0.1043 D_{15}= 0.0566 D_{10}= 0.0422
C_u= 6.06 C_c= 1.01

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Figure

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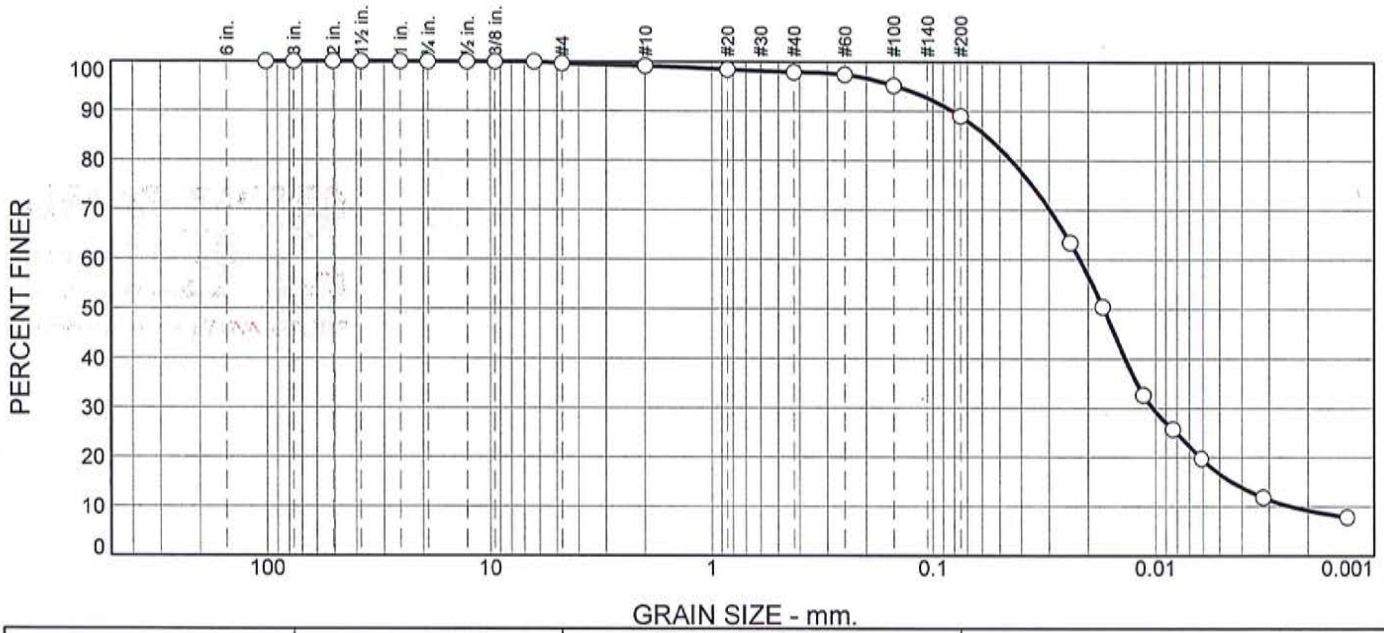
GRAIN SIZE ANALYSIS
ASTM D-422

Project: Arkwright **Project No.:** 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-499 (S4)
Sample Number: 15-61 **Depth:** 6 - 4 ft **Date:** 06.23.15



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.3	0.5	1.3	8.9	72.4	16.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
1/4"	100.0		
#4	99.7		
#10	99.2		
#20	98.5		
#40	97.9		
#60	97.4		
#100	95.2		
#200	89.0		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.0574 D_{60}= 0.0219 D_{50}= 0.0170
D_{30}= 0.0103 D_{15}= 0.0044 D_{10}= 0.0024
C_u= 9.14 C_c= 2.03

Classification

USCS= AASHTO=

Remarks

Atterberg testing not performed.

