

# WETLAND DELINEATION REPORT

Jordanville Wind Power Project  
Towns of Warren and Stark  
Herkimer County, New York

*Prepared For::* Jordanville Wind, LLC  
480 Broadway; Suite 218  
Saratoga Springs, NY 12866

*Prepared By:* Environmental Design & Research, Landscape Architecture,  
Environmental Services, Engineering and Surveying, P.C. (EDR)  
238 West Division Street  
Syracuse, New York 13204

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## **1.0 INTRODUCTION**

### **1.1 PROJECT DESCRIPTION**

Environmental Design & Research, Landscape Architecture, Environmental Services, Engineering and Surveying, P.C. (EDR) was retained by Jordanville Wind, LLC to identify and delineate all wetlands and streams within or adjacent to the footprint of the Jordanville Wind Power Project (the Project). The Project is located within an approximately 5,130-acre site (the Project Site) in the Towns of Stark and Warren, Herkimer County, New York. The Project Site includes 56 individual properties (under lease from multiple private landowners), which are proposed to be utilized in the development of a utility-scale wind power generating facility located approximately 5 miles south of the Cities of German Flatts and Herkimer, 5 miles north of the Village of Richfield Springs, 2 miles west of the Hamlet of Starkville, and 1 mile northeast of the Hamlet of Jordanville (as measured to the nearest turbine) (Figure 1).

The Project is proposed to include approximately 68 wind turbines, 19 miles of access roads, 27 miles of electrical interconnect, an O&M facility, a collection substation, a 0.7-mile long overhead 230 kilovolt (kV) transmission line, an interconnection substation, and two temporary construction staging areas.

### **1.2 PURPOSE**

This wetland delineation report has been prepared in support of the Supplement to the Draft Environmental Impact Statement (SDEIS) to be submitted to the lead agency (Town of Warren), which is reviewing this project in accordance with the requirements of the New York State Environmental Quality Review Act (SEQRA). The Draft Environmental Impact Statement (DEIS) was accepted as complete by the lead agency on May 31, 2006 and released for public review/comment. This wetland delineation report also serves as a response to several comments raised during the public comment period on the DEIS, which ended on August 4, 2006.

Specific tasks performed for this study included a field delineation of all potential state and federal jurisdictional areas proximate to the Project footprint, subsequent instrument survey of jurisdictional area boundaries utilizing Global Positioning System (GPS) technology with reported sub-meter accuracy, and a detailed description of jurisdictional areas based on hydrology, vegetation, and soils data collected in the field. This report describes the results of both the delineation and data collection efforts conducted by EDR, as well as a description of the wetlands and water bodies that were identified and delineated. This document is

intended to provide all the information necessary for an agency jurisdictional determination, and to support a permit application, which will be submitted to the United States Army Corps of Engineers (USACOE) and the New York State Department of Environmental Conservation (NYSDEC) if necessary.

### **1.3 RESOURCES**

Materials and literature supporting this investigation have been derived from a number of sources including United States Geological Survey (USGS) topographic mapping (Jordanville, Van Hornesville, NY 7.5 minute quadrangles), United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapping, NYSDEC freshwater wetlands mapping, United States Department of Agriculture (USDA) Soil Conservation Service (SCS) (currently the Natural Resources Conservation Service [NRCS]) Herkimer County Soil Survey, the NRCS List of Hydric Soils of the State of New York, the NRCS list of New York Soils with potential hydric inclusions, and recent (2003) color infrared aerial photography obtained from the NYS Geographic Information System (GIS) Clearinghouse.

Vascular plant names follow nomenclature found in Gleason and Cronquist (1991), and wetland indicator status for vegetative species was determined by reference to Reed (1988).

### **1.4 QUALIFICATIONS**

On-site wetland delineations and data inventories were performed by EDR ecologists John Hecklau, Benjamin Brazell, William Trembath, and Brian Schwabenbauer.

Mr. Hecklau serves as principal-in-charge on all of EDR's environmental inventory, management, and permitting projects. He received a bachelor's degree in biology from Middlebury College and a master's degree in wildlife biology from State University of New York (SUNY) College of Environmental Science and Forestry. With over 20 years of experience in the environmental field, professional expertise includes wetland delineations, plant and wildlife identification and community mapping, resource management planning, habitat assessments, and environmental impact analysis.

Mr. Brazell is a project manager with over 5 years of experience in the environmental field. He received a bachelor's degree in natural resources from North Carolina State University. Professional expertise includes wetland delineations, federal and state wetland/stream

permitting, plant and wildlife identification, stream restoration, community mapping, SEQR compliance, and environmental impact analysis.

Mr. Trembath is a project manager with over 18 years experience in the environmental field; professional expertise includes environmental impact analyses and monitoring, wetland delineations, federal and state permitting, SEQRA compliance, hazardous waste operations, industrial health and safety, emergency response, and wildlife damage management.

