High Bridge Wind Project

Case No. 18-F-0262

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 a review of the U.S. Department of Agriculture (USDA) Web Soil Survey, the average depth to groundwater ranges from the ground surface to greater than 53 inches throughout the Facility Site, with high water tables most common in low-lying areas in and adjacent to wetlands. The Web Soil Survey also indicates bedrock may be exposed or generally within 2 to 8 feet of surface on the hilltops. As part of a larger geotechnical investigation, Terracon Consultants-NY, Inc. (Terracon), conducted preliminary soil borings at a subset of turbine locations. The results of this study are generally consistent with the depth ranges to bedrock and groundwater identified via the Web Soil Survey (see Appendix 21-C, Report of Expected Geotechnical Conditions). The study did not identify any karst features within the Facility Site. Maps showing depth to bedrock and depth to water table throughout the Facility Site, based on the Soil Survey of Chenango County, New York, are provided in Figure 21-3 (USDA, 1985).

Temporary construction dewatering may be required for surface water control and for excavations that encounter perched groundwater conditions, groundwater or seepage. Although precise locations requiring 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. Based on the relatively low permeability of the soils anticipated, 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. Water velocity dissipation will be provided at all discharge points. Dewatering activities will not cause erosion in receiving channels or adversely impact water resources.

All proposed methods of dewatering will address concerns and requirements related to runoff and sediment transport as well as any other applicable requirements of the New York State Department of Environmental Conservation's (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater

Discharges from Construction Activity, GP-0-15-002. Additional information pertaining to dewatering is presented in Exhibit 23(a)(3)(i). In addition, consistent with GP-0-15-002, a preliminary Stormwater Pollution Prevention Plan (SWPPP) has been prepared to address construction-related best management practices (BMPs), including those relating to site dewatering. The SWPPP is included in Appendix 21-D and described below in Exhibit 23(c).

(2) Groundwater Aquifers, Recharge Areas, and Water Wells

Aquifers and Recharge Areas

Primary aquifers are considered by the U.S. Geological Survey (USGS) and NYSDEC as aquifers that are highly productive and utilized by major municipal water supply systems (NYSDEC, 2011). A review of Primary Aquifers mapped by NYSDEC Division of Water Resources Management indicates that no primary aquifers are located within 24 miles of the Facility Site.

The U.S. Environmental Protection Agency (EPA) maintains authority over sole source aquifers (SSAs), which are those aquifers that supply at least 50% of the drinking water in a given area. Based on a review of Sole Source Aquifers mapped by the EPA,[1] no SSAs are located within 13 miles of the Facility Site; thus, no adverse impacts to SSAs are anticipated.

The Facility Site overlays a 0.2-acre portion of an unconsolidated aquifer mapped by NYSDEC (see Figure 23-1). However, Facility construction activities will be located more than a quarter mile from this aquifer. Further, potential stormwater runoff resultant from the construction of the Facility will be mitigated through the erosion and sediment control practices outlines in the preliminary Stormwater Pollution Prevention Plan (SWPPP). Thus, adverse effects to this unconsolidated aquifer are not anticipated.

Water Wells

To identify existing water wells the Water Well Study Area, the Applicant sent private well surveys to all 394 landowners with unique tax parcels within 500 feet of the Facility Site or a half mile of anticipated blasting locations (e.g., wind turbine locations) and sought information from the New York State Department of Health (NYSDOH) pertaining to public water supplies.[2] The water well survey developed by the Applicant included a brief summary of the Facility and the Article 10 process, contact information for the Applicant, a description of where the well owner can get more information, and a questionnaire that included questions such as: whether the parcel had

[1] Available at: https://epa.maps.arcgis.com/apps/webappviewer/index.html?id=9ebb047ba3ec41ada1877155fe31356b
[2] All information requests specific to public water supplies were directed though the NYSDOH, at their request.

