

Heritage Wind Project

Case No. 16-F-0546

1001.23 Exhibit 23- REDACTED

Water Resources and Aquatic Ecology

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EXHIBIT 23 WATER RESOURCES AND AQUATIC ECOLOGY

This Exhibit includes a review of the groundwater, surface water, and aquatic ecology impacts of the Facility consisting of the identification and mapping of existing conditions, an impact analysis, and proposed impact avoidance, minimization and mitigation measures.

(a) Groundwater

(1) Hydrologic Information

According to soil borings performed at seven locations within the Facility Site, the average depth to groundwater varies from 5 feet to over 25 feet below ground surface (bgs). The borings were completed October – November 2019 and were drilled to depths ranging from 20 to 51.5 feet. These locations were selected to be representative of the overall Facility Site. The preliminary geotechnical investigation included borings to test for subsurface soil, bedrock, and groundwater properties (see Preliminary Geotechnical Report in Appendix 21-B). Impacts to construction and design will be addressed through relatively common engineering measures and construction techniques, including dewatering, which will avoid and minimize the potential for groundwater to cause erosion and sedimentation. See Section (3) below for a description of impact avoidance and minimization. Maps showing depths to bedrock and water table throughout the Facility Site based on the Soil Survey of Orleans County, New York, and the Preliminary Geotechnical Investigation (including soil borings) are provided in Figure 21-3 (USDA, 1973).

(2) Groundwater Aquifers and Recharge Areas

(i) Aquifers

The Preliminary Scoping Statement (PSS) identified a total of four principal aquifers in the vicinity of the Facility.¹ These four principal aquifers were mapped by the U.S. Geological Service (USGS) and correlate to the New York and New England carbonate-rock aquifer (see Figure 23-1). The Facility Site, as proposed in this Application, is located between two USGS principal aquifers which are mapped as unconsolidated sand and gravel. The closest aquifer is the principal unconsolidated aquifer of alluvial and glacial origin, which is located 420 feet west of the Facility Site (see Figure 23-1). Therefore, the Facility Site does not contain any principal

¹ As described in Exhibit 9, the Facility Site identified in the PSS extended to the Town of Barre municipal boundary. Subsequent to the PSS, the Applicant refined the Facility Site, and as a result of an iterative design process, the Facility Site presented in this Application is significantly smaller than what was presented earlier in the Article 10 process.

aquifers, a designation applied by the New York State Department of Environmental Conservation (NYSDEC) to aquifers that are highly productive but not intensively used by major municipal systems (NYSDEC, 2011). The Facility Site also does not contain any primary aquifers, which are designated by NYSDEC as sources of water supplies used by major municipal water supply systems (NYSDEC, 2011).

The Facility Site does not contain any unconsolidated aquifers mapped by the NYSDEC Division of Water, Bureau of Water Resources Management. However, eight unconfined aquifers lie within the 5-mile Study Area. The closest aquifers lie approximately 0.6 mile west of the Facility Site and 1.6 miles east of the Facility Site. Both aquifers consist of sand and gravel of unknown thickness or saturation. The yield potential of this unconsolidated kame, kame terrace, kame moraine, outwash, or alluvium aquifer is greater where streams are present (NYSDEC, 2008). Given the distance of unconfined aquifers from the Facility Site, no impacts are anticipated.

The U.S. Environmental Protection Agency (US EPA) maintains authority over sole source aquifers (SSAs), or those that supply at least 50% of the drinking water to a specific consumer area. There are no sole source aquifers in the Facility Area. The closest SSA is the Cattaraugus Creek Basin Aquifer located more than 30 miles from the Facility Site. Therefore, impacts to SSAs resulting from project construction are not anticipated.

(ii) Water Wells

To identify existing water wells within 500 feet of the Facility Site and 2,000 feet from wind turbine locations, the Applicant requested information from the New York State Department of Health (NYSDOH) in accordance with a Confidentiality Agreement executed with the Applicant, which is the agency's established approach for providing this information for Article 10. The Applicant requested any information pertaining to groundwater wells and surface water intakes (including location, construction logs, depths, and descriptions of encountered bedrock) within one mile of the Facility. In a response dated 11/08/2019, the NYSDOH informed the Applicant that there are no public wells or supply intakes located within one mile of the Facility. Well locations more than one mile from the Facility were mapped from NYSDEC's Water Well Program, collected and administered by the Division of Water's, Bureau of Water Resource Management.

Private wells were identified by sending a well survey to all residences/businesses located within 500 ft. from disturbance activities and 2,000 ft. from potential blasting areas. The Applicant's consultant, Environmental Design & Research, Landscape Architecture, Engineering, & Environmental Services, D.P.C. (EDR), sent out letters in September 2019 including a brief summary of the Project and the Article 10 process, contact information

