

Wetland and Stream Delineation Report

High Bridge Wind Project

Town of Guilford

Chenango County, New York

Prepared for:

High Bridge Wind, LLC

717 Texas Ave

Suite 1000

Houston, TX 77002

Contact: Mr. Alec Jarvis, Director of Development

Phone: (207) 956-1169

Prepared by:



Environmental Design & Research,

Landscape Architecture, Engineering & Environmental Services, D.P.C.

41 State Street, Suite 401

Albany, New York 12207

Contact: Gregory S. Liberman

Phone: (518) 451-9150

August 2019

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	PROJECT DESCRIPTION	1
1.2	PURPOSE	1
1.3	RESOURCES	2
1.4	QUALIFICATIONS	2
2.0	REGULATORY AUTHORITIES AND PERMITS	3
2.1	WATERS OF THE UNITED STATES	3
2.2	NEW YORK STATE FRESHWATER WETLANDS AND PROTECTED STREAMS	4
3.0	PHYSICAL CHARACTERISTICS AND RESOURCES	5
3.1	PHYSIOGRAPHY AND SOILS	5
3.2	HYDROLOGY	7
3.3	FEDERAL AND STATE MAPPED WETLANDS AND STREAMS	7
4.0	WETLAND AND STREAM IDENTIFICATION	8
4.1	METHODOLOGY	8
4.2	RESULTS	10
4.2.1	Wetlands and Streams	13
4.2.2	Wetland Functions and Values	15
4.2.3	Vernal Pools	18
5.0	CONCLUSIONS	18
6.0	REFERENCES	19

LIST OF TABLES

Table 1.	Study Area Soils	6
Table 2.	State-Mapped Streams Within the Study Area	7
Table 3.	Delineated Wetlands	10
Table 4.	Delineated Streams	12

LIST OF APPENDICES

Appendix A: Figures

Figure 1: Regional Facility Location

Figure 2: Facility Layout

Figure 3: Study Area

Figure 4: Topographic Mapping

Figure 5: Study Area Soils

Figure 6: Mapped Wetlands and Streams

Figure 7: Delineated Wetlands and Streams

Appendix B: Wetland Determination Data Forms

Appendix C: Photographs of Representative Wetland and Stream Communities

Appendix D: Wetland Functions and Values Assessment Table

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

High Bridge Wind, LLC (the “Applicant”), a wholly owned subsidiary of Calpine Corporation, is proposing to construct an up to 100.8-megawatt (MW) wind energy facility (the “Facility”) in the Town of Guilford in Chenango County, New York (see Figure 1). The Facility will consist of the construction and operation of up to 25 wind turbines, associated 34.5 kilovolt (kV) underground collection lines, access roads, meteorological tower(s), a temporary construction staging/laydown area, and an operation and maintenance (O&M) building. These turbines and related facilities will be sited within privately-owned leased land within a 3,921-acre Facility Site (see Figure 2). The Facility’s footprint will be substantially smaller than the Facility Site and will have only minor impacts on land use (i.e., farming, logging, and other operations will be largely unaffected). To deliver electricity to the New York State power grid, the Applicant proposes to construct a collection substation, which will include battery storage, and a point of interconnection (POI) substation that will interconnect with the New York State Energy and Gas (NYSEG) Jennison to East Norwich 115 kV transmission line in the Town of Guilford. A short (200-foot) section of 115-kV overhead electrical transmission line will connect the collection substation to the POI substation.

Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C. (EDR) was retained, in addition to Fisher Associates (FA), to identify all wetlands and streams within and adjacent to the proposed Facility components described above. Within the Facility Site, detailed wetland and stream delineations were conducted within a 200-foot wide corridor centered on linear Facility components (i.e., access roads and collection lines), and within a 265-foot radius of turbines and other components such as meteorological towers, the O&M building, the staging/laydown area, and the proposed substations (hereafter referred to as the “Detailed Wetland Study Area” or “Study Area”; see Figure 3).¹ Wetland and stream delineations occurred in the fall of 2018, and also in the spring and summer of 2019.

1.2 PURPOSE

The purpose of this study was to delineate and describe all wetlands and streams that may fall under state and/or federal jurisdiction, and to identify vernal pools under appropriate seasonal conditions, that could possibly be impacted by construction of the proposed Facility. Specific tasks performed for this study included: (1) review of background resource data and mapping; (2) field delineation of all potential state and federal jurisdictional wetlands, streams, and

¹ Consistent with the requirements of 1001.22(i) of the Article 10 Regulations, wetlands and streams outside the Detailed Wetland Study Area, but within 500 feet of areas proposed to be disturbed by the construction of the Facility and within the Facility Site were delineated in accordance with the three-parameter methodology described in the U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual, and the appropriate Regional Supplement to the USACE Wetland Delineation Manual. See the High Bridge Wind Project Article 10 Application for a description of these wetlands.

vernal pools; (3) Global Positioning System (GPS) surveys of on-site delineated wetland, stream, and vernal pool boundaries; (4) quantification of the area of on-site jurisdictional wetlands and streams within the Study Area; and (5) describing potentially jurisdictional areas based on hydrology, vegetation, and soils data collected in the field.

This document is intended to provide the information necessary to identify and document on-site delineations, facilitate jurisdictional determinations, and support state and federal permit applications.

1.3 RESOURCES

Data supporting this investigation have been derived from a number of sources including United States Geological Survey (USGS) topographic mapping (Guilford and Oxford USGS 7.5-Minute quadrangles), United States Fish and Wildlife Service National Wetlands Inventory (NWI) mapping (USFWS, 2016), New York State Department of Environmental Conservation (NYSDEC) Freshwater Wetlands mapping, Natural Resources Conservation Service (NRCS) Web Soil Survey data (Soil Survey Staff, 2018), the NRCS List of Hydric Soils of the State of New York (NRCS, 2017), and recent aerial photography (NYS DOP, 2018).

Vascular plant names follow nomenclature found in the New York Flora Atlas (Weldy et al., 2018), and wetland indicator statuses for plant species were determined by referencing the National Wetland Plant List (Lichvar et al., 2016). Jurisdictional areas were characterized in accordance with the wetlands and deepwater habitats classification system used in NWI mapping (Cowardin, 1979).

1.4 QUALIFICATIONS

Wetland and stream delineations were conducted under the direction and guidance of Benjamin Brazell, EDR Principal and Director of Environmental Services; Brian Kirkpatrick, EDR Director of Ecological Services; and Samouel Beguin, EDR Senior Environmental Analyst.

Mr. Brazell received a Bachelor of Science Degree in Natural Resources Ecosystem Assessment from North Carolina State University and joined EDR in 2004. Since that time, Mr. Brazell has worked in the capacity of an Ecologist, Project Manager, Senior Project Manager, and Director of Environmental Services. Mr. Brazell has over 15 years of experience performing and/or supervising projects involving wetland and stream delineations, state and federal wetland and stream permitting, habitat and ecosystem analysis, and environmental impact assessments.

Mr. Kirkpatrick obtained a Bachelor of Science in Wildlife Resources from West Virginia University in 1986 and joined EDR in 2019, having worked on ecological services and permitting projects throughout the northeastern United States

and selected locations in the southeastern and southwestern United States. He has more than 30 years of experience conducting and/or managing projects requiring wetland and stream delineations, state and federal wetland and stream permitting, wildlife inventories, habitat assessments, and environmental impact assessments.

Mr. Beguin is a Senior Environmental Analyst with more than 5 years of experience in environmental consulting, wildlife biology, and scientific research. He received a Master of Science degree in Environmental and Forest Biology from the State University of New York College of Environmental Science and Forestry and a Bachelor of Arts degree in Biology and Environmental Studies from Middlebury College. Mr. Beguin's experience includes wetland and stream delineations, environmental permitting, wildlife surveys, and GIS mapping and data analysis. At EDR, Mr. Beguin has conducted field delineations and other ecological resource surveys for several energy, municipal, and private residential development projects.

2.0 REGULATORY AUTHORITIES AND PERMITS

2.1 WATERS OF THE UNITED STATES

In accordance with Section 404 of the Clean Water Act (CWA), the USACE has regulatory jurisdiction over Waters of the United States (WOUS). As defined by the USACE, WOUS includes all lakes, ponds, streams (intermittent and perennial), and wetlands. Wetlands are defined as *“those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions”* (EPA, 2001). Such areas are indicated by the presence of three criteria: a dominance of hydrophytic vegetation, hydric soils, and evidence of wetland hydrology during the growing season (Environmental Laboratory, 1987).

On August 28, 2015, the United States Environmental Protection Agency (USEPA) released the *Clean Water Rule* (the “2015 Rule”; 33 CFR Part 328) which provides a clearer and more consistent approach to defining the scope of the CWA and WOUS. In February 2017, an Executive Order was issued directing the USEPA and the USACE to review and rescind or revise the 2015 Rule. However, as of August 29, 2018, the 2015 Rule remains in effect for 22 states, including New York.

Three major elements of the 2015 Rule that define jurisdictional waters are summarized below:

Traditional navigable waters, interstate waters, territorial seas, and impoundments of jurisdictional waters:

- Consistent with the existing regulations.
- The agencies will assert jurisdiction over these waters.

Tributaries:

- Specifically defines tributaries as “waters that are characterized by the presence of physical indicators of flow – bed and banks and ordinary high-water mark – and that contribute flow directly or indirectly to a traditional navigable water”.
- The agencies will assert jurisdiction over these waters.

Adjacent Waters:

- Defined as “bordering, contiguous, or neighboring, including waters separated from other “waters of the United States” by constructed dikes or barriers, natural river berms, beach dunes and the like”.
- The agencies will assert jurisdiction over these waters if any of these settings occur:
 - “Waters located in whole or in part within 100 feet of the ordinary high water mark of a traditional navigable waters, interstate waters, territorial seas, and impoundments”;
 - “Waters located in whole or in part in the 100-year floodplain and that are within 1,500 feet of the ordinary high-water mark of a traditional navigable water, interstate waters, territorial seas, an impoundment, or a tributary”; and
 - “Waters located in whole or in a part within 1,500 feet of the tide line of a traditional navigable water or the territorial seas and waters located within 1,500 feet of the ordinary high-water mark of the Great Lakes”.

A Section 404 permit from the USACE is required for activities that result in the placement of dredged or fill materials in WOUS. It is assumed that all delineated wetlands and streams within the Study Area are jurisdictional WOUS.

In addition to Section 404 of the CWA, Section 10 of the Rivers and Harbor Act (33 U.S.C. 401 et seq.) requires a permit from the USACE to construct any structure in or over any navigable water of the United States, as well as any proposed action that would alter or disturb (such as excavation/dredging or deposition of materials in) these waters. There are no Section 10 navigable waters mapped within the Study Area.

2.2 NEW YORK STATE FRESHWATER WETLANDS AND PROTECTED STREAMS

The Freshwater Wetlands Act (Article 24 and Title 23 of Article 71 of the Environmental Conservation Law) gives the NYSDEC jurisdiction over state-protected wetlands and adjacent areas (100-foot upland buffer). The Freshwater Wetlands Act requires the NYSDEC to map all state-protected wetlands to allow landowners and other interested parties a means of determining where state jurisdictional wetlands exist. To implement the policy established by this Act, regulations were promulgated by the state under 6 NYCRR Parts 663 and 664. Part 664 of the regulations designates wetlands into four class ratings, with Class I being the highest or best quality wetland and Class IV being the lowest. In general, wetlands regulated by the state are those 12.4 acres in size or larger. Smaller wetlands can also be regulated if they are considered of unusual local importance. A 100-foot adjacent area around the delineated boundary of any state-regulated wetland is also under NYSDEC jurisdiction. The location and approximate boundaries of wetlands regulated by the State of New York under Article 24 are indicated on NYS Freshwater Wetland Maps. An Article 24 permit is required from the NYSDEC for any disturbance to a state-protected wetland or 100-foot adjacent

area, including removing vegetation. However, under Article 10 of the Public Service Law, this permitting authority has been delegated to the New York State Board on Electric Generation Siting and the Environment (Siting Board).

Under Article 15 of the Environmental Conservation Law (Protection of Waters), the NYSDEC has regulatory jurisdiction over any activity that disturbs the bed or banks of protected streams. In addition, small lakes and ponds with a surface area of 10 acres or less, located within the course of a protected stream, are considered to be part of a stream and are subject to regulation under the stream protection category of Article 15. The term “protected stream” means any stream, or portion of a stream, that has been assigned by the NYSDEC any of the following classifications or standards: AA, A, B, or C(T) or C(TS) (6 NYCRR Part 701). A classification of AA or A indicates that the best use of the stream is as a source of water supply for drinking, culinary or food processing purposes, primary and secondary contact recreation, and fishing. The best usages of Class B waters are primary and secondary contact recreation and fishing. The best usage of Class C waters is fishing. Streams designated (T) indicate that they support trout, while those designated (TS) support trout spawning. State water quality classifications of unprotected watercourses include Class C and Class D streams. Waters with a classification of D are suitable for fishing and non-contact recreation. An Article 15 permit is required from the NYSDEC for any disturbance to a stream classified C(T) or higher. However, under Article 10, this permitting authority has been delegated to the Siting Board.

3.0 PHYSICAL CHARACTERISTICS AND RESOURCES

3.1 PHYSIOGRAPHY AND SOILS

The Study Area is located within the Allegheny Plateau physiographic province of New York State. Elevations in the Study Area range from 880 to 1,960 feet above mean sea level (see Figure 4). The Allegheny Plateau in Chenango County is characterized by ranging topography that varies from general rolling hills to steeper terrain adjacent to major drainage ways. The region’s broad stream valleys are separated by ridgelines and flat-topped hills that approach an elevation of 2,000 ft., a unique characteristic of New York state that is predominately confined to the Adirondacks and Catskill Regions.

Soil composition in Chenango County was heavily influenced by the deposition of heterogenous materials through glacial advances and retreats. Consequently, the most common deposit in the county is glacial till, but loamy alluvial deposits can also be found in long narrow bands along valley waterways. (USDA, 1981).

The Web Soil Survey indicates that 33 soil series are present within the Study Area (Figure 5). Table 1 below lists the soil map units within the Study Area and their hydric characteristics based on information obtained from the United States Department of Agriculture (USDA) Web Soil Survey (NRCS, 2018). Although soil series may be generally classified as hydric in the online databases, this is for general use and does not supersede specific conditions documented in the field.

Table 1. Study Area Soils

Map Unit	Series	Slope % ¹	Drainage ²	Hydric ³	Potentially Hydric ⁴	Acres in Study Area
AsB	Arnot channery silt loam	3-8	SED	No	No	14.2
Cc	Carlisle muck	--	VPD	Yes	No	5.4
Cm	Chippewa and Norwich soils	0-3	PD	Yes	No	9.3
Cn	Chippewa and Norwich soils	0-3	PD	Yes	No	40.6
LaB	Lackawanna channery silt loam	3-8	WD	No	No	26.9
LaC	Lackawanna channery silt loam	8-15	WD	No	No	57.2
LaD	Lackawanna channery silt loam	15-25	WD	No	No	16.4
LoB	Lordstown channery silt loam	3-8	WD	No	No	82
LoC	Lordstown channery silt loam	8-15	WD	No	No	162.2
LrE	Lordstown and Oquaga channery silt loams	15-35	WD	No	No	186.2
LrF	Lordstown and Oquaga channery silt loams	35-50	WD	No	No	0.5
MaB	Mardin channery silt loam	3-8	MWD	No	No	10.7
MaC	Mardin channery silt loam	8-15	MWD	No	No	13.5
MbE	Mardin and Lackawanna channery silt loamy	15-35	WD	No	No	16.4
McB	Mardin and Wellsboro channery silt loams	3-8	MWD	No	No	30.9
McC	Mardin and Wellsboro channery silt loams	8-15	MWD	No	No	89.9
MoA	Morris channery silt loam	0-3	SPD	No	Yes	6.8
MoB	Morris channery silt loam	3-8	SPD	No	Yes	95.4
MoC	Morris channery silt loam	8-15	SPD	No	Yes	11.4
OaB	Oquaga channery silt loam	3-8	WD	No	No	159
OaC	Oquaga channery silt loam	3-15	WD	No	No	113.4
OIB	Oquaga and Lordstown, very stony silt loams	3-8	WD	No	No	21.8
OIC	Oquaga and Lordstown very stony silt loams	8-15	WD	No	No	241.7
OIE	Oquaga and Lordstown very stony silt loams	15-35	WD	No	No	233.9
Tu	Tuller channery silt loam	--	SPD	No	Yes	11.6
Ud	Udifluvents-Fluvaquents complex, frequently flooded	--	MWD	No	Yes	2.5
VaB	Valois gravelly silt loam	3-8	WD	No	No	2.9
VoB	Volusia channery silt loam	3-8	SPD	No	Yes	32.5
VoC	Volusia channery silt loam	8-15	SPD	No	Yes	0.3
VpB	Volusia and Morris channery silt loams	3-10	SPD	No	Yes	167.5
W	Water	--	--	No	No	1.4
WeB	Wellsboro channery silt loam	3-8	MWD	No	No	185
WeC	Wellsboro channery silt loam	8-15	MWD	No	No	26.3

¹ "--" indicates that no slope range is associated with/available for the respective map unit.

² Soil drainage is represented by the following abbreviations: "SED"= Somewhat excessively drained, "MWD"=moderately well drained, "SPD" = somewhat poorly drained, "WD" = Well Drained, "PD" = poorly drained and "VPD = Very Poorly Drained.

³"Yes" indicates this soil is listed as containing 66% or more hydric components within the map unit as listed on the USDA Web Soil Survey.

⁴"Yes" indicates this soil is listed as containing 1% to 65% hydric components within the map unit as listed on the USDA Web Soil Survey.

3.2 HYDROLOGY

Most of the Study Area is within the Upper Susquehanna drainage basin (USGS Hydrologic Unit 02050101), with a small northwestern portion of the Study Area located within the Chenango drainage basin (USGS Hydrologic Unit 2050102). The Upper Susquehanna and Chenango drainage basins combine within the Susquehanna River Watershed to drain all or portions of Broome, Tioga, Chenango, Madison, Cortland, Delaware, and Otsego counties. The Upper Susquehanna drainage basin drains a portion of south-central New York State to the Atlantic Ocean via the Chesapeake Bay (NYSDEC, 2018). Total annual precipitation averages 47.05 inches in nearby Norwich, New York (NOAA, 2019).

3.3 FEDERAL AND STATE MAPPED WETLANDS AND STREAMS

NWI mapping indicates the presence of 28 wetland communities within the Study Area, totaling 30.6 acres (Figure 6). Forested/Shrub wetland communities (PFO and PSS) are the dominant community type on site, totaling approximately 23.1 acres. Other NWI-mapped communities within the Study Area include emergent (PEM) wetlands (1.5 acres), R5UBH riverine wetlands (5.7 acres) and open water (PUB) ponds (0.4 acres).

Review of NYSDEC Freshwater Wetlands mapping indicates that there are no state-regulated wetlands that intersect the Study Area (Figure 6). Wetland GL-2 is the nearest mapped state-regulated wetland to the Study Area, and is located approximately 735 feet northwest of the Study Area.

There are six NYSDEC-mapped streams that flow through the Study Area. These include one Class C(T) stream and five Class C streams. Table 2 below provides a summary of all state-mapped streams and their linear distances within the Study Area.

Table 2. State-Mapped Streams Within the Study Area

Stream Name ¹	NYSDEC Class	Linear Feet Within Study Area ²
Kent Brook	C(T)	290
Trib. of Unadilla River	C	767
Trib. of Guilford Creek	C	150
Trib. of Guilford Creek (Moses Brook)	C	771
Trib. of Unadilla River	C	410
Trib. of Unadilla River	C	967

¹ "Trib" refers to unnamed tributaries within the Study Area that flow into named streams, some of which are located outside the Study Area.

² Represents the portion of stream within the Study Area, based on the location and length of stream, as delineated by EDR (see also Table 4).

4.0 WETLAND AND STREAM IDENTIFICATION

4.1 METHODOLOGY

An initial desktop analysis of the Study Area was conducted by EDR prior to performing on-site wetland delineations. The desktop analysis was performed using NYSDEC Freshwater Wetland and stream mapping, NWI maps, USGS topographic mapping, lidar data, and recent aerial photography. From these data sources, EDR identified areas likely to contain wetland and stream resources within the Study Area. In addition, a reconnaissance-level investigation was conducted in December 2017. Following these efforts, formal wetland delineations were performed in fall 2018 and in spring and summer 2019 for the entire Study Area.

The determination of wetland boundaries was made by EDR personnel in accordance with the three-parameter methodology described in the *USACE Wetland Delineation Manual* (hereafter referred to as the 1987 Manual) (Environmental Laboratory, 1987). Determination of wetland boundaries was also guided by the *Interim Regional Supplement to the USACE of Engineers Wetland Delineation Manual: Northcentral and Northeastern Region* (hereafter referred to as the Regional Supplement) (USACE, 2012). Attention was also given to the identification of potential hydrologic connections between wetland areas that could influence their jurisdictional status. Wetland boundaries were defined in the field with sequentially numbered pink surveyor's flagging and were subsequently mapped using a GPS unit with reported sub-meter accuracy.

Data were collected from one or more sample plots in each delineated wetland (depending on the size and diversity of ecological communities of the delineated area) and recorded on USACE Routine Wetland Determination forms (Appendix B). Data collected for each of the wetlands included dominant vegetation, hydrology indicators, and soil characteristics. Data collected for streams included information on channel width (mean high water mark), water depth, substrate material, bank condition, and gradient.

The vegetative data collection process focused on dominant plant species in four categories: trees (>3" diameter at breast height), saplings/shrubs (<3.0" diameter at breast height and >3.2' tall), herbs (<3.2' tall), and woody vines. Dominance was measured by visually estimating those species having the largest relative basal area (trees), greatest height (saplings/shrubs), greatest number of stems (woody vines), and greatest percentage of aerial coverage (herbaceous) by species. Dominant species for each stratum in the plant community were identified for all delineated wetlands on the site. The dominant species from each category are defined as those plants with the highest ranking which, when cumulatively totaled, exceeds 50 percent of the total dominance measure for that category, plus any additional plant species comprising 20 percent or more of the total dominance measure for the category. The species were rank ordered for each category by decreasing value of dominance.

