

# **Heritage Wind Project**

**Case No. 16-F-0546**

**1001.22 Exhibit 22- REDACTED**

**Terrestrial Ecology and Wetlands**

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## EXHIBIT 22 TERRESTRIAL ECOLOGY AND WETLANDS

### (a) Plant Communities

#### (1) Land Cover

Plant communities and vegetation occurring within the Facility Site were evaluated using current National Land Cover Data (NLCD) information, which is compiled by the United States Geological Survey (USGS) (Yang et al., 2018).<sup>1</sup> These communities and vegetation classes were further verified during on-site field investigations conducted in 2018 and 2019. The Facility Site encompasses approximately 5,813 acres and primarily consists of actively managed agricultural land (cultivated row crops and pasture/hay) and woody wetlands (see Table 22-1).<sup>2</sup>

**Table 22-1. Land Cover Classes within the Facility Site**

Land Cover Class	Acres	Percent Cover (%)
Cultivated Crops	2,914	50
Woody Wetlands	1,200	21
Pasture/Hay	1,090	19
Deciduous Forest	345	6
Developed, Open Space	97	2
Emergent Herbaceous Wetlands	77	1
Mixed Forest	54	1
Shrub/Scrub	25	<1
Developed, Low Intensity	24	<1
Developed, Medium Intensity	2	<1
<b>Total</b>	<b>5,828<sup>1</sup></b>	<b>100</b>

Source: NLCD 2016 (Yang et al., 2018).

<sup>1</sup>The reported total acreage is based on the NLCD 2016 raster dataset. This value is larger than that of the vector-based boundary of the Facility Site (5,813 acres) because of the cell size of the raster data, which overlaps and partially extends beyond the Facility Site.

<sup>1</sup>The most current version of the NLCD dataset (Yang et al., 2018) was used for land cover analyses. This is an updated version of the previous NLCD dataset referenced in the Final Scoping Statement (Homer et al., 2015).

<sup>2</sup>Land cover was assessed within the Facility Site, which is defined as those parcels currently under, or being pursued, for lease (or other real property interests) with the Applicant for the location of all Facility components.

(2) Ecological Communities

Ecological community types were identified within the Facility Site based on the classification system and definitions described by Edinger et al. (2014). These communities are depicted in Figure 22-1. All major ecological communities found within parcels that will host Facility components are common to New York; however, a specific uncommon and high-quality occurrence of the silver maple-ash swamp community has been identified within the vicinity of the Facility Site. Additional details for this community are provided below and in Sections (d)(1) and (f)(6). Cropland (primarily corn and soybean row crops) and silver maple-ash swamp (forested wetlands) are the dominant ecological community types within the Facility Site, while successional southern hardwoods and successional shrubland occur to a lesser extent. A summary of all ecological communities within the Facility Site is presented below in Table 22-2, while descriptions and typical vegetation are provided in the paragraphs below for the most dominant community types present. Detailed descriptions of wetland community types encountered during on-site delineations are provided below in Section (j).

**Table 22-2. Ecological Community Types within the Facility Site**

<b>Ecological Community Type<sup>1</sup></b>	<b>Acres</b>	<b>Percent Cover (%)</b>
Cropland	4,023	69
Silver Maple-Ash Swamp	939	16
Successional Southern Hardwoods	431	7
Successional Shrubland	101	2
Developed/Disturbed	86	1
Pastureland	78	1
Pine Plantation	36	1
Shallow Emergent Marsh	27	<1
Shrub Swamp	27	<1
Mowed Roadside/Pathway	25	<1
Red Maple-White Pine Swamp	16	<1
Open Water	10	<1
Mowed Lawn with Trees	9	<1
Successional Old Field	4	<1
Spruce/Fir Plantation	1	<1
<b>Total</b>	<b>5,813</b>	<b>100</b>

<sup>1</sup>Ecological community types have been defined based on Edinger et al., 2014.

### Agricultural Land

As defined in the *Ecological Communities of New York State* (Edinger et al., 2014), agricultural land includes cropland/row crops, cropland/field crops, pastureland, and several other community types within the terrestrial cultural subsystem. As defined by the United States Department of Agriculture (USDA, 2009), and for the purposes of this Application, agricultural land includes harvested cropland, fields with crop failure, cultivated summer fallow fields, cropland used only for pasture, and idle cropland. Each of these agricultural land categories exhibits variation in vegetation type, intensity of agricultural operations (e.g., tillage, seeding, harvesting), and overall land use. Vegetation species typically found within cropland communities include either planted row crops such as corn or soybeans, or field crops, including alfalfa, timothy, rye, wheat, or other perennial grasses used for hay. Pastureland is similar in vegetation composition to field cropland but is differentiated by regular and/or periodic livestock grazing.

### Silver Maple-Ash Swamp

As defined by Edinger et al. (2014), silver maple-ash swamps typically occur in poorly-drained depressions or along the borders of large lakes. The tree stratum is often dominated by silver maple (*Acer saccharinum*) and green ash (*Fraxinus pennsylvanica*). Other tree species typically found in these communities include black ash (*Fraxinus nigra*), American elm (*Ulmus americana*), white ash (*Fraxinus americana*), swamp white oak (*Quercus bicolor*), American hornbeam (*Carpinus caroliniana*), and red maple (*Acer rubrum*). Understory trees and shrubs frequently observed in these communities include prickly ash (*Zanthoxylum americanum*), winterberry (*Ilex verticillata*), spicebush (*Lindera benzoin*), various shrubby dogwoods (*Cornus racemosa*, *C. amomum*, and *C. sericea*), various viburnums (*Viburnum dentatum* var. *lucidum*, *V. lentago*, and *V. nudum* var. *cassinoides*), speckled alder (*Alnus incana* ssp. *rugosa*), gooseberries (*Ribes* spp.), and sapling canopy trees. Characteristic herbaceous plants include sensitive fern (*Onoclea sensibilis*), skunk cabbage (*Symplocarpus foetidus*), false nettle (*Boehmeria cylindrica*), wood nettle (*Laportea canadensis*), cinnamon fern (*Osmunda cinnamomea*), royal fern (*Osmunda regalis*), marsh fern (*Thelypteris palustris*), jewelweed (*Impatiens capensis*), manna grasses (*Glyceria striata*, *G. grandis*), and various sedges (*Carex lupulina*, *C. crinita*, *C. bromoides*, and *C. lacustris*). Characteristic herbaceous plants found in wetter areas may include reed canary grass (*Phalaris arundinacea*), arrow arum (*Peltandra virginica*), arrowheads (*Sagittaria* spp.), wild calla (*Calla palustris*), cattail (*Typha latifolia*), tufted loosestrife (*Lysimachia thyrsoiflora*), water smartweed (*Persicaria amphibia*), and duckweeds (*Lemna* spp.).

According to Edinger, et al. (2014), this ecological community is typically found in the lowlands of western and central New York, including the Great Lakes Plain ecozone. Approximately 1,000 occurrences are thought to be present statewide (NYNHP, 2007). Based on an April 2019 response received from the New York Natural Heritage Program (NYNHP), a specific silver maple-ash swamp community located along Powerline Road adjacent to the northeastern portion of the Facility Site has been identified as a Significant Natural Community (see Figure 22-2). The nearest boundary of this Significant Natural Community is located approximately 150 feet outside the Facility Site. Refer to Sections (d)(1) and (f)(6) below for additional information.

#### Successional Southern Hardwoods

This ecological community is characterized as hardwood or mixed forest occurring on sites that have been previously cleared or otherwise disturbed (Edinger et al., 2014). Trees and shrubs characteristically associated with this community include: American elm, slippery elm (*Ulmus rubra*), white ash, red maple, box elder (*Acer negundo*), silver maple, white sassafras (*Sassafras albidum*), gray birch (*Betula populifolia*), various hawthorns (*Crataegus* spp.), eastern red cedar (*Juniperus virginiana*), and chokecherry (*Prunus virginiana*). Cleared or highly disturbed areas within this community are also inherently inviting to opportunistic introduced species such as black locust (*Robinia pseudoacacia*) and buckthorn (*Rhamnus cathartica*).

#### Successional Shrubland

As defined by Edinger et al. (2014), this community is classified as a shrubland occurring in areas that have been cleared or otherwise disturbed. At least 50% of vegetation is comprised of shrub species including, but not limited to: gray dogwood (*Cornus racemosa*), eastern red cedar, raspberries (*Rubus* spp.), serviceberries (*Amelanchier* spp.), chokecherry, wild plum (*Prunus americana*), sumac (*Rhus glabra*, *R. typhina*), nannyberry viburnum (*Viburnum lentago*), and arrowwood (*Viburnum dentatum* var. *lucidum*). Non-native invasive shrubs within this community often include multiflora rose (*Rosa multiflora*), autumn olive (*Elaeagnus umbellata*), buckthorn, and multiple species of honeysuckle (*Lonicera tatarica*, *L. morrowii*, *L. maackii*). Additional information regarding invasive species is provided below in Section (b).

#### Disturbed/Developed

Disturbed/developed land consists of a combination of several community types within the terrestrial cultural subsystem (Edinger et al., 2014). Disturbed/developed lands occur throughout the Facility Site, and are characterized by the presence of buildings, mowed lawns, paved and unpaved roads, and utility lines and associated rights-of-way (i.e., transmission lines and pipelines). Vegetation in these areas is generally either lacking or highly managed (e.g., mowed lawns or routinely maintained rights-of-way). Volunteer vegetation that naturally re-establishes in these areas is generally sparse, and is typically comprised of early successional, often

non-native, herbaceous species such as pokeweed (*Phytolacca americana*), bull thistle (*Cirsium vulgare*), ragweed (*Ambrosia artemisiifolia*), curly dock (*Rumex crispus*), mugwort (*Artemisia vulgaris*), burdock (*Arctium* spp.), dandelion (*Taraxacum officinale*), and various upland grasses.

### (3) Map of Ecological Communities

A map of all identified ecological communities within the Facility Site, classified according to *Ecological Communities of New York State* (Edinger et al., 2014), is provided in Figure 22-1.

### (4) Plant Species List

Vascular plant species at the Facility Site were identified during various field studies performed in 2018 and 2019 (e.g., wetland and stream delineations, invasive species surveys) and through incidental observations. A list of plant species identified is attached as Appendix 22-A; nomenclature for this list follows the New York Flora Atlas (Weldy et al., 2019). More than 125 native and non-native plant species were identified during field surveys conducted for the Facility in October and November 2018 and May, June, July, and October 2019.

## (b) Impact to Plant Communities

### (1) Calculations of Potential Impact

Construction and operation of the Facility will result in three general types of impacts to plant communities: temporary, permanent conversion, and permanent. However, most impacts will be temporary, and associated with collection line installation, access road and turbine workspaces, and construction staging areas. Permanent conversion will occur where existing communities are cleared and then maintained by the Applicant as early successional communities for the life of the Facility (note that this is a separate category from permanent impacts). Permanent impacts will be primarily associated with built facilities including turbine foundations and pads, access roads, the operations and maintenance (O&M) facility, meteorological tower foundations, and the collection and point of interconnection (POI) substations. Estimated Facility-related impacts to all ecological communities identified in Section (a)(2) above are detailed below in Table 22-3. These impacts were calculated using geographic information systems (GIS) software, ecological community data, and the limits of disturbance (LOD) identified in the Preliminary Design Drawings (see Exhibit 11, Appendix 11-A). The LOD were developed based on the impact assumptions presented in Table 5 of the Final Scoping Statement, and were further refined based on sensitive resource avoidance and minimization and site-specific engineering considerations.



As indicated below in Table 22-3, permanent impacts to ecological communities are expected to total 47.61 acres, which represents approximately 0.8% of the 5,813-acre Facility Site. Combined impacts (including temporary, permanent conversion, and permanent) are expected to total 275.64 acres, which is equivalent to approximately 4.7% of the area within the Facility Site. Temporary and permanent impacts to plant and ecological communities will not result in extirpation or significant reduction in any ecological community type.

For a detailed description of impacts to agricultural lands, see Section (q) below. Refer to Exhibit 23(b)(4) for a discussion of impacts to surface waters (i.e., streams) that are anticipated as a result of Facility construction and operation.

**Table 22-3. Estimated Ecological Community Impacts**

<b>Ecological Community Type</b>	<b>Temporary Impact (acres)<sup>1</sup></b>	<b>Permanent Conversion (acres)<sup>2</sup></b>	<b>Permanent Impact (acres)</b>	<b>Total Impact (acres)</b>
Cropland <sup>3</sup>	176.42	n/a	42.3	218.72
Successional Southern Hardwoods	10.76	7.9	2.02	20.68
Silver Maple-Ash Swamp	4.62	7.59	0.94	13.15
Successional Shrubland	5.21	5.07	1.24	11.52
Mowed Roadside/Pathway <sup>3</sup>	2.52	n/a	0	2.52
Disturbed/Developed <sup>3</sup>	1.92	n/a	0.4	2.32
Pine Plantation	1.03	0.8	0.14	1.97
Pastureland <sup>3</sup>	1.62	n/a	0.32	1.94
Successional Old Field	0.91	0.63	0.16	1.7
Mowed Lawn with Trees <sup>3</sup>	1.00	n/a	0.09	1.09
Spruce/Fir Plantation	0.02	< 0.01	0	0.02
Shallow Emergent Marsh	0	0.01	0	0.01
Shrub Swamp	< 0.01	0	0	< 0.01
Open Water	0	0	0	0
Red Maple-White Pine Swamp	0	0	0	0
<b>Total</b>	<b>206.03</b>	<b>22.00</b>	<b>47.61</b>	<b>275.64</b>

Note: Impacts to public road rights-of-way are included in these calculations. Therefore, the total impact data presented in this table will not exactly match the data presented in other impact tables (e.g., Exhibit 4, Table 4-9).

<sup>1</sup>These areas will not be maintained by the Applicant following construction. Unless otherwise disturbed/managed by the landowner, these areas would be expected to return to their pre-disturbance state over time.

<sup>2</sup>It is anticipated that all areas not converted to built facilities within 15 feet of buried collection lines, within 10 feet of permanent access road edges, and within 100 feet of wind turbine pads would be maintained in an early successional state following construction. All other areas outside of these distances would not be maintained by the Applicant.

<sup>3</sup>Buried collection line rights-of-way, permanent access road shoulders, and areas adjacent to wind turbine pads will not be maintained by the Applicant where they cross or are within active agricultural and/or developed communities unless otherwise mandated in the landowner lease agreement.

## (2) Identification of Invasive Species

An on-site invasive species survey was conducted within all proposed areas of disturbance during the 2019 growing season. The primary purpose of the on-site invasive species survey was to identify non-native invasive species listed as prohibited or regulated by the New York State Department of Environmental Conservation (NYSDEC) (NYSDEC, 2014). The results of the survey are provided in the Invasive Species Control Plan (ISCP) prepared for the Facility (see Appendix 22-B) and are summarized below. The ISCP also includes a detailed description of the methods that will be used for additional pre-construction and post-construction monitoring surveys of invasive species, including area and concentration thresholds for mapped invasive species.

A total of 12 invasive species (all plants) were documented during the on-site survey. No invasive vertebrate, invertebrate, fungal, algal, or cyanobacteria species were observed during site-specific field investigations or incidentally while on site for other purposes. Invasive plant species observed on site included:

- Garlic mustard (*Alliaria petiolate*);
- Mugwort (*Artemisia vulgaris*);
- Oriental bittersweet (*Celastrus orbiculatus*);
- Spotted knapweed (*Centaurea stoebe*);
- Creeping thistle (*Cirsium arvense*);
- Autumn olive (*Elaeagnus umbellata*);
- Morrow's honeysuckle (*Lonicera morrowii*);
- Common reed (*Phragmites australis*);
- Common buckthorn (*Rhamnus cathartica*);
- Black locust (*Robinia pseudoacacia*);
- Multiflora rose (*Rosa multiflora*); and
- Swallow-wort<sup>3</sup> (*Vincetoxicum* sp.).

Distribution and density of invasive species within the Facility Site varies by species. Common buckthorn and Morrow's honeysuckle were the most prevalent within the Facility Site, frequently occurring together, and were particularly concentrated in hedgerows, along forest edges, and within forest understories. During the on-site invasive species survey, a GPS-enabled device was used to record the center point, or create a polygon encompassing any invasive

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<sup>3</sup>Due to the phenology of this species and the time of the survey, it was not possible to determine whether the observed plants were *V. rossicum* or *V. nigrum*. However, both are listed as prohibited invasive species under 6 NYCRR Part 575.

species population with an absolute cover value above 25%. Identified concentrations of non-native invasive plant species in areas of proposed disturbance are shown at a scale of 1:2,000 in Figure 22-1. Refer to the ISCP (Appendix 22-B) for details regarding proposed methods for pre-construction monitoring for invasive species and proposed control methods (including target species treatment and removal).

As noted above, there were no invasive species of insects or other invertebrates documented during on-site surveys, and there were no observations of dead ash trees, which would potentially indicate the presence of emerald ash-borer (*Agrilus planipennis*). However, this invasive insect is known to occur in Orleans County, and there is a possibility of existing or future infestation within the Facility Site (particularly given the ongoing spread of this species throughout the eastern United States). Hemlock woolly adelgid (*Adelges tsugae*) has also been documented in Orleans County and could possibly occur within the Facility Site. Therefore, measures to prevent the spread of emerald ash borer and hemlock woolly adelgid within the Facility Site are also included in the ISCP.

