


Supplemental Phase 1B Archaeological Survey

Arkwright Summit Wind Farm Project

Towns of Arkwright and Pomfret, Chautauqua County, New York

Prepared for:

Arkwright Summit Wind Farm, LLC
c/o EDP Renewables, North America, LLC
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September 2015

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MANAGEMENT SUMMARY

SHPO Project Review Number:	08PR0564
Involved State and Federal Agencies:	Town of Arkwright (SEQRA)
Phase of Survey:	Supplemental/Addendum Phase 1B Archaeological Survey
Location Information:	Towns of Arkwright and Pomfret, Chautauqua County, New York
Survey Area:	
Project Description:	The Applicant is proposing to develop a wind-powered generating facility. As presently envisioned, the current Project Layout consists of up to 36 turbines. In addition to the turbines, the current Project Layout includes construction and operation of 1 permanent meteorological tower, approximately 13.4 miles of gravel access roads, approximately 18.3 miles of underground (buried) electrical collection lines and communication cables, an operations and maintenance facility, a 5.5-mile overhead Generator Lead Line, and a substation and associated point of interconnection switchyard. In addition to the permanent components of the Project, the Project will require a temporary laydown yard and construction work space. Three stages of Phase 1B archaeological survey have previously been completed for the Project.
Project Area:	This addendum report addresses a 1.9 mile (3.1 kilometer) long portion of the overhead Generator Lead Line and the 2-acre substation/point-of-interconnect switchyard that have not been subject to previous Phase 1B archaeological surveys.
USGS 7.5-Minute Quadrangle Map:	*Dunkirk, NY*
Archaeological Survey Overview:	
Number/interval of shovel tests:	163 shovel tests at 50 foot intervals
Number/size of excavation units:	n/a (Phase 1B only)
Pedestrian surface survey:	n/a
Surface survey transect interval:	n/a
Results of Archaeological Survey:	
Pre-contact sites identified:	None
Historic sites identified:	None
Report Authors:	Nicholas P. Freeland, RPA; Patrick J. Heaton, RPA
Date of Report:	September 2015

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1.0 INTRODUCTION

1.1 Purpose of the Investigation

On behalf of Arkwright Summit Windfarm, LLC (the Applicant), a wholly owned subsidiary of EDP Renewables North America LLC, Environmental Design & Research, Landscape Architecture, Engineering, & Environmental Services, D.P.C. (EDR) conducted an supplemental (or addendum) Phase 1B archaeological survey for the proposed Arkwright Summit Wind Farm Project (the Project; formerly identified as the New Grange Wind Farm), located in the Towns of Arkwright and Pomfret, Chautauqua County, New York. The Applicant is continuing the review process for their Joint Permit Application for a Special Use Permit and Wind Overlay Zone, and associated review under the State Environmental Quality Review Act (SEQRA), for the Project with the Town of Arkwright, who is serving as SEQRA Lead Agency. EDR is currently preparing a Second Supplemental Environmental Impact Statement (SEIS2) on behalf of the Applicant for submission to the Town of Arkwright. A previous Draft Environmental Impact Statement (DEIS) (Tetra Tech, 2008a), Supplemental Environmental Impact Statement (SEIS) (Tetra Tech, 2009a), Phase 1 Cultural Resources Survey (Tetra Tech, 2008b), Supplemental Phase 1 Archaeological Survey (Tetra Tech, 2008b), and an Addendum Phase 1 Archaeological Survey (Tetra Tech, 2008c) have previously been completed for the Project. The previous cultural resources surveys were completed and reviewed by the New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP) under Project Review No. 08PR0564. The purpose of the current supplemental Phase 1B archaeological survey is to determine whether archaeological sites are located in a 1.9-mile (3.1-kilometer) long section of proposed overhead Generator Lead Line and the adjacent proposed 2- acre substation/POI switchyard parcel that both occur outside the area subject to previous archaeological surveys. Note that following the supplemental Phase 1B archaeological survey, a 0.4-mile (0.6-kilometer) portion of the Generator Lead Line was eliminated from the proposed Project and a 0.1-mile (0.2-kilometer) portion of the Generator Lead Line was relocated slightly.

The current supplemental Phase 1B archaeological survey was conducted under the supervision of a Registered Professional Archaeologist (RPA) in a manner consistent with the New York Archaeological Council's 1994 *Standards for Cultural Resources Investigations and the Curation of Archaeological Collections in New York* State (the *NYAC Standards*; NYAC, 1994) and the *New York State Historic Preservation Office Guidelines for Wind Farm Development Cultural Resources Survey Work* (the *SHPO Wind Guidelines*; NYSOPRHP, 2006). This addendum Phase 1B report was prepared in accordance with applicable portions of the New York State Office of Parks, Recreation and Historic Preservation's (NYSOPRHP's) *Phase 1 Archaeological Report Format Requirements* (NYSOPRHP, 2005).

Please note that this Addendum Phase 1B report applies only to archaeological resources. A separate memorandum addressing the SEIS2 Project Layout's potential effect on historic-architectural resources has been provided to NYSOPRHP under separate cover.

1.2 Project Location and Description

The Project is located in the northwestern corner of Chautauqua County, New York (Figure 1). The proposed Project is located approximately 5.2 miles southeast of Lake Erie, approximately 4.8 miles southeast of the City of Dunkirk, 3.7 miles south-southeast of the Village of Fredonia, 3.4 miles southwest of the Village of Forestville, and 4.6 miles northeast of the Village of Cassadaga. The Project is located within the Towns of Arkwright and Pomfret, and will occur on approximately 3,883 acres of leased land (the Project Site) located off of State Route 83, Center Road, Ball Road, Straight Road, Brainard Road, and Webster Road (see Figures 2-4). The size of the current Project Site has decreased from the 5,964 acres included in the SEIS Project Site (see Figure 3), primarily due to changes in wind turbine locations and the elimination of overhead collection lines from the Project Layout.

The Applicant is proposing to develop a wind-powered generating facility. As presently envisioned, the current Project Layout (the SEIS2 Project Layout) consists of up to 36 turbines, which are anticipated to include 33 turbines with a nameplate capacity of 2.2 megawatts (MW) and 3 turbines with a nameplate capacity of 2.0 megawatts (MW), for a total anticipated nameplate generating capacity of 78.8 MW. The Applicant intends to select a turbine that includes both 2.2 and 2.0 MW nameplate capacity models; however, it is anticipated that both models will have the same physical dimensions and appearance. The Project has submitted an interconnection request and is currently in the System Reliability Impact Study process with the New York Independent System Operator (NYISO) for 78.8 MW. Therefore, the proposed use of both 2.2 and 2.0 MW turbines allows the Applicant to maximize the energy generation potential of the proposed Project within the constraints of their approved interconnection agreement while minimizing the number of proposed wind turbines. In addition, to allow for flexibility on final site selection, the Applicant is evaluating and seeks approval for 38 proposed turbine locations (although only 36 turbines will ultimately be built). Therefore, 2 turbines are shown as "Alternate Wind Turbines" in Figures 2 through 5.

In addition to the turbines, the current Project Layout includes construction and operation of 1 permanent meteorological tower, approximately 13.4 miles (21.6 kilometers) of gravel access roads, approximately 18.3 miles (29.5 kilometers) of underground (buried) electrical collection lines and communication cables, an operations and maintenance (O&M) facility, a 5.5-mile (8.9 kilometers) overhead Generator Lead Line, and a substation and associated point of interconnection (POI) switchyard. In addition to the permanent components of the Project, the Project will require a temporary laydown yard and construction work space, including, but not limited to, areas to store Project components (laydown yards), construction vehicle parking areas, and cleared areas for

turbine assembly. The current Project Layout is depicted in Figures 2, 4, and 5. Relative to the DEIS and SEIS Project Layouts, the SEIS2 Project Layout has been reduced in scale in the following ways:

- The number of proposed turbines has been reduced from 47 (in the DEIS), to 44 (in the SEIS), to 36 (in the SEIS2). Notably, seven proposed wind turbines located in the southeastern portion of the Project site (i.e., south of County Route 72/Burnham Road in the vicinity of Ruttenbur Road) have been eliminated from the Project layout. Otherwise, the proposed turbines in the SEIS2 Project Layout are for the most part located in close proximity to turbine locations that were previously evaluated in the SEIS (see Figure 3).
- The total distance of proposed access roads has been reduced from 18 miles (in the DEIS), to 15.8 miles (in the SEIS), to 13.4 miles (in the SEIS2).
- The areas of temporary soil disturbance resulting from construction of the SEIS2 Project Layout total 359 acres, which is the same as the SEIS Project Layout and reduced from 375 acres in the DEIS Project Layout.
- The SEIS2 Project Layout is sited on many of the same parcels that were previously included in the DEIS and SEIS. The Project Site as presented in the DEIS included 5,930 acres. The SEIS Project Layout was somewhat more dispersed and included 5,964 acres. The Project Site for the SEIS2 has been reduced to 3,883 acres. The SEIS2 Project Site considered herein is shown in comparison to the SEIS Project Site in Figure 3.
- The DEIS and SEIS Project Layouts also included a 1.4-mile segment of overhead collection line in the southeastern portion of the Project. The 1.4-mile overhead collection line is no longer proposed as part of the Project.

The remaining aspects of the SEIS2 Project layout that have been modified since the SEIS include the following:

- The total distance of proposed underground collection lines has remained approximately the same; 21 miles (in the DEIS), to 17.9 miles (in the SEIS), to 18.3 miles (in the SEIS2).
- The SEIS2 Project Layout includes a 5.5-mile overhead generator lead that will connect the switchgear facility in the Town of Arkwright with the POI substation/switchyard in the Town of Pomfret (see Figure 2).

The differences between the SEIS2 Project Layout relative to the DEIS and SEIS Project Layouts are depicted in Figure 3.

The current supplemental Phase 1B archaeological survey focuses on a 1.9 mile (3.1 kilometer) segment of the overhead Generator Lead Line and associated 2-acre proposed substation/POI switchyard parcel that occur outside

the DEIS and SEIS Project Areas, and was not subject to archaeological survey during the three previous Phase 1B survey efforts (Tetra Tech, 2008b; 2009b; 2009c).

1.3 Previous Cultural Resources Investigations

As previously discussed, review of the potential environmental impacts of the proposed Project has included consultation with the NYSOPRHP (under Project Review No. 08PR0564). To support that consultation, the Applicant retained Tetra Tech between 2007 and 2009 and has recently retained EDR to conduct cultural resources investigations to investigate the Project's potential effect on archaeological and historic-architectural resources. It should be noted that in 2007, the Applicant initially retained Northern Ecological Associates (NEA) to conduct the initial Phase 1 cultural resource survey. However, following the completion of fieldwork for the Phase 1 cultural resources survey by NEA, but prior to the completion of the report, NEA was acquired by Tetra Tech on September 24, 2007 (Bloomberg Business, L.P., n.d.), and therefore, the initial Phase 1B report was produced by Tetra Tech (2008b). It should also be noted that, at that time (2007-2008), the Project's title was the *New Grange Wind Farm Project*, but it had been changed to the current title by 2009. As part of the SEQRA permitting and review process, NEA/Tetra Tech completed a Phase 1 cultural resources survey in 2007, and Tetra Tech completed additional Phase 1B archaeological surveys in 2009 for the Project on behalf of the Applicant (Tetra Tech, 2009b; 2009c). Cultural resources fieldwork and consultation with the NYSOPRHP to date is discussed further in Section 2 of this report.

2.0 BACKGROUND RESEARCH

In terms of physiography, land use, previously identified cultural resources, and historic context, the Project Site is as described in the DEIS, SEIS, and previous cultural resources reports (Tetra Tech, 2008a; 2008b; 2009a; 2009b; 2009c). Therefore, this section focuses on summarizing previously conducted cultural resources surveys for the Project, as well as their findings. Table 1 presents a summary of cultural resources fieldwork, reports, and consultation with the NYSOPRHP (per their role as State Historic Preservation Office [SHPO]) for this project to date. Tetra Tech's Phase 1B surveys covered 114 acres associated with proposed wind turbine sites, 23.9 miles (38.5 kilometers) of proposed access roads, and 20.1 miles (32.4 kilometers) of proposed transmission/circuit lines, comprising a total of 4,010 excavated shovel test pits (STPs). The Phase 1B fieldwork efforts thus far are summarized in Table 2.

Table 1 Summary of Fieldwork, Reports, and Consultation Pertaining to Archaeological Resources Within the Proposed Project Site.

Date	Archaeological Resources Work
September-November, 2007	NEA/Tetra Tech conducted the initial Phase 1A and 1B archaeological survey effort on behalf of the Applicant prior to consulting with NYSOPRHP regarding the *Wind Guidelines* (Herter, 2007; Locking, 2007; Tetra Tech, 2008b).
January, 2008	The Applicant submitted the Phase I Cultural Resources Investigation Report (Tetra Tech, 2008b) to NYSOPRHP.
February 2, 2008	NYSOPRHP provided the Arkwright Town Board (the Lead Agency) with a cultural resources scope including the NYSOPRHP *Wind Farm Survey Guide* (Bonafide, 2008)
February 27, 2008	The Applicant's DEIS (Tetra Tech, 2008a) was accepted as complete by the Arkwright Town Board.
July-October, 2008	Tetra Tech conducted a supplemental Phase 1B archaeological survey on behalf of the Applicant (Tetra Tech, 2009b).
February, 2009	The Applicant submitted the Supplemental Phase I Archaeological Investigation Report (Tetra Tech, 2009b) to NYSOPRHP.
April 13, 2009	The Applicant's SEIS (Tetra Tech, 2009a) was accepted as complete by the Lead Agency
October 16, 2009	NYSOPRHP requested additional Phase 1B archaeological survey and avoidance plans for six archaeological sites based on changes to project design (Herter, 2009).
November-December, 2009	Tetra Tech conducted additional Phase 1B archaeological surveys as requested by NYSOPRHP (Herter, 2009; Tetra Tech, 2009c).
December, 2009	The Applicant submitted the Addendum Phase I Archaeological Investigation Report (Tetra Tech 2009c) to NYSOPRHP.
June, 2015	As part of the preparation of a second SEIS (SEIS2), EDR conducted the current supplemental Phase 1B archaeological survey, reported herein.

Table 2 Summary of Tetra Tech's Archaeological Field Work Efforts for the Arkwright Summit Wind Farm.

Year (reference)	Phase 1B Surveyed Areas	Total Excavated Shovel Tests
2007 (Tetra Tech, 2008)	63 acres of wind turbine pads	1,239
2008 (Tetra Tech, 2009b)	45 acres of wind turbine pads	2,525
	21.5 miles (34.6 km) of access roads	
	20.1 miles (32.4 km) of transmission/ circuit lines	
2009 (Tetra Tech, 2009c)	6.0 acres of turbine pads	246
	2.4 miles (3.9 km) of access roads	

Tetra Tech identified six prehistoric archaeological sites, four prehistoric isolated finds (IFs) and no historic archaeological sites or IFs. The archaeological resources identified by Tetra Tech are summarized in Table 2 and depicted in Figure 5. Attempts will be made to alter the project layout, where necessary, to avoid sites by the distances recommended in Table 3. If avoidance is not possible for any of the previously identified sites, EDR will conduct Phase II testing to define site boundaries and work the Applicant and NYSOPRHP to implement mutually agreed upon mitigation measures.