Soils data at each sampling location were collected from a soil pit dug with a spade. Information concerning soil name, drainage classification, texture, matrix and redoximorphic feature color was obtained for each delineated wetland by reviewing the Chenango County Soil Survey and through field sampling. Soil colors were determined using Munsell Soil Charts (Munsell Color, 2009). These data were used to determine whether the soils displayed hydric characteristics. Hydric soils are those that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil layer. Hydric soils are poorly drained, and their presence is indicative of the likely occurrence of wetlands (Environmental Laboratory, 1987).

The Regional Supplement lists the following indicators as evidence of wetland hydrology (in order of decreasing reliability): (A1) surface water, (A2) high water table, (A3) saturation, (B1) water marks, (B2) sediment deposits, (B3) drift deposits, (B4) algal mat or crust, (B5) iron deposits, (B7) inundation visible on aerial imagery, (B8) sparsely vegetated concave surface, (B9) water-stained leaves, (B13) aquatic fauna, (B15) marl deposits, (C1) hydrogen sulfide odor, (C3) oxidized rhizospheres on living roots, (C4) presence of reduced iron, (C6) recent iron reduction in tilled soils, and (C7) thick muck surface. Hydrologic characteristics (inundation and soil saturation) were visually assessed to a depth of 12 inches. The hydrology indicators described above are considered "primary indicators," and any one of these indicators is sufficient evidence that wetland hydrology is present. In addition, "secondary indicators" used by EDR personnel included: (B6) surface soil cracks, (B10) drainage patterns, (B16) moss trim lines, (C2) dry-season water table, (C8) crayfish burrows, (C9) saturation visible on aerial imagery, (D1) saturation visible on aerial imagery, (D2) geomorphic position, (D3) shallow aquitard, (D4) microtopographic relief, and (D5) fac-neutral test. Any two of these also indicate the presence of wetland hydrology. Wetland hydrology, when combined with a dominant hydrophytic plant community and hydric soils, indicate the presence of a wetland.

Streams were identified according to the Cowardin Classification System (1979) and stream boundaries were determined based on the presence of ordinary high-water line characteristics. Typical ordinary high-water mark characteristics include a "clear, natural line impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; the presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding areas" (CFR, 1986). Stream boundaries were defined and mapped in the field using the same method as described above for wetlands. Data regarding stream gradient (gentle, moderate, or steep), stream bank and channel width, water depth, stream bed substrate, in-stream cover, and flow regime (perennial, intermittent, or ephemeral) were collected and recorded on a stream inventory form.

Photographs were taken of wetlands and streams delineated within the Study Area. Representative photographs of on site wetland and stream communities are included in Appendix C.

4.2 RESULTS

EDR delineated 50 wetlands within the Study Area, totaling approximately 16.2 acres. In addition, EDR delineated 41 streams, totaling approximately 10,645 linear feet (2.0 miles). In many cases, delineated wetlands and streams extend beyond the boundaries of the Study Area and are larger than the acreage documented within the Study Area. Information pertaining to individual delineated wetlands and streams is summarized in Table 3 below. Wetlands and streams were categorized as one or more of the following community types: emergent wetland (PEM), scrub-shrub wetland (PSS), forested wetland (PFO), open water (POW), riverine upper perennial (R3), riverine intermittent (R4), unknown perennial (R5), and riverine ephemeral (R6). All delineated wetlands and streams within the Study Area are depicted in Figure 7, and described in Section 4.2.1, below.

Table 3. Delineated Wetlands

Wetland Delineation ID ¹	Wetland Acreage Within Study Area ²					Stream(s) Present	Linear Feet of Stream(s) Within Wetland ³	Latitude of Centroid	Longitude of Centroid	Appendix A: Figure 7 Sheet Number(s)
	PFO	PSS	PEM	POW	Total					
1A	0.12				0.12	No	--	42.446832	-75.497691	1
1B		0.01			0.01	No	--	42.444842	-75.496855	1
1F		0.09			0.09	No	--	42.442772	-75.493504	1, 10
1H	0.87				0.87	No	--	42.4415	-75.493365	10
1J			0.02		0.02	No	--	42.439815	-75.491168	10
1K				0.05	0.05	No	--	42.439875	-75.486286	10, 11
1L			0.06		0.06	No	--	42.439929	-75.485148	10, 11
1M			0.38		0.38	No	--	42.439968	-75.482689	10, 11
1V			0.09		0.09	Yes: 7F	516	42.444112	-75.477795	11
1W		1.90	0.16		2.06	Yes: 7J	20	42.445158	-75.476998	5
1Z			0.16		0.16	No	--	42.451708	-75.471024	2, 5
2C			0.15		0.15	Yes: 7O, 7P	20, 76	42.452768	-75.465154	2, 5, 6
2D	0.66				0.66	Yes: 7S	22	42.444847	-75.467196	5, 6, 12
2E	0.03				0.03	Yes: 7Q	48	42.444913	-75.466129	5, 6, 12
2G	0.03				0.03	Yes: 7T	13	42.444571	-75.465416	5, 6, 12
2K			0.55		0.55	No	--	42.440217	-75.458048	12
2R			0.15		0.15	No	--	42.43086	-75.456092	15
2V	0.10	0.004			0.11	No	--	42.442836	-75.451028	12, 13
2Y	0.73	0.42	0.40		1.55	Yes: 8N, 8S	252, 75	42.447905	-75.450578	6, 7, 13
3A	0.29	0.04			0.32	No	--	42.451046	-75.449817	6, 7, 13
3B	0.11		0.21		0.32	Yes: 8T	288	42.452153	-75.449831	6, 7
3D	0.01				0.01	No	--	42.453597	-75.45007	6, 7
3F		0.50			0.50	No	--	42.458257	-75.444308	3, 7
3G	0.38	0.19			0.57	No	--	42.458943	-75.439466	3, 7

Wetland Delineation ID ¹	Wetland Acreage Within Study Area ²					Stream(s) Present	Linear Feet of Stream(s) Within Wetland ³	Latitude of Centroid	Longitude of Centroid	Appendix A: Figure 7 Sheet Number(s)
	PFO	PSS	PEM	POW	Total					
3H		0.12			0.12	No	--	42.461309	-75.440895	3
3I	0.15	0.16	0.14		0.44	No	--	42.462269	-75.438268	3, 4
3J			0.23		0.23	No	--	42.461621	-75.438889	3
3L			0.30		0.30	No	--	42.46234	-75.435547	3, 4
3N	0.23				0.23	No	--	42.460992	-75.432748	3,4
3O			0.18		0.18	No	--	42.461799	-75.433175	3, 4
3P				0.52	0.52	No	--	42.461091	-75.431102	3, 4
3Q	0.36		0.07		0.43	Yes: 9A	273	42.458156	-75.42951	3, 4
3S		0.15			0.15	No	--	42.458405	-75.428876	4
3T		0.24	1.05		1.29	Yes, 9G	824	42.455385	-75.426385	4
3Y			0.001		0.00	No	--	42.453409	-75.423497	8
4C			0.18		0.18	No	--	42.445496	-75.420404	8, 14
4D			0.03		0.03	Yes: 9Q	32	42.444355	-75.420537	14
4H			0.19		0.19	No	--	42.445803	-75.409864	9
4I			0.08		0.08	No	--	42.445035	-75.408947	9
4N			0.01		0.01	Yes: 9Z	26	42.442944	-75.407891	9
4X			0.01		0.01	No	--	42.431379	-75.421402	16
5F	0.27				0.27	No	--	42.41898	-75.404597	19, 20
5J	0.04				0.04	No	--	42.413526	-75.417996	20
5K	0.01				0.01	No	--	42.413119	-75.418292	20
5N			0.05		0.05	Yes: 10Z	59	42.413406	-75.417254	20
5P	0.06		0.002		0.07	No	--	42.409527	-75.416937	21
6A	1.29	0.13	0.13		1.54	Yes: 10Z	827	42.403363	-75.416148	21, 22
6E		0.47	0.30		0.77	No	--	42.399273	-75.418588	22
6F	0.14				0.14	Yes: 10Z	82	42.409622	-75.416209	21, 22
6G			0.03		0.03	No	--	42.442986	-75.407972	9
Total Wetlands: 50										

¹Delineation ID assigned by EDR. Wetlands identified outside the Detailed Study Area are not addressed in this report.

²Wetland community types are based upon the Cowardin et al. (1979) classification system: PEM = Palustrine Emergent, PFO = Palustrine Forested, POW = Palustrine Open Water, and PSS = Palustrine Scrub-Shrub.

³Linear feet of stream does not include distance where streams run through culverts.

Table 4. Delineated Streams

Stream Delineation ID ¹	Linear Feet of Stream Within Study Area ²	Stream Type ³	Stream Name	NYSDEC Stream Class ⁴	Latitude of Centroid	Longitude of Centroid	Appendix A: Figure 7 Sheet Number(s)
7C	169	R4 - Intermittent	--	--	42.442433	-75.493519	10
7D	78	R4 - Intermittent	Trib. of Guilford Creek	C	42.439964	-75.483394	10
7F	599	R3 - Upper Perennial	Trib. of Guilford Creek (Moses Brook)	C	42.444178	-75.477779	11
7I	32	R6 - Ephemeral	--	--	42.444716	-75.477981	5
7J	65	R6 - Ephemeral	--	--	42.444638	-75.477808	5
7K	104	R4 - Intermittent	--	--	42.449369	-75.470143	5
7O	27	R4 - Intermittent	--	--	42.452927	-75.465108	2, 5
7P	76	R6 - Ephemeral	--	--	42.452578	-75.465132	2, 5
7Q	69	R4 - Intermittent	--	--	42.444891	-75.466124	5, 6, 12
7S	318	R4 - Intermittent	--	--	42.444818	-75.466202	5, 6, 12
7T	84	R4 - Intermittent	--	--	42.444634	-75.465555	5, 6, 12
7W	269	R5 - Unknown Perennial	--	--	42.444866	-75.464971	5, 6, 12
7X	195	R4 - Intermittent	--	--	42.444987	-75.465498	5, 6, 12
8A	439	R4 - Intermittent	--	--	42.445292	-75.457994	6, 12, 13
8D	307	R4 - Intermittent	--	--	42.445614	-75.455465	6, 12, 13
8E	344	R4 - Intermittent	--	--	42.445721	-75.454244	6, 12, 13
8F	222	R4 - Intermittent	--	--	42.445699	-75.4538	6, 13
8H	189	R4 - Intermittent	--	--	42.445725	-75.45207	6, 13
8N	398	R3 - Upper Perennial	Trib. of Unadilla River	C	42.448723	-75.449789	6, 13
8O	285	R3 - Upper Perennial	Kent Brook	C(T)	42.446651	-75.449804	6, 13
8R	29	R6 - Ephemeral	--	--	42.449596	-75.449684	
8S	75	R6 - Ephemeral	--	--	42.449535	-75.449784	6, 13
8T	288	R5 - Unknown Perennial	Trib. of Unadilla River	C	42.452001	-75.449823	6, 7
9A	273	R4 - Intermittent	--	--	42.458012	-75.429181	4
9G	1115	R3 - Upper Perennial	Trib. of Unadilla River	C	42.455109	-75.425367	4
9H	215	R4 - Intermittent	--	--	42.45466	-75.424347	4, 8
9M	281	R5 - Unknown Perennial	--	--	42.451041	-75.423854	8
9O	200	R4 - Intermittent	--	--	42.447163	-75.42339	8
9Q	334	R4 - Intermittent	--	--	42.444188	-75.420766	14
9R	104	R6 - Ephemeral	--	--	42.444013	-75.420573	14
9U	164	R4 - Intermittent	--	--	42.444983	-75.408459	9
9W	5	R6 - Ephemeral	--	--	42.443946	-75.40841	9

Stream Delineation ID ¹	Linear Feet of Stream Within Study Area ²	Stream Type ³	Stream Name	NYSDEC Stream Class ⁴	Latitude of Centroid	Longitude of Centroid	Appendix A: Figure 7 Sheet Number(s)
9X	27	R4 - Intermittent	--	--	42.443525	-75.408127	9
9Y	104	R4 - Intermittent	--	--	42.443149	-75.40767	9
9Z	72	R4 - Intermittent	--	--	42.442684	-75.407933	9
10A	118	R6 - Ephemeral	--	--	42.441452	-75.410304	9, 14
10U	159	R6 - Ephemeral	--	--	42.404054	-75.415982	21, 22
10W	423	R6 - Ephemeral	--	--	42.403803	-75.41612	21, 22
10Z	2036	R3 - Upper Perennial	Trib. of Unadilla River	C	42.407126	-75.415982	20, 21, 22
11B	211	R3 - Upper Perennial	--	--	42.461224	-75.431901	3, 4
11C	142	R3 - Upper Perennial	--	--	42.460816	-75.430614	3, 4
Total Streams: 41							

¹Delineation ID assigned by EDR. Streams identified outside the Detailed Study Area are not addressed in this report.

²Linear feet of stream does not include distance where streams run through culverts.

³Stream types are based upon the Cowardin et al. (1979) classification system: R3 = Riverine Upper Perennial, R4 = Riverine Intermittent, R6 = Riverine Ephemeral.

⁴Based on existing NYSDEC stream mapping.

4.2.1 Wetlands and Streams

Descriptions of each wetland and stream community type delineated within the Study Area are presented below.

Many of the wetlands identified contained more than one community type (see Table 4 and Table 5).

Emergent wetlands (PEM) – Twenty-nine wetlands contain emergent wetland communities. These wetland areas are dominated by herbaceous vegetation including common rush (*Juncus effusus*), spotted jewelweed (*Impatiens capensis*), woolgrass (*Scirpus cyperinus*), and multiple sedge species (*Carex* spp.). Evidence of wetland soils included low chroma matrix with red colors (e.g., 5YR 4/2) and high chroma mottles (e.g., 7.5YR 4/6) throughout the matrices with prominent redox concentrations. Wetland hydrology indicators found within these areas at the time of delineation included standing surface water, high water table, soil saturation, drainage patterns, oxidized rhizospheres on living roots, inundation, and the presence of reduced iron. Representative photographs of emergent wetland communities are provided in Appendix C (see Photos 1, 2, 3, and 4).

Forested wetland (PFO) – Twenty wetlands contain forested wetland communities. These communities are dominated by trees that are 20 feet or taller, but also include an understory of shrubs and herbaceous species. Forested wetlands in the Study Area are dominated by red maple (*Acer rubrum*) and green ash (*Fraxinus pennsylvanica*) in the upper canopy. Shrub vegetation includes saplings of the above-mentioned species, highbush blueberry (*Vaccinium corymbosum*), and honeysuckle (*Lonicera* spp.). Herbaceous species in the forested wetlands included various sedges

(*Carex* spp.), false hellebore (*Veratrum viride*), sensitive fern (*Onoclea sensibilis*), and spotted jewelweed (*Impatiens capensis*). Evidence of wetland hydrology observed in these wetlands at the time of delineation typically included soil saturation, microtopographic relief, iron deposits, drainage patterns, and water stained leaves. Typical hydric soil indicators for forested wetlands included depleted matrix (F3), redox dark surface (F6), and depleted below dark surface (A11). Representative photographs of forested wetland communities are provided in Appendix C (see Photos 5, 6, 7, and 8).

Scrub-shrub wetlands (PSS) – Fourteen wetlands contain scrub-shrub vegetation. Scrub-shrub wetlands are characterized by dense stands of shrub species and small trees less than 20 feet tall. Shrub-scrub vegetation typically included various willow species (*Salix* spp.), highbush blueberry (*Vaccinium corymbosum*) and gray dogwood (*Cornus racemosa*). Herbaceous vegetation in these areas included reed canary grass (*Phalaris arundinacea*), sensitive fern, false hellebore (*Veratrum viride*), and spotted jewelweed (*Impatiens capensis*). Evidence of wetland hydrology observed in scrub-shrub wetlands at the time of delineation consisted of indicators such as drainage patterns, surface water, saturation, high water table, and microtopographic relief. Hydric soil indicators included depleted soils with low chroma (2 or less) and prominent redox concentrations. Representative photographs of scrub-shrub wetland communities are provided in Appendix C (see Photos 9, 10, 11, and 12).

Palustrine Open Water (POW) – Two wetlands contain open water communities. These open water features are bordered by upland forest and/or developed areas (e.g., roads or lawn). These open water communities have well-defined banks and fringes of emergent wetland vegetation. Although not verified, water depths of such ponds were typically estimated to be greater than four feet deep. Representative photographs of open water communities are provided in Appendix C (see Photos 13, 14, and 15).

Streams – A total of 41 streams were delineated within the Study Area. These streams are mostly located within forests and hedgerows, and generally have a gentle to moderate gradient (0-5%). Half of the delineated streams were identified as intermittent channels. Most of the streams were less than 10 feet wide with variable substrates and vegetative cover characteristics. Delineated stream channels are generally characterized by rock and cobble substrate and well-defined, abrupt, and steep banks, and primarily flow during the wet season (winter to spring). Representative photographs of stream communities are provided in Appendix C (see Photos 16, 17, 18, 19, and 20).

4.2.2 Wetland Functions and Values

A functions and values assessment was conducted following the general methodology described in the *Wetlands Functions and Values: Descriptive Approach* described in the September 1999 supplement to *The Highway Methodology Workbook* (Supplement) by the New England Division of the USACE (USACE, 1995). Wetland functions are ecosystem properties that result from the biologic, geologic, hydrologic, chemical and/or physical processes that take place within a wetland. These functions include:

1. Groundwater Recharge/Discharge
2. Flood flow Alteration (Storage and Desynchronization)
3. Fish and Shellfish Habitat
4. Sediment/Toxicant/Pathogen Retention
5. Nutrient Removal/Retention/Transformation
6. Production (Nutrient) Export
7. Sediment/Shoreline Stabilization
8. Wildlife Habitat

Wetland values are the perceived benefits for society that can be derived from the ecosystem functions and/or other characteristics of a wetland. Values attributed to wetlands in the Supplement include the following:

1. Recreation
2. Education/Scientific Value
3. Uniqueness/Heritage
4. Visual Quality/Aesthetics
5. Threatened or Endangered Species Habitat

Wetlands functions and values recognized under Article 24 of the Environmental Conservation Law and Regulations are similar to those described in the Supplement, and include:

1. Flood and storm control by the hydrologic absorption and storage capacity of wetlands;
2. Breeding, nesting and feeding habitat for many forms of wildlife, including migratory wildfowl and rare species such as the bald eagle and osprey;
3. Protection of subsurface water resources and recharge of ground water supplies;
4. Recreation by providing areas for hunting, fishing, boating, hiking, bird watching, photography, camping and other uses;
5. Pollution treatment by serving as biological and chemical oxidation basins;
6. Erosion control by serving as filtering basins, absorbing silt and organic matter and protecting channels and harbors;

7. Education and scientific research by providing outdoor bio-physical laboratories, living classrooms and training/education resources;
8. Open space and aesthetic appreciation by providing often the only remaining open areas along crowded river fronts and coastal regions;
9. Sources of nutrients in freshwater food cycles and nursery grounds and sanctuaries for fish.

Based on the “Considerations/Qualifiers” outlined in the Supplement, EDR developed a spreadsheet that includes several basic considerations that help identify the primary functions and values provided by wetlands. These considerations include observed vegetation conditions, hydrologic conditions, size, adjacent area conditions, and the availability of public access. Specific conditions within each of these consideration areas were also defined to allow each wetland’s functions and values to be evaluated based on data collected during field delineation. A total of 50 wetlands delineated within the Study Area were entered into the spreadsheet and wetland characteristics identified for each. Data regarding these wetland characteristics and associated functions and values were based on upon the field work completed in fall 2018 and spring/summer 2019. Based on the entered data within the spreadsheet, the primary functions and values provided by each wetland were identified. Results of this evaluation are presented in Appendix D and are also summarized below.

The functions and values assessment indicated that all 50 of the delineated wetlands within the Study Area are expected to exhibit some level of groundwater recharge/discharge. The next most common functions identified included wildlife habitat (22 wetlands), nutrient removal/retention/transformation (19 wetlands), flood flow alteration (12 wetlands), and sediment/pollutant retention (6 wetlands). For small- (<1-acre) and medium-sized (1-5-acre) wetlands, these functions are expected to be somewhat limited. On the other hand, the six largest (>5-acre) wetlands are anticipated to provide substantial levels of these functions. Four of the largest delineated wetlands (1W, 3I, 3T, and 6A) were determined to provide an important wildlife habitat function (in addition to several other primary functions) because they represent sizeable wetland complexes, exhibit interspersions of vegetation classes and/or open water, include multiple wetland cover types, and have forested adjacent areas. The combination of these qualities is anticipated to provide habitat for a diversity of wildlife species.

In addition to several of the functions described above, two of the delineated wetlands within the Study Area (3P and 3T) were also expected to provide production export functions given the presence of considerable wildlife food sources within the wetlands, evidence of detritus development, and high vegetation density. These wetlands are expected to have higher productivity level and the potential to yield resources that can be consumed by wildlife and downstream organisms. Many of the medium-sized (1-5-acre) delineated wetlands within the Study Area were noted as having standing water and/or have enhanced water quality and groundwater recharge/discharge functions. However, because

these wetlands lacked some of the conditions of the largest wetlands described above (e.g., less vegetation interspersed/diversity, single cover types), most of these wetlands were anticipated to provide wildlife habitat for a more limited number of species.

More than 20 of the delineated wetlands are associated with perennial or intermittent streams, with 12 of these likely providing considerable flood flow attenuation functions. Those which contain dense vegetation and show evidence of inundation or a variable water level throughout the year were considered to provide an enhanced flood flow alteration function. A combination of these characteristics suggests the ability to slow or disperse waters from flooding events and reduce the potential for damage to lands downstream. Wetlands that contained dense herbaceous vegetation and that are also bordered by a perennial or intermittent stream were determined to provide shoreline stabilization functions. Dense herbaceous vegetation surrounding a watercourse serves to stabilize banks and act as a buffer against the erosional forces of flood events. Three wetlands associated with perennial streams were also determined to provide potential fish and/or shellfish habitat.