well(s); the depth, size, and yield of the well; the well's depth to groundwater; sampling and testing history of the well; and location of the well. Included with the questionnaire was a stamped and addressed return envelope to facilitate return of the surveys. Where possible, the locations of identified water wells within the Facility will be field verified. The Applicant is consulting with landowners within the Facility Site to field verify the locations

The Applicant received 95 responses to the surveys identifying a total of 62 private wells. Only three wells were identified within a quarter mile of anticipated blasting locations (e.g., wind turbine locations; see Figure 23-1), with the closest approximately 800 feet from the nearest anticipated blasting location. The depths of the private wells ranged from 5 feet to 406 feet below grade with an average depth of approximately 200 feet below grade (the depths of 16 wells were unknown or not available). Most of the wells reported were installed in bedrock and are primarily used for residences; however, several wells were reported to be used for agriculture activities. Groundwater yields reported in this survey range from 2.5 gallons per minute (gpm) to 30 gpm with average yields of approximately 11.5 gpm.

The Applicant's information request to the NYSDOH pertained to public water supplies (including location, construction logs, depths, and descriptions of encountered bedrock) within one mile of the preliminary Facility Site. After the Applicant and NYSDOH executed a confidentiality agreement, the NYSDOH Bureau of Water Supply Protection provided a response on April 18, 2019 that identified [redacted]. Information on the depth and yield for these water systems was not provided. The nearest public water system to the Facility Site is associated [redacted] located approximately a half mile from the nearest proposed wind turbine.

Of the community water systems outlined above, [redacted]. The boundaries of the Mt. Upton Water District extend to roughly mirror the boundaries of the hamlet (see Figure 23-1),[3] and the nearest edge of the district is located 0.31 miles east of the Facility Site and 0.62 miles from the nearest proposed wind turbine.

[3] The boundaries of the Mt. Upton Water District were provided on 06/14/2019 by George Seneck, the Town of Guilford Supervisor and the public point of contact for the Mt. Upton Water District.

Table 23-1 summarizes public and private water well locations, well design, and production information, to the extent such data was provided or is publicly available. The locations of private and public water sources are depicted on Figure 23-1.

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

(3) Groundwater Impacts

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. Most of the proposed turbines will be located on hilltops, generally above and away from groundwater resources (Figure 23-1). Excavations for foundations, roadways, and underground collection lines are expected to be relatively shallow and are not expected to have long-term impacts on groundwater resources. Most of the known groundwater wells located within and adjacent to the Facility Site (as described in Exhibit 23(a)(2)) are located more than a quarter mile from the nearest wind turbine. Only three wells are located within a quarter mile of a wind turbine: two private residential wells, which are located approximately 900 feet from the nearest turbines; and one private agricultural spring well, which is located approximately 800 feet from the nearest turbines. Residence and community groundwater wells are generally assumed to be set deeper than the proposed wind turbine foundations and associated underground electrical collection lines within fractured bedrock or granular till soil.

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 plan to remove 12 feet or less of material 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(j)(2)).

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 at all water wells within the above specified distances of blasting, 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.

A potential impact to groundwater is the introduction of pollutants from the accidental discharge of petroleum or other chemicals used during construction, operation or maintenance. Such discharges 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. However, the Applicant has developed avoidance, minimization, and mitigation measures that are outlined in the Facility's Preliminary Spill Prevention, Control and Countermeasures (SPCC) Plan to respond if such unlikely events were to occur. See Exhibit 23(b)(5) and Exhibit 23(d) for a discussion of the SPCC Plan and other mitigation measures.

Construction activities have the potential to impact localized groundwater flow paths in areas where 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 23(a), bedrock may be exposed or generally within 2 to 8 feet of surface on the hilltops. Mechanical excavation (e.g., using a pneumatic hammer or large ripper) may be possible for some of the rock encountered, particularly the upper few feet, but in many cases, blasting will generate less noise overall and take less time. Blasting will likely 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-A. 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 BMPs contained in the Facility's SWPPP (see Appendix 21-D).