### (3) Invasive Species Control Plan

As mentioned above, an ISCP for the Facility is included with this Application in Appendix 22-B. This plan was developed based on invasive species identified during the 2019 on-site survey. The ISCP outlines post-construction monitoring that will take place after the Facility is operational along with any required corrective actions that may be potentially implemented to ensure that control measures are sufficient in preventing further spread of invasive species. Best management practices outlined in the ISCP that will be implemented to control invasive plant and insect species include: measures to educate workers; measures to control the spread of invasive species (including construction materials inspection, target species treatment and removal, and construction equipment sanitation); and restoration following construction.

### (c) Measures to Avoid or Mitigate Plant Community Impacts

Avoidance, minimization, and mitigation of impacts to plant communities have been accomplished as part of site planning. Specifically, temporary and permanent impacts to plant communities have been largely avoided by siting infrastructure within previously disturbed and existing agricultural lands to the greatest extent practicable. Impacts to large areas of agricultural land have also been minimized to the greatest extent practicable; please refer to Exhibit 4 for details. Permanent Facility structures have also been sited along field edges and in non-agricultural areas where possible to confine areas of disturbance of agricultural lands. In addition, Facility access roads have been sited along field edges to the greatest extent practicable.

To minimize disturbance and protect undisturbed vegetation and other ecological resources, a comprehensive erosion and sediment control plan will be developed and implemented prior to Facility construction; a Preliminary Stormwater Pollution Prevention Plan (SWPPP) for the Facility is provided in Appendix 21-E. Additional measures that will be implemented to avoid and/or minimize impacts to vegetation will include: identifying sensitive areas (such as wetlands and streams) where no disturbance or vehicular activities are allowed; educating the construction workforce on respecting and adhering to the physical boundaries of off-limit areas; employing best management practices during construction; and maintaining clean work areas within the designated construction sites. An Environmental Monitor will conduct inspections of all areas requiring environmental compliance during construction activities, as described below in Section (n).

Following construction activities, temporarily disturbed areas will be reseeded (and stabilized with mulch and/or straw as necessary) to reestablish vegetative cover in these areas. Disturbed agricultural areas will be replanted with crops designated by the landowner.

(d) Vegetation, Wildlife, and Wildlife Habitats

(1) Vegetation

Section (a) above describes the dominant plant communities present within the Facility Site. In addition, site-specific requests for data on rare plant species and significant natural/ecological communities have been submitted to the New York Natural Heritage Program (NYNHP)<sup>4</sup> several times during the environmental review process for the Facility. The most recent NYNHP response letter was received on April 22, 2019. This response letter identified a specific Silver Maple-Ash Swamp community located along Powerline Road adjacent to the northeastern portion of the Facility Site as a Significant Natural Community (see Figure 22-2). The nearest boundary of this Significant Natural Community is located approximately 150 feet outside the Facility Site. See Section (f)(6)(vii) below for additional impact information. No rare, threatened, or endangered plant species were identified within the Facility Site (see Appendix 22-A).

(2) Wildlife

(i) Mammals

Detailed information regarding the occurrence of mammalian species within the Facility Site is generally not publicly available. Therefore, the occurrence of mammals was primarily determined based observations, presence of suitable habitat, and signs recorded during on-site field surveys for other Exhibit 22 support studies, such as

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<sup>4</sup>The NYNHP is an agency that maintains data on rare, threatened, and endangered plant and animal species, as well as significant natural/ecological communities in New York.

wetland and stream delineations. In addition, county-based hunting and trapping records maintained by NYSDEC were also reviewed. Mammal species identified during on-site surveys included: white-tailed deer (*Odocoileus virginianus*), woodchuck (*Marmota monax*), eastern gray squirrel (*Sciurus carolinensis*), red squirrel (*Tamiasciurus hudsonicus*), eastern chipmunk (*Tamias striatus*), and eastern cottontail (*Sylvilagus floridanus*). In addition, the following mammal species may occur within the Facility Site based on the presence of suitable habitat and their typical ranges: Virginia opossum (*Didelphis virginiana*), North American porcupine (*Erethizon dorsatum*), bobcat (*Lynx rufus*), American beaver (*Castor canadensis*), striped skunk (*Mephitis mephitis*), American black bear (*Ursus americanus*), and eastern coyote (*Canis latrans*), multiple species of bats, weasels, foxes, and a variety of small mammals (i.e., mice, voles, moles, and shrews). Based on consultation with the NYSDEC, the federal and State-listed northern long-eared bat (*Myotis septentrionalis*) may be present at the Facility Site during certain times of the year. (See Sections (f), (g), and (h) below for additional detail on this species.) A complete list of mammal species that may potentially occur, or have been observed, in the vicinity of the Facility are included in the Wildlife Species List provided in Appendix 22-A.

NYSDEC staff did not request pre-construction surveys for bats, as pre- and post-construction studies for bats at other wind projects in the Northeast provide a broad baseline of data on species distribution and temporal activity in the region, and only one State-listed bat species is expected to occur at the Facility Site. Although no site-specific surveys for bats were conducted, several widely distributed bat species may be found within the Facility Site, including big brown bat (*Eptesicus fuscus*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), silver-haired bat (*Lasionycteris noctivagans*), little brown bat (*Myotis lucifugus*), and tri-colored bat (*Perimyotis subflavus*). Although the NYNHP response letter discussed above indicated that there is one maternity colony and two hibernacula of the northern long-eared bat within 40 miles of the Facility Site, no known occurrences of this species have been documented within or in close proximity to the Facility Site (NYSDEC, 2016b). However, potential presence has been assumed during certain times of the year based on consultation with NYSDEC staff. The Facility Site is outside the current range of the federal and State-listed Indiana bat (*Myotis sodalis*) (USFWS, 2019).

(ii) Birds

The occurrence of bird species within the Facility Site was determined using a variety of data collection methods, which included the results of numerous on-site avian surveys conducted between 2016 and 2018 by Ecology & Environment (E&E; see Appendix 22-C) and review of publicly available data sources. A summary of on-site avian

surveys is provided below and in Section (h). All avian species identified are also included in the Wildlife Species List, which is provided in Appendix 22-A.<sup>5</sup>

### Site-specific Surveys

In order to determine the type and number of bird species present within the Facility Site, a study plan for pre-construction avian surveys was developed by E&E in accordance with guidance provided by the U.S. Fish and Wildlife Service (USFWS) and the NYSDEC. Breeding birds and raptor migration surveys were planned in accordance with the NYSDEC *Guidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects* (NYSDEC, 2016a). Surveys for eagles were developed in accordance with the USFWS *Eagle Conservation Plan Guidance* (ECPG) (USFWS, 2013) and revisions to the ECPG that were published in December 2016 (USFWS, 2016b). The scope and methodology for on-site avian surveys were developed by E&E and the Applicant in consultation with NYSDEC and USFWS biologists prior to the initiation of surveys. The study plan and pre-construction avian studies included the following:

- 2017 Avian and Bat Study Plan (report dated May 5, 2017);
- 2016-2017 Wintering Grassland Raptor Survey (Year 1) (report dated May 25, 2017);
- 2017 Breeding Bird Survey (Year 1) (report dated September 26, 2017);
- 2017 Spring Migratory Raptor Survey (Year 1) (report dated October 30, 2017);
- 2016-2017 Avian/Eagle Use Survey (Year 1) (report dated February 2018);
- 2017 Fall Migratory Raptor Survey (report dated February 15, 2018);
- 2017-2018 Winter Grassland Raptor Survey (Year 2) (report dated July 2018);
- 2018 Raptor Nest Survey (report dated September 2018);
- 2018 Breeding Bird Survey (Year 2) (report dated September 2018);
- 2018 Spring Migratory Raptor Survey (Year 2) (report dated October 2018); and
- 2017-2018 Avian/Eagle Use Survey (Year 2) (report dated December 2017-November 2018).

A summary of the methods and results of all surveys conducted by E&E for the Facility is provided below in Section (h) below, and copies of all reports with detailed results of each survey, as well as the associated approved study plan, are provided in Appendix 22-C.

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<sup>5</sup>The Wildlife Species List also includes species identified during other field surveys conducted by the Applicant within the Facility Site (e.g., wetland and stream delineations, vernal pool surveys, invasive species surveys).

## Public Data Sources

In addition to on-site survey data, further information on birds that may occur at the Facility Site was obtained from a variety of publicly available sources including the New York State Breeding Bird Atlas, the USGS North American Breeding Bird Survey, the Audubon Christmas Bird Count database, eBird, the Hawk Migration Association of North America (HMANA) database, The Nature Conservancy (TNC), and The Kingbird publication.

### *New York State Breeding Bird Atlas*

The New York State Breeding Bird Atlas (BBA) is a comprehensive, statewide survey that indicates the distribution of breeding birds in the State within 5-kilometer by 5-kilometer survey blocks across the State (NYSDEC, 2007b). BBA surveys were conducted by volunteers, with the most recent data collected between 2000 and 2005. The Facility Site corresponds to eight survey blocks—2278B, 2278D, 2378A, 2378B, 2378C, 2378D, 2478A, 2478C. These blocks were queried for bird species occurrence data, and 91 species were listed as having been observed within these survey blocks. State-listed species recorded include one State-listed endangered species (black tern [*Chidonias niger*]), five State-listed threatened species (bald eagle [*Haliaeetus leucocephalus*], Henslow's sparrow [*Centronyx henslowii*], upland sandpiper [*Bartramia longicauda*], least bittern [*Ixobrychus exilis*], and pied-billed grebe [*Podilymbus podiceps*]), five State species of special concern (common nighthawk [*Chordeiles minor*], black-throated blue warbler [*Setophaga caerulescens*], cerulean warbler [*Setophaga cerulea*], vesper sparrow [*Pooecetes gramineus*], and horned lark [*Eremophila alpestris*]), and eight State species of greatest conservation need (brown thrasher [*Toxostoma rufum*], bobolink [*Dolichonyx oryzivorus*], eastern meadowlark [*Sturnella magna*], American woodcock [*Scolopax minor*], blue-winged warbler [*Vermivora cyanoptera*], black-billed cuckoo [*Coccyzus erythrophthalmus*], American kestrel [*Falco sparverius*], and scarlet tanager [*Piranga olivacea*]).

### *North American Breeding Bird Survey*

The North American Breeding Bird Survey (BBS), overseen by the USGS Patuxent Wildlife Research Center, is a long-term, large-scale, international avian monitoring program that tracks the status and trends of North American bird populations. The BBS includes various survey routes. Each survey route is 24.5 miles long, with 3-minute point counts conducted at 0.5-mile intervals. During the point counts, every bird seen or heard within a 0.25-mile radius is recorded. The survey route closest to the Facility Site, located approximately 1 mile away, is the Byron BBS route (Route 61066). The most commonly observed species along the Byron BBS route include: European starling (*Sturnus vulgaris*), red-winged blackbird (*Agelaius phoeniceus*), American robin (*Turdus migratorius*), song sparrow (*Melospiza melodia*), common grackle (*Quiscalus quiscula*), American goldfinch (*Spinus tristis*), mourning dove (*Zenaida macroura*), American crow (*Corvus brachyrhynchos*), savannah sparrow (*Passerculus sandwichensis*), barn swallow (*Hirundo rustica*), and yellow



warbler (*Setophaga petechia*). One State-listed threatened species (northern harrier [*Circus cyaneus*]) and eight State-listed species of special concern (Cooper's hawk [*Accipiter cooperii*], horned lark, vesper sparrow, grasshopper sparrow [*Ammodramus savannarum*], red-headed woodpecker [*Melanerpes erythrocephalus*], cerulean warbler, sharp-shinned hawk [*Accipiter striatus*], and American bittern [*Botaurus lentiginosus*]) have been observed along this route. No federally listed endangered or threatened bird species have been documented along this route.

#### *Audubon Christmas Bird Count*

The Christmas Bird Count (CBC), which was established by the National Audubon Society in 1900, is the longest-running citizen science project in the United States. The primary objective of the CBC is to monitor the status and distribution of wintering bird populations across the Western Hemisphere. Counts take place on a single day within 15-mile (24-km) diameter count circles, and all bird species and individuals observed are recorded by volunteers. Because the edges of the closest count circles to the Facility Site (the Oak Orchard Swamp circle and the Rochester circle) are approximately 9.5 miles southwest and approximately 10 miles east of the Facility, respectively, data from the CBC are not applicable to the Facility Site and are therefore not included in this Application.

#### *eBird*

The eBird database, managed by the Cornell Lab of Ornithology at Cornell University, is an online database of bird observations collected by citizen scientists around the world, and vetted by regional experts. eBird data are used to document bird distribution, abundance, habitat use, and trends within a simple, scientific framework to help inform bird research worldwide. The main limitation of eBird data is the concentration of data on publicly accessible lands such as state and national parks, national forest lands, and other known birding hotspots. The Iroquois National Wildlife Refuge is the nearest location that encompasses nine hotspots with greater than 100 species recorded and is located approximately 10 miles southwest of the Facility Site. Data from these hotspots are not applicable to the Facility Site and are therefore not included in this Application. Other hotspots with fewer than 100 species were reviewed; however, the species listed were common and/or already documented through review of the other, more local data sources described in this Exhibit (e.g., BBA, pre-construction monitoring surveys).

#### *Hawk Migration Association of North America*

The Hawk Migration Association of America (HMANA) is a nonprofit organization that collects hawk migration data from almost 200 affiliated raptor monitoring sites throughout the United States, Canada, and Mexico. There are no Hawkwatch sites within 20 miles of the Facility Site. The four closest sites (all approximately 20

miles from the Facility Site) did not yield observations of any species not already documented by other, more local data sources.

#### *The Nature Conservancy*

No areas protected by The Nature Conservancy (TNC) are located within the Facility Site. The closest TNC lands are the Thousand Acre Swamp and Rob's Trail Preserve, which are located approximately 33 miles east and approximately 41 miles southeast of the Facility Site, respectively.

#### *The Kingbird*

The Kingbird is a quarterly journal published by the New York State Ornithological Association (NYSOA). The Kingbird maintains searchable archives for research and educational purposes dating back to 1950. A search through records maintained by The Kingbird did not reveal records of birds not already documented by on-site surveys or the other, more local data sources described above.

In addition to these data sources, the latest response (April 22, 2019) provided by the NYNHP identifies ten State-listed bird species that have been documented within 10 miles of the Facility Site. These species include bald eagle, black tern, Henslow's sparrow, king rail (*Rallus elegans*), least bittern, northern harrier (*Circus hudsonius*), pied-billed grebe, sedge wren (*Cistothorus platensis*), short-eared owl (*Asio flammeus*), and upland sandpiper.

#### (iii) Amphibians and Reptiles

Information on amphibians and reptiles for the Facility Site was compiled from the New York State Amphibian & Reptile Atlas (Herp Atlas), a 10-year survey conducted between 1990 and 1999 designed to document the geographic distribution of New York's herpetofauna (NYSDEC, 2007a). Data from this survey were queried for the Knowles, Albion, and Holley USGS 7.5-minute quadrangles, which encapsulate the Facility Site. A total of 16 amphibian species and 11 reptile species were included in the Wildlife Species List based on this review (see Appendix 22-A).

Because several amphibian species that may occur within the Facility Site utilize vernal pool habitats, a survey of vernal pools was conducted by the Applicant in early May 2018 and concurrent with wetland and stream delineations during the 2018 and 2019 growing seasons. The results of this survey are summarized in a Vernal Pool Survey Report (see Appendix 22-D). Amphibian species observed in or near vernal pools included spring peeper (*Pseudacris crucifer*), gray treefrog (*Hyla versicolor*), green frog (*Lithobates clamitans*), northern leopard frog (*Lithobates pipiens*), and wood frog (*Lithobates sylvaticus*).

As indicated in Section (f)(6) below, five amphibian species of special concern (wood turtle [*Gleptemys insculpta*], spotted turtle [*Clemmys guttata*], blue-spotted salamander [*Ambystoma laterale*], Jefferson Salamander [*Ambystoma jeffersonianum*], Jefferson/blue-spotted salamander complex [*Ambystoma jeffersonianum x laterale*]) may also potentially occur in the Facility Site based on data from the Herp Atlas (NYSDEC, 2007a).

As described in the Vernal Pool Survey Report (Appendix 22-D), a total of 16 vernal pools were identified within or near the Facility Site. Efforts have been made to avoid and minimize direct and indirect impacts to vernal pools wherever practicable (see Exhibit 9, Table 9-1). Based on these efforts, impacts to 15 of the 16 vernal pools will be completely avoided. Vernal pool VP-D may be temporarily impacted as a result of buried collection line installation. Therefore, vernal pool habitat is expected to remain largely intact within the Facility Site. Although minor impacts to wood frogs and other amphibian species could potentially result from temporary construction-related impacts, large areas of suitable amphibian habitat (in the form of undisturbed vernal pools, large forested wetlands, and other wetland complexes) will remain available to these species and undisturbed by the Facility.

#### (iv) Terrestrial Invertebrates

Publicly available data on terrestrial invertebrate species are generally not available for upstate New York. As stated above, the NYNHP maintains data on rare, threatened, and endangered plant and animal species, as well as significant ecological communities in the State. Although the NYNHP tracks several invertebrate groups, not all invertebrate groups are monitored. A site-specific request for data on rare wildlife species was submitted to NYNHP, and a response was received on April 22, 2019, which did not identify any rare, threatened, and endangered terrestrial invertebrates within the Facility Site. Similarly, consultation performed to date with the NYSDEC and the USFWS has not resulted in identification of federal or State-listed invertebrate species.

