GARNET ENERGY CENTER

Case No. 20-F-0043

1001.21 Exhibit 21

Geology, Seismology, and Soils

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Exhibit 21: Geology, Seismology, and Soils

This Exhibit will track the requirements of Final Stipulation 21, dated March 5, 2021, and therefore, the requirements of 16 New York Codes, Rules and Regulations (NYCRR) § 1001.21. This Exhibit contains a comprehensive summary of the potential geology, seismology, and soil impacts resulting from proposed construction of the Garnet Energy Center. This Exhibit provides identification and mapping of existing geological and surficial soil conditions, an impact analysis, definition of constraints resulting from these geological conditions, and discusses potential impact avoidance and mitigation measures.

Conclusions made within this Exhibit are based on the findings of a geotechnical investigation performed by Terracon Consultants-NY, Inc. (Terracon), conducted during January 2021 and a summary report dated April 20, 2021 (Appendix 21-1). A total of 27 borings and 12 test-pits were completed at the Project Area during the geotechnical exploration, as further detailed in the Preliminary Geotechnical Engineering Report provided as Appendix 21-1. A summary of the borings completed to date is presented in Table 21-1.

Table 21-1. Summary of Test Borings During Project Area Survey

Test Boring No.	Depth of Bore/Test Pit (feet)	Date Completed
GB-1	19.4	1/18/2021
GB-2	18.3	1/18/2021
GB-3	20	1/18/2021
GB-4	20	1/18/2021
GB-5	20	1/16/2021
GB-6	18.9	1/18/2021
GB-7	20	1/19/2021
GB-8	18.9	1/18/2021
GB-9	18.4	1/16/2021
GB-10	18.4	1/15/2021
GB-11	18.4	1/16/2021
GB-12	20	1/16/2021
GB-13	18.3	1/19/2021
GB-14	18.8	1/16/2021
GB-15	18.8	1/14/2021
GB-16	20	1/14/2021
GB-17	18.7	1/14/2021
GB-18	20	1/14/2021

Table 21-1. Summary of Test Borings During Project Area Survey

Test Boring No.	Depth of Bore/Test Pit (feet)	Date Completed
GB-19	18.7	1/14/2021
GB-20	19.3	1/14/2021
GB-21	19.4	1/20/2021
GB-22	19.9	1/19/2021
GB-23	18.3	1/19/2021
GB-24	20	1/19/2021
GSB-1	48.4	1/15/2021
GSB-2	49.5	1/15/2021
GSB-3	48.2	1/15/2021

21(a) Existing Slopes Map

Slope data from the United States Geological Survey (USGS) National Elevation Dataset was analyzed and mapped using Esri ArcGIS software, to delineate existing slopes (0-3 percent, 3-8 percent, 8-15 percent, 15-25 percent, 25-35 percent, and 35 percent and over) on and within a mapped drainage area which may be influenced by Project development and associated interconnections. Digital Elevation Model (DEM) were processed using Esri ArcGIS software to delineate a drainage area and develop slope mapping. The map includes and labels surface water features in and around the Facility area (streams, lakes, rivers, and reservoirs). This data is visually represented in Figure 21-1. Slopes within the Project Area range from 0-3 percent to >35 percent, with the majority of the Project Area (87.5%) occurring on slopes less than 15 percent. Table 21-2, below, presents the percent coverage that each slope range encompasses within the Project Area.

Table 21-2. Percent Coverage of Slope Ranges within Drainage Area

Slope Range (%)	Percent within Drainage Area (%)
0 – 3	40.05
3 – 8	29.34
8 – 15	18.13
15 – 25	8.36
25 – 35	2.79
> 35	1.33
Total	**100**

21(b) Slope Impact Avoidance

Steep slopes exceeding 15 percent grade make up approximately 12.5 percent (303.25 acres) of the Project Area. Project Components are sited to avoid steep slopes to the maximum extent practicable, however approximately 7.76 acres within the Project Area with steep slopes will be graded to slopes of approximately 15 percent or less to allow for solar array construction. Grading will be performed as indicated on the Preliminary Design Drawings presented in Appendix 11-1.

Earth moving and general soil disturbance associated with Project construction activities may increase the potential for wind/water erosion and sedimentation into surface waters and downstream areas. Further, impacts to steep slopes and highly erodible soils may occur due to extreme rainfall or other natural events which could lead to severe erosion and downstream water quality issues. Implementing the erosion and sediment control measures as outlined in the Stormwater Pollution Prevention Plan (SWPPP) will minimize these potential impacts. The SWPPP for this Project is included as Appendix 23-3 and will be updated and filed with the Secretary before construction. In addition, impacts to soil will be further minimized by the following means, as necessary:

- Prior to commencing construction activities, erosion control devices will be installed between the work areas and downslope areas to reduce the risk of soil erosion and sedimentation. Erosion control devices will be monitored continuously throughout construction and restoration for function and effectiveness.
- During construction activities, straw bale dikes, silt fence, and other appropriate erosion control measures will be placed as needed around disturbed areas and stockpiled soils.
- Public road ditches and other locations where Project-related runoff is concentrated will be armored with riprap to dissipate the energy of flowing water and to hold the soil in place.
- Following construction, all temporarily disturbed areas will be stabilized in accordance with approved plans.

Erosion and sediment control measures are described in greater detail within the SWPPP provided as Appendix 23-3 and are depicted in the Preliminary Design Drawings presented in Appendix 11-1.