Mr. Schwabenbauer is an environmental analyst with over 4 years of experience in the environmental field. He received a bachelor's degree in environmental studies from Hobart College, and is currently pursuing a master's degree in environmental policy from SUNY College of Environmental Science and Forestry. Professional expertise includes GPS surveying and mapping, GIS analysis, wetland delineations, and SEQR compliance.

## **2.0 PHYSICAL CHARACTERISTICS AND RESOURCES**

### **2.1 PHYSIOGRAPHY AND SOILS**

The Project Site is located within the Allegheny Plateau physiographic province of New York State. The area is characterized by a geologically young glacial landscape dominated by drumlins, which extend in an east-to-west direction as a result of the lateral movement of the glacier caused by the obstruction of the Adirondack Mountains to the north (USDA, 1975). Slopes in the area generally range from 0 to 15 percent (except in some drumlin areas, which can range from 15 to 20 percent), and most streams in the Project Site lack significant ravines. Moderate ravines occur along Ohisa Creek and unnamed tributaries to Nowadaga Creek, in the southeastern and northern portions of the Project Site, respectively. Elevations in the Project Site range from approximately 1,100 feet above mean sea level (amsl) in the northeast to 1,760 feet amsl in the central portion of the Project Site (Figure 2).

The Herkimer County Soil Survey indicates that approximately 30 soil series are present within the Project Site (USDA, 1975) (Figure 3). A review of the National Hydric Soil List for New York State indicates that 7 of the 30 on-site soils are listed as hydric in New York State (NRCS, 2006). In addition, six soils are listed as having the potential for hydric inclusions (NRCS, 1989). Table 1 presents detailed information for all on-site soils.

**Table 1. Site Soils<sup>1</sup>**

Series	Subgroup	Mapping Unit	Slope (%)	Drainage <sup>2</sup>	Landscape Position	Noted Hydrology	Depth to Seasonal High Water Table (ft)	Hydric Soil <sup>3</sup>
Alluvial Land	N/A	Ad	Nearly level	Variable	Flood plains.	Frequently flooded	0	A
Appleton	Aeric Ochraqualfs	ApA	0-3	SPD	Nearly level to gently sloping uplands.	Slow runoff or in areas that receive runoff.	0.5-1.5	B
		ApB	3-8					
Bombay	Glossoboric Hapludalfs	BoB	3-8	MWD	Gently sloping to moderately sloping uplands.	Available water capacity is moderate to high.	1.5-2	
Burdett	Aeric Ochraqualfs	BuA	0-3	SPD	Nearly level to moderately sloping on upland till plains.	Available water capacity is moderate.	0.5-1.5	B
		BuB	3-8					
		BuC	8-15					
Carlisle	Typic Medisaprists	Cm	Level	VPD	Level areas and depressions in glacial till uplands.	Formed in marsh. Available water capacity is high.	0	A
Cohoctah	Fluvaquentic Haplaquolls	Co	Nearly level	PD-VPD	Old channels and flood plains.	Prolonged high water table at or near the surface much of the year.	0-0.5	A
Conesus	Glossoboric Hapludalfs	CsB	2-8	MWD	Gently sloping uplands.	Available water capacity is high.	1.5-2	
Farmington	Lithic Eutrochrepts	FaC	0-8	WD	Upland areas where bedrock affects the relief.	Available water capacity is low.	>3	
		FcD	0-25					
		FkE	Steep, Very steep					
Fredon	Aeric Haplaquepts	Fr	Level, Nearly level	SPD-PD	Flat areas and depressions on glacial outwash terraces.	Available water capacity is low to moderate.	0.5-1.5	
Freshwater Marsh	N/A	Fw	N/A	N/A	Around ponds in uplands.	Periodically flooded	0	A
Hartland-Agawam complex	Entic Haplorthods and Entic Haplorthods	HgB	3-8	WD	Smoothly sloping to undulating landscapes of stream terraces and lake plains.	Available water capacity is high.	>2.5	
Hilton	Glossoboric Hapludalfs	HIB	3-8	MWD	Gently to moderately sloping upland till plains.	Accumulates some runoff. Moderate available water capacity.	1.5-2	
		HIC	8-15					

