Wetland Delineation Report

Bluestone Wind Project

Towns of Windsor and Sanford
Broome County, New York

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September 2018

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1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

Bluestone Wind, LLC (the Applicant), a wholly owned subsidiary of Calpine Corporation, is proposing to construct a 124 megawatt (MW) wind energy facility (the Facility) in the Towns of Windsor and Sanford in Broome County, New York (See Figure 1). The Facility will consist of the construction and operation of up to 33 wind turbines, associated collection lines, access roads, meteorological towers, and an operation and maintenance (O&M) building. These turbines and related facilities will be sited within privately-owned leased land within an approximately 5,700-acre Facility Site. To deliver electricity to the New York State power grid, the Applicant proposes to construct a collection substation, and a point of interconnect substation including a battery storage facility, which will interconnect with NYSEG's existing Afton to Stilesville 115 kV transmission line, in the Town of Sanford.

Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C. (EDR) was retained to identify all wetlands and streams within and adjacent to the proposed Facility components described above (hereafter referred to as the "Study Area" - see Figure 2). Specifically, detailed wetland delineations within the Study Area were conducted within a 200-foot wide corridor centered on linear Facility components (e.g., access roads, buried electrical interconnect, overhead transmission line), and within a 265-foot radius of turbines and other components such as permanent meteorological towers, O&M building, staging areas, and the collection substation. Wetland and stream delineations took place within the Study Area during spring and summer 2018.

1.2 PURPOSE

The purpose of this study was to delineate and describe all wetlands and streams that may fall under state or federal jurisdiction, and to identify the potential location of vernal pools, 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 and flagging of all potential state and federal jurisdictional wetlands, streams, and vernal pools, 3) Global Positioning System (GPS) survey of on-site delineated wetland and stream boundaries, 4) quantification of the area of on-site jurisdictional wetlands and streams within the Study Area, and 5) a description of potentially jurisdictional areas based on hydrology, vegetation, and soils data collected in the field.

This document is intended to provide all of 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 State Geological Survey (USGS) topographic mapping (Gulf Summit and Deposit 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 (Soil Survey Staff, 2018), the NRCS List of Hydric Soils of the State of New York (NRCS, 2017), and recent aerial photography.

Vascular plant names follow nomenclature found in the New York Flora Atlas (Weldy et al., 2018), and wetland indicator status for plant species, was determined by reference to 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 by EDR field ecologists Russell Farchione, Shelby Zemken, and Robert Wojcikiewicz.

Mr. Farchione is an Environmental Analyst with five years of experience in the environmental field. He received a Bachelor of Science Degree in Biology from State University of New York at Geneseo. Mr. Farchione's experience includes wetland and stream delineations, advanced hydric soils training, ecological surveys, conservation and environmental research, environmental impact analysis and geographic information system (GIS) data analysis. While at EDR, Mr. Farchione has conducted numerous wetland and stream delineations including surveys for several large-scale wind projects.

Mr. Zemken is an Environmental Analyst with more than four years of experience in the natural resources field. He received a Bachelor of Science in Environmental Science from SUNY Oneonta, and a Master's Degree in Environmental Science from the University of Cologne, Germany. Mr. Zemken's experience includes wetland and stream delineations, ecological resource investigations, and GIS data analysis.

Mr. Wojcikiewicz is an Environmental Analyst with more than three years of experience in the natural resources field. He received a Bachelor of Science Degree in Geology from State University of New York at Geneseo. Mr. Wojcikiewicz's experience includes wetland and stream delineations, ecological surveys, and GIS data analysis. At

EDR, Mr. Wojcikiewicz has conducted wetland delineations and field assessments for energy, transportation and private 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, the USACE has regulatory jurisdiction over Waters of the Unites 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).

The jurisdictional status of all on-site waters can only be determined following an official jurisdictional determination provided by the USACE, which typically includes a field visit. On June 5, 2007 the United States Environmental Protection Agency (EPA) and the Department of Army issued Clean Water Act jurisdiction guidance regarding the extent of their jurisdiction following the Supreme Court's decision in *Rapanos* and *Carabell* (547 U.S., June 29, 2006). A summary of this guidance is as follows:

The USACE will assert jurisdiction over the following waters:

- Traditional navigable waters;
- Wetlands adjacent to traditional navigable waters;
- Non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months); and
- Wetlands that directly abut such tributaries.