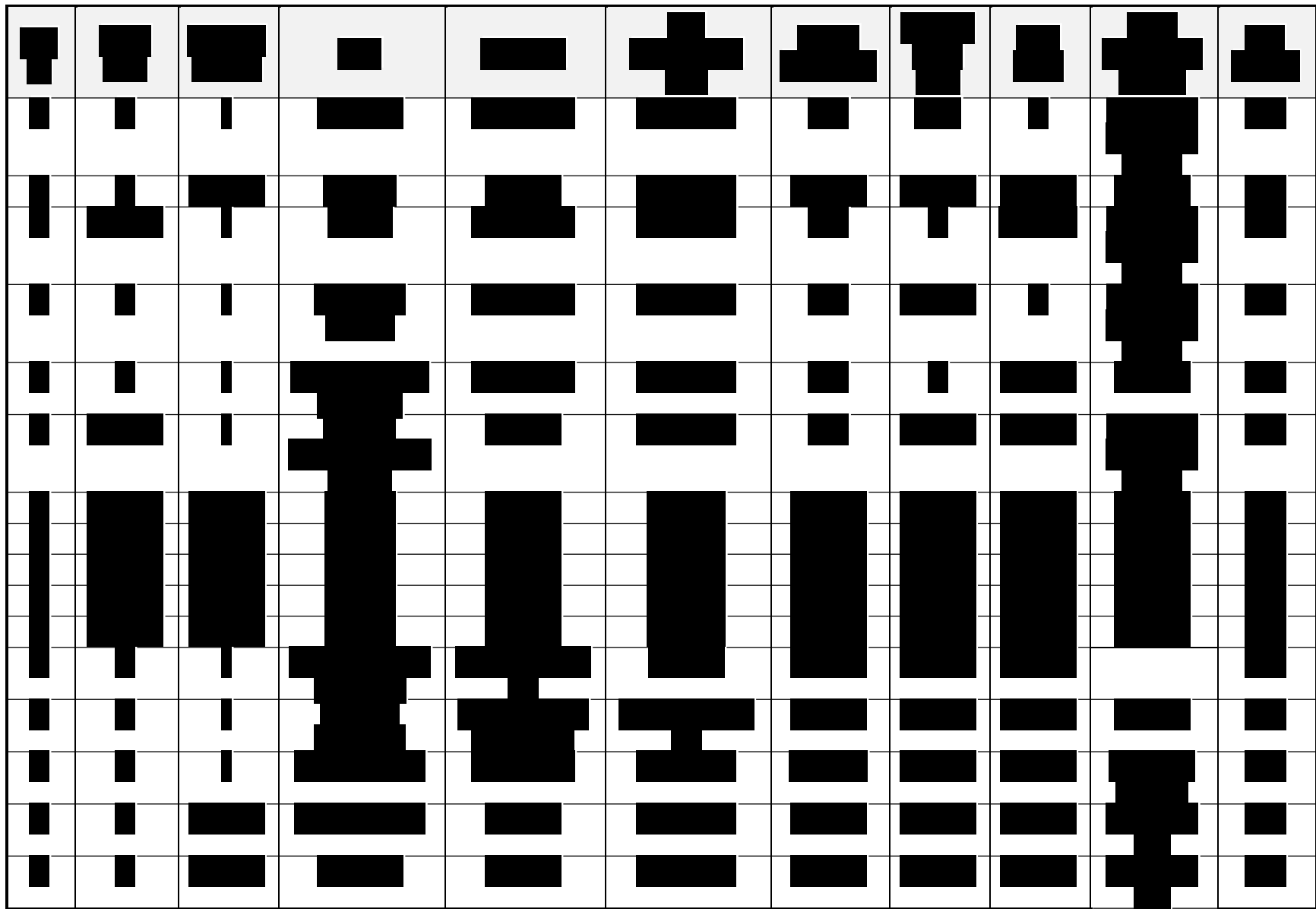
for the Applicant, a description of where the well owner can get more information about the Project, and a questionnaire to the owners of the unique tax parcels located within a 2,000-foot radius of the proposed Facility Area. The questionnaire included questions such as: whether the parcel had well(s); the size and yield of the well; the well's depth to groundwater; sampling and testing history of the well; and location in relation to buildings on the parcel. Included with the questionnaire was an EDR-addressed envelope to facilitate return of the surveys.

<BEGIN CONFIDENTIAL INFORMATION>

[REDACTED]

Table 23-1. Summary of Available Public and Private Well Locations and Characteristics

Well ID	Well Name	Well Type	Well Status	Well Depth	Well Diameter	Well Construction	Well Completion	Well Production	Well Location	Well Characteristics
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
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<END CONFIDENTIAL INFORMATION>

(3) Groundwater Impacts

As described above in Section (2), the Facility Site is not located over any primary, principal, or sole-source aquifers; thus, impacts to aquifers are not anticipated. The Facility is not anticipated to result in any significant impacts to groundwater quality or quantity, drinking water supplies, aquifer protection zones, or groundwater aquifers in the Facility Area. The proposed turbines will be located outside of the nearby aquifer footprints (Figure 23-1). Excavations for foundations, roadways, and underground collection lines are expected to be relatively shallow and are not anticipated to intercept groundwater within the surrounding aquifers. However, there is potential for short-term, minor adverse impacts to groundwater during construction, as described below.

Residential and community groundwater wells are generally assumed to be set deeper than the proposed wind turbine foundations and associated underground electrical transmission lines within fractured bedrock or granular till soil. Additionally, turbines will be set back 1,225 feet from participating residential structures and 1,500 feet from non-participating residential structures. See Table 6-2 in Exhibit 6 for more information on setbacks. The closest private well to a turbine location is approximately 1,300 feet.

Based on (1) the distance of these wells from proposed wind turbines, (2) the elevated position of the wind turbines relative to the wells, and (3) the relatively shallow excavations needed (i.e., roughly 12 feet or less) at each wind turbine foundation location, it is unlikely that Facility construction activities will have a long-term impact on shallow aquifer or residential water-well groundwater quality or quantity (see also Exhibit 21[2][q]).