Table 3 Archaeological Resources Identified During Previous Phase 1B Archaeological Surveys Within the Arkwright Summit Wind Farm Project Area.

Site/IF (Reference)	Description	Previous Management Recommendations by Tetra Tech	EDR Recommendations
Cannon I Site A01301.000015 (Tetra Tech 2008b)	Prehistoric lithic scatter	(1) Avoidance (2) Phase II	Avoidance
IF T27/1 A01301.000016 (Tetra Tech 2008b)	Prehistoric lithic scatter	Additional radial shovel tests needed if impacts are proposed adjacent to west side of originally proposed Turbine Pad 27	Avoidance
Lehman I Site A01301.000017 (Tetra Tech 2008b)	Prehistoric lithic scatter	(1) Avoidance (2) Phase II	Avoidance
Maslach I Site A01301.000018 (Tetra Tech 2008b)	Prehistoric lithic scatter	(1) Avoidance (2) Phase II	Avoidance
IF T46/1 A01301.000019 (Tetra Tech 2008b)	One prehistoric flake	None	No further work recommended.

Cannon II Site A01301.000020 (Tetra Tech 2008b)	Prehistoric lithic scatter with buried features	(1) Avoidance (2) Phase II	Avoidance
Arkwright Campground #1 Site A01301.000021 (Tetra Tech 2008b)	Prehistoric earthwork mound and lithic scatter	(1) Avoidance (2) Phase II	Avoidance
Jurczak I Site A01301.000040 (Tetra Tech 2009b)	Prehistoric lithic scatter	(1) Avoidance (2) Phase II	Avoidance
AR-AA IF-1 A01301.000041 (Tetra Tech 2009b)	Prehistoric lithic scatter	None	No further work recommended
C23 IF-1 A01301.000042 (Tetra Tech 2009b)	Prehistoric lithic scatter	None	No further work recommended

3.0 CURRENT SUPPLEMENTAL PHASE 1B ARCHAEOLOGICAL SURVEY

3.1 Scope of Supplemental Phase 1B Archaeological Survey

The SHPO *Wind Guidelines* (NYSOPRHP, 2006) specify an archaeological testing methodology that intensively samples selected areas within the larger Project area. The amount of archaeological survey work required (i.e., the number of shovel tests excavated) is determined based on the total area of proposed ground disturbance (archaeological APE) at the time that the archaeological work is conducted, and the guidelines suggest a standard metric of 16 STPs per acre of disturbance. The SHPO *Wind Guidelines* are based on the assumption that additional archaeological survey work is not necessary if project components move around during the project development process, as long as the total area of ground disturbance for the project does not increase (NYSOPRHP, 2006).

Therefore, given the extent of previous Phase 1B archaeological survey already completed, and the fact that the currently proposed layout consists of the same level of ground disturbance as the previously proposed SEIS layout, and 16 fewer acres of ground disturbance than the previously proposed DEIS (see Figure 3), only the northwestern-most 1.9 miles (3.1 kilometers) of the proposed Generator Lead Line and the adjacent proposed substation/POI switchyard parcel were surveyed during the current Phase 1B supplemental archaeological survey. As previously noted, following the supplemental Phase 1B archaeological survey, a 0.4-mile (0.6-kilometer) segment of the Generator Lead Line was eliminated from the Project (see Figure 2) and a 0.1-mile (0.2-kilometer) portion of the Generator Lead Line was relocated slightly. It is the opinion of EDR that this additional survey, coupled with Tetra Tech's previous surveys (Tetra Tech, 2008b, 2009b, 2009c), constitutes a reasonable good faith effort to identify archaeological resources within the project area in accordance with the *SHPO Wind Guidelines* (NYSOPRHP, 2006) and the *NYAC Standards* (NYAC 1994).

3.2 Supplemental Phase 1B Archaeological Survey Methods

Prior to initiating Phase 1B fieldwork, EDR reviewed the 1883 *Atlas of Chautauqua County, New York* (Beers, 1875) (Figure 6) as well as the historic maps summarized by Tetra Tech (2008b). No historic map documented structures or other indications of historic-period archaeological resources occur within or adjacent to the area subject to the current supplemental Phase 1B archaeological survey.

Phase 1B archaeological survey fieldwork was conducted within the northernmost 1.9 miles (3.1 kilometers) of the proposed overhead Generator Lead Line and the proposed 2-acre substation/POI switchyard parcel, as previously discussed (see Figures 2 and 3). EDR excavated STPs spaced at 50-foot (approximately 15-meter) intervals along the centerline of the proposed Generator Lead Line and along a 50-foot grid at the proposed substation/POI switchyard parcel (Figure 7). The STPs were excavated in lawns, pastures, a vineyard, second growth forest, and

successional scrubland (Appendix B: Photographs 1-9). No archaeological survey (i.e., shovel test excavation) was conducted in previously disturbed areas (i.e., paved driveways, built up roadbeds, and septic systems/leach fields), inundated areas, and steep slopes (defined as slopes greater than 12%) (Appendix B: Photographs 10-11). Additionally, EDR personnel were refused access from two small segments of the proposed Generator Lead Line. Therefore, no STPs were excavated in these areas (see Figure 7). In all but a few cases, EDR did not excavate STPs within mapped wetlands.

Throughout the course of the archaeological survey, EDR's Project Archaeologist recorded field notes on the methods and results of testing and photographed field activities, paying close attention to representative views that clearly documented environmental setting, context, and existing conditions of the survey area (see Appendix B).

EDR field personnel passed excavated soils through 1-quarter inch hardware cloth to ensure uniform recovery of cultural material and recorded STP stratigraphic profile data on standardized field record sheets that included strata depth, Munsell soil colors, soil texture and inclusions, and any cultural materials. No artifacts were recovered; however, if there had been recovered artifacts, they would have been placed in temporary field bags marked with standard provenience information and returned to EDR's Syracuse office for processing and placement in archival-grade polyethylene artifact bags. If buried cultural material that suggested the possible presence of an archaeological site had been recovered from a shovel test, EDR personnel would have excavated additional "radial" shovel tests per the NYSOPRHP's *Phase 1 Archaeological Report Format Requirements* (NYSOPRHP, 2005). However, no such finds were recovered so no additional radial shovel tests were necessary. All field notes were returned to EDR's office in Syracuse, NY.

3.3 Supplemental Phase 1B Archaeological Survey Results

EDR conducted the current supplemental Phase 1B archaeological survey fieldwork on June 17-19, 2015. Nicholas Freeland, RPA (Project Archaeologist), Sam Holmes, and Emily Stanfill (Archaeological Field Assistants) completed the fieldwork. Weather conditions consisted of warm temperatures with overcast and rainy to partly sunny skies during fieldwork. EDR personnel excavated a total of 163 shovel tests during the course of the current supplemental Phase 1B fieldwork for the Project. The following data sets generated from the current supplemental Phase 1B survey are included in this report:

- Photographs of existing conditions within the Project site during the current supplemental Phase 1B survey (Appendix B).
- A log of all shovel tests excavated during the current supplemental Phase 1B fieldwork (Appendix C).

For the purpose of organizing archaeological fieldwork, EDR divided the Addendum Phase 1B area into four areas (Archaeological Survey Areas 1-4), based on topographic divisions. Transects of shovel tests were each designated with sequential numbers, beginning with "1" within each given survey area. The locations of all shovel tests within each archaeological survey area are shown on Figure 7. Table 3 (below) summarizes the level of effort and results of the Phase 1B survey for each archaeological survey area.

Soil stratigraphy observed in shovel tests throughout the Addendum Phase 1B survey area was relatively consistent (see Appendix C for all shovel test records). Soils in the Project site vicinity range from somewhat poorly drained to well drained (Natural Resources Conservation Service, n.d.). Typical soils in the current supplemental Phase 1B survey area consist of silty to clayey loams with variable gravel and cobble contents (Appendix B: Photograph 12). Hydric mottling was present in the subsoil in some areas within or adjacent to wetlands. Six STPs contained isolated fragments of modern or possibly historic debris such as plastic, brick, cinder block, asphalt, colorless flat glass, and amber bottle glass (see Table 4). Due to the low density and probably modern origins of these artifacts, they were noted but not collected, and are not considered indicative of significant historic cultural deposits.

Table 4. Summary of Current Supplemental Phase 1B Archaeological Survey Results

Archaeological Survey Area	Shovel Tests Excavated	Setting	Results	Photographs (Appendix B)
1	61	Mown lawn, ATV trail through second growth forest. Some steep slopes, inundated areas, and wetlands not tested.	STP 1.17 contained 2 plastic fragments and 1 cinder block fragment (not collected); STP 1.18 contained a small number of plastic and brick fragments (not collected); STP 1.38 contained 1 fragment of colorless flat glass (not collected).	1, 2, 10, 11, 12
2	15	Second growth forest, successional scrubland, mown lawn, and pasture. Some disturbed areas, steep slopes, and areas of denied access not tested.	STP 2.3 contained 1 fragment of colorless flat glass (not collected); STP 2.7 contained decayed asphalt fragments throughout (not collected).	3, 4
3	34	Substation/POI Switchyard parcel. Occurs entirely within a vineyard.	No cultural material.	5, 6
4	53	Second growth forest, successional scrubland, and mown lawn. Some steep slopes, inundated areas, wetlands, and areas of denied access not tested.	STP 4.46 contained 1 fragment of modern amber bottle glass (not collected).	7, 8, 9

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Summary of the Supplemental Phase 1B Archaeological Survey Findings

Previous cultural resources investigations associated with the Project have included a Phase 1 cultural resources survey (Tetra Tech, 2008b), a supplemental Phase 1 archaeological survey (Tetra Tech, 2009b), and an addendum Phase 1 archaeological survey (Tetra Tech, 2008c). The results and recommendations from the previous Phase 1 and Phase 1B reports are summarized in Sections 1.3 and 2.0 of this report.

EDR conducted the current supplemental Phase 1B archaeological survey along a 1.9-mile (3.1-kilometer) segment of the proposed Generator Lead Line and the adjacent proposed 2-acre substation/POI switchyard parcel in the northwestern portion of the Project Site. Following the supplemental Phase 1B archaeological survey, a 0.4-mile (0.6-kilometer) portion of the Generator Lead Line was eliminated from the proposed Project and a 0.1-mile 0.2-kilometer portion of the Generator Lead Line was relocated slightly (see Figures 2 and 7). The current addendum Phase 1B survey described herein consists of the excavation of 163 STPs. STPs were excavated at a 50-foot (approximately 15-meter) interval throughout the Project site, which consisted of second growth forest, successional scrubland, pastures, lawns, and a vineyard.

The results of the current supplemental Phase 1B archaeological survey are summarized as follows:

- In total, EDR personnel excavated 163 shovel tests during the course of the current supplemental Phase 1B survey at 50-foot (15-meter) intervals.
- Several areas of inundation, steep slopes, heavy disturbance, or refused access were excluded from the survey, as were most mapped wetlands.
- EDR identified no archaeological resources during the current supplemental Phase 1B archaeological survey.

4.2 Recommendations

Based on the results of this supplemental Phase 1B archaeological survey, it is the opinion of EDR that the expanded APE for the Arkwright Summit Wind Project will not affect any significant archaeological resources. The recommendations laid out in the previous cultural resources survey reports (Tetra Tech, 2008b; 2009b; 2009c) and concurred with by the NYSOPRHP, including the management recommendations and avoidance distances suggested in Table 3 of this report, should be adhered to, and no additional archaeological survey should be required for the Project.

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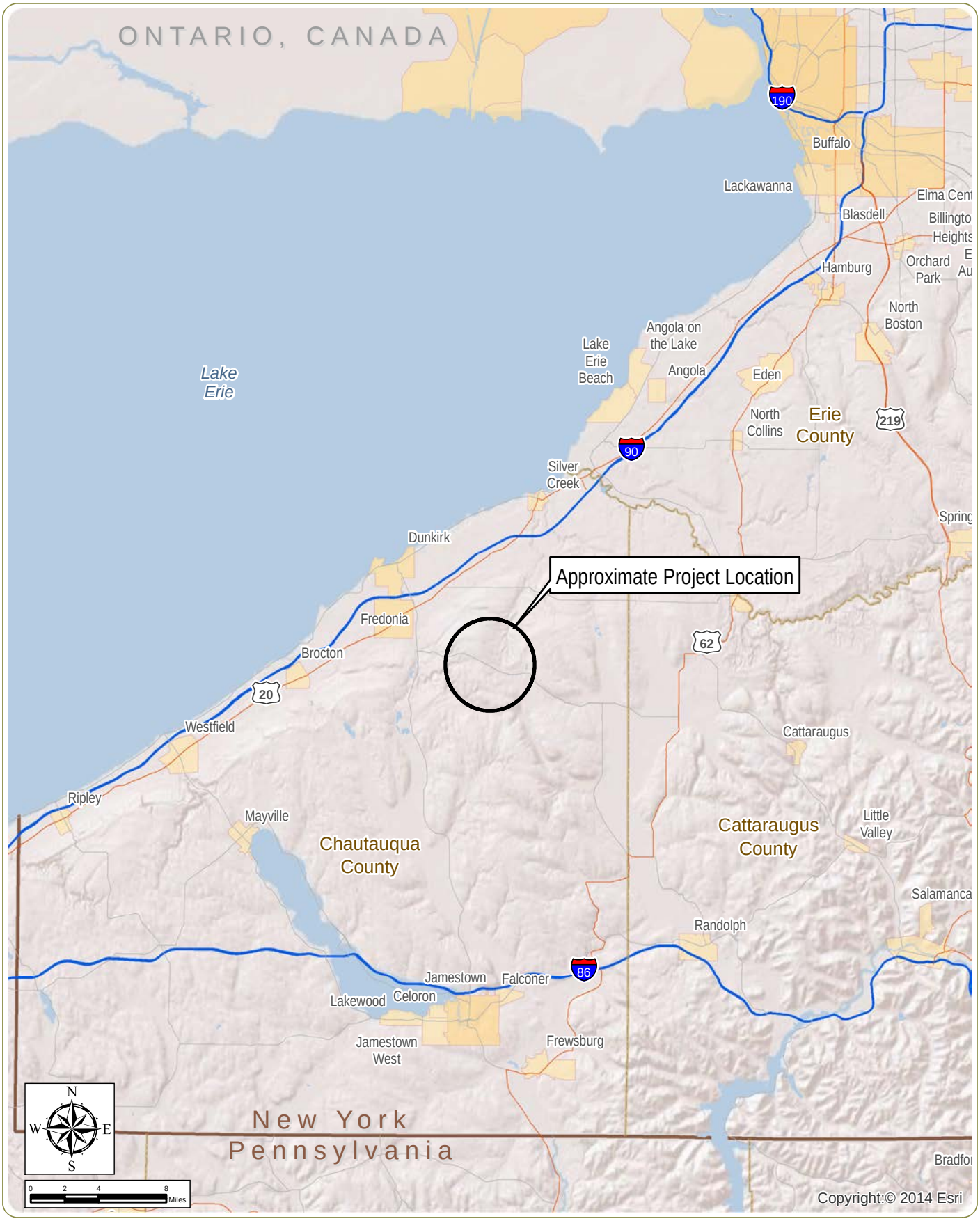
Figures