Based on the size of the Facility Site and on-site observations of habitat types available, a wide range of terrestrial invertebrates may potentially occur. These invertebrates may include butterflies, moths, dragonflies, damselflies, ants, bees, beetles, weevils, mosquitoes, fleas, crickets, ladybirds, fireflies, aphids, cicadas, flies, grasshoppers, mantids, stink bugs, cockroaches, earwigs, centipedes, millipedes, arachnids (e.g., spiders, ticks, and mites), pill bugs, slugs, snails, earthworms, and nematodes.

### (3) Wildlife Habitat

A discussion of the wildlife habitat that is provided by the dominant community types identified in Sections (a) and (j) is provided below. Wildlife habitats with similar ecological community types are grouped together for discussion purposes.

#### *Agricultural Land*

Agricultural communities include open fields that are dominated by row crops, field crops (e.g., hay, alfalfa), and pastureland. Active agricultural land characterizes more than 69% of the Facility Site and generally provides marginal habitat for most species of wildlife, as these habitats are often too disturbed for foraging, nesting, breeding, and/or other essential behaviors to be successful. However, bird species that may still utilize agricultural communities include eastern meadowlark, bobolink, grasshopper sparrow, and Canada goose (*Branta canadensis*). Additionally, several mammal species, such as white-tailed deer, voles, and mice may forage in agricultural fields, depending on food resources that may be available.

#### *Forested Wetlands*

Forested wetlands found in the Facility Site are comprised of silver maple-ash swamp (939 acres) and red maple-white pine swamp (16 acres), and account for approximately 16% of the Facility Site. Forested wetlands provide habitat for a variety of amphibian, avian, and mammalian species that prefer (or require) moist conditions for nesting, breeding, or foraging. Amphibian species typically found within forested wetlands include spotted salamander (*Ambystoma maculatum*), blue-spotted salamander, Jefferson salamander, Jefferson/blue-spotted salamander complex, gray treefrog, spring peeper, and green frog. Species of greatest conservation need (SGCN) that may utilize these habitats during some times of the year (including migratory periods) include American black duck (*Anas rubripes*), red-shouldered hawk (*Buteo lineatus*), and rusty blackbird (*Euphagus carlinus*). Additional avian species that may use these types of forested wetlands include belted kingfisher (*Megaceryle alcyon*), green heron (*Butorides virescens*), and wood duck (*Aix sponsa*). Two avian species of special concern, the prothonotary warbler (*Protonotaria citrea*) and cerulean warbler, may also be associated with this type of habitat. Mammal species utilizing forested wetlands could include American beaver, American mink (*Neovison vison*), and bobcat.

#### *Upland Forest*

Upland forest habitat within the Facility Site primarily includes successional southern hardwoods (431 acres, 7% of the Facility Site). Due to the largely agricultural nature of the Facility Site and surrounding area, many upland forest patches have been fragmented and/or are subject to a high degree of disturbance (e.g.,

logging, motorized vehicle use). Avian species that may utilize upland forest habitats within the Facility Site may include chestnut-sided warbler (*Setophaga pensylvanica*), downy woodpecker (*Dryobates pubescens*), northern flicker (*Colaptes auratus*), American woodcock, and Cooper's hawk. Typical mammals that may utilize upland forests within the Facility Site white-tailed deer, coyote, weasels, mice, voles, and several bat species.

#### *Successional Shrubland*

Within the Facility Site, successional shrubland totals 101 acres (2%). Typical mammal species include the white-tailed deer, eastern cottontail, striped skunk, and several small terrestrial mammal species. Typical bird species inhabiting successional shrublands include common yellowthroat (*Geothlypis trichas*), yellow warbler (*Setophaga petechia*), song sparrow (*Melospiza melodia*), and eastern towhee (*Pipilo erythrophthalmus*). Sensitive avian species may include blue-winged warbler (*Vermivora cyanoptera*) and brown thrasher (*Toxostoma rufum*). Reptiles and amphibians that may be found in successional shrubland include common garter snake (*Thamnophis sirtalis*), Eastern milk snake (*Lampropeltis triangulum*) and American toad (*Anaxyrus americanus*).

#### *Non-forested Wetlands and Open Water*

Non-forested wetland habitats within the Facility Site include shallow emergent marsh (27 acres), shrub swamp (27 acres), and open water communities (10 acres), which together account for approximately 2% of the Facility Site. These wetlands support diverse (and often dense) communities of vegetation that provide habitat for numerous species, some of which may also use terrestrial habitat types in the Facility Site. Common waterbirds such as mallard (*Anas platyrhynchos*), great blue heron (*Ardea herodias*), belted kingfisher, and Canada goose would be expected to these areas. American black duck, great egret (*Ardea alba*), least bittern, and pied-billed grebe represent special status species that rely on emergent wetlands.

Open water areas provide habitat for a variety of aquatic vertebrates and invertebrates, including certain species of fish, zooplankton, and many different types of aquatic insects. Areas above/along shallow open water bodies may also provide foraging habitat for bats, including species that are listed as either species of concern in New York or species of greatest conservation need. Frogs, toads, and salamanders may use isolated ponds within the Facility Site as egg-laying sites. Turtles likely use open waters within the Facility Site for foraging and basking. Some species of mammals expected to use open water communities include beaver, muskrat (*Ondatra zibethicus*), and mink. Refer to Exhibit 23 for further discussion regarding aquatic habitats and aquatic species.

#### (4) Special Status Species

Based on the results of on-site avian surveys, a review of publicly available sources, and a characterization of wildlife habitats within the Facility Site, a list of special status species which occur or potentially occur within the Facility Site is provided below in Table 22-4 (i.e., species identified through direct observation or historically observed in the aforementioned data sources).

**Table 22-4. New York State Special Status Species Occurring or Potentially Occurring within the Facility Site**

Species	NYS Status <sup>1</sup>	USFWS Status	SGCN Status <sup>2</sup>	Typical Habitat Requirements and On-site Observation Notes <sup>3</sup>	Source <sup>4</sup>	Observed on-site?
Black Tern <i>Chlidonias niger</i>	E	N/A	SGCN-HP	Found in New York in cattail-dominated freshwater marshes between May and July. Preferentially forages in shallow, emergent marshes. Minimal potential habitat is present within the Facility Site (see Table 22-2 above), and the species was not observed during on-site avian surveys.	NHP	No
Peregrine Falcon <i>Falco peregrinus</i>	E	N/A	SGCN	Nests in cliff and urban communities with tall structures such as bridges or buildings. Wintering and migrating birds utilize urban and open areas. Although suitable habitat does not occur at the Facility Site, the species was observed during on-site avian surveys (two observations only; one during fall migration and another in winter).	EE	Yes
Short-eared Owl <i>Asio flammeus</i>	E	N/A	SGCN-HP	Found in open habitats that include emergent marshes, hayfields, pastureland, and fallow farm fields. Preferentially roosts on the ground or in coniferous stands along the edges of agricultural or successional fields. Suitable habitat for this species occurs within the Facility Site, and the species was observed multiple times during on-site avian surveys.	EE, NHP	Yes
Bald Eagle <i>Haliaeetus leucocephalus</i>	T	N/A	SGCN	Found near open water in a wide range of forested habitats including hemlock-northern hardwood forest and beech-maple mesic forest communities. Preferentially roosts and nests in conifers or large, mature deciduous trees. Observed during on-site avian surveys multiple times. No occupied, active nests have been identified within the Facility Site.	EE, NHP	Yes
Henslow's Sparrow <i>Ammodramus henslowii</i>	T	N/A	SGCN-HP	Found in a wide range of open habitats such as pastures, row crops, and early successional fields, with a preference for those that lack woody vegetation. Confirmed breeding sites in Orleans County. Potential habitat may occur within the Facility Site, but this species was not observed during on-site avian surveys.	NHP	No
King Rail <i>Rallus elegans</i>	T	N/A	SGCN	A secretive species found primarily in emergent marshes in western New York during breeding season that migrates to coastal habitats to overwinter. Preferentially nests in shallow marshes or tussocks; confirmed breeding sites in Orleans County. Minimal potential habitat is present within the Facility Site (see Table 22-2 above), and the species was not observed during on-site avian surveys.	NHP	No
Least Bittern <i>Ixobrychus exilis</i>	T	N/A	SGCN	Migratory, secretive species found in both shallow and deep emergent marshes with dense cattails, bur-reeds, and sedges. Winters in southern coastal brackish wetlands. Minimal potential habitat is present within the Facility Site (see Table 22-2 above), and the species was not observed during on-site avian surveys.	NHP	No
Northern Harrier <i>Circus hudsonius</i>	T	N/A	SGCN	Found in open habitats including grassland, emergent marsh, pastureland, and successional old field communities. Suitable habitat for this species occurs within the Facility Site. Observed multiple times during on-site avian surveys.	EE, NHP, BBA	Yes
Northern Pintail <i>Anas acuta</i>	T	N/A	SGCN	Found in croplands, wet meadows, seasonal wetlands, and shortgrass prairies. Winters in lakes, bays, tidal marshes, and ponds. Suitable habitat occurs for this species within the Facility Site. Observed multiple times during on-site avian surveys.	EE	Yes

Species	NYS Status <sup>1</sup>	USFWS Status	SGCN Status <sup>2</sup>	Typical Habitat Requirements and On-site Observation Notes <sup>3</sup>	Source <sup>4</sup>	Observed on-site?
Pied-billed Grebe <i>Pdoilymbus podiceps</i>	T	N/A	SGCN	Found in emergent marshes, lakes, and ponds. Winters largely in coastal areas but may be found in open water on Lake Erie. Minimal potential habitat is present within the Facility Site (see Table 22-2 above), and the species was not observed during on-site avian surveys.	BBA, NHP	No
Sedge Wren <i>Cistothorus platensis</i>	T	N/A	SGCN-HP	Found in moist meadows with scattered low bushes, grass and sedge bogs, and coastal brackish marshes. Preferred nesting habitat includes meadows with some small shrubs and/or tall grass and sedge clumps. Potential habitat may occur within the Facility Site; however, this species was not observed during on-site avian surveys.	NHP	No
Upland Sandpiper <i>Bartramia longicauda</i>	T	N/A	SGCN-HP	Obligate grassland species found in open agricultural habitat with nearby anthropogenic structures for perching such as barns and fenceposts. Preference for grazed pasture for feeding and courtship. Nests in larger, older hayfields and overgrown pasture. Potential habitat may occur within the Facility Site, but this species was not observed during on-site avian surveys.	NHP	No
Northern Long-eared Bat <i>Myotis septentrionalis</i>	T	T	SGCN-HP	Found in multiple forest communities, including hemlock-northern hardwood and beech-maple mesic forests. Overwinters in caves where temperature and moisture remain constant. Summer roost habitat consists of trees with cracked or exfoliating bark, and summer foraging habitat typically consists of forest understories. Suitable habitat may be present within the Facility Site. May occur during migration; however, this species is severely impacted by white nose syndrome and therefore the likelihood of occurrence within the Facility Site is low.	NHP	No
Black-throated Blue Warbler <i>Dendroica caerulescens</i>	SC	N/A	SGCN	Found in deciduous and mixed coniferous-deciduous forest with thick understory, often in hilly and mountainous regions. Suitable habitat for this species is unlikely to occur within the Facility Site, and this species was not observed during on-site avian surveys.	BBA	No
Cerulean Warbler <i>Dendroica cerulea</i>	SC	N/A	SGCN	Found patchily distributed in oak-hickory dominated ridgetops and side-slopes, beech-maple mesic forest, riparian forests, or forested swamps with maple, ash, and sycamore trees. Suitable habitat is present within the Facility Site, and this species was observed multiple times during on-site avian surveys.	EE, BBA	Yes
Common Loon <i>Gavia immer</i>	SC	N/A	SGCN	Found in lake and bog communities in the northern United States and Canada. Winters on lakes, rivers, and coastlines. There is limited suitable habitat within the Facility Site; however, the species was observed once during on-site avian surveys.	EE	Yes
Common Nighthawk <i>Chordeiles minor</i>	SC	N/A	SGCN	Found in a wide range of open habitats, including grassland, cliff, and urban communities. Suitable habitat exists within the Facility Site. Observed once during on-site avian surveys.	EE, BBA	Yes
Cooper's Hawk <i>Accipiter cooperii</i>	SC	N/A	N/A	Found in a wide range of forested habitats, including hemlock-northern hardwood and beech-maple mesic forest communities. Suitable habitat for this species occurs within the Facility Site. The species was observed multiple times during on-site avian surveys.	EE	Yes
Horned Lark <i>Eromophila alpestris</i>	SC	N/A	SGCN-HP	Year-round resident commonly nesting in lowland row crops and hayfields in Great Lakes Plains, Appalachian Plateau, and Coastal Lowlands. Suitable habitat is present within the Facility Site, and this species was observed multiple times during on-site avian surveys.	EE, BBA	Yes
Northern Goshawk <i>Accipiter gentilis</i>	SC	N/A	SGCN	Found in large tracts of old growth or mature deciduous hardwood and coniferous forests. Suitable habitat for this species is present within the Facility Site. Observed twice during on-site avian surveys.	EE	Yes



Species	NYS Status <sup>1</sup>	USFWS Status	SGCN Status <sup>2</sup>	Typical Habitat Requirements and On-site Observation Notes <sup>3</sup>	Source <sup>4</sup>	Observed on-site?
Osprey <i>Pandion haliaetus</i>	SC	N/A	N/A	Found in open habitats above or adjacent to open water, including marsh and lake communities. Often builds nests above open water in submerged poles or trees. There is limited suitable habitat within the Facility Site, although the species may transiently utilize the Facility Site. Observed multiple times during on-site avian surveys.	EE	Yes
Red-shouldered Hawk <i>Buteo lineatus</i>	SC	N/A	SGCN	Found in moist forest habitats including floodplain, maple swamp, and shrub swamp communities. Suitable habitat for this species occurs within the Facility Site, and it was observed multiple times during on-site avian surveys.	EE	Yes
Rusty Blackbird <i>Euphagus carolinus</i>	SC	N/A	SGCN-HP	Typically found breeding in the Adirondack region at the southern limit of its breeding range. Expected to occur within the Facility Site during migration only. This species was observed three times during on-site avian surveys.	EE	Yes
Sharp-shinned Hawk <i>Accipiter striatus</i>	SC	N/A	N/A	Found in a range of forested habitats including hemlock-northern hardwood and beech-maple mesic forest communities. Suitable habitat for this species is present within the Facility Site. The species was observed multiple times during on-site avian surveys.	EE	Yes
Vesper Sparrow <i>Pooecetes gramineus</i>	SC	N/A	SGCN-HP	Ground nesting grassland species found in early successional open farmland and short grass meadows. Suitable habitat for this species occurs within the Facility Site, and it was observed multiple times during on-site avian surveys.	EE, BBA	Yes
Spotted Turtle <i>Clemmys guttata</i>	SC	N/A	SCGN-HP	Found in small pools and ponds, open/early successional wetlands, forested swamps, and upland forest habitats depending on the time of year. Suitable habitat for this species occurs within the Facility Site. The NYS Reptile and Amphibian Atlas reports occurrences in Orleans County.	HA	No
Wood Turtle <i>Glyptemys insculpta</i>	SC	N/A	SCGN-HP	Found in a variety of aquatic, riparian, and floodplain habitats. Typically nests along sandy stream banks or on sand-gravel bars within streams. The NYS Reptile and Amphibian Atlas reports occurrences in Orleans County.	HA	No
Blue-spotted Salamander <i>Ambystoma laterale</i>	SC	N/A	SGCN-HP	Found in moist forest habitats including beech-maple mesic forest, deciduous-coniferous mixed stands with poorly drained soils, and shrub swamp communities. Breeds in fishless ponds and vernal pools. The NYS Reptile and Amphibian Atlas reports occurrences in Orleans County.	HA	No
Jefferson/blue-spotted Salamander Complex <i>Ambystoma jeffersonianum x laterale</i>	SC	N/A	SGCN-HP	Found in moist forest habitats including beech-maple mesic forest and maple swamp communities. Breeds in fishless ponds and vernal pools. The NYS Reptile and Amphibian Atlas reports occurrences in Orleans County.	NYS	No
Jefferson Salamander <i>Ambystoma jeffersonianum</i>	SC	N/A	SGCN	Found in moist forest habitats including beech-maple mesic forest, hemlock forest, and shrub swamp communities below 1,700 feet in elevation. Breeds in fishless ponds and vernal pools. Suitable habitat for this species occurs within the Facility Site. The NYS Reptile and Amphibian Atlas reports occurrences in Orleans County.	HA	No
American Black Duck <i>Anas rubripes</i>	N/A	N/A	SGCN-HP	Found in a wide range of freshwater habitats including marshes, kettle ponds, bogs in mixed hardwood forests, and forested swamps. Suitable habitat for this species occurs in the Facility Site and it was observed three times during on-site avian surveys.	EE	Yes
American Kestrel <i>Falco sparverius</i>	N/A	N/A	SGCN	Found in open habitats including grassland, cropland, and successional old field communities. Suitable habitat is present within the Facility Site. The species was observed multiple times during on-site avian surveys.	EE, BBA	Yes