**Table 1. Site Soils<sup>1</sup> (continued)**

<b>Series</b>	<b>Subgroup</b>	<b>Mapping Unit</b>	<b>Slope (%)</b>	<b>Drainage<sup>2</sup></b>	<b>Landscape Position</b>	<b>Noted Hydrology</b>	<b>Depth to Seasonal High Water Table (ft)</b>	<b>Hydric Soil<sup>3</sup></b>
Honeoye	Glossoboric Hapludalfs	HoB	3-8	WD	Gently sloping to steep uplands.	Available water capacity is moderate to high.	>2.5	
		HoC	8-15					
		HoD	15-25					
Honeoye and Lansing	Glossoboric Hapludalfs	HrE	25-35	WD	Side slopes in uplands and sharp breaks along streams.	Available water capacity is moderate to high.	2->2.5	
Honeoye and Mohawk	Glossoboric Hapludalfs and Mollic Hapludalfs	HsD	0-25	WD-MWD	Rounded hilltops and side slopes in uplands.	Available water capacity is moderate to high.	2->2.5	
Hornell	Aeric Haplaquepts	HtA	0-3	SPD-MWD	Nearly level to moderately sloping on uplands.	Available water capacity is moderate.	0.5-2	
Howard and Palmyra	Glossoboric Hapludalfs	HwD	15-25	WD-ED	Terrace escarpments and kamy areas.	Available water capacity is moderate to low.	>3.5	
Ilion	Mollic Ochraqualfs	In	<3	PD	Flat areas or depressions on upland till plains.	Runoff is slow, accumulates water.	0-0.5	A
Lairdsville	Glossoboric Hapludalfs	LaB	3-8	WD-MWD	Bedrock-controlled landscapes of upland till plains.	Available water capacity is moderate.	1.5-2.5	
		LaC	8-15					
		LaD	15-25					
Lansing	Glossoboric Hapludalfs	LnC	8-15	WD	Nearly level to steep upland till plains.	Available water capacity is high.	2-2.5	
		LnD	15-25					
Lima	Glossoboric Hapludalfs	LoA	0-3	MWD	Nearly level to moderately sloping uplands.	Runoff is moderate. Slow permeability.	1.5-2	
		LoB	3-8					
		LoC	8-15					
Lockport	Aeric Ochraqualfs	LpB	0-4	SPD	Flat bedrock-controlled landscapes of upland till plains.	Runoff and permeability are slow.	0.5-1.5	B
Lyons	Mollic Haplaquepts	Ly	<3	PD-VPD	Nearly level or depressions on upland till plains.	Runoff and permeability are slow to very slow.	0-0.5	A

**Table 1. Site Soils<sup>1</sup> (continued)**

Series	Subgroup	Mapping Unit	Slope (%)	Drainage <sup>2</sup>	Landscape Position	Noted Hydrology	Depth to Seasonal High Water Table (ft)	Hydric Soil <sup>3</sup>
Manheim	Udolic Ochraqualfs	McA	0-3	SPD	Nearly level to moderately sloping uplands.	Runoff is moderate. Slow permeability.	0.5-1.5	B
		McB	3-8					
Manlius	Typic Dystrochrepts	MIB	3-8	WD-ED	Uplands influenced by bedrock.	Moderate permeability, low to moderate available water capacity.	>3.5	
		MIC	8-15					
		MID	15-25					
Mohawk	Mollic Hapludalfs	MoB	3-8	WD-MWD	Upland till landscapes.	Available water capacity is high.	2-2.5	
Ontario	Glossoboric Hapludalfs	OnB	3-8	WD	Gently sloping to moderately steep uplands.	Available water capacity is moderate.	>2.5	
		OnC	8-15					
		OnD	15-25					
Palms	Teric Medisaprists	Pk	Nearly level	VPD	Till plains, lake plains, and flood plains in formerly ponded basin areas.	Water table is at or near the surface most of the year.	0	A
Palmyra	Glossoboric Hapludalfs	PIB	3-8	WD-ED	Nearly level to very steep outwash plains, kames and kame terraces.	Available water capacity is moderate.	>3.5	
Phelps	Glossaquic Hapludalfs	PpB	0-4	MWD	Glacial outwash terraces.	Seasonal wetness, low available water capacity.	1.5-2	
Rhinebeck	Aeric Ochraqualfs	RbB	3-8	SPD	Fringe areas of old lake plains.	Available water capacity is moderate.	0.5-1.5	B
Wassaic	Glossoboric Hapludalfs	WaA	0-3	WD	Glacially modified, bedrock-controlled till plains	Available water capacity and permeability are moderate.	>3.5	
		WaB	3-8					
		WaC	8-15					
		WaD	15-25					

<sup>1</sup>Unless otherwise noted, information derived from the Soil Survey of Herkimer County, New York, Southern Part (1975).

<sup>2</sup>Soil drainage is represented by the following abbreviations: "ED" = excessively drained, "WD" = well drained, "MWD" = moderately well drained, "SPD" = somewhat poorly drained, "PD" = poorly drained, and "VPD" = very poorly drained.

<sup>3</sup>"A" indicates this soil is considered hydric in New York State, and "B" indicates the potential for hydric inclusions in New York State (NRCS, 2006; NRCS, 1989).