Arkwright Summit Wind Farm

Towns of Arkwright and Pomfret - Chautauqua County, New York

Figure 1: Regional Project Location

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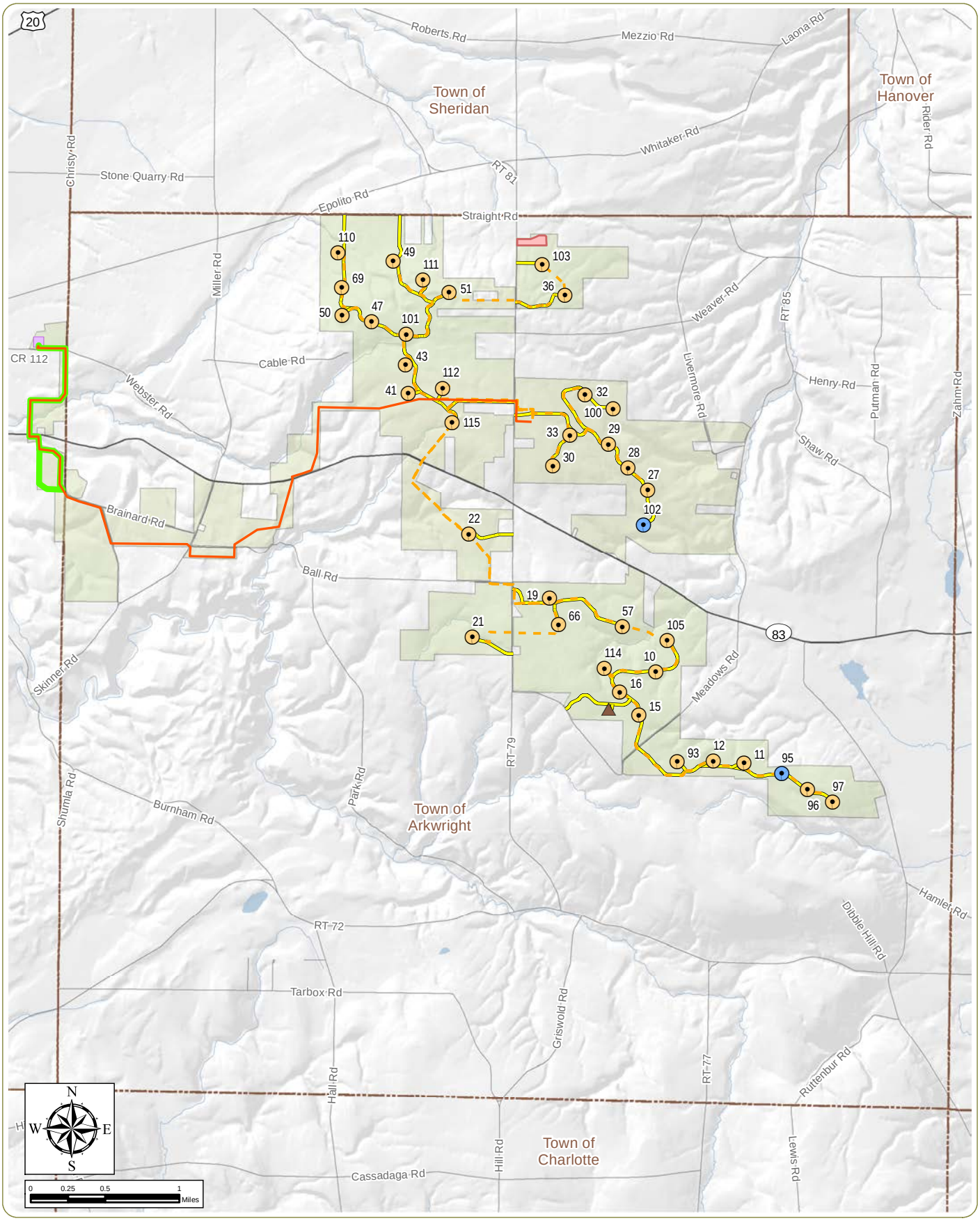
Notes: 1. Basemap: ESRI ArcGIS Online "World Shaded Relief" Map Service and ESRI StreetMap North America, 2008.
2. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Arkwright Summit Wind Farm

Towns of Arkwright and Pomfret - Chautauqua County, New York

Figure 2: Revised Project Layout

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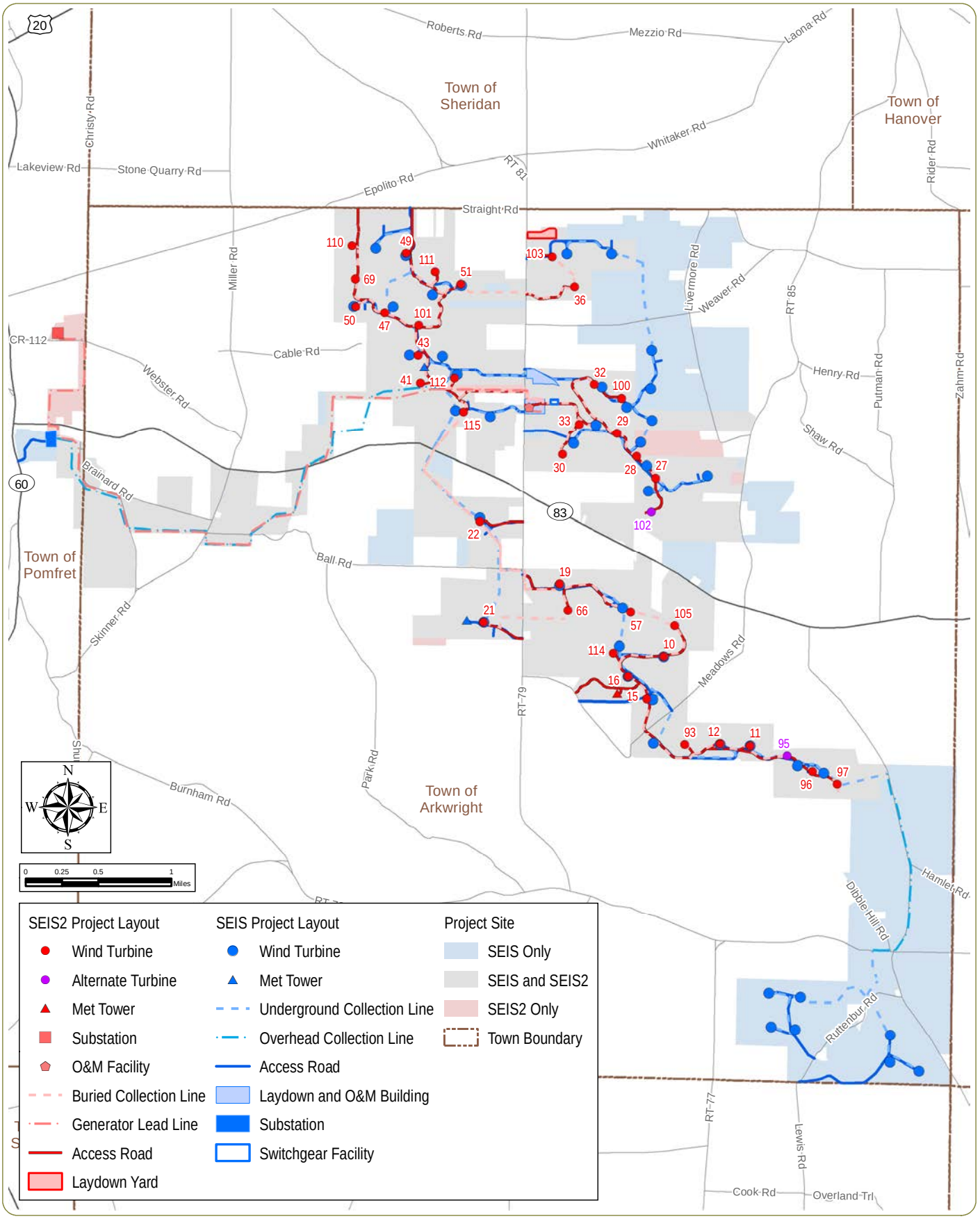
Notes: 1. Basemap: Hillshade generated from USGS digital elevation model data and ESRI StreetMap North America, 2008
2. This is a color graphic. Reproduction in grayscale may misrepresent the data.

- Wind Turbine
- Alternate Wind Turbine
- Met Tower
- Substation
- Buried Collection Line
- Generator Lead Line
- Access Road
- Laydown Yard
- Supplemental Phase 1B Survey Area
- Project Site
- Town Boundary



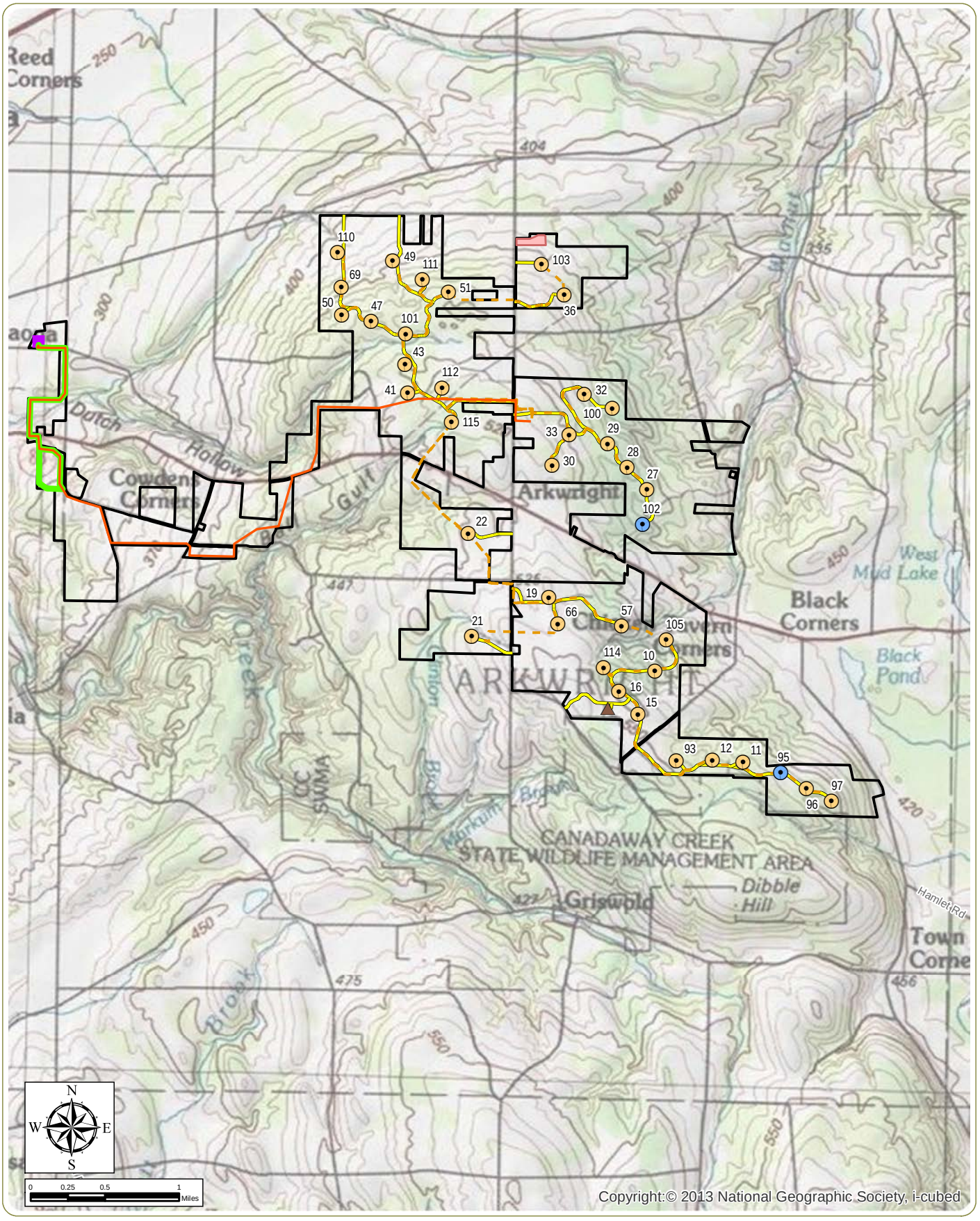
Arkwright Summit Wind Farm

Towns of Arkwright and Pomfret - Chautauqua County, New York

Figure 3: Project Layout Comparison

September 2015

Notes: 1. Basemap: ESRI StreetMap North America, 2008.
2. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Arkwright Summit Wind Farm

Towns of Arkwright and Pomfret - Chautauqua County, New York

Figure 4: Project Site Topography

September 2015

Notes: 1. Basemap: ESRI ArcGIS Online"USA Topo Maps" Map Service.
2. This is a color graphic. Reproduction in grayscale may misrepresent the data.