Many of the wetlands which provide flood flow attenuation also contain seasonal pools, standing water, or dense vegetation, and have the potential to provide a substantial water quality enhancement function. Dense vegetation aids in filtering out sediment and the uptake of nutrients while standing or slow-moving water in seasonal pools and inundated areas allow for sediment and pollutants to settle out of the water column or be adsorbed. Sediment/pollutant retention was also considered an important function when wetlands were near roadways or other development areas (e.g., 3S and 3T).

More than half of the wetlands are also adjacent to active or semi-active agricultural areas and/or developed land. Many of these wetlands contained dense herbaceous vegetation, standing water, and some also border watercourses. These areas are likely to play a role in water quality improvement by adsorbing nutrients from agricultural runoff and preventing excess nutrients from affecting downstream watercourses.

Due to the private ownership of all properties within the Study Area, none of the delineated wetlands provide any substantial social values such as recreation, education/scientific value, or visual quality/aesthetics for the general public. However, recreation and visual quality/aesthetics values were identified for several larger and/or more open wetlands in recognition of their potential importance to private landowners. Uniqueness/heritage value is usually applied to wetlands which provide a special value in the context of the overall landscape, contain cultural features, or represent a rare wetland or habitat type within the local area. None of the delineated wetlands within the Study Area were noted as having any unique or rare characteristics that might be considered for this value.

Additionally, habitat for known endangered or threatened species are generally not present within the delineated wetland features. Other than providing potential summer roosting habitat for northern long-eared bat (*Myotis septentrionalis*) and potential nesting habitat for the bald eagle (*Haliaeetus leucocephalus*), none of the wetlands within the Study Area are considered likely to provide substantial habitat opportunities for listed threatened or endangered species.

4.2.3 Vernal Pools

A vernal pool study was conducted in April and May 2019 under appropriate seasonal conditions to identify potentially sensitive vernal pool habitats within the Study Area, provide an understanding of potential Facility-related impacts, and inform impact avoidance and minimization efforts. For additional details, please refer to the Vernal Pool Survey Report prepared for the High Bridge Wind Project Article 10 Application (Appendix 22-E).

5.0 CONCLUSIONS

EDR delineated a total of 50 wetlands within the Study Area totaling 16.2 acres. These wetlands were identified based on the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. The delineated wetlands included emergent, forested, scrub-shrub, and open water wetland communities. EDR also delineated 41 streams, totaling approximately 10,645 linear feet (2.0 miles) within the Study Area. The delineated streams included perennial, perennial, and ephemeral channels. The primary functions provided by wetlands and streams within the Study Area include groundwater recharge/discharge, wildlife habitat, nutrient removal/retention/transformation, and flood flow alteration.

EDR's analyses suggest that all delineated wetlands and streams are likely to be considered jurisdictional by the USACE under Section 404 of the Clean Water Act due to hydrological connections with WOUS. No NYSDEC-mapped wetlands and no delineated wetlands exceeding 12.4 acres are located within the Study Area. One delineated stream, Stream 80, corresponds with a NYSDEC-mapped Class C(T) stream and therefore, pursuant to Article 15, this stream may be under the jurisdiction of the NYSDEC. Final determinations of wetland and stream jurisdictional status must be made USACE and NYSDEC staff.

6.0 REFERENCES

- Code of Federal Regulations (CFR). 1986. 33 CFR 329.11. Navigation and Navigable Waters: Definition of Navigable Waters of the United States. Available at: <https://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=2fcc86a0ae4919652ccaf4d67829679d&rqn=div5&view=text&node=33:3.0.1.1.35&idno=33>. Accessed June 2019.
- Cowardin, L.M., V. Carter, F.C. Goblet and E.T. LaRoae. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Fish and Wildlife Service, OBS-79/31, Washington, D.C.
- Environmental Laboratory. 1987. *Corps of Engineers Wetland Delineation Manual*. Technical Report Y-87-1. U.S. Army Corps of Engineers: Waterways Experiment Station; Vicksburg, MS.
- Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2016. *The National Wetland Plant List: 2016 Update of Wetland Ratings*. Phytoneuron 2014-41: 1-42. https://wetland_plants.usace.army.mil (Accessed June 2019).
- Munsell Color. 2009. Munsell Soil Color Book. X-Rite, Incorporated. Grand Rapids, MI.
- National Oceanic and Atmospheric Administration (NOAA). 2019. *Temperature and Precipitation Summary for Norwich, NY, 1998-2019*. NOAA Regional Climate Center. Available at: <http://aqacis.rcc-acis.org/?fips=36017> Accessed June 2019.
- Natural Resources Conservation Service (NRCS). 2018. Web Soil Survey. Available at: <http://websoilsurvey.nrcs.usda.gov/> (Accessed March 2018).
- NRCS. 2017. New York Portion of the 2017 National Hydric Soil List. Available at: <http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric> Accessed June 2019.
- New York Natural Heritage Program (NYNHP). 2019. Online Conservation Guide for Vernal Pools. Available at: <http://www.acris.nynhp.org/guide.php?id=9902>. Accessed April 2019.
- New York Department of Environmental Conservation (NYSDEC). 2015. List of Endangered, Threatened and Special Concern Fish & Wildlife Species of New York State. Available at: <https://www.dec.ny.gov/animals/7494.html>. Accessed April 2019.
- NYSDEC. 2018. Susquehanna River Watershed. Available at: <https://www.dec.ny.gov/lands/48020.html> Accessed January 2019.
- New York Statewide Digital Orthoimagery Program (NYSDOP). 2018. 2018 Annual Lot. Available at: <https://gis.ny.gov/gateway/orthoprogram/lot18/> Accessed January 2019.
- USACE. 1995. *The Highway Methodology Workbook Supplement. Wetland Functions and Values: A Descriptive Approach*. U.S. Army Corps of Engineers, New England Division. NENEP-360-1-30a. 32PP.
- USACE. 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*. ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
- United States Department of Agriculture (USDA). 1981. Soil Survey of Chenango County, New York. United States Department of Agriculture, Soil Conservation Service, Washington, D.C.

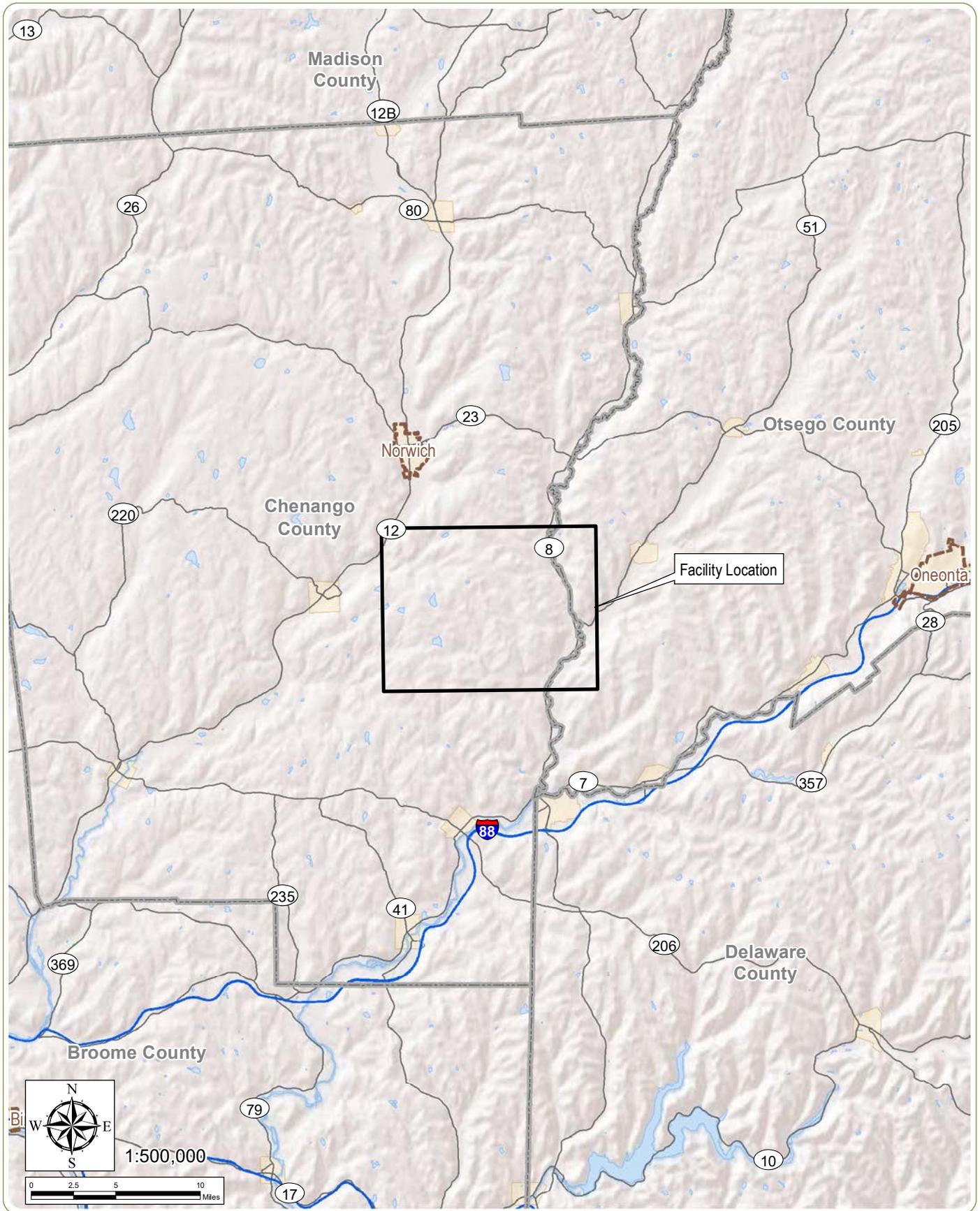
United States Environmental Protection Agency (USEPA). 2001. *Interagency Memorandum from Gary S. Guzy (General Counsel for the U.S. Environmental Protection Agency) and Robert M. Anderson (Chief Counsel for the U.S. Army Corps of Engineers)*. Memorandum Subject: Supreme Court Ruling Concerning CWA Jurisdiction over Isolated Waters.

USFWS. 2016. Wetlands Mapper Documentation and Instruction Manual. National Standards and Support Team, Madison, Wisconsin.

Weldy, Troy, David Werier, and Andrew Nelson. 2018. New York Flora Atlas. [S.M. Landry and K.N. Campbell (original application development), USF Water Institute. University of South Florida. New York Flora Association, Albany, New York.

Appendix A

Figures



High Bridge Wind Project
 Town of Guilford, Chenango County, New York

Figure 1: Regional Facility Location

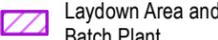
Notes: 1. Basemap: ESRI "Shaded Relief" map service. 2. This map was generated in ArcMap on July 31, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.

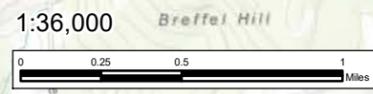
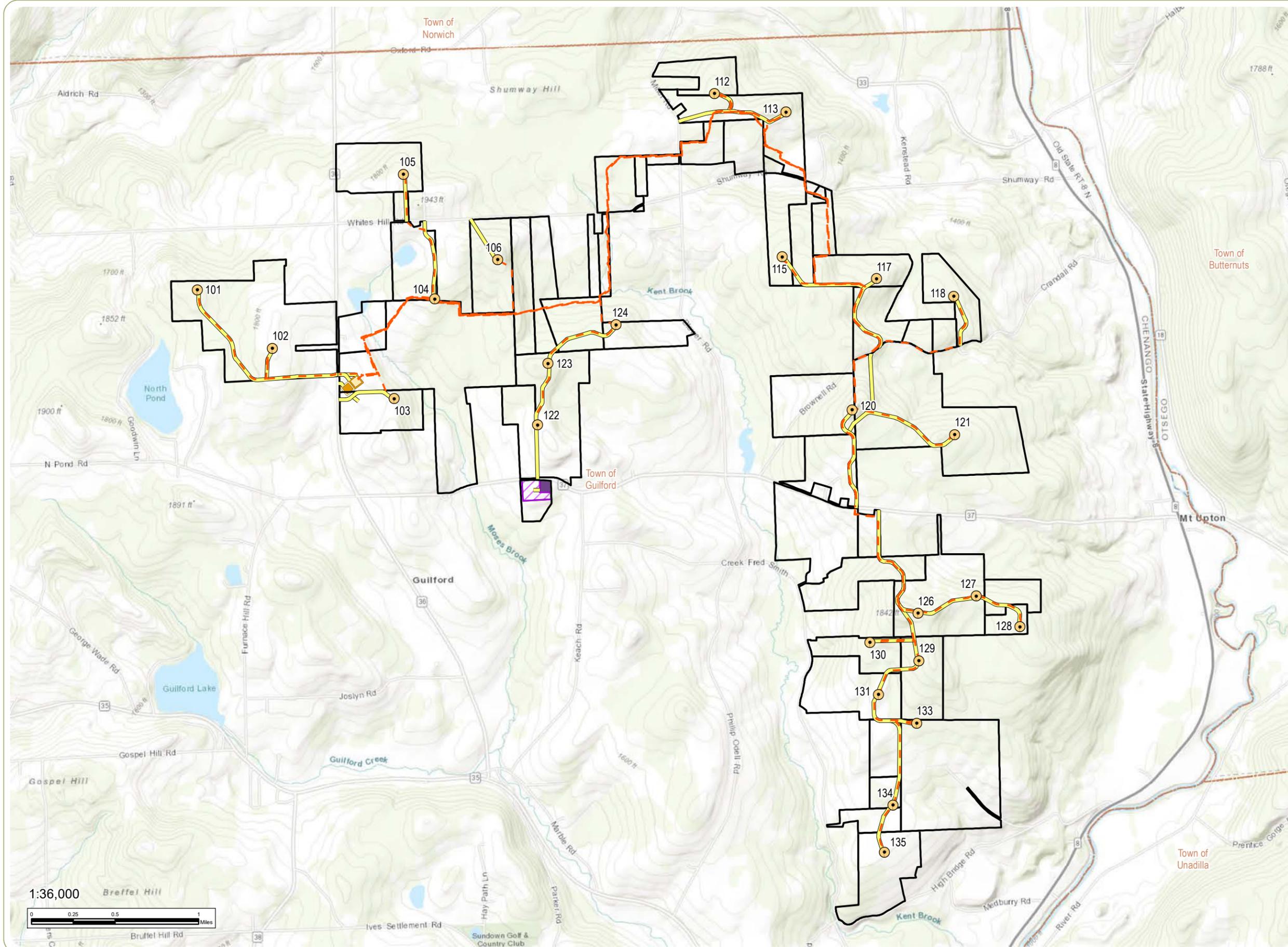


High Bridge Wind Project

Town of Guilford, Chenango County, New York

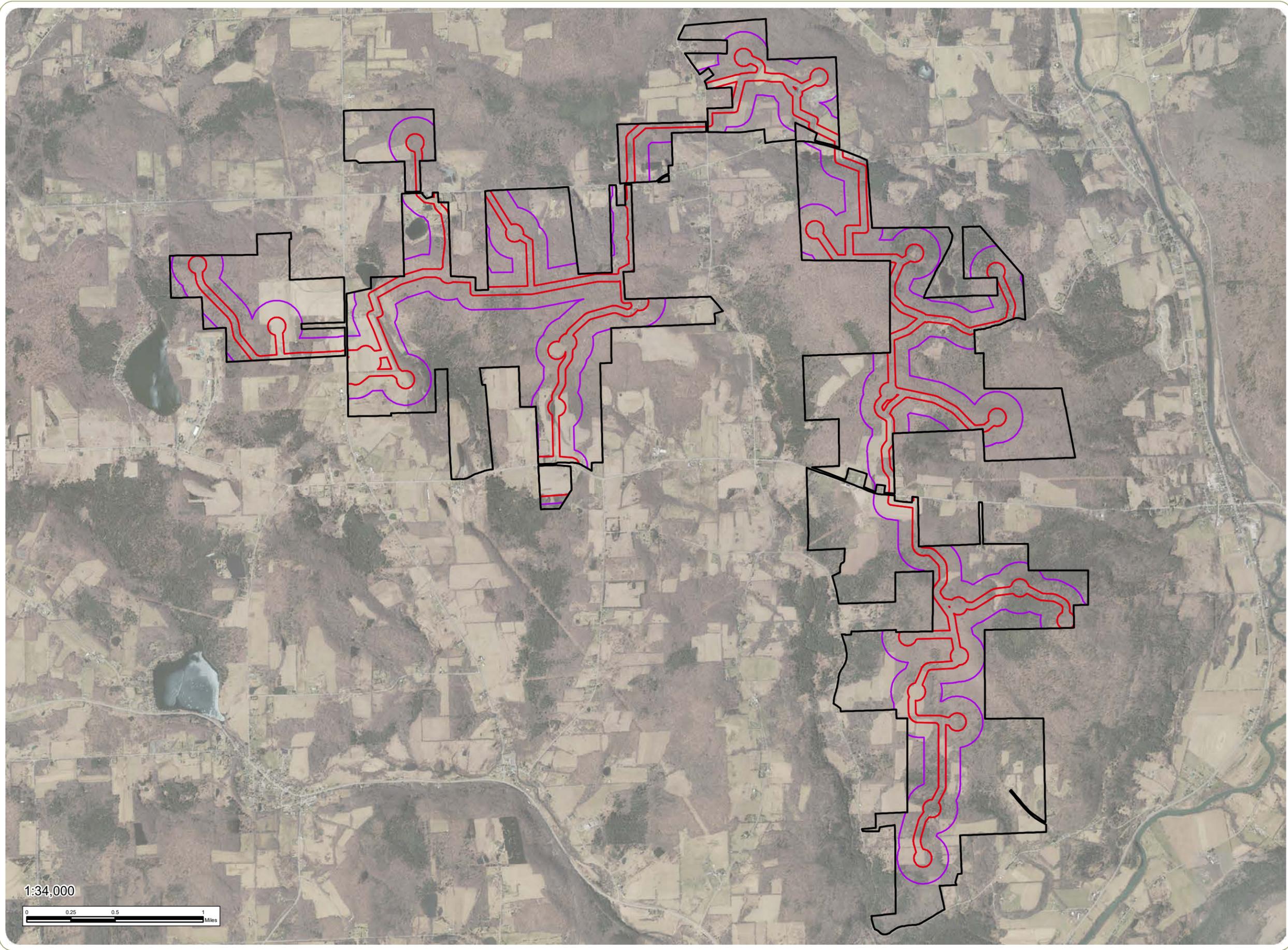
Figure 2: Facility Layout

-  Wind Turbine
-  Access Road
-  Collection Line
-  POI Substation
-  Collection Substation
-  O&M Building
-  Laydown Area and Batch Plant
-  Facility Site
-  Town Boundary



Notes: 1. Basemap: ESRI ArcGIS Online "World Topographic Map" map service. 2. This map was generated in ArcMap on July 31, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.





High Bridge Wind Project

Town of Guilford, Chenango
County, New York

Figure 3: Study Area

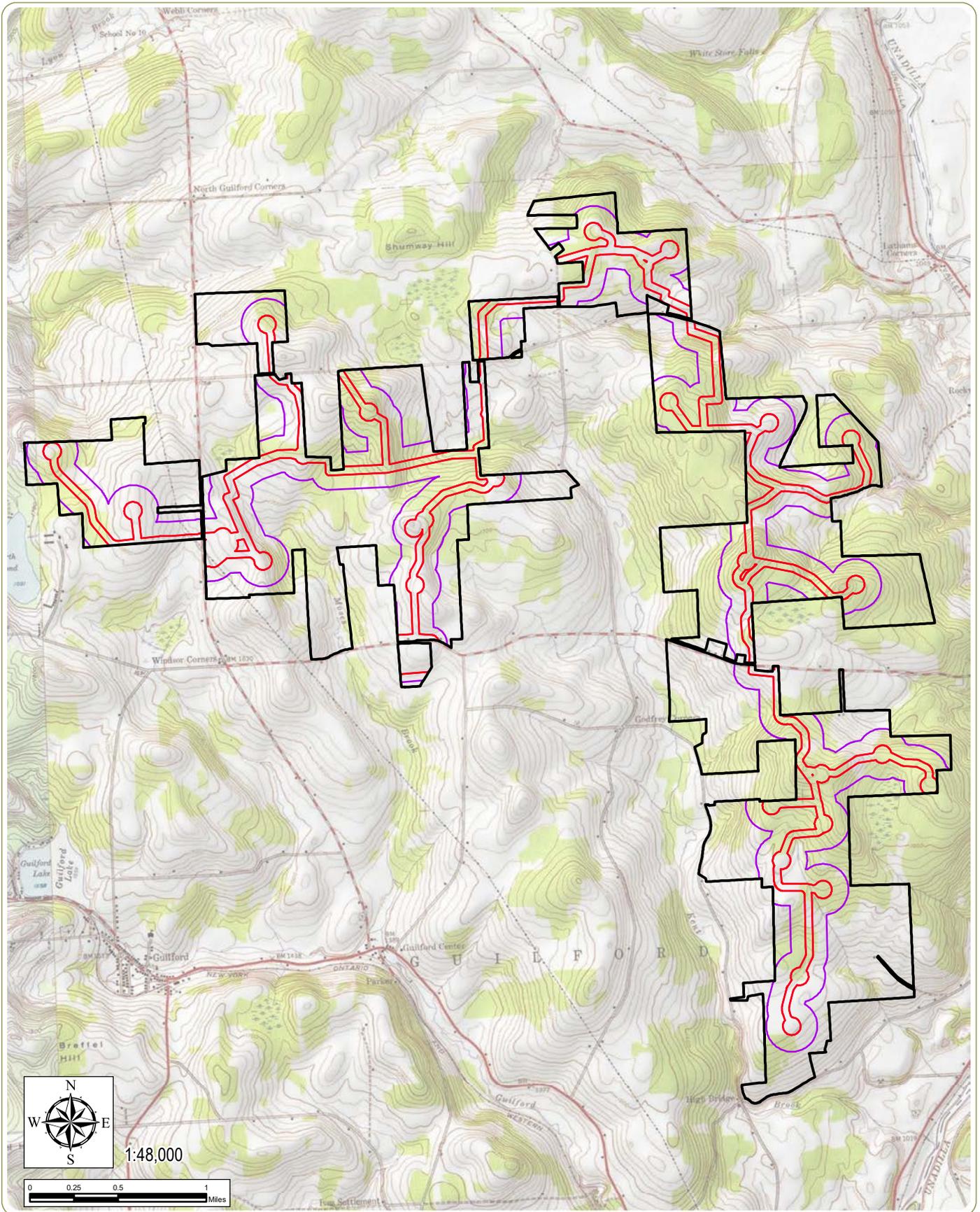
-  Detailed Wetland Study Area
-  500-foot (Article 10) Wetland Study Area
-  Facility Site

Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on July 31, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.