Figure

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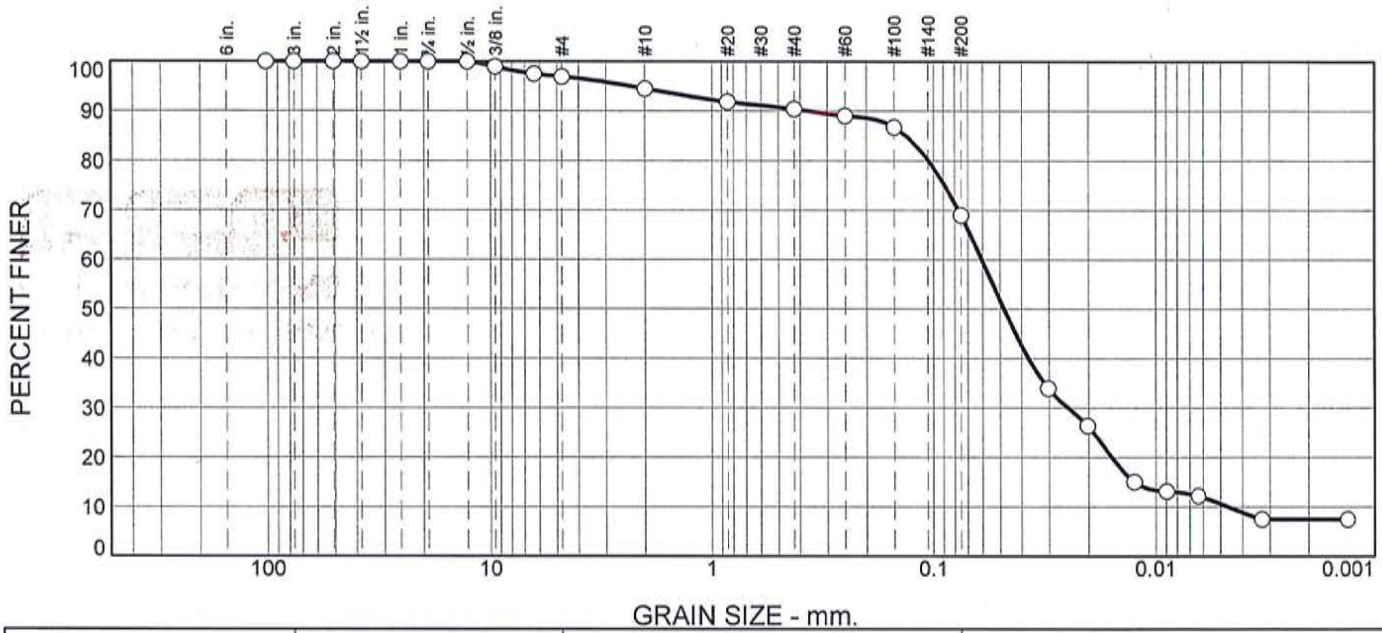
GRAIN SIZE ANALYSIS
ASTM D-422

Project: Arkwright **Project No.:** 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-500 (S4)
Sample Number: 15-64 **Depth:** 6 - 8 ft **Date:** 06.23.15



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.0	2.5	4.1	21.4	58.4	10.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	98.9		
1/4"	97.5		
#4	97.0		
#10	94.5		
#20	91.9		
#40	90.4		
#60	89.0		
#100	86.8		
#200	69.0		

* (no specification provided)

Material Description

sandy silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{85}= 0.1324 D_{60}= 0.0604 D_{50}= 0.0480
D_{30}= 0.0248 D_{15}= 0.0125 D_{10}= 0.0046
C_u= 13.06 C_c= 2.20