- Wind Turbine
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- Project Site
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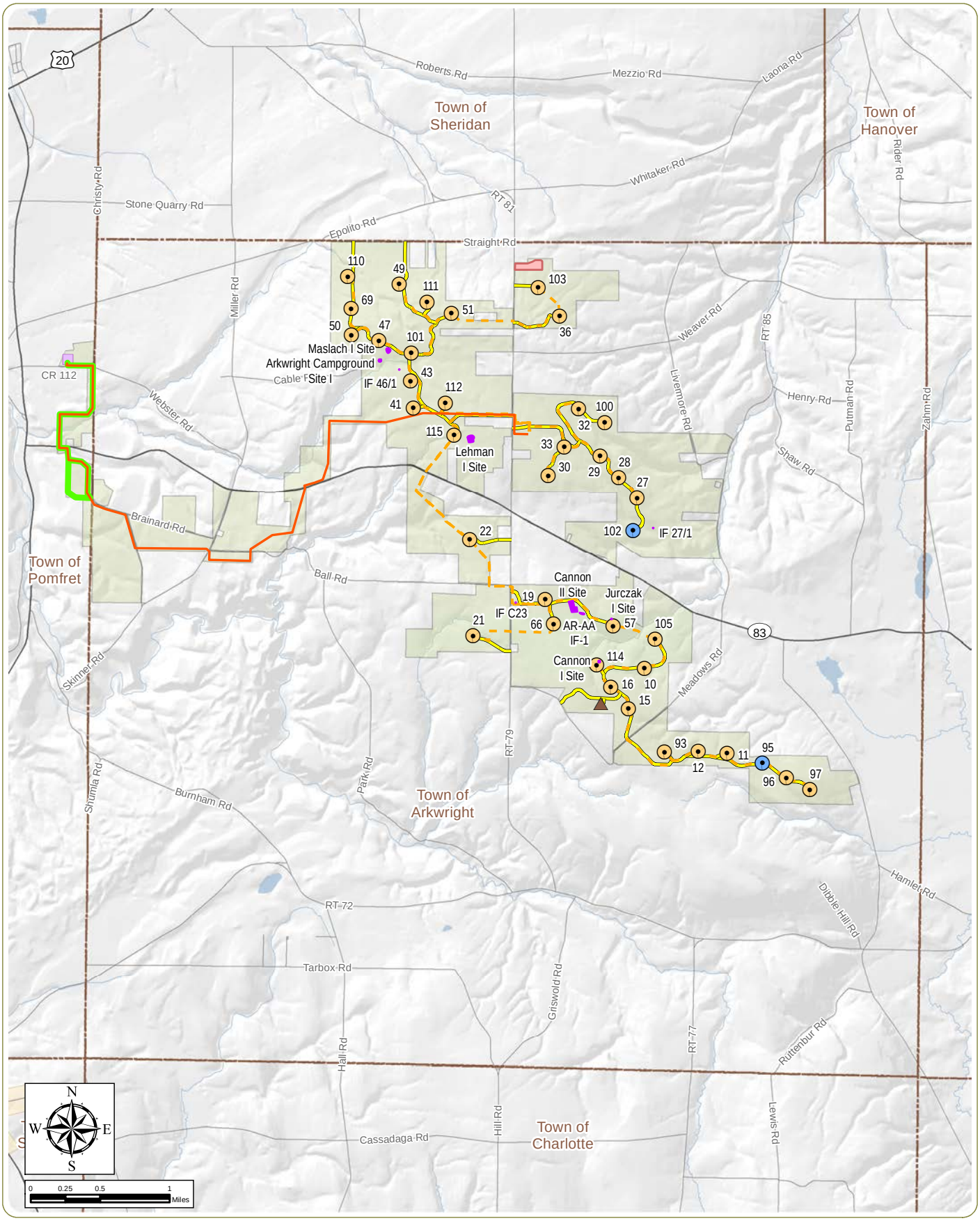
ARKWRIGHT SUMMIT WIND FARM

edr



Arkwright Summit Wind Farm

Towns of Arkwright and Pomfret - Chautauqua County, New York

Figure 5: Previously Identified Archaeological Resources

September 2015

Notes: 1. Basemap: Hillshade generated from USGS digital elevation model data and ESRI StreetMap North America, 2008
2. This is a color graphic. Reproduction in grayscale may misrepresent the data.

- Previously Identified Archaeological Resources
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- Substation
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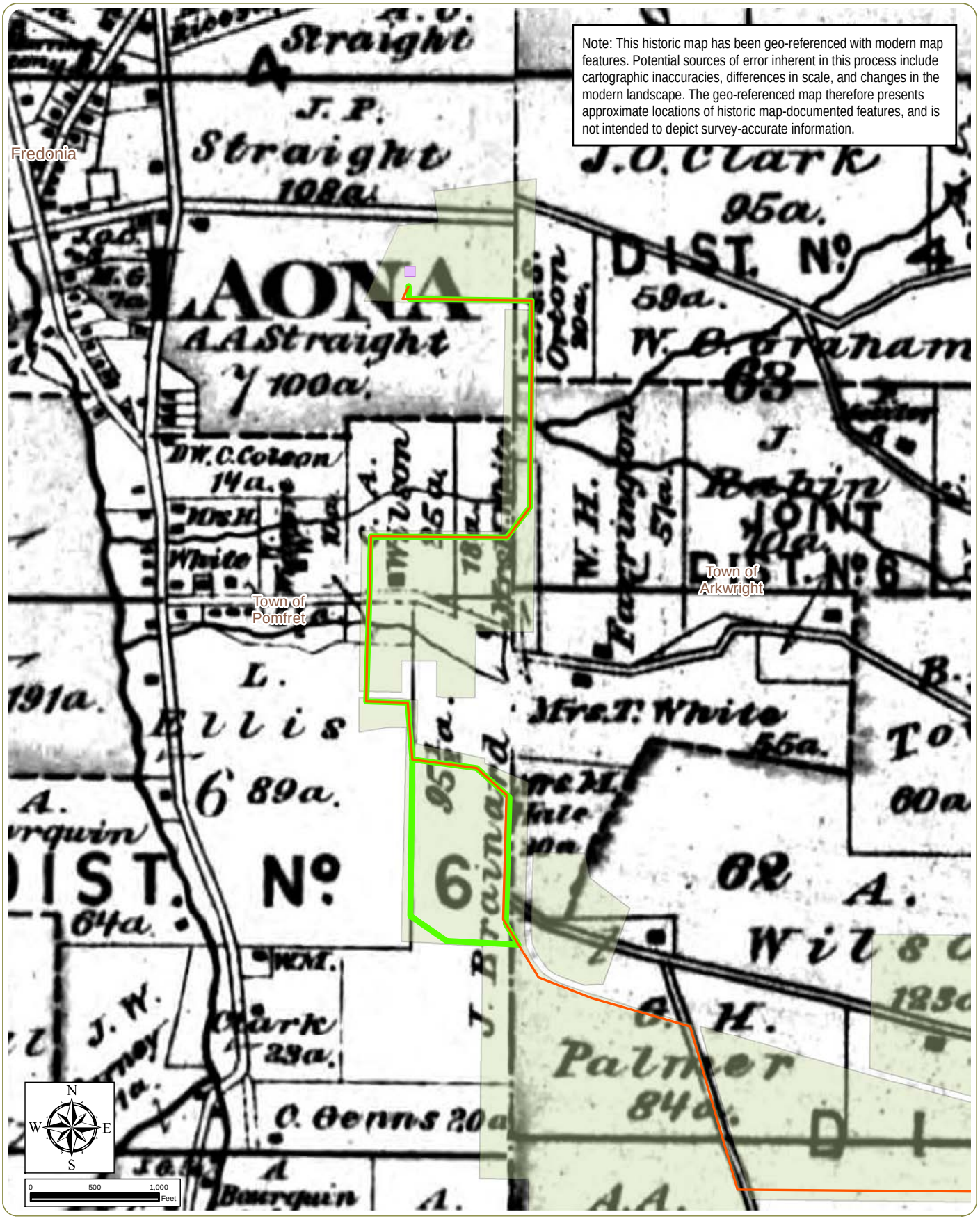


Arkwright Summit Wind Farm

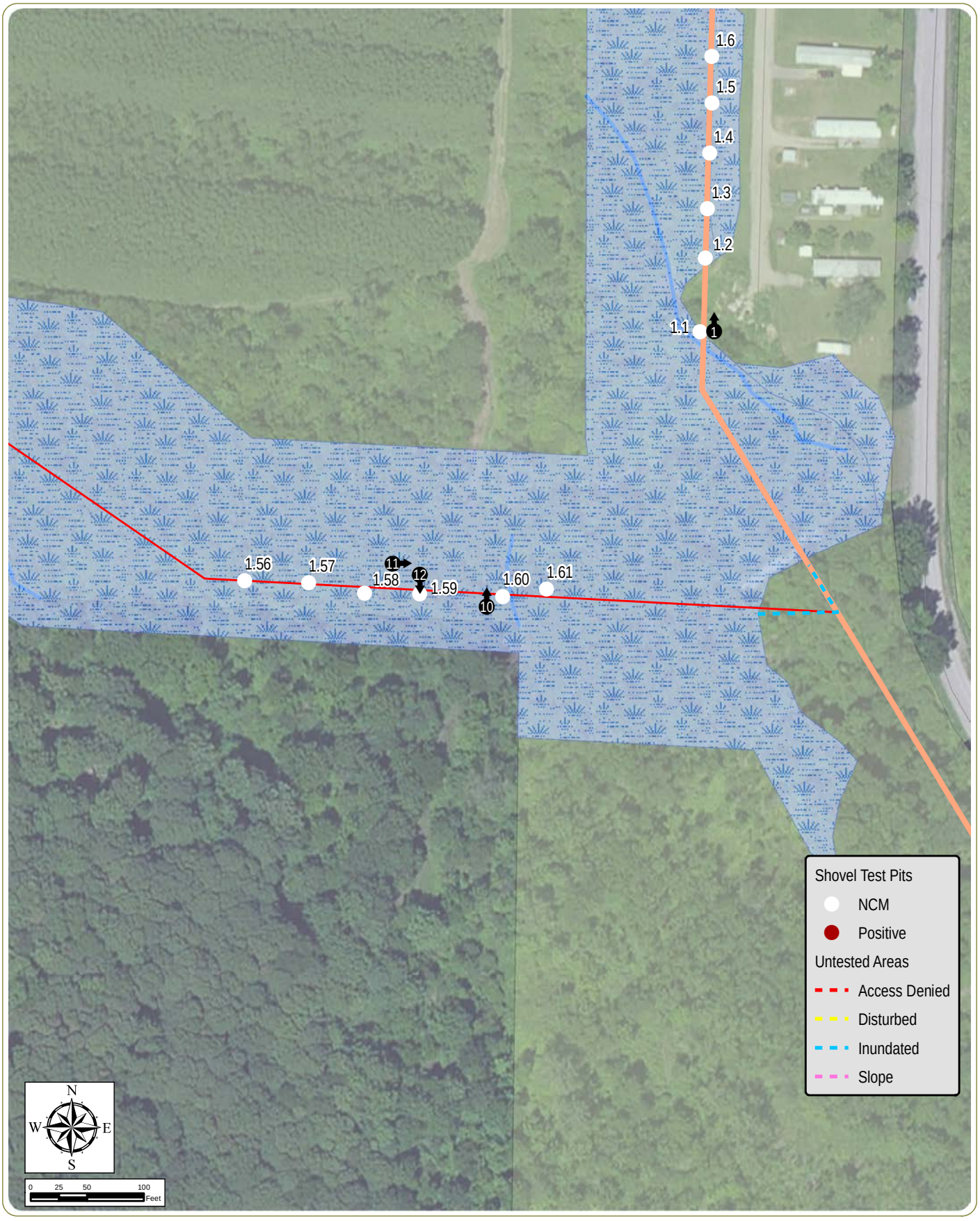
Towns of Arkwright and Pomfret - Chautauqua County, New York

Figure 6: 1881 Beers Map of Chautauqua County

September 2015

Notes: 1. Basemap: F.W. Beers 1881 Chautauqua County Atlas
StreetMap North America, 2008
2. This is a color graphic. Reproduction in grayscale may misrepresent the data.

- Supplemental Phase 1B Survey Area
- Generator Lead Line
- Substation
- Project Site



Arkwright Summit Wind Farm

Towns of Arkwright and Pomfret -
Chautauqua County, New York

Figure 7: Archaeological Survey Results

September 2015

Notes: 1. Basemap: ESRI ArcGIS Online "World Imagery" Map Service.
2. This is a color graphic. Reproduction in grayscale may misrepresent the data.

- Photograph Locations
- Wind Turbine
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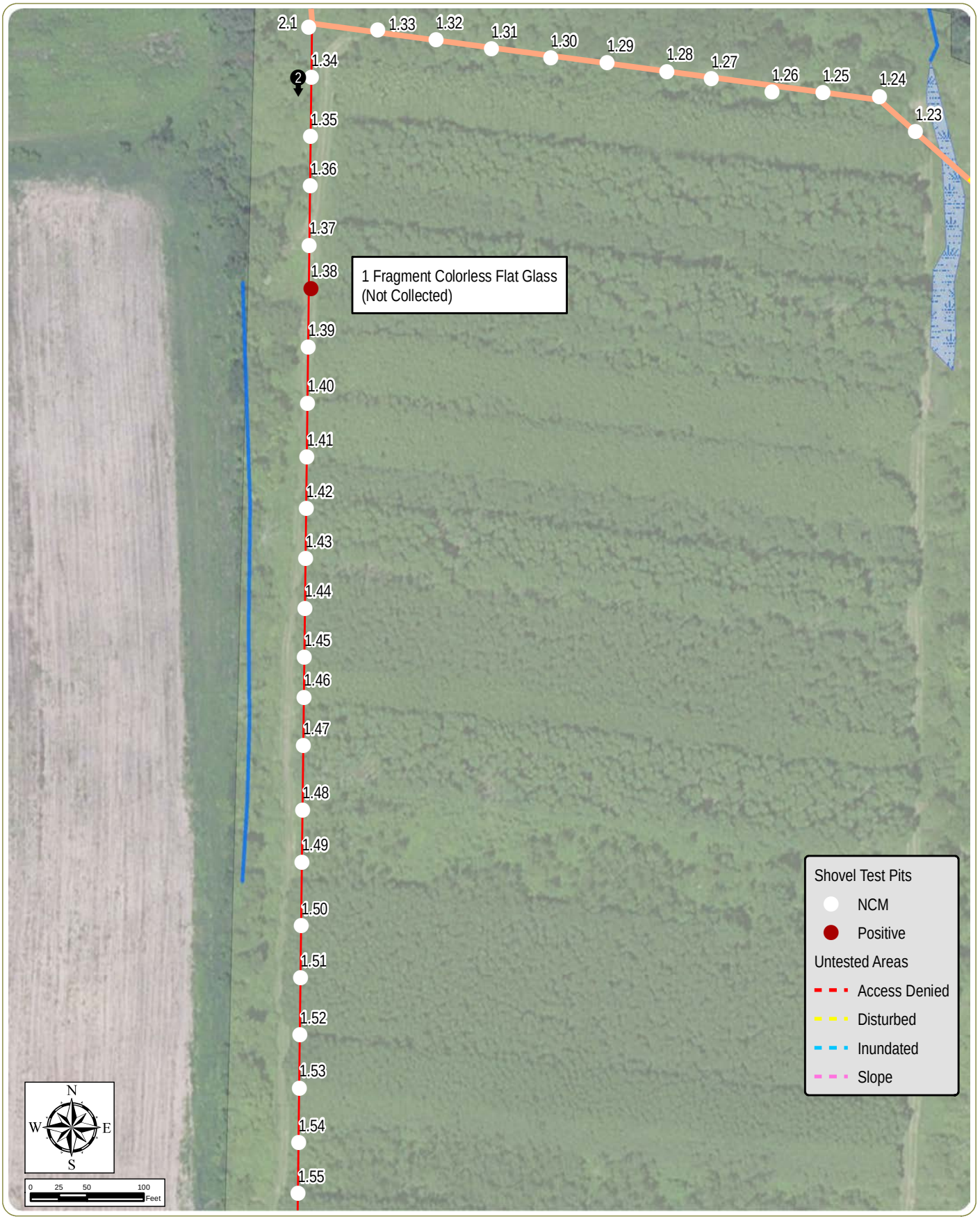