1:34,000
0 0.25 0.5 1 Miles



www.edrdpc.com



High Bridge Wind Project

Town of Guilford, Chenango County, New York

Figure 4: Topographic Mapping

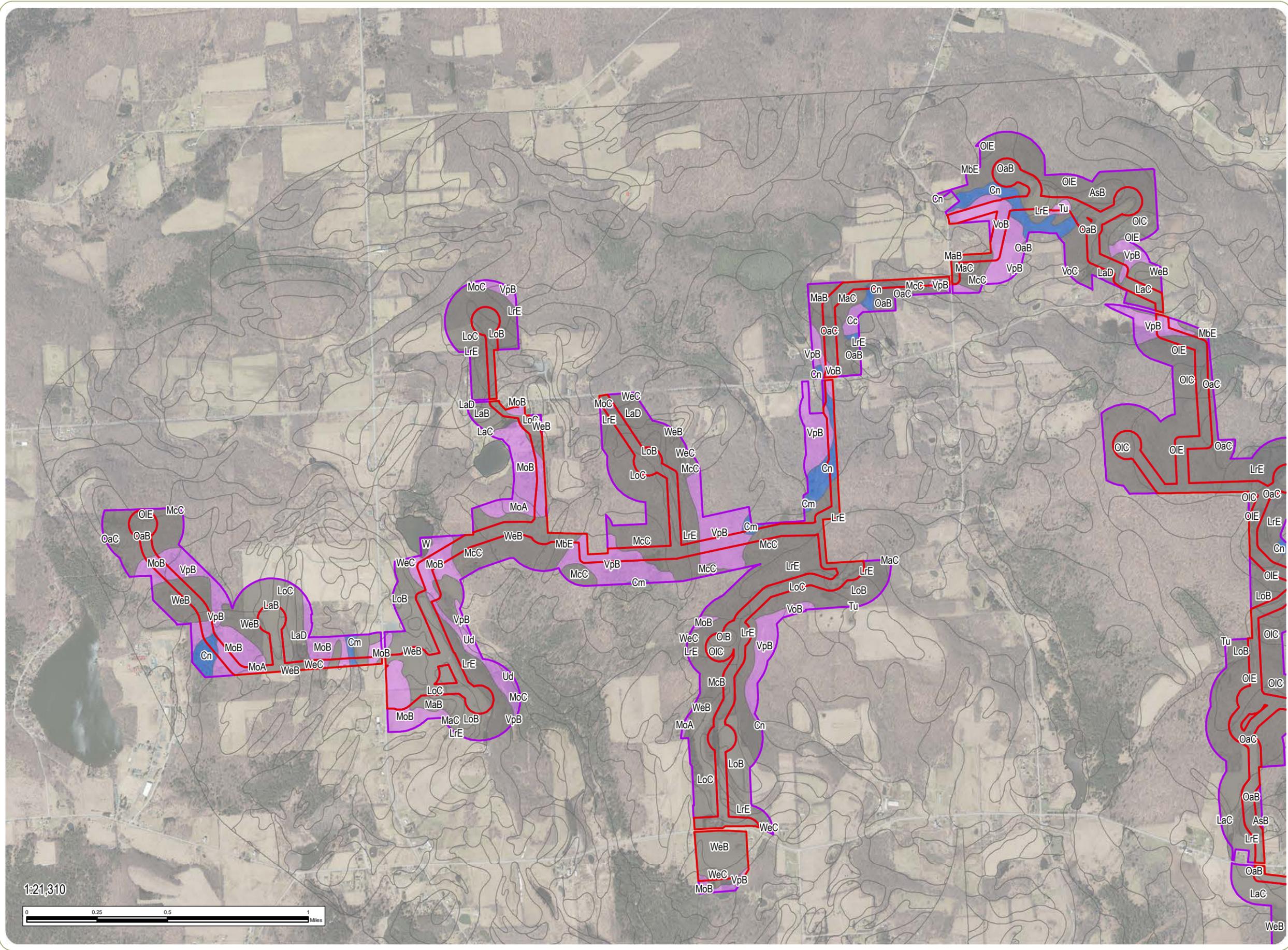
Notes: 1. Basemap: ESRI ArcGIS Online "USA Topo Maps" map service. 2. This map was generated in ArcMap on July 31, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.

- Detailed Wetland Study Area
- 500-foot (Article 10) Wetland Study Area
- Facility Site

High Bridge Wind Project

Town of Guilford, Chenango County, New York

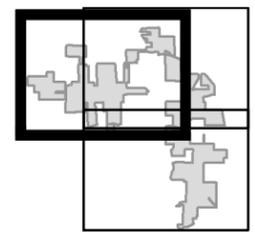
Figure 5: Study Area Soils



Detailed Wetland Study Area
 500-foot (Article 10) Study Area

Hydric Rating

Hydric
 Potentially Hydric
 Not Hydric



Sheet 1 of 3

Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on July 31, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.

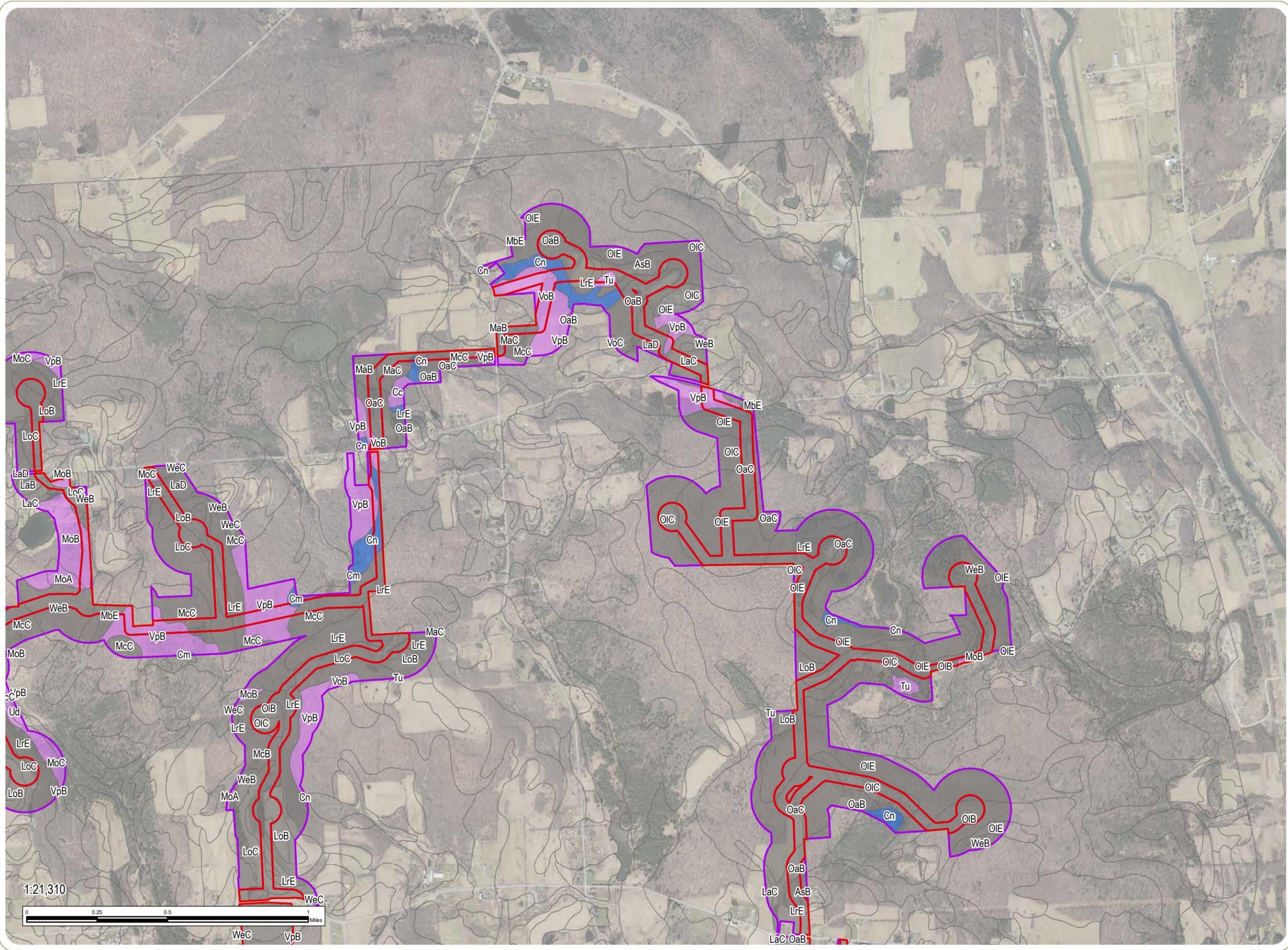


www.edrdpc.com

High Bridge Wind Project

Town of Guilford, Chenango County, New York

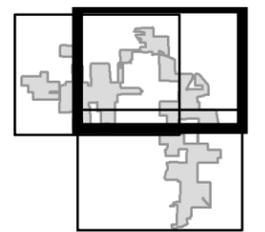
Figure 5: Study Area Soils



Detailed Wetland Study Area
 500-foot (Article 10) Study Area

Hydric Rating

Hydric
 Potentially Hydric
 Not Hydric



Sheet 2 of 3

Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on July 31, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.

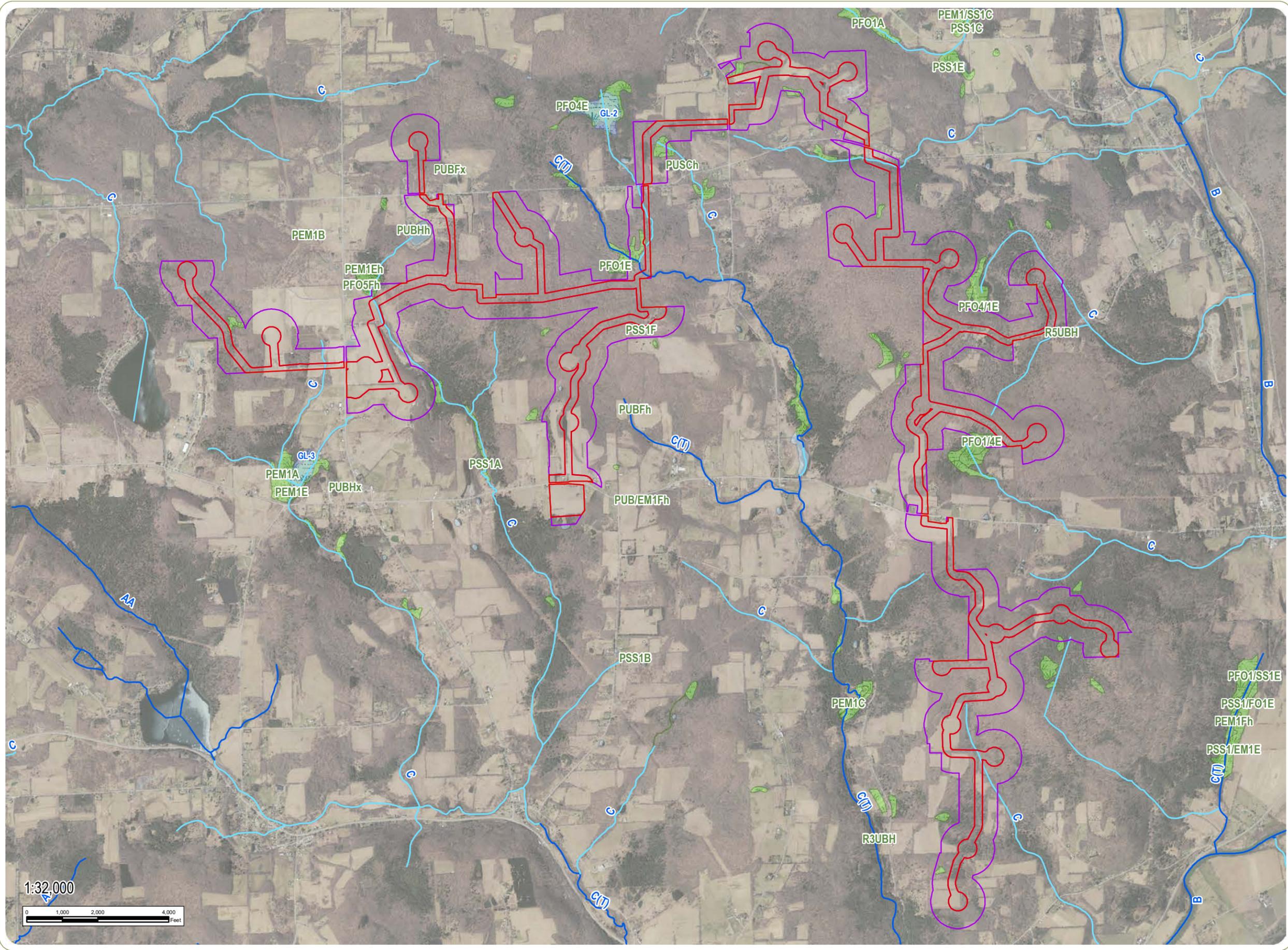


www.edrdpc.com

High Bridge Wind Project

Town of Guilford, Chenango County, New York

Figure 6: Mapped Wetlands and Streams



- NYS Protected Stream
- Unprotected Stream
- NYSDEC Mapped Wetland
- NWI Mapped Freshwater Wetland
- NWI Mapped Freshwater Pond/Lake/Riverine
- Detailed Wetland Study Area
- 500-foot (Article 10) Wetland Study Area

Notes: 1. Basemap: NYS DOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on July 31, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.

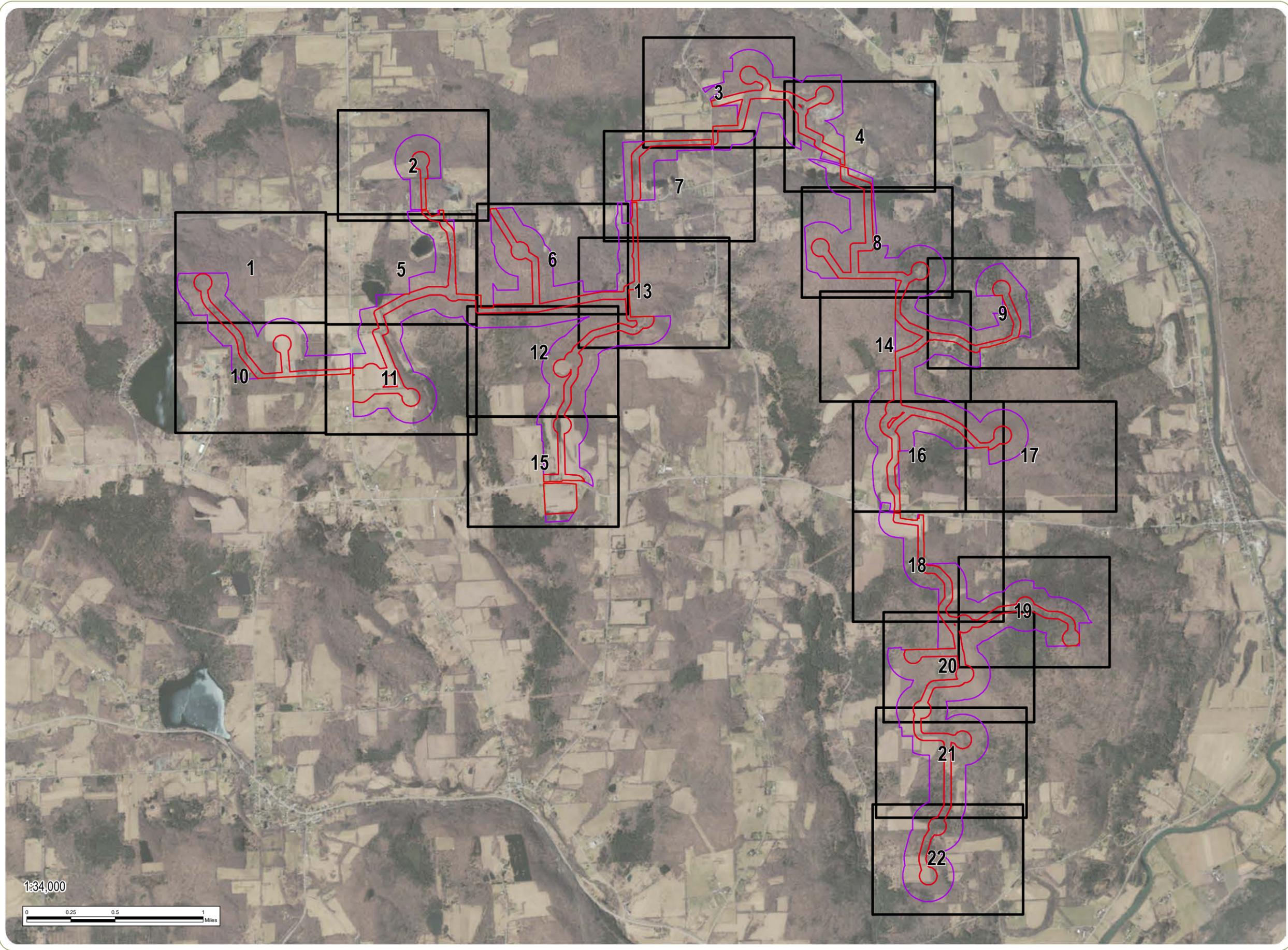
www.edrdpc.com

High Bridge Wind Project

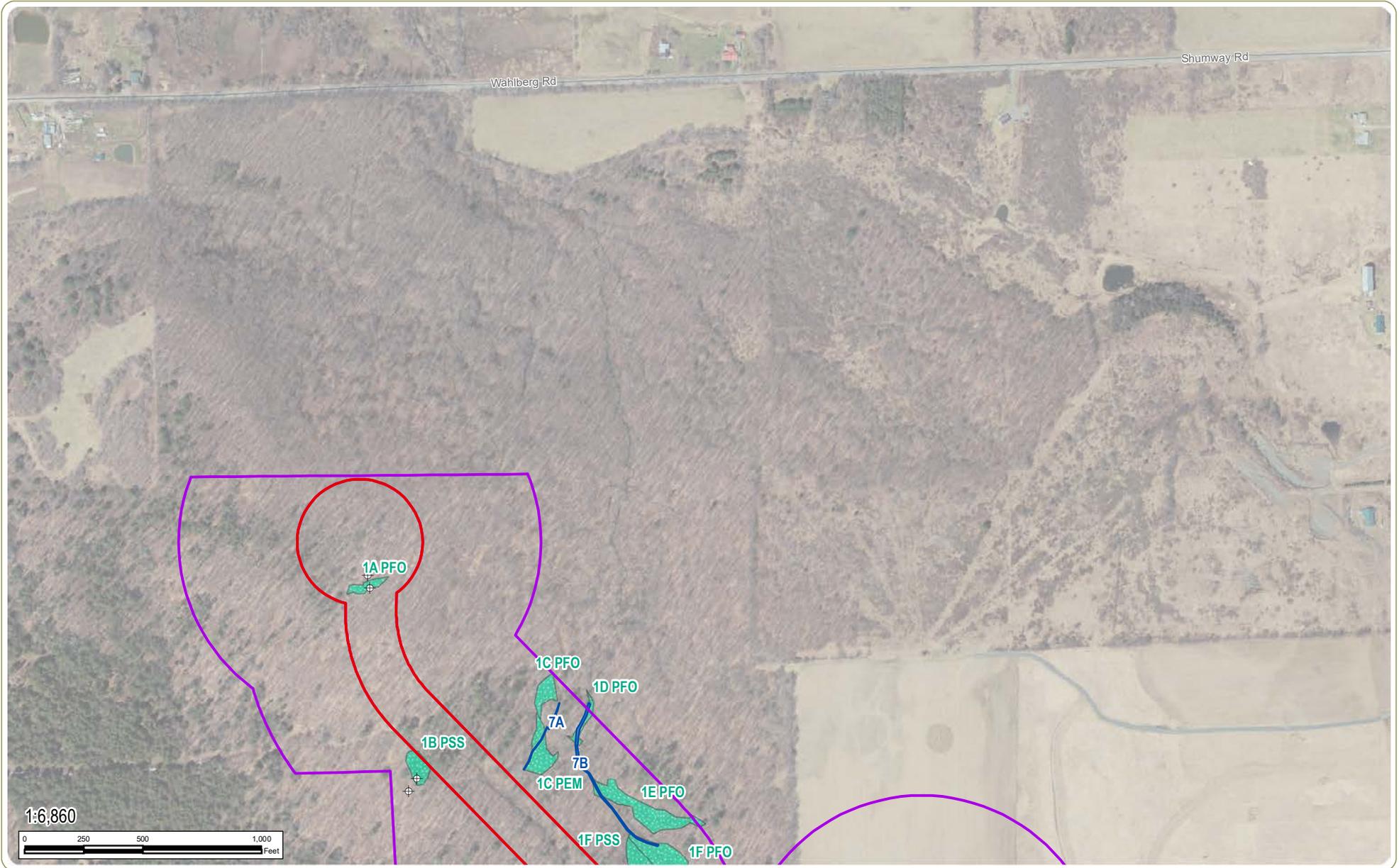
Town of Guilford, Chenango County, New York