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 Exhibit 23(a)(3)(i). Turbine foundations are typically designed to resist hydrostatic forces, when required, eliminating the need to install permanent drainage systems.

As previously noted, preliminary soil borings have been conducted to determine groundwater levels at a subset of turbine locations (see Appendix 21-C). The preliminary subsurface investigations by Terracon included subsurface soil and bedrock sampling and limited geotechnical laboratory testing at 9 boring locations located in proximity to the proposed turbine sites, collection and point of interconnection substation, and operation and maintenance (O&M) building. The borings were completed January-March 2019 and were drilled to depths ranging from 18 to 35 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. Groundwater was not encountered at any of the proposed turbine locations. This result suggests that groundwater is not anticipated to be encountered at turbine locations. Should shallow/perched groundwater be encountered, any construction impacts 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.

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 Exhibit 21(a) for details of proposed erosion control methods that will be implemented by the Applicant to address temporary and permanent erosion risks in areas where collection lines will be installed along and across steep slopes.

(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. It is anticipated that groundwater and/or surface water that accumulates in shallow excavations of the upland areas can generally be controlled using conventional sump and pump

methods. Where dewatering is required, a temporary pit (or sediment trap) will be constructed in upland areas (i.e., not within streams or wetlands) to trap and filter water prior to discharging it to a stable discharge area. Dewatering will involve pumping accumulated water to a device (e.g., sediment filter bag, silt fence barrier), decreasing discharge velocity, and trapping suspended sediment prior to out letting the water to undisturbed ground. The stable outlet must be capable of filtering further sediment and withstanding the velocity of the discharge water to prevent erosion. 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.

As stated previously, none of the sample borings at the proposed wind turbine locations encountered groundwater. As such, long-term dewatering at turbine foundations is not anticipated. Further determination of long-term dewatering (if necessary) will be addressed during final geotechnical investigations to be conducted at each turbine location prior to the start of construction. See Exhibit 23(b)(5) for additional information on dewatering methods.

(4) Sources of Water during Construction

Sources of water that may be utilized during construction (e.g., for concrete mixing, fire control, and invasive species wash stations) include wells constructed by the Applicant, water trucks, and/or small ponds on participating properties within the Facility Site. Details associated with the design and layout of facilities for withdrawal, storage and transport of source water will be provided once the Applicant engages a BOP contractor. Any surface or ground water withdrawal system proposed by the Applicant will have a withdrawal capacity below the NYSDEC threshold for a Water Withdrawal Permit (see Exhibit 38).

(b) Surface Waters

(1) Surface Waters Map

Maps showing locations of all surface waters, including intermittent and ephemeral streams (to the extent such streams and wetlands are identified in publicly available data or during on-site wetland delineations), within the Facility Site, are provided in Figures 22-2 and 23-2.[4] Data sources used to generate these maps include publicly

[4] Note: delineated surface waters and mapped surface waters are shown in two separate maps (Figures 22-2 and 23-2, respectively). Significant feature overlap between these datasets reduced clarity when both delineated and mapped surface waters were included in the same map.

available data from Chenango County, NYSDEC, the Environmental Systems Research Institute (ESRI), the USGS, and National Wetlands Inventory (NWI), and stream data collected during on-site wetland and stream delineations. Wetland and stream delineations identified all surface waters (ponds; ephemeral, intermittent, and perennial streams; and wetlands) within the Wetland Study Area. Shapefiles of these data will be submitted to NYSDEC and NYSDPS staff under separate cover. The Wetland Delineation Report includes tabular summary information for all surface waters delineated to fulfill the U.S. Army Corps of Engineers (USACE) requirements.

(2) Description of Surface Waters

The Facility Site is in a high elevation area relative to local relief at the boundaries between two major watersheds. Approximately 91% of the Facility Site lies within the Upper Susquehanna Sub-Basin, while the western edge of the Facility Site (approximately 9%) drains into the Chenango River Sub-Basin. Both the Chenango River and the Upper Susquehanna River basins combine to drain Onondaga, Schoharie, Herkimer, Oneida, Broome, Tioga, Chenango, Madison, Cortland, Delaware, and Otsego counties. These two watersheds, and their rivers and streams, supply clean drinking water in the Mid-Atlantic region.