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Figure

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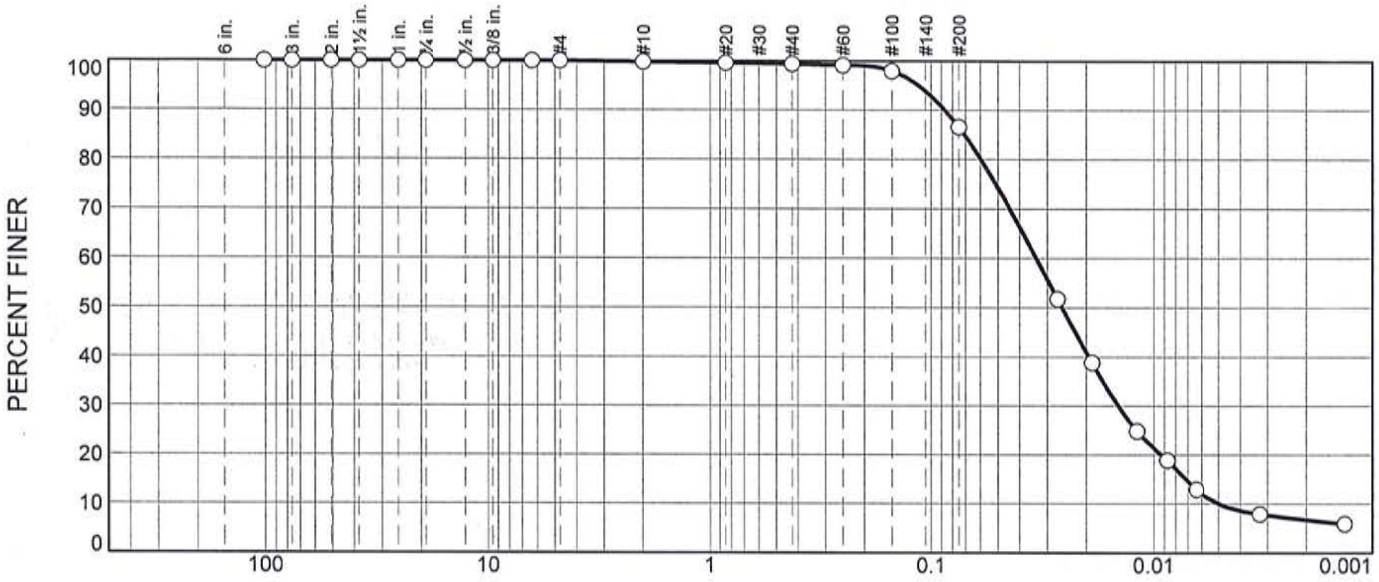
GRAIN SIZE ANALYSIS
ASTM D-422

Project: Arkwright **Project No.:** 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-502 (S7)
Sample Number: 15-67 **Depth:** 12 - 14 ft **Date:** 06.23.15



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	0.4	12.8	76.6	10.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
1/4"	100.0		
#4	100.0		
#10	99.8		
#20	99.6		
#40	99.4		
#60	99.2		
#100	98.0		
#200	86.6		

* (no specification provided)

Material Description

silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{85}= 0.0706 D_{60}= 0.0336 D_{50}= 0.0257
D_{30}= 0.0144 D_{15}= 0.0071 D_{10}= 0.0050
C_u= 6.73 C_c= 1.24