Arkwright Summit Wind Farm

Towns of Arkwright and Pomfret -
Chautauqua County, New York

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September 2015

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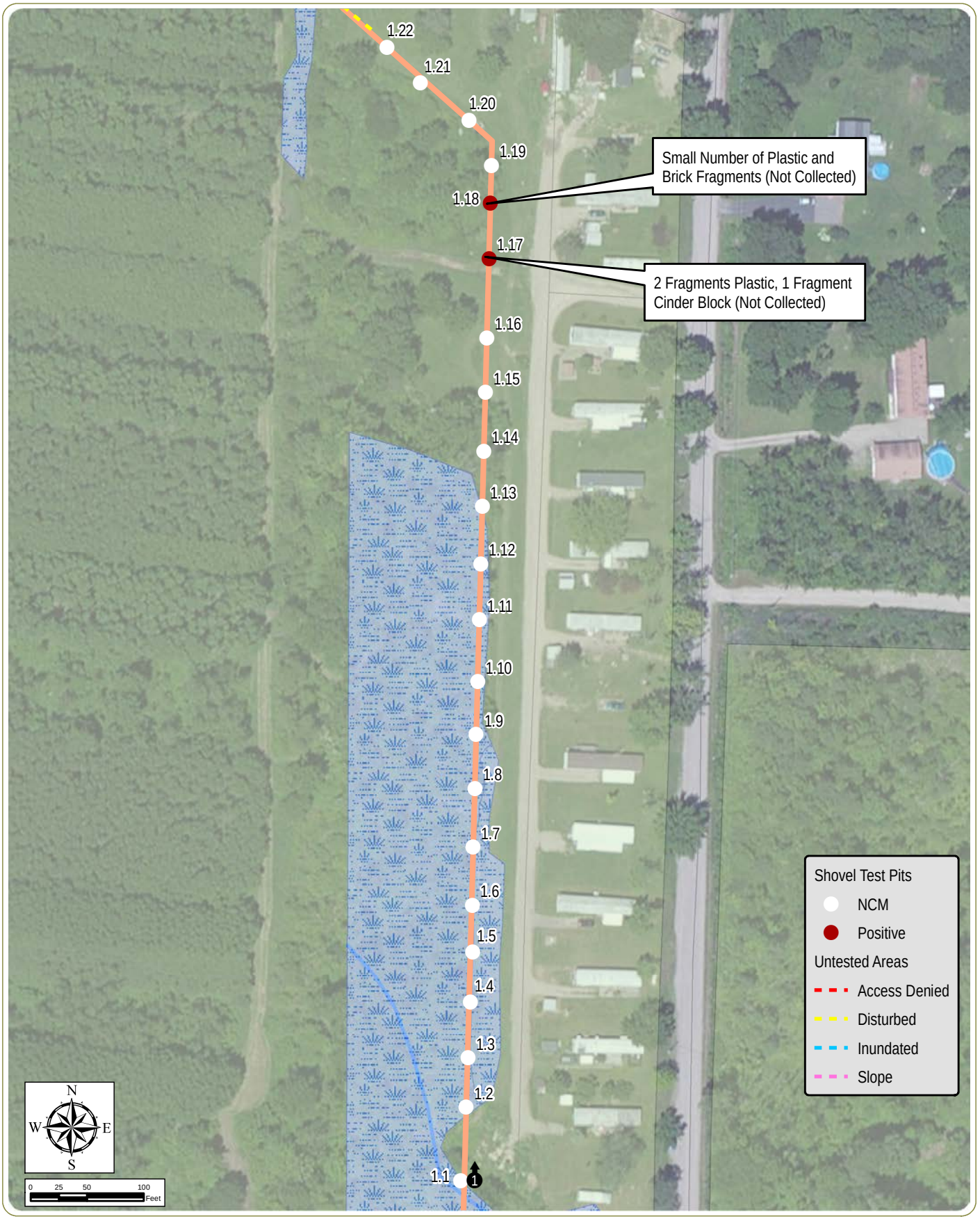

Arkwright Summit Wind Farm

Towns of Arkwright and Pomfret -
Chautauqua County, New York

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September 2015

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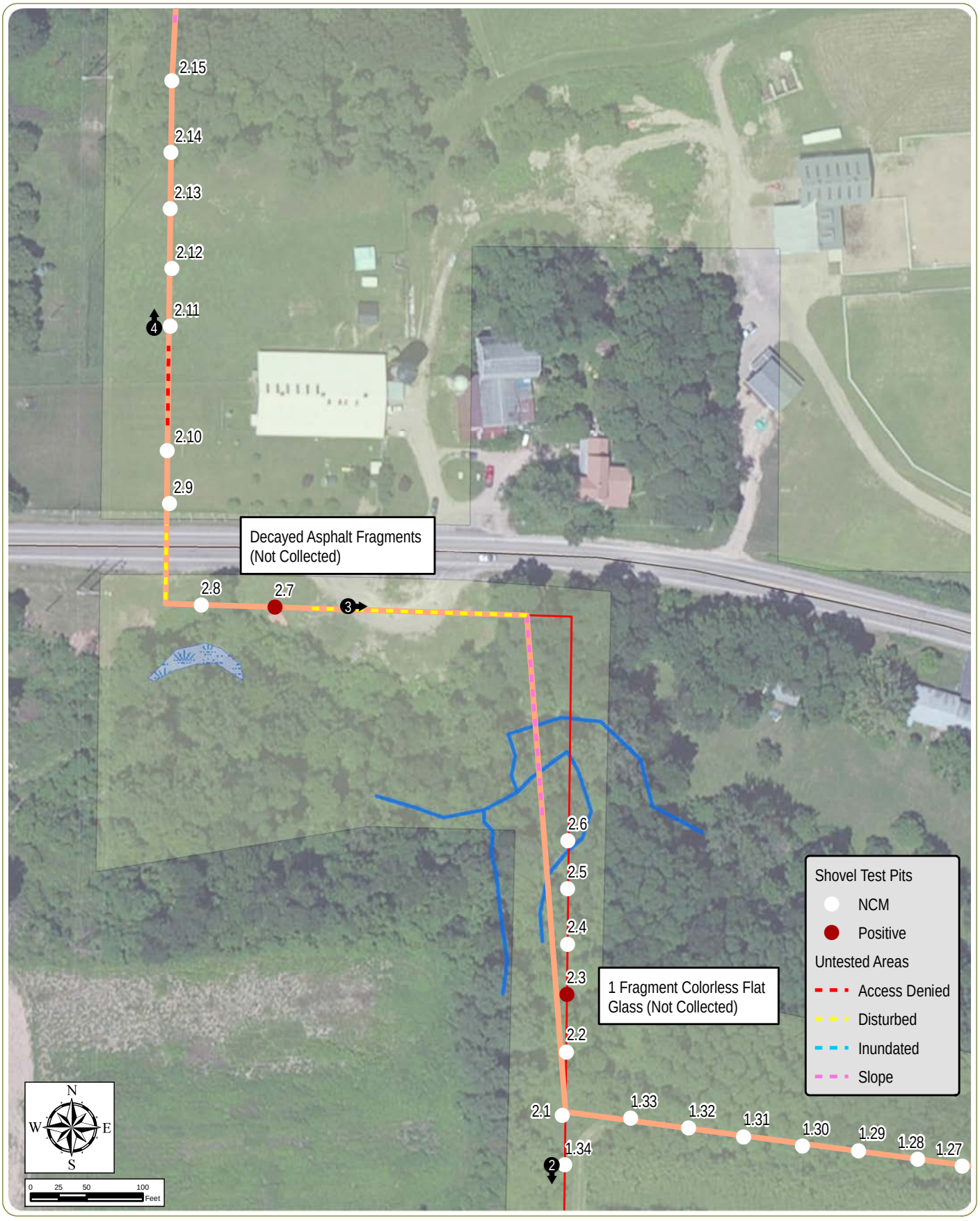

Arkwright Summit Wind Farm

Towns of Arkwright and Pomfret -
Chautauqua County, New York

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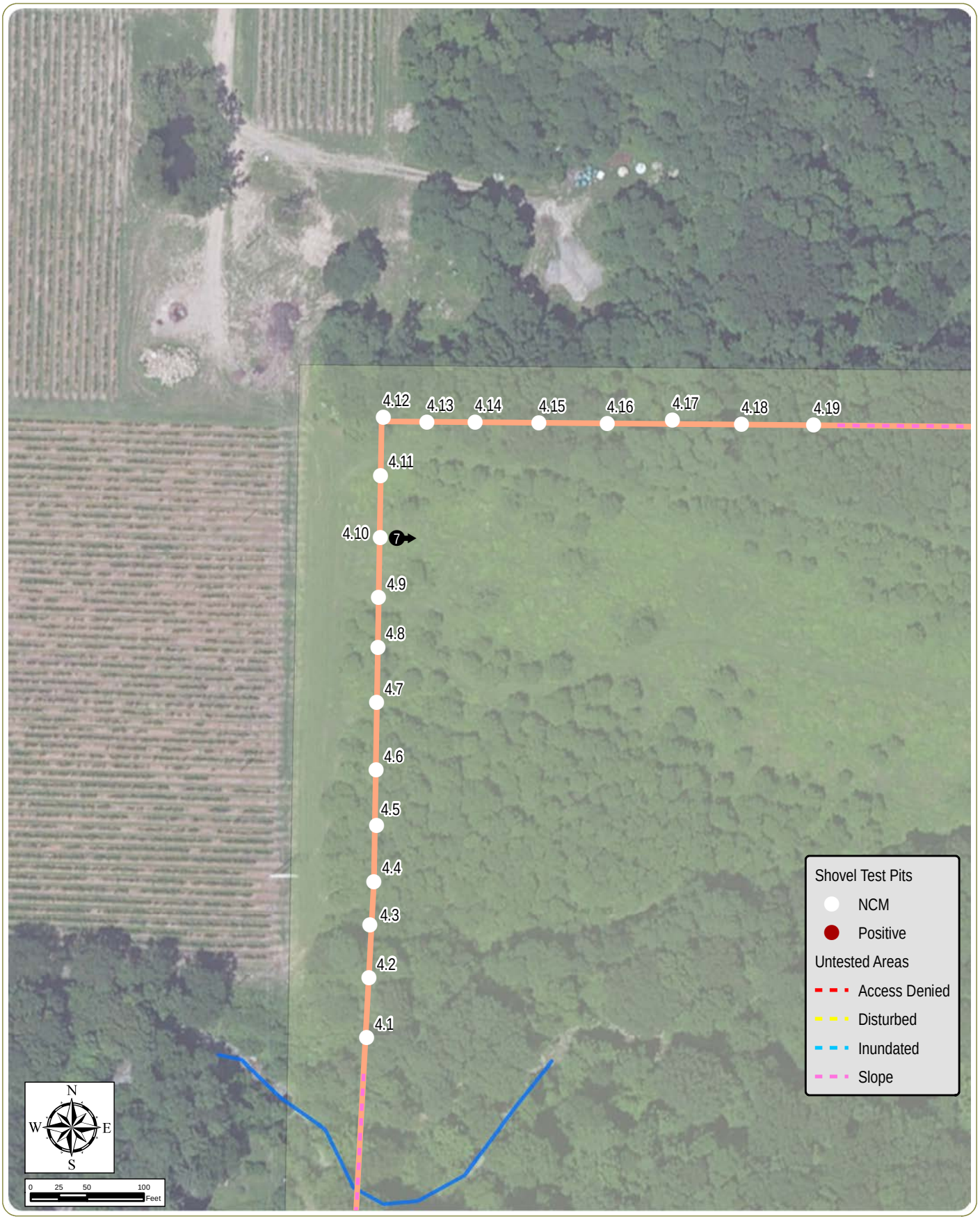

Arkwright Summit Wind Farm

Towns of Arkwright and Pomfret -
Chautauqua County, New York

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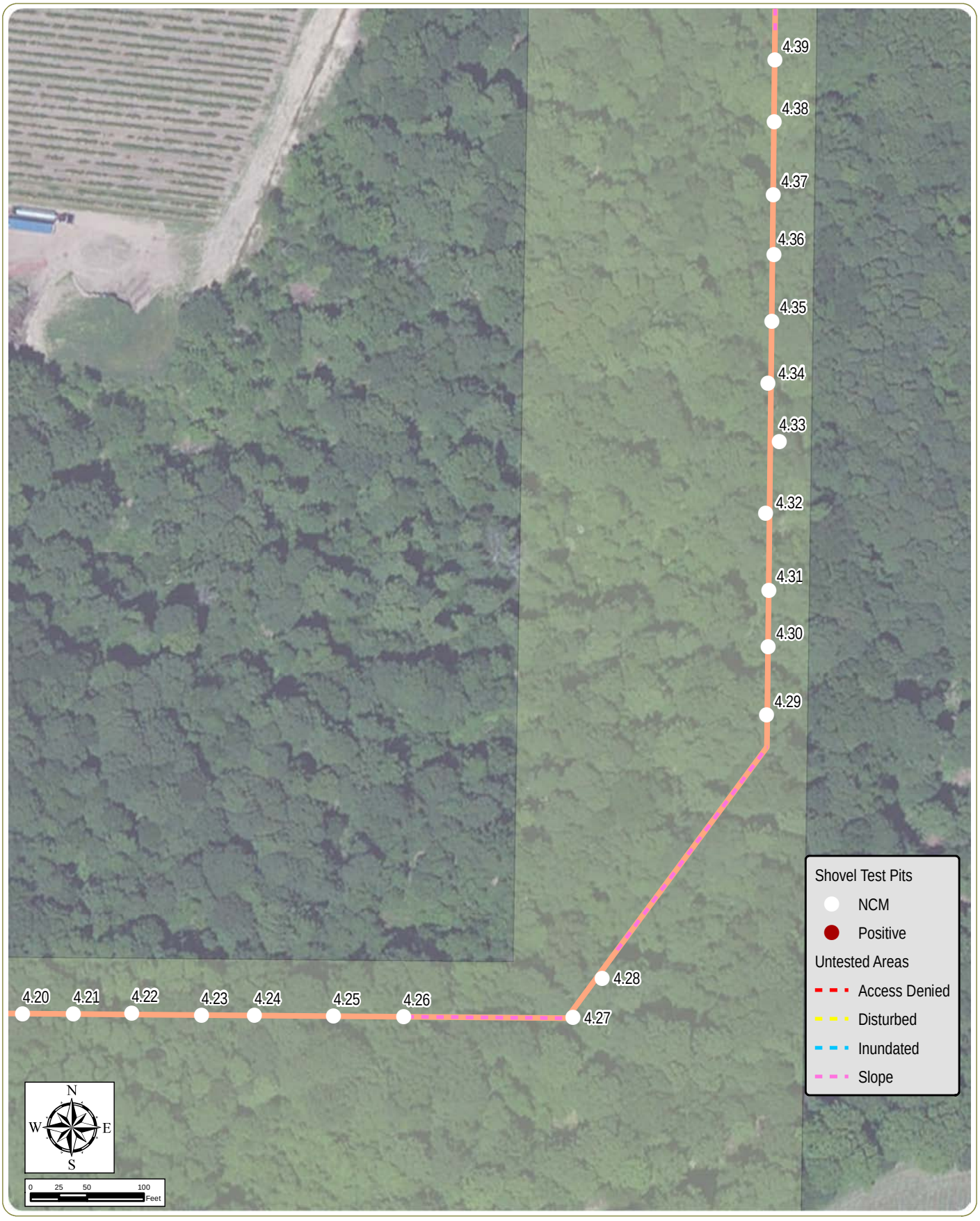