21(c) Proposed Site Plan

A proposed preliminary Site Plan was prepared and included within the Preliminary Design Drawings presented in Appendix 11-1. The Site Plan shows existing contours at one-foot intervals and proposed contours at two-foot intervals for the Project Area and the location of on-Site interconnection facilities. The Site Plan also identifies, at a scale sufficient to show locations of all proposed infrastructure including construction areas, solar panel locations, access roads, paved and vegetative surfaces, electrical collection line routes, energy storage, and interconnections to existing utility infrastructure. Buildings are not proposed as part of the Project.

21(d) Preliminary Calculations of Cut and Fill

A preliminary calculation was performed utilizing existing and proposed three-dimensional surfaces generated from one-foot contour data to estimate the quantity of cut and fill necessary for Project construction. The cut and fill volumes stated below are differences calculated between the existing ground conditions, based on contemporary and Project specific Light Detection and Ranging (LiDAR) data, and the presumed ground surface character which will be left as a direct result of Project development. Specifically, earthwork quantity calculations were prepared using AutoCAD Civil 3D software. An existing conditions surface was created based on one-foot contours generated from a LiDAR survey of the Project Area. From that data set, a proposed conditions surface was created from the Project grading plan. Differences between these two surface designs indicated the amount of material which will be excavated for construction. Calculations are provided for topsoil, sub-soil and rock layers separately based on information provided in the Cayuga County Soil Survey and the results of the Preliminary Geotechnical Engineering Report.

These calculations do not account for the collection line trenching operations as part of the equation. It is presumed that collection line trenching would return soils to near existing conditions with the backfilling of the trench after collection line placement, negating any net change in the soil strata (similar to procedures implemented on operational solar farms across New York State). Approximately 564,286 cubic yards of material will be excavated from the Project Area. Of this total, approximately 309,483 cubic yards of topsoil and 254,803 cubic yards of sub-soil will be excavated and used as fill for grading and construction in other areas of the Site. Excavated material will be stripped and redistributed to restore the original site grading, to the maximum extent practicable. Approximately 565,568 cubic yards of fill will be required for the proposed construction, resulting in a net earthwork balance of approximately 1,283 cubic yards of fill material needed for construction. Approximately 24,350 cubic yards of gravel fill/crushed stone is needed for access road, substation, and switchyard construction. Section 21(e) details the quantity of fill material to be imported into the Project Area for construction of the access roads, structural bases for foundations, and compacted fill for burial of electric lines.

It should be noted that the calculation of cut and fill assumed that depths of greater than 78 inches were to be considered as indicating bedrock per the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) lower limit of soil survey presented in Keys to Soil Taxonomy (NRCS, 2014). However, in reference to Figure 21-3, actual depth to bedrock throughout the Project Area was identified as greater than 78 inches except in the westernmost array area where bedrock depths of approximately 2 to 3 feet (20 to 39 inches) were identified. In addition, the Preliminary Geotechnical Engineering Report identified bedrock in nine sample locations at depths of eight to 43 feet (96 to 516 inches). Excavations are not expected to reach or exceed the 78 inches.

It is anticipated that no material will be exported from the Project Area and any excess materials from on-Site excavations will be used as fill throughout the Project Area, with the exception of gravel for the access roads, which will consist of imported fill material. It should be noted, however, that the initial design is likely conservative and overstates the amount of cut that will be necessary during construction of the Project, as the access roads and substation will in fact be constructed in both cut and fill conditions.

Invasive Species Management and Control Plan

The Applicant has developed an Invasive Species Management and Control Plan (ISMCP) to outline best practices and control measures for identifying the presence of invasive species in spoil material and for preventing the introduction and spread of invasive species within or outside of the Project Area or interconnections. The ISMCP is provided in Appendix 22-7. The primary purpose of the ISMCP is to control the spread or introduction of invasive species in the excavated materials and avoid spreading and/or transporting invasive species by vectors (mechanisms of species transfer) directly linked to the construction and operation of the Project. The ISMCP will be appended to the Project construction contract, requiring the Contractor to implement the control measures outlined within the ISMCP. The principal construction-related control measure will include prohibiting fill material from being transported off-Site from the Project Area. This action will minimize the potential for introduction and/or transport of invasive species identified within the Project Area to uncolonized regions.

Management actions will be grouped into four main categories including: material inspection, targeted species treatment and removal, sanitation, and restoration. Within each category, specific actions or combinations thereof will be implemented based on best science regarding treatment and control options for a species and its density within the target area. Monitoring for invasive species will be conducted throughout the duration of the Project to ensure that the ISMCP is implemented appropriately and that the goals outlined therein are being met. Identification resources will be made available to Project staff and contractors to facilitate early identification of invasive species. A list of invasive species identified within the Project Area based on previously conducted field surveys is provided in Appendix 22-7. Of note, it should be stated that invasive species identified at the Project Area prior to construction are likely to spread even in the absence of further human intervention. It is therefore necessary to distinguish between natural movement of invasive species and anthropogenic movement caused by Project related construction activities. The ISMCP will propose a goal of a zero-net increase in the number of invasive species present and their distribution in the Project Area resulting from actions directly attributable to Project construction and operation (i.e., significant distances between existing and novel populations such as could not occur through natural dispersal mechanisms).

Post-construction monitoring will be conducted in year 1, year 3, and year 5, following completion of construction and restoration. If after five years post-construction, all invasive species control requirements have not been achieved, the Applicant will evaluate the likely reasons for these results in consultation with NYSDEC, New York State Department of Agriculture and Markets (NYSAGM), and DPS and submit an “Invasive Species Remedial Plan” to the Secretary. The “Invasive Species Remedial Plan” will describe the likely reasons for not achieving NYSDEC requirements, the actions necessary to correct the situation, and the schedule for conducting the remedial work. The “Invasive Species Remedial Plan” will be implemented according to the specified schedule.