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Figure

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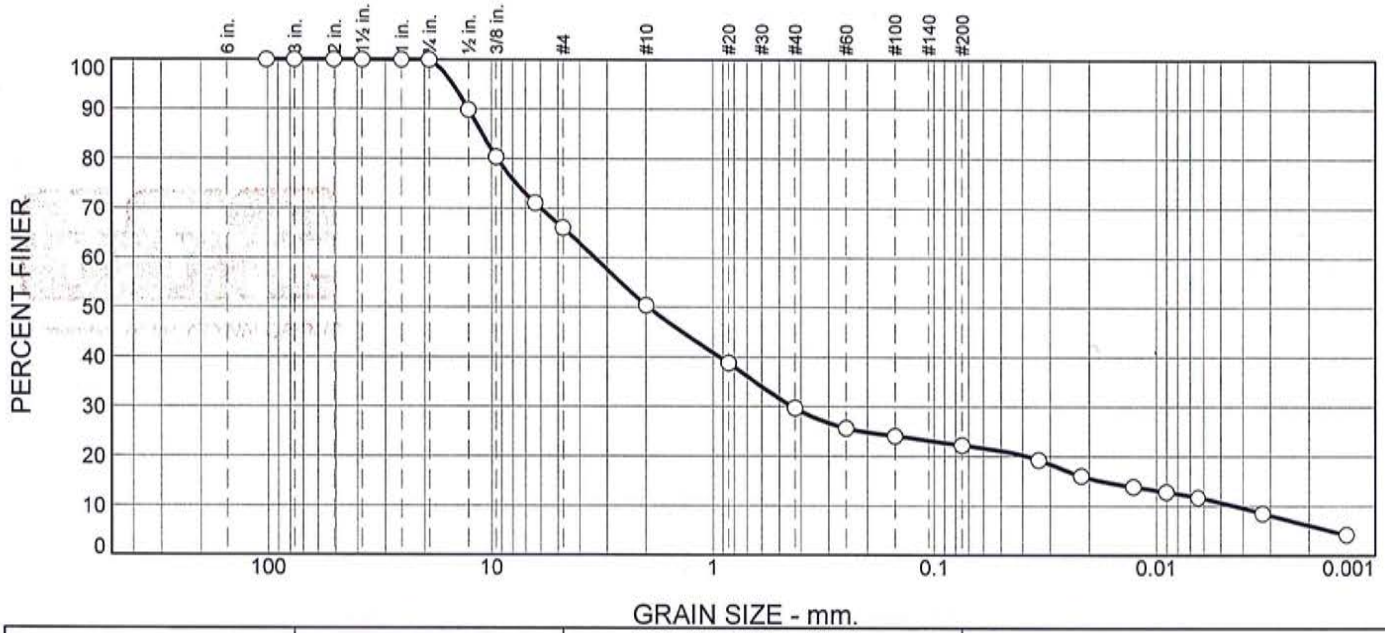
GRAIN SIZE ANALYSIS
ASTM D-422

Project: Arkwright

Project No.: 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-503 (S3)
Sample Number: 15-70 **Depth:** 4 - 6 ft **Date:** 06.23.15



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	33.9	15.7	20.7	7.5	11.5	10.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	89.9		
3/8"	80.4		
1/4"	71.1		
#4	66.1		
#10	50.4		
#20	38.8		
#40	29.7		
#60	25.6		
#100	24.1		
#200	22.2		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 10.9957 D_{60}= 3.4025 D_{50}= 1.9457
D_{30}= 0.4368 D_{15}= 0.0177 D_{10}= 0.0043
C_u= 784.85 C_c= 12.93

Classification

USCS= AASHTO=

Remarks

Atterberg testing not performed.

Figure

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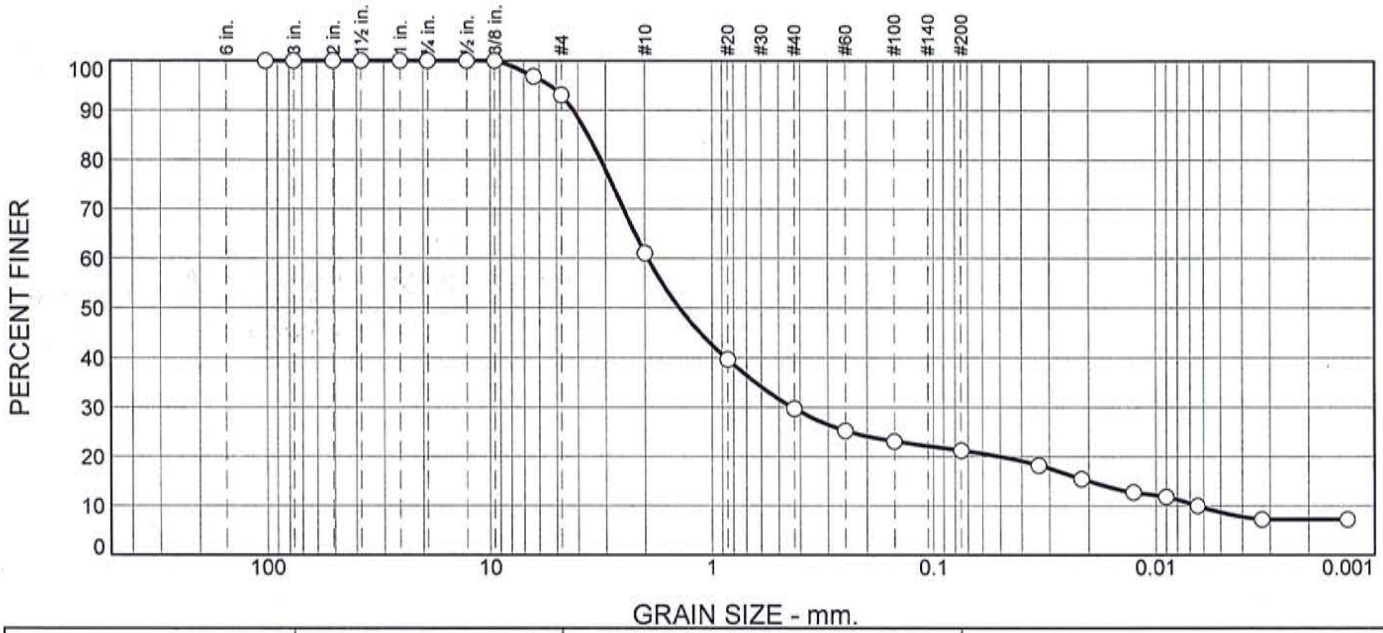
GRAIN SIZE ANALYSIS
ASTM D-422