Arkwright Summit Wind Farm

Towns of Arkwright and Pomfret -
Chautauqua County, New York

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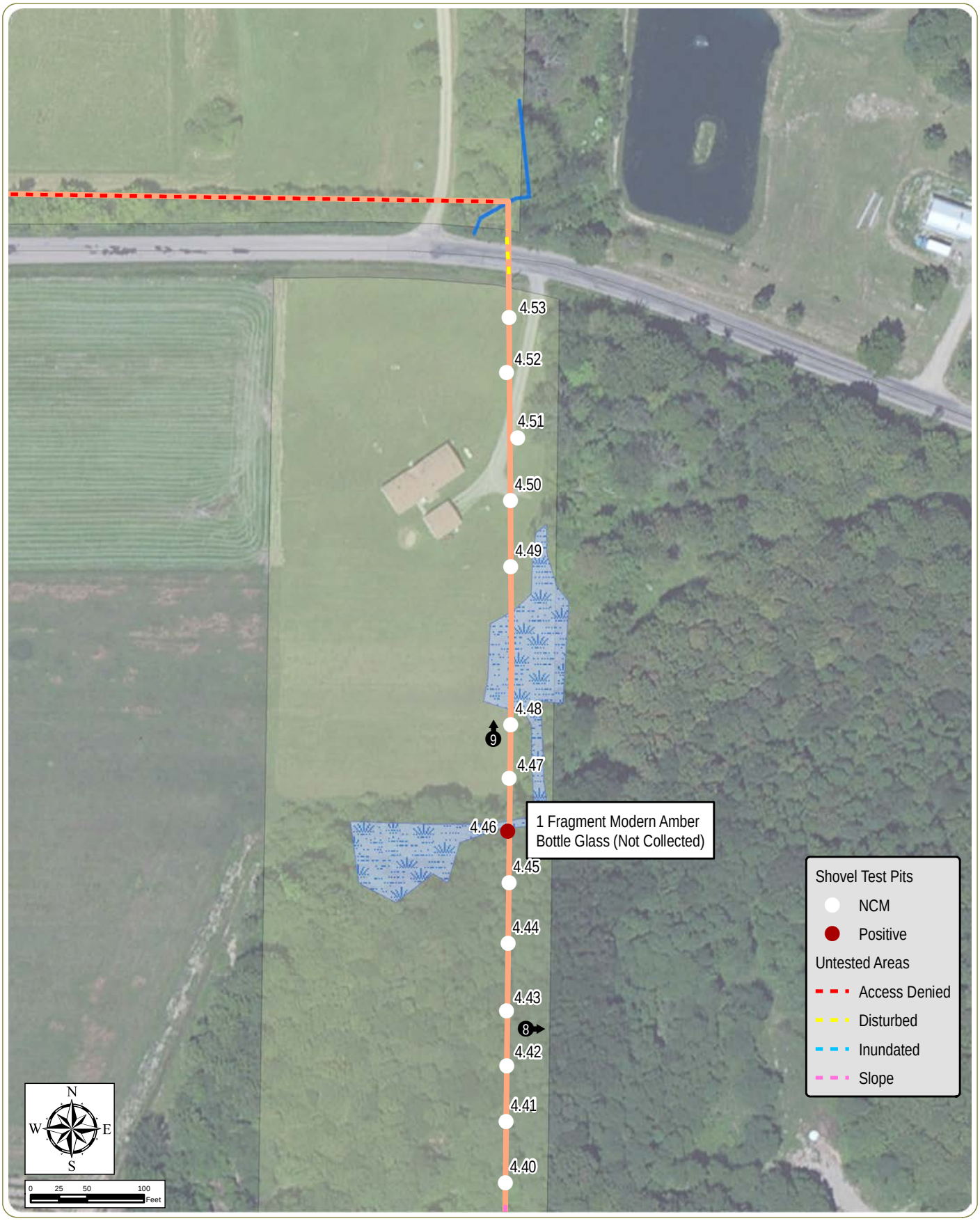

Arkwright Summit Wind Farm

Towns of Arkwright and Pomfret -
Chautauqua County, New York

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Arkwright Summit Wind Farm

Towns of Arkwright and Pomfret -
Chautauqua County, New York

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Wetlands
Project Site

Appendix A:

NYSOPRHP Correspondence

New York State Historic Preservation Office Correspondence

Bonnie Locking

From: Nancy.Herter@oprhp.state.ny.us
Sent: Wednesday, November 14, 2007 11:22 AM
To: blocking@neanewyork.com
Subject: RE: New Windfarm Project in Chautauqua County

Bonnie,

The SHPO's recommendation is that you either:

1. Follow the NYAC Standards and the SHPO Phase I Report Guidance. This would mean that you would continue testing the project area at a 100% with a 15 m (50 ft) shovel test interval.

2. Submit a Phase IB Scope-of-Work based on the SHPO's Windfarm Guidance. I can send you an example if you would like. If this is the case, you would be using a 5 m shovel test interval and concentrating these tests in a portion of the project area.

Thank you,
Nancy

Nancy Herter
Historic Preservation Archaeology Analyst New York State Historic Preservation Office PO Box 189, Peebles Island Waterford, New York 12188-0189
(518) 237-8643 ext. 3280
(518) 233-9049 (fax)

-----Original Message-----
From: Bonnie Locking [mailto:blocking@neanewyork.com]
Sent: Thursday, November 08, 2007 4:56 PM
To: Herter, Nancy (PEB)
Subject: New Windfarm Project in Chautauqua County

Dear Nancy:

Per our conversation, NEA, Inc. (NEA) has been contracted by Horizon Wind Energy (Horizon) to conduct cultural resource surveys in association with their proposed Wind Energy Project in the Town of Arkwright, Chautauqua County, New York. The project consists of the construction of 40 wind turbines and several miles of access roads and circuit transits. While most of the proposed turbine locations have been sited, none of the access roads or circuit transits has been determined at this time. NEA conducted a critical issues analysis for the proposed Project in Spring 2007. Part of the analysis consisted of a site file search (conducted by Ed Curtin Consulting). While no archaeological sites were located within the project area, several were located within 1 mile of the project boundaries. No portion of the project area has been previously surveyed.

At this time NEA has begun full Phase IA and limited Phase IB investigations. While on the OPRHP website I reviewed the NYSHPO?s Guidelines for Wind Farm Development Cultural Resources Survey Work.
While some aspects of the investigations have begun prior to NYSHPO consultation, they are nevertheless within the presented Guidelines.

Horizon had initially identified approximately 48 potential turbine site locations (see attached figure). Each turbine site location has the potential to impact a 3-acre area resulting in an APE of approximately
144 acres. Of the 48 potential turbine locations, 40 will be chosen based on suitability, including impacts to natural and cultural resources. Phase IA level investigations have been completed at all of the 48 initially identified locations and included reconnaissance survey (visual assessment, site walkover, and photodocumentation), background research (environmental and historical), and an archaeological sensitivity assessment (based on

slope, soils, accessibility, drainage, vantage, defensibility, proximity to aquatic and terrestrial resources, proximity to potable water, protection from prevailing winds, and proximity to sources of techno-economic materials). A summary of the results of the Phase IA investigations is presented in the attached table. In a number of cases, simultaneous Phase IB investigations were conducted in areas determined highly sensitive that also contained natural resources. In these areas, archaeological investigations were crucial in determining if the potential area was suitable for a turbine location. In all cases, investigations consisted of shovel test pit excavations at 7.5-15 m intervals based on slope, extent of previous disturbance, and proximity to wetlands/waterbodies. Ten locations were tested thus far. Five of the potential turbine sites were positive for prehistoric archaeological sites, of which two resulted in isolated finds and three of which NEA is recommending avoidance or Phase II evaluations. In the event of a positive STPs, NEA followed NYSHPO standards (May 2005) and excavated 8 radial STPs. Where appropriate,
site boundaries were delineated by testing at 5 m intervals. A summary
of the results is presented in the attached table.

Finally, the attached table also includes recommendations for the remaining turbine locations following NYSHPO guidelines.
Recommendations for Phase IB testing were based on archaeological sensitivity, observed disturbances, and extent of slope. Approximately 70% of each environmental zone is recommended for Phase IB testing.
Recommended testing intervals are based on the criteria presented above and specific to each proposed turbine location. A number of turbine site relocations have been and currently are being made and/or planned based on other environmental surveys. The same methodology and guidelines will be applied to the new locations as they become available. Furthermore, once access roads and circuit transits are determined they also will be subject to the same methodology and guidelines.

As we discussed, I would like to be compliance with NYSHPO Guidelines and look to your office for consultation and recommendations regarding further testing going forward. The best way to reach me is by cell phone 716-903-4172. I look forward to hearing from you.
Sincerely,
Bonnie L. Locking
Principal Archaeologist

PS - I have reviewed the Guidelines for the Architectural Survey. NEA plans on conducting this portion of the cultural resources investigation in the upcoming Spring and will again look to the NYSHPO for consultation and recommendations.

Bonnie L. Locking
Archaeological Services Group
Northern Ecological Associates, Inc.
10 Lafayette Square
16th Floor
Buffalo, NY 14203
716-849-9419
716-849-9420 (fax)
716-903-4172 (cell)

NEA
NORTHERN ECOLOGICAL ASSOCIATES, INC.

CONTACT REPORT

TO:		**FROM:**	
DATE:	11/14/07	**NEA FILE:**	HWE-100/121
CONTACT:	Nancy Herter	**TITLE:**	Historic Preservation Archaeology Analyst
COMPANY:	NYS Office Parks, Recreation, & Historic Preservation	**ADDRESS:**	PO Box 189
CITY:	Peebles Island	**STATE, ZIP**	NY, 12188
PHONE:	518-237-8643 x3280	**FAX:**	518-233-9049
E-MAIL:	Nancy.Herter@oprhp.state.ny.us	**MOBILE:**	
CC:		**PROJECT, PROPOSAL, OR MARKETING EFFORT**	

SUMMARY:

Discussed with N. Herter the OPRHP's guidance and recommendations for Phase I field methodology for the New Grange Wind Farm Project in response to email received 11/14/07. N. Herter stated that it is the preference of the OPRHP that we continue the proposed methodology (bullet #1). She also requested that I reference the email outlining the methodology and this phone conversation in the final Phase I report.

ACTION STEPS:

NEA
NORTHERN ECOLOGICAL ASSOCIATES, INC.

CONTACT REPORT

TO:		**FROM:**	
DATE:	11/14/07	**NEA FILE:**	HWE-100/121
CONTACT:	Nancy Herter	**TITLE:**	Historic Preservation Archaeology Analyst
COMPANY:	NYS Office Parks, Recreation, & Historic Preservation	**ADDRESS:**	PO Box 189
CITY:	Peebles Island	**STATE, ZIP**	NY, 12188
PHONE:	518-237-8643 x3280	**FAX:**	518-233-9049
E-MAIL:	Nancy.Herter@oprhp.state.ny.us	**MOBILE:**	
CC:		**PROJECT, PROPOSAL, OR MARKETING EFFORT**	

SUMMARY:

Contacted N. Herter regarding mound with looter's pit located on T47R. She suggested not disturbing it further. Photograph, document, STP off mound, profile looter's trench, and fill trench to prevent further disturbance.

ACTION STEPS:

OFFICE OF PARKS · RECREATION · HISTORIC PRESERVATION
NEW YORK STATE

New York State Office of Parks, Recreation and Historic Preservation

Historic Preservation Field Services Bureau • Peebles Island, PO Box 189, Waterford, New York 12188-0189
518-237-8643
www.nysparks.com

Eliot Spitzer
Governor

Carol Ash
Commissioner

February 4, 2008

Mr. Daniel A. Spitzer
Hodgen Russ, LLP
140 Pearl Street, Suite 100
Buffalo, NY 14202-4040

Re: SEQRA New Grange Wind Farm
Arkwright, Chautauqua County
08PR00564

Dear Mr. Spitzer:

Thank you for providing this office with a copy of the town of Arkwright's review of the proposed New Grange Wind Farm zoning overlay material.

As the state agency responsible for the assessment of the state's historic and cultural resource, we welcome an opportunity to work with your client town in providing comments/guidance on the potential impacts to historic/cultural properties associated with the development of a wind farm.

We have enclosed a copy of the scope of cultural resources survey work that is recommended by this office. These guidelines would be the minimum level of review that would be acceptable to this office.

If you, or your client community would like to discuss the scope of work or have any questions, please do not hesitate to contact me at 518-237-8643, ext.3263.

Sincerely,

John A. Bonafide
Historic Preservation Services
Coordinator

enc: NYSHOP Wind Farm Survey Guide

cc: Ms. Janice Rundell, Arkwright Town Clerk
Mr. Patrick Doyle, New Grange Wind Farm, LLC
Steve Metivier, ACOE

New York State Historic Preservation Office
Guidelines for Wind Farm Development Cultural Resources Survey Work

The New York State Historic Preservation Office has established the following guidelines for the assessment of historic and cultural resources associated with the development of wind farm projects in New York State.

Survey for Historic Buildings

1. Establish a five-mile Area of Potential Effect (APE) around the project site.
    i. Establish boundary of APE using topographic survey to determine where project may be visible from.

2. Conduct field survey within the positive visual APE as defined by topographic study.

3. Using NYSHPO data, the survey will initially identify all buildings/sites within the study area that were previously determined eligible for inclusion in or are already listed in the New York State and National Registers of Historic Places.

4. The survey will assess all buildings 50 years old or older within the study area. Surveyors will determine potential State and National Register eligibility of each resource using the National Register Criteria for Evaluation.
    i. Surveyor will schedule a meeting with NYSHPO staff prior to undertaking survey work to verify the APE.
    ii. Surveyor will schedule a meeting with NYSHPO staff after completion of survey of mile-1 "ring" of study area to verify eligibility determination methodology. Meeting will review properties determined eligible and will provide a sampling of resources determined not-eligible.
    iii. After evaluation methodology is verified by the NYSHPO, survey of remaining APE area will be completed.
    iv. All properties previously listed in the State and/or National Registers in addition to all properties determined eligible prior to the survey and as part of the project survey are to be marked using a single GPS point. The single point should be taken at the edge of the property generally at the mid-point of the property's street frontage.
    v. The GPS data will be linked to the street address and/or SHPO Unique Site Number (if one already exists).
    vi. All survey data will be provided to the NYSHPO in a standardized format that will be discussed at the initial pre-survey meeting.

Archaeological Survey

1. Phase I Archaeological Survey is recommended for all wind farm project areas.

2. Archaeological Survey will be limited to the *Archaeological* Area of Potential Effect (APE) associated with the construction of the project. This smaller core of the project APE is composed of areas that will experience ground disturbing activity during the construction phase of the project. These areas include but are not limited to:
    i. Turbine sites
    ii. Construction staging areas
    iii. Borrow pits
    iv. New/Access Roads
    v. Utility corridors
    vi. New building locations
    vii. Other areas where the current ground surface may be modified as a result of the project.