The USACE will decide jurisdiction over the following waters based on a fact-specific analysis to determine whether they have significant nexus with a traditional navigable water:

- Non-navigable tributaries that are not relatively permanent;
- Wetlands adjacent to non-navigable tributaries that are not relatively permanent; and
- Wetlands adjacent to, but that do not directly abut, a relatively permanent non-navigable tributary.

The USACE generally will not assert jurisdiction over the following features:

- Swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent, or short duration flow); and

- Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water.

The USACE will apply the significant nexus standard as follows:

- A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters; and

- Significant nexus includes consideration of hydrologic and ecologic factors.

A Section 404 permit from the USACE is required for activities that result in the placement of dredged or fill materials in WOUS.

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 particular 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 glaciated Appalachian Plateau physiographic province of New York State. Elevations in the Study Area range from 1,200 to 2,024 feet above mean sea level (Figure 3). The Appalachian Plateau in Broome County is characterized by well-rounded rolling streams and rolling hills formed by millions of years of water erosion by glaciers of the Pleistocene era. The smaller streams divide the area into a network of smaller hills and ridges. The majority of the soil in Broome County was formed from unsorted glacial till (USDA, 1971).

The soil survey indicates that 26 soil series are present within the Study Area (Figure 4). Table 1 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 (Soil Survey Staff, 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

Mapping Unit	Series	Slope %[1]	Drainage[2]	Hydric[3]	Potentially Hydric[4]	Acres within Wetland Study Area
Ad	Alluvial land	--	Poorly drained	Yes	No	4.0
CcC	Lackawanna channery silt loam	5 to 15	Well drained	No	No	110.7
CcD	Lackawanna channery silt loam	15 to 25	Well drained	No	No	42.8
CcE	Lackawanna channery silt loam	25 to 35	Well drained	No	No	20.6
CuB	Wellsboro channery silt loam	2 to 8	Moderately well drained	No	No	67.5

Mapping Unit	Series	Slope %[1]	Drainage[2]	Hydric[3]	Potentially Hydric[4]	Acres within Wetland Study Area
CuC	Wellsboro channery silt loam	8 to 15	Moderately well drained	No	No	17.2
CuD	Wellsboro channery silt loam	15 to 25	Moderately well drained	No	No	2.3
LdC	Lordstown channery silt loam	5 to 15	Well drained	No	No	9.8
LdD	Lordstown channery silt loam	15 to 25	Well drained	No	No	8.1
LoE	Lordstown and Oquaga channery silt loams	25 to 35	Well drained	No	No	17.4
LrF	Lordstown and Oquaga soils	35 to 60	Well drained	No	No	5.1
LsE	Lordstown and Oquaga extremely stony and rocky soils	0 to 35	Well drained	No	No	178.3
MhC	Mardin channery silt loam	8 to 15	Moderately well drained	No	No	6.3
MhD	Bath channery silt loam	15 to 25	Well drained	No	No	0.1
MhE	Bath channery silt loam	25 to 35	Well drained	No	No	2.3
MrF	Bath and Lackawanna soils	35 to 65	Well drained	No	No	4.4
Ms	Middlebury silt loam	--	Moderately well drained	No	No	3.6
MtB	Morris channery silt loam	2 to 8	Somewhat poorly drained	No	Yes	44.2
MtC	Morris channery silt loam	8 to 15	Somewhat poorly drained	No	Yes	79.7
MuD	Morris and Tuller soils	3 to 25	Somewhat poorly drained	No	Yes	1.3
OuC	Oquaga channery silt loam	5 to 15	Well drained	No	No	95.7
OuD	Oquaga channery silt loam	15 to 25	Well drained	No	No	131.0
Tg	Tioga gravelly silt loam	--	Well drained	No	No	4.7
VoC	Volusia channery silt loam	8 to 15	Somewhat poorly drained	No	Yes	6.2
VoD	Volusia channery silt loam	15 to 25	Somewhat poorly drained	No	Yes	1.6
Wd	Wayland soils complex	0 to 3	Poorly drained	Yes	No	6.0

