DRAFT GEOTECHNICAL INVESTIGATION REPORT

For the Proposed

MET Tower

at the

Arkwright Summit Wind Farm
Town of Arkwright
Chautauqua County, NY

Prepared For:

Arkwright Summit Wind Farm LLC

FA No.:   081017

Prepared by:

FISHERASSOCIATES

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June 25, 2015

Table of Contents

1.0 Executive Summary

This preliminary report presents the geotechnical investigation performed at the proposed site of the Meteorological (MET) Tower for the Arkwright Summit Windfarm in Chautauqua County, New York. The subsurface conditions encountered at the exploration locations generally consisted of a surficial layer of topsoil underlain by:

- A thin slackwater deposit of loose sandy silt approximately one foot in thickness, overlying
- Stiff to hard glacial till extending from a depth of one foot to 29.4 feet below the ground surface (bgs).

Based on the subsurface conditions encountered, we recommend the following geotechnical parameters are utilized for the MET Tower foundations:

TABLE 1 – Summary of Subsurface Conditions

Parameter	**Value**	**Units**	**Notes**
Min. Dry Backfill Density	115	pounds per cubic foot (pcf)	Assumes compaction achieves at least 90% of maximum dry density
Maximum Moist Backfill Density	145	pounds per cubic foot (pcf)	Assumes compaction achieves at least 95% of maximum dry density
Gross Allowable Bearing Pressure	3500	pounds per square foot (psf)	Assumes foundations bear on undisturbed glacial till or structural fill approved by
Short Duration Increase	Not Recommended		
Estimated Differential Settlement	0.5	inches	Assumes proper foundation preparation and stiff to hard glacial till
Groundwater	See Text		In-situ soil has low permeability; "bathtub" may be created if foundation drainage not provided
Poisson' ratio	0.4	n/a	Assumes topsoil and slackwater deposit stripped
Subgrade density below foundation	135	pcf	Assumes foundations bear on undisturbed glacial till or structural fill approved by
Shear Wave Velocity	See Text		
Seismic Site Class	C	n/a	Per IBC 2012
Sds	0.12	g's	Per IBC 2012
Sd1	0.059	g's	Per IBC 2012

The Met Tower foundation must bear on undisturbed stiff glacial till. Bearing grade must be protected during construction to ensure no loss of strength.

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. This report presents the geotechnical investigation performed at the proposed site of the MET Tower.

Fisher Associates conducted this geotechnical investigation to obtain general subsurface condition information in the proposed area of the MET Tower. 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 proposed site for the MET Tower is presently a wooded lot on the east side of Center Road (County Route 79). The location is also north of Meadows Road.

2.3 Project Description

It is our understanding that site improvements will include:

- A meteorological tower approximately 80 meters high that is constructed on concrete spread footings with slab-on-grade;

Parking and driveway areas will also be constructed as part of site development.

3.0 Subsurface Exploration

3.1 Test Boring

The subsurface exploration program consisted of the advancement of one test boring, designated as MET-4-15. Boring MET-4-15 was performed by Earth Dimensions, Inc. on May 27, 2015. The test boring was advanced using an all-terrain rotary drill rig and 4-1/4” I.D. hollow stem augers to a depth of 29.4 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 - MET tower 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 not performed specifically for this structure due to the similarity with the soils encountered nearby that have undergone laboratory testing.

4.0 Summary of Subsurface Conditions

4.1 General

The site is located in the Appalachian Plateau physiographic province. Typical surficial geology consists of glacial deposits of drift or till. Local bedrock typically consists of shale and siltstone.

The subsurface conditions encountered at the exploration locations generally consisted of a surficial layer of topsoil underlain by:

- A thin slackwater deposit of loose sandy silt approximately one foot in thickness,
- overlying stiff to hard glacial till extending from a depth of one foot to 29.4 feet below the ground surface (bgs).

The generalized soil profile described below and shown on the test boring log 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

Approximately four inches of topsoil was encountered at the test boring location. The topsoil generally consisted of very soft black sand with organic matter.

4.3 Slackwater Deposit

The slackwater deposit consisted of loose sandy silt. Standard Penetration Testing “N” values in this deposit measured 12 blows per foot (bpf).

4.4 Glacial Till

Glacial till was typically encountered below the slackwater deposit and extended to a depth of at least 29.4 feet bgs. The glacial till typically consisted of a binder of hard clay and silt with interbedded gravel and sand. “N” values in the glacial till ranged from 15 bpf to over 100 bpf, and typically exceeded 30 bpf.