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 include those more specifically designated (ts) which support trout spawning.

Table 23-2 lists all NYSDEC-mapped streams that cross areas that will be disturbed by the construction of the Facility (i.e., the limits of disturbance). There are no mapped Class AA, AA(t), A, A(t), B, B(t) streams that cross the Facility's limits of disturbance. All NYSDEC-mapped streams within the Facility Site drain into the Upper Susquehanna River Sub-Basin.

Table 23-2. NYSDEC Mapped Streams within the Limits of Disturbance[5]

Stream Name[1]	NYSDEC Classification	Part Item Number	Water Index Number[2]
Kent Brook	C(T)	931-1031	SR-146-3
Trib. of Unadilla River	C	931-1034	SR-146-3
Trib. of Guilford Creek	C	931-1015	SR-146-1
Trib. of Guilford Creek (Moses Brook)	C	931-1015	SR-146-1
Trib. of Unadilla River	C	931-1149	SR-146-3
Trib. of Unadilla River	C	931-1033	SR-146-3

[1] Based on streams from the Water Quality Classifications – NYS GIS layer (downloaded from https://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1118); "Trib" refers to unnamed tributaries within the Study Area that flow into named streams, some of which are located outside the Study Area.
[2] Based on streams from the Water Inventory/Priority Waterbodies List GIS layer (downloaded from `http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1117).

On-site wetland/stream delineations were conducted in the fall of 2018 and spring of 2019, during which data were collected on streams that exist within the Wetland Study Area (i.e., all areas in the Facility Site within 500 feet of areas to be disturbed by construction). For a description of stream and wetland delineation methods and results, see the Wetland Delineation Report (Appendix 22-J). Included in the delineations are portions of the mapped streams listed above in Table 23-2, as well as unmapped intermittent, perennial, or ephemeral streams. Most streams were located within forests and hedgerows, and generally had gentle to moderate gradients. Most streams appear to be intermittent channels that primarily flow during the wet season, with a rocky substrate and well-defined banks.

The Applicant will coordinate with representatives of the NYSDEC, USACE, and NYSDPS to conduct a site visit to review the boundaries of delineated wetlands and streams. Based on the Preliminary Design Drawings (see Exhibit 11), a total of one potential crossing of a NYSDEC-protected stream is proposed. See Exhibit 23(b)(4) for a detailed discussion of potential impacts to streams and Exhibit 23(b)(5) for a discussion of avoidance and minimization measures.

Publicly available data on fish communities in streams associated with the Facility Site are limited. The Upper Susquehanna and Chenango River watersheds support several fish species sought by anglers including brown and brook trout, small- and largemouth bass, yellow perch, and black crappie. The few open water wetlands within the Facility Site likely support a smaller diversity of aquatic species. Much of the Facility is high in the watershed,

[5] Physical water quality parameters, flow rate, biological aquatic resource characteristics (including species of vertebrates and invertebrates, habitat and presence of aquatic invasive species) and other data on these streams is not publicly available. See the Plant and Wildlife Species List (Appendix 22-A) for a description of aquatic vertebrates identified within the Facility Site.

and the streams within the Facility Site are generally small and likely support lower numbers of aquatic species. However, to conservatively represent all species that could possibly occur, fish species documented in the Susquehanna River watershed are included in the Wildlife Species List (see Appendix 11-A). A total of 88 unique fish species were identified as potentially occurring within and adjacent to the Facility Site.