[1] "--" indicate no slope data is available on the USDA Web Soil Survey 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, and "PD" = 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

The majority of the Study Area lies within the Upper Delaware drainage basin (USGS Hydrologic Unit 02040101,) while the westernmost portion of the Study Area drains into the Upper Susquehanna drainage basin (USGS Hydrologic Unit 02050101). Both the Delaware and the Upper Susquehanna river basins combine to drain Broome, Tioga, Chenango, Madison, Cortland, Delaware, and Otsego counties. The Upper Delaware drainage basin headwaters originate in the Catskill Mountains and eventually flow into the Atlantic Ocean through Delaware Bay (NYSDEC, 2018). The Upper Susquehanna drainage basin drains a portion of south-central New York State to the Atlantic Ocean through Chesapeake Bay (NYSDEC, 2018). Total annual precipitation averages 49.56 inches in nearby Deposit, New York (NOAA, 2018).

Based on review of mapped wetlands and streams, aerial imagery, and site-specific field investigations, the largest surface water body within the Study Area is Oquaga Creek, located in the eastern half of the Study Area. Streams in the Study Area flow southeast until their confluence with Oquaga Creek. Oquanga Creek flows east until its confluence with the western branch of the Delaware River. Delaware River continues southeast until its terminus in Delaware Bay.

3.3 FEDERAL AND STATE MAPPED WETLANDS AND STREAMS

NWI mapping indicates there are 20 wetland communities within the Study Area, totaling 85 acres (Figure 5). Riverine wetland communities are the dominant community type on site, totaling approximately 59 acres. Other NWI-mapped wetland communities within the Study Area include emergent wetlands (18 acres), forested/shrub wetlands (6 acres) and open water ponds (2 acres).

Review of NYSDEC Freshwater Wetlands mapping indicates that there are no state-regulated wetlands that intersect the Study Area (Figure 5). Wetland GS-1 is the nearest wetland to the Study Area, which is 2,015 feet north of the Study Area at Turbine 36.

NYSDEC stream mapping indicates that there are seven state protected streams that flow through the Study Area (Table 2). Protected streams include one Class A, one Class B(T) and five Class C(T). One protected (Class C(T)) stream is mapped just outside the Study Area boundary and is listed in Table 2 below. There are three other NYSDEC-mapped unprotected (Class C) streams within the Study Area. Table 2 provides a summary of all State-mapped streams (protected and unprotected), and their linear distances, within the Study Area.

Table 2. State-Mapped Streams Within the Study Area

Stream Name	NYSDEC Class	Linear Feet Within Study Area[2]
Big Hollow Creek (trib)	A	229
Fly Creek	B(T)	273
Marsh Creek (trib)	C(T)	115
March Creek (trib)[1]	C(T)	209
Marsh Creek (trib)	C(T)	935
Marsh Creek	C(T)	278
Oquaga Creek (trib)	C(T)	1725
Tarbell Brook	C(T)	0[3]
Bone Creek	C	202
Oquaga Creek (trib)	C	490
Oquaga Creek	C	245

[1] NYSDEC stream classification mapping shows straight lines crossing over these areas. Upon wetland and stream field investigations, it was determined that there is a wetland in this area but no evidence of a stream.
[2] Represents portion of stream within the study area according to mapping.
[3] NYSDEC stream classification mapping shows the stream just outside the boundary of the Study Area. However, a delineated stream (5E) within the Study Area appears to have hydrologic connection to the state mapped stream.

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 mapping, NWI maps, USGS topographic mapping, 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 initiated in May of 2018 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 tiling spade. Information concerning soil name, drainage classification, texture, matrix and redoximorphic feature color was obtained for each delineated wetland by reviewing the Broome 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 all wetlands delineated within the Study Area. Photographs representative of the delineated wetlands are included in Appendix C.