Project: Arkwright **Project No.:** 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-505 (S3)
Sample Number: 15-73 **Depth:** 4 - 6 ft **Date:** 06.23.15



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.9	32.0	31.4	8.5	12.5	8.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
1/4"	96.8		
#4	93.1		
#10	61.1		
#20	39.7		
#40	29.7		
#60	25.3		
#100	23.1		
#200	21.2		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 3.5976 D_{60}= 1.9429 D_{50}= 1.4003
D_{30}= 0.4347 D_{15}= 0.0199 D_{10}= 0.0064
C_u= 302.72 C_c= 15.16

Classification

USCS= AASHTO=

Remarks

Atterberg testing not performed.

Figure

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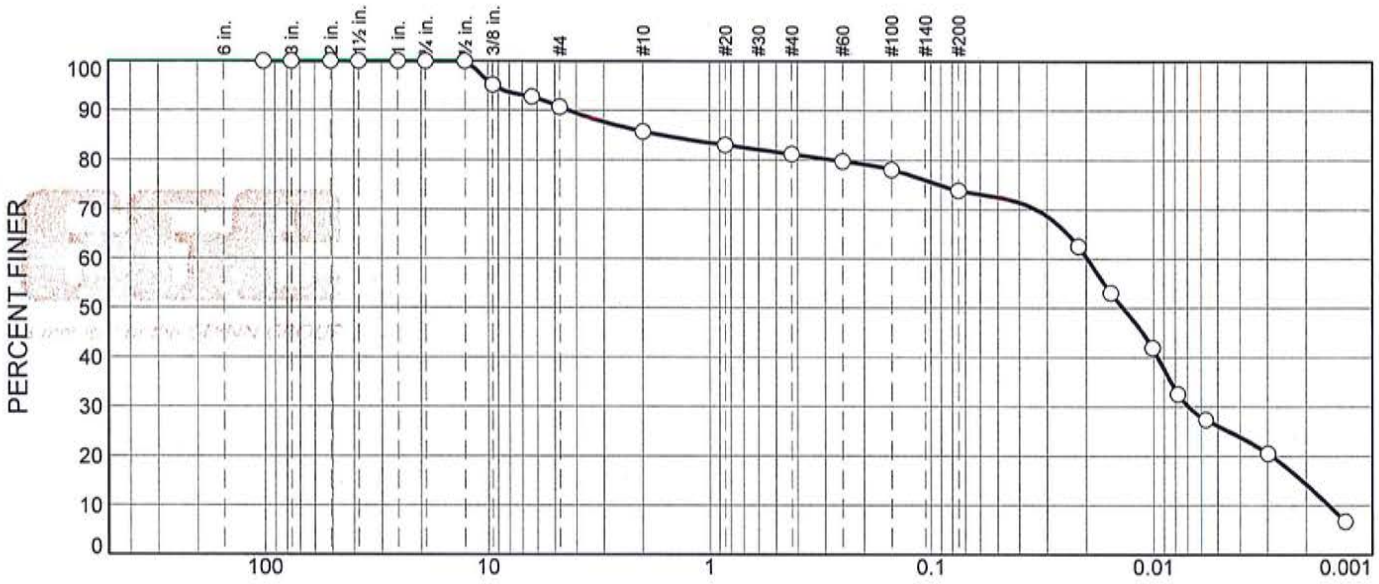
GRAIN SIZE ANALYSIS
ASTM D-422