21(e) Description and Preliminary Calculation of Fill, Gravel, Asphalt, and Surface Treatment Material

The existing site topography is derived from LiDAR survey data of the Project Area. Proposed topography/final grade was developed based on the design criteria and constraints required for the anticipated delivery of Project Components and construction of the Project. As stated previously, a preliminary calculation was performed utilizing existing and proposed three-dimensional surfaces generated from one-foot contour data to estimate the quantity of cut and fill necessary for Project construction.

Fill material will be required for several purposes including subgrade material for access roads and temporary laydown areas, burial of electrical lines, structural bases for solar array foundations, and site grading to achieve necessary construction grades. Based on the calculation of cut and fill, the material excavated from the site will be utilized for fill for the Project Area and interconnections. Importing additional graded fill material will be required for the construction of permanent access roads and the substation and switchyard. It is anticipated that approximately 565,568 cubic yards of fill will be required for construction of the Project Area and interconnections. Approximately 24,350 cubic yards of crushed stone/gravel fill will be imported from off-Site for construction of the access roads, substation, and switchyard. Excess material from excavations will be distributed across disturbed areas and blended into existing topography to return each area to its pre-construction condition to the maximum extent practicable, or as described in the Preliminary Design Drawings, provided in Appendix 11-1.

Imported structural fill (e.g., gravel) should contain no particles larger than three inches and less than 20 percent, by weight, of material finer than a No. 200 mesh sieve. Non-frost susceptible (NSF) fill should contain less than 5 percent material finer than a No. 200 mesh sieve. The imported materials should be free of organic matter and debris including recycled concrete, asphalt, bricks, glass, and pyritic shale rock. Additional laboratory testing will be required to determine if the on-Site soils are suitable for use as structural fill on site. Crushed stone imported as fill should be uniform, consisting of ¾-inch angular particles wrapped in geotextile fabric.

Additionally, imported surface material and concrete (used for footings and foundations) will also constitute as fill for the Project. The quantity of gravel and surface treatment materials was estimated based on the preliminary Site Plan. The estimated quantity of each imported material is presented in Table 21-3.

Table 21-3. Estimated Quantity of Imported Material

Imported Material	Quantity (yd^3)
Gravel	24,350
Surface Material	1,283
Concrete	5,093
TOTAL	**30,726**

At this time, it is assumed that large off-road dump trucks with an approximate capacity of 22 cubic yards will be the primary truck used to transport materials throughout the Project Area. As such, it is presumed that approximately 1,107 truckloads would be required to transport imported gravel fill material into the Project Area throughout the duration of construction. Additionally, 59 truckloads of surface material will also be brought into the Project Area utilizing these truck types. The concrete trucks presumed to be utilized for this Project have a capacity of approximately 8 cubic yards and weigh 70,000 lbs. An estimated 5,093 cubic yards of concrete will be required for this Project. Therefore, 637 concrete truckloads will also be necessary to transport concrete materials on-Site. Note that 4,143 cubic yards of concrete will be used for fence posts. This concrete will come from bags of concrete mix, mixed right at the location of each fence post. Only approximately 950 cubic yards of concrete will be transported via wet concrete trucks and will be utilized for the substation and switchyard foundations.

21(f) Description and Preliminary Calculation of Fill, Gravel, Asphalt, Cut, or Surface Treatment Materials to be Removed

Based on the preliminary cut and fill calculations performed in Section 21(d), it is not expected that any on-Site material will be removed from the Project Area during construction. It is not expected that excess topsoil will be stripped from the ground surface where fill will be placed. Stripped topsoil will be replaced in kind, to the maximum extent practicable as existing soils are suitable for reuse as backfill. This material will be temporarily stockpiled and contained by erosion and sediment controls along the construction corridors and incorporated in the site restoration where applicable, as described in further detail on the Preliminary Design Drawings provided in Appendix 11-1.

During restoration of the Project, all excess topsoil materials will be regraded to approximate pre-construction conditions in order for the site character and drainage areas to be returned to existing conditions to the maximum extent practicable.

As stated in Section 21(e), imported structural fill (e.g., gravel) should contain no particles larger than three inches and less than 20 percent, by weight, of material finer than a No. 200 mesh sieve. The imported materials should be free of organic matter and debris including recycled concrete, asphalt, bricks, glass, and pyritic shale rock. Additional laboratory testing will be required to determine if the on-Site soils are suitable for use as structural fill on site.

21(g) Construction Methodology and Excavation Techniques

The proposed start date for the construction of the Project is currently late 2022. Project excavation and construction will be performed in several stages and will include the main elements and activities described below.

Location and Extent of Horizontal Directional Drilling Methods

The Applicant is proposing to utilize trenchless excavation techniques, otherwise known as horizontal directional drilling (HDD), on the Project to route 34.5-kilovolt (kV) collection circuits under obstacles including an existing pipeline, roads, streams, and wetland features. The HDD drill is usually passed four to six feet below ground surface (BGS). The HDD method was chosen because it has proven to be a safe and efficient method of crossing roads, railroads, streams, wetlands, and other environmentally sensitive areas with minimal surface impact. Fifteen preliminary HDD locations have been proposed for the Project at the crossing of stream S-NSD-7 and wetland W-JJB-3, Egypt Road and County Route 38, as well as two separate locations along Spook Woods Road and Montana Road, three separate locations along Cooper Street, and four separate locations along Slayton Road.

Refer to the Preliminary Design Drawings in Appendix 11-1 for preliminary HDD locations and a typical HDD equipment layout diagram. Other areas may also be included, as identified in a Compliance Filing, where topographical or environmental constraints dictate that HDD installation methodology is the best construction practice.