Species	NYS Status <sup>1</sup>	USFWS Status	SGCN Status <sup>2</sup>	Typical Habitat Requirements and On-site Observation Notes <sup>3</sup>	Source <sup>4</sup>	Observed on-site?
American Woodcock <i>Scolopax minor</i>	N/A	N/A	SGCN	Found in young, early successional forests, and mixed forest-agricultural open spaces. Suitable habitat exists within the Facility Site; however, this species was not observed during on-site avian surveys.	BBA	No
Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i>	N/A	N/A	SGCN	Found along edges and clearings of young deciduous and mixed hardwood forests, forested wetlands, agricultural lowlands, forested wetlands, and riparian habitats. Preferentially nests in overgrown pasture and edge habitat. Suitable habitat for this species occurs in the Facility Site, but it was not observed during on-site surveys.	BBA	No
Blue-winged Warbler <i>Vermivora cyanoptera</i>	N/A	N/A	SGCN	Found in dense, shrubby edges of old fields and densely vegetated swamps. Suitable habitat may occur within the Facility Site; however, this species was not observed during on-site avian surveys.	BBA	No
Bobolink <i>Dolichonyx oryzivorus</i>	N/A	N/A	SGCN-HP	Found in grassland, cropland, and successional old field communities. Suitable habitat is present within the Facility Site. The species was observed multiple times during on-site avian surveys.	EE, BBA	Yes
Brown Thrasher <i>Toxostoma rufum</i>	N/A	N/A	SGCN-HP	Found in hedgerows, early successional shrubby fields, and deciduous mixed forests. Suitable habitat for this species occurs within the Facility Site, and the species was observed multiple times during on-site avian surveys.	EE, BBA	Yes
Common Goldeye <i>Bucephala clangula</i>	N/A	N/A	SGCN-HP	Cavity nesters found in lakes and rivers of boreal forests, preferring to winter in coastal waters. While suitable habitat for this species does not occur at the Facility Site, this species may use agricultural habitats during migration and was observed once during on-site avian surveys.	EE	Yes
Eastern Meadowlark <i>Sturnella magna</i>	N/A	N/A	SGCN-HP	Found in grassland, cropland, and successional old field communities. Suitable habitat is present within the Facility Site. This species was observed twice during on-site avian surveys.	EE, BBA	Yes
Great Egret <i>Ardea alba</i>	N/A	N/A	SGCN	Found in marshes, lakeshores, irrigation canals, tidal rivers, and summer-stratified monomictic lakes. Suitable habitat occurs within the Facility Site, and the species was observed twice during on-site avian surveys.	EE	Yes
Scarlet Tanager <i>Piranga olivacea</i>	N/A	N/A	SGCN	Found in a range of forested habitats including hemlock-northern hardwood and beech-maple mesic forest communities. Suitable habitat is present within the Facility Site. The species was observed multiple times during on-site avian surveys.	EE, BBA	Yes
Eastern Red Bat <i>Lasiurus borealis</i>	N/A	N/A	SGCN	A migratory bat that is found in a range of forested habitats including hemlock-northern hardwood and beech-maple mesic forest. Often roosts in deciduous trees and forages over open water, pastureland, and along forest edges. Suitable habitat is present within the Facility Site.	NYS	No
Hoary Bat <i>Lasiurus cinereus</i>	N/A	N/A	SGCN	A migratory bat that is found in a range of forested habitats including hemlock-northern hardwood and spruce-northern hardwood forest. Roosts in trees and often forages in forest openings and over open water. Suitable habitat is present within the Facility Site.	NYS	No
Little Brown Bat <i>Myotis lucifugus</i>	N/A	N/A	SGCN-HP	A habitat generalist found in deciduous, mixed, and coniferous forest stands. Summer roost habitat includes rocky outcrops, wood piles, tree bark, and some human-built structures. Foraging habitat includes vegetated and riparian edges. May occur on-site during migration but white nose syndrome has greatly decreased populations of this species and therefore likelihood of occurrence is low.	NHP	No

Species	NYS Status <sup>1</sup>	USFWS Status	SGCN Status <sup>2</sup>	Typical Habitat Requirements and On-site Observation Notes <sup>3</sup>	Source <sup>4</sup>	Observed on-site?
Silver-haired Bat <i>Lasionycteris noctivagans</i>	N/A	N/A	SGCN	A migratory bat that is found in a range of forested habitats including hemlock-northern hardwood and beech-maple mesic forest. Roosts in bark crevices and hollows and often forages over streams and ponds. Suitable habitat is present within the Facility Site.	NYS	No
Tri-colored bat <i>Perimyotis subflavus</i>	N/A	N/A	SGCN	A migratory bat that is found in a range of forested habitats including hemlock-northern hardwood and beech-maple mesic forest. Suitable habitat is present within the Facility Site.	NYS	No
Common Mudpuppy <i>Necturus maculosus</i>	N/A	N/A	SGCN	Found in both moving and standing permanent waterbodies; a generalist that thrives in large waterways, deep cold lakes, shallow weedy ponds, and fast-moving clean streams providing submerged cover. Suitable habitat occurs with the Facility Site. The NYS Reptile and Amphibian Atlas reports occurrences in Orleans County.	HA	No
Western Chorus Frog <i>Pseudacris triseriata</i>	N/A	N/A	SGCN	Found in damp meadows with low shrubs and grasses. Breeds in vernal pools, flooded fields, and ditches. Suitable habitat for this species occurs within the Facility Site. The NYS Reptile and Amphibian Atlas reports occurrences in Orleans County.	HA	No
Common Snapping Turtle <i>Chelydra s. serpentine</i>	N/A	N/A	SGCN	Aquatic generalist found in a wide range of lakes, ponds, marshes, slow-moving streams, or any permanent body of fresh water. Suitable habitat for this species occurs within the Facility Site. The NYS Reptile and Amphibian Atlas reports occurrences in Orleans County.	HA	No
Eastern Rat Snake <i>Pantherophis alleghaniensis</i>	N/A	N/A	SGCN	Woodland generalist found in agricultural land with anthropogenic infrastructure. Suitable habitat for this species occurs within the Facility Site. The NYS Reptile and Amphibian Atlas reports occurrences in Orleans County.	HA	No
Smooth Green Snake <i>Opheodrys vernalis</i>	N/A	N/A	SGCN	Found in damp meadows, early successional fields, mountain foothills, and riparian habitats. Suitable habitat for this species occurs within the Facility Site. The NYS Reptile and Amphibian Atlas reports occurrences in Orleans County.	HA	No

<sup>1</sup> Designations based on the NYSDEC List of Endangered, Threatened and Special Concern Fish & Wildlife Species of New York State. Available at: <https://www.dec.ny.gov/animals/7494.html>. E = endangered; T = threatened; SC = species of special concern.

<sup>2</sup> SGCN Status refers to the species' status under the Comprehensive State Wildlife Strategy. Available at: <https://www.dec.ny.gov/animals/9406.html>. SGCN = Species of Greatest Conservation Need; SGCN-HP = High Priority Species of Greatest Conservation Need.

<sup>3</sup> Typical habitat requirements based on review of NYNHP Animal Guides (<http://acris.nynhp.org/animals.php>) and The Cornell Lab All About Birds online guide (<https://www.allaboutbirds.org/guide/>).

<sup>4</sup> Source: EE= observed on-site by Ecology & Environment biologists during on-site avian surveys; NHP = identified by the New York Natural Heritage Program following a site-specific request for data; BBA = identified by the NYS Breeding Bird Atlas; HA = identified by the NYS Herp Atlas; NYS = Species occurs throughout much of New York State and potentially occurs within the Facility Site during some times of the year based on species' distribution information published by the NYSDEC ([https://www.dec.ny.gov/docs/administration\\_pdf/batsofny.pdf](https://www.dec.ny.gov/docs/administration_pdf/batsofny.pdf)) and the NYNHP (<http://acris.nynhp.org/animals.php>).

(e) Species List

A Plant Species Inventory and a Wildlife Species Inventory are included in Appendix 22-A. As discussed above, these lists were compiled based on on-site surveys; data/responses provided by the NYNHP, NYSDEC, and USFWS; and publicly available data from the Herp Atlas, BBA, BBS, CBC, HMANA, and other sources described above.

(f) Impacts to Vegetation, Wildlife, Wildlife Habitat, and Wildlife Travel Corridors

(1) Potential Construction and Operation Impacts to Habitat

Construction and operational impacts on vegetation are addressed above in Section (b) and depicted in Figure 22-1. Up to 206.03 acres of vegetation (3.5% of the Facility Site) will experience temporary disturbance and up to 47.61 acres (less than 1% of the Facility Site) will experience permanent impacts as a result of Facility construction. In addition, up to 22.00 acres of vegetation (less than 1% of the Facility Site) will be permanently converted and maintained in an early successional state for the operational life of the Facility. No plant or ecological community will be extirpated or significantly reduced as a result of the Facility. Direct and indirect impacts to wildlife habitat are also discussed below and in the Habitat Fragmentation Analysis prepared for the Facility (see Appendix 22-E). The Applicant is taking measures to avoid, minimize, and mitigate impacts to vegetation, wildlife, and wildlife habitats to the greatest extent practicable, as discussed in Section (g) below. Therefore, impacts to wildlife and wildlife habitat are expected to be minimal and will not have significant effects within the Facility Site.

(2) Direct and Indirect Construction-Related Impacts to Wildlife

Construction-related impacts to wildlife are anticipated to be limited to incidental injury or mortality due to construction activity and vehicular movement, construction-related sedimentation impacts on aquatic organisms, habitat disturbance/loss associated with clearing and earth-moving activities, and displacement due to increased noise and human activities. Each of these potential impacts is described below in greater detail.

(i) Incidental Injury or Mortality

Direct impacts from construction equipment may include incidental injuries or mortalities to wildlife. Potential mortality is expected to be low, as equipment used in wind energy facility construction is generally slow-moving and/or stationary for long periods (e.g., erection cranes). Incidental injury and mortality are expected to be limited to sedentary/slow-moving species such as small mammals, reptiles, amphibians, and invertebrates that are unable to move out of the areas that are being actively disturbed by construction. More mobile species will typically be able to vacate areas that are being disturbed by construction. Potential vehicle-related mortality may increase

temporarily due to the increased traffic associated with construction; however, Facility-related wildlife-vehicle collisions will decrease as construction is completed.

The highest risk of direct injury or mortality to birds from construction is the potential destruction of a nest during the breeding season. However, adverse impacts to birds during construction of the Facility area are not expected because the Applicant intends to conduct tree clearing outside the breeding season to the extent possible. Similarly, the highest risk to bat species would be if tree clearing were to occur outside of the winter season when bats are hibernating. By performing most tree clearing between November 1 and March 31, these impacts will be avoided.

(ii) Habitat Disturbance and Loss Due to Clearing and Earth-moving Activities

Based on the results of a habitat fragmentation analysis performed for the Facility, approximately 44 acres of forest habitat (including forested wetlands) and 17 acres of grassland habitat (in the form of pasture/hay) may be directly impacted by clearing and earth-moving activities. These direct impact acreage values represent approximately 10.7% and 4.3% of land cover within the Facility LOD, and 0.8% and 0.3% of the area within the 5,813-acre Facility Site, respectively. Within these direct impact areas, only approximately 16 acres of forest habitat and 6 acres of grassland habitat (0.3% and 0.1% of the area within the Facility Site) will be permanently transformed into built structures/impervious areas (see Appendix 22-E). Disturbances to vegetation that alter the quality of habitat could influence the foraging, nesting, or roosting behavior of wildlife species. However, it is anticipated that the majority of wildlife present in the Facility Site will return to temporarily disturbed areas and normal behaviors following the completion of construction activity.

(iii) Displacement of Wildlife

Some wildlife displacement may potentially occur due to increased noise and human activity from Facility construction. The level of impact will vary by species and the seasonal timing of construction activities. Within New York, late spring and early summer are typically peak breeding time for birds common to forested and agricultural habitats. If construction begins before the initiation of breeding activities, then most breeding birds will likely avoid nesting in active construction areas. If construction begins during the breeding season, the breeding birds that are accustomed to similar disturbances such as farming and logging are expected to remain in the area while others will likely relocate to adjacent suitable habitat. These impacts are not expected to have population level effects, as only 44 acres of forest habitat and 17 acres of grassland habitat of the 5,813-acre Facility Site will be directly impacted, and large amounts of unaffected habitat will remain surrounding the Facility Site.

The Facility construction may also indirectly affect up to 355 acres of forest habitat and up to 113 acres of grassland habitat in the form of pasture/hay based on the assumption that indirect impacts (e.g., fragmentation, displacement, edge effects) may extend up to 300 feet from the Facility LOD. However, more than 22,800 acres of forest habitat and more than 4,600 acres of grassland habitat will remain unaffected within the local landscape surrounding the Facility<sup>6</sup> (see Appendix 22-E). Finally, although up to 44 acres of interior forest<sup>7</sup> may be affected by the Facility, approximately 448 acres of interior forest (91%) will remain undisturbed within the Facility Site (in addition to substantial areas of interior forest within the local landscape surrounding the Facility; see Appendix 22-E). Outside of localized displacement due to construction disturbance in the immediate vicinity of turbines, access roads, and other Facility components, no large-scale displacement impacts on wildlife species are anticipated during construction.

### (3) Direct and Indirect Operational-related Impacts to Wildlife

Operation-related impacts to wildlife may include direct habitat loss, habitat degradation through fragmentation, disturbance/displacement due to presence of wind turbines, and avian and bat mortality as a result of collisions with operating turbines.

#### (i) Habitat Loss

As described in Section (b)(1) above, up to 47.61 acres of wildlife habitat will be permanently lost within the Facility Site (i.e., transformed into built facilities). This habitat loss represents less than 1% of the 5,813-acre Facility Site. An additional 22 acres, including 15.49 acres of forest, will be permanently converted to and maintained as early successional communities for the life of the Facility as a result of necessary maintenance activities. As described in the Habitat Fragmentation Analysis, approximately 16 acres of forest habitat and 6 acres of grassland habitat in the form of pasture/hay will be permanently transformed into built facilities. Because the Facility will largely be constructed in existing agricultural cropland, habitat loss/conversion resulting from Facility development is not considered significant.

#### (ii) Fragmentation

In order to assess potential Facility-related forest and grassland fragmentation impacts, a habitat fragmentation analysis was performed to assess direct impacts, indirect impacts (i.e., those extending up to 300 feet from the Facility LOD), interior forest impacts, and specific species that may be affected by these changes. The Habitat

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<sup>6</sup>The local landscape surrounding the Facility was defined as all areas within 2.5 miles (4.0 kilometers) of the Facility Site. Refer to Appendix 22-E for additional information.

<sup>7</sup>Interior forest includes forest habitat areas that are more than 300 feet from the edge of a given patch (the edge is where a given patch transitions from forest to non-forest communities). Refer to Appendix 22-E for additional information.

Fragmentation Analysis is attached as Appendix 22-E; direct and indirect impacts to habitat are summarized above, and bird and bat species fragmentation impacts are presented below.

#### *Fragmentation Impacts to Birds*

Sensitivity to habitat fragmentation varies by species, with forest interior species showing the highest degree of sensitivity (Bannerman, 1998). Forest interior habitat located deep within woodlands has a relatively stable climatic environment with dense vegetation and woody debris that provides shelter and concealment from predators. As forests are cut, edges are created, which results in increased exposure to wind, sun, and predators. Some species of birds benefit from the creation of edge habitat, and these species are typically habitat generalists that are adapted to use the variety of vegetation and food resources located within the forest edge. On the other hand, interior forest species such as the black-throated blue warbler, cerulean warbler, hooded warbler (*Setophaga citrina*), or ovenbird (*Seiurus aurocapilla*) may be affected by conversion of interior forest. Appendix 22-E presents a list of interior forest bird species that could be affected by the Facility's conversion of approximately 44 acres of interior forest; however, population-level effects are unlikely to result from the construction of the Facility, as forest fragmentation and interior forest impacts are expected to be minimal, and large areas of remaining habitat will be readily available for these species' continued use. Overall, considering that only a relatively small amount of forested habitat is expected to be affected, construction of the Facility will not result in significant forest fragmentation impacts to birds.

Similarly, fragmentation impacts to grassland bird species are also anticipated to be minor. Although some existing grassland habitat in the form of actively managed pastureland and hayfields will be directly and indirectly affected by Facility construction, large areas of similar habitat are present within the local landscape surrounding the Facility. Moreover, the typical suite of grassland bird species that utilize these types of open fields are continually confronted by other forms of disturbance under existing conditions (i.e., mowing, planting, grazing, mechanized vehicle use, and other activities associated with ongoing agricultural operations). Therefore, it is not anticipated that construction-related effects to grassland habitat will be substantially different from these existing forms of disturbance/disruption.

#### *Fragmentation Impacts to Bats*

Forest fragmentation effects on bats are not well understood and effects may be different between species based upon each species' ecology (e.g., preferred prey, foraging areas, roosting needs, and flight morphology). To the extent practicable, tree clearing for the Facility will take place during the winter when bats are hibernating or have migrated away from the Facility Site to minimize the potential for impacts to forest habitat that bats may potentially utilize. These direct and indirect construction-related impacts to forest habitat

will not be substantially different from historical and ongoing forms of disturbance/disruption, and bat species will still have access to substantial areas of foraging and roosting habitat surrounding the Facility.

(iii) Disturbance/Displacement of Wildlife

Disturbance resulting from the operation of turbines and other wind energy facility infrastructure can make a site unsuitable or less suitable for nesting, foraging, roosting, or other wildlife use. However, the combined footprint of turbine pads, roads, and other permanent Facility infrastructure represents only a very small percentage of the Facility Site and the surrounding landscape. Therefore, overall land use will remain relatively unchanged following Facility development. However, displacement by a wind energy facility can extend beyond the functional footprint, due to the presence of tall structures and increased human activity. Potential disturbance/displacement impacts to songbirds, waterbirds, and raptors are detailed in the Avian Risk Assessment prepared for the Facility (see Appendix 22-F). Information regarding avian and bat collision fatalities is provided below and in the Cumulative Impacts Assessment (see Appendix 22-G).