4.5 Groundwater

Groundwater was observed at a depth of 25.7 feet in the completed borehole. However, adequate time may not have passed during and/or after the completion of overburden drilling and sampling for groundwater to achieve a final static level. 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. A groundwater monitoring well was not included in the scope of this investigation and therefore was not installed at this location.

5.0 Geotechnical Engineering and Construction Considerations

5.1 Geotechnical Analysis

The glacial till is a competent bearing material if undisturbed. If a fixed-base foundation is utilized for the MET tower, a shallow foundation system bearing on the glacial till can be utilized. Guy anchors can also be adequately supported by the glacial till. The glacial till contains an appreciable percentage of silt and clay and must not be allowed to saturate and lose strength. Bearing grade should remain dewatered throughout construction, and the earthwork recommendations presented below must be followed.

The glacial till has a low in-situ permeability and high in-place density. It is likely that the backfill placed around foundations will have greater void space, and greater permeability, than the surrounding glacial till. It is likely that, over time, the backfill surrounding the foundations will become saturated. We therefore recommend that effective unit weights be used for the backfill when calculating uplift resistance and passive earth pressure.

Assuming the recommendations in this report are followed, we recommend the geotechnical design parameters listed in Table 1, page 1are utilized during design. Shear wave velocities are not planned at the MET Tower site but may be performed at a nearby WTG location.

Foundations should bear at least 48 inches below finished exterior grade for frost protection unless an insulated frost protection system is installed.

We anticipate that less than one inch of total settlement, and less than 0.75 inches of differential settlement, will occur if the footing bearing grade is adequately protected during construction. Drainage should be maintained away from foundations both during and after construction. Each footing excavation should be inspected by qualified geotechnical personnel and approved prior to placing reinforcing steel and concrete. Over-excavate below foundations to remove any fill or soil that is disturbed or softened during construction activities. Re-establish bearing grade using structural fill placed in level lifts no thick than 12 inches and compacted to at least 95% of the maximum dry density (ASTM D-1557).

5.2 Slabs-On-Grade

Should slab-on-grade construction be required for ancillary equipment, we recommend that:

- The exposed subgrades should be thoroughly *compacted/densified*, *proof rolled*, evaluated and prepared in accordance with our recommendations.
- The slab-on-grade floor system should be constructed over a minimum 9-inch thick layer of *Structural Fill* (i.e. Subbase Stone), where the existing fill remains in-place and the floors are lightly loaded. The Subbase Stone layer should be increased to a minimum of 12-inches where heavier loads are expected such as storage areas and mechanical rooms.
- Any deleterious materials, such as organics, soft soils, highly voided debris/rubble,

existing structures, etc., which are present within the fill soils at the bottom of the subgrade excavation, should be further undercut, removed, and replaced with additional *Structural Fill* material.

- A suitable stabilization/separation geotextile, such as Mirafi 500X, should be placed between the existing fill subgrades and the overlying *Structural Fill* layer.

The floor slabs can be designed using a modulus of subgrade reaction of 150 pounds per cubic inch at the top of the *Structural Fill* layer.

The above subbase stone thickness is not designed for carrying construction vehicle loads. Therefore, it may be desirable for the Contractor to temporarily increase the Subbase thickness within the building pad to provide a suitable working surface to stage the construction, carry construction vehicle loads and protect the underlying subgrades. This will be particularly important if construction proceeds during seasonally wet periods. The additional subbase stone material could then be removed in preparation for the actual floor construction and re-used as foundation backfill, pavement area subbase or as otherwise determined appropriate.

5.3 Foundation Backfill

We recommend that foundation elements be backfilled with *compacted structural fill* to provide uplift support. Backfill in these areas should be placed in *lifts* and *compacted*.

5.4 Lateral Earth Pressures

We recommend the following lateral earth pressure coefficients for any guy anchor design and foundation overturning calculations:

Recommended Lateral Earth Pressure Coefficients					
Coefficient of Passive Lateral Earth Pressure (Kp)	Coefficient of At-Rest Lateral Earth Pressure (Ko)	Coefficient of Active Lateral Earth Pressure (Ka)	Angle of Internal Friction	Total Unit Weight of Soil (pcf)	Submerged Unit Weight of Soil (pcf)
3.0	0.5	0.33	30°	130	65

If feasible, the foundation backfill should be drained and include a non-woven geotextile, selected considering drainage and filtration, installed around drainage stone surrounding a slotted under-drain pipe. The drainage stone should be sized in accordance with the pipe slotting or perforations. A crushed aggregate conforming to NYSDOT Standard Specifications Section 703-02, Size Designation No. 1 or No. 2 is generally acceptable. The foundation drainage stone and surrounding geotextile should extend above the drainpipe a minimum of 2 feet.