3. Phase I survey will be conducted by sampling Environmental Zones. Necessary steps in this process include:
    i. Determining the total acreage of the *Archaeological* APE.
    ii. Determining the total number of shovel tests recommended for the *Archaeological* APE by multiplying the acreage by 16 shovel tests per acre.
    iii. Identifying the various environmental zones within the *Archaeological* APE following Robert E. Funk's 1993 work, *Archaeological Investigations in the Upper Susquehanna Valley, New York State* (Chapter 5).

4. Once the zones are defined, the archaeological consultant will divide up the total number of shovel tests previously determined and apply an equal percentage of tests to each defined environmental zone. Any previously identified archaeological site(s) or map documented structure (MDS) must be included in the Phase IB testing.

5. Within each zone shovel testing will be conducted using a five meter interval or other acceptable methods such as plowing/disking for previously plowed farm land.

6. Prior to implementing a proposed testing methodology the project consultant will schedule a meeting with SHPO staff to consult on the proposed plan. A copy of the plan will be provided for SHPO staff review in advance of the meeting.

7. Sites, identified as part of the survey process will be documented using standard practices (such as site forms or approved data bases) and will all be located using a single GPS point.

8. Once the Phase I survey is completed a report will be provided to the SHPO using the established New York SHPO Phase I Archaeological Report Format Requirements and the Standards for Cultural Resource Investigations and the Curation of Archaeological Collections in New York State.

Electronic Survey Data

1. Project sponsors will provide the following data sets to the SHPO as part of their submission. Sponsors or their consultants should contact the SHPO staff to verify specific data requirements.
    i. GIS data coverage defining the five-mile survey area.
    ii. GIS data locating (as best as practical) each of the proposed tower locations.
    iii. GPS data locating by singe point each building, structure, object or site identified as being eligible for or listed in the New York State and/or National Registers of Historic Places.
    iv. GIS data locating the boundary of all archaeologically tested areas.
    v. Final archaeological reports should be provided in bound format (see New York SHPO Phase I Archaeological Report Format Requirements) as well as in PDF format on CD.

2. Project's consultant should contact SHPO staff to determine exact format of data to be submitted.

For more information about the New York State Historic Preservation Office, please call us at 518-237-8643 or visit our web site at **http://nysparks.state.ny.us** then select **HISTORIC PRESERVATION.** Select the **On Line Resources** option to find specific information regarding historic and cultural resources in any community in the state.

OFFICE OF PARKS, RECREATION & HISTORIC PRESERVATION
NEW YORK STATE

David A. Paterson
Governor

Carol Ash
Commissioner

New York State Office of Parks, Recreation and Historic Preservation

Historic Preservation Field Services Bureau • Peebles Island, PO Box 189, Waterford, New York 12188-0189
518-237-8643
www.nysparks.com

October 16, 2009

Thomas Stebbins
Arkwright Summit Wind Farm
52 James Street
Albany, NY 12207

Dear Mr. Stebbins:

Re: CORPS, DEC
Arkwright Summit Wind Farm
Town of Arkwright, Chautauqua County
08PR0564

Thank you for requesting the comments of the State Historic Preservation Office (SHPO). The SHPO has reviewed the Phase I Archaeological Investigation Map for the Arkwright Summit Wind Farm Project, dated 9/09, in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended. This map details changes to the area of potential effect (APE) related to redesign.

Based upon this review, the SHPO concurs that the new design layout avoids the Leman I Precontact Site (A01301.000017) and the Cannon II Precontact Site (A01301.000020) and requests an avoidance plan be submitted for SHPO review. Suggested avoidance measures are enclosed for your consideration.

In regards to changes in the APE, the alignment has shifted significantly in the below locations and the SHPO recommends that these areas are archeologically tested, as per the SHPO's Guidelines for Wind Farm Development Cultural Resources Survey Work.

Area between T42 - T33
Area to the west of T-41
Area of T-27, T-28, T-29, T-30 and T-31
Vicinity of T-57
Vicinity of T-15
Vicinity of T-90, T-5 and T-92
Area west of T-3

The SHPO looks forward to receiving avoidance plans for the Leman I Site, the Cannon II Site, the Cannon I Site, the Maslach I Site, the Arkwright Campground #1 Site and the Jurczak I Site and an addendum Phase IB Archaeological Investigation Report.

Sincerely,

Nancy Herter

Nancy Herter
Scientist, Archaeology

cc. Bonnie Locking, Tetra Tech (*via email only*)
Gail Thompson, Seneca Nation of Indians (*via email only*)

David A. Paterson
Governor

Carol Ash
Commissioner

New York State Office of Parks,
Recreation and Historic Preservation

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Office of Parks, Recreation and Historic Preservation (OPRHP) Avoidance Plan for the Protection of Archeological Sites

Short Term Site Avoidance/Protection

- The site(s) boundary (including buffer) will be clearly delineated on the final construction plans and identified as a "Sensitive Area/No Access".
- Each site will be protected with temporary fencing during all construction activities and signage stating "Sensitive Area/No Access".
- A preconstruction meeting with the construction contractor(s) is required to notify those in charge of the requirements to avoid/protect the site(s).
- Existing landscape at the site(s) will be maintained. Any proposed modifications will require consultation with the OPRHP.

Long Term Site Avoidance/Protection

- An archeology covenant will be transferred with each property containing the avoided/protected site(s).
- State and federal regulations that include restrictions associated with this project will include provisions for site(s) avoidance/protection.
- Unauthorized activities within the site boundaries will require notification to the OPRHP at (518) 237-8643, ext 3280.

Appendix B:
Project Site Photographs

PHOTO 01:

View to the North from STP 1.1.

PHOTO 02:

View to the South from STP 1.34.

PHOTO 03:

Proposed Generator Lead Line Route Along South Side of State Route 83, View to the East.

PHOTO 04:

View to the North from STP 2.11.

PHOTO 05:

View to the East from STP 3.1.

PHOTO 06:

Proposed Substation/POI Switchyard Parcel from Southwest Corner, View to the Northeast.

PHOTO 07:

View to the East from STP 4.10.

PHOTO 08:

Typical Stone Wall in Project Area in Vicinity of STP 4.43, View to the Northeast.

PHOTO 09:

View to the North from STP 4.48.

PHOTO 10:

Stream Channel in the Vicinity of STP 1.60, View to the North.

PHOTO 11:

Logging Road/ATV Trail in the Vicinity of STP 1.59, View to the East.

PHOTO 12:

STP 1.59, Displaying Typical Stratigraphy for the Undisturbed Portions of the Surveyed Area, View to the South.

Appendix C:
Shovel Test Records

Shovel Test	Depth (cm)	Soil Color	Soil Texture	Comments/Artifacts
1.1	0-25	10yr 4/4	si sa lo w/ gravel	ncm; fill
	25-35	10 yr 6/4	si sa lo	ncm
1.2	0-8	10 yr 3/3	si lo	ncm
	8	--	compacted gravel fill impasse	ncm
1.3	0-19	10 yr 4/3	cl lo	ncm
	19-29	10 yr 4/6	cl lo	ncm
1.4	0-33	10 yr 4/4 streaked w/10 yr 5/6	si cl lo	ncm
	33-46	10 yr 6/6	si cl lo	ncm; water at 46cm
1.5	0-23	10 yr 3/3	cl lo & water	ncm
	23-33	10 yr 4/6	hydirc cl lo & gravel	ncm
1.6	0-33	10 yr 4/4	si cl lo	ncm; naturally occuring small chert nodules
	33-48	10 yr 6/6	si cl lo	
1.7	0-26	10 yr 3/2	cl lo	ncm
	26-36	10 yr 4/4	hydric cl lo & gravel	ncm
1.8	0-29	10 yr 4/4	si cl lo	ncm
	29-39	10 yr 6/6	si cl lo w/gravel	ncm
1.9	0-31	10 yr 3/2	cl lo	ncm
	31-41	10 yr 6/3	hydric cl lo & gravel	ncm
1.10	0-29	10 yr 4/4	si cl lo	ncm
	29-50	10 yr 3/4 mottled w/ 10 yr 5/3 and 10 yr 8/2	si cl lo	ncm; possibly hydric soils
1.11	0-27	10 yr 3/2	cl lo	ncm
	27-37	10 yr 6/3	hydric cl lo gravel	ncm
1.12	0-23	10 yr 4/4	si cl lo	ncm
	23-34	10 yr 3/4 mott w/10 yr 6/3 and 10 yr 8/2	si cl lo	ncm; hydric soils
1.13	0-33	10 yr 3/2	cl lo	ncm
	33-43	10 yr 4/6	hydric cl lo & gravel	ncm
1.14	0-23	10 yr 4/4	si cl lo	ncm
	23-33	10 yr 4/4	si cl lo w/70% gravel	ncm
	33-42	10 yr 6/3	si cl lo	ncm
1.15	0-37	10 yr 3/2	cl lo	ncm
	37-47	10 yr 4/4	cl lo	ncm
1.16	0-26	10 yr 4/4	si cl lo	ncm
	26-41	10 yr 3/4 mott w 6/3	si cl lo	ncm
1.17	0-29	10 YR 3/3	cl lo	2 plastic fragments (not collected)
	29-39	10 yr 5/3	cl lo & gravel	1 clnder block fragment (not collected)
1.18	0-24	10 yr 4/4 mott w/10 yr 5/3 and 10 yr 8/2	sisalo w/gravel 50%	ncm some plastic & brick frags in top 10cm (not collected)
	24-34	10 yr 3/4		ncm
1.19	0-17	10 yr 3/3	cl lo	ncm
	17-	--	gravel/rock impasse	ncm
1.20	0-20	10 yr 4/4 mott w/10 yr 5/3 and 10 yr 8/2	si cl lo	ncm
1.21	0-12	10 yr 3/3	cl lo	ncm
	12-	--	gravel rock impasse	ncm
1.22	0-13	10 yr 3/2	cl lo	ncm
	13-	--	gravel rock impasse near septic field	ncm

Shovel Test	Depth (cm)	Soil Color	Soil Texture	Comments/Artifacts
1.23	0-5	10 yr 4/4 mott w/10 yr 5/3 and 10 yr 8/2	sisalo w/gravel 50%	gravel fill encountered in top 5 cm, STP not completed
1.24	0-17	10 yr 4/3	cl lo	ncm
	17-	--	gravel and rock impasse	ncm; dug 5m north of STP
1.25	0-25	10 yr 4/3	si lo w 50% cobbles	ncm; moved 1 ft north
	25-	--	rock impasse	ncm
1.26	0-15	10 yr 4/3	cl lo	ncm
	15-25	10 yr 5/4	cl lo	degraded bedrock matrix
1.27	0-20	10 yr 3/4	si lo w/50% gravel	ncm; moved 5 ft north
	20-	--	rock impasse/possible decaying bedrock	ncm
1.28	0-18	10 yr 4/3	cl lo	ncm
	18-28	10 yr 5/4	cl lo & rocks	ncm
1.29	0-22	10 yr 3/4	si lo w/gravel	ncm; naturally occuring chert present near interface
	22-33	10 YR 5/4	si sa lo w/gravel	ncm
1.30	0-21	10 yr 4/3	cl lo	ncm
	21-	--	rock impasse	ncm
1.31	0-27	10 yr 3/4	si lo w gravel	ncm
	27-34	10 yr 5/4	si sa lo w/ gravel	ncm
1.32	0-26	10 yr 4/3	cl lo	ncm
	26-36	10 yr 4/6	cl lo	ncm
1.33	0-28	10 yr 4/4	si lo	ncm; no gravel and few rocks
	28-40	10 yr 5/4	si lo	ncm; no gravel and few rocks
1.34	0-29	10 yr 4/3	cl lo	ncm
	29-39	10 yr 4/6	hydric cl lo	ncm
1.35	0-32	10 yr 3/2	si cl lo	ncm
	32-45	10 yr 4/4	si cl lo	ncm
1.36	0-33	10 yr 3/3	cl lo	ncm
	33-43	10 yr 4/6	hydric cl lo	ncm
1.37	0-40	10 yr 3/2	si cl lo	ncm
	40-	--	rock impasse	ncm
1.38	0-31	10 yr 3/2	cl lo	ncm
	31-41	10 yr 4/6	hydric cl lo & rocks	1 piece window glass (not collected)
1.39	0-23	10 yr 3/2	si cl lo w gravel	ncm
	23-32	10 yr 2/1	si lo	ncm
	32-41	10 yr 5/3	si lo	ncm
1.40	0-12	10 yr 3/2	cl lo	ncm
	12-22	10 yr 4/6	hydric cl lo & rocks	ncm
1.41	0-20	10 yr 3/4	si cl lo	ncm
	20-30	10 yr 5/2 mottled w/10 yr 6/2	si cl lo	ncm
1.42	0-23	10 yr 3/5	cl lo	ncm
	23-33	10 yr 6/3 & 10 yr 5/6	hydric cl lo	ncm
1.43	0-22	10 yr 3/4	si cl lo	ncm
	22-43	10 yr 3/3 mottled w 10 yr 5/6	si cl lo	ncm
1.44	0-21	10 yr 3/3	cl lo	ncm
	21-31	10 yr 6/2 & 10 yr 5/6	hydric cl lo	ncm
1.45	0-29	10 yr 3/3	si lty lo	ncm
	29-40	10 yr 6/2 w/ hydric mottling	si lty lo	ncm; wet
1.46	0-23	10 yr 3/3	cl lo	ncm