Project: Arkwright **Project No.:** 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-509 (S5)
Sample Number: 15-76 **Depth:** 8 - 10 ft **Date:** 06.23.15



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	9.3	4.9	4.6	7.3	47.8	26.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	95.2		
1/4"	92.8		
#4	90.7		
#10	85.8		
#20	83.0		
#40	81.2		
#60	79.8		
#100	78.1		
#200	73.9		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 1.6227 D_{60}= 0.0198 D_{50}= 0.0137
D_{30}= 0.0070 D_{15}= 0.0021 D_{10}= 0.0016
C_u= 12.53 C_c= 1.55

Classification

USCS= AASHTO=

Remarks

Atterberg testing not performed.

Figure

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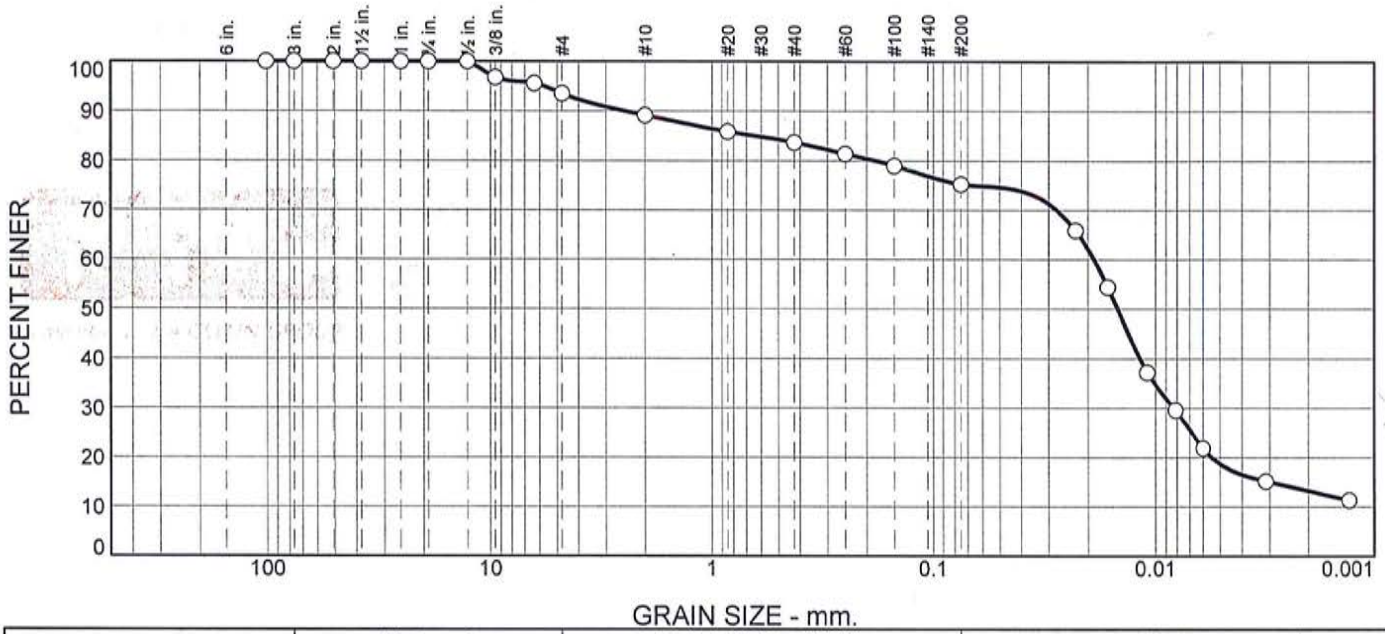
GRAIN SIZE ANALYSIS
ASTM D-422