## **2.2 HYDROLOGY**

The Project Site is located in the Mohawk River and the Unadilla River drainage basins (USGS Hydrologic Units 02020004 and 02050101, respectively) of the Mid-Atlantic Region, which ultimately drains to the Atlantic Ocean. In general, the northeastern portion of the Project Site drains north to the Mohawk River, while the southwestern portion of the Project Site drains south to the Unadilla River.

USGS mapping indicates that Ohisa Creek, along with unnamed tributaries to Fulmer Creek, Otsquago Creek, and Nowadaga Creek occur within the Project Site (Figure 2). Ohisa Creek flows north to Nowadaga Creek, Fulmer Creek flows northwest, and Otsquago Creek flows east, all eventually flowing into the Mohawk River. On-site streams are generally moderate to gentle gradient streams that meander through wetlands and along the edge of agricultural fields.

USGS mapping also indicates the presence of one named water body, Mud Lake, which occurs just outside the Project Site. This lake is associated with a much larger forested wetland (portions of which extend into the project area), which is mapped by the NYSDEC as Wetland JV-10 (see Section 3.2). The primary sources of hydrology within and adjacent to the Project Site likely include precipitation, surface water runoff during rainfall or snowmelt events, and groundwater discharges/inflow.

## **3.0 JURISDICTIONAL AREA MAPPING**

### **3.1 WATERS OF THE UNITED STATES**

As defined by the USACOE, Waters of the United States include all lakes, ponds, streams (intermittent and perennial), and wetlands. Jurisdictional 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” (USEPA, 2001). Such areas are indicated by the presence of three criteria: hydrophytic vegetation, hydric soils, and evidence of wetland hydrology during the growing season (Environmental Laboratory, 1987). However, as a result of the Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers Supreme Court case (No. 99-1178; January 9, 2001), it has been determined that the USACOE does not have jurisdictional authority over waters that are “nonnavigable, isolated, and intrastate” (USEPA, 2001). More recently, the Supreme Court decided *U.S. v. Rapanos*, 547 U.S. (June 19, 2006), in which it held in two consolidated

cases (the other one was *Carabell*) that the Corps misinterpreted the Clean Water Act (Act) in determining its jurisdiction over wetland protection.

In the first consolidated case, *Rapanos*, the lower court held that the landowners violated the Act by discharging pollutants into jurisdictional wetlands without a permit. In *Rapanos*, the wetlands were near ditches and man-made drains that eventually emptied into a lake approximately 20 miles away. In the second case, *Carabell*, the lower court also held that the Corps had jurisdiction over the wetlands and *Carabell* was denied a permit to build. The wetlands in *Carabell* were separated from a ditch by a man-made berm which “ordinarily, if not always, blocks surface-water flow from the wetlands into the ditch.” This ditch drained into a creek, which flowed into Lake St. Clair. Before the Supreme Court, both the *Rapanos* and *Carabells* argued that while their properties may have wetlands, these wetlands are not adjacent to navigable waters and are therefore beyond the Act’s jurisdiction.

Four members of the Court (or a plurality) held that the wetlands in question were outside the Corps’ jurisdiction. However, it is Justice Kennedy’s concurring opinion, which will likely sway the lower courts as the controlling opinion. While Justice Kennedy’s opinion provides broader wetland protection than the plurality, it still requires a “significant nexus” on a case-by-case basis when it seeks to regulate wetlands based on adjacency to nonnavigable tributaries.” Justice Kennedy also looked to the Corps own definition of a tributary in terms of the regularity of flow to suggest that the Corps was overstepping its jurisdictional boundaries when it regulated wetlands based on adjacency to drains, ditches, and streams remote from any navigable-in-fact water and carrying only minor water-volumes. Specific to the Project Site, the jurisdictional status of all on-site waters will be determined following a field visit with a Buffalo District USACOE representative (if necessary).

NWI mapping indicates that there are approximately 118 federally mapped wetland communities (or portions there of) within the Project Site (Figure 4). NWI wetland mapped within the proposed Project Site range in size from less than 0.01 acre to approximately 16 acres in size, and total approximately 207 acres. The NWI indicates three prevalent wetland types: palustrine, emergent, persistent (PEM1); palustrine, forested, broad-leaved, deciduous (PFO1); and palustrine, unconsolidated bottom, permanently flooded (PUBH). In addition, scrub-shrub and evergreen forest wetlands are also present within the Project Site.

### 3.2 NEW YORK STATE FRESHWATER WETLANDS & 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 to determine 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.