5.5 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.

5.6 Construction Dewatering Considerations

Construction dewatering will be required for surface water control and for excavations which encounter groundwater conditions. Surface water and groundwater should be diverted away from open excavations and prevented from accumulating on exposed subgrades.

Dewatering should be implemented in conjunction with excavation work such that the work generally proceeds in the dry. Excavation dewatering should be implemented sufficiently ahead of the excavation to maintain the groundwater levels at least 1 to 2 feet below the bottom of the excavation. If adequate dewatering is not completed, groundwater seepage and instability of the excavation bottom and sidewall could occur, particularly where the more permeable soil deposits are present. The amount of groundwater infiltration will depend on the soil condition encountered.

As a minimum, the use of sump and pump methods of dewatering will be necessary to control groundwater. Dewatering from the sumps should be commenced in advance of the excavation work to allow the groundwater to start to be drawn down. Dewatering sumps and wells should be designed to prevent the loss of fines from the soils. In addition, the selected dewatering system should be designed such that the resulting well drawdown does not adversely impact the adjacent utilities and structure foundations. Discharges from the dewatering system should be in accordance with permitted site storm-water management practices. Dewatering pumps should be operated on a continual basis, until the foundation is sufficiently and properly backfilled above the groundwater conditions.

5.7 Earthwork Construction Considerations

Based on the soils encountered in the subsurface explorations, exposed subgrade materials will generally consist of glacial till that can include clayey silt, silty sand, sandy silt, and silty sand with gravel soils. Due to the grain size and composition, some areas will be sensitive to disturbance and strength degradation in the presence of excess moisture. These soils will also be frost susceptible if left exposed to inclement weather conditions during construction.

We recommend that the site preparation work be performed during seasonally dry periods to *minimize potential for degradation of the subgrade soils* and undercuts which may become necessary to establish a stable base for construction. Excavation to the proposed subgrades should be performed using a method which reduces disturbance to the subgrade soils such as a backhoe equipped with a smooth blade bucket.

Site preparation for the slab-on-grade and pavement areas should include *densification, proper subgrade preparation, proof rolling* and all efforts should be made to *minimize the potential for degradation of the subgrade soils*.

Compacted Select Granular Fill may be used in general site grading operations and as backfill against exterior foundation walls. We do not recommend reuse of the *excavated soils* due the fine-grain nature of the soils. However these *excavated soils* may be considered for general site grading or trench backfilling in areas where overlying structures, pavement areas or other site facilities are not proposed, providing they are free of any organics, particles greater than 6-inch diameter, deleterious materials, and can be properly *compacted*.

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.