4.2 RESULTS

EDR delineated 64 wetlands within the Study Area, totaling approximately 29 acres. In addition, EDR delineated 28 streams, totaling approximately 9,133 linear feet (1.72 miles). Please note that in most cases delineated wetlands and streams extend beyond the boundaries of the Study Area, and are thus larger than the acreage documented within the Study Area. Information pertaining to individual delineated wetlands and streams is summarized in Table 4 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) 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 and Streams

Delineation ID[1]	Latitude of Centroid	Longitude of Centroid	Wetland Present	Wetland Type Acreage Within Wetland Study Area[2]				Total Wetland Acreage Within Wetland Study Area	Stream Present	Stream Type[3]	Linear Feet of Stream Within Study Area[4]	NYSDEC Stream Class[5]	Stream Name	Federal Jurisdiction[6]	State Jurisdiction[7]	Appendix A: Figure 7 - Sheet #
				PFO	PSS	PEM	POW									
A	42.1182	-75.4448	Yes	--	2.32	--	--	2.32	Yes	R3	134	A	Big Hollow Creek (trib)	Yes	Yes	38,39,40
E	42.1166	-75.4429	Yes	--	--	0.04	--	0.04	--	--	--	--	--	Yes	--	40
F	42.1164	-75.4473	Yes	--	--	0.05	--	0.05	--	--	--	--	--	--	--	39
H	42.1018	-75.5521	Yes	--	--	--	0.15	0.15	--	--	--	--	--	Yes	--	23
I	42.1033	-75.5488	Yes	0.32	--	0.13	--	0.45	Yes	R3	420	--	--	Yes	--	21
J	42.0974	-75.5383	Yes	0.03	--	--	--	0.03	--	--	--	--	--	Yes	--	15,22
K	42.1018	-75.5459	Yes	0.01	--	--	--	0.01	--	--	--	--	--	--	--	21
L	42.1024	-75.547	Yes	0.99	--	--	--	0.99	Yes	R4	70	--		Yes	--	21,22
M	42.0887	-75.4800	Yes	--	--	3.31	--	3.31	Yes	R3	740	C	Oquaga Creek	Yes	--	34,35
N	42.0887	-75.4763	Yes	--	--	0.06	--	0.06	--	--	--	--	--	Yes	--	35
O	42.0887	-75.4749	--	--	--	--	--	--	Yes	R4	525	--	--	Yes	--	35
R	42.0835	-75.4812	--	--	--	--	--	--	Yes	R3	1506	C(T)	Oquaga Creek (trib)	Yes	Yes	29,30,31, 32,33
S	42.0893	-75.4947	--	--	--	--	--	--	Yes	R4	187	--	--	Yes	--	29,30
T	42.1055	-75.5375	--	--	--	--	--	--	Yes	R6	216	--	--	Yes	--	19
U	42.1093	-75.5331	Yes	0.24	--	--	--	0.24	--	--	--	--	--	Yes	--	20
V	42.0874	-75.5361	Yes	0.92	--	--	--	0.92	--	--	--	--	--	Yes	--	12
X	42.0803	-75.5648	--	--	--	--	--	--	Yes	R4	241	--	--	Yes	--	1
Y	42.0764	-75.5641	Yes	--	0.37	--	--	0.37	--	--	--	--	--	Yes	--	2
Z	42.0881	-75.5391	--	--	--	5.38	--	5.38	--	--	--	--	--	Yes	--	11,12
AA	42.0768	-75.446	--	--	--	--	--	--	Yes	R3	366	C	Bone Creek	Yes	--	41
BB	42.0773	-75.4458	Yes	--	--	--	0.10	0.10	--	--	--	--	--	Yes	--	41
DD	42.0774	-75.4450	Yes	--	--	0.14	--	0.14	--	--	--	--	--	Yes	--	41
EE	42.0995	-75.4548	Yes	0.77	--	0.01	--	0.78	--	--	--	--	--	Yes	--	37
FF	42.0927	-75.4641	Yes	1.40	--	--	--	1.40	--	--	--	--	--	Yes	--	36
GG	42.0977	-75.5355	Yes	--	0.19	--	--	0.19	Yes	R3	330	C(T)	Marsh Creek (trib)	Yes	Yes	15,16