(iv) Avian Collision Risk

Turbines pose a collision risk for birds and every wind energy facility in the United States likely results in some bird mortality. In New York, average avian fatality rates have ranged from 0.37 to 5.81 birds/MW/year based on publicly available post-construction survey data for 13 operational wind energy facilities (see Appendix 22-G). In the nearby region within 100 miles of the Facility, average avian fatality rates have ranged from 0 to 3.38 birds/MW/year (see Appendix 22-G). For additional information regarding collision risk to birds and avian fatalities, refer to Appendices 22-F and 22-G. The following details for specific bird groups are provided based on the Avian Risk Assessment prepared for the Facility (Appendix 22-F).

*Passerines (Songbirds)*

To assess population level impacts of avian fatalities at wind facilities across the United States and Canada, Erickson et al. (2014) compared the estimated number of fatalities for small passerines (songbirds) at wind energy facilities to continent-wide population estimates. The authors found that the cumulative mortality rate per year by species was highest for black-throated blue warbler and tree swallow (*Tachycineta bicolor*), estimated at 0.043% of the entire population of each species. For the 18 passerine species with the next highest values, this estimate ranged from 0.008% to 0.038%. The authors summarized that wind turbines present a minimal risk to bird populations.

In New York, turbines currently result in less than 6 bird fatalities/MW/year, and about three-quarters of these fatalities are to passerines. Collision risk varies among avian species based on abundance, use of habitat,



and behavior. Nocturnal migrants account for most fatalities with bird fatality rates peaking during the spring and fall migration seasons and fatality rates dropping during the breeding season at most wind energy facilities (Erickson et al., 2014). Therefore, peer-reviewed studies strongly suggest that wind turbines do not pose a significant population risk to any passerine species in North America.

#### *Waterbirds*

Although waterbird mortality at wind energy facilities has been highly variable, national research has demonstrated that these groups rarely collide with inland turbines. Waterbirds have been found to comprise approximately 3.5% of all fatalities in the northeastern United States and southern Ontario based on a review of publicly available post-construction mortality data from wind facilities. The relatively low percentage of waterbird fatalities has been consistent in fatality studies for wind energy facilities throughout the United States. For example, at nine wind energy facilities in the Midwest and western United States, waterfowl made up 2.5% of fatalities (Erickson et al., 2001). Therefore, it is highly unlikely that wind turbines in New York, Ontario, or North America as a whole are impacting waterbird populations in a significant fashion. Accordingly, the contribution of the Facility to waterbird fatalities would be negligible.

#### *Raptors*

Three seasons of weekly raptor migration surveys were conducted to document movement of raptors migrating through the Facility Site. The fall raptor migration surveys completed by Ecology & Environment, Inc. showed that the rate of 2.5 raptors observed per hour (excluding turkey vultures [*Cathartes aura*]) is far less than the rate observed at significant and well documented migration locations in New York (HMANA sites), such as Braddock Bay, Franklin Mountain, or Derby Hill. This strongly suggests that relatively few raptors migrate through the Facility Site, and that the collision risk is minimal.

In addition, raptor fatalities at wind energy projects in nearby Ontario (Bird Studies Canada, 2017) and in New York have been relatively low and have not been shown to impact regional populations (see Appendix 22-F, Table 6). These studies also show that fatalities of raptors are relatively low at wind projects, even those that are located in important migration pathways. From the studies that have been completed in New York, about one raptor per 8 MW of energy generated was killed, with red-tailed hawk and turkey vulture being the species typically impacted (see Appendix 22-F). Counts of migrant raptors within the Facility Area were low, and the rate of migration was miniscule compared to sites like Braddock Bay and Derby Hill on the Lake Ontario shoreline. The Facility is more than 10 miles south of the Lake Ontario shoreline and there are no long ridges at or near the Facility that would concentrate migrating raptors into the Facility Area. Also relevant is the fact that the empirical studies of collision fatalities along the northern shore of Lake Erie and more than 20 wind

projects on Appalachian ridges (Taucher et al., 2012) reveal low fatality rates of migrating raptors. Likewise, studies conducted at 31 wind projects in Ontario with turbines within 3 miles of the Lake Erie shoreline, and a few more in the United States (e.g., Kerlinger et al., 2014), have not found fatality rates for raptors to be greater than those documented at wind projects located well away from the lakeshore. These empirical data indicate that migrating raptors are not at significant risk at the Facility.

In short, the results of the raptor use studies conducted at the Facility indicate relatively low use of the area by migrating raptors compared to nearby sites. Moreover, the results of mortality monitoring studies at other New York wind energy facilities indicate that turbines do not pose a significant risk to raptor populations. Raptor fatality rates at the Facility are expected to be similar to those at other northeastern wind facilities, and the Facility is not expected to adversely impact any raptor species at a population level.

(v) Bat Collision Risk

Though WNS represents the primary source of bat fatalities in New York and the surrounding region, evaluation of studies conducted at wind energy facilities across the United States and Canada indicated that operational fatality rates for all bat species ranged widely from 0 bats/MW/year to 70 bats/MW/year (Cryan, 2011; AWWA, 2018). Other studies have estimated that fatalities may total 500,000 bats per year (Arnett and Baerwald, 2013; Hayes, 2013; Smallwood, 2013). Therefore, wind energy facilities generally represent a more significant threat to bats than to birds (O'Shea et al., 2016), but bat impacts vary widely based on region and species. WNS generally impacts cave-dwelling species, largely in the *Myotis* genus, and wind turbines impact mainly migratory tree bat species that are not susceptible to WNS (Arnett et al., 2013). In addition, while wind energy facilities affect bats, population-level impacts are difficult to estimate given the relative lack of basic demographic data for many species (Frick et al., 2017).

In New York, average bat fatality rates have ranged from 1.78 to 16.30 bats/MW/year based on post-construction surveys conducted at 24 wind energy facilities (see Appendix 22-G). Collision risk is highest for migratory, tree-roosting species of bats (hoary bat, silver-haired bat, and eastern red bat), which account for between 50 and 75% of post-construction bat fatalities at wind energy facilities in the United States, New York, and the region surrounding the Facility (Ellison, 2012). These migratory, tree-roosting species have broad geographic distributions that include most of North America and portions of South America (hoary bat), much of eastern and central North America (eastern red bat), and most of North America (silver-haired bat) (IUCN, 2020; Reid, 2006). Currently, all three of these species have a global conservation status of "Least Concern" (IUCN, 2020), although future population trends are unclear, and these species may be at risk of future decline (Frick et al., 2017).

In order to avoid impacts to these and other bats species, the Facility will implement a curtailment regime that is expected to reduce all bat fatalities by between 50% and more than 80% throughout the operational life of the Facility. In addition, the Facility proposes to employ acoustic bat deterrent systems (BDS), and/or similar technologies that may become available, at wind turbines during Facility operation as a means of further minimizing potential impacts to bats. Currently available BDS emit ultrasonic noise in the same natural frequency range as bats, interfering with their ability to echolocate and discouraging them from entering the area surrounding a turbine. Although the response of various species of bats to curtailment and/or BDS may vary, the combination of these two minimization methods provides a more comprehensive strategy to lower overall bat fatality rates (Iskali et al., 2019). In addition, the BDS system would be applied for the entire active season for bats and would provide benefits outside of the fall migration season. Additional information is presented in Appendix 22-G (Cumulative Impacts Analysis) and Appendix 22-H (Net Conservation Benefit Plan).

(vi) Impacts to Wildlife Travel Corridors and Wildlife Habitat

The Applicant conducted research to determine the presence of documented wildlife travel corridors within or adjacent to the proposed Facility, and none were identified within the exception of the Atlantic flyway (see below). As is the case with most wildlife habitats, smaller-scale travel corridors that are used for local movement between resource patches likely exist within the Facility Site. These may include game trails, which typically consist of travel ways between patches of habitat that mammal species may utilize.

The Atlantic flyway is a major north-south corridor for migratory birds in North America, which generally ranges from Greenland south to the tropical portions of South America and the Caribbean. However, it is important to note that the entirety of New York and the Ontario Province overlap the northern extent of this migratory corridor. Therefore, although the Facility is located within a portion of this avian migratory corridor, potential impacts to avian species is anticipated to be similar to those associated with operational facilities in the region. As discussed above, impacts to migratory bird species are expected to be minor (see Appendix 22-F for additional details).

Besides possible impacts to small numbers of migratory birds using the Atlantic flyway, the proposed Facility is not expected to have any impacts to wildlife travel corridors or concentration areas.

(4) Potential Short and Long-term Impacts from Biocides

Based on the terms of established landowner lease agreements, the Applicant is not typically permitted to apply pesticides, herbicides, or biocides without the consent of the landowner. However, if necessary for vegetation management purposes (e.g., invasive plant species control), limited biocide use may occur with landowner consent.

The use of biocides is expected to be minimal, and would only occur within small, targeted areas of the Facility Site. Areas where the use of biocides is not allowed (e.g., wetlands, streams, State-regulated wetland adjacent areas, organic farmland) would be identified prior to biocide applications for avoidance. In addition, biocides would be applied by NYSDEC certified applicators in accordance with label restrictions and notification requirements. Given these considerations, short-term and long-term impacts to non-target plants (including trees, ground cover, and other non-target vegetation), animals, and habitats are not anticipated.

#### (5) Quantification of Temporary and Permanent Impacts

Refer to Table 22-3 above for a summary of anticipated temporary and permanent impacts to wildlife habitats and ecological community types associated with the construction and operation of the Facility. Information regarding impacts to forest habitat, interior forest, and grassland habitat is provided above and in Appendix 22-E.

#### (6) Protected Species

As described above, the Applicant compiled a list of federally listed and State-listed species, as well as additional special status species, that could occur within the Facility Site based on consultation with the USFWS, NYNHP, NYSDEC and direct observations made during on-site surveys. For example, the Applicant obtained site-specific data from the USFWS Information for Planning and Consultation (IPaC) database and the NYNHP database to determine the presence of threatened, endangered, candidate, rare or special concern species that may occur in the Facility Site. The most current results are provided in Appendix A of the Net Conservation Benefit Plan prepared for the Facility (see Appendix 22-H). See Section (d)(4) and Table 22-4 above for a list of all special status species identified, a brief description of the ecological requirements of each species, the source of information about whether the species is known to occur in the vicinity of the Facility Site, and whether the species was observed during on-site surveys.

Based on consultation with UFSWS and NYSDEC, it was determined that one federally listed species could occur within vicinity of the Facility Site, the northern long-eared bat. This species is also State-listed as threatened, and designated as a high priority species of greatest conservation need by the NYNHP. Details regarding the northern long-eared bat, along with impact avoidance, minimization, and mitigation information, are provided in the Net Conservation Benefit Plan (Appendix 22-H).

State-listed bird species identified by the NYNHP in the most recent (April 22, 2019) environmental screening response for the Facility included two State-listed endangered bird species (black tern and short-eared owl) and eight State-listed threatened species (bald eagle, Henslow's sparrow, king rail, least bittern, northern harrier, pied-billed grebe, sedge

wren, and upland sandpiper). One additional State-listed endangered bird species (peregrine falcon) was observed twice during on-site avian surveys. Refer to Table 22-4 above for additional information regarding State-listed species occurring or potentially occurring within the Facility Site.

The NYNHP and the NYSDEC also keep records on species of special concern (SSC). These species are not listed, but their conservation needs do “warrant attention and consideration” (NYSDEC, 2017a). A total of 17 State-listed species of concern were identified through site-specific correspondence with the above sources, direct observation on-site, or review of other sources used to prepare the Wildlife Inventory as discussed in Section (e)(2). These species included 12 avian species, two reptile species, and three amphibian species: common nighthawk, black-throated blue warbler, cerulean warbler, vesper sparrow, rusty blackbird, common loon, red-shouldered hawk, horned lark, osprey, Cooper’s hawk, sharp-shinned hawk, northern goshawk, spotted turtle, wood turtle, blue-spotted salamander, Jefferson salamander, and Jefferson/blue-spotted salamander complex.

In addition, NYSDEC and NYNHP maintain a Comprehensive State Wildlife Strategy that includes a list of Species of Greatest Conservation Need (SGCN) (NYSDEC, 2017b). This list describes species that are rare or declining. Species listed as High Priority Species of Greatest Conservation Need (SGCN-HP) need timely management intervention to avoid reaching critical population levels in New York, specifically needing conservation actions within the next ten years. Species of Greatest Conservation Need (SGCN) are species that are experiencing some level of population decline and need conservation actions to maintain stable populations or sustain recovery. However, the need for conservation action is not as imperative as for those in the High Priority category. Many of the species listed as threatened, endangered, or of special concern are also identified as SGCN or SGCN-HP. There are twelve SGCN or SGCN-HP species that have been observed within or near the Facility Site that are not also listed as threatened, endangered, or of special concern.

A discussion of the Facility’s potential to impact the abovementioned threatened, endangered, special concern, and SGCN species is provided below as a summary impact table (Table 22-5). It is important to note that some species listed in Table 22-5 are not expected to be impacted by Facility construction or operation at all. This is because these species either do not occur at the Facility Site, or occur so rarely as to not be detected during on-site surveys. Similarly, many of the species included in Table 22-5 were observed very few times during on-site surveys, and possible impacts to these species are therefore expected to be minimal. For more discussion of possible impacts to special status bird species specifically, refer to the Avian Risk Assessment (Appendix 22-F). For additional details regarding possible impacts to special status bat species, refer to Appendices 22-G and 22-H.

No threatened, endangered, candidate, or rare plant species were identified by either the USFWS or the NYNHP. In addition, no special status plants were observed on-site during ecological surveys (see Appendix 22-A). Therefore, Facility construction and operation are not expected to result in adverse impacts to protected plants. As described above, the NYNHP identified a specific silver maple-ash swamp community located along Powerline Road adjacent to the northeastern portion of the Facility Site as a Significant Natural Community (see Figure 22-2). The nearest boundary of this Significant Natural Community is located approximately 150 feet outside the Facility Site. Although this Significant Natural Community may be hydrologically connected to delineated Wetland M3 (see Figures 22-2 and 22-3), the boundary of the NYNHP-identified feature is located fully outside the Facility Site. Therefore, construction and operation of the Facility will not directly impact this Significant Natural Community, and any potential indirect impacts to this community will be avoided or minimized through the methods outlined above in Section (c).

**Table 22-5. Possible Impacts for Special Status Species Potentially Occurring within the Facility Site**

Species	Temporary Impacts Anticipated Due to Construction			Permanent Impacts Anticipated Due to Operation and Maintenance			
	Indirect Impacts		Direct Impacts	Indirect Impacts			Direct Impacts
	Displacement	Habitat Disturbance	Injury or Mortality	Habitat Loss	Habitat Fragmentation	Displacement	Injury or Mortality <sup>2</sup>
<b>State Endangered Species</b>							
Black Tern <sup>1</sup> <i>Chlidonias niger</i>	none	none	none	none	none	none	unlikely
Peregrine Falcon <sup>1</sup> <i>Falco peregrinus</i>	none	none	none	none	none	none	unlikely
Short-eared Owl <i>Asio flammeus</i>	unlikely	unlikely	unlikely	none	none	none	unlikely
<b>State Threatened Species</b>							
Bald Eagle <i>Haliaeetus leucocephalus</i>	unlikely	unlikely	unlikely	none	none	none	unlikely
Henslow's Sparrow <sup>1</sup> <i>Ammodramus henslowii</i>	none	none	none	none	none	none	unlikely
King Rail <sup>1</sup> <i>Rallus elegans</i>	none	none	none	none	none	none	unlikely
Least Bittern <sup>1</sup> <i>Ixobrychus exilis</i>	none	none	none	none	none	none	unlikely
Northern Harrier <i>Circus hudsonius</i>	unlikely	unlikely	unlikely	none	none	none	unlikely
Northern Pintail <i>Anas acuta</i>	unlikely	unlikely	unlikely	none	none	none	unlikely
Pied-billed Grebe <sup>1</sup> <i>Pdoilymbus podiceps</i>	none	none	none	none	none	none	unlikely
Sedge Wren <sup>1</sup> <i>Cistothorus platensis</i>	none	none	none	none	none	none	unlikely
Upland Sandpiper <sup>1</sup> <i>Bartramia longicauda</i>	none	none	none	none	none	none	unlikely
Northern Long-eared Bat <i>Myotis septentrionalis</i>	unlikely	unlikely	none	unlikely	unlikely	unlikely	unlikely