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, 2018a). Of the 22 invasive species included on the list, 12 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*),
- Rock snot (*Didymosphenia geminata*),
- Asian clam (*Corbicula fluminea*),
- Zebra mussel (*Dreissena polymorpha*),
- Quagga mussel (*Dreissena bugensis*),
- Alewife (*Alosa pseudoharengus*), and
- Round goby (*Neogobius melanstomus*).[6]

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. Most of the aquatic habitat within the Facility Site is in the upper portion of the watershed, where water bodies are of insufficient volume to support most of these species.

(3) Drinking Water Supply Intakes

As previously noted, the Applicant sought information from NYSDOH pertaining to public water supplies (including public water supply intakes) which was supplied pursuant to a confidentiality agreement between the Applicant and NYSDOH. In their April 18, 2019 response, the NYSDOH Bureau of Water Supply Protection provided the locations of 10 public water systems within one mile of the Facility Site. See Exhibit 23(a)(2) and Table 23-1 for a

[6] Per NYSDEC, 2018b; Weldy & Werier, 2018; NYIS.INFO, 2018

description of public and private water supply intakes. See Exhibit 23(a)(3) for a description of potential impacts to known public and private water supply intakes.

(4) Impacts to Surface Waters

During the early stages of Facility development, the Applicant considered installing up to 43 turbines within and adjacent to the Facility Site. The decision to reduce the number of turbines installed to 25 has reduced potential impacts to surface waters. Moreover, the Applicant has sited wind turbine foundations, the O&M facility, and the collection and point of interconnection substations to avoid or minimize temporary and permanent impacts to surface waters, to the maximum extent practicable. The Applicant also has attempted to avoid impacts to surface waters associated with the Facility Site by relocating access roads and collection lines to minimize the number of stream crossings. Where stream crossings cannot be avoided, the overall impacts will be minimized by utilizing existing crossings and narrow crossing locations to the extent practicable. In addition, the Applicant will use trenchless technologies (i.e., horizontal direction drilling [HDD], jack and bore, etc.) where feasible to further minimize crossing impacts. As described in Exhibit 22, the construction of the Facility will only have minimal impacts to surface waters and open water wetlands.

During construction, direct or indirect impacts to surface waters will occur as a result of the installation of access roads, the installation of electrical interconnects, 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,
2) siltation and sedimentation due to earthwork, such as excavating and grading activities,
3) disturbance of stream banks and/or substrates resulting from buried cable installation, and
4) the direct placement of fill 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).

Clearing of trees and other woody vegetation around stream and riverbanks could increase the temperature of those waters. 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, including 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 decrease (USGS, 2016). Temperature in streams also influences the water chemistry, including dissolved oxygen levels and chemical reactions. Thirty-one stream segments occur within the limits of clearing for the Facility. 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.

Potential temporary and permanent impacts to streams and open 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 approximately 2,201 linear feet and 13,065 square feet (0.30 acres) of temporary disturbance to perennial, ephemeral, and intermittent streams and up to approximately 731 linear feet and 3,411 square feet (0.08 acres) of permanent disturbance to perennial, intermittent, and ephemeral streams. As stated above, impacts have already been minimized substantially due to changes in the Facility layout (see Table 9-1 for a description of stream impacts avoided by the Applicant). Table 23-3 summarizes stream impacts. Measures the Applicant will take to avoid or minimize impacts at each stream crossing, including collocating Facility components (e.g., access roads and collection lines) and the use of trenchless technologies are discussed in Exhibit 23(b)(5).