Delineation ID[1]	Latitude of Centroid	Longitude of Centroid	Wetland Present	Wetland Type Acreage Within Wetland Study Area[2]				Total Wetland Acreage Within Wetland Study Area	Stream Present	Stream Type[3]	Linear Feet of Stream Within Study Area[4]	NYSDEC Stream Class[5]	Stream Name	Federal Jurisdiction[6]	State Jurisdiction[7]	Appendix A: Figure 7 - Sheet #
				PFO	PSS	PEM	POW									
HH	42.0972	-75.5382	Yes	0.07	--	0.12	--	0.19	--	--	--	--	--	Yes	--	15
II	42.089	-75.5393	--	--	--	--	--	--	Yes	R6	114	--	--	Yes	--	11,12
JJ	42.0811	-75.5485	Yes	0.05	--	0.03	--	0.08	Yes	R3	382	B(T)	Fly Creek	Yes	Yes	4
KK	42.0791	-75.5500	Yes	0.06	--	--	--	0.06	--	--	--	--	--	Yes	--	3,4
LL	42.0788	-75.5505	Yes	0.09	--	--	--	0.09	--	--	--	--	--	Yes	--	3,4
MM	42.0781	-75.5529	Yes	0.37	--	--	--	0.37	--	--	--	--	--	Yes	--	3
OO	42.0769	-75.5621	Yes	0.07	--	--	--	0.07	Yes	R4	58	--	--	Yes	--	2
PP	42.0770	-75.5630	Yes	0.04	--	--	--	0.04	Yes	R4, R6	176	--	--	Yes	--	2
SS	42.0864	-75.4900	Yes	0.08	--	0.05	--	0.13	--	--	--	--	--	Yes	--	8
TT	42.0738	-75.5364	Yes	--	--	0.03	--	0.03	Yes	R3	234			Yes	--	8
UU	42.0793	-75.5317	Yes	--	--	0.06	--	0.06	--	--	--	--	--	--	--	9
VV	42.0785	-75.5303	Yes	0.11	--	--	--	0.11	--	--	--	--	--	--	--	9
XX	42.0745	-75.5251	Yes	0.17	--	--	--	0.17	--	--	--	--	--	--	--	10
ZZ	42.0798	-75.5307	Yes	0.02	--	--	--	0.02	--	--	--	--	--	--	--	9
AAA	42.0819	-75.5359	Yes	--	--	0.10	--	0.10	--	--	--	--	--	--	--	7
BBB	42.0825	-75.5375	Yes	--	--	0.11	--	0.11	--	--	--	--	--	--	--	6,7
CCC	42.0842	-75.538	Yes	--	--	0.37	--	0.37	--	--	--	C(T)	Marsh Creek (trib)	Yes	--	6
DDD	42.086	-75.4891	Yes	0.03	--	--	--	0.03	Yes	R3, R4	1044	--	--	Yes	--	31,32
FFF	42.0941	-75.5038	Yes	--	--	0.97	--	0.97	--	--	--	--	--	Yes	--	25
GGG	42.098	-75.5343	Yes	--	--	0.10	--	0.10	--	--	--	--	--	Yes	--	16
III	42.098	-75.5334	Yes	--	--	0.16	--	0.16	--	--	--	--	--	Yes	--	16,17
JJJ	42.0983	-75.5325	Yes	--	--	0.25	--	0.25	--	--	--	--	--	Yes	--	16,17
KKK	42.0985	-75.5296	Yes	0.01	--	--	--	0.01	--	--	--	--	--	--	--	17
LLL	42.0972	-75.535	Yes	--	--	0.02	--	0.02	Yes	R3	285	C(T)	Marsh Creek (trib)	Yes	Yes	16
MMM	42.0964	-75.5349	Yes	--	--	0.21	--	0.21	Yes	R3	131	--	--	Yes	--	14,16
NNN	42.097	-75.5343	Yes	--	--	0.04	--	0.04	--	--	--	--	--	Yes	--	16
OOO	42.0933	-75.534	Yes	--	0.83	--	--	0.83	Yes	R3	430	C(T)	Marsh Creek (trib)	Yes	Yes	13,14