Species	Temporary Impacts Anticipated Due to Construction			Permanent Impacts Anticipated Due to Operation and Maintenance			
	Indirect Impacts		Direct Impacts	Indirect Impacts			Direct Impacts
	Displacement	Habitat Disturbance	Injury or Mortality	Habitat Loss	Habitat Fragmentation	Displacement	Injury or Mortality <sup>2</sup>
<b>State Species of Special Concern</b>							
Black-throated Blue Warbler <sup>1</sup> <i>Dendroica caerulescens</i>	none	none	none	none	none	none	unlikely
Cerulean Warbler <i>Dendroica cerulea</i>	potential	potential	unlikely	unlikely	potential	unlikely	unlikely
Common Loon <sup>1</sup> <i>Gavia immer</i>	none	none	none	none	none	none	unlikely
Common Nighthawk <i>Chordeiles minor</i>	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely
Cooper's Hawk <i>Accipiter cooperii</i>	unlikely	unlikely	none	unlikely	unlikely	unlikely	unlikely
Horned Lark <i>Eromophila alpestris</i>	potential	potential	unlikely	unlikely	unlikely	potential	potential <sup>2</sup>
Northern Goshawk <i>Accipiter gentilis</i>	unlikely	unlikely	none	unlikely	unlikely	unlikely	unlikely
Osprey <i>Pandion haliaetus</i>	none	none	none	none	none	none	unlikely
Red-shouldered Hawk <i>Buteo lineatus</i>	unlikely	unlikely	none	unlikely	unlikely	unlikely	unlikely
Rusty Blackbird <sup>1</sup> <i>Euphagus carolinus</i>	none	none	none	none	none	none	unlikely
Sharp-shinned Hawk <i>Accipiter striatus</i>	unlikely	unlikely	none	unlikely	unlikely	unlikely	unlikely
Vesper Sparrow <i>Pooecetes gramineus</i>	potential	potential	unlikely	unlikely	unlikely	potential	unlikely
Spotted Turtle <i>Clemmys guttata</i>	unlikely	unlikely	unlikely	unlikely	unlikely	none	none



Species	Temporary Impacts Anticipated Due to Construction			Permanent Impacts Anticipated Due to Operation and Maintenance			
	Indirect Impacts		Direct Impacts	Indirect Impacts			Direct Impacts
	Displacement	Habitat Disturbance	Injury or Mortality	Habitat Loss	Habitat Fragmentation	Displacement	Injury or Mortality <sup>2</sup>
Wood Turtle <i>Glyptemys insculpta</i>	unlikely	unlikely	unlikely	unlikely	unlikely	none	none
Blue-spotted Salamander <i>Ambystoma laterale</i>	unlikely	unlikely	unlikely	unlikely	unlikely	none	none
Jefferson/blue-spotted Salamander Complex <i>Ambystoma jeffersonianum x laterale</i>	unlikely	unlikely	unlikely	unlikely	unlikely	none	none
Jefferson Salamander <i>Ambystoma jeffersonianum</i>	unlikely	unlikely	unlikely	unlikely	unlikely	none	none
<b>High Priority Species of Greatest Conservation Need</b>							
American Black Duck <i>Anas rubripes</i>	unlikely	unlikely	none	unlikely	unlikely	unlikely	unlikely
Bobolink <i>Dolichonyx oryzivorus</i>	potential	potential	unlikely	unlikely	unlikely	potential	unlikely
Brown Thrasher <i>Toxostoma rufum</i>	unlikely	unlikely	none	unlikely	unlikely	unlikely	unlikely
Common Goldeye <i>Bucephala clangula</i>	unlikely	unlikely	none	unlikely	unlikely	unlikely	unlikely
Eastern Meadowlark <i>Sturnella magna</i>	none	none	none	none	none	unlikely	unlikely
Little Brown Bat <i>Myotis lucifugus</i>	unlikely	unlikely	none	unlikely	unlikely	unlikely	unlikely
<b>Species of Greatest Conservation Need</b>							
American Kestrel <i>Falco sparverius</i>	unlikely	unlikely	none	unlikely	unlikely	unlikely	unlikely

Species	Temporary Impacts Anticipated Due to Construction			Permanent Impacts Anticipated Due to Operation and Maintenance			
	Indirect Impacts		Direct Impacts	Indirect Impacts			Direct Impacts
	Displacement	Habitat Disturbance	Injury or Mortality	Habitat Loss	Habitat Fragmentation	Displacement	Injury or Mortality <sup>2</sup>
American Woodcock <i>Scolopax minor</i>	unlikely	unlikely	none	unlikely	unlikely	unlikely	unlikely
Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i>	unlikely	unlikely	none	unlikely	unlikely	unlikely	unlikely
Blue-winged Warbler <i>Vermivora cyanoptera</i>	unlikely	unlikely	none	unlikely	unlikely	unlikely	unlikely
Great Egret <sup>1</sup> <i>Ardea alba</i>	unlikely	unlikely	none	unlikely	unlikely	unlikely	unlikely
Scarlet Tanager <i>Piranga olivacea</i>	potential	potential	unlikely	unlikely	potential	unlikely	unlikely
Eastern Red Bat <i>Lasiurus borealis</i>	unlikely	unlikely	none	unlikely	unlikely	unlikely	potential <sup>2</sup>
Hoary Bat <i>Lasiurus cinereus</i>	unlikely	unlikely	none	unlikely	unlikely	unlikely	potential <sup>2</sup>
Silver-haired Bat <i>Lasionycteris noctivagans</i>	unlikely	unlikely	none	unlikely	unlikely	unlikely	potential <sup>2</sup>
Tri-colored bat <i>Perimyotis subflavus</i>	unlikely	unlikely	none	unlikely	unlikely	unlikely	potential <sup>2</sup>
Common Mudpuppy <i>Necturus maculosus</i>	none	none	none	none	none	none	none
Western Chorus Frog <i>Pseudacris triseriata</i>	potential	potential	unlikely	unlikely	unlikely	unlikely	none
Common Snapping Turtle <i>Chelydra s. serpentine</i>	unlikely	none	none	none	none	none	none
Eastern Rat Snake <i>Pantherophis alleghaniensis</i>	potential	potential	unlikely	unlikely	unlikely	unlikely	none

Species	Temporary Impacts Anticipated Due to Construction			Permanent Impacts Anticipated Due to Operation and Maintenance			
	Indirect Impacts		Direct Impacts	Indirect Impacts			Direct Impacts
	Displacement	Habitat Disturbance	Injury or Mortality	Habitat Loss	Habitat Fragmentation	Displacement	Injury or Mortality <sup>2</sup>
Smooth Green Snake <i>Opheodrys vernalis</i>	potential	potential	unlikely	unlikely	unlikely	unlikely	none

<sup>1</sup> Based on the results of on-site surveys and publicly available data, the species either rarely occurs or does not occur at the site; however, based on the species' range and migratory behavior, there is a possibility of the species colliding with turbines during migration, though highly unlikely.

<sup>2</sup> Species that could potentially be directly impacted by Facility operation are species that may occur at the Facility, and that have been documented as more common fatalities at operational wind energy facilities (refer to Appendices 22-F and 22-G).

(g) Measures to Avoid or Mitigate Impacts to Vegetation, Wildlife and Wildlife Habitat

(1) Plant Communities

With respect to measures to avoid or mitigate impacts to plant communities and vegetation, refer to Section (c) above.

(2) Wildlife and Wildlife Habitat

Minimization of wildlife and wildlife habitat impacts related to construction activity has been accomplished through the site design process (e.g., utilizing existing roads, avoiding sensitive habitat, and minimizing disturbance to the extent practicable), adherence to designated construction limits, implementation of erosion and sediment control measures, and avoidance of sensitive areas.

Minimization of impacts related to permanent habitat loss and forest fragmentation has also been accomplished through the site design process. Facility access roads and collection lines have been sited along existing roads, the edges of agricultural fields, and other previously disturbed areas to minimize impacts to, and fragmentation of, wildlife habitat. Cleared agricultural land surrounding turbines will continue to be utilized for agricultural purposes, which will continue to provide habitat for some wildlife species.

The Facility has been designed to minimize bird and bat collision mortality (see Appendices 22-G and 22-H). To further reduce avian and bat impacts, electrical collection lines between the turbines will be buried to the maximum extent practicable. Lighting of the turbines (and other infrastructure) will be minimized to the extent allowed by the Federal Aviation Administration (FAA), and will follow specific design guidelines to reduce collision risk while maintaining safety and site security in line with the proposed measures as outlined in Exhibit 18.

(3) Special Status Species

Construction and operation of the Facility may potentially result in some level of impact to northern long-eared bat. An estimate of take was calculated for the Net Conservation Benefit Plan prepared for the Facility (see Appendix 22-H) based on a 33-turbine, 184.8 MW layout and while taking into consideration the curtailment minimization proposed.

Post-construction data collected from numerous post-construction studies was used to develop a take estimate for northern long-eared bat. Collision risk at the Facility for northern long-eared bat would be limited to the fall migration period as defined by the NYSDEC (July 1 to October 1), given that no summer maternity records exist for northern long-eared bat in Orleans County, New York and there are no known spring northern long-eared bat fatalities. The

estimated annual take for the Facility was calculated to be up to <BEGIN CONFIDENTIAL INFORMATION/> [REDACTED]

[REDACTED] </END CONFIDENTIAL INFORMATION> based on available data and the implementation of a curtailment schedule during the fall migration period as outlined in Section (h) below. In addition, the take estimate conservatively does not account for the potential reduction of fatalities from BDS to this species, even though the BDS would be applied for the entire active season for bats. Although this is a conservative estimate, compensatory mitigation will also be implemented to offset remaining potential take of northern long-eared bats in order to ensure a net conservation benefit for the species. The details of the Facility's curtailment schedule and proposed mitigation are provided in Appendix 22-H and will be further refined based on additional consultation with NYSDEC biologists. Although take of the species has been conservatively calculated and included in the NCBP for the Facility, actual take of the species is unlikely.

(h) Avian and Bat Impact Analysis and Monitoring Program:

(1) Avian and Bat Impacts

Numerous avian pre-construction surveys were conducted to support the Article 10 Application. In combination with data provided by local experts and obtained from publicly available sources, the results of these surveys have been used to assess potential impacts the Facility could have on birds. Based on surveys and this analysis, potential impacts to bird populations and sensitive birds are expected to be low. Based on consultation with NYSDEC biologists, impacts to bats from Facility construction and operation are expected to be similar to impacts observed at similar wind energy facilities in New York; therefore, the analysis of cumulative impacts to bats is based on post-construction studies conducted at other wind facilities in the region (see Appendix 22-G).

(i) Pre-construction Surveys

Avian pre-construction surveys were conducted by E&E between 2016 and 2018. As mentioned in Section (d) above, multiple reports detailing the results of these avian surveys were submitted to the USFWS and NYSDEC, and are included with this Application in Appendix 22-C. The methods and results of these surveys, as provided in these reports, are summarized in this section.

*Breeding Bird Surveys*

Studies were conducted in the spring/summer of 2017 (May 26-June 27) and 2018 (May 24-July 1) during the breeding season to sample birds per the NYSDEC's (2016) guidelines. Seventeen transects were sampled at proposed turbine sites in 2017, and 20 transects were sampled in 2018, with 15 being located at turbines and five being controls within the Facility Area but not near turbines. The latter sites were chosen to serve as

reference (control) sites to compare with potential turbine locations. Surveys were conducted in all types of habitats representative of turbine locations.

In 2017, 87 species were observed during 2,115 sightings, with 59 species occurring within 50 meters of the transects. The most commonly observed species included American goldfinch, gray catbird, and red-winged blackbird. These are mostly species found in edge habitats or old field/edge habitats, although catbirds are found in a wide variety of habitats where there are trees and shrubs.

In 2018, 94 species were observed during 2,918 sightings, with 73 species seen within 50 meters of the transects. The most common species included red-winged blackbird, American goldfinch, song sparrow and horned lark. These are mostly species found in edge habitats or old field/edge habitats, although horned lark is a grassland nesting species and is known to use disturbed agricultural fields for nesting.

No federally or State-listed endangered or threatened species were observed in either year of the study. Five State-listed species of special concern were observed during the two years surveyed: horned lark, vesper sparrow, cerulean warbler, Cooper's hawk, and common nighthawk. However, the horned lark, cerulean warbler, and vesper sparrow were observed only during 2018. Of these species, the habitat at the turbine sites is not suitable for the cerulean warbler, and this species may have been a late migrant rather than a nesting bird. This species generally nests in tall trees in larger forests rather than in the small patches of trees and fragmented forests found at the Facility Area. Although the horned lark and vesper sparrow may nest within the Facility Site in grassy or tilled agricultural fields, many of their nests and offspring may be destroyed by hay mowing or tilling as part of typical agricultural operations (Kerlinger and Guarnaccia, 2011). Suitable habitat for Cooper's hawk can be found within the Facility Site in forest patches. For the common nighthawk, a ground nester, there is little to no suitable or undisturbed habitat present, and any potential nests in tilled farm fields would likely be destroyed by farm equipment.

#### *Eagle Use Surveys*

Surveys to document eagle use of the Facility Site were conducted by E&E between December 2016 and December 2017, and again between December 2017 and November 2017. Surveys were consistent with the USFWS Eagle Conservation Plan Guidance (ECPG; USFWS, 2013).

These surveys were conducted based on consultation with the NYSDEC and totaled 648 hours of observations spread throughout both years. The studies included observations at 16 point count locations where eagle behavior, including height, time within 800 meters of the observation point, and age of the eagles

was recorded. A total of 63 bald eagle sightings were recorded: 35 in 2017 (0.09 per hour) and 28 in 2018 (0.11 per hour). This constitutes relatively low use at the Facility Site. Over the two-year period studied, 33 of 63 (52.4%) sightings were in the spring. Other bald eagle sightings were spread throughout the year. Hourly rates (0.09 per hour in 2017; 0.11 in 2018) strongly suggest low use but relatively consistent presence of eagles, which may be the same individual eagles being counted repeatedly. Bald eagles were distributed throughout the Facility Area. During the two-year survey period, 39 of 63 (61.9%) eagle sightings were estimated to be flying between 50 and 200 meters, which is within the rotor swept height.

#### *Raptor Migration Surveys*

Three seasons of weekly raptor migration surveys were conducted to document movement of raptors migrating through the Facility Area. Surveys were completed between March 6 and May 22, 2017, August 16 and December 13, 2017, and March 8 and May 23, 2018, which represent the spring and fall seasons in which more than 90% of all raptors migrate in New York. Observations were conducted between approximately 0800 and 1700 when visibility was greater than 200 meters vertically and 800 meters horizontally. Surveys were conducted for one hour each at eight of 16 point-count observation locations, and the locations rotated weekly to allow for each point to be surveyed once every other week. In addition to raw counts of each species during each observation period, the altitude of hawks and vultures in three height categories (0-50 meters, 50-200 meters [approximate height of rotor zone], and above 200 meters) was recorded, as was flight direction, and other flight behaviors.

Turkey vultures were the most commonly observed species in all three seasons. Cumulatively, they accounted for 2,565 of the 3,414 (75.1%) raptors observed during all three seasons. Red-tailed hawks accounted for roughly 15%, and the remaining 10% were divided among 8 or 9 species during the three survey seasons. Bald eagles accounted for less than 2% of raptor observations. Flight height of approximately 50% of observed raptors was estimated within 50 to 200 meters of the ground, which is the approximate rotor height zone. However, no study to date has shown a correlation between the number or percentage of raptors (or other birds) flying within the rotor swept height zone and the rate of fatalities. Raptors are generally less susceptible to turbine collisions.

Overall, observations in the three seasons amounted to approximately 10 raptor sightings per hour. Turkey vultures accounted for 7.5 raptor sightings per hour, while all other raptor species were observed at a rate of 2.5 per hour. The rate of 2.5 raptors per hour in the Facility Area is far less than rates at significant and well documented migration locations in New York, such as Braddock Bay, Franklin Mountain, or Derby Hill. The data strongly suggests that relatively few raptors migrate through the Facility Site.

### *Raptor Nest Aerial Survey*

An aerial nest survey was conducted on May 6-7, 2018. At the time of the survey, trees had not leafed out, so eagle and other raptor nests would be readily visible, if present. No nests were found within the Facility Site boundary. Three occupied, active bald eagle nest were documented outside of the Facility Site, the nearest of which was located <BEGIN CONFIDENTIAL INFORMATION/> [REDACTED] </END CONFIDENTIAL INFORMATION/>. The other two occupied, active bald eagle nests were located more than 4 miles outside of the Facility Area.

### (ii) Cumulative Avian Impacts

In New York, average avian fatality rates have ranged from 0.37 to 5.81 birds/MW/year (0.75 to 15.5 birds/turbine/year) based on post-construction surveys conducted at 13 wind energy facilities (23 studies; see Appendix 22-G). Average avian fatality rates at specific facilities with post-construction survey data within 100 miles of the Facility (the nearby region) have ranged from 0 to 3.38 birds/MW/year (see Appendix 22-G). It is anticipated that the Facility would have similar average avian fatality rates, with potential for somewhat higher rates per turbine if larger turbine models are selected (however, the use of larger turbines typically means fewer turbines are constructed for a given facility, which may comparatively reduce risk to birds and produce lower per MW rates). Additional information regarding cumulative avian impacts is provided in Appendix 22-G.

It is important to note that wind energy facilities represent only a very small contributor to overall avian fatalities compared to other anthropogenic sources. Of the main sources of avian fatalities regularly identified in scientific reviews, six of these account for an overwhelming majority of bird deaths in the United States and Canada: (1) domestic cats; (2) windows and buildings; (3) highways and vehicles; (4) pesticides; (5) legal and illegal hunting; and (6) electrical transmission line structures. Together, these sources result in more than four billion (4,000,000,000) estimated avian fatalities per year. Compared to this estimate, wind turbines in the United States and Canada result in only a very small proportion (~368,000 or ~0.009%) of avian fatalities (Erickson et al., 2014).

Refer to Appendix 22-F for detailed information pertaining to: (1) bird occupancy and usage of Facility Site in comparison to other wind energy projects; (2) potential species-level mortality and risk at the Facility based on post-construction data from operational wind energy facilities; and (3) assessment of potential risk to eagles.