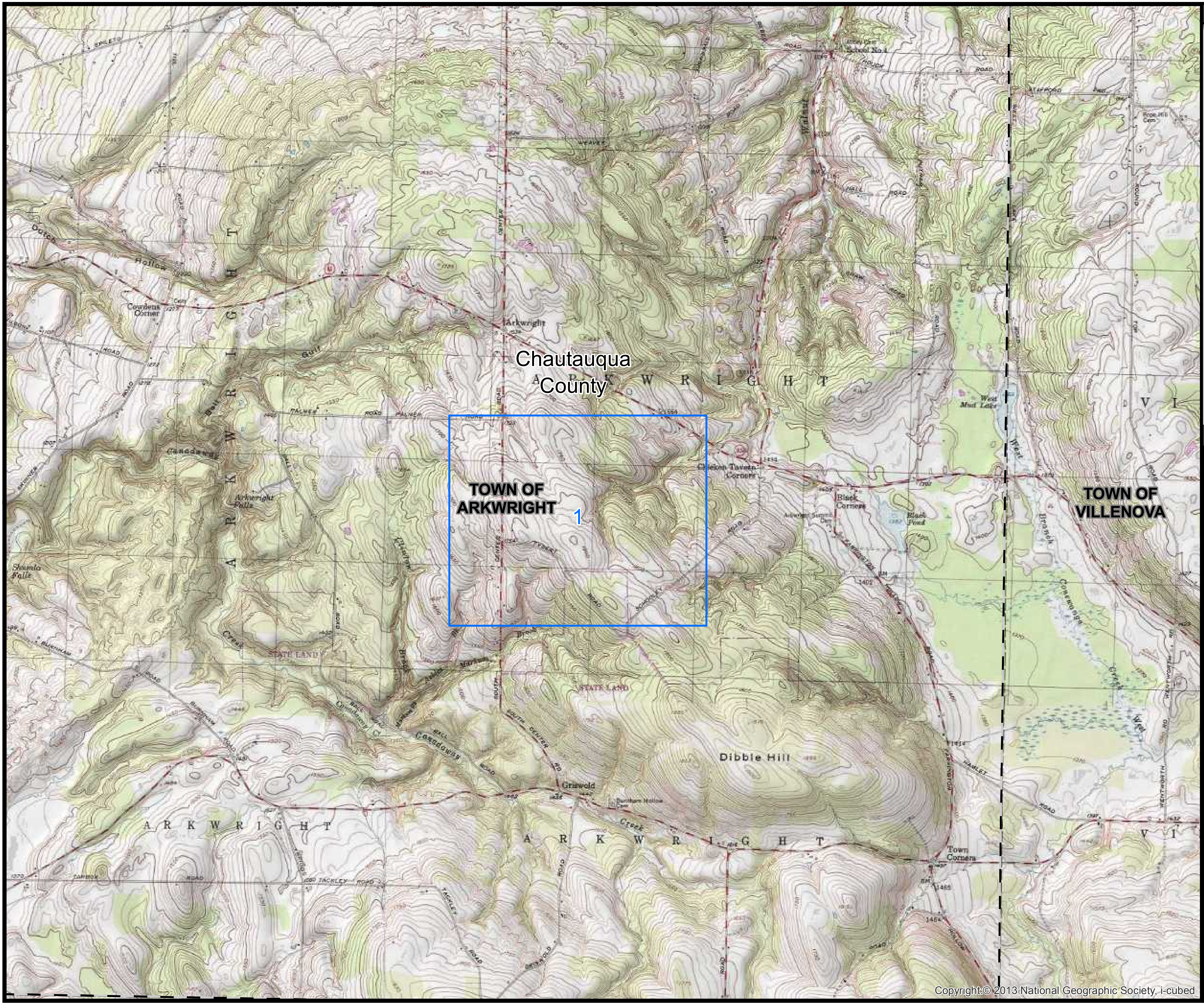
Minimize Potential Degradation of the Subgrade Soils - Efforts should be made to maintain the subgrades in a dry and stable condition at all times, and traffic over exposed subgrades should be minimized to the extent practicable during construction. These efforts could include: installation of drainage 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

FIGURES

Creator: alexandra Date: 6/24/2015



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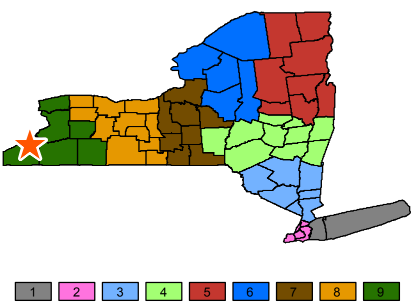
LEGEND