The Facility is not expected to have adverse impacts on public or private water wells. Prior to the commencement of construction, the Applicant will conduct reasonable investigations of active water supply wells or water supply intakes on non-participating parcels that exist within 500 feet of any blasting. If environmental or engineering constraints require blasting within 500 feet of a known existing, active water supply well on a non-participating parcel, the Applicant shall engage a qualified third party to collect pre- and post-blasting water samples of the well, provided the Applicant is granted access by the property owner. These water samples will be sent to a NYSDOH-certified laboratory for potability testing. Should the NYSDOH-certified laboratory testing conclude that the water supplied by an existing, active water supply well met federal and New York State standards for potable water prior to construction, but failed to meet such standards post-construction, the Applicant shall cause a new water well to be constructed.

The Facility will add only small areas of impervious surface (see Exhibit 22(b)), which will be dispersed throughout the Facility Site and will have a negligible effect on groundwater recharge. However, construction of the proposed

Facility could result in certain localized short-term impacts to groundwater and the use of that water by adjacent landowners. These impacts could include:

- Minor localized disruption of groundwater flows down-gradient of proposed turbine foundations;
- Minor modification to surface runoff or streamflow, thereby affecting groundwater recharge characteristics;
- Minor degradation of groundwater quality from accidental spills and installation of concrete foundations;
- Impacts to groundwater recharge areas (wetlands); and
- Groundwater migration along collection line trenches.

Accidental discharges of petroleum or other chemicals used during construction, operation or maintenance could occur in the form of minor leaks from fuel and hydraulic systems, as well as more substantial spills that could occur during refueling or due to mechanical failures and other accidents. As discussed in Section (d)(1) below, the Applicant has developed avoidance, minimization, and mitigation measures outlined in the Facility's Preliminary Spill Prevention, Control and Countermeasures (SPCC) Plan, to respond if such unlikely events were to occur.

Construction activities have the potential to impact localized groundwater flow paths if excavation occurs below the water table. In these instances, water is anticipated to flow around the disturbance and resume its original flow direction downgradient of the disturbance. Groundwater that infiltrates into the excavation may require removal by pumping, which could have a minimal, short-term effect on the elevation of the water table. However, this water will be pumped to the surface, discharged to the ground surface through a velocity dissipating device, and allowed to infiltrate back into the water table with negligible loss of volume due to evaporation. In addition, excavation is not anticipated to occur below the water table for the Facility. Therefore, any effect will be very localized and temporary.

The greatest potential for impacts to groundwater from the Facility is the installation of turbine foundations. As noted in Exhibit 21(a), bedrock may be exposed or generally within 5 to 40 feet of surface on the hilltops. Mechanical excavation may be possible for some of the rock encountered, particularly the upper few feet. Blasting may be necessary where bedrock is encountered at a shallow depth for construction of proposed wind turbine foundations. All required blasting will comply with applicable laws and regulations and will be conducted in accordance with a site-specific Blasting Plan. A Preliminary Blasting Plan is included with the Application as Appendix 21-C. See Exhibit 21(i) through (k) for additional information on blasting and associated mitigation measures. Impacts associated with conventional excavation methods will be managed by utilizing best management practices (BMPs) contained in the Facility's SWPPP (see Appendix 21-E).

Installation of the concrete foundations could cause a temporary, localized increase in the pH of groundwater during the curing process. This effect will not extend beyond the immediate area of the foundation and will not adversely affect groundwater quality. In the event a perched groundwater condition is encountered at a turbine site, temporary construction dewatering methods will be employed, as described in Section (3)(i) below. Turbine foundations are typically designed to resist hydrostatic forces, when required, eliminating the need to install permanent drainage systems.

In addition to impacts to groundwater due to turbine foundation installation, minor impacts could result from the installation of support structures and buried collection lines, which may facilitate groundwater migration along trench backfill in areas of shallow groundwater. Due to the decompaction of soils within the trench of the buried collection lines, water could collect in the trench and migrate through the trench to areas of lower elevation where it will naturally infiltrate back into the water table with negligible loss of volume. See Section (c)(1) below for details of proposed erosion control methods that will be implemented by the Applicant to address temporary and permanent erosion risks. No work is proposed on slopes greater than 15% (see Exhibit 21[a]); therefore, additional protection measures such as trench breakers and plugs are not required.

(i) Dewatering Areas

During construction, groundwater may be encountered in shallow excavations in areas of poorly drained soils and/or shallow bedrock. Additionally, ponding of surface water and/or precipitation may occur in open excavations and in low-lying areas. Although precise locations requiring construction-related dewatering have not yet been identified, the review of site conditions conducted to date indicates that dewatering may be necessary at some Facility component locations. The final method for dewatering the Facility Site during construction will be determined by the Balance of Plant (BOP) contractor prior to commencing construction. The open sump pumping method—which is a common and economical method of dewatering—may be used at the Facility Site. During construction-related dewatering activities, sediment laden water will be sufficiently filtered in upland locations and not discharged into wetlands or streams (see Stormwater Pollution Prevention Plan [SWPPP] Appendix 21-E). Water velocity dissipation in accordance with applicable state standards will be provided at all discharge points. Dewatering activities will not cause erosion in receiving channels or adversely impact water resources. However, because final engineering will not be completed until the Facility has been certified and a turbine model has been selected, exact areas of dewatering cannot be known at the time of this Application.

The determination of long-term dewatering (if necessary) will be addressed during final geotechnical investigations to be conducted at each turbine location following Certification. See Section (b)(5) below for additional information on dewatering methods.