Inadvertent Return Plan for HDD

The HDD process involves the use of water and bentonite (a naturally occurring clay) slurry as a coolant and lubricant for the advancing drill head. The slurry also helps to stabilize the bore and aids in the removal of cuttings during the drilling process. The specific bentonite material to be used for HDD has not been chosen at the time of this Application, however safety data sheets (SDS) will be provided in the Inadvertent Return Plan once the material has been selected by the HDD contractor. Bentonite is nontoxic; however, if released into waterbodies, has the potential to adversely impact fish, fish eggs, aquatic plants, and benthic invertebrates. Therefore, to protect these natural resources, the Applicant has prepared an Inadvertent Return Plan which outlines operational procedures and responsibilities for the prevention, containment, and cleanup of inadvertent releases associated with the HDD process. The objective of this Plan is to:

1. Minimize the potential for an inadvertent release of drilling fluids associated with HDD activities;
2. Provide for the timely detection of inadvertent returns;
3. Protect environmentally sensitive areas (e.g., streams, wetlands) while responding to an inadvertent release;
4. Ensure an organized, timely and “minimum-impact” response in the event of an inadvertent return and release of drilling fluids; and,
5. Ensure that all appropriate notifications are made immediately.

A detailed Inadvertent Return Plan was created for the Project and is included in Appendix 21-2 of this Application. Details within the Plan indicate:

- Site personnel responsibilities;
- Effective training regimes for handling an inadvertent return;
- Proposed setbacks of HDD operations in relation to stream banks, drinking water wells, and other known potentially sensitive receptors;
- Typical HDD staging layout;
- Mitigation measures to prevent inadvertent releases;
- Equipment and containment materials which will be utilized in the event of an inadvertent return;
- An outline on effective response measures for an inadvertent release;
- A list of parties to be notified at the unlikely event of an inadvertent return;
- Details outlining an effective clean up and restoration strategy;
- Steps on construction restart and avoidance of future inadvertent returns; and

- Effective documentation of the incident.

Although HDD has proven to be a safe and reliable method of crossing surface features avoiding impacts, there is a remote risk for inadvertent releases of drilling fluid to the surface, which can have a detrimental impact on the environment. These releases occur as a result of seeps which can form when pressure in the drill hole exceeds the capability of the overburden to contain it, or when fluids find a pre-existing fault in the overburden. The likelihood of these situations occurring can be minimized by taking into consideration the soil type and bedrock composition. Bore depth should be determined based on these site-specific factors.

The proposed HDD for the Project has a remote risk of inadvertent release based on the existing site soils and bedrock features. The chance for inadvertent return increases when unfavorable drilling stratum are experienced such as glacial till, highly fractured rock, non-cohesive alluvial material, or cobbles. The soil stratum at the Project Area, as discussed in further detail in Section 21(i), below, is primarily composed of mixtures of silt and sand, some clay and gravel, and contains rock/cobble fragments, with weathered shale bedrock. The surficial and native soils layers are satisfactory for performing HDD operations. The shale bedrock is moderately fractured with close fracture spacing, which may result in difficulties when conducting drilling operations. Geotechnical investigations indicated the depth to bedrock adjacent to the proposed HDD locations ranges from approximately eight feet to upwards of 18 feet deep. The HDD bore depths will remain in the silt, sand, clay, and gravel layers to the maximum extent practicable. Inadvertent return is not anticipated as a result of HDD operations and precautions will be taken to reduce the possibility of a release. Geotechnical factors will be significantly considered when finalizing the HDD bore locations and design in order to reduce the possibility of an inadvertent return event during HDD operations.

Refer to Appendix 21-2 for the Inadvertent Return Plan for this Project.

Construction Phases

<u>Pre-Construction Survey and Environmental Monitoring</u>

Prior to the commencement of Project related construction, an overall site survey will be performed in order to effectively locate and demarcate the exact location of Project Components and routes. This survey will facilitate assembly strategy and construction efficiency. An Environmental Monitor (EM) will be designated during the construction phase of the Project to oversee all construction and restoration activities in order to oversee compliance with all applicable certificate conditions and other permit requirements. Prior to the start of construction at specific sites, the EM, with support of construction management personnel, will conduct site reviews in locations to be impacted, or potentially impacted, by associated construction activities. Pre-construction site review will direct attention to previously identified sensitive resources to avoid (e.g., select wetlands and waterbodies, archaeological, or agricultural resources), as well as the limits of clearing, location of drainage features (e.g., culverts, ditches), location of existing underground pipelines, known locations of agricultural tile lines, and layout of erosion and sediment control measures. Work area limits will be defined by flagging, staking, and/or fencing prior to construction.

The pre-construction walk over will also aid in the identification of any specific landowner preferences and concerns, as applicable. The placement of erosion and sediment control features will also be located during this site review in order to mitigate potential impacts to sensitive sites and also uphold erosion and sediment control State-wide initiatives. The pre-construction site review will serve as a critical means of identifying any required changes in the construction of the Project in a timely manner in order to avoid future delays to Project construction timeframes.

Site Clearing and Preparation

After the pre-construction site review by the EM and construction personnel, wherein the limit of disturbance (LOD) and construction workspaces are established and sensitive resources are identified, Project-related construction will be initiated by clearing brush and woody vegetation within the LOD established for the solar arrays, access roads, electrical collection line routes, and other supporting infrastructure (collection substation, switchyard, laydown yard, etc.). Vegetation cleared within the LOD will be removed, organized, and disposed of on-Site and outside any indicated sensitive sites (see Appendix 11-1). The definitive clearing impacts which will occur as a result of the Project will be based on final engineering design. For more information on clearing impacts, including their description and quantification, refer to Exhibit 22 of this Application.