- ▭ Map Tiles
- ⌐ ¬ Municipal Boundary
- ★ Project Location

NYSDEC REGIONS



USGS Quads:
Cassadaga
Dunkirk
Forestville
Hamlet

0 1,500 3,000
Feet

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WWW.FISHERASSOC.COM

PROJECT

ARKWRIGHT WIND FARM
CHAUTAUQUA COUNTY, NY

edp renewables
powered by nature

TITLE

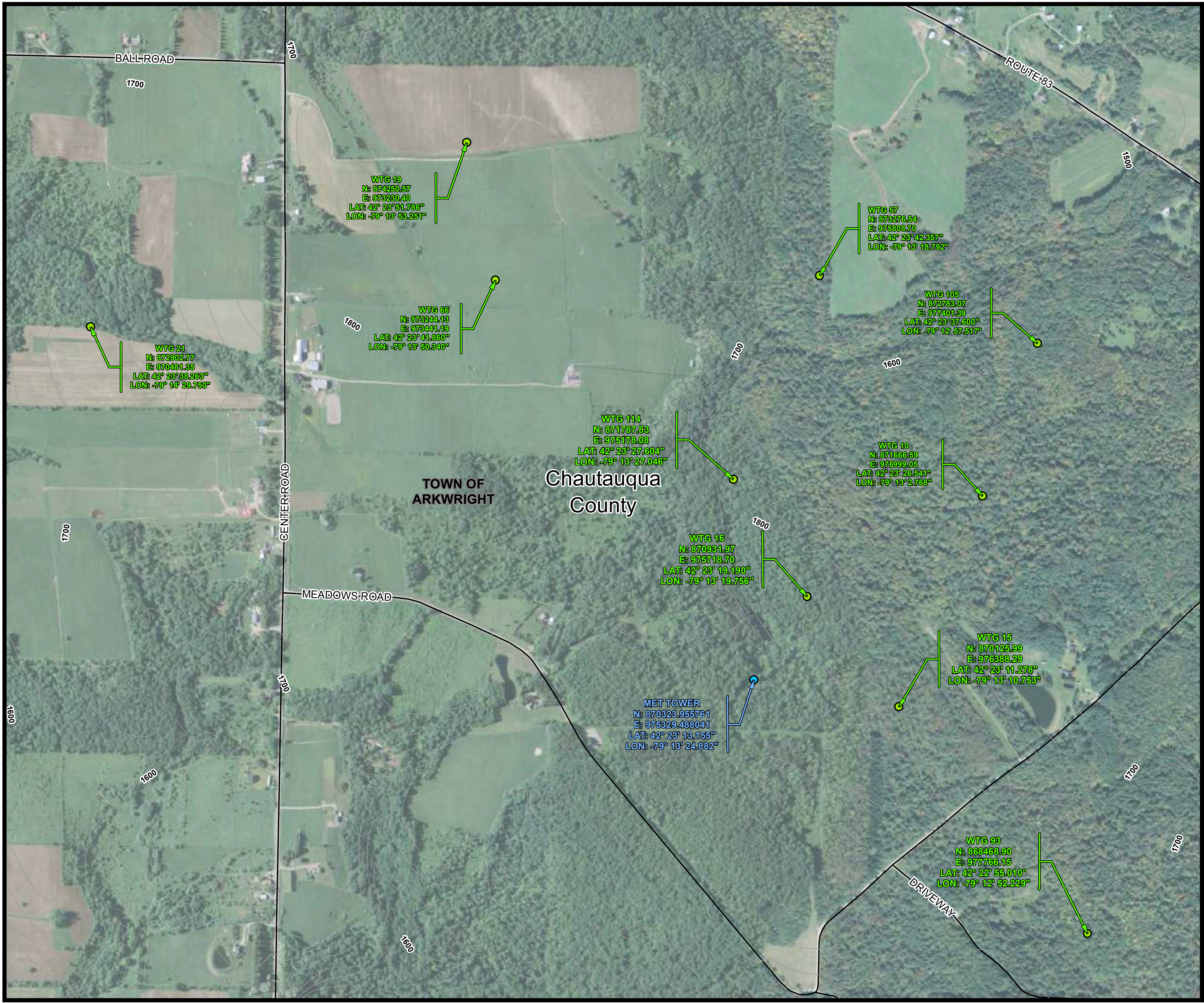
MET TOWER
LOCATION

TILE NO.

INDEX

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

Creator: alexandra **Date:** 6/24/2015



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

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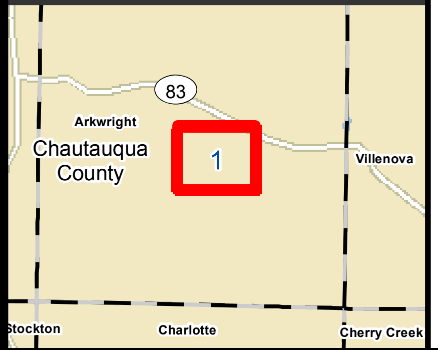
LEGEND

- ● WTG - Turbine
- ● Met Tower
- — Contour 20ft
- ⌐ ¬ Municipal Boundary

REGIONAL INDEX



0 350 700
Feet

New York State Education Law Section 7209 states that it is a violation of this law for any person, unless he / she is acting under the direction of a licensed professional engineer or land surveyor, to alter an item in any way.

If an item bearing the seal of an engineer or land surveyor is altered, the altering engineer or land surveyor shall affix to the item his / her seal and the notation "altered by" followed by his / her signature and the date of such alteration, and a specific description of the alteration.

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PROJECT

ARKWRIGHT WIND FARM
CHAUTAUQUA COUNTY, NY

edp renewables
powered by nature

TITLE

MET TOWER
LOCATION

TILE NO.