(4) Sources of Water During Construction

Sources of water that may be utilized for construction uses (e.g., for concrete mixing, fire control, and invasive species wash stations) include water trucks and small ponds on participating properties within the Facility Site. Details associated with the design and layout of facilities for withdrawal and transport of source water will be provided post-Certification once the Applicant engages a BOP contractor.

(b) Surface Waters

Under Article 15 of the Environmental Conservation Law (Protection of Waters), NYSDEC has regulatory jurisdiction over any activity that disturbs the bed or banks of protected streams. Any stream, or particular portion of a stream, that has been assigned by the NYSDEC any of the following classifications or standards is considered a protected stream: AA, AA(t), A, A(t), B, B(t) or C(t) (6 NYCRR Part 701). A classification of AA or A indicates that the best use of the stream is as a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The best usages of Class B waters are primary and secondary contact recreation and fishing. The best usage of Class C waters is fishing and non-contact activities, and Class D waters represent the lowest classification standard. Streams designated (t) indicate that they support trout, and those more specifically designated (ts) support trout spawning. Class C navigable streams are regulated under Article 15 whether or not they have a (t) designation as defined by 6 NYCRR 608.1(u) and New York Environmental Conservation Law (ECL) 15-0505.

A special flood hazard area, or 100-year floodplain, is land adjacent to a stream or river that experiences occasional or periodic flooding. Information on floodplains in the vicinity of the Facility Site was obtained from the Town of Barre's Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FEMA, 1981). FEMA updated these data in 2015; however, this information was not available publicly for the Project Area. Using the available FEMA data, areas designated as 100-year floodplains were determined to be present in the southern edge of the Facility Site along unnamed streams north of Gillette Road to the west of Quaker Hill Road. Mapped 100-year floodplains are present in the Facility Site east of Quaker Hill Road, south of where it splits from Oak Orchard Road, and south of Delano Steel Road. These floodplains are associated with wetlands and located along the banks of unnamed streams in the southern part of the Facility Site.

(1) Surface Waters Map

A map showing locations of all surface waters, including intermittent and ephemeral streams (to the extent such streams and wetlands are identified in publicly available data), within and adjacent to the Facility Site, is provided in Figure 23-2. Data sources used to generate this map include publicly available data from Orleans County, NYSDEC, the Environmental Systems Research Institute (ESRI), the USGS, and National Wetlands Inventory (NWI) along with stream data collected during on-site wetland and stream delineations. Wetland and stream delineations identified all surface waters (ponds; vernal pools; ephemeral, intermittent, and perennial streams; and wetlands) within a 500-foot wide radius of proposed construction work areas (i.e., areas to be disturbed by construction of the Facility). Table 23-2 below summarizes these data. Shapefiles identifying the data will be submitted to NYSDEC and New York State Department of Public Service (NYSDPS) staff under separate cover.

(2) Description of Surface Waters

The entire Facility Site is within the Oak Orchard-Twelve-mile drainage basin (USGS Hydrologic Unit 4130001) (FEMA, 2014). The Oak Orchard-Twelve-mile drainage basin drains a large area of northwestern New York State to Lake Ontario and eventually to the Atlantic Ocean via the Saint Lawrence River (NYSDEC, 2019b). Total annual precipitation averaged 35.74 inches in nearby Albion, New York, for the 1981-2010 period (NOAA, 2019).

As described in the Wetland and Stream Delineation Report (Appendix 22-J), no major surface water bodies are present within the Facility Site. Streams present in the vicinity of the Facility generally flow north or south until their confluence with Oak Orchard Creek or the West Branch Sandy Creek (both of which appear to be traditional navigable waters). The Oak Orchard Creek and West Branch Sandy Creek both flow north and drain into Lake Ontario along its southern shore.

The West Branch Sandy Creek, Oak Orchard Creek, and their tributaries comprise the list of all NYSDEC-mapped streams that cross the Facility Site (see Table 23-2).

Table 23-2. NYSDEC Mapped Streams that Cross the Facility Site

Stream Name ¹	NYSDEC Classification ²	NYSDEC Standard ²	Part Item Number ²	Water Index Number ¹
Oak Orchard Creek, Upper, and tributaries	C	C	847-697	Ont 138 (portion 4)
West Branch and tributaries	C	C	847-636	Ont 130- 2

¹ Based on streams from the Water Inventory/Priority Waterbodies List GIS layer (downloaded from <http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1117>) that intersected Facility buffered areas as defined in the PSS.

² Based on streams from the Water Quality Classifications – NYS GIS layer (downloaded from <https://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1118>) that intersected Facility buffered areas as defined in the Preliminary Scoping Statement (PSS).

As described in Exhibit 22, the NYSDEC will conduct a site visit to review the boundaries of delineated wetlands and streams, and will subsequently issue a Freshwater Wetlands Determination, which will address the jurisdictional status of streams.

Surface Water Delineations

On-site wetland/stream delineations were conducted in the spring, summer, and fall between May 2018 and October 2019, during which data were collected on streams that exist within a wetland/stream survey area (i.e., a 500-foot radius around areas of proposed disturbance).

Based on the Wetland and Stream Delineation Report (see Appendix 22-J), a total of 37 streams were identified within the wetland study area. None of these streams were mapped by NYSDEC as an A or B Class streams, and 14 were mapped as Class C. While none of the Class C streams are identified as Class C(t), as discussed above, the streams mapped by the NYSDEC are considered navigable waters and thus are regulated under ECL 15-0505. See Exhibit 22(m) for a detailed discussion of impacts within the regulated 100-foot adjacent area of state-regulated wetlands. See Section (4) below for a detailed discussion of potential impacts to streams and Section (5) for a discussion of avoidance and minimization measures.