### (iii) Cumulative Bat Impacts

Bat fatalities range widely by region and in terms of the species that they effect, with migratory bat species being the most commonly found as fatalities. In New York, average bat fatality rates have ranged from 1.78 to 16.30 bats/MW/year based on post-construction surveys conducted at 24 wind energy facilities (26 studies; see Appendix 22-G). Within 100 miles of the Facility (including a portion of Ontario), average bat fatality rates have ranged from 0.11 to 16.3 bats/MW/year (see Appendix 22-G). However, many existing wind energy facilities have operated without curtailment regimes in place and therefore these estimates are not necessarily comparable to proposed facilities that plan to implement turbine curtailment. Though on-shore wind energy development is expected to increase considerably in New York in the coming decades, more and more of these facilities are expected to implement turbine curtailment or other minimization strategies as a means of significantly reducing bat mortality. Multiple studies show that turbine curtailment can reduce all bat fatalities by between 50% and more than 80%, depending on the cut-in speed used and the bat species that typically occur at a given site (Arnett et al., 2011; Baerwald et al., 2009; Martin et al., 2017). Bat deterrents or BDS can provide additional minimizations and can lower fatality rates by up to 95% when combined with curtailment (Iskali et al. 2019). In addition, the BDS can also be applied throughout the active season for bats to provide additional minimization outside of the fall migration period when curtailment is proposed. Given these considerations, it is likely that bat fatality rates at the Facility and other proposed projects in New York would be similar, or lower, than those reported for operational wind energy facilities.

Hoary bat, eastern red bat, and silver-haired bat account for between 50 and 75% of post-construction bat fatalities at wind energy facilities in the United States (and also in New York and the region surrounding the Facility) (Ellison, 2012). These migratory, tree-roosting species have broad geographic distributions that include most of North America and portions of South America (hoary bat), much of eastern and central North America (eastern red bat), and most of North America (silver-haired bat) (IUCN, 2020; Reid, 2006). Currently, all three of these species have a global conservation status of “Least Concern” (IUCN, 2020), though future population trends are not clear and these species may be at risk of future decline (Frick et al., 2017).

As indicated above, other bat species expected to occur within or near the Facility during certain times of the year (including migratory periods, as applicable) include big brown bat, little brown bat, northern long-eared bat, and tri-colored bat (IUCN, 2020; NYSDEC, 2020; USFWS, 2019; USFWS, 2020). These species typically represent a much smaller proportion of documented fatalities at wind energy facilities, particularly following the introduction of WNS in 2006 and its associated effects (Gruver and Bishop-Boros, 2015).

Given this information, most bat fatalities at the Facility (and at other facilities within the region) are expected to include the three migratory tree-roosting species listed above rather than the rarer cave-dwelling species. The Facility will implement a curtailment schedule that is expected to minimize risk to the federally and State-listed northern long-eared bat, and also significantly reduce overall bat fatalities. Facility wind turbine operation will be curtailed on the following schedule:

- When wind speeds are less than <BEGIN CONFIDENTIAL INFORMATION>█</END CONFIDENTIAL INFORMATION> meters per second (m/s) (cut-in speed) during the period from July 1 through October 1<sup>8</sup>, 30 minutes prior to sunset through 30 minutes after sunrise, when air temperatures are greater than 50 degrees Fahrenheit (10 degrees Celsius).

The Facility also plans to test the use of BDS and/or other technologies that may become available, as a further measure to avoid and minimize potential impacts to bats. These systems have been shown to be effective in reducing bat fatalities, and can be paired with curtailment for even further reductions by providing a more comprehensive minimization strategy. At a project in Illinois, bat fatalities were reduced by approximately 60% to 95% when combining curtailment at 5.0 m/s and BDS (Iskali et al., 2019). This study also demonstrated that each of the migratory tree bat species, which differ in their ecology, call frequencies, and migration patterns, may have reacted differently to the application of the BDS and/or curtailment treatment. Silver-haired bat fatalities were not significantly reduced from curtailment-only treatment, but addition of the BDS system further reduced fatalities by 66.7% compared to curtailment alone. Eastern red bats saw the higher reduction in fatalities from curtailment, but also benefited from the addition of the BDS system with a 31.6% further reduction in fatalities compared to feathering alone. Hoary bats appeared to benefit from both curtailment and BDS (Iskali et al., 2019). Other studies showed a significant reduction in hoary bat mortality as a result of BDS implementation (Weaver et al., 2018, unpublished data from Weaver et al., 2018). The BDS can also be deployed for the entire active season for bats, which will further reduce fatalities outside of the fall migration period when curtailment is typically implemented.

While curtailment alone provides direct benefits to bat species, a review of available case studies (AWWI, 2018; DNVGL, 2018) shows that there is only a marginal benefit to reductions in bat fatalities at curtailment above 4.5 m/s, while the power loss at increased levels of curtailment can be substantial. Levels of bat fatalities are similar whether the wind farm implements a curtailment regime of 5.0 m/s, 5.5 m/s, or 6.0 m/s (AWWI, 2018). In contrast, the foregone energy production at these curtailment cut-in speeds is significant (DNVGL, 2018). Thus, the energy

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<sup>8</sup>The July 1 to October 1 period includes the portion of the maternity season when juveniles become volant, as well as the majority of the fall migratory period. This is also the period during which the majority of NLEB fatalities have been documented at operational wind energy facilities (Gruver and Bishop-Boros, 2015).

generation and economic cost of protecting additional bats from being taken for increased levels of curtailment rises sharply above the Facility's proposed curtailment cut-in speed of <BEGIN CONFIDENTIAL INFORMATION/> [REDACTED] </END CONFIDENTIAL INFORMATION/>. These energy generation and economic impacts have been analyzed for several curtailment scenarios, and are summarized in Appendix 22-I. Based on these considerations, the proposed curtailment schedule is expected to result in a significant reduction in potential bat fatalities while also ensuring that the Facility achieves energy production targets and provides a meaningful contribution to New York's clean energy goals. The production of clean energy will also help offset risk posed by climate change to birds, bats and many other species. Additional information regarding bat impacts is provided in Appendices 22-G and 22-H, and details pertaining to impact avoidance and minimization measures are provided below in Section (h)(3).

(iv) Cumulative Habitat Impacts

Cumulative impacts to habitat (including forestland and grassland) as a result of wind energy facility development within New York and the region are expected to be minimal. This is largely because most operational and proposed wind turbines within New York and the region are/will be sited in existing agricultural fields that are actively managed for the production of row and/or field crops, and do not represent suitable habitat for most bird and bat species. Though wind energy facilities may require the clearing of forest habitat at some turbine locations, these impacts are typically minor on a landscape-scale and occur primarily on the edges of existing forest patches. In addition, tree removal activities for the Facility will occur between November 1 and March 31 to the extent possible, which will serve to further minimize impacts to birds and bats that utilize forest habitat. Furthermore, existing wind turbine locations for operational facilities in the region were reviewed using the U.S. Wind Turbine Database (USGS, 2020), and many operational wind energy facilities appear to have had minimal effects on forest or grassland habitat. In other words, large areas of undisturbed forest and grassland habitat remain in the immediate vicinity of these facilities following construction. Additional information regarding direct and indirect habitat impacts is provided in Appendix 22-E.

(2) Avian and Bat Post-Construction Monitoring

The Applicant is in the process of developing a Post-Construction Monitoring Program (Monitoring Program) to assess the direct and indirect impacts of the Facility on bird and bat species. The Monitoring Program will continue to be refined in consultation with the NYSDEC and USFWS, and in accordance with NYSDEC's June 2016 *Guidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects*, and Tier 4 of the USFWS's *Wind Energy Guidelines* for standard post-construction studies.

The Applicant has proposed conducting two years of post-construction fatality monitoring following commencement of operation. The Monitoring Program will include standard carcass searches of turbines; searcher efficiency trials to determine percentage of carcasses found by searchers; and carcass removal trials to estimate the length of time that a carcass remained in the field for possible detection. Adjusted fatality estimates for birds and bats based on the results of searcher efficiency trials and carcass removal trials will be used to estimate bird and bat mortality within the Facility Site. These surveys may also include testing of the proposed addition of BDS to curtailment. A final version of the Monitoring Program will be provided upon completion and following Application filing.

### (3) Avian and Bat Impact Avoidance and Mitigation Plan

Based on the data collected during pre-construction surveys, the Applicant has extensively evaluated the potential impacts of Facility construction and operation on avian and bat species through the development of an Avian Risk Assessment and Cumulative Impacts Assessment, provided in Appendix 22-F and Appendix 22-G, respectively. Based on these analyses, the Applicant has committed to several measures to avoid, minimize, and mitigate impacts to avian and bat species. The Applicant's proposed curtailment regime discussed above will dramatically reduce potential collision impacts to northern long-eared bat, other bat species, and some migratory bird species. In addition, the Applicant proposes to employ acoustic bat deterrent systems (or similar technologies) at wind turbines during Facility operation as a means of further minimizing potential impacts to bats. Estimated remaining take of northern long-eared bat with curtailment applied, although unlikely to occur, will be offset through compensatory mitigation measures in order to achieve a net conservation benefit for this species. Refer to Appendix 22-H for additional details.

#### (i) Map Showing Delineated Wetland Boundaries

##### (1) Wetland Boundaries and Mapping

Wetland delineations were conducted through on-site field investigations in the Facility Site within 500 feet of areas to be disturbed by construction (the Wetland Study Area). Delineations were conducted per the three-parameter methodology described in the U.S. Army Corps of Engineers (USACE) *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987), and the corresponding Regional Supplement (USACE, 2012). Additionally, freshwater wetlands regulated under Article 24 of the New York Environmental Conservation Law (ECL) were identified and delineated according to the methods described in the *Freshwater Wetlands Delineation Manual* (NYSDEC, 1995).

During on-site delineations of wetlands, data were collected and recorded as needed to fulfill USACE requirements. This information was recorded on regional USACE Wetland Determination Data Forms, which are included in the Wetland and Stream Delineation Report (Appendix 22-J). Data collected for wetlands included dominant vegetation,

hydrology indicators, and soil characteristics. All delineated wetland boundaries were defined in the field by sequentially numbered pink surveyor's flagging marked "wetland delineation," and locations were recorded using GPS technology with reported sub-meter accuracy. Wetlands identified within the Wetland Study Area, as described in this section, are referred to as "delineated wetlands." In addition, the predicted presence and extent of wetlands outside the Facility Site but within 500 feet of areas to be disturbed (e.g., wetlands within adjacent properties without accessibility) were approximated based on review of remote-sensing data, interpretation of published wetland and soils mapping, and evaluation of aerial orthoimagery. Wetlands identified by these methods are referred to as "approximate wetlands" (i.e., "predicted wetlands"). All delineated and predicted wetlands are shown on Figure 22-3, and are keyed to the Preliminary Design Drawings included with Exhibit 11. Wetlands mapping includes wetlands identified within 50 meters of NYSDEC mapped wetlands, as well as vernal pools.

A total of 57 wetlands were delineated within the Wetland Study Area, totaling approximately 317.2 acres. Refer to Section (j) and the Wetland and Stream Delineation Report (Appendix 22-J) for additional details. Refer to Exhibit 23 for details related to delineated streams.

Wetlands regulated under Article 24 of the New York Environmental Conservation Law (ECL) were identified and delineated according to the methods described in the NYSDEC Freshwater Wetlands Delineation Manual (1995). Based on a review of NYSDEC Freshwater Wetlands mapping, the Article 24 regulations, and initial consultation with NYSDEC Region 8 staff (Jones and Burns, 2019), it is anticipated that up to 13 wetlands delineated within the Facility Site may fall under State jurisdiction based on overlap and/or close proximity to NYSDEC mapped wetlands, size (i.e., greater than 12.4 acres), and/or direct hydrologic connections to NYSDEC mapped wetlands. Of these, eight delineated wetlands overlap directly with mapped State-regulated wetlands within the Facility Site (see Appendix 22-J and Figure 23-2). Wetland AL-3 is the largest of these mapped State-regulated wetlands, totaling 23.5 acres within the Facility Site. As noted above, final determination of State jurisdictional wetland boundaries will be made through further consultation and on-site review with NYSDEC personnel.

In parallel with the filing of this Application, the Applicant will provide a copy of the Wetland and Stream Delineation Report (Appendix 22-J) containing detailed information on delineated and stream wetland boundaries to NYSDEC Region 8 staff and the USACE in order to facilitate scheduling of a Jurisdiction Determination (JD) site visit. The Applicant anticipates that the JD site visit will occur in spring 2020, and any follow-up information resulting from the JD will be provided to the Siting Board.

(j) Description of Wetlands

Wetlands were categorized as one or more of the following Cowardin et al. (1979) community types: palustrine emergent wetland (PEM), palustrine scrub-shrub wetland (PSS), palustrine forested wetland (PFO), and palustrine open water (POW). A brief summary of wetland community types within the Wetland Study Area is provided below. Refer to Exhibit 23 for details pertaining to delineated stream (riverine) communities.

*Emergent wetlands (PEM)* – A total of 36 delineated wetlands contained emergent wetland communities. These wetland areas were dominated by herbaceous vegetation including common soft rush (*Juncus effusus*), reed canary grass (*Phalaris arundinacea*), cattails (*Typha* spp.), nodding beggar ticks (*Bidens cernua*), American bugleweed (*Lycopus americanus*), swamp milkweed (*Asclepias incarnata*), northern water plantain (*Alisma triviale*), boneset (*Eupatorium perfoliatum*), sensitive fern (*Onoclea sensibilis*), and multiple sedge species (*Carex* spp.). 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, and geomorphic position. Hydric soil indicators included histosol (A1), black histic (A3), depleted matrix (F3), redox dark surface (F6), and depleted below dark surface (A11).

*Forested wetlands (PFO)* – Of the delineated wetlands within the Wetland Study Area, 29 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 Wetland Study Area were dominated by red maple (*Acer rubrum*), silver maple (*Acer saccharinum*), green ash (*Fraxinus pennsylvanica*), and American elm (*Ulmus americana*) in the upper canopy. Shrub vegetation typically included saplings of the above-mentioned species, spicebush (*Lindera benzoin*), and American hornbeam (*Carpinus caroliniana*). Typical herbaceous species documented in on-site forested wetlands included various sedges, sensitive fern, and spotted jewelweed (*Impatiens capensis*). Evidence of wetland hydrology observed in these wetlands at the time of delineation often included standing surface water, soil saturation, high water table, oxidized rhizospheres on living roots, moss trim lines, geomorphic position, drainage patterns, and sparsely vegetated concave surfaces. Typical hydric soil indicators for forested wetlands included depleted matrix (F3), redox dark surface (F6), and depleted below dark surface (A11).

*Scrub-shrub wetlands (PSS)* – Seven wetland features delineated within the Wetland 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 (i.e., saplings). Vegetation typically encountered in these communities included

silky dogwood (*Cornus amomum*), gray dogwood (*Cornus racemosa*), and green ash. Herbaceous vegetation in these areas included reed canary grass, sensitive fern, boneset, and sedge species such as common soft rush and fox sedge (*Carex vulpinoidea*). Evidence of wetland hydrology observed in scrub-shrub wetlands at the time of delineation consisted of indicators such as surface water, high water table, saturation, drainage patterns, moss trim lines, and sparsely vegetated concave surfaces. Hydric soil indicators included depleted matrix (F3), redox dark surface (F6), and depleted below dark surface (A11).

*Open water (POW)* – Nine wetlands delineated within the Wetland Study Area contained open water communities. Open water communities were typically small farm ponds or waterbodies associated with human-made impoundments. These features occurred in open fields, shrubland, and forested areas, and exhibited well-defined banks and a fringe of emergent wetland vegetation. Although not verified, water depths of such ponds were typically estimated to be greater than four feet deep, which may provide evidence of permanent inundation throughout the year.

#### (k) Wetland Functional Assessment

In addition to on-site delineations, a functions and values assessment was also 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* (USACE 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 (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 USACE 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 USACE 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 special status 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 biophysical 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 USACE Supplement, a spreadsheet was developed that includes several basic considerations that help identify the primary functions and values provided by the delineated 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. Wetlands delineated within the Wetland Study Area were entered into the spreadsheet and wetland characteristics were identified for each. Data regarding these wetland characteristics and associated functions and values were collected during the wetland delineation surveys conducted in the fall of 2018, and also in the spring and summer of 2019. The results of the qualitative assessment are included in the Wetland and Stream Delineation Report (Appendix 22-J).



Results of the wetland functions and values assessment indicated that almost all (55 of 57) of the delineated wetlands within the wetland study area are expected to exhibit some level of groundwater recharge/discharge. Twelve of these wetlands were also determined to provide a wildlife habitat function because they represent sizeable wetland complexes, exhibit interspersions of vegetation classes and/or standing water, include multiple wetland cover types, and have forested adjacent areas. While essentially all of the delineated wetlands exhibited the presence of some invasive plant species (e.g., Morrow's honeysuckle, common reed, autumn olive, multiflora rose), the larger wetlands that were determined to provide a wildlife habitat function typically had invasive species present only along or near the outer edges of the wetland. Refer to Appendix 22-J for additional details.

#### (l) Off-site Wetlands Analysis

Off-site wetland boundaries within 500 feet of ground disturbance, but outside the Facility Site (i.e., on land with no access) were approximated by interpreting aerial orthoimagery signatures, observing on-site characteristics from public roadways and participating parcels, reviewing topographic contour data, and referencing NYSDEC and NWI wetlands mapping. Additional wetlands in the vicinity of the Facility Site were also digitized in this manner. All approximate (i.e., predicted) wetlands are shown in Figure 22-3. As mentioned above, final jurisdictional determinations will be made in consultation with USACE and NYSDEC staff.