Topsoil, forest mat and otherwise unsuitable or disturbed materials will be stripped and/or removed prior to placing fill. Stripped materials consisting of vegetation and organic materials will primarily be used to revegetate landscaped areas or exposed slopes after completion of grading operations. Soils which are suitable for reuse as fill will be temporarily stockpiled on site, and later distributed throughout the Project area return disturbed areas to existing grades. Additional stripped materials containing vegetation or organic matter may be used to revegetate landscaped areas or exposed slopes following construction and grading.

Laydown Yard Construction

Laydown yard areas were selected for ease of accessibility, strategic location in the construction workflow, relatively flat ground surface, occurrence outside of sensitive resources (wetlands, waterbodies, cultural areas, etc.), and containing limited shrubby or woody vegetation in order to reduce impacts to natural vegetation areas. A majority of the laydown yard areas are situated within agricultural areas or within old fields left fallow.

Laydown yards will be developed by stripping and stockpiling the topsoil (stockpiles will be stabilized per the SWPPP) and grading the subsoil (as necessary). Geotextile fabric and gravel fill will then be put in place to create level working areas for the staging of temporary construction trailers, equipment, and materials. Laydown areas will also be utilized for contractor parking. Refer to the Preliminary Design Drawings in Appendix 11-1 for the locations of laydown yards.

Upon completion of the construction phase of the Project, the gravel fill and geotextile fabric will be removed, and topsoil stockpiles will be utilized to return laydown areas to existing grades and conditions. Subsoils at laydown yards staged in active agricultural areas will be “ripped” to reduce compaction caused by construction of the Project. Active agricultural lands will be restored in accordance with the NYSAGM Guidelines for Solar Energy Projects – Construction Mitigation for Agricultural Lands Revision 10/18/2019, to the maximum extent practicable.

Access Road Construction

Access roads will be constructed to provide access from existing roadways for the Project. The new gravel access roads will be constructed to reach the proposed solar array location safely and effectively. Road widths will be approximately 12 feet of gravel for array access roads (with a total vehicle clearance width of at least 20 feet), and 20 feet of gravel for substation/switchyard access roads.

Road construction will initially involve the stripping of topsoil and grubbing of stumps, as necessary, after removal of vegetation. All topsoil will be segregated from subsoil and stockpiled (windrowed) along the access road corridor for use in site restoration and soil surface grading.

Following removal of topsoil, exposed subsoils will be graded to the specifications outlined in the site design, compacted for constructability, and surfaced with gravel or crushed stone for intended use as an established Project access road. Geotextile fabric or grid may be installed beneath the road surface where needed in order to provide additional stability support to the access road. Details regarding access road construction are discussed in Exhibit 11 of this Application. Refer to the Preliminary Design Drawings in Appendix 11-1 for the locations of proposed access roads.

If necessary, dewatering of excavations may occur in order to keep the excavations free of standing water and permit a safe and constructible environment. Dewatering methods will involve pumping the water to a dewatering facility located in a predetermined, well-vegetated area away from wetlands, waterbodies, and other sensitive resources. Dewatering facilities will include measures/devices to slow water velocities and trap suspended sediment (e.g., geotextile filter bags). All dewatering activities will also be conducted in accordance with the final Project SWPPP and in accordance with the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity in effect at the time of construction. The use of temporary pump-around techniques or coffer dams will be used during the installation of all access road waterbody crossings. Appropriate erosion and sediment control measures will be installed and maintained according to the final Project SWPPP, which will be finalized during final engineering and prior to construction. In order to facilitate effective draining and surface water management within the access road, culverts and/or water bars will also be utilized where necessary. The access roads will be sloped where appropriate to direct water towards the edge of the road and/or down gradient to minimize the potential for ponding on or adjacent to the access roads.

Solar Array Racking System Construction

The construction of solar array racking systems (the supporting structures on which the solar modules will be mounted) will occur after associated access roads to the predefined array sites have been completed or are substantially in place. Upon access to the predetermined array location, strictly adhering to guidance from the site grading plan, the grading and leveling of the array site location will occur. In keeping with conventional topsoil preservation methods, topsoil will be stripped from the excavation area as in the access road construction operation. Topsoil will be stockpiled and stabilized in accordance with SWPPP guidelines for future use in site restoration efforts.

During excavation, subsoil and bedrock will also be segregated and stockpiled for reuse as backfill and for access road development. As stated previously, stockpiled soils will be located outside of sensitive resource areas and will be stabilized in accordance with the final Project SWPPP. Though none is proposed, if blasting is deemed necessary, all blasting operations will adhere to applicable New York State statutes and regulations governing the use of explosives. See Section 21(j) below for more information on the Project Blasting Plan.

Depending on site soil characteristics, racking posts will be installed by one of four methods. First, the post may be driven directly into the soil. This is the primary method of post installation proposed. If refusal is encountered while driving the posts directly into the subsurface, there are three alternative methods for installation. A helical post (i.e., pile screw) can be installed directly into the subsurface. In cases of bedrock or pile driving refusal, undersized holes can be pre-drilled to an appropriate depth prior to driving the post and then backfilled with cuttings, provided cobbles and boulders are removed from the material. In situations with very hard rock, an oversized hole may need to be pre-drilled and then backfilled with gravel or grouted after the post is installed. Refer to the Preliminary Design Drawings for additional racking information. Based on the findings of the geotechnical investigation, soils may not be conducive to the installation of pile-driven foundations. Some areas are likely to encounter refusal above the required embedment depth, and therefore post-holes should be drilled, and foundations reinforced as described above.