Table 23-3. Impacts to Streams

Stream ID[1]	Stream Type[2]	NYSDEC Class (if applicable)	Temp. Impact (square feet)	Temp. Impact (linear feet)	Perm. Impact (square feet)	Perm. Impact (linear feet)	Facility Impacting Resource[3]	Crossing or Avoidance Method[4]	Preliminary Design Drawing (Appendix 11-A) Sheet #
7C	R4	--	141	51	--	--	AR, CL	--	C-204
7D	R4	C - Trib. of Guilford Creek	20	7	--	--	AR, CL	--	C-202
7F	R3	C - Moses Brook	Impacts avoided through trenchless technologies.				CL	Trenchless	C-301A
7K	R4	--	16	19	7	10	AR, CL	--	C-206
7P	R6	--	1	1	58	41	AR	--	C-208
7Q	R4	--	176	67	--	--	CL	Trench	C-301B
7S	R4	--	328	318	--	--	CL	Trench	C-301B, C-302
7W	R5	--	770	75	--	--	CL	Trench	C-302
7X	R4	--	130	82	--	--	CL	Trench	C-301B
8A	R4	--	548	86	--	--	CL	Trench	C-302
8D	R4	--	289	60	--	--	CL	Trench	C-302, C-303A
8E	R4	--	349	95	--	--	CL	Trench	C-303A
8F	R4	--	492	82	--	--	CL	Trench	C-303A
8H	R4	--	435	77	--	--	CL	Trench	C-303A
8N	R3	C - Trib. of Unadilla River	375	68	--	--	CL	Trench	C-303B
8O	R3	C(t) - Kent Brook	Impacts avoided through trenchless technologies.				CL	Trenchless	
8R	R6	--	61	16	--	--	CL	Trench	C-303B

Stream ID[1]	Stream Type[2]	NYSDEC Class (if applicable)	Temp. Impact (square feet)	Temp. Impact (linear feet)	Perm. Impact (square feet)	Perm. Impact (linear feet)	Facility Impacting Resource[3]	Crossing or Avoidance Method[4]	Preliminary Design Drawing (Appendix 11-A) Sheet #
8T	R5	C - Trib. of Unadilla River	119	62	--	--	CL	Trench	C-303B
9A	R4	--	494	62	--	--	CL	Trench	C-305A
9G	R3	C - Trib. of Unadilla River	2310	325	--	--	CL	Trench	C-305A
9H	R4	--	353	69	--	--	CL	Trench	C-305B
9M	R5	--	297	62	--	--	CL	Trench	C-305B
9O	R4	--	155	41	495	108	AR, CL	--	C-216
9Q	R4	--	673	114	564	101	AR, CL	--	C-215
9R	R6	--	65	18	74	20	AR, CL	--	C-215
9U	R4	--	107	56	245	130	AR, CL	--	C-218
10C	R4	--	38	20	239	91	AR	--	C-231
10W	R6	--	244	46	464	74	AR, CL	--	C-229
10Z	R3	C - Trib. of Unadilla River	973	93	1265	155	AR, CL	--	C-228
11B	R3	--	2849	131	--	--	CL	Trench	C-213
11C	R3	--	257	44	--	--	CL	Trench	C-213
Totals:			**13,065**	**2,201**	**3411**	**731**			

[1]Delineation ID assigned by EDR.
[2]R3 = Upper Perennial, R4 = Intermittent, R5 = Unknown Perennial, R6 = Ephemeral
[3]AR = Access Road, CL = Underground Collection Line
[4]All access road stream crossings will meet NYSDEC and/or U.S. Army Corps of Engineers standards, as

As indicated above in Table 23-3, it is anticipated that there will be no impacts to Class C(t) or higher streams. The Applicant will avoid impacts in crossing Kent Brook (Class C(t)) and Moses Brook (Class C) using trenchless technologies. These crossings are shown in the Preliminary Design Drawings (Appendix 11-A) and are detailed in the Wetland and Stream Impact Drawings (Appendix 22-K). The Wetland and Stream Impact Drawings indicate the length of each of these crossings; a narrative description and typical details of the anticipated trenchless technologies to be implemented are provided in Exhibit 34(g) and the Preliminary Electrical Detail Drawings (Appendix 05-B).

There will be a total of five crossings of streams with a NYSDEC-classification of C, which are regulated under Article 15 of the New York Environmental Conservation Law. Of these five crossings, three are associated with buried interconnection lines, while the remaining two are associated with access road construction. These crossings are of minor tributaries of Guilford Creek, Kent Brook, and the Unadilla River. Stream crossings will be conducted in accordance with all applicable laws and regulations. BMPs and other guidelines for Article 15 stream crossings will be developed in consultation with the NYSDEC and NYSDPS. See Exhibit 23(b)(5) for further discussion of avoidance, minimization, and mitigation of impacts to surface waters.