Figure 7: Delineated Wetlands and Streams - Index

- Map Sheet
- Detailed Wetland Study Area
- 500-foot (Article 10) Study Area



Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on July 31, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



High Bridge Wind Project

Town of Guilford, Chenango County, New York

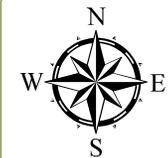
Figure 7: Delineated Wetlands and Streams

- ⊕ Data Sampling Point
- ▬ Delineated Stream
- ▨ Delineated Wetland
- ▭ Detailed Wetland Study Area
- ▭ 500-foot (Article 10) Wetland Study Area

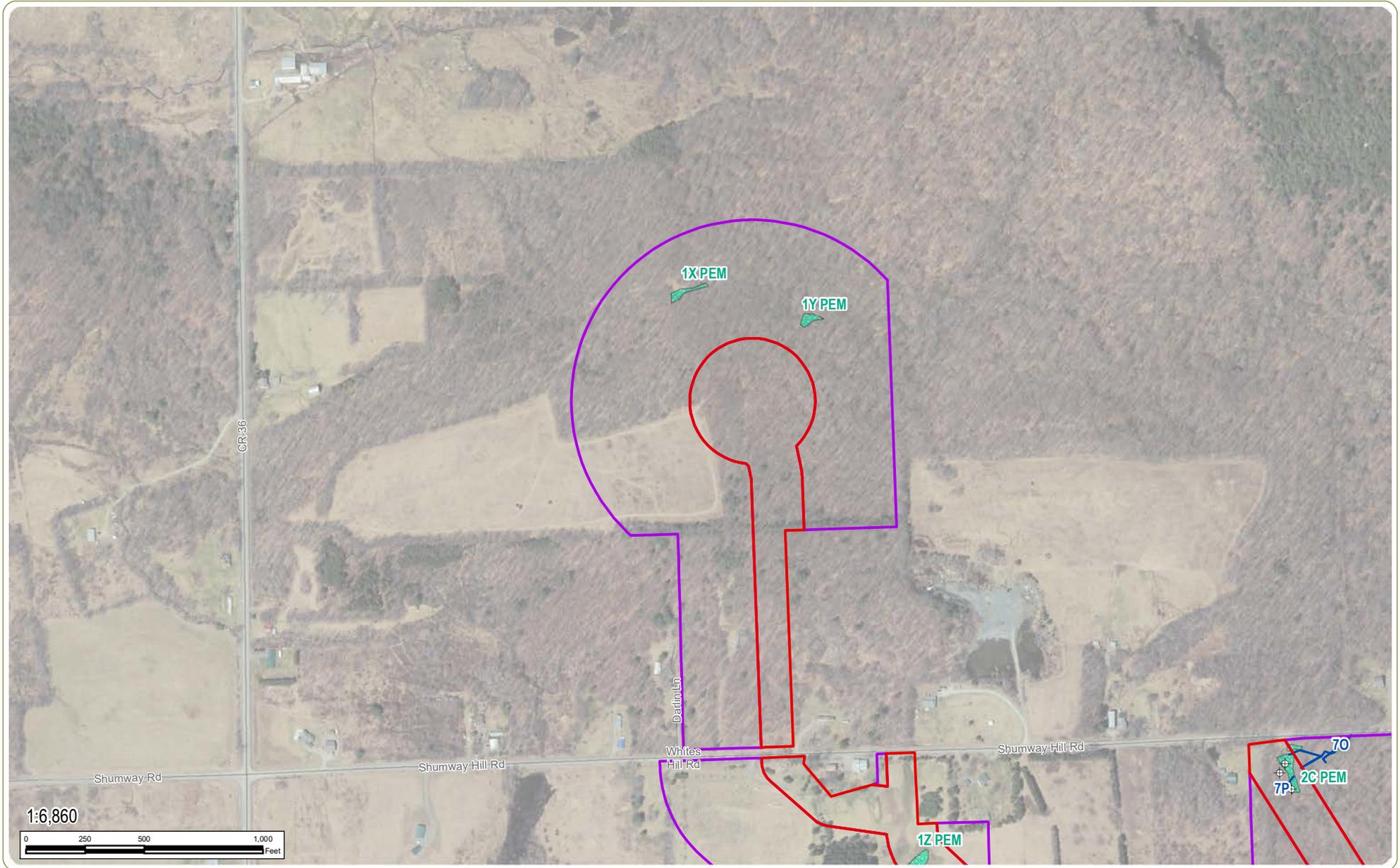
Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 1 of 22



www.edrdpc.com



High Bridge Wind Project
Town of Guilford, Chenango County, New York

Figure 7: Delineated Wetlands and Streams

- Delineated Wetland
- Detailed Wetland Study Area
- 500-foot (Article 10) Wetland Study Area

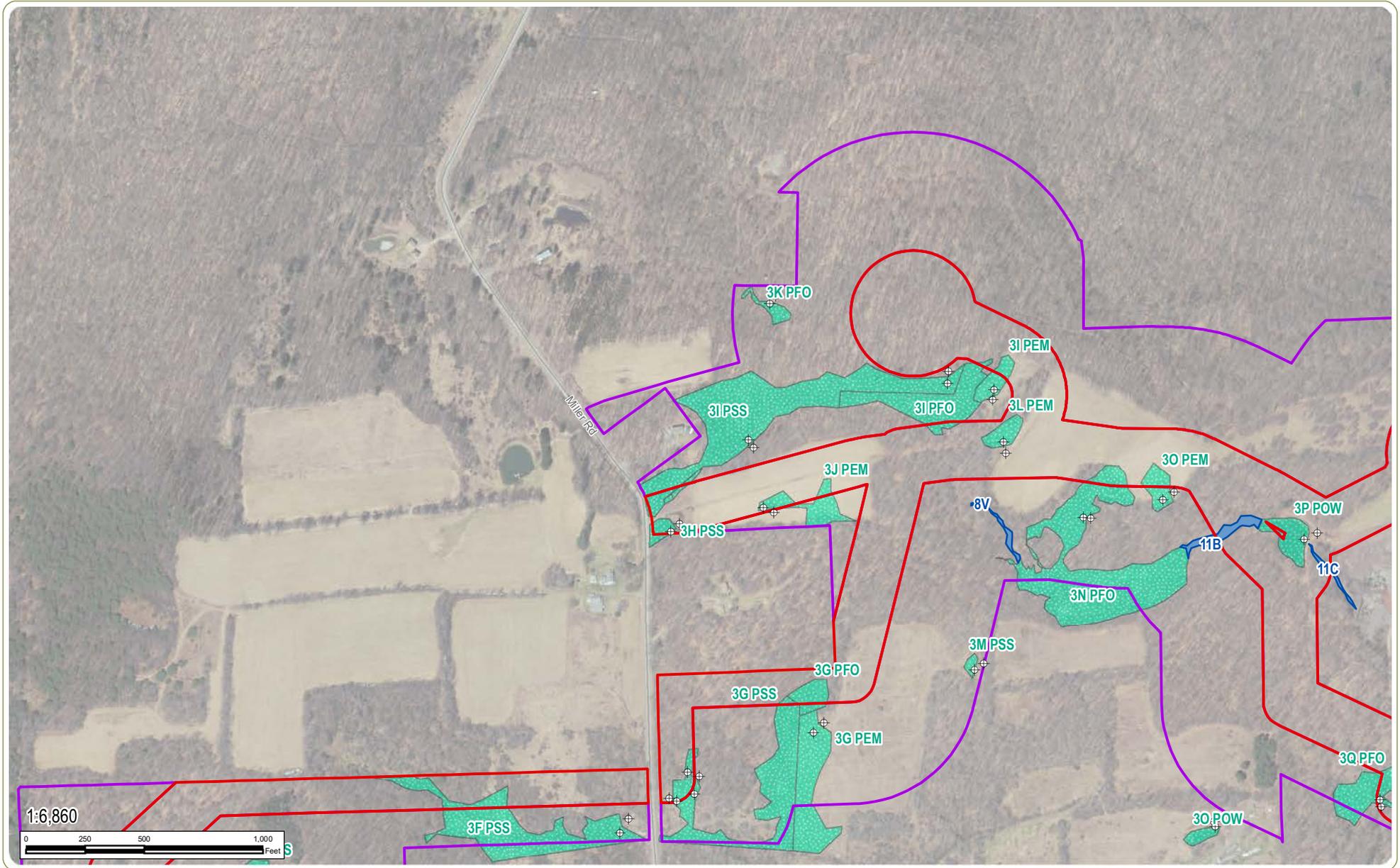
Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 2 of 22



www.edrdpc.com

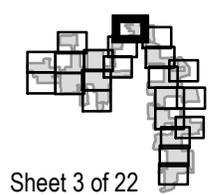


High Bridge Wind Project

Town of Guilford, Chenango County, New York

Figure 7: Delineated Wetlands and Streams

- ⊕ Data Sampling Point
- ▬ Delineated Stream
- ▨ Delineated Wetland
- ▭ Detailed Wetland Study Area
- ▭ 500-foot (Article 10) Wetland Study Area

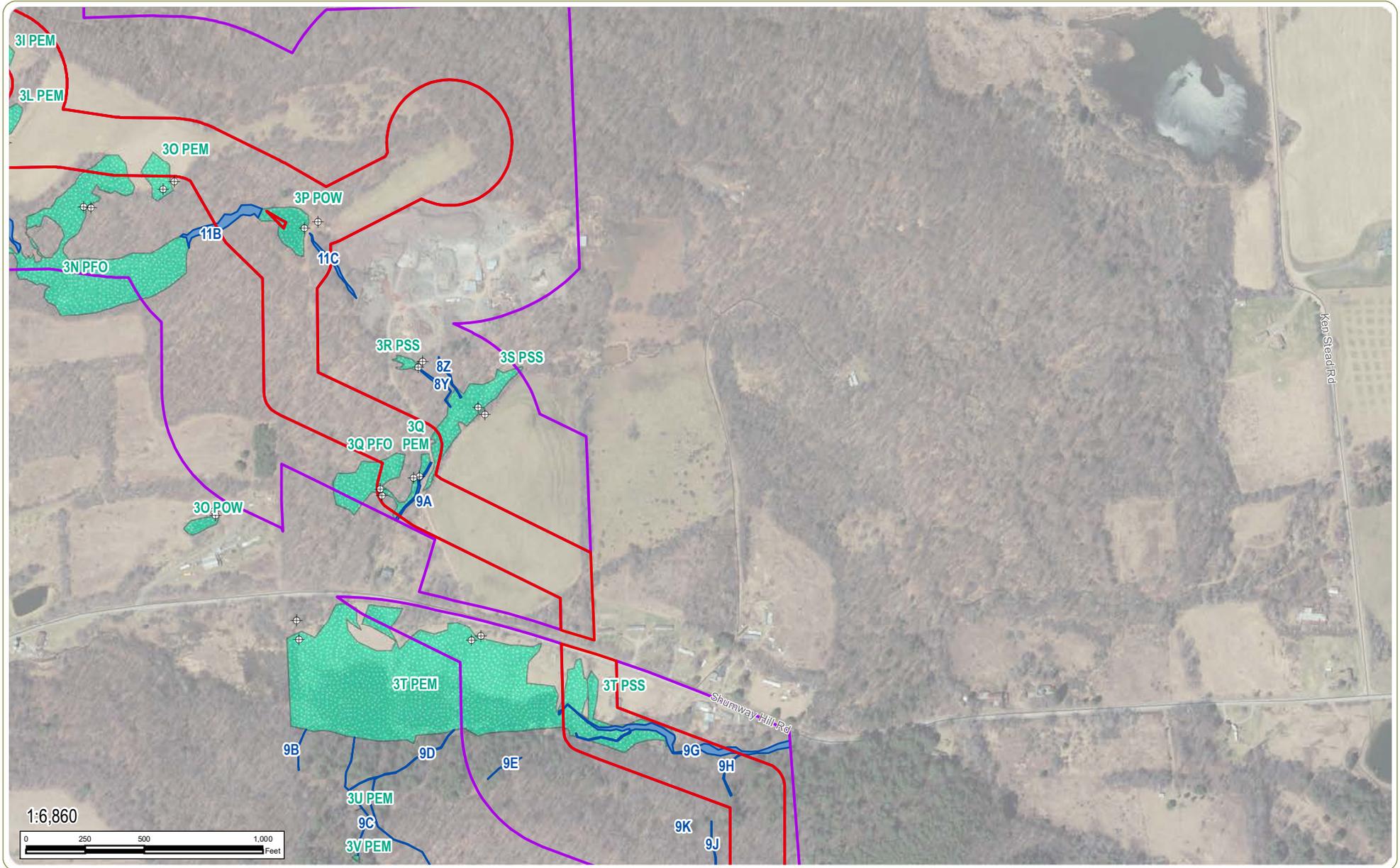


Sheet 3 of 22



www.edrdpc.com

Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



High Bridge Wind Project

Town of Guilford, Chenango County, New York

Figure 7: Delineated Wetlands and Streams

- ⊕ Data Sampling Point
- ▬ Delineated Stream
- ▨ Delineated Wetland
- ▭ Detailed Wetland Study Area
- ▭ 500-foot (Article 10) Wetland Study Area

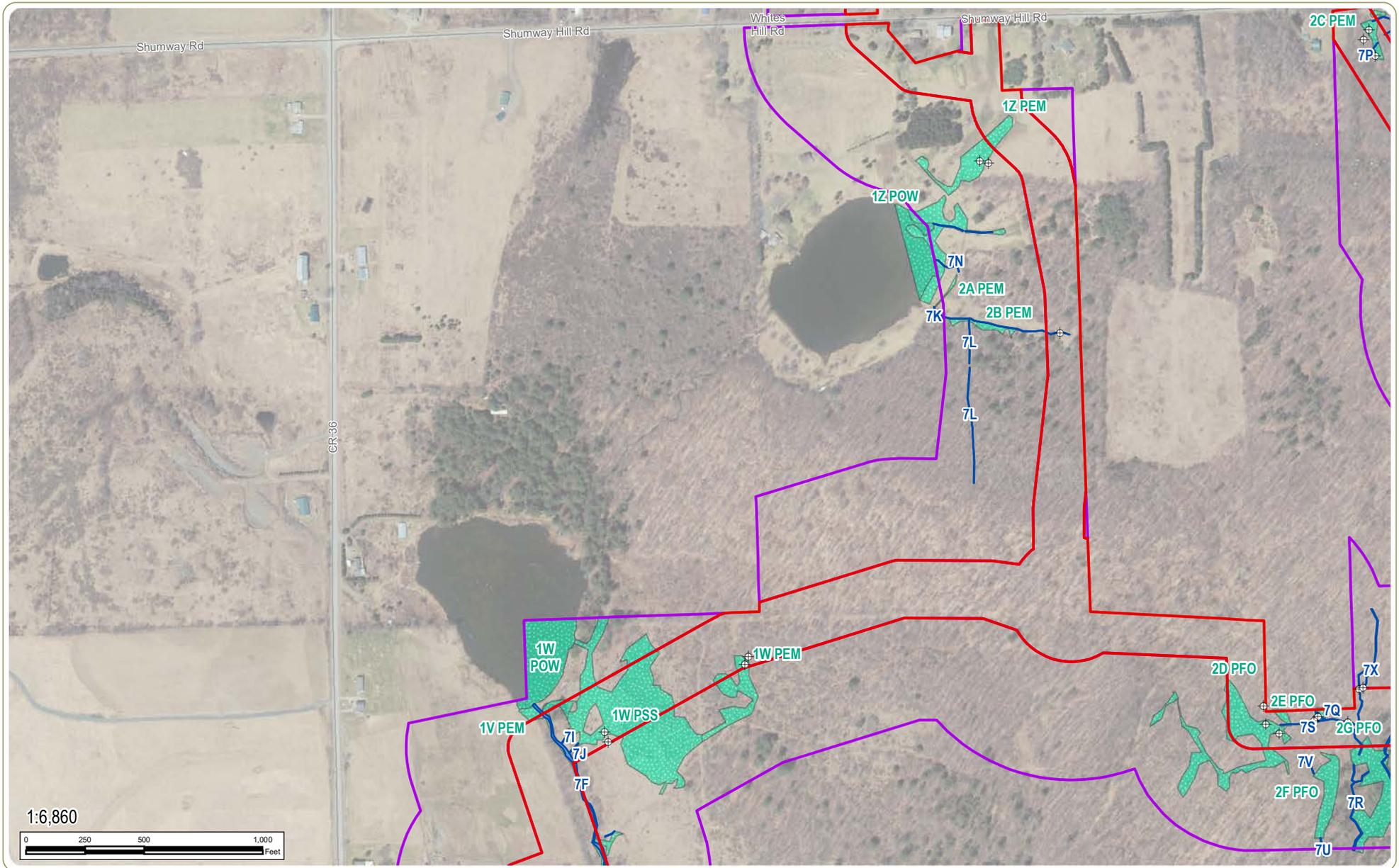
Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 4 of 22



www.edrdpc.com



High Bridge Wind Project

Town of Guilford, Chenango County, New York

Figure 7: Delineated Wetlands and Streams

- Data Sampling Point
- Detailed Wetland Study Area
- Delineated Stream
- 500-foot (Article 10) Wetland Study Area
- Delineated Wetland

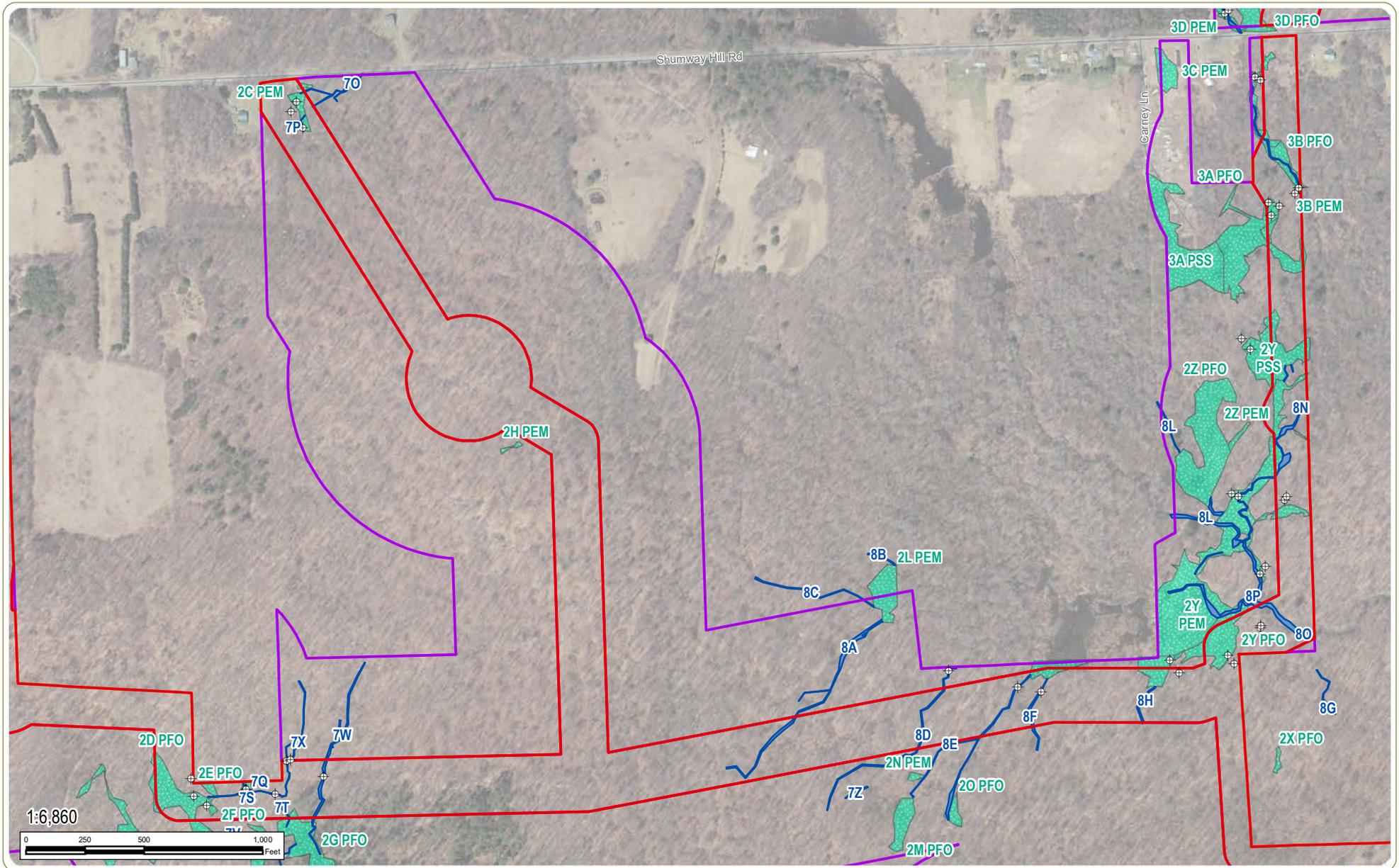
Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 5 of 22



www.edrdpc.com



High Bridge Wind Project

Town of Guilford, Chenango County, New York

Figure 7: Delineated Wetlands and Streams

- ⊕ Data Sampling Point
- ▭ Detailed Wetland Study Area
- ▭ 500-foot (Article 10) Wetland Study Area
- ▬ Delineated Stream
- ▭ Delineated Wetland