Delineation ID[1]	Latitude of Centroid	Longitude of Centroid	Wetland Present	Wetland Type Acreage Within Wetland Study Area[2]				Total Wetland Acreage Within Wetland Study Area	Stream Present	Stream Type[3]	Linear Feet of Stream Within Study Area[4]	NYSDEC Stream Class[5]	Stream Name	Federal Jurisdiction[6]	State Jurisdiction[7]	Appendix A: Figure 7 - Sheet #
				PFO	PSS	PEM	POW									
PPP	42.0925	-75.5334	Yes	--	--	0.06	--	0.06	--	--	--	--	--	Yes	--	13
QQQ	42.0919	-75.5323	Yes	--	--	0.75	--	0.75	--	--	--	--	--	Yes	--	13
RRR	42.1011	-75.5374	Yes	--	--	0.08	--	0.08	--	--	--	--	--	Yes	--	18
SSS	42.1004	-75.5368	Yes	--	--	0.16	--	0.16	--	--	--	--	--	Yes	--	18
TTT	42.099	-75.5353	Yes	--	--	0.06	--	0.06	--	--	--	--	--	Yes	--	16,18
UUU	42.0987	-75.5351	Yes	--	--	0.05	--	0.05	--	--	--	--	--	Yes	--	16,18
VVV	42.0982	-75.5346	Yes	--	--	0.03	--	0.03	--	--	--	--	--	Yes	--	16
XXX	42.1006	-75.5375	Yes	--	--	0.02	--	0.02	--	--	--	--	--	Yes	--	18
YYY	42.1007	-75.5376	--	--	--	--	--	--	Yes	R3	21			Yes	--	18
ZZZ	42.0906	-75.531	Yes	--	--	0.87	--	0.87	--	--	--	--	--	Yes	--	13
4A	42.0823	-75.5425	Yes	0.64	--	3.74	--	4.38	--	--	--	--	--	Yes	--	5,6
4B	42.0979	-75.4988	Yes	--	--	0.02	--	0.02	--	--	--	--	--	Yes	--	27
4C	42.0972	-75.5015	Yes	0.04	--	--	--	0.04	Yes	R4	166	C(T)	Oquaga Creek (trib)	Yes	Yes	26
4D	42.095	-75.498	Yes	0.19	--	--	--	0.19	Yes	R3	382	C(T)	Oquaga Creek (trib)	Yes	Yes	28
4E	42.0981	-75.521	Yes	--	--	0.27	--	0.27	Yes	R3	292	C(T)	Marsh Creek	Yes	Yes	24
4F	42.0993	-75.4538	Yes	0.09	--	--	--	0.09	--	--	--	--	--	Yes	--	37
4G	42.0972	-75.5357	Yes	--	--	0.05	--	0.05	--	--	--	--	--	Yes	--	15,16
4H	42.0881	-75.5406	Yes	0.23	--	--	--	0.23	--	--	--	--	--	Yes	--	11
4I	42.0882	-75.5371	Yes	0.02	--	--	--	0.02	--	--	--	--	--	Yes	--	11,12
4J	42.0968	-75.5345	Yes	--	--	0.01	--	0.01	--	--	--	--	--	Yes	--	14,16
5E	42.0986	-75.4573	--	--	--	--	--	--	Yes	R6	170	C(T)	Tarbell Brook	Yes	Yes	37
5A	42.1184	-75.4463	--	--	--	--	--	--	Yes	R6	170	--	--	Yes	--	39
5B	42.1175	-75.4458	--	--	--	--	--	--	Yes	R6	190	--	--	Yes	--	39,40
6A	42.118	-75.4464	--	--	--	--	--	--	Yes	R6	153	--	--	Yes	--	39
Total Wetlands: 64									Total Streams: 28							

[1]Field ID assigned by EDR. Several wetlands identified in the field are located outside of the Wetland Study Area, and are not addressed in this report.
[2]Wetland community types are based upon the Cowardin et al. (1979) classification system: PSS = Palustrine Scrub-Shrub, PEM = Palustrine Emergent, POW = Palustrine Open Water, and PFO = Palustrine Forested.

[3] Stream types are based upon the Cowardin et al. (1979) classification system: R3 = Riverine Upper Perennial, R4 = Riverine Intermittent, R6 = Riverine Ephemeral.
[4]Linear feet of stream does not include distance where streams run through culverts.
[5]Based on existing NYSDEC mapping of freshwater wetlands.
[6]Based on visual observation of hydrologic connectivity in the field and review of available spatial data. Final jurisdictional determination to be made by USACE.
[7]Based on visual observation of hydrologic connectivity in the field and review of available spatial data. Final jurisdictional determination to be made by NYSDEC.