Shovel Test	Depth (cm)	Soil Color	Soil Texture	Comments/Artifacts
	23-33	10 yr 4/6	hydric cl lo	ncm
1.47	0-14	10 yr 3/4	si cl lo	ncm
	14-24	10 yr 5/6 mottled w 10 yr 3/6	si cl lo	ncm
1.48	0-26	10 yr 3/3	si lo	ncm, light gravel
	26-37	10 yr 6/2 w hydric mottle	si lo	ncm
1.49	0-21	10 yr 3/3	cl lo	ncm
	21-31	10 yr 6/2 & 10 yr 5/6	hydric cl lo	ncm
1.50	0-18	10 yr 3/4	si cl lo	ncm
	18-27	10 yr 5/6 mottled w 10 yr 3/6	si cl lo	ncm
1.51	0-24	10 yr 3/2	cl lo	ncm
	24-34	10 yr 4/6	hydric cl lo	ncm
1.52	0-23	10 yr 3/4	si cl lo	ncm
	23-39	10 yr 5/6 mottled w 10 yr 3/6	si cl lo	ncm
1.53	0-14	10 yr 3/3	wet cl lo	ncm
	14-	--	rock impasse	ncm
1.54	0-23	10 yr 3/4	si cl lo	ncm
	23-	--	root impasse	ncm
1.55	0-19	10 yr 3/3	cl lo	ncm
	19-29	10 yr 4/6	hydric cl lo	ncm
1.56	0-20	10 yr 3/2	si cl lo	ncm
	20-	--	water	ncm
1.57	0-26	10 yr 3/3	cl lo	ncm; very wet
	26-36	10 yr 4/6	cl lo	ncm
1.58	0-21	10 yr 3/2	cl cl lo	ncm
	21-	--	water	ncm
1.59	0-31	10 yr 2/2	cl lo	ncm
	31-41	10 yr 4/6	cl lo & rocks hydric	very wet
1.60	0-19	10 yr 2/2	cl lo	ncm
	19-29	10 yr 4/6	hydric cl lo	ncm; very wet
1.61	0-28	10 yr 3/4	cl cl lo	ncm
	28-39	10 yr 4/3 mottled w 10 yr 6/2	si cl lo	ncm
2.1	0-29	10 yr 3/3	cl lo	ncm
	29-39	10 yr 4/6	cl lo hydric	ncm
2.2	0-30	10 yr 3/4	si lo	ncm
	30-40	10 yr 5/4	si lo	ncm
2.3	0-23	10 yr 3/2	cl lo	1 fragment colorless flat glass (not collected)
	23-33	10 yr 46	cl lo & cobbles	ncm
2.4	0-20	10 yr 3/4	si lo	ncm
	20-22	10 yr 5/4	si lo	ncm
	22-	--	root impasse	ncm
2.5	0-14	10 yr 3/2	cl lo	ncm
	14-	--	rock impasse	ncm
2.6	0-52	10 yr 3/4	si lo	ncm; very gravelly
	52-	--	root impasse	ncm
2.7	0-15	10 yr 4/4	si sa lo w/gravel	ncm; decayed asphalt throughout
	15-20	10 yr 6/2	si sa lo	ncm; decayed asphalt throughout
	20-	--	rock impasse	ncm
2.8	0-12	10 yr 3/3	cl lo	ncm
	12-22	10 yr 4/6	cl lo & rocks	ncm
2.9	0-33	10 yr 4/3	cl lo	ncm
	33-43	10 yr 6/4	cl lo	ncm

Shovel Test	Depth (cm)	Soil Color	Soil Texture	Comments/Artifacts
2.10	0-33	10 yr 4/4	si lo	ncm
	33-43	10 yr 5/6	si lo	ncm
2.11	0-30	10 yr 3/3	cl lo	ncm
	30-40	10 yr 5/3	cl lo	ncm
2.12	0-25	10 yr 4/4	si lo	ncm
	25-45	10 yr 5/3	si lo	ncm; possible hydric soils
2.13	0-23	10 yr 3/3	cl lo	ncm
	23-33	10 yr 5/4	cl lo	ncm
2.14	0-15	5 yr 4/4	si lo	ncm
	15-30	5 yr 5/4	si lo	ncm; chert spalls naturally occuring
2.15	0-4	10 yr 3/3	cl lo	ncm
	4-14	10 yr 6/4	cl lo	ncm
3.1	0-7	10 yr 3/3	cl lo	ncm
	7-17	10 yr 4/6	hydric cl lo & rocks	ncm
3.2	0-15	10 yr 4/4	si cl lo gravel throughout	ncm
	15-25	10 yr 6/3 mottled v/10 yr 4/6	si cl lo gravel throughout	ncm
3.3	0-16	10 yr 4/3	cl lo & cobbles	ncm
	16-18	10 yr 4/6	cl lo	ncm
	18-	--	rock impasse	ncm
3.4	0-17	10 yr 4/4	si lo	ncm; natural chert in top 10 cm
	17-30	10 yr 5/6	si lo	ncm; modern bottle glass
3.5	0-17	10 yr 4/3	cl lo	ncm
	17-27	10 yr 4/6	hydric cl lo & rocks	ncm
3.6	0-19	10 yr 3/2	cl lo	ncm
	19-29	10 yr 4/6	hydric cl lo & rocks	ncm
3.7	0-24	10 yr 3/2	cl lo	ncm
	24-34	10 yr 4/6	hydric cl lo	ncm
3.8	0-26	10 yr 3/2	cl lo	ncm
	26-36	10 yr 4/6	hydric cl lo	ncm
3.9	0-21	10 yr 3/2	cl lo	ncm
	21-31	10 yr 4/6	hydric cl lo & cobbles	ncm
3.10	0-23	10 yr 3/2	cl lo	ncm
	23-33	10 yr 4/6	hydric cl lo & cobbles	ncm
3.11	0-22	10 yr 3/2	cl lo	ncm
	22-32	10 yr 4/6	hydric cl lo & cobbles	ncm
3.12	0-24	10 yr 3/2	cl lo	ncm
	24-34	10 yr 4/6	hydric cl lo & cobbles	ncm
3.13	0-22	10 yr 3/2	si cl lo	ncm
	22-35	10 yr 6/3 mott w 10 yr 8/2	si cl lo	ncm; hydric soils
3.14	0-26	10 yr 3/2	si cl lo	ncm
	26-32	10 yr 5/4	si cl lo	ncm
3.15	0-24	10 yr 3/2	si cl lo	ncm
	24-34	10 yr 5/6	si cl lo	ncm
3.16	0-22	10 yr 3/3	si cl lo	ncm
	22-31	10 yr 3/3 w/ iron oxide streaking	si cl lo	ncm
3.17	0-25	10 yr 3/4	si cl lo	ncm
	25-35	10 yr 5/3 mottled w /10 yr 5/6	si cl lo	ncm
3.18	0-27	10 yr 2/2	si cl lo	ncm

Shovel Test	Depth (cm)	Soil Color	Soil Texture	Comments/Artifacts
	27-39	10 yr 6/6 mottled w/10 yr 3/3	si lo	ncm
3.19	0-23	10 yr 3/4	si cl lo	ncm
	23-35	10 yr 6/6 mottled w 10 yr 8/2	si cl lo	ncm
3.20	0-25	10 yr 2/2	si cl lo	ncm
	25-38	10 yr 6/6	si cl lo	ncm
3.21	0-25	10 yr 3/4	si cl lo	ncm
	25-35	10 yr 6/6 mottled w 10 yr 8/2	si cl lo	ncm
3.22	0-21	10 yr 3/4	si cl lo	ncm
	21-34	10 yr 6/6 mottled w 10 yr 8/2	si cl lo	ncm
3.23	0-22	10 yr 3/4	si cl lo	ncm
	22-33	10 yr6/6 mottled w 10 yr 8/2	si cl lo	ncm
3.24	0-25	10 yr 3/4	si cl lo	ncm
	25-35	10 yr 6/6 mottled w 10 yr 8/2	si cl lo	ncm
3.25	0-22	10 yr 3/3	cl lo	ncm
	22-32	10 yr 4/6	hydric cl lo & cobbles	ncm
3.26	0-21	10 yr 3/3	cl lo	ncm
	21-31	10 yr 4/6	hydric cl lo & cobbles	ncm
3.27	0-29	10 yr 3/3	cl lo	ncm
	29-39	10 yr 4/6	cl lo & cobbles	ncm
3.28	0-27	10 yr 3/2	cl lo	ncm
	27-37	10 yr 4/6	hydric cl lo & cobbles	ncm
3.29	0-21	10 yr 4/2	si cl	ncm
	21-37	10 yr 6/6 mottled w 10 yr 8/2	cl	ncm; low to moderate gravel content
3.30	0-26	10 yr 4/2	si cl	ncm
	26-39	10 yr 6/4	clay	ncm; low gravel content
3.31	0-27	10 yr 4/2	si cl	ncm
	27-37	10 yr 6/4 hydric mottling	cl	ncm; moderate concentration gravel & cobbles
3.32	0-23	10 yr 4/2	si cl	ncm
	23-41	10 yr /4 hydric mottling	cl	ncm; moderate concentration gravel & cobbles
3.33	0-28	10 yr 4/2	si cl	ncm
	28-38	10 yr 6/4 hydric mottling	cl	ncm; moderate concentration gravel & cobbles; boulder in west wall
3.34	0-20	10 yr 4/2	si cl	ncm
	20-33	10 yr 6/4 hydric mottle	cl	ncm; low gravel content
4.1	0-15	10 yr 2/2	si lo w/40% gravel	ncm
	15-30	10 yr 6/6 mott w 10 yr 8/2	si lo w/70% gravel	ncm
4.2	0-18	10 yr 4/4	cl lo & rocks	ncm
	18-28	5 yr 6/4	cl lo & rocks	ncm
4.3	0-25	10 yr 4/4	si cl lo	ncm
	25-	--	rock impass	ncm
4.4	0-17	10 yr 4/4	cl lo & rocks	ncm
	17-	--	rock impass	ncm
4.5	0-24	10 yr 4/4	si lo w/40% gravel	ncm
	24-34	10 yr 6/6	si lo w/40% gravel	ncm
4.6	0-21	10 yr 4/4	cl lo & cobbles	ncm
	21-31	10 yr 4/6	cl lo & cobbles	ncm
4.7	0-26	10 yr 4/4	si lo w/50% gravel	ncm
	26-	--	rock impasse	ncm
4.8	0-16	10 yr 4/4	cl lo & cobbles	ncm
	16-	--	rock impass	ncm
4.9	0-28	10 yr 4/4	si lo w 50% gravel	ncm

Shovel Test	Depth (cm)	Soil Color	Soil Texture	Comments/Artifacts
	28-38	10 yr 6/6	si lo	ncm
4.10	0-26	10 yr 4/4	cl lo & cobbles	ncm
	26-36	10 yr 4/6	cl lo & cobbles	ncm
4.11	0-22	10 yr 4/4	si lo w 50% gravel	ncm
	22-32	10 yr 6/6	si lo	ncm
4.12	0-19	10 yr 4/4	cl lo & gravel	ncm
	19-	--	rock/gravel impasse	ncm
4.13	0-26	10 yr 4/4	si lo 40% gravel	ncm
	26-37	10 yr 6/4	si lo	ncm
4.14	0-22	10 yr 4/4	cl lo & gravel	ncm
	22-32	10 yr 6/4	cl lo	ncm
4.15	0-20	10 yr 8/3	si lo	ncm
	20-31	10 yr 6/4	si lo	ncm
4.16	0-17	10 yr 4/4	cl lo	ncm
	17-27	10 yr 8/4	cl lo	ncm
4.17	0-24	10 yr 4/4	si lo	ncm
	24-	--	root impasse	ncm
4.18	0-17	10 yr 4/3	cl lo	ncm
	17-27	10 yr 8/4	cl lo	ncm
4.19	0-15	10 yr 4/4	si lo	ncm
	15-25	10 yr 6/4	si lo	ncm
4.20	0-12	10 yr 3/2	cl lo	ncm
	12-22	10 yr 6/6	cl lo	ncm
4.21	0-20	10 yr 3/2	si lo	ncm
	20-32	10 yr 6/4	si lo	ncm
4.22	0-8	10 yr 3/2	cl lo	ncm
	8-18	10 yr 4/6	cl lo	ncm
4.23	0-18	10 yr 3/3	si lo	ncm
	18-24	10 yr 6/4	si lo	ncm
4.24	0-6	10 yr 3/2	cl lo	ncm
	6-16	10 yr 6/6	cl lo	ncm
4.25	0-15	10 yr 2/2	si lo	ncm
	15-21	10 yr 6/4	si lo	ncm
	21-	--	root impasse	ncm
4.26	0-9	10 yr 3/2	cl lo	ncm
	9-19	10 yr 6/6	cl lo	ncm
4.27	0-24	10 yr 4/4	si lo	ncm
	24-38	10 yr 6/3	si lo	ncm
4.28	0-23	10 yr 2/2	si cl lo	ncm
	23-35	10 yr 6/3 mottled w 10 yr 8/2	si lo	ncm hydric soils
4.29	0-6	10 yr 2/2	cl lo	ncm
	6-13	10 yr 6/8	cl lo	ncm
	13-23	10 yr 6/3	cl lo	ncm
4.30	0-12	10 yr 2/2	cl lo	ncm
	12-22	10 yr 4/6	cl lo	ncm
4.31	0-15	10 yr 4/4	si lo	ncm
	15-20	10 yr 6/4	si lo	ncm
	20-30	10 yr 6/6	si lo	ncm
4.32	0-14	10 yr 2/2	cl lo	ncm
	14-24	10 yr 4/6	cl lo	ncm
4.33	0-10	10 yr 2/2	si lo	ncm

Shovel Test	Depth (cm)	Soil Color	Soil Texture	Comments/Artifacts
	10-22	10 yr 6/6	si lo	ncm
	22-34	10 yr 6/3	si lo	ncm
4.34	0-15	10 yr 3/3	cl lo	ncm
	15-25	10 yr 4/6	cl lo	ncm
4.35	0-15	10 yr 3/2	si lo	ncm
	15-30	10 yr 6/4	si lo	ncm
4.36	0-13	10 yr 3/3	cl lo	ncm
	13-23	10 yr 4/6	cl lo	ncm
4.37	0-18	10 yr 3/2	si lo	ncm
	18-30	10 yr 6/4	si lo	ncm
4.38	0-17	10 yr 3/2	cl lo	ncm
	17-27	10 yr 4/6	cl lo	ncm
4.39	0-12	10 yr 4/6	cl lo	ncm
	12-13	10 yr 4/6	cl lo	ncm
4.40	0-25	10 yr 3/2	si lo	ncm
	25-35	10 yr 5/4	si lo	ncm
4.41	0-17	10 yr 3/3	cl lo	ncm
	17-27	10 yr 4/6	cl lo	ncm
4.42	0-23	10 yr 3/4	si lo w/ 15% cobbles	ncm
	23-	--	rock impasse	ncm
4.43	0-14	10 yr 3/2	cl lo	ncm
	14-24	10 yr 4/6	cl lo	ncm
4.44	0-15	10 yr 3/4	si lo	ncm
	15-30	10 yr 6/6	si lo	ncm
4.45	0-17	10 yr 3/2	cl lo	ncm
	17-27	10 yr 4/6	cl lo	ncm
4.46	0-35	10 yr 4/4	si cl lo	1 fragment modern brown curved glass (not collected)
	35-	--	rock impasse	ncm
4.47	0-15	10 yr 6/3	cl lo	ncm
	15-25	10 yr 6/2 & 10 yr 4/2	hydric cl lo	ncm
4.48	0-20	10 yr 4/4	si cl lo	ncm
	20-35	10 yr 6/6 mott w/10 yr 8/2	si cl lo	ncm; hydric soils
4.49	0-11	10 yr 6/3	cl lo	ncm
	11-21	10 yr 6/2	hydric cl lo	ncm
4.50	0-25	10 yr 4/4	si cl lo	ncm
	25-35	10 yr 6/3 mott w 10 yr 8/2	si cl lo	ncm
4.51	0-31	10 yr 4/4	cl lo	ncm
	31-41	10 yr 4/6	hydric cl lo	ncm
4.52	0-30	10 yr 4/4	si cl lo	ncm; odd smell in top strat
	30-39	10 yr 6/6 mott w/10 yr 6/3	si cl lo	ncm
4.53	0-27	10 yr 4/4	cl lo	ncm
	27-37	10 yr 4/6	hydric cl lo	ncm