Fish Species

With respect to fish species, an email request was submitted to the NYSDEC Natural Heritage Program (NHP) on March 26, 2019 for data on state-listed species or species of special concern. A response from NHP received on April 22, 2019 indicated that streams within the Facility Area do not contain State-listed endangered or threatened species or species of special concern. Publicly available data on fish communities in lakes and streams associated with the Facility Site is limited. The Oak Orchard-Twelve-mile watershed supports several fish species sought by anglers including brown trout, small- and largemouth bass, yellow perch, and white and black crappie. However, there are no major surface water bodies present in the Facility Site and the Facility Site is high in the watershed.

The few adjacent streams are small and likely support a smaller diversity of aquatic species. To conservatively represent all species that could possibly occur, fish species documented in the Oak Orchard-Twelvemile watershed are included in the Wildlife Species List (see Appendix 22-A). A total of 76 unique fish species were identified as potentially occurring at the Facility Site.

Invasive Aquatic Species

The NYSDEC maintains a list of the *Common Aquatic Invasive Species of New York*, which includes fish, clam, mussel, insect, plant, and algae species, known habitat distributions of these species and recommended boat-cleaning methods to prevent their spread (NYSDEC, 2019 A). Of the 22 invasive species included on the list, 10 could occur in the vicinity of the Facility Site based on known distributions and habitat requirements, including: curly-leaf pond weed (*Potamogeton crispus*), European frogbit (*Hydrocharis morsus-ranae*), Eurasian watermilfoil (*Myriophyllum spicatum*), water chestnut (*Trapa natans*), hydrilla (*Hydrilla verticillata*), starry stonewort (*Nitellopsis obtusa*), zebra mussel (*Dreissena polymorpha*), quagga mussel (*Dreissena bugensis*), alewife (*Alosa pseudoharengus*), and round goby (*Neogobius melanstomus*) (NYSDEC, 2019 A). None of the species on the list were observed during wetland delineations or other field investigations, including a terrestrial plant invasive species survey; however, a comprehensive aquatic species inventory was not conducted. It is important to note that most of the aquatic habitats within the Facility Site have an insufficient volume of water to support most of these species.

(3) Drinking Water Supply Intakes

To identify existing water wells and drinking water supply intakes within one mile of the Facility Site, the Applicant requested information from the NYSDOH in accordance with a Confidentiality Agreement executed with the Applicant, in accordance with established procedures for Article 10. The inquiry requested data on public surface drinking water intake sites within one mile of the proposed Facility. The NYSDOH informed the Applicant that no public water supply sources are located within one mile of the Facility. No information on water wells was received from the NYSDEC or Orleans County Health Department.

The public water service area for the Barre Town Water Distribution System does intersect with Facility parcels. In locations where water supply infrastructure intersects the Facility Site, specifically collection lines or access roads, measures will be taken to avoid any impacts and disturbance during project construction. Typical impact avoidance measures such as separation distance above and below the water pipelines will be adhered to in accordance with local and/or state standards (see Exhibit 12 for additional information).

Potential Impacts to Surface Waters

Direct and Indirect Impacts

During construction, direct or indirect impacts to surface waters will occur as a result of the installation of access roads, the installation of electrical cabling, and the development and use of temporary construction workspaces around the batch plant and laydown yard. Direct impacts could include 1) an increase in water temperature and conversion of cover type due to clearing of vegetation in proximity to stream channels, 2) disturbance of stream banks and/or substrates resulting from buried cable installation, and 3) the direct placement of fill and/or culverts in surface waters to accommodate road crossings. Indirect impacts to surface waters may result from sedimentation and erosion caused by construction activities (e.g., removal of vegetation and soil disturbance).

Potential temporary and permanent impacts to surface waters that could result from Facility construction and operation have been calculated using site-specific limit of disturbance data. The Facility is anticipated to result in up to 2,177 linear feet of temporary disturbance to perennial, ephemeral, and intermittent streams and up to 239 linear feet of permanent disturbance to perennial, intermittent, and ephemeral streams. The details of these impacts are summarized in Table 23-3 and described below.

Table 23-3. Potential Temporary and Permanent Impacts to Surface Waters

Stream ID ¹	Stream Type ²	NYSDEC Classification (if applicable)	Temporary Impact (sq ft)	Temporary Impact (ln ft)	Permanent Stream Impact (sq ft)	Permanent Impact (ln ft)	Type of Impact ³	Article 10 Figure 23-1, Sheet #	Preliminary Design Drawing (Appendix 11-A), Sheet #
1D	R3	--	973	49	--	--	CL	3	C-301B
1E	R3	Class C	854	57	--	--	CL	2	C-301B
1J	R4	--	390	56	--	--	CL	5	C-302A
1K	R4	--	473	68	--	--	CL	6	C-302A
1P	R3	Class C	680	57	--	--	CL	14	C-303A
1Y	R6	--	21	14	43	28	CL, AR	21	C-213
1Z	R6	--	96	53	129	75	AR	20	C-212
2B	R3	Class C	243	37	4	3	AR	20	C-212
2I	R4	--	297	155	--	--	AR	15	C-210
2O	R3	Class C	1,587	153	--	--	CL	22, 24	C-304B, C-221
2Y	R6	--	2,916	980	130	72	AR	31, 32	C-227
3E	R6	--	96	48	54	27	AR	29	C-229
3F	R4	Class C	900	88	--	--	CL	28, 30	C-229
3I	R4	Class C	260	18	--	--	AR	35	C-234, C-236
3K	R4	--	893	88	12	15	AR	33	C-232
3L	R4	Class C	935	41	--	--	CL	37	C-236, C-311B
3M	R6	--	1,218	60	255	19	AR	36	C-234
4B	R4	Class C	185	58	--	--	CL	19	C-303B
4C	R4	--	226	57	--	--	CL	18	C-210
4D	R3	Class C	662	40	--	--	CL	26	C-308C
Totals:			13,905	2,177	627	239			