To be granted a permit from the NYSDEC pursuant to the Freshwater Wetlands Act, the proposed activity must minimize impacts to, or loss of, the wetland or its adjacent area, including impacts to the functions, values and benefits provided by these wetlands. During the permit review process, the NYSDEC will consider the economic and social need for a project, as well as the economic and social burdens that a project may impose on the public. The level of need is weighed against the public burden and the level of net losses or impacts to the wetland. NYSDEC must strike a reasonable balance in order to issue a permit. In general, the more important the wetland functions, values and benefits and the greater the potential loss or reduction of these attributes, the greater the amount of economic and social need that the applicant must demonstrate to obtain a permit.

Review of NYSDEC freshwater wetlands mapping indicates the presence of six wetlands within the Project Site that are regulated under Article 24 of the Environmental Conservation Law. The state-regulated wetlands are identified in Figure 4 and described in Table 2.

**Table 2. State-Regulated Wetlands Within the Project Site**

<b>Wetland</b>	<b>Class<sup>1</sup></b>	<b>Total Size (Acres)</b>	<b>Size Within Project Site (Acres)</b>
JV-10	II	63.4	2.0
VH-2	II	25.2	4.8
VH-3	II	32.1	0.5

<b>Wetland</b>	<b>Class<sup>1</sup></b>	<b>Total Size (Acres)</b>	<b>Size Within Project Site (Acres)</b>
VH-4	II	23.7	20.1
VH-5	II	53.1	21.8
VH-6	II	22.7	5.2

<sup>1</sup>NYS classification system, which established four separate classes that rank wetlands according to their ability to provide functions and values (Class I having the highest rank, descending through Class IV).

EDR staff delineated portions of two of the seven NYSDEC mapped wetlands located within the Project Site. Delineated wetlands CCCC, EE, and FF correspond to portions of NYSDEC wetland VH-6, and delineated wetlands T and U correspond to portions of NYSDEC wetland VH-4 (see Table 3 for additional detail). It should be noted that classifying all of the previously mentioned delineated wetlands as state-regulated represents a very conservative approach. Based upon EDR’s past experience, and due to a noticeable change of wetland character between delineated wetlands and state-mapped wetlands, it is likely that delineated wetlands EE, FF, and CCCC would not be considered jurisdictional by NYSDEC wetland biologists. However, in order to present a “worst-case” analysis, these delineated wetlands are considered portions of state-mapped wetlands in this report.

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 stream, are considered to be part of a stream and are subject to regulation under the stream protection category of Article 15. Protected stream means any stream, or particular portion of a stream, for which has been assigned by the NYSDEC any of the following classifications or standards: AA, AA(t), A, A(t), B, B(t) or C(t) (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, and also include those more specifically designated (ts) which support trout spawning. State water quality classifications of unprotected watercourses include Class C and Class D streams. Classification D waters are suitable for fishing and non-contact recreation.

Some stream segments within the Project Site are protected by the Protection of Waters regulations, including segments of Ohisa Creek, unnamed tributaries to Nowadaga Creek,

and unnamed tributaries to Otsquago Creek. These streams are all classified as C(t) trout streams. Specific locations are indicated on Figure 5. Portions of these streams were delineated by EDR staff. Wetlands NN and XXX include protected segments of Ohisa Creek, Wetland BBBB includes a protected unnamed tributary of Nowadaga Creek, Wetland NNNN includes a protected tributary to Ohisa Creek, and RRR includes a protected tributary to Otsquago Creek.

## **4.0 ON-SITE JURISDICTIONAL AREA DELINEATION**

### **4.1 METHODOLOGY**

Identification and delineation of wetlands and streams in areas within or adjacent to the project footprint were performed by EDR personnel during the fall 2005 growing season and the spring, summer, and fall of 2006. EDR performed field surveys/delineations only on those wetlands that may be subject to the siting of proposed project components (including the turbines, turbine workspaces, access roads, substation, collection station, staging areas, and buried electrical interconnect) and along the portions of public roads that may be subject to improvements, such as an increased turning radius. The determination of wetland boundaries was made by EDR personnel according to the three parameter methodology presented in the USACOE Wetland Delineation Manual (hereafter referred to as the 1987 Manual) (Environmental laboratory, 1987). 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, which was subsequently surveyed using a Trimble Pathfinder® Pro GPS unit with reported sub-meter accuracy. Data was collected from one or more (depending on the size of the delineated area), sample plots in each delineated wetland, and was recorded on USACOE *Routine Wetland Determination* forms (Appendix B). The data collected for each of the delineated wetlands included vegetation, hydrology indicators, and soils characteristics. This methodology was applied to all wetlands delineated in the Project Site.

Vegetative community data collection 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 wetland delineations in the Project 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 percent cover.

Project Site soils data was collected by EDR personnel using a soil auger. Information concerning soil series, subgroup, drainage classification, texture, and matrix and mottle color was obtained for each delineated wetland. This information was 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). Hydric soils were determined in the field through observation of composition, color, and morphology. Soil colors were determined using *Munsell Soil Charts* (Kollmorgen Corp., 2000).