1 OF 1

APPENDIX A

Test Boring Logs
As prepared by Earth Dimensions, Inc.

EARTH DIMENSIONS, INC.

Soil and Hydrogeologic Investigations • Wetland Delineations
1091 Jamison Road • Elma, NY 14059
(716) 655-1717 • FAX (716) 655-2915

10B13a

HOLE NO. MET-4-15

SURF. ELEVATION _

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

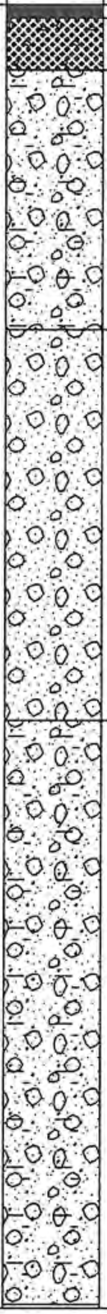
LOCATION _

CLIENT Fisher Associates

DATE STARTED 05/27/15 COMPLETED 05/27/15

DEPTH IN FT	SN	REC	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N
	1	20	2	2	4	8	6
	2	20	7	5	7	7	12
5	3	18	5	6	9	6	15
	4	22	7	11	17	27	28
	5	24	15	21	29	28	50
10	6	22	7	17	15	64	32
	7	24	12	23	25	27	48
15	8	24	12	31	37	100/3	68
	9	22	9	23	20	34	43
20							

LITH



DESCRIPTION AND CLASSIFICATION

Extremely moist black (MUCK) topsoil, very soft, granular soil structure, (OL). 0.2

Extremely moist faintly mottled brown (SANDY-SILT) with 5 to 10% gravel, little sand, trace clay, loose, blocky soil structure, (ML).

grades downward to 1.0

Extremely moist distinctly mottled olive brown gravelly (SAND-SILT-CLAY) with 15 to 40% subangular gravel, little sand and clay, stiff, massive soil structure, (ML-CL) tending towards (SC).

grades downward to 5.0

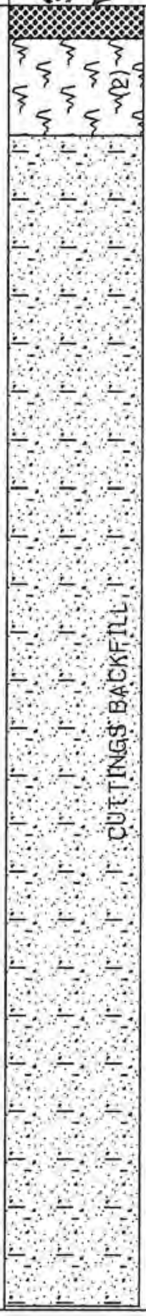
Extremely moist distinctly mottled olive brown gravelly (SANDY-SILT) with 15 to 40% mostly subangular gravel, little sand, trace to little clay, compact, massive soil structure, (ML) tending towards (ML-CL).

clear transition to 11.0

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).

WELL

(1) 2



WATER TABLE AND REMARKS

← 0.5'

← 2.0'

(1) TOPSOIL FILL
(2) CONCRETE

Note: MET-4-15 drilled 5.0 feet north of staked location.

Organic rich mucky surface to 0.2 feet over coarse silty slack water sediment with little sand, trace gravel and clay to 1.0 feet over loamy glacial till to 11.0 feet over silty glacial till to 23.0 feet over loamy 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 29.4 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)

EARTH DIMENSIONS, INC.
Soil and Hydrogeologic Investigations • Wetland Delineations
1091 Jamison Road • Elma, NY 14059
(716) 655-1717 • FAX (716) 655-2915

10B13a

HOLE NO. MET-4-15

SURF. ELEVATION _

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

LOCATION _

CLIENT Fisher Associates

DATE STARTED 05/27/15 COMPLETED 05/27/15

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% mostly subangular gravel, little sand and clay, hard, massive soil structure, (ML-CL). grades downward to 23.0	CUTTINGS BACKFILL	
	10 24	28	52	74	87	126		Extremely moist faintly mottled olive brown gravelly (SANDY-SILT) with 15 to 40% mostly subangular gravel with occasional cobble, little sand, very dense, massive soil structure, (ML).		
25										Water level at 25.7 feet below ground surface at completion.
	11 16	25	57	100/5				29.4		← 29.4'
30								Split spoon refusal at 29.4 feet.		
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)

SHEET 2 OF 2