¹ Stream ID assigned by EDR

² R3 = Upper Perennial, R4 = Intermittent, R5 = Unknown Perennial, R6 = Ephemeral

³ AR = Access Road, CL = Underground Collection Line

As indicated above in Table 23-3, it is anticipated that there will be no stream crossings of NYSDEC Class C(t) or higher protected streams. However, a total of 10 Class C streams may be affected as described above and would be regulated under Article 15 because they are navigable waters. See Section 5 below for further discussion of avoidance, minimization, and mitigation of impacts to surface waters.

Thermal Effects

Water temperature governs most of the physical, chemical, and biological processes that occur in streams. Temperature determines the types of organisms that can live in streams and rivers. All aquatic organisms such as zooplankton, phytoplankton, fish, and insects have a range of temperatures they can live within. Above or below that range, the organisms can become stressed and the number of individuals of the species will subsequently decrease (USGS, 2016). Temperature in streams also influences the water chemistry, including dissolved oxygen levels and chemical reactions.

The majority of the impacted streams identified in Table 23-3 above are located within active agricultural areas and do not have substantive woody vegetation along the banks or adjacent areas providing shading. Although some streams are located within wooded areas, at these locations, vegetation clearing along streambanks will be minimized to the extent practicable to minimize changes in cover that could result in localized increases in stream temperature. Forest clearing along streams will be limited to short segments and will not occur along the length of the entire stream. Therefore, water temperature impacts are anticipated to be localized and minor.

Aquatic Habitat Impacts

There are no NYSDEC mapped streams with a class of C(t) or higher, indicating a lack of high quality water bodies in the Facility Site. Therefore, adverse impacts to aquatic habitat will be avoided. In addition, based on the April 2019 response from NHP, there are no known state-listed threatened or endangered aquatic species or habitat at the Facility Site. Additional information pertaining to potential impacts to specific of special concerns (SSC) and species of greatest conservation need (SGCN) are included in Table 22-5.

Turbidity and Effluent Limitations

A review NYSDEC GIS data and 6 NYCRR Part 701 indicate the presence of one stream in the Facility Site which may be subject to effluent limitations or a Total Maximum Daily Load (TMDL). Oak Orchard Creek and its tributaries is listed as a water body for which a TMDL is deferred (https://www.dec.ny.gov/docs/water_pdf/303dListfinal2016.pdf). The 2016 NYSDEC impaired water list identifies phosphorus as a pollutant or cause for impairment.

Although construction work is proposed at and near Oak Orchard Creek, adverse effects from phosphorus will not occur. The proposed work will include:

- Collection crossings at eight locations
- Access road construction at three locations.

These temporary and permanent construction disturbances will not result in the direct use of phosphorous or impart land-use changes that would affect phosphorus levels in the stream (i.e., installing mowed lawns that need to be fertilized), nor will these work activities result in additional point source discharges of stormwater runoff. Because these work activities will not affect phosphorus levels and considering the construction will be implemented pursuant to the project-specific SWPPP, adverse impacts associated with increase turbidity and effluent discharges will not occur.

Drinking Water

As discussed in Section (3) above, the Applicant has not identified any public surface drinking water intake sites within one mile of the Facility. Regardless, Facility construction or operation is not anticipated to impact drinking water. The measures that the Applicant will take to avoid, minimize, and mitigate impacts to surface waters, described below in Section (5) below will ensure that drinking water sourced at surface intake sites is not degraded by Facility construction or operation. As previously noted, the Applicant has also drafted a Preliminary SPCC Plan to minimize the potential for unintended releases of petroleum and other hazardous chemicals during Facility construction and operation (Appendix 23-B). Proper implementation of the SPCC Plan will avoid, minimize, and mitigate the potential for contamination of both surface water and groundwater, thereby protecting drinking water supplies.

Dredging

No dredging is proposed as part of this Facility.

(4) Measures to Avoid or Minimize Surface Water Impacts

Surface Water

Direct impacts to surface waters have been minimized by designing the Facility layout to avoid surface water impacts where practicable and implementing other measures such as utilizing existing or narrow crossing locations whenever possible. There will be no permanent impacts to wetlands containing open waters resulting from Facility construction and operation. Surface water sources most vulnerable to sedimentation are those with steep uplands adjacent to work areas. The Facility has been designed to avoid steep slopes to the maximum extent practicable,

but some construction in areas of steep slopes is unavoidable. Construction of the Facility could result in some siltation and sedimentation in streams adjacent to steeper uplands. However, these impacts are anticipated to be minor because the Applicant will take measures to avoid and minimize siltation, as described in Section (5) below, including developing and implementing a SWPPP, as described in Section (c)(1) below. In addition, the use of horizontal directional drilling (HDD) will minimize impacts to stream reaches, and typical BMPs will be implemented (e.g., appropriate drilling setbacks from surface waters, use of erosion and sediment control measures, etc.). Final specifications associated with HDD installation will be prepared by the BOP contractor in accordance with all relevant environmental permitting conditions. Anticipated locations of HDD in relation to surface water resources are identified in Figure 23-2 and the Wetland and Stream Impact Drawings (Appendix 22-K). A Preliminary Inadvertent Return Plan (i.e., “frac out” contingency plan) to address inadvertent releases associated with HDD is included in Appendix 21-D.