The 1987 Manual lists the following indicators as evidence of wetland hydrology (in order of decreasing reliability): (1) visual observation of inundation, (2) visual observation of soil saturation, (3) water marks, (4) drift lines, (5) sediment deposits, and (6) drainage patterns. 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 when combined with a hydrophytic plant community and hydric soils. In addition, "secondary indicators" used by EDR personnel included: (1) oxidized root channels in the upper 12 inches of soil, (2) water-stained leaves, (3) local soil survey data, and (4) morphological plant adaptations. Any two of these indicates the presence of wetland hydrology.

Photographs were taken of each wetland delineated within the proposed Project Site, and representative photographs of the various wetland communities are included in Appendix C.

## **5.0 RESULTS**

EDR personnel delineated a total of 49 wetlands/waters within the Project Site. These include 37 wetlands, eight streams/drainages, and four farm ponds. Information pertaining to individual on-site wetlands is summarized in Table 3.

In general, jurisdictional areas delineated on the Project Site exist as one of the following six types (or a combination thereof): forested wetland (FO), wet meadow (WM), scrub-shrub swamp (SS), emergent marsh (EM), streams or drainages, and farm ponds. All on-site delineated wetlands and streams are depicted in Figure 6, and descriptions of each of the communities are presented below.

**Table 3. Delineated Wetlands and Streams**

Wetland/Stream ID	Community Type <sup>1</sup>	State Jurisdiction (Yes/No)	Federal Jurisdiction (Yes/No)	Potential Impact (Yes/No) <sup>2</sup>	Figure 6 Reference Sheet #
A	SS/EM	No	Yes	No	4
B	EM/WM	No	Yes	No	4
C	SS	No	Yes	No	4
D	WM	No	Yes	No	8
T	SS/FO	Yes	Yes	No	7
U	SS/EM	Yes	Yes	No	7
DD	EM/Open water	No	Yes	No	4
EE	SS/WM	Yes	Yes	No	12, 13
FF	WM	Yes	Yes	No	12
GG	SS	No	Yes	No	8
HH	SS/WM	No	Yes	No	8
II	SS(drainage)	No	Yes	No	4
JJ	WM(drainage)	No	Yes	No	4
KK	SS/WM	No	Yes	Yes (P)	8
LL	WM	No	Yes	Yes (T)	6
MM	SS	No	Yes	No	11
NN	SS/WM	Yes	Yes	No	11
AAA	SS	No	Yes	No	11
CCC	EM	No	Yes	No	11
DDD	FO/WM	No	No	No	16
EEE	FO/WM	No	Yes	No	16
FFF	FO/WM	No	No	No	16
GGG	FO/WM	No	No	No	16
HHH	FO/WM	No	No	No	16
III	FO/WM	No	No	No	16
LLL	FO	No	Yes	No	2
MMM	Drainage/Stream	No	Yes	No	2
NNN	EM drainage swale	No	Yes	No	7
QQQ	SS/WM/Pond	No	Yes	No	5, 6
RRR	WM	Yes	Yes	No	12
SSS	EM/WM/Pond	No	Yes	No	12

Wetland/Stream ID	Community Type <sup>1</sup>	State Jurisdiction (Yes/No)	Federal Jurisdiction (Yes/No)	Potential Impact (Yes/No) <sup>2</sup>	Figure 6 Reference Sheet #
TTT	SS/WM	No	Yes	No	12
WWW	SS	No	Yes	No	11
XXX	WM/SS/Stream	Yes	Yes	No	11
YYY	WM/Pond	No	No	No	5
ZZZ	SS	No	Yes	No	4
AAAA	SS/WM	No	No	No	4
BBBB	Stream	Yes	Yes	No	3
CCCC	EM	Yes	Yes	No	13
DDDD	SS/WM/Stream	No	Yes	No	9
EEEE	WM/SS/EM/FO	No	Yes	No	2
FFFF	EM/WM	No	Yes	No	2
GGGG	EM	No	Yes	No	2
HHHH	EM/WM	No	Yes	No	2
IIII	WM	No	Yes	Yes (P)	3
JJJJ	WM	No	No	No	5
KKKK	SS	No	Yes	No	5
MMMM	FO/Stream	No	Yes	Yes (T)	2, 3
NNNN	WM	Yes	Yes	No	12

<sup>1</sup> Wetland community types are represented by the following abbreviations: “EM” = Emergent, “FO” = Forested, “SS” = Scrub-shrub, “WM” = Wet meadow.

<sup>2</sup> Based on preliminary assessment of impact avoidability. “T” designates a temporary impact, “P” designates a permanent impact.