Project: Arkwright **Project No.:** 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-511 (S3)
Sample Number: 15-79 **Depth:** 4 - 6 ft **Date:** 06.23.15



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.4	4.4	5.5	8.4	56.6	18.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	96.8		
1/4"	95.6		
#4	93.6		
#10	89.2		
#20	85.9		
#40	83.7		
#60	81.4		
#100	79.0		
#200	75.3		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.6318 D_{60}= 0.0188 D_{50}= 0.0148
D_{30}= 0.0083 D_{15}= 0.0030 D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Atterberg testing not performed.

Figure

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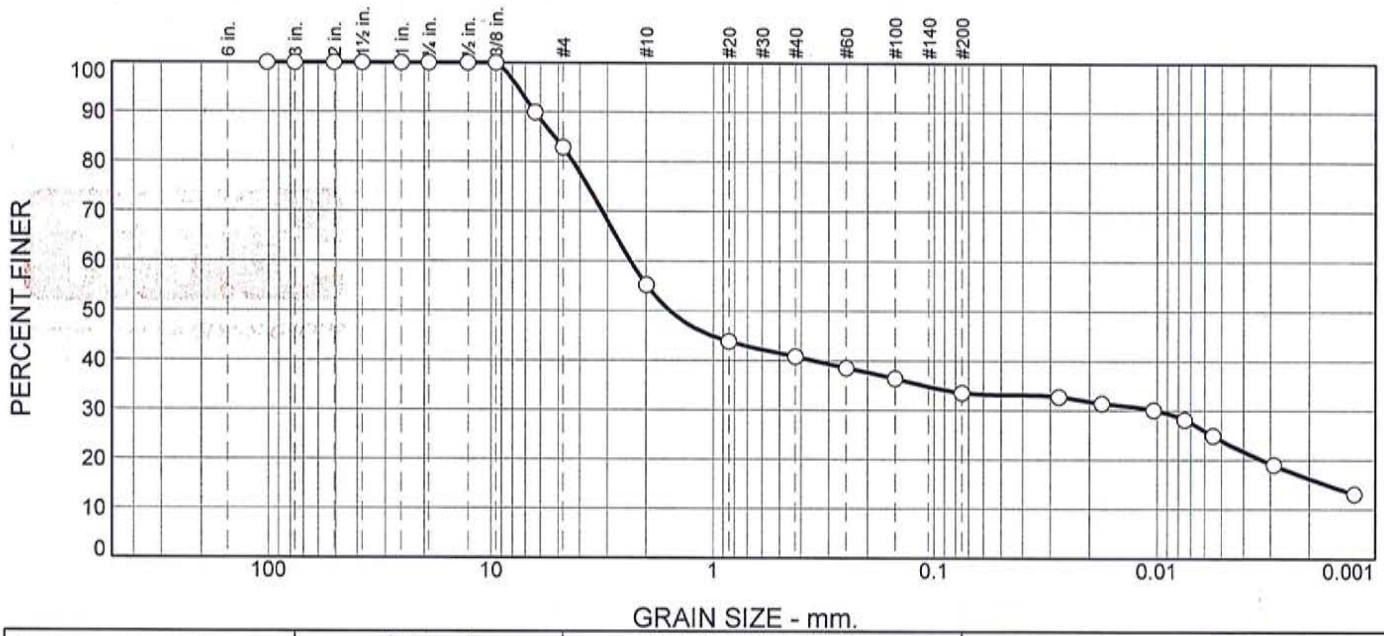
GRAIN SIZE ANALYSIS
ASTM D-422

Project: Arkwright **Project No.:** 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-517 (S3)
Sample Number: 15-82 **Depth:** 4 - 6 ft **Date:** 06.23.15



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	17.1	27.6	14.5	7.3	9.6	23.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
1/4"	89.9		
#4	82.9		
#10	55.3		
#20	43.9		
#40	40.8		
#60	38.5		
#100	36.4		
#200	33.5		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 5.1758 D_{60}= 2.3555 D_{50}= 1.5627
D_{30}= 0.0100 D_{15}= 0.0017 D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Atterberg testing not performed.