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 steep uplands. However, these impacts are anticipated to be minor because the Applicant will take measures to avoid and minimize siltation, as described in Exhibit 23(b)(5), including developing and implementing a Final SWPPP (see Exhibit 23(c)(1)). In addition, the use of 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 the Wetland and Stream Impact Drawings (Appendix 22-K) and the Preliminary Design Drawings (Appendix 11-A).

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 in Exhibit 23(b)(5), 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 23A). 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.

No dredging is proposed as part of this Facility. Therefore, this application does not identify precautions taken to avoid or minimize the need for dredging.

(5) Measures to Avoid or Mitigate Surface Water Impacts

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. Upgrading existing crossings that are under-maintained/undersized will have a long-term beneficial effect on water quality, as it will help to keep farm equipment or other vehicles out of surface waters. Special crossing techniques, equipment restrictions, herbicide use restrictions, and erosion and sedimentation control measures will be utilized to reduce adverse impacts to water quality, surface water hydrology, and aquatic organisms. In addition, clearing of vegetation along stream banks will be kept to a minimum.

As previously indicated, three of the five proposed crossings of NYSDEC-mapped streams are associated with buried interconnection lines; three are associated with access roads. Impact avoidance and mitigation associated with these types of crossings are described below:

Access Roads

Where access road crossings are unavoidable, crossings will meet the NYSDEC and/or U.S. Army Corps of Engineers requirements. To the maximum extent practicable, crossings will be located at the narrowest portion of the stream in the vicinity of the proposed crossing. Where culverts are required, culverts will be designed per NYSDEC and USACE standards to limit perching and maintain hydrologic connections for aquatic organisms. In addition, the use of appropriate NYSDEC-approved erosion and sediment control details, such as rock outlet protection details (see Appendix 11-A, Preliminary Design Drawings) will limit the potential for scour or erosion. Additional measures documented in the SWPPP (Appendix 21-D) further address this concern and include NYSDEC-approved outlet details and sizing criteria standards.

Buried Collection Line

Where avoidance was not practicable (e.g., due to topography or land ownership constraints) or would result in conflicts with other sensitive resources (e.g., steep slopes, cultural resources, etc.), narrow portions of stream resources were selected wherever practicable. As detailed in Exhibit 23(b)(4), the crossings of Kent Brook (Class C(t)) and Moses Brook (Class C) will be completed with trenchless technologies to avoid impacts to bank vegetation, stream beds, etc. These crossings are shown in the Preliminary Design Drawings and the Wetland and Stream Impact Drawings.

The Applicant will provide final engineering plans to the NYSDEC and NYSDPS regarding each proposed crossing prior to the start of construction or as a Compliance Filing. Stream crossing methods will take into consideration all NYSDEC stream crossing guidelines. Any work prohibition dates associated with the crossing 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 will 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 where Facility construction traverses streams, 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 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 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 Final 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.

The Chenango River and the Upper Susquehanna River, which are located approximately 4 miles east and 5 miles south of the Facility Site, respectively, are both susceptible to frequent and severe flooding. Between 1996 and 2017, there were six severe flood events in Chenango County, and three severe events in adjacent Otsego County (NYS DHSES, 2019).

A floodplain is flat 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 Federal Emergency Management Agency (FEMA) and the NYS Hazard Mitigation Plan Floodplain Mapper.[7] Areas designated as 100-year floodplains are not present within the Facility Site. The nearest 100-year floodplain is located over one mile from the Facility Site along Guilford Creek. To minimize risks associated with flooding, the Applicant has developed a flood mitigation

[7] Available at: https://mitigateny.availabs.org/hazards/riverine.

strategy that focuses on two main components: (1) Facility siting/design and (2) mitigation/minimization measures to be deployed during Facility construction. Each of these components are discussed below.