The column “State Jurisdiction in Table 3 contains either a “Yes” or “No” for each wetland, where “Yes” indicates that the delineated wetland corresponds to a portion of a NYSDEC mapped wetland and “No” indicates that the delineated wetland does not correspond to any portion of a NYSDEC mapped wetland.

The column “Federal Jurisdiction” in Table 3 contains either a “Yes” or “No” for each wetland. In this case, “No” indicates the respective system is considered non-jurisdictional by EDR personnel, and “Yes” indicates that, in EDR’s opinion, the respective system is considered jurisdictional. The following represents the methodology used by EDR personnel to determine potential federal jurisdiction.

- 1) All on-site wetland delineations were cross-referenced with on-site stream delineations and field notes. Those wetlands having a direct hydrologic association with a stream were automatically considered jurisdictional.
- 2) All on-site wetland delineations were overlain on aerial photographs and USGS topographic mapping. EDR personnel focused on all wetlands not eliminated in step 1 above. Mapping was then analyzed for drainage features. Any wetland lying within or

immediately adjacent to a drainage feature was considered jurisdictional. Mapped drainage features used during this step included USGS blue-lined streams, topographic drainage, and aerial photograph signatures.

- 3) The remaining on-site wetland delineations (those not eliminated in either step 1 or step 2 above) were then evaluated by consulting data sheets and/or field notes taken during the field investigation and corresponding field maps. The description of each wetland was used to make a jurisdictional recommendation.

After completing the three steps described above, it appears that the majority of wetlands delineated within the Project Site are not isolated and therefore likely to be considered jurisdictional. These wetlands are typically associated with the headwaters and tributaries of Fulmer Creek, Ohisa Creek, and Otsquago Creek. Our analysis suggests that eight wetlands have the potential to be considered non-jurisdictional by the USACOE.

## 5.1 WETLANDS

*Forested wetland* – Forested wetland communities are generally dominated by trees that are 20 feet or taller, but also include an understory of shrubs and herbs (Tiner, 1999). The forested wetlands on the Project Site are commonly dominated by red maple (*Acer rubrum*) and green ash (*Fraxinus pennsylvanica*) in the overstory, with a midstory either absent or consisting of red maple/green ash saplings and shrub species such as silky dogwood (*Cornus amomum*) and speckled alder (*Alnus rugosa*) (see photos in Appendix C). The herbaceous vegetation commonly includes species such as sensitive fern (*Onoclea sensibilis*), spotted jewelweed (*Impatiens capensis*), sedges (*Carex. sp.*), and Joe-Pye weed (*Eupatorium maculatum*). A good example of a forested wetland characteristic of the Project Site, Wetland DDD, is located south of Jordanville Road. This wetland is characterized by a mature green ash and red maple overstory, with a midstory of saplings, and an herbaceous ground plain dominated by spotted jewelweed. Soils in this wetland are characterized as silt loam with a low chroma matrix color and high chroma mottling in the B horizon. Indicators of hydrology include buttressing of tree trunks, drainage patterns in the wetland, water marks, saturated soils, water-stained leaves, and oxidized root zones.

*Scrub-shrub wetland* – Scrub-shrub wetlands are generally dominated by stands of woody vegetation less than 20 feet tall (Tiner, 1999). Scrub/shrub wetlands within the study area are typically dominated by shrubs such as silky dogwood, speckled alder, and willow (*Salix*

sp.) (see photos in Appendix C). Late goldenrod, reed canary grass (*Phalaris arundinacea*), and sedges typically dominate herbaceous vegetation in these areas. Other herbs include sensitive fern, Joe-Pye weed, boneset (*Eupatorium perfoliatum*), spotted jewelweed, and broad-leaved cattail (*Typha latifolia*). These areas are characterized by periodic inundation/saturation (through flooding, surface runoff, and seasonal high groundwater). Many of the delineated scrub-shrub wetlands display a somewhat irregular microtopography with hummocks and surface water pools. Wetland U, located east of Forrest Road, is a good example of a scrub-shrub swamp. The shrub layer consists of willow and silky dogwood and the ground cover is dominated by reed canary grass. The ground surface in this wetland was inundated by 1 to 2 inches of water at the time of data collection (August 8, 2006) and soils displayed low chroma matrix color (10YR 5/2) with high chroma mottles (10YR 5/6) in the B-horizon.