Figure

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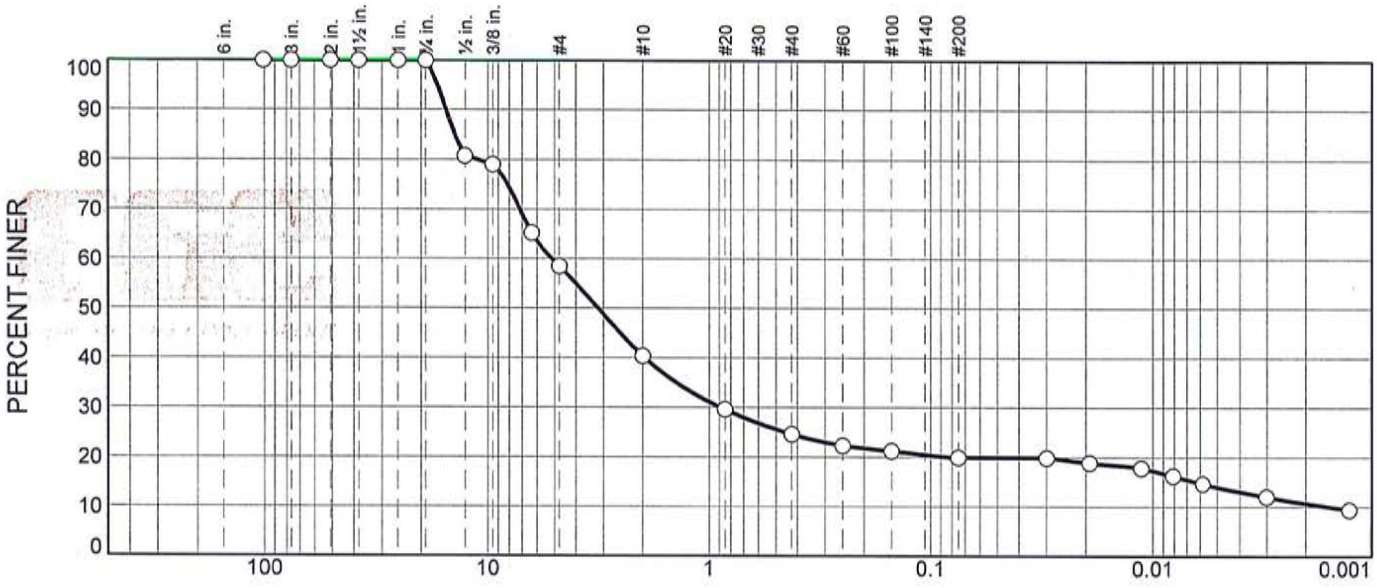
a member of the GLYNN GROUP

GRAIN SIZE ANALYSIS
ASTM D-422

Project: Arkwright **Project No.:** 05-1090

Client: Nature's Way Environmental Consultants & Contractors, Inc.

Location: TL-520 (S5)
Sample Number: 15-85 **Depth:** 8 - 10 ft **Date:** 06.23.15



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	41.5	18.1	15.8	4.7	5.9	14.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0		
1-1/2"	100.0		
1-0"	100.0		
3/4"	100.0		
1/2"	80.8		
3/8"	79.0		
1/4"	65.3		
#4	58.5		
#10	40.4		
#20	29.6		
#40	24.6		
#60	22.3		
#100	21.2		
#200	19.9		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 14.1203 D_{60}= 5.1361 D_{50}= 3.1797
D_{30}= 0.8920 D_{15}= 0.0063 D_{10}= 0.0016
C_u= 3291.46 C_c= 99.27

Classification

USCS= AASHTO=

Remarks

Atterberg testing not performed.

Figure

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