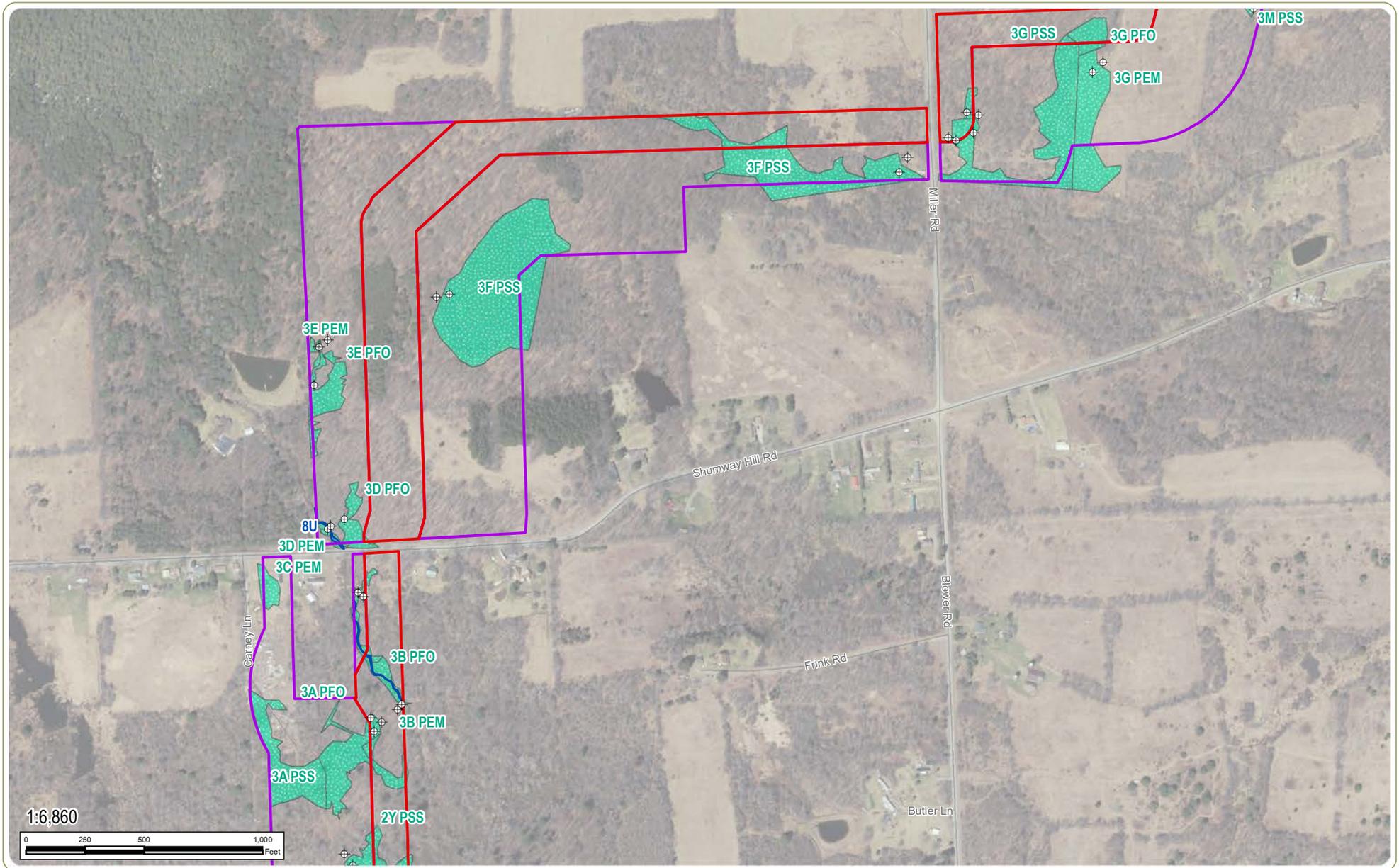
Notes: 1. Basemap: NYS DOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 6 of 22



www.edrdoc.com



High Bridge Wind Project

Town of Guilford, Chenango County, New York

Figure 7: Delineated Wetlands and Streams

- ⊕ Data Sampling Point
- ▭ Detailed Wetland Study Area
- ▭ Delineated Stream
- ▭ 500-foot (Article 10) Wetland Study Area
- ▭ Delineated Wetland

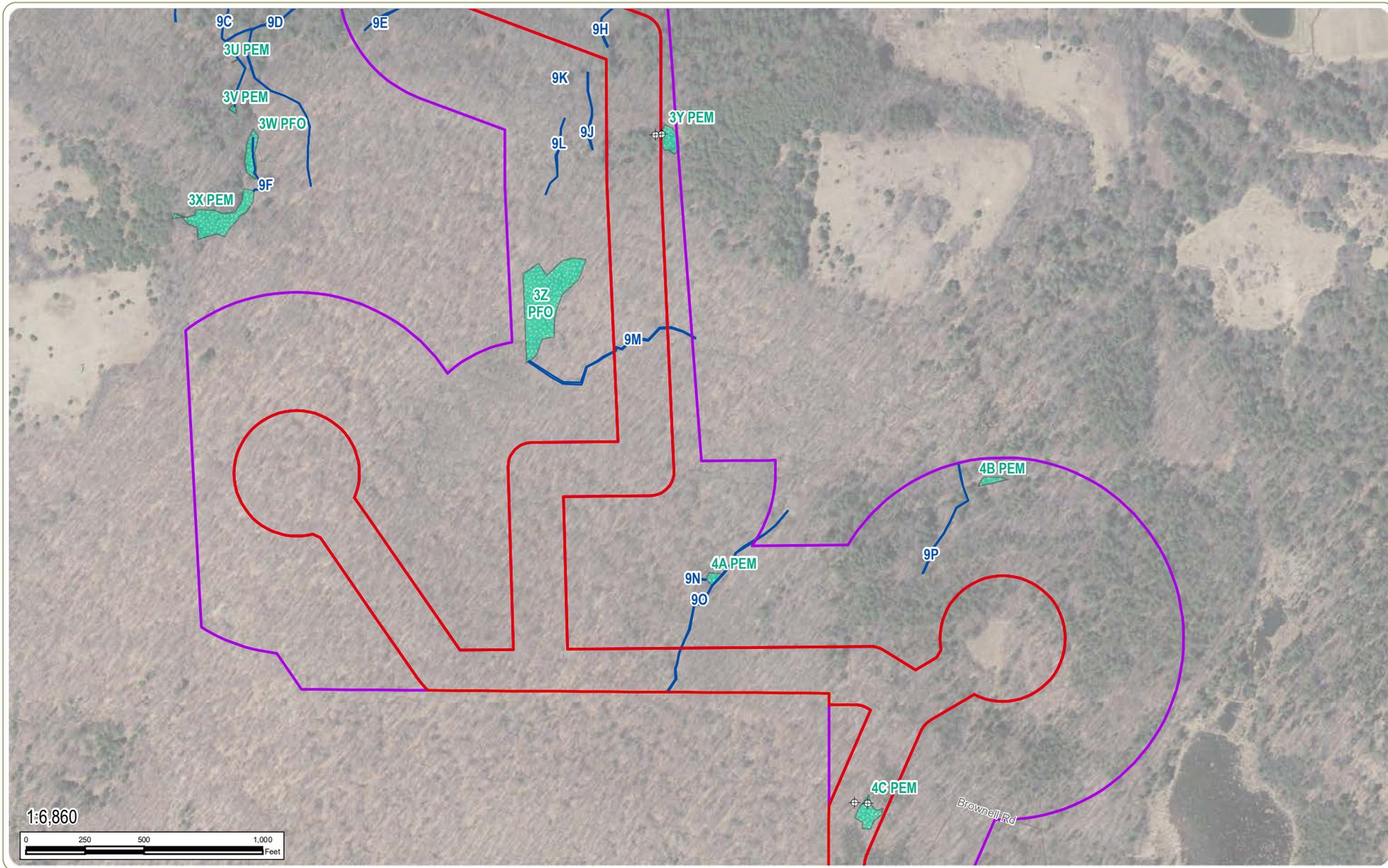
Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 7 of 22



www.edrdpc.com



High Bridge Wind Project

Town of Guilford, Chenango County, New York

Figure 7: Delineated Wetlands and Streams

- ⊕ Data Sampling Point
- ▬ Delineated Stream
- ▨ Delineated Wetland
- ▭ Detailed Wetland Study Area
- ▭ 500-foot (Article 10) Wetland Study Area

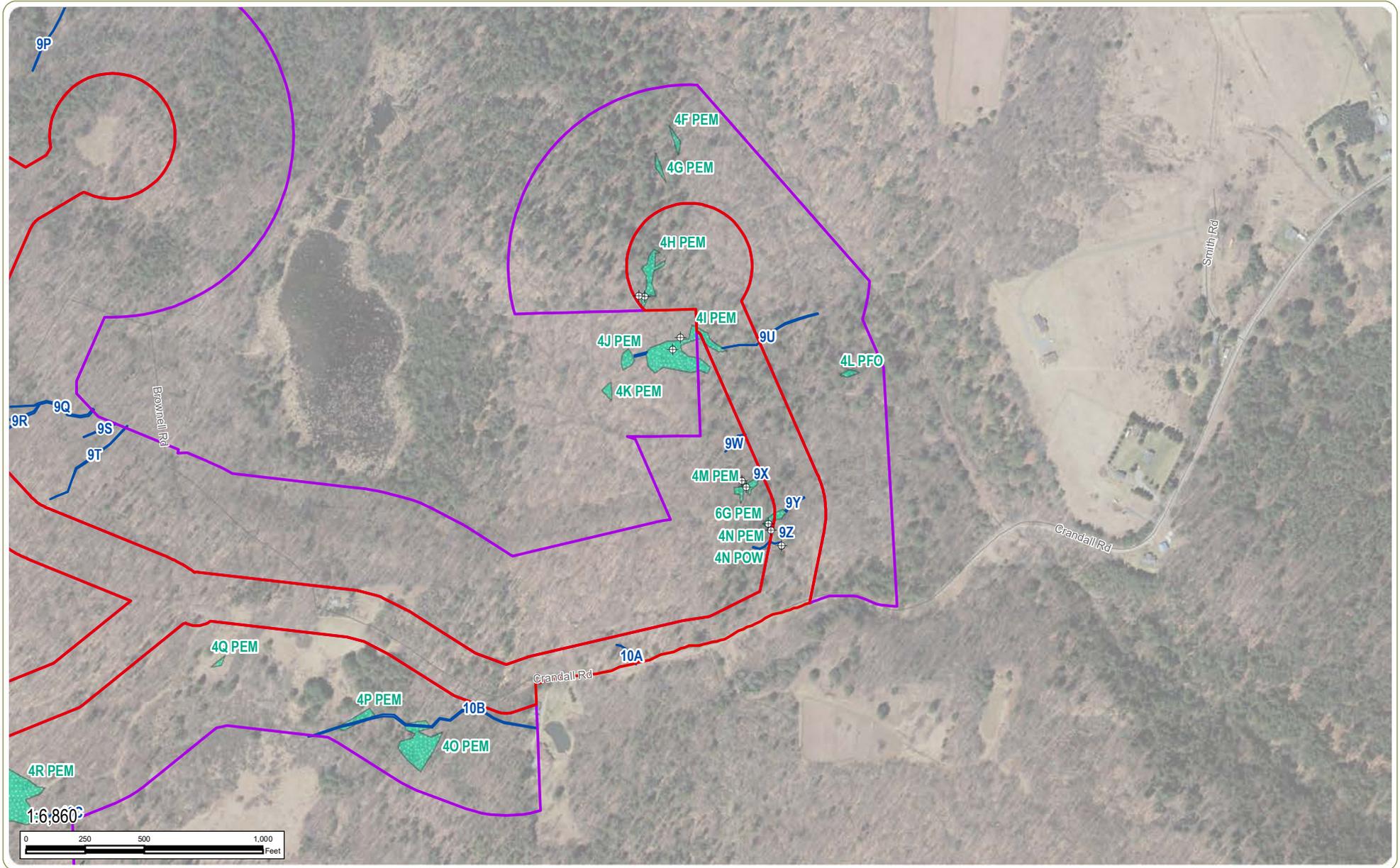
Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 8 of 22



www.edrdpc.com



High Bridge Wind Project

Town of Guilford, Chenango County, New York

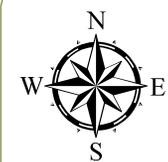
Figure 7: Delineated Wetlands and Streams

-  Data Sampling Point
-  Detailed Wetland Study Area
-  Delineated Stream
-  500-foot (Article 10) Wetland Study Area
-  Delineated Wetland

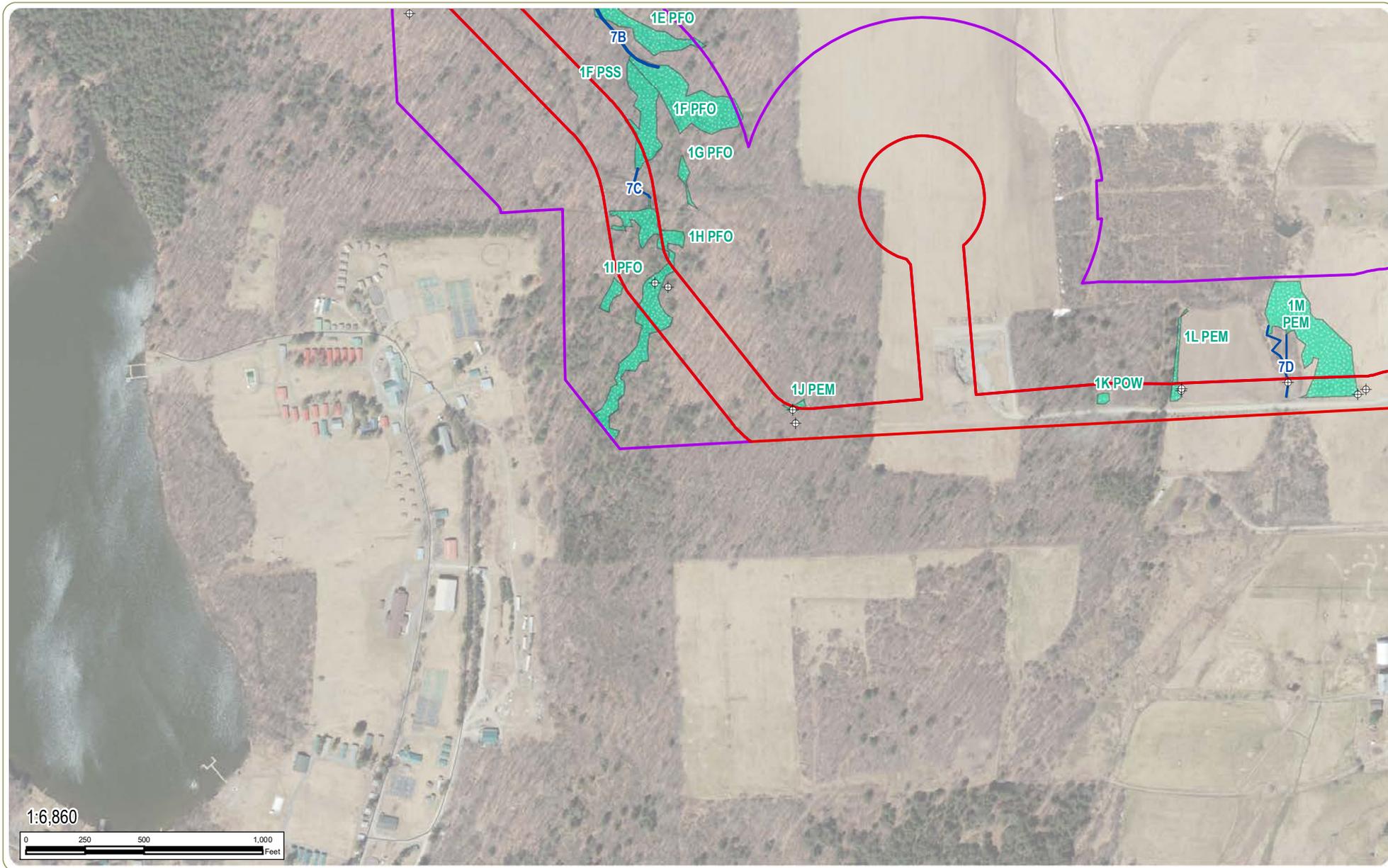
Notes: 1. Basemap: NYS DOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 9 of 22



www.edrdpc.com



High Bridge Wind Project

Town of Guilford, Chenango County, New York

Figure 7: Delineated Wetlands and Streams

- ⊕ Data Sampling Point
- ▭ Delineated Stream
- ▭ Delineated Wetland
- ▭ Detailed Wetland Study Area
- ▭ 500-foot (Article 10) Wetland Study Area

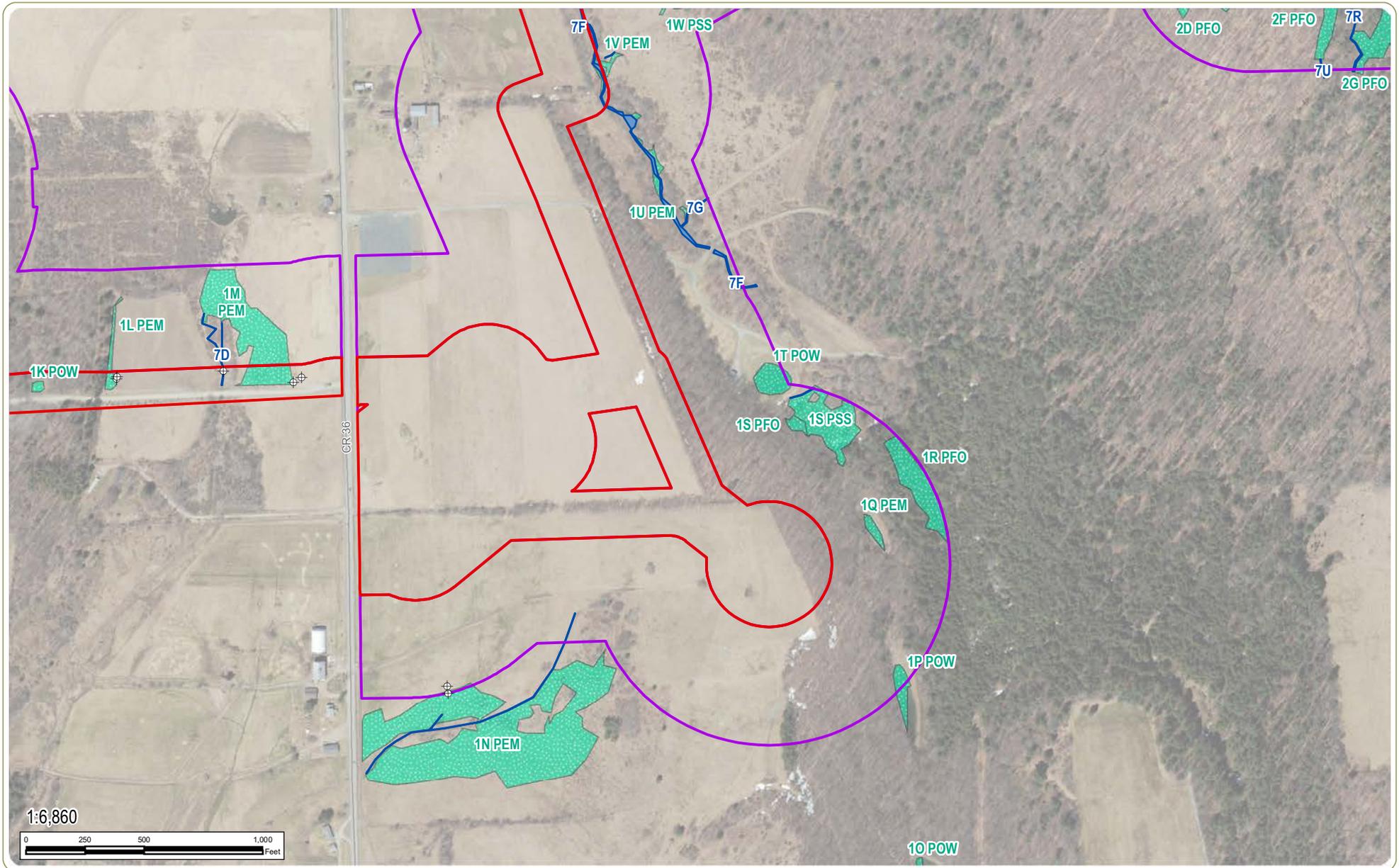
Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 10 of 22



www.edrdpc.com



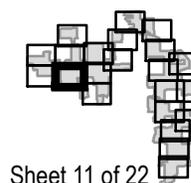
High Bridge Wind Project

Town of Guilford, Chenango County, New York

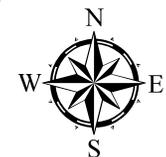
Figure 7: Delineated Wetlands and Streams

- ⊕ Data Sampling Point
- ▭ Detailed Wetland Study Area
- ▬ Delineated Stream
- ▭ 500-foot (Article 10) Wetland Study Area
- ▭ Delineated Wetland