4.2.1 Wetlands

Descriptions of each wetland community type delineated within the Study Area are presented below. Many wetlands identified contained more than one community type. A complete list of the community types for each wetland is provided in Table 4 above.

Forested wetland (PFO) – Of the delineated wetlands within the Study Area, 27 contained 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 were dominated by red maple (*Acer rubrum*) and eastern hemlock (*Tsuga canadensis*) in the upper canopy. Shrub vegetation included saplings of the above-mentioned species, spice bush (*Lindera benzoin*), and Morrow's honeysuckle (*Lonicera morrowii*). Herbaceous species in the forested wetlands included various sedges (*Carex* spp.), cinnamon fern (*Osmundastrum cinnamomeum)*, sensitive fern (*Onoclea sensibilis*), and spotted jewelweed (*Impatiens capensis*). Evidence of wetland hydrology observed in these wetlands at the time of delineation included soil saturation, oxidized rhizospheres on living roots, geomorphic position, drainage patterns, and sparsely vegetated concave surfaces (see Photos 5 to 8 in Appendix C).

Scrub-shrub wetlands (PSS) – Four wetland features delineated within the Study Area contained 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 encountered in these communities delineated within the Study Area included silky dogwood (*Cornus amomum*) and meadowsweet (*Spiraea alba*). Herbaceous vegetation in these areas included reed canary grass *(Phalaris arundinacea)*, sensitive fern, common boneset (*Eupatorium perfoliatum*), and sedge species including common rush *(Juncus effuses),* and broom sedge (*Carex scoparia).* Evidence of wetland hydrology observed in scrub-shrub wetlands at the time of delineation consisted of indicators such as drainage patterns, surface water, saturation, and sparsely vegetated concave surfaces. Hydric soil indicators included depleted soils with low chroma (2 or less) and prominent redox concentrations (see Photos 1 to 4 in Appendix C).

Emergent wetlands (PEM) – A total of 37 delineated wetlands contained emergent wetland communities. These wetland areas were dominated by herbaceous vegetation including common rush, spotted jewelweed, and multiple sedge species. Evidence of wetland soils included low chroma matrix with dark brown to black colors (10YR 2/1) and high chroma mottles (7.5YR 4/6) throughout the matrices with prominent redox concentrations. Wetland hydrology indicators found within these areas at the time of delineation included hydrology visible on aerial imagery, standing surface water, high water table, soil saturation, drainage patterns, oxidized rhizospheres on living roots, inundation, and the presence of reduced iron (see Photos 9 to 12 in Appendix C).

Open Water (OW) – Two open water communities were delineated in the Study Area. These open water features were either small farm ponds or man-made impoundments typically found in farm settings, either adjacent to houses and barns or within wetlands. These ponds occurred in open fields, scrub-shrub, and forested environments, and had well-defined banks and a fringe of emergent wetland vegetation. Although not verified, water depths of such ponds were typically in excess of four feet deep (see Photos 13 to 16 in Appendix C).

Streams – A total of 28 streams were delineated within the Study Area. These streams were mostly located within forests and hedgerows, and generally had a gentle to moderate gradient (0-5%). The majority of the delineated streams appeared to be intermittent channels. Most of the streams were less than 10 feet wide with variable substrates and vegetative cover characteristics. The delineated stream channels were generally characterized by rock and cobble substrate and well-defined, abrupt steep banks, and primarily flow during the wet season (winter to spring) (see Photos 17 to 20 in Appendix C).

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. Floodflow Alteration
3. Fish and Shellfish Habitat
4. Sediment/Pollutant 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 64 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 May – July 2018. Based on the entered data within the spreadsheet, the primary functions and values provided by each wetland were determined. Results of this evaluation are presented in Appendix D, and summarized below.