The Applicant will provide final engineering plans to the NYSDEC and NYSDPS regarding each proposed stream crossing prior to the Siting Board’s determination of whether to issue an Article 10 Certificate to the Facility. Stream crossing methods will take into consideration and meet all NYSDEC stream crossing guidelines. Any work prohibition dates associated with crossings of State-protected streams under ECL Article 15 will be established in consultation with the NYSDEC. Where crossings of surface waters are required, BMPs will be utilized, as required by the NYSDEC. Specific minimization measures for protecting 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, streams 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 to mitigate impacts from construction to streams, wetlands and surface waterbodies. 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 stream or wetland (or as required per manufacturer’s instructions);
 - No degradation of stream banks;
 - 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 SPDES General Permit for the Stormwater Discharges from Construction Activity. 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 ensure that erosion and siltation is kept to a minimum along wetland boundaries. Specific control measures will be identified in the Facility's 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. See Section (c) below for a detailed discussion of stormwater issues.
- *Trenchless Technologies*: Use of HDD or jack and bore methods can avoid and/or minimize direct impacts to stream resources.
- *Culvert Design Standards*: Culvert crossings at access roads will be designed to meet the applicable NYSDEC and/or U.S. Army Corps of Engineers (USACE) requirements and will meet the following criteria:
 - All structures must be able to safely pass the 1% storm event, and be capable of withstanding any higher flow intervals likely to be experienced within a specific waterbody without causing damage to the stream bed or banks;
 - Bridges or culverts may not be dragged through the stream, and must be suitably anchored to prevent downstream transport during a flood;
 - Culverts will be directly embedded to allow for long-term passage of aquatic species; and
 - Geotextile fabric must be placed below and extending onto the bank, and suitable side rails must be built into the bridges to prevent sediment from entering the waterbody.

Floodplains

The Facility layout has been designed to avoid floodplains to the extent practicable. No above grade Facility components (i.e., turbines, O&M Facility, etc.), including laydown areas, are within designated 100-year floodplains. Only minor portions (less than 1 mile of access road and/or buried collection line) are located with portions of 100-year floodplains. Where access roads must cross streams (e.g., there is no other practicable way to access turbine sites), the crossings have been designed to accommodate high flow levels.

(c) Stormwater

(1) Stormwater Pollution Prevention Plan

Prior to construction, the Applicant will submit a Notice of Intent seeking coverage under the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity issued in January 2015 and effective on

January 29, 2015 (as modified July 14, 2015 and November 23, 2016) (see http://www.dec.ny.gov/docs/water_pdf/gp015002.pdf) or its successor. This authorization is subject to review by NYSDEC and is independent of the Article 10 process. A Preliminary SWPPP required by the General Permit is attached as Appendix 21-E. The Preliminary SWPPP provides: an introduction and overview of the proposed Facility, and the purpose and need and appropriate contents of a complete SWPPP; a description of anticipated stormwater management practices, including temporary and permanent erosion and sediment control measures (vegetative and structural); anticipated construction activities, including preliminary construction phasing and disturbance limits; waste management and spill control measures; proposed site inspection and maintenance measures, including construction site inspections and recordkeeping; and conditions that will allow for the termination of permit coverage.

(2) Post-Construction Erosion and Sediment Control Practices

As described above, the Preliminary SWPPP and associated erosion and sedimentation control plan will address the anticipated stormwater management practices that will be used to reduce the rate and volume of stormwater runoff after Facility construction has been completed. The Preliminary SWPPP was prepared in accordance with New York State Standards and Specifications for Erosion and Sediment Control (NYS Standards), and the New York State Stormwater Management Design Manual, and includes information on permanent, post-construction erosion and sediment control measures (vegetative and structural), along with the anticipated stormwater management practices that will be used to reduce the rate and volume of stormwater runoff after construction has been completed.

Following Certification of the Facility, it is anticipated that hydrologic models (e.g., Hydraflow Hydrographs Extension for AutoCAD Civil 3D software) based upon measurable watershed characteristics will be utilized by professional engineers to calculate stormwater discharges. Stormwater runoff rates discharged from the Facility Site under existing conditions (pre-construction) will provide the basis for evaluation and comparison to proposed conditions (post-construction). Design points of interest will be established where stormwater runoff exits the Site (e.g., where proposed Facility access roads intersect with existing public roads/roadside ditches). These design points will provide fixed locations at which existing and proposed stormwater quantities can be compared. The areas draining to these design points will be delineated using land survey information and proposed grading plans, and a hydrologic analysis of each of the drainage areas will be conducted to model their discharges (typically for the 1, 2, 10, 25, 50 and 100-year storm events). Because final engineering will not be completed until the Facility has been certified, and because the Applicant will ultimately seek coverage under the SPDES General Permit independent of the Article 10 process, a final SWPPP cannot be included in the Article 10 Application. Following

Certification of the Facility, the Applicant will conduct the detailed engineering necessary to prepare a final SWPPP, in accordance with the SPDES General Permit.