<u>34.5-kV Electrical Collection Line Construction</u>

The construction of the 34.5-kV collection circuits between solar arrays will involve multiple methods including direct burial and open trench methods utilizing equipment such as a rock saw, cable plow, rock wheel, and/or trencher.

Direct burial methods involve the installation of a bundle of electric and fiber optic cable directly into a narrow trench in the ground. Where direct burial is not possible due to site-specific constraints, an open trench will be utilized. Open trench operations involve the excavation, segregation, and stockpiling of topsoil and subsoil adjacent to the cutting of an open trench. Cable bundles are laid at the base of the trench and the trench is backfilled with suitable fill material and any additional spoils are spread out to match existing grades. Refer to the Preliminary Design Drawings in Appendix 11-1 for the location of the collection lines.

Trench breakers will be put into place as necessary along trench lines in order to prevent erosion caused by the lateral movement of runoff of soil strata in the open trench. These breakers will be located within the trench on steep slopes (based on field conditions) above agricultural, cultural, or wetland/waterbody areas to avoid erosion, sediment build up, and the deposition of sediment into any of the predetermined sensitive resources in the Project Area.

Following installation of the 34.5-kV collection line route, areas will utilize strategically positioned topsoil and subsoil piles to return disturbed areas to pre-construction grades. Installation of buried electrical lines would typically require a width of up to 20 feet of vegetation clearing for this Project. However, in areas where buried electrical lines have been routed collinear with proposed access roads, there will be no additional vegetation or soil disturbance beyond what is expected for the predetermined access road construction. All cleared areas along the buried electrical line routes will be restored through seeding and mulching, and areas outside of the Facility fence line will be allowed to regenerate naturally. As previously noted, HDD will also be employed in select areas in order to avoid crossing roads, streams, and wetlands, and to prevent damage to sensitive resources. For more information on HDD drilling, refer to the subsection on *Inadvertent Return for Horizontal Directional Drilling (HDD)* above and the Inadvertent Return Plan located in Appendix 21-2.

<u>Solar Array and Energy Storage Delivery</u>

The solar array segments, racking, inverters, and energy storage components will be delivered to the designated construction locations through use of large big rigs utilizing flatbeds and dry vans (for hardware) and offloaded by crane equipment. No excavation of soil strata or disturbance of bedrock is proposed to occur during this stage of the construction.

<u>Collection Substation and Switchyard Construction</u>

Much like the clearing of laydown areas, substation and switchyard construction will commence with clearing of any woody or shrubby vegetation within the substation footprint. After clearing, the topsoil will be stripped and stockpiled for later use in site restoration. Exposed subsoil will then be graded to specifications outlined in the Project grading plan and foundation areas will be excavated using standard excavation equipment. Construction staging areas for equipment and materials will also be graded and created. Structures will be supported with a combination of shallow and deep foundations. At this stage, the shallow mat/slab foundations will be poured, and deep foundations will be embedded or drilled. After the foundations have set, installation of electrical infrastructure (structural steel skeleton, conduits, cables, bus conductors, insulators, switches, circuit breakers, transformers, control house, etc.) will occur.

During substation and switchyard site finalization, gravel fill/crushed stone will be spread throughout the substation and switchyard surface and a perimeter of chain link fence will be erected for security and safety precautions. Finally, the high voltage linkups will be connected and tested for charge and integrity through electrical control systems in the control house on-Site. Restoration of the adjacent areas impacted by construction back to existing conditions in direct vicinity to the substation and switchyard will be completed using stockpiled topsoil, and the appropriate seed and mulch. Refer to the Preliminary Design Drawings in Appendix 11-1 for the locations of the substation and switchyard.

Blasting Operations

As stated previously, this Project involves excavation of soil for the installation of foundations for the placement of substation facilities. The excavation consists of drilling holes of various sizes and depths for the installation of foundations to support steel structures. Based upon the geotechnical investigation conducted at the Project Area, there is a possibility that the sub-soil may consist of weathered rock or solid bedrock, and therefore blasting may be necessary, specifically in high grading areas.

If rock or bedrock is encountered during excavation, the construction crews will extract and excavate it using a backhoe or other appropriate equipment. However, if the bedrock cannot be extracted with a backhoe, other means may be used for excavation (e.g., pneumatic jacking and/or hydraulic fracturing). Consequently, no blasting will be required if the above procedures are used for the excavation. However, if the rock cannot be excavated using above equipment, it may be necessary to use a blasting method to remove bedrock/rock laden foundation sites. In such cases a blasting plan shall be used. See Section 21(j) below for more details on the Project Blasting Plan.

Subsurface Drain Tile Repair Impact and Repair/Replacement

The Applicant is committed to minimizing impacts to agricultural operations and will work with landowners/farm operators to address unanticipated post-construction impacts. The Applicant will work with affected landowners/farmers regarding potential drainage issues on their properties and will utilize trench breakers in areas of moderate to steep slopes on active agricultural land if deemed prudent (base on field conditions) to provide that the deposition of impacted or stockpiled soils do not occur over agricultural lands.

Existing drain tiles will be identified and located before construction as much as is reasonably possible based primarily on consultation with the landowner. During and after construction operations, any existing drain tiles within the LOD will be checked for damage, and damaged drain tiles will be repaired or replaced as specified in landowner lease agreements and will be performed by qualified drain-tile specialists. The Applicant will coordinate with the landowner to continue to monitor drain tiles post-construction to ensure repairs are properly functioning.