*Wet meadow* – Wet meadows are common throughout the Project Site and are usually found in poorly drained, low-lying depressional areas. These wetlands may resemble grasslands and are typically drier than other marshes, except during periods of seasonal high water. They generally lack standing water for most of the year, though snow melt, stormwater runoff, and/or a high water table allows the soil to remain saturated for a significant portion of the growing season. These wetlands are dominated by herbaceous species, with some areas having high vegetative diversity, while others are almost monotypical (i.e. dense stands of reed canary grass). Prevalent hydrophytic vegetation found in wet meadows on-site include sedges, late goldenrod, reed canary grass, Joe-Pye weed, and broad-leaved cattail (see photos in Appendix C). Wetland RRR, located off of the east side of Jordanville Road near the Puskarenko Road intersection, provides a representative example of a wet meadow. It is dominated by sedges, reed canary grass, and spearmint (*Mentha spicata*). Soils in this wetland are clearly hydric with a low chroma matrix color and common high chroma mottles in the B horizon. Indicators of hydrology include inundation (two to three inches of standing water above ground surface) drainage patterns in the wetland, oxidized root channels, morphological plant adaptations, and hummocky microtopography.

*Emergent marsh* – Emergent marsh wetlands occur within some of the wet meadow systems, where surface water collects in shallow basins, and/or adjacent to open water. These wetlands are characterized by more persistent and/or deeper inundation than wet meadows, often containing soils that remain inundated throughout the year. Emergent marshes on-site are dominated by herbaceous species such as broad-leaved cattail, sedges, reed canary grass, and Joe-Pye weed (see photos in Appendix C). Wetland DD, located

north of Hick's Road and west of Turbines 94 and 12A, is an example of an emergent marsh community with an open water component. Vegetation includes cattail, sedges, late goldenrod and boneset, with the cattails dominating. Indicators of hydric soils include a low chroma matrix color and moderately abundant high chroma mottles in the B horizon. Primary indicators of hydrology include inundation (one to two inches of standing water above ground surface) and drainage patterns in the wetland.

*Open Water* – Open water features/farm ponds were observed in a number of locations within the Project Site (see photos in Appendix C). Generally, they are found in open field settings or adjacent to houses and barns. Typically, they are excavated or diked, and range in size from less than 0.5 acre to greater than 3 acres. Banks are typically well-defined and emergent wetland vegetation tends to be limited or lacking. However, the banks of some ponds are less abrupt and transition into a fringe emergent wetland community. Water depths are typically 4 feet or more.

## **5.2 STREAMS/EPHEMERAL DRAINAGES**

As indicated in Table 3, EDR personnel delineated a total of eight streams or ephemeral drainages. Delineated streams generally had a moderate to gentle gradient and flow rate. Widths typically ranged from 2 to 5 feet with a few larger streams ranging from 5 to 10 feet wide. Water depths ranged from 1 to 12 inches. Most streams on the Project Site are intermittent, have a rock/gravel substrate, and support little or no aquatic vegetation (see photos in Appendix C). A few of the streams delineated by EDR personnel are characterized as ephemeral drainages, carrying water only seasonally or after periods of heavy precipitation.

## **6.0 CONCLUSIONS**

A total of 49 wetlands and streams were delineated by EDR personnel in areas within or immediately adjacent to the Jordanville Wind Power Project footprint. These wetlands were identified based on the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. The delineated areas include forested, scrub-shrub, wet meadow, and emergent wetlands as well as streams, ephemeral drainages, and open water areas. The primary functions provided by these wetlands appear to include maintaining surface water flows, recharging groundwater supplies, storm water detention, flood abatement, water quality improvement, wildlife habitat, and nutrient cycling. Several of the larger forested wetlands provide habitat for forest-nesting songbirds and breeding amphibians (as evidenced by egg

masses in several wetlands). The functions of many on-site wetlands are limited due to 1) their small size, 2) location within or adjacent to agricultural fields, 3) lack of structural diversity, and 4) past or on-going physical disturbance (e.g., agriculture). However, several of the delineated wetlands are portions of much larger systems (such as those regulated by the NYSDEC), which often have sizable watersheds, providing significant flood storage, wildlife habitat, water quality, and groundwater benefits. Additional detail relative to the functions and values of on-site wetlands will be provided in the Joint Application for Permit, which will be submitted to the USACOE and NYSDEC subsequent to this report (if necessary).

As previously mentioned, EDR's analysis suggests that eight of the 49 wetlands and streams delineated on-site will not be considered jurisdictional by the USACOE due to their lack of adjacency to jurisdictional (non-navigable) waters and/or the lack of a "significant nexus" between these wetlands and adjacent wetlands/waters. The remaining 41 wetlands and streams are assumed to be under federal jurisdiction, with ten of these also being under state jurisdiction pursuant to Article 24 or Article 15 (see Table 2). However, final determination of jurisdictional status must be made by the USACE and NYSDEC. It should also be noted that none of the non-federally jurisdictional wetlands are anticipated to incur project-related impacts. Therefore, jurisdictional status will not be factored into future impact determinations.

## 7.0 REFERENCES

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**APPENDIX A**  
FIGURES

## **APPENDIX B**

### ROUTINE WETLAND DETERMINATION FORMS

## **APPENDIX C**

### REPRESENTATIVE WETLAND COMMUNITIES