(d) Chemical and Petroleum Bulk Storage

(1) Spill Prevention and Control Measures

To prevent unintended releases of petroleum and other hazardous chemicals, a Preliminary SPCC Plan has been prepared that outlines preventative measures and response procedures in the unlikely event of a release. Specifically, the plan contains descriptions of on-site oil storage activities, procedures for handling oil, discharge or drainage controls, procedures in the event of a discharge discovery, a discharge response procedure, a list of spill response equipment to be maintained on-site, methods of disposal of contaminated materials in the event of a discharge, and spill reporting information. Electric transformers at the collection and POI substation will be constructed with secondary containment. No transformers, or components requiring additional containment, are located at the turbine sites. Refueling areas will be greater than 100 feet from all freshwater wetland areas.

Construction and operation of the Facility will not require the use, storage, or disposal of large quantities of chemicals or hazardous substances other than petroleum. Chemicals potentially found on-site during construction and operation of the Facility will likely include antifreeze, paints/solvents, lubricants and other chemicals commonly associated with the maintenance of engines and equipment. These materials will be stored consistent with label instructions in small containers (typically less than 5 gallons). Any spills of these material will be reported internally, and a decision will be made whether the incident must be reported to federal, state or local authorities.

(2) Compliance with New York State Chemical and Petroleum Bulk Storage Regulations

It is not anticipated that large volumes of petroleum or hazardous substances will be stored in tanks subject to regulation under the State of New York's chemical and petroleum bulk storage programs. If the Applicant elects to store petroleum or chemicals in tanks in quantities that exceed applicable regulatory thresholds, it will submit the necessary registration application(s) to NYSDEC and will comply with all applicable requirements set forth in the petroleum and chemical bulk storage regulations. See 6 NYCRR Part 613 (petroleum bulk storage) and 6 NYCRR Parts 596-599 (chemical bulk storage).

(3) Compliance with Local Chemical and Petroleum Storage Regulations

No local laws governing the storage of chemicals (i.e., hazardous substances) or petroleum have been identified.

(e) Aquatic Species and Invasive Species

(1) Impact to Biological Aquatic Resources

With respect to potential impacts to wetlands, see Exhibit 22. With respect to impacts to surface waters, see Table 23-3, above. Impacts to surface waters generally result in impacts to biological aquatic resources that require aquatic habitats. However, only a small fraction of the available aquatic habitat that exists within the Facility Site will be impacted by Facility construction or operation.

A list of threatened, endangered, and otherwise protected species that could occur within the Facility Site is provided in Exhibit 22(f)(6), Table 22-4. As indicated, no threatened, endangered or otherwise protected aquatic species occur within the Facility Site. Sedimentation and changes in water hydrology during project construction and operation are typically the main threats to protected species; however, potential impacts will be minimized through the development of a SWPPP for the Facility. Therefore, no impacts to threatened or endangered aquatic species are anticipated to result from Facility construction or operation.

None of the species included in the Common Aquatic Invasive Species of New York (NYSDEC, 2019 A) list were observed during on-site delineations or field investigations; however, a comprehensive inventory of aquatic invasive species was not conducted. Presence of these aquatic invasive species is not expected because the Facility Site is high in the watershed and does not consist of water bodies large enough to provide the aquatic habitat that supports these species. Furthermore, most aquatic invasive species are introduced to lakes before being spread to streams and rivers by ships, boats, barges, aquaculture, recreation, and connected waterways. These activities are infrequent in the small streams surrounding the Facility Site, thereby limiting the potential for the introduction of aquatic invasive species to nearby surface waters. As a result, the construction and operation of the Facility is not anticipated to cause the spread of aquatic invasive species or have adverse impacts to native aquatic species. For additional information on aquatic invasive species see Section (b)(2) above and Exhibit 22. As no aquatic invasive species were identified within the Facility Site, maps and shapefiles of the locations of aquatic invasive species are not included in this Application.

(2) Measures to Avoid or Mitigate Impacts to Aquatic Species

Measures to avoid and mitigate impacts to surface waters during construction are addressed above in Section (b)(5). These measures protect aquatic species by protecting the water quality in the habitats where they occur.

They also offer direct protection through ensuring avoidance of protected streams during the times of the year when fish are likely to be migrating and spawning.

Surface water impacts during Facility operation will be limited to those associated with permanent changes attributable to installation of Facility components. Impacts to surface waters are discussed in more detail in Section (b)(4) above. There will be some permanent loss of aquatic habitat resulting from placement of Facility components in surface waters (i.e., primarily associated with access roads). However, where access roads cross delineated stream features, the proposed culverts will be designed to applicable NYSDEC and/or USACE standards to facilitate aquatic species passage. Therefore, loss of habitat will be largely avoided at these crossings.

With respect to aquatic invasive species, smaller waterbodies like the streams found throughout the Facility Site are less likely to host invasive species than larger waterbodies. Since the activities typically responsible for creating aquatic invasive species pathways (commercial shipping vessels, recreational watercraft, aquaria release, and bait) will not be part of construction or operation of the Facility, the risk of spreading invasive species is low. Due to the low risk of spreading invasive species, there are no significant impacts to aquatic resources anticipated from invasive species. Where permanent access roads cross streams, special crossing techniques will be used in accordance with regulatory requirements and NYSDEC guidance. These measures will collectively ensure compliance with applicable water quality standards (6 NYCRR Part 703).

(f) Cooling Water

The proposed Facility does not involve the use of cooling water, and as such, the requirements of this section are not applicable to this Facility.

REFERENCES

6 NYCRR Ch. V Resource Management Services § 596-599, 613. 2019.

6 NYCRR Ch. X Division of Water § 701, 703. 2019.

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