Temporary Cut or Fill Storage Areas

In the initial siting and design process, the strategic placement and design of these components was undergone with the direct strategy of minimizing the amount of areas which require cut and fill operations to occur. As stated previously, the construction and placement of Project infrastructure will require cut or fill to achieve the final grades within the Project Area. A multitude of scenarios would potentially require areas of cut and/or fill including access roads constructed on a side slope, grading areas of the arrays to slopes of 15 percent or less, grading out work areas which are naturally undulatory or crowned, and access roads traversing an existing grade that exceeds the maximum design slope. It is anticipated that approximately 564,286 cubic yards will be fill derived from excavated materials.

Based on site conditions presented in the Preliminary Geotechnical Engineering Report, steel driven piles will be embedded to depths ranging from 7 to 12 feet below existing grade. Permanent access roads will be constructed using a minimum of six inches of crushed gravel over native sub-soils which will be stockpiled for this said use. Where necessary, the native soils will be reinforced with geo-synthetic fabric.

Proper methods for segregating stockpiled and spoil material will be implemented. All excavated soils will be reused in close proximity to where it was unearthed to the maximum extent practicable. This technique will aide in reducing the proliferation of non-native flora to uncolonized areas within Project.

21(h) Delineation of Temporary Cut of Fill Storage Areas

Excavation and grading plans, including design and location of temporary storage of topsoil and subsoil structures, are provided in Appendix 11-1 to this Application. Excess fill materials will be stockpiled and stored for use on-Site. Several storage options may be employed to stockpile topsoil materials as determined appropriate for on-Site conditions during the construction phase including but not limited to silt fencing and straw bale barriers. Concrete waste may be stored in a constructed concrete wash area sited away from wetlands, wetland buffers, and environmentally sensitive areas.

21(i) Characteristics and Suitability of Material Excavated for Construction

Terracon, an engineering services company, conducted a geotechnical investigation at the Project Area. Twenty-four test borings were advanced in the solar array area and three test borings were advanced within the substation area. Based on the findings of the investigation, the subsurface materials that were encountered within the Project Area are suitable for construction of the proposed structures.

Twelve test pits were excavated to approximate depths between 6 and 11 feet. Laboratory corrosion series testing was performed at sixteen locations, and thermal resistivity dry-out curves were performed at ten locations within solar array and substation areas. Infiltration testing was performed at ten locations during the geotechnical investigation within the solar array and substation areas. Field electrical resistivity testing was conducted at thirteen locations within the solar array areas and substation areas.

The results of the corrosion test are detailed in Table 21-4, below. Additional information on the corrosion series testing is provided in Section 21(v) of this Exhibit.

Table 21-4. Results of Laboratory Corrosion Analysis[1]

Boring	pH	Sulfates (ppm)	Sulfides (ppm)	Chlorides (ppm)	Red-Ox (mV)	Total Salts (ppm)	Resistivity (ohm-cm)
GSB-1	7.82	75	Nil	47	693	346	3,880
GSB-2	7.96	51	Nil	53	695	136	9,506
GTP-3	7.41	135	Nil	47	694	427	3,201
GTP-4	7.56	83	Nil	55	695	365	5,335

[1] Reproduced from the Preliminary Geotechnical Engineering Report, Appendix 21-1

Table 21-4. Results of Laboratory Corrosion Analysis[1]

Boring	pH	Sulfates (ppm)	Sulfides (ppm)	Chlorides (ppm)	Red-Ox (mV)	Total Salts (ppm)	Resistivity (ohm-cm)
GTP-6	7.30	47	Nil	35	696	266	4,268
GTP-7	7.03	88	Nil	67	695	262	5,335
GTP-8	7.49	88	Nil	53	693	403	6,693
GTP-9	7.42	77	Nil	65	691	601	4,656
GTP-10	7.61	66	Nil	40	696	130	13,580
GTP-11	7.43	80	Nil	27	695	203	5,529
GTP-12	7.40	102	Nil	93	696	282	4,947
GB-5	7.67	54	Nil	63	688	1148	5,044
GB-5	8.46	94	Nil	25	691	576	6,208
GB-15	7.29	70	Nil	75	690	694	5,044
GB-18	8.15	121	Nil	35	691	687	5,044
GB-21	8.28	80	Nil	65	692	570	7,372

In general, a chloride concentration greater than 500 parts per million (ppm), or a sulfate concentration greater than 2,000 ppm is considered to be indicative of a corrosive environment for most structures. Based on the test results, it appears that a corrosive environment does not exist, and standard Type I/II cement may be utilized on this Project.

Frost depth in the Project Area is 48 inches. The foundations for new site structures will be below this depth to prevent frost heave.

Possibly reworked topsoil was encountered at the ground surface during the investigation. The depth of the topsoil was typically no more than approximately 1.0 foot. This material will be stripped during earthwork so that new structures do not bear on the topsoil.

The geotechnical investigation findings suggest that the three primary strata to be encountered at boring locations are:

- Stratum 1 – Surficial layer consisting of topsoil; possible reworked soil
- Stratum 2 – Native soil, consisting of silt, sand, clay and gravel mixtures with occasional rock/cobble fragments
- Stratum 3 – Completely weathered shale bedrock

Stratum 1 – A thin layer of topsoil containing possible re-worked soil was encountered from the soil surface to a depth of 1 foot for both Standard Penetration Test (SPT) borings and test pits. The stratum contains soil with some indication that the soil has been re-worked.

Stratum 2 – Native Soil was encountered from 0.07 to 49.5 feet BGS for both SPT borings and test pits. This stratum is primarily composed of mixtures of silt and sand, some clay and gravel, and contains rock/cobble fragments. Standard Penetration Testing "N" values in this stratum ranged between 0 and 81 blows per foot.