#### (m) Wetland Impacts

During construction, temporary, permanent direct, and permanent indirect impacts to wetlands may occur as a result of the installation of access roads and collection lines, the creation of temporary road improvements, and the development and use of temporary workspaces around the turbine sites. The construction of access roads is anticipated to result in permanent impacts (loss of wetland acreage through filling), permanent forested wetland conversion (clearing or other disturbance to forested wetlands that does not involve filling), and temporary impacts (clearing or other disturbance to non-forested wetlands). The installation of collection lines and the development and use of temporary workspaces around wind turbines is anticipated to temporarily disturb wetlands during construction as a result of clearing (brush hogging or similar clearing method requiring no removal of rooted woody plants). In addition, soil disturbance and permanent forest conversion from the installation of the electrical collection lines and the temporary workspaces may occur. Indirect impacts to wetlands may result from sedimentation and erosion caused by adjacent construction activities (e.g., removal of vegetation and soil disturbance). These types of indirect impacts may occur at wetlands adjacent to work areas where no direct wetland impacts are anticipated, including areas adjacent to proposed access road upgrade/construction, electrical collection and transmission routes, turbine sites, staging area(s), wind measurement towers, or the substations.

Based on the Facility LOD as identified in the Preliminary Design Drawings (see Exhibit 11, Appendix 11-A), construction of the Facility is anticipated to result in 0.80 acre of temporary impact, 1.73 acres of permanent forested wetland conversion impact, and 0.19 acre of permanent impact (i.e., loss/fill) to wetlands. All of these impacts are depicted on the Wetland Impact Drawings (Appendix 22-K). Impacts to each delineated wetland are presented below in Table 22-6. Impacts to streams are detailed in Exhibit 23.

**Table 22-6. Anticipated Wetland Impacts from Facility Construction**

ID <sup>1</sup>	Type <sup>2</sup>	Temp. Impact (acres) <sup>3</sup>	Perm. Wetland Conversion (acres) <sup>3</sup>	Perm. Impact (acres) <sup>3</sup>	Reason for Impact/Crossing Method <sup>4</sup>	Appendix 22-K Sheet(s)	Appendix 11-A Sheet(s)	NYSDEC Wetland ID	Antic. Juris. Status <sup>5</sup>
1D	PEM	0.04	--	<.01	AR – C	1	C-201	OK-1	F, S
1I	PEM	0.03	--	--	RI – N/A	4	C-110, C-204	--	F
1K	PFO	--	1.03	--	CL – T	6, 7	C-302, C-207	AL-3	F, S
1K	PEM	0.04	--	--	CL – T	7	C-207	AL-3	F, S
1N	PEM	0.22	--	0.15	AR, CL – C, T	8, 9	C-208A	AL-7	F, S
1N	PFO	--	0.20	--	AR, CL, WT – T, N/A	8, 9, 10	C-208A, C-209	AL-7	F, S
1T	PEM	0.10	--	--	CL – T	12, 13	C-210, C-303B	--	F
1U	PEM	0.07	--	<.01	AR, CL, WT – C, T, N/A	12, 13, 14, 15	C-210, C-303B	--	F
1Z	PEM	0.02	--	<.01	AR, CL – C, T	18	C-212	--	F
2H	PFO	--	0.45	--	CL – T	19, 22	C-221, C-304B, C-305	AL-6	F, S
2H	PEM	0.11	--	--	CL – T	19, 22, 23, 24	C-221, C-304B, C-305A	AL-6	F, S
2N	PEM	0.02	--	--	CL – T	21	C-219	--	F
3J	PSS	<.01	--	--	CL, WT – T, N/A	35	C-236	--	F
3J	PEM	0.15	--	--	CL – T	35	C-236	--	F
3M	PFO	--	0.05	0.02	AR, CL – C, T	33	C-235	HO-22	F, S
3Q	PEM	<.01	--	<.01	AR, CL – N/A, T	9	C-208A	--	F
<b>Totals:</b>		<b>0.80</b>	<b>1.73</b>	<b>0.19</b>	<b>Combined Anticipated Total: 2.7 acres</b>				

<sup>1</sup> Delineated Wetland ID codes assigned by EDR.

<sup>2</sup> PEM = palustrine emergent; PFO = palustrine forested; PSS = palustrine scrub-shrub (Cowardin et al., 1979).

<sup>3</sup> Acreages have been rounded to the nearest hundredth. Temp. = Temporary; Perm. = Permanent. Permanent forest conversion refers to tree clearing in a forested wetland in combination with temporary soil disturbance or temporary fill.

<sup>4</sup> AR = Access Road; CL = Collection Line; RI = Temporary Road Improvement; WT = Wind Turbine Work Area; C = Culvert(s) may be used for access road crossing(s); N/A = No crossing involved for temporary fill and clearing-only impacts; T = Direct burial trench may be used for collection line crossing(s);

<sup>5</sup> Anticipated jurisdictional status is preliminary. F = Anticipated to be federal jurisdictional; S = Anticipated to be State jurisdictional.

### Anticipated State Jurisdictional Wetlands

As described above, it is anticipated that up to 13 wetlands delineated within the Wetland Study Area may fall under State jurisdiction based on overlap and/or close proximity to NYSDEC mapped wetlands, size (i.e., greater than 12.4 acres), and/or hydrologic connections to NYSDEC mapped wetlands. Although final determination of State jurisdictional wetland boundaries will be made through further consultation and on-site review with NYSDEC personnel, potential State jurisdictional delineated wetland boundaries were buffered by 100 feet to allow for estimation of anticipated impacts to State-regulated 100-foot adjacent areas. Based on the LOD, construction of the Facility may result in 12.66 acres of temporary impact and 2.34 acres of permanent impact to anticipated State-regulated 100-foot adjacent areas. Of these 15.0 acres of estimated combined impacts, approximately 10.0 acres (67%) will be within previously disturbed cropland, mowed lawn, and/or mowed roadside/pathway communities that are within 100 feet of delineated wetland boundaries. Estimated impacts to anticipated State-regulated 100-foot adjacent areas are summarized below in Table 22-7.

**Table 22-7. Estimated Impacts to Anticipated State-Regulated 100-foot Wetland Adjacent Areas**

Wetland ID <sup>1</sup>	Existing Ecological Community Type	Estimated Temporary Adjacent Area Impact (acres)	Estimated Permanent Adjacent Area Impact (acres)	NYSDEC Freshwater Wetland ID
1A	Cropland	0.58	--	KN-4
1D	Mowed Lawn with Trees	0.16	0.12	OK-1
	Pine Plantation	0.12	--	OK-1
	Cropland	0.36	0.17	OK-1
	Successional Southern Hardwoods	0.32	0.18	OK-1
1F	Cropland	0.03	--	AB-1
	Silver Maple-Ash Swamp	0.55	--	AB-1
1K	Cropland	0.67	0.07	AL-3
	Silver Maple-Ash Swamp	0.001	--	AL-3
1N	Cropland	0.97	0.54	Al-7
	Silver Maple-Ash Swamp	0.33	--	Al-7
	Successional Old Field	0.24	0.10	Al-7
	Successional Southern Hardwoods	1.14	0.09	Al-7
2B	Cropland	1.54	--	--
	Silver Maple-Ash Swamp	0.55	--	--
	Successional Shrubland	0.14	0.16	--
2G	Cropland	0.03	0.01	AL-12
2H	Mowed Roadside/Pathway	0.05	--	AL-12/AL-6
	Cropland	1.18	--	AL-12/AL-6
	Silver Maple-Ash Swamp	0.41	--	AL-12/AL-6
	Mowed Roadside/Pathway	0.15	--	AL-12/AL-6
	Successional Southern Hardwoods	1.03	--	AL-12/AL-6
2L	Mowed Roadside/Pathway	0.16	--	AL-6
3M	Cropland	1.32	0.71	HO-22
	Silver Maple-Ash Swamp	0.62	0.17	HO-22
<b>Estimated Totals</b>		<b>12.66</b>	<b>2.34</b>	<b>15.0 acres</b>

<sup>1</sup> Delineated Wetland ID codes assigned by EDR.

(n) Measures to Avoid/Mitigate Wetland Impacts

(1) Avoidance and Minimization

During the iterative Facility design process, the Applicant avoided wetland impacts to the greatest extent practicable. Wetland data were progressively used to inform Facility design, locating turbines, access roads, and collection facilities outside of wetlands, and utilizing existing crossings to the maximum extent practicable. As a result, as shown in Table 22-6, temporary and permanent wetland impacts were reduced to 0.80 acre and 0.19 acre, respectively (see Exhibit 23(b)(4) for a discussion of impacts to surface waters). Where avoidance was not practicable due to land use or leasing constraints, narrow portions of the wetlands were chosen for crossing locations to minimize overall impacts. Where permanent impacts are unavoidable, the Applicant will comply with the Clean Water Act. Refer to Table 9-1 in Exhibit 9 for more detailed information regarding the Applicant's wetland avoidance and minimization efforts.

Possible indirect impacts to wetlands from siltation and degradation of downstream water quality during construction of the Facility are not anticipated because the Applicant plans to implement erosion and sediment control and other measures to prevent these impacts, as detailed below and in the Preliminary SWPPP for the Facility (see Appendix 21-E).

Measures to protect wetlands and surface water resources may include the following:

- No Equipment Access Areas: Except where crossed by permitted access roads or through non-jurisdictional use of temporary matting, wetlands will be designated "No Equipment Access," thus prohibiting the use of motorized equipment in these areas.
- Restricted Activities Area: A buffer zone of 100 feet, referred to as "Restricted Activities Area," will be established where Facility construction traverse wetlands and other bodies of water. Restrictions will include:
  - No deposition of slash within or adjacent to a waterbody;
  - No accumulation of construction debris within the area;
  - Herbicide restrictions within 100 feet of a wetland (or as required per manufacturer's instructions);
  - No equipment washing or refueling within the area;
  - No storage of any petroleum or chemical material; and
  - No disposal of excess concrete or concrete wash-water.
- Sediment and Siltation Control: A soil erosion and sedimentation control plan will be developed and implemented as part of the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity for the Facility. Silt fences, hay bales, and temporary siltation basins will be installed and maintained throughout Facility construction. Exposed soil will be seeded

and/or mulched to assure that erosion and siltation is kept to a minimum along wetland boundaries. Specific control measures are identified in the Facility's Preliminary SWPPP, and the location of these features will be indicated on construction drawings and reviewed by the contractor and other appropriate parties prior to construction. These features will be inspected on a regular basis to assure that they function properly throughout the period of construction, and until completion of all restoration work.

## (2) Mitigation

Despite avoiding and minimizing wetland impacts to the greatest extent practicable, some wetland impacts are unavoidable given other constraints. Based on the current LOD, an anticipated total of 0.19 acre of wetlands will be permanently impacted as a result of Facility construction and operation. Mitigation in New York is somewhat complicated by the fact that the USACE generally prefers to use an approved "in-lieu-fee" program when available, whereas the NYSDEC Article 24 regulations do not allow for use of such a program to offset impacts to State jurisdictional wetlands and streams. In addition, it is anticipated that the majority of wetland impacts will occur in wetlands regulated by the USACE only; however, this cannot be confirmed until the full extent of NYSDEC Article 24 jurisdiction is understood. (As previously indicated, jurisdictional determinations from both the USACE and NYSDEC are anticipated to take place early in the growing season of 2020.) Therefore, the Applicant will ultimately propose compensatory mitigation that will be determined in consultation with NYSDEC and USACE and the applicable impacts to jurisdictional wetlands and streams. This mitigation will ensure "no net loss" of wetlands, and may include the purchase of credits from an approved in-lieu-fee program, creation of an on-site compensatory mitigation area, restoration or enhancement of wetlands in the impacted watershed, or some combination of these options.

## (3) Environmental Monitoring and Compliance Program

In addition to the avoidance, minimization, and mitigation measures described above, an Environmental Compliance and Monitoring Program (ECMP), or similar mechanism, will be implemented during Facility construction, and the Applicant will provide funding for an independent, third party environmental monitor to oversee compliance with environmental commitments and applicable issued permit requirements. The environmental compliance and monitoring program may include the following components:

1. Planning – Prior to the start of construction, the environmental monitors will review all environmental permits and, based upon the conditions/requirements of the permits, prepare an environmental management document (Environmental Compliance Manual) that will be utilized for the duration of the construction of the Facility. This document will distill and clearly present all environmental requirements for construction and restoration included in all Facility permits and approvals, and will be designed to aid in the management of environmental issues and

concerns that may arise during construction of the Facility. The Environmental Compliance Manual will include: (1) copies of all issued environmental permits and approvals; (2) a compliance matrix that summarizes all relevant permit requirements and identifies the responsible party and time frame (if applicable); and (3) a Facility contact list and organizational chart.

2. Training – The environmental monitors will hold environmental training sessions that will be mandatory for all contractors and subcontractors before they begin working on the site. The purpose of the training sessions will be to distribute the Environmental Compliance Manual, explain the environmental compliance program in detail prior to the start of construction, and to assure that all personnel on site are aware of the permitting requirements for construction of the Facility.

3. Pre-construction Coordination – Prior to construction, specific construction procedures in environmentally sensitive and/or designated areas will be discussed amongst the group and updated to become part of the Facility layout and construction sequence, as needed. The pre-construction site review will serve as a critical means of identifying any required changes in the construction of the Facility early enough in the process to avoid potential delays once construction has begun. Proposed changes to the construction plan will be identified as soon as possible, as changes may require an agency notification period and take time for approval to be received.

4. Construction and Restoration Inspection – The environmental monitor is the primary individual(s) responsible for overseeing and documenting compliance with environmental permit conditions on the Facility. The environmental monitor will conduct inspections of all areas requiring environmental compliance during construction activities, with an emphasis on those activities that are occurring within jurisdictional/sensitive areas, including cultural resource areas, wetland and stream crossings, and active agricultural lands. When on-site, the environmental monitor's schedule will include participation in a daily meeting with the contractors to obtain schedule updates, identify in-field monitoring priorities, and address any observed or anticipated compliance issues. During the course of each visit, multiple operations are likely to be occurring throughout the Facility Site and will need to be monitored by the environmental monitor. Activities with the potential to impact jurisdictional/sensitive resources, or with greater potential for environmental impact, will receive priority attention from the environmental monitor. For instance, installation of an access road across a protected stream would likely receive greater attention than installation of buried electrical collection lines across a successional old field. However, some level of field inspection by the environmental monitor will occur at all earth-disturbing work sites during each site visit. The monitor will keep a log of daily construction activities, and will issue periodic/regular (typically weekly) reporting and compliance audits. Additionally, when construction is nearing completion in certain

portions of the Facility area, the monitor will work with the contractors to create a punch list of areas in need of restoration in accordance with all issued permits.

(o) State and Federal Endangered or Threatened Species

Refer to Sections (e) through (h) above for discussion of State and federal threatened and endangered species documented within or adjacent to the Facility Site, along with potential impacts, avoidance, minimization, and mitigation for such species. Discussion of mitigation for wildlife and wildlife habitat is provided in Section (g). These measures will also mitigate impacts to threatened and endangered species, even though they are not specific to such species. Measures to mitigate impacts specifically to New York threatened and endangered species that are found within the Facility Site are discussed in Section (h)(3) above, and are further detailed in the Net Conservation Benefit Plan prepared for the Facility (see Appendix 22-H). All federal and State-listed threatened and endangered species, as well as other special status species, are identified in the Wildlife and Plant Species List detailed above (see Appendix 22-A), as well as in Tables 22-4 and 22-5.

(p) Invasive Species Prevention and Management Plan

Refer to Section (b) above for a discussion of invasive species prevention and management. In addition, an Invasive Species Control Plan (ISCP) is provided in Appendix 22-B.

(q) Agricultural Impacts

Construction of the Facility is anticipated to result in 222 acres of temporary impacts and 39 acres of permanent impacts to agricultural land (see Exhibit 4). Numerous minimization and mitigation measures will be implemented to offset these impacts; see Exhibit 4(i) for a complete list. The Applicant consulted with New York State Department of Agricultural and Markets (NYSDAM) staff during their pre-application outreach process, which included a site visit held on October 9, 2019 during which NYSDAM staff provided a set of recommendations to the Applicant. A description of these recommendations and resulting design shifts are presented in Exhibit 4, Section (i) and Exhibit 9, Table 9-1. By making the certain changes recommended by NYSDAM staff and generally adhering to the NYSDAM *Guidelines for Agricultural Mitigation for Wind Power Projects*, adverse impacts to agricultural lands will be avoided and/or minimized to the maximum extent practicable. Details related to maintenance, repair, and mitigation measures that will be implemented to minimize impacts to agricultural land (including those related to access roads and drainage features) are provided in Exhibit 4, Section (i).



Specific to agricultural land impacted by the Facility, the Applicant proposes a monitoring and remediation period of two years immediately following the completion of initial restoration. This two-year period will allow for the effects of climatic cycles such as frost action, precipitation, and growing seasons to occur, from which various monitoring determinations can be made. The monitoring and remediation phase will be used to identify any remaining agricultural impacts associated with construction that may require mitigation, and to implement appropriate follow-up restoration activities. An Environmental Compliance and Monitoring Plan is provided in Appendix 22-L.

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