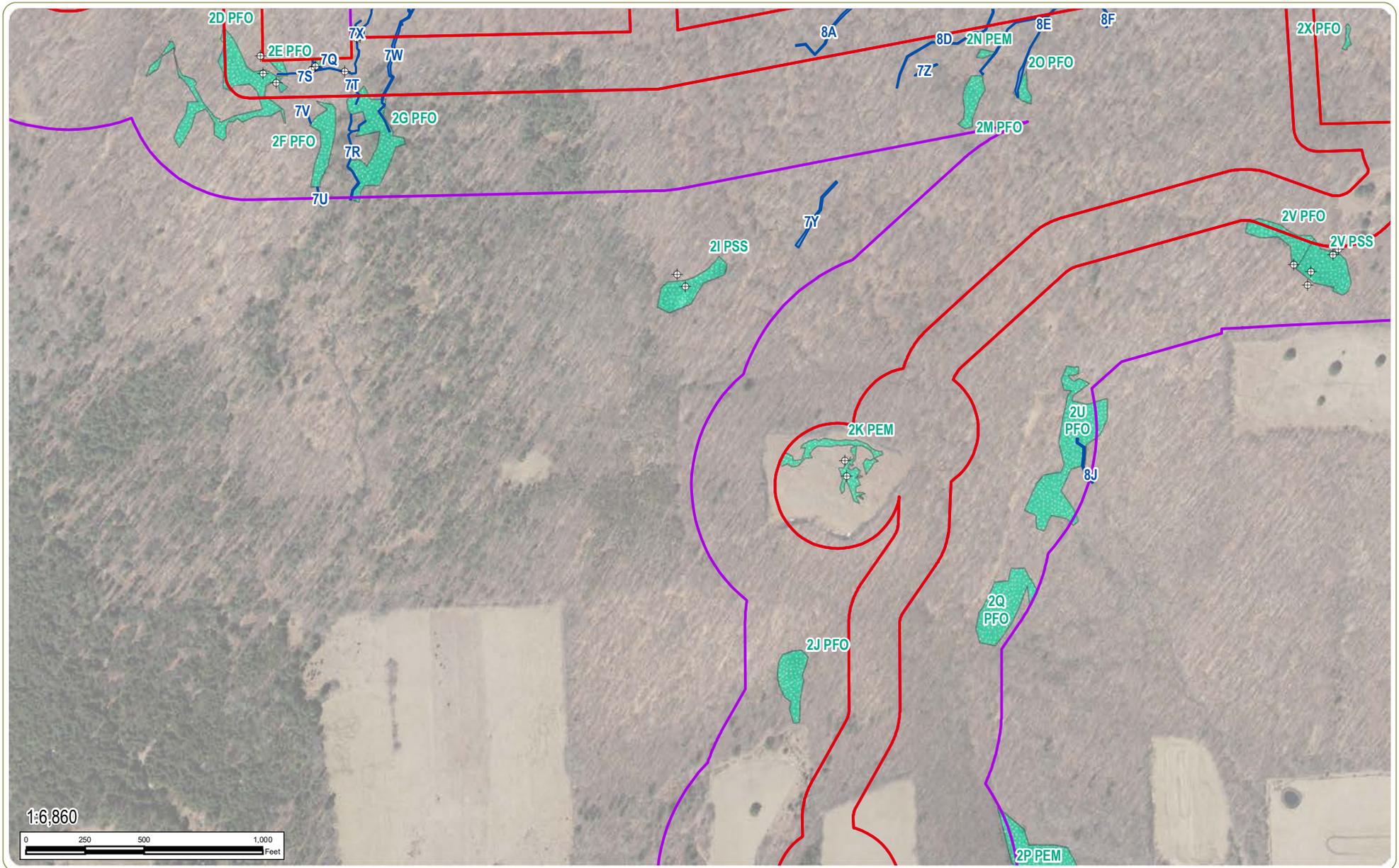
Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 11 of 22



www.edrdpc.com



High Bridge Wind Project

Town of Guilford, Chenango County, New York

Figure 7: Delineated Wetlands and Streams

- ⊕ Data Sampling Point
- ▬ Delineated Stream
- ▨ Delineated Wetland
- ▭ Detailed Wetland Study Area
- ▭ 500-foot (Article 10) Wetland Study Area

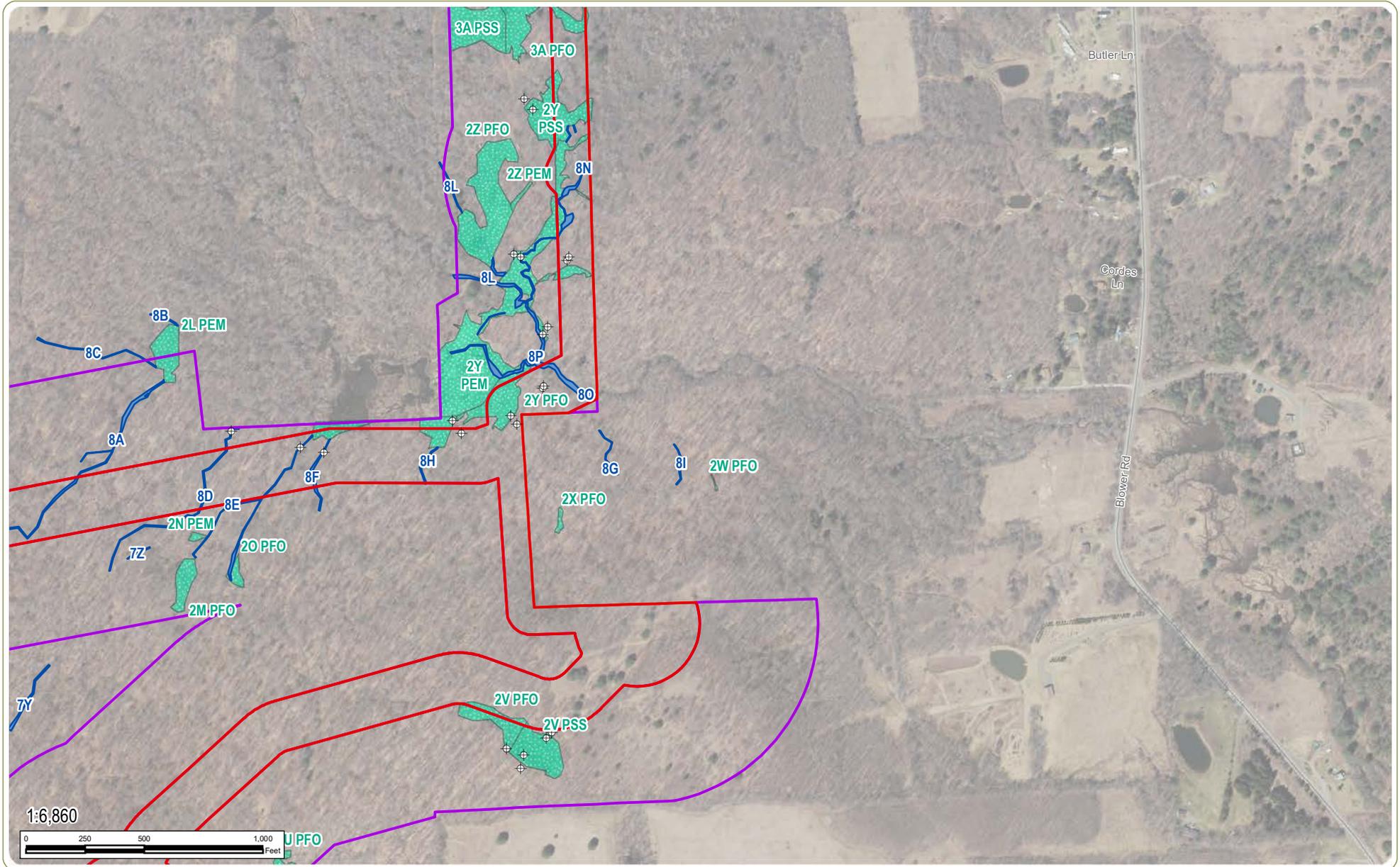
Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 12 of 22



www.edrdpc.com



High Bridge Wind Project

Town of Guilford, Chenango County, New York

Figure 7: Delineated Wetlands and Streams

-  Data Sampling Point
-  Detailed Wetland Study Area
-  Delineated Stream
-  500-foot (Article 10) Wetland Study Area
-  Delineated Wetland

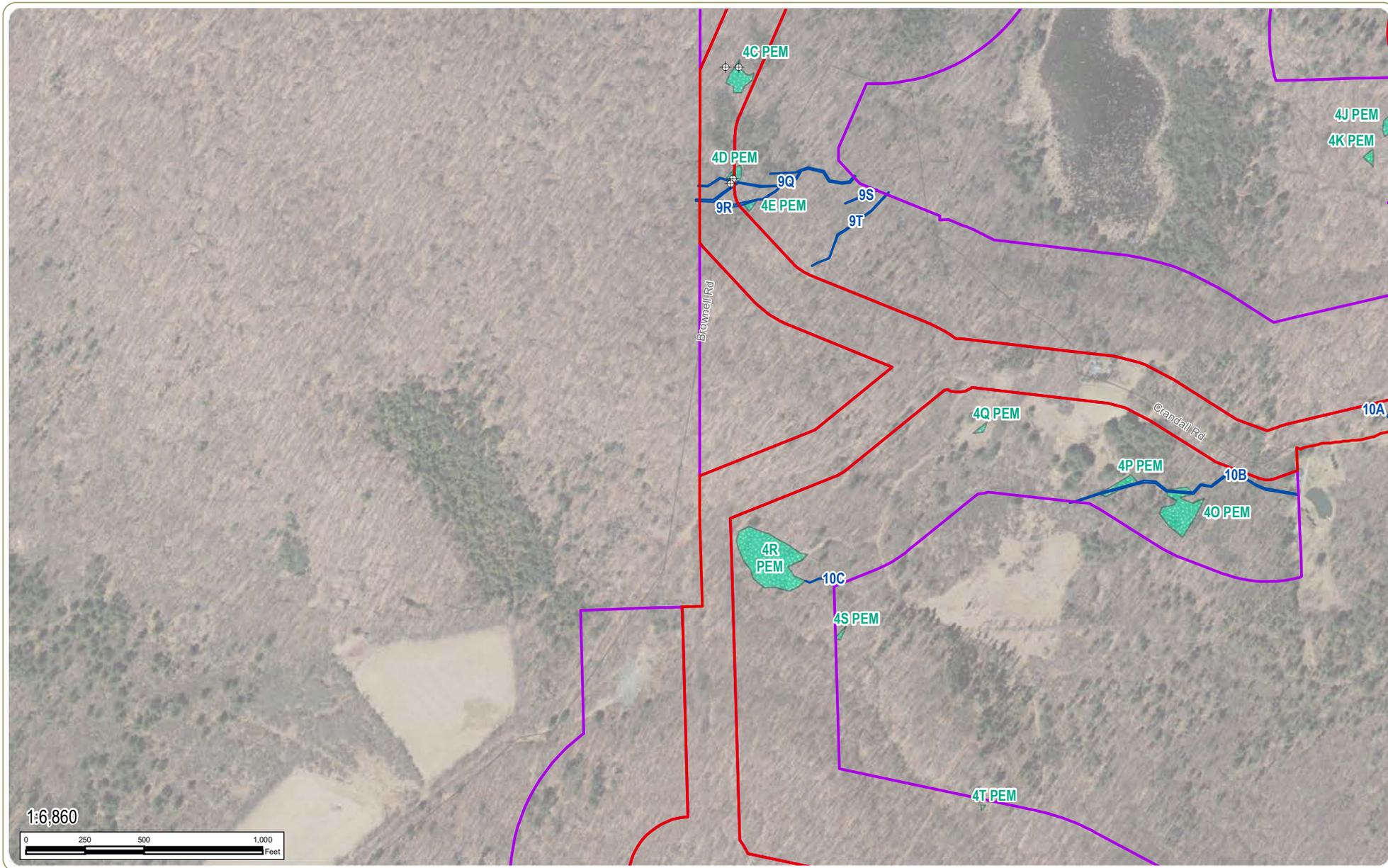
Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 13 of 22



www.edrdpc.com



High Bridge Wind Project

Town of Guilford, Chenango County, New York

Figure 7: Delineated Wetlands and Streams

- ⊕ Data Sampling Point
- ▬ Delineated Stream
- ▨ Delineated Wetland
- ▭ Detailed Wetland Study Area
- ▭ 500-foot (Article 10) Wetland Study Area

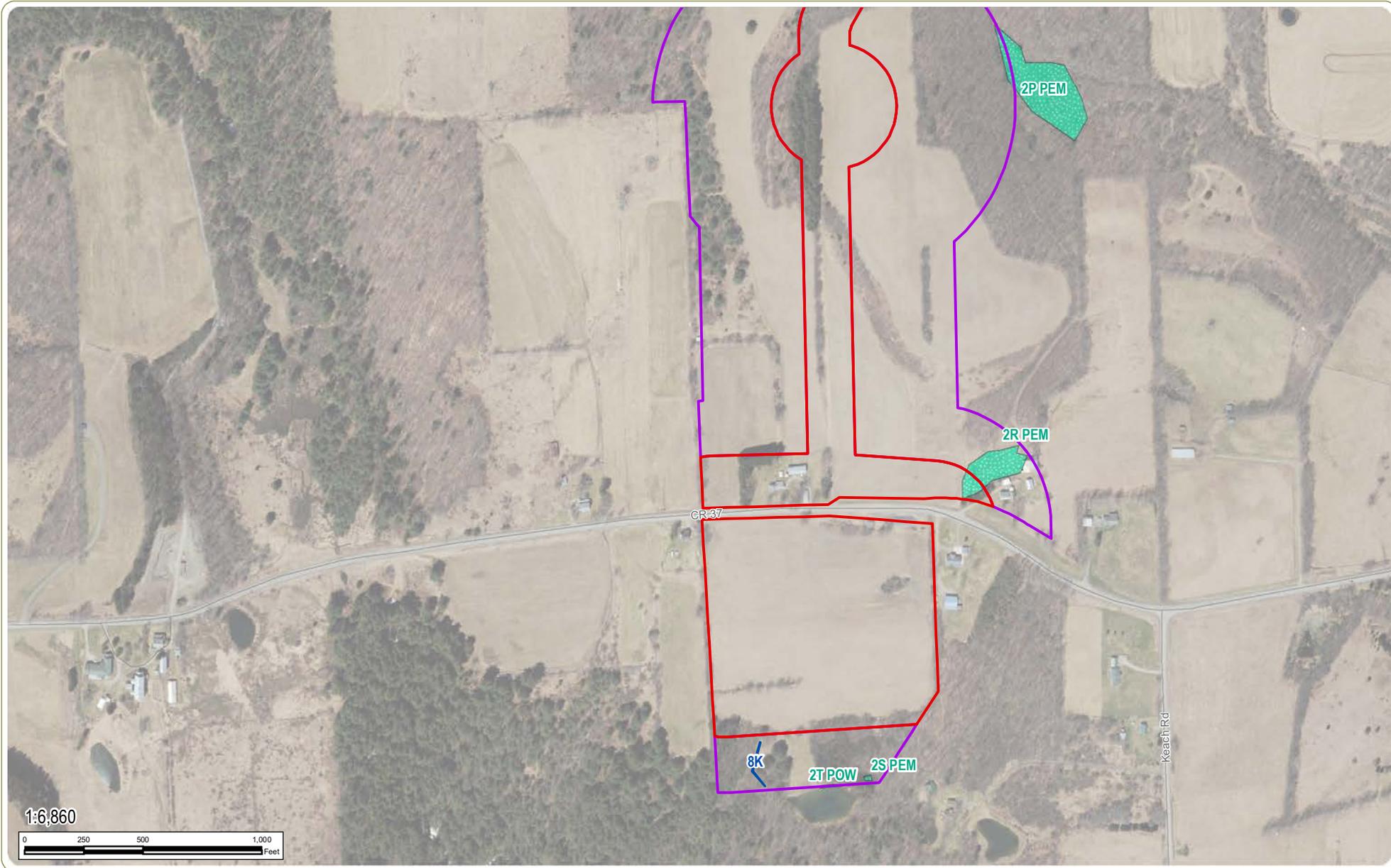
Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 14 of 22



www.edrdpc.com



High Bridge Wind Project

Town of Guilford, Chenango County, New York

Figure 7: Delineated Wetlands and Streams

- | | |
|--|--|
|  Delineated Stream |  Detailed Wetland Study Area |
|  Delineated Wetland |  500-foot (Article 10) Wetland Study Area |

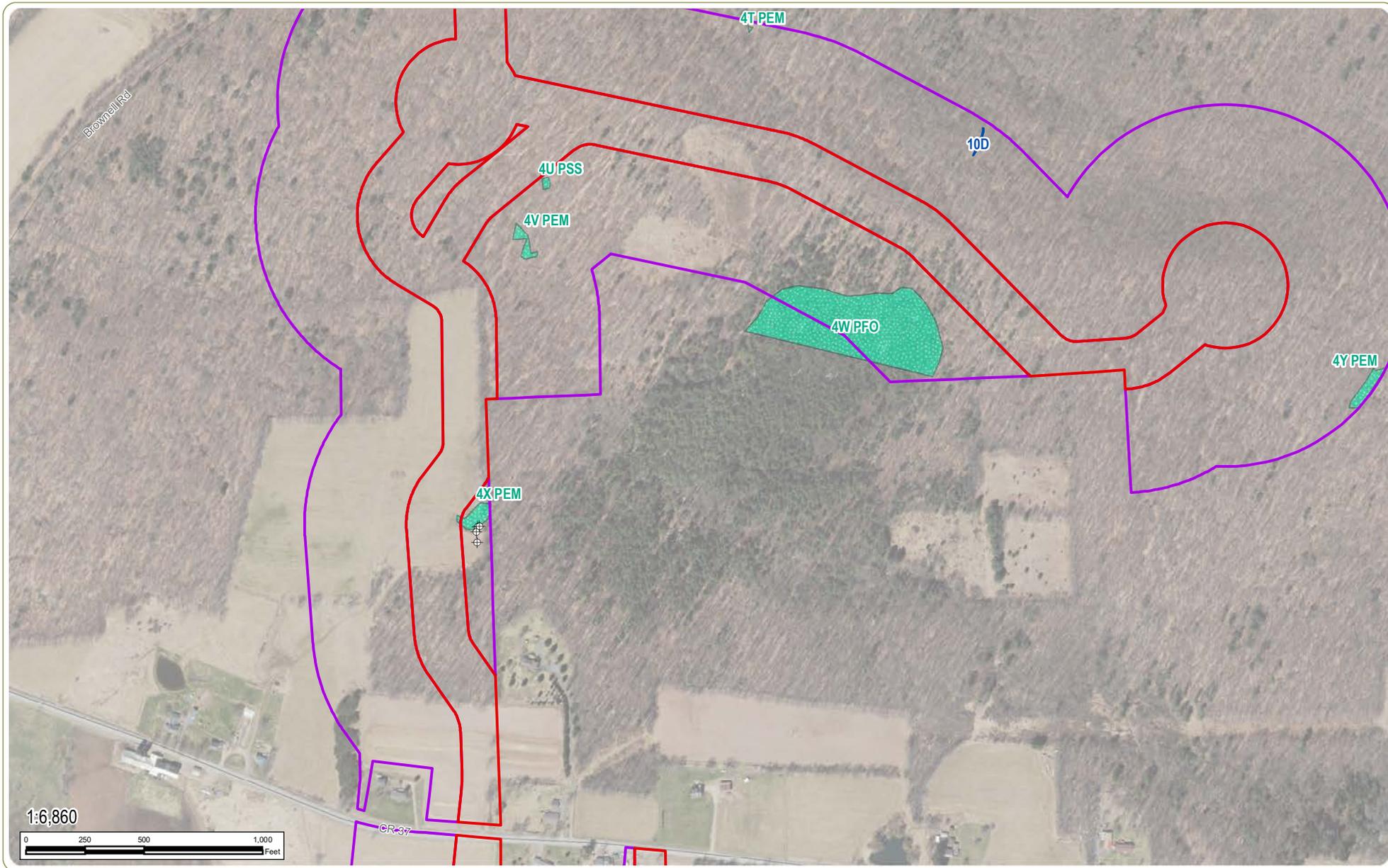
Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 15 of 22



www.edrdpc.com



High Bridge Wind Project

Town of Guilford, Chenango County, New York

Figure 7: Delineated Wetlands and Streams

- ⊕ Data Sampling Point
- ▭ Delineated Stream
- ▭ Delineated Wetland
- ▭ Detailed Wetland Study Area
- ▭ 500-foot (Article 10) Wetland Study Area

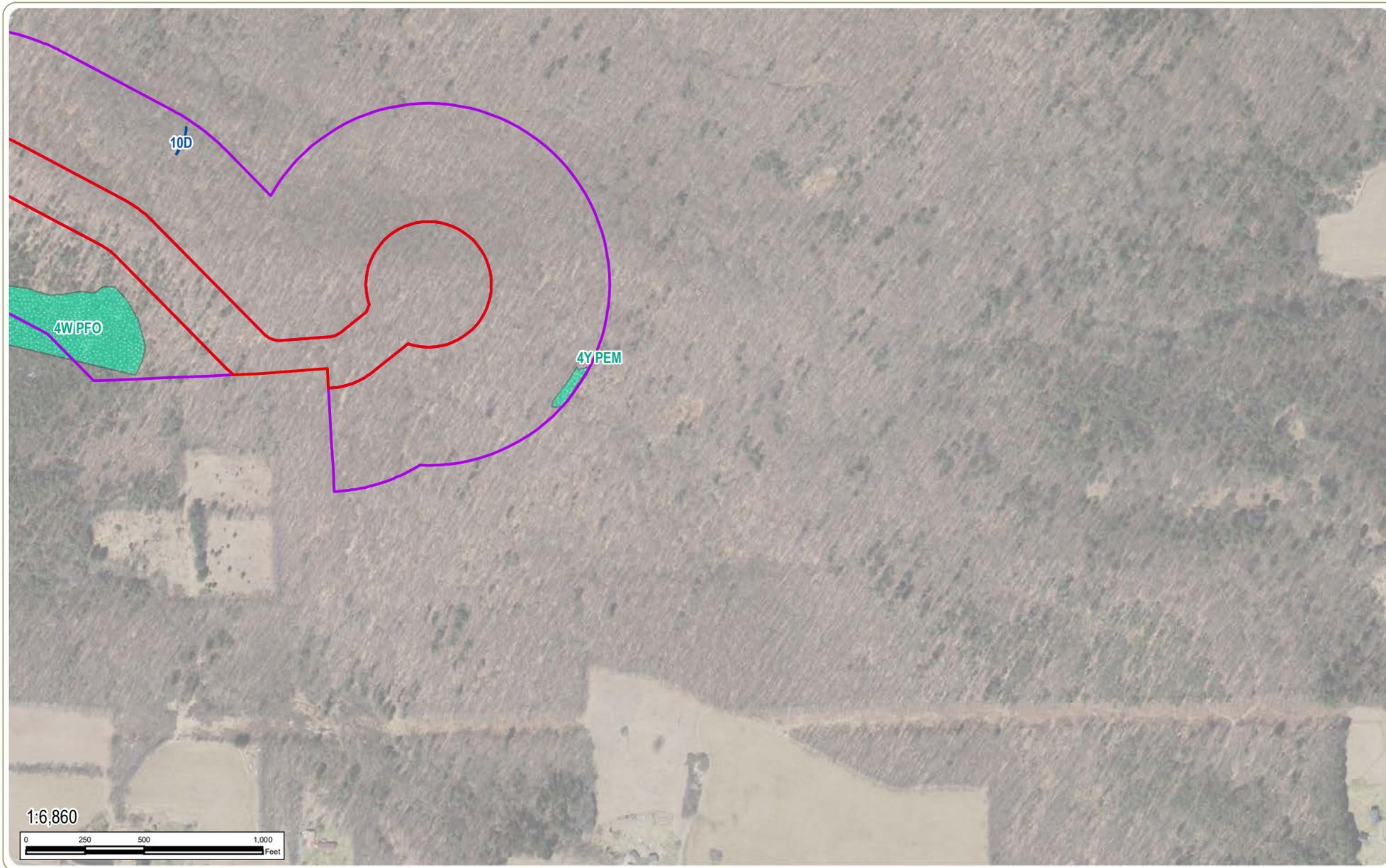
Notes: 1. Basemap: NYS DOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 16 of 22



www.edrdpc.com



High Bridge Wind Project

Town of Guilford, Chenango County, New York

Figure 7: Delineated Wetlands and Streams

- | | |
|--|--|
|  Delineated Stream |  Detailed Wetland Study Area |
|  Delineated Wetland |  500-foot (Article 10) Wetland Study Area |