The functions and values assessment indicates that most of the delineated wetlands within the Study Area provide some level of wildlife habitat, groundwater recharge and water quality improvement functions. In most cases these functions are limited by the small size of many of the wetlands. However, two of these wetlands were determined to provide a substantial wildlife habitat function because they are part of sizeable wetland complexes, typically including

a variety of wetland cover types (including forested wetland), have little or no invasive species present, and have forested adjacent areas. The combination of these qualities provides habitat for a diversity of wildlife species. All of the wetlands were noted as having standing water and/or have enhanced water quality and groundwater recharge functions. Lacking the other conditions described above, most of these wetlands were determined to provide wildlife habitat for a more limited number of species. Of the wetlands with standing water, five appeared to have characteristics that are indicative of seasonal water bodies, or vernal pools. These characteristics are wetlands that are located in a woodland/forested community, contain 4 inches or more of standing water during the wet season (winter to spring), and have hydrology characteristics such as water stained leaves and/or sparsely vegetated concave surface.

One wetland within the Study Area is part of a sizeable wetland complex, contain dense vegetation, show evidence of inundation, or border a perennial stream, provide a production export function. Such wetlands have a higher productivity levels and have the potential to yield resources that can be consumed by downstream organisms.

Fourteen delineated wetlands are associated with perennial or intermittent streams. Those which contain dense vegetation and show evidence of inundation or a variable water level throughout the year were considered to provide an enhanced floodflow alteration function. A combination of these characteristics suggest 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 are bordered by a perennial or intermittent stream were also 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. Nine of the delineated wetlands were determined to contain shoreline stabilization characteristics. Four wetlands associated with perennial streams were also determined to provide potential fish habitat.

Six wetlands which provide floodflow attenuation and also contain seasonal pools, standing water, or dense vegetation, also 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 in close proximity to roadways or other development areas.

A total of 28 wetlands are adjacent to active or semi-active agricultural areas. A majority of these wetlands contained dense herbaceous vegetation, and several also border watercourses or contain seasonal pools or standing water. These areas are likely to play a role in water quality improvement by adsorbing nutrients from agricultural run-off 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/aesthetic value for the general public. 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 and endangered species.

4.2.3 Vernal Pool Characteristic

A vernal pool study was conducted to identify potentially sensitive vernal pool habitats, and thereby provide an understanding of potential impacts and inform Facility design (see Appendix E). Five potential vernal pools were identified by EDR within the Study Area (see Figure VP-1 in Appendix E). All five were classified as isolated, semi-permanent forested wetlands and were found on ridge tops in natural bowl-shaped depressions surrounded by upland forest. All had indicators of standing water less than 3 inches in depth and no surface connection to other streams or wetlands. Indicator amphibian species (e.g., adult wood frogs [*Rana sylvatica*] and male salamanders [*Ambystoma spp.*] exhibiting breeding behavior, larvae, egg masses) were not observed in any of the vernal pools identified. This may be because most breeding activity had already occurred earlier in the spring (i.e., March and/or April) or because significant breeding was not occurring in these pools.

5.0 CONCLUSIONS

EDR delineated a total of 64 wetlands within the Study Area. These wetlands were identified based on the presence of hydrophytic vegetation, hydric soils, and wetland hydrology, and total approximately 29 acres. The delineated wetlands included open water ponds, emergent, scrub-shrub, and forested wetland communities. EDR also delineated 28 streams within the Study Area. The delineated streams included intermittent, perennial and ephemeral channels. A total of approximately 9,133 linear feet (1.72 miles) of stream channels were delineated within the Study Area. The primary functions provided by wetlands and streams within the Study Area include water quality improvement, wildlife habitat, ground water recharge/discharge, and flood flow alteration.

EDR analysis suggests that 54 delineated wetlands and all delineated streams are likely to be considered jurisdictional by the USACE under Section 404 of the Clean Water Act due to hydrological connections with WOUS. Nine of the delineated wetlands appear to be isolated and likely will not be considered jurisdictional by the USACE. Although no NYSDEC-mapped wetlands are located at the Study Area. One wetland (Wetland M) was determined to potentially exceed 12.4 acres in total; thus, it may be considered under the jurisdiction of the NYSDEC pursuant to Article 24. Ten of the delineated streams are state protected under Article 15. However, final determination of jurisdictional status of all wetlands and streams within the Study Area must be made by the USACE and NYSDEC.

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