The Facility layout has been designed to avoid floodplains. No Facility components, including laydown areas, are within designated 100-year floodplains. In addition, the access road layout has been developed with deliberate intent to avoid permanent water crossings wherever feasible. 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.

During construction, the Applicant will deploy various preventative measures to minimize impacts associated with potential flooding events. For example, to minimize sedimentation risks during construction, erosion controls will be reinforced in advance of significant storm events, when feasible. For more information about the erosion and sediment control practices to be implemented during construction, see Exhibit 23(c) and the Preliminary SWPPP (Appendix 21-D). The Facility's Final SWPPP will include comprehensive on-site stormwater management controls designed to handle 1, 2, 10, 25, 50 and 100-year storm events in accordance with SPDES permit requirements. Using controls such as vegetation buffers and infiltration basins, the Facility will not adversely impact the quality or quantity of stormwater runoff from the Facility Site.

(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 appended to this Application (Appendix 21-D). The Preliminary SWPPP includes a discussion of pre-construction requirements, which include ensuring that there is at least one person on site daily to inspect the site's erosion and sediment control practices when soil disturbing activities are being performed. The Preliminary SWPPP provides: an introduction and overview of the proposed project, 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 and green infrastructure practices (e.g., vegetative filters) 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 on 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 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 closer to the start of construction, 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. The Applicant will conduct the detailed engineering necessary to prepare a Final SWPPP, in accordance with the SPDES General Permit, and which will be submitted as a compliance filing.

(d) Chemical and Petroleum Bulk Storage

(1) Spill Prevention and Control Measures

To prevent unintended releases of petroleum and other hazardous chemicals, a Preliminary Spill Prevention, Control and Countermeasure (SPCC) Plan has been prepared that outlines preventative measures and response

procedures in the unlikely event of a release (see Appendix 23-A). 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.[8]

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 or other oils. 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).

(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. Adverse impacts to surface waters can also impact certain biological aquatic resources associated with those surface waters. 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), which includes two species of mussels that are listed as threatened in New York State.

[8] Note, in addition to oil, very limited quantities of other chemicals will be stored on site, as discussed in the SPCC Plan.

The green floater and brook floater mussel have historically been recorded in the vicinity of the Facility. However, as discussed in Exhibit 22(f)(6), no suitable habitat for these species will be disturbed by the construction or operation of the Facility. Sedimentation and changes in water hydrology are the main threats to these species, and these 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.

As detailed in Exhibit 23(b)(2), none of the species included in the Common Aquatic Invasive Species of New York list were observed during on-site delineations or field investigations. As no aquatic invasive species were identified within the Facility, 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 in Exhibit 23(b)(5). These measures protect aquatic species by protecting the water quality in the habitats where they occur and by ensuring avoidance of protected streams during the times of the year when fish are likely to be migrating and/or spawning. Surface water impacts during Facility operation will be limited to those permanent impacts associated with built facilities (see Exhibit 23(b)(4)). Some aquatic habitat will be permanently lost as a result of placing Facility components in surface waters. However, this loss of habitat has been minimized through careful siting and design. The majority of the Facility will be located high in the watershed, and Facility components have been sited away from larger streams and rivers that could potentially support threatened aquatic species.

With respect to invasive species, most aquatic invasive species are introduced to lakes, and then travel to streams and rivers. Aquatic invasive species are typically spread by ships, boats, barges, aquaculture, recreation, and connected waterways. These activities are infrequent in small headwater streams.

As the common pathways for invasive species introduction are not applicable to the construction or operation of the Facility, the risk of spreading invasive species is low. No significant impacts to aquatic resources from invasive species are anticipated. 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 assure compliance with applicable water quality standards (6 NYCRR Part 703).

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 Exhibit 22.

(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. Therefore, information related to cooling water systems, intake, and discharge is not included in this Application.

REFERENCES

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