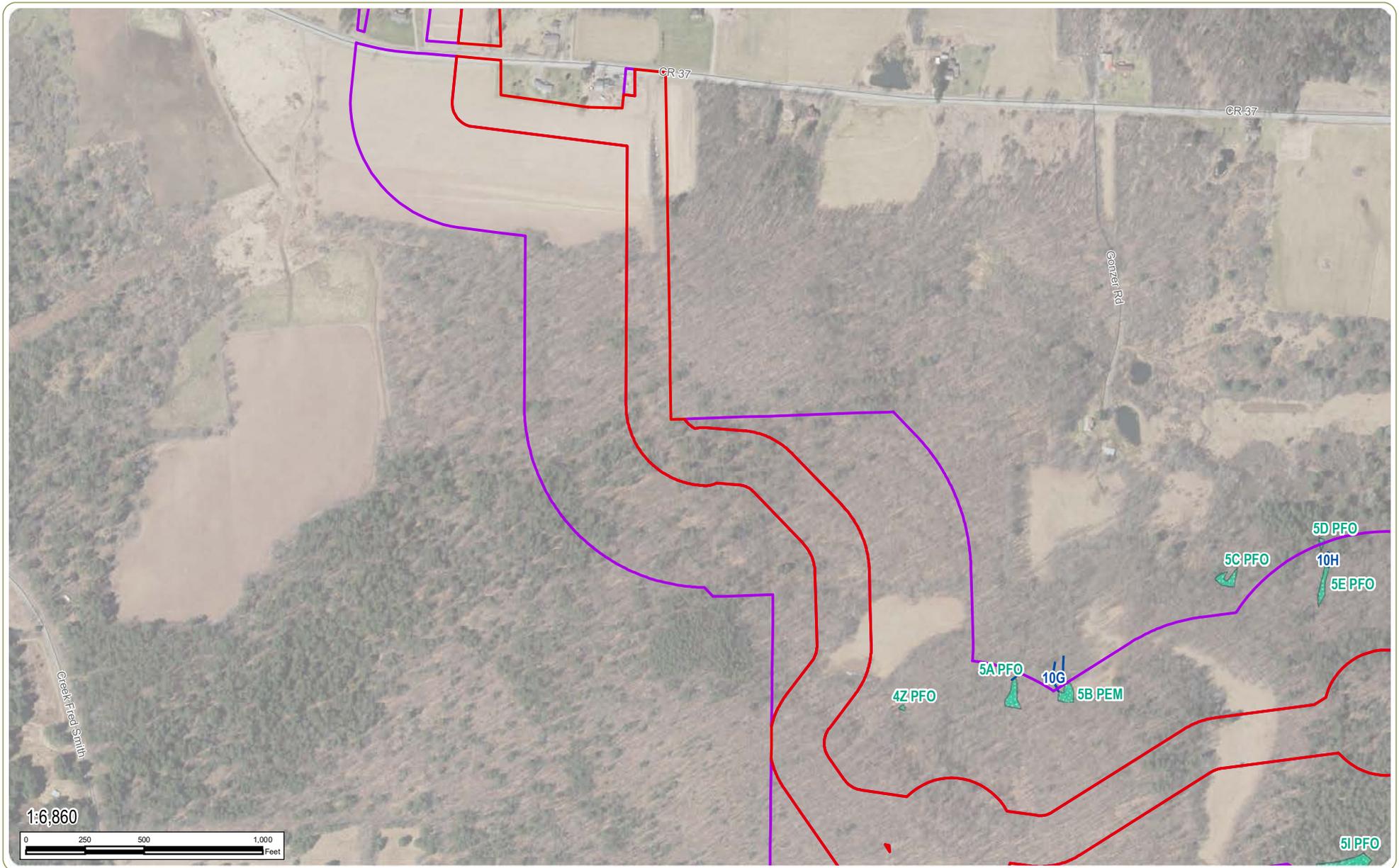
Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 17 of 22



www.edrdpc.com



High Bridge Wind Project

Town of Guilford, Chenango County, New York

Figure 7: Delineated Wetlands and Streams

- Delineated Stream
- Detailed Wetland Study Area
- Delineated Wetland
- 500-foot (Article 10) Wetland Study Area

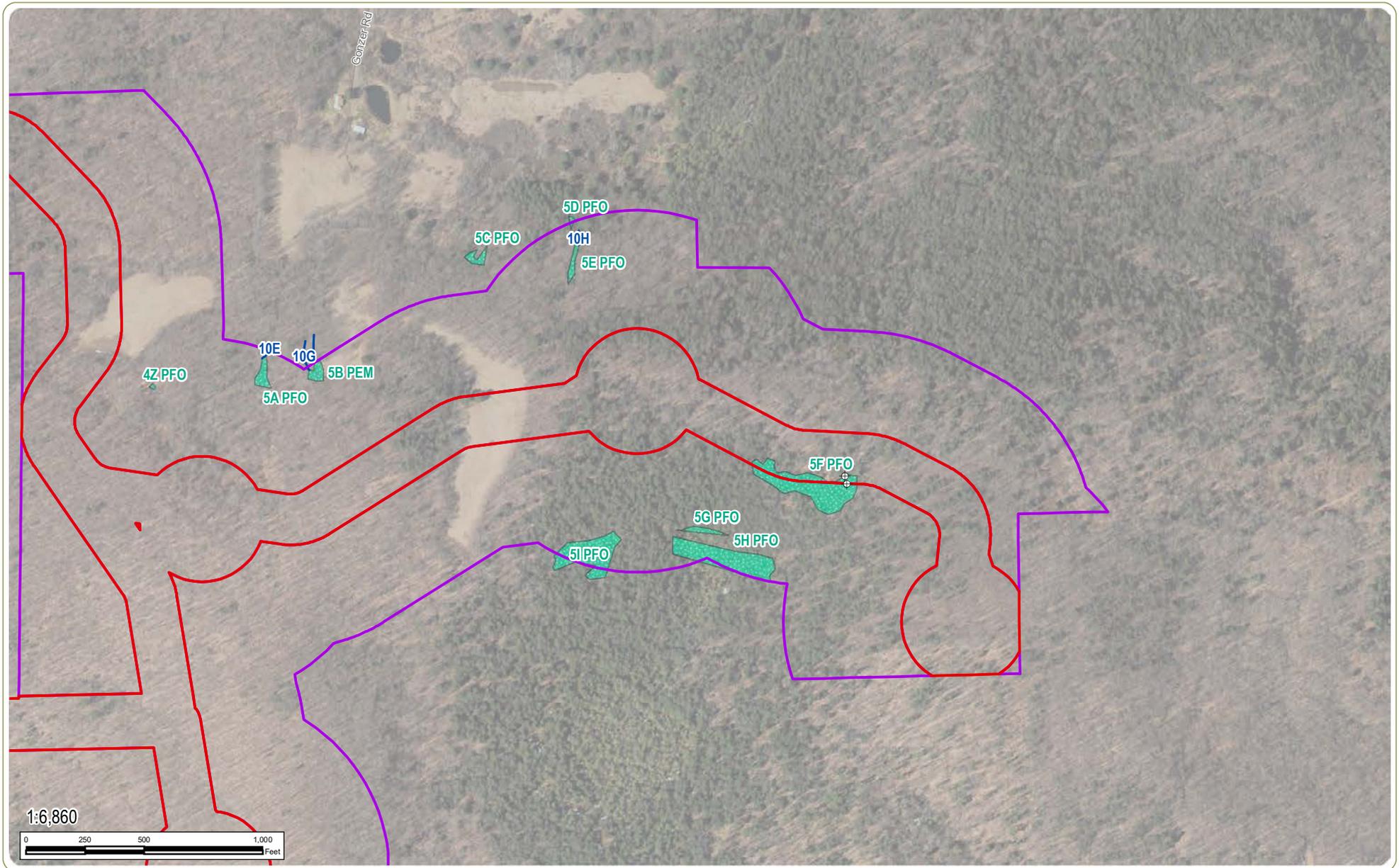
Notes: 1. Basemap: NYS DOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 18 of 22



www.edrdoc.com



High Bridge Wind Project

Town of Guilford, Chenango County, New York

Figure 7: Delineated Wetlands and Streams

-  Data Sampling Point
-  Detailed Wetland Study Area
-  Delineated Stream
-  500-foot (Article 10) Wetland Study Area
-  Delineated Wetland

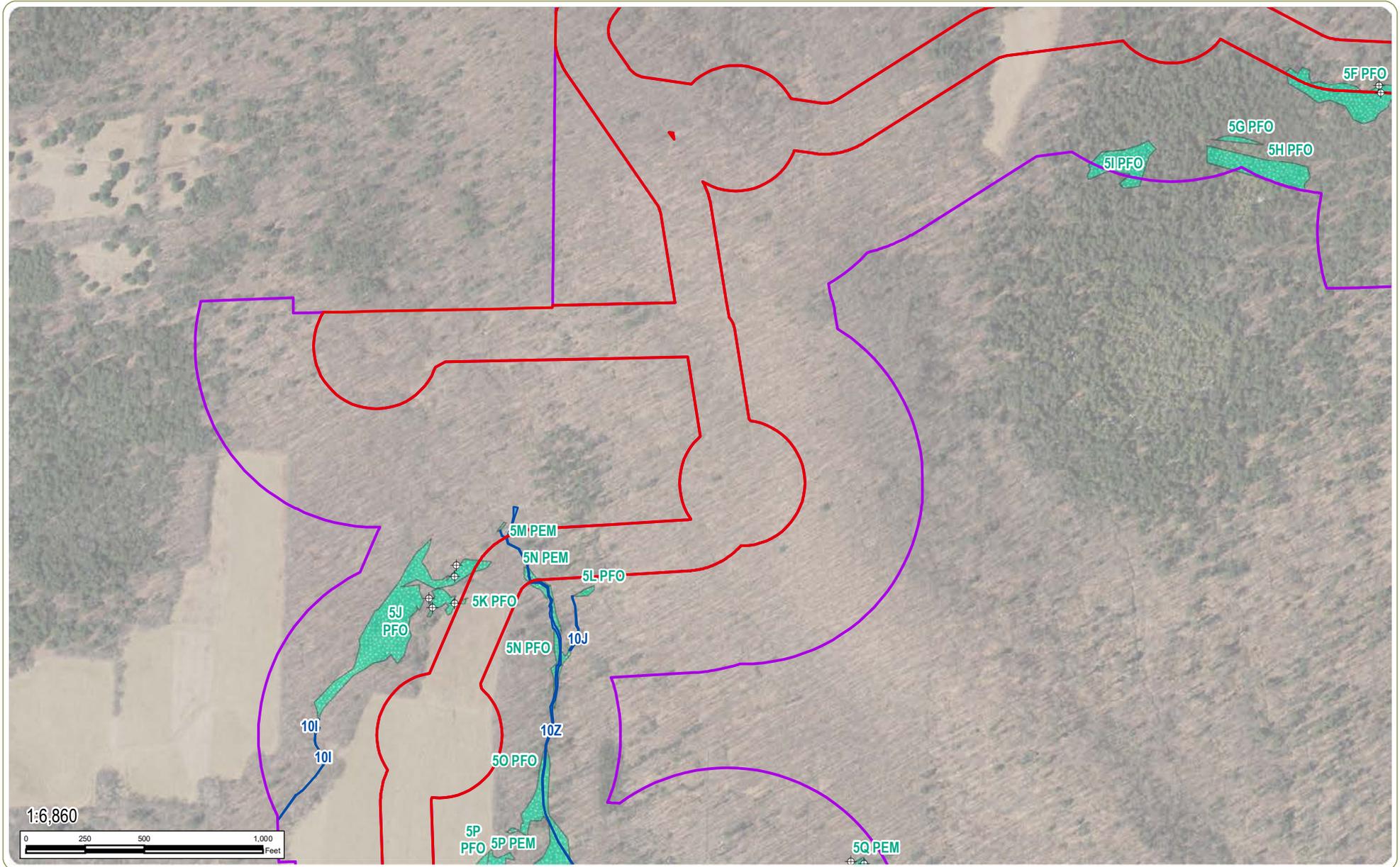
Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 19 of 22



www.edrdpc.com



High Bridge Wind Project

Town of Guilford, Chenango County, New York

Figure 7: Delineated Wetlands and Streams

-  Data Sampling Point
-  Detailed Wetland Study Area
-  Delineated Stream
-  500-foot (Article 10) Wetland Study Area
-  Delineated Wetland

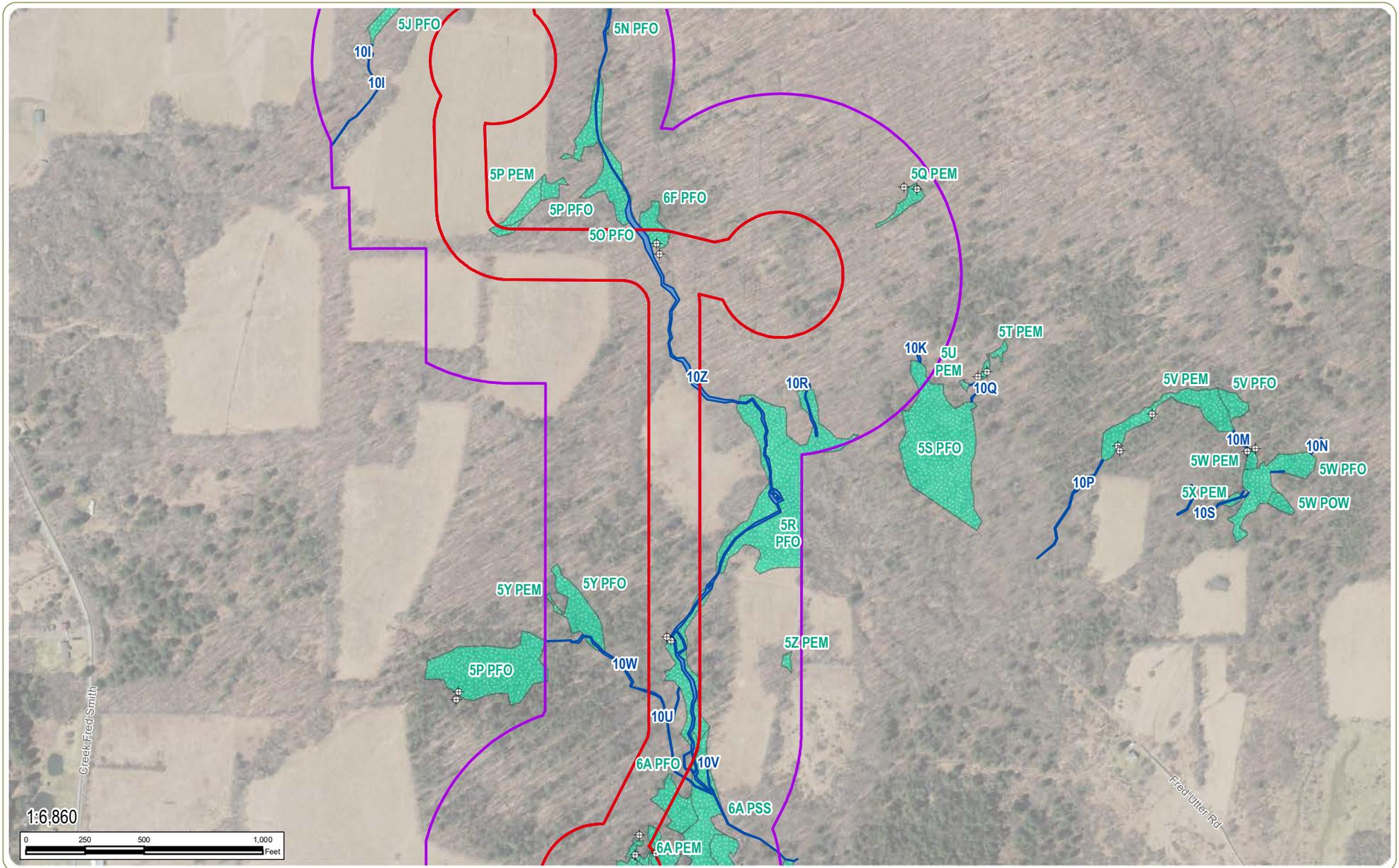
Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 20 of 22



www.edrdpc.com



High Bridge Wind Project

Town of Guilford, Chenango County, New York

Figure 7: Delineated Wetlands and Streams

- ⊕ Data Sampling Point
- ▭ Detailed Wetland Study Area
- ▭ Delineated Stream
- ▭ 500-foot (Article 10) Wetland Study Area
- ▭ Delineated Wetland

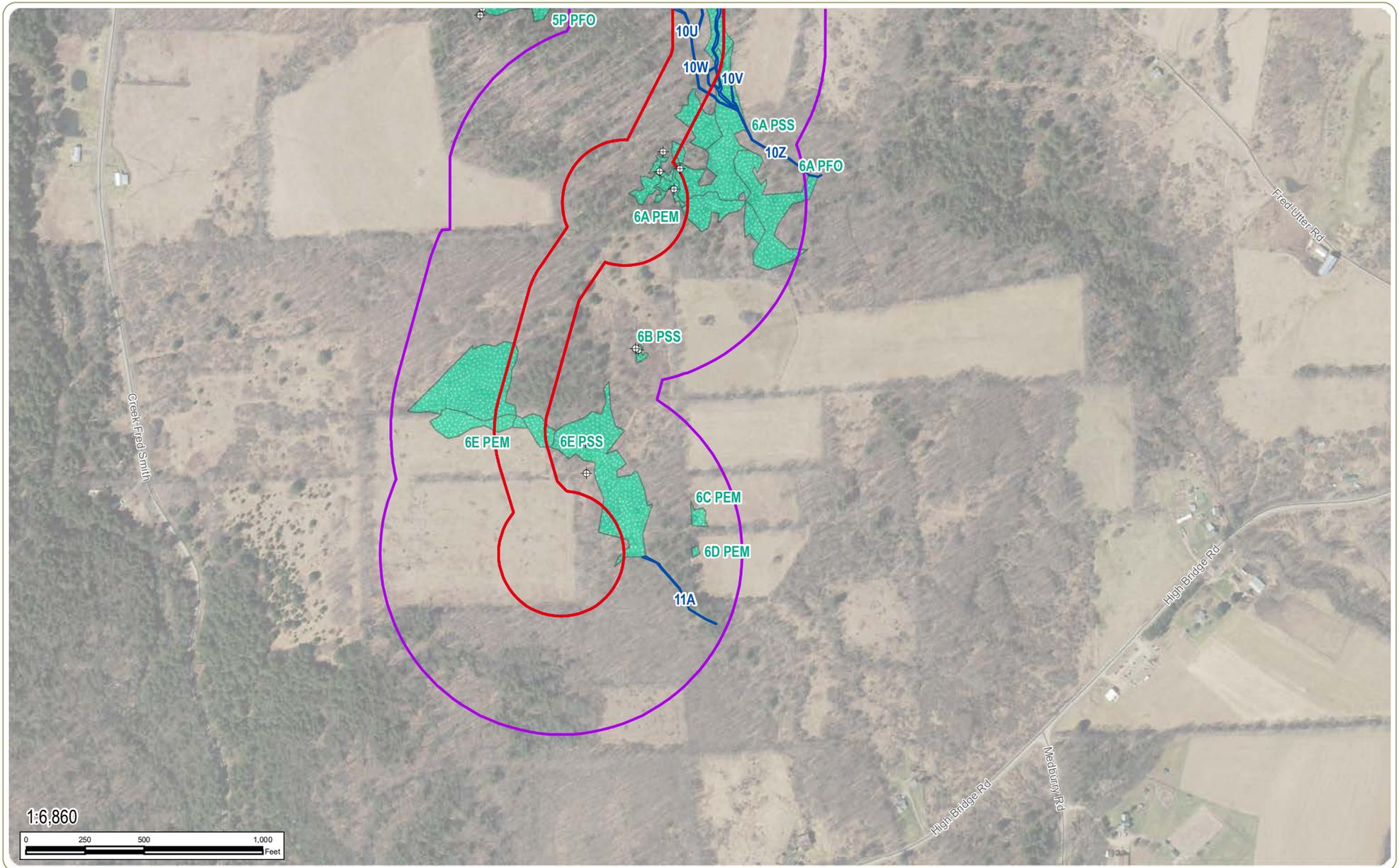
Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 21 of 22



www.edrdpc.com



High Bridge Wind Project

Town of Guilford, Chenango County, New York

Figure 7: Delineated Wetlands and Streams

- ⊕ Data Sampling Point
- ▭ Delineated Stream
- ▨ Delineated Wetland
- ▭ Detailed Wetland Study Area
- ▭ 500-foot (Article 10) Wetland Study Area

Notes: 1. Basemap: NYSDOP "2018" orthoimagery map service. 2. This map was generated in ArcMap on August 1, 2019. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data.



Sheet 22 of 22



www.edrdpc.com