Stratum 3 – Weathered Rock was encountered from 2 to 48.4 feet BGS for both SPT borings and test pits. This stratum is primarily composed of weathered shale. Standard Penetration Testing "N" values in this stratum ranged from 0 to 86 blows per foot.

Subsurface conditions varied over the Project Area, resulting in the designation of five distinct zones. Zone 1, 2, and 3 soils consisted of medium dense to dense or medium stiff to hard silty, sandy and clay soils over weathered shale. Zone 4 and 5 soils consisted of loose to medium dense or very stiff silty and sandy soils. Borings were encountered to a maximum depth of 50 feet and weathered shale was encountered at depths ranging from 8 to 18 feet.

During the geotechnical investigation, groundwater was encountered at 18 of the boring and test pit locations during drilling at depths ranging from two to 23 feet BGS. Temporary water wells were installed at 7 boring locations to monitor stabilized groundwater levels. The temporary well locations indicated stabilized groundwater levels at depths ranging from soil surface to 5 feet BGS, which would be indicative of the water table depths throughout the Project. Groundwater conditions can change with vary based on factors such as season and weather.

21(j) Preliminary Plan for Blasting Operations

Blasting and/or rock excavation techniques may be required for Project construction based on the results from the geotechnical investigation and proposed excavation depths, specifically in areas requiring significant grading. A preliminary Blasting Plan has been prepared in the event that blasting is determined to be required. The Preliminary Blasting Plan is provided in Appendix 21-3.

Soil conditions present throughout the Project Area indicate suitability for excavation using standard equipment. Terracon doesn't anticipate any problematic circumstances or vast obstructions to pile driving activities during construction in Zones 4 and 5. Areas in Zones 1, 2 and 3 may require pre-drilling of holes for pile-drive supports due to the native soils and/or weathered bedrock and refusal in these areas along with the occurrence of cobbles/boulders. Groundwater is expected to occur during excavations, in addition to instabilities such as sloughing, caving, and raveling. Excavations will likely need bracing and/or additional measures to create a stable working environment. However, in Zones 4 and 5, there is a low likelihood of any difficulties during pile driving activities. Despite the potential to encounter dense soils, it is anticipated that the contractor for this Project can excavate with relatively little difficulty using an excavator, rock saw, cable trencher, or plow. Where bedrock is encountered, it is anticipated to be rippable due to its content, and thus will be excavated using large excavators, rock rippers, or chipping hammers. The method or combination of methods required will be tailored to the structural integrity, depth, and robustness of rock/bedrock encountered.

In the event that blasting is required for construction, the Preliminary Blasting Plan provided as Appendix 21-3, including procedural timeframes for notifying municipal officials, owners of existing infrastructure within the Project Area, and property owners (or persons residing at the location if different) within one-half mile radius of the blasting site of these activities, as well as an assessment of potential blasting impacts, and blasting impact mitigation measures plan, will be used. However, it should be stated that the blasting contractor shall be responsible for generating an overall Contractor Blasting Plan, if required, and also a written site-specific blasting plan if there are differences in selected blasting sites including the subsoil and bedrock conditions. This specification shall also be used for pre-blast surveys, notifications, use of explosives, security, monitoring, and documentation.

Prior to construction, the Applicant will first determine where blasting is required onsite during construction. Subsequently the selected contractor will submit a blast design for a specific area based on field conditions as an Informational Filing. The blast design will specify minimum setbacks from surrounding structures and appropriate mitigation measures for the safety of construction personnel, the public, and identified structures.

Setbacks regarding livestock, residences, and other structures will be determined in accordance with the structure discussed above. Additionally, according to 29 C.F.R. Parts 1910.109 (Explosives and Blasting Agents) and 1910.119 (Process Safety Management); USDOI Rules 816.61–68 and 817.61–68; and the Office of Surface Mining, Reclamation and Enforcement's Blasting Guidance Manual, pre-blasting surveys are required if blasting is to be performed within a ½ mile of structures or residences. A blast design is required to be submitted to the regulatory authority if blasting is proposed within 1,000 feet of any structure used as a dwelling or gathering place outside of the permit area. These regulations will be adhered to for Project blasting, if required.

To minimize impacts, any required blasting shall be designed and controlled to meet the limits for ground vibration set forth in United States Bureau of Mines (USBM) Report of Investigation (RI) 8507 Figure B-1 and air overpressure shall be under the limits set forth in the Conclusion section in USBM Report of Investigation 8485 (USBM RI 8507 and USBM RI 8485).

21(k) Assessment of Potential Impacts from Blasting

The bedrock encountered in the geotechnical survey consisted of weathered shale. Stratums were sampled by coring. The recovered bedrock core was typically strong rock with extremely close to very close fractures and very thin bedding. Blasting and/or rock excavation techniques may be required for Project construction based on bedrock within the Project area, specifically in areas requiring significant grading.

If blasting is determined to be required, the blasting contractor will be responsible for preparing an overall Contractor Blasting Plan for the Project using the Preliminary Blasting Plan provided in Appendix 21-3 as a guide. The Contractor Blasting Plan will be submitted to the Secretary as an Information Filing prior to construction. Impacts from blasting operations may include, but are not limited to, ground vibration, air blast overpressure, generation of fly rock, generation of dust, and generation of noxious gases and chemical residue in the subsurface. The impacts from blasting operations may affect environmental features, aboveground structures, and belowground structures such as pipelines, wells, and drain tiles. Methods to prevent adverse impacts include site-specific design of load/charge configurations, the use of a blasting delay, the use of blasting mats, etc. Federal, state, and Occupational Safety and Health Administration (OSHA) regulations dictating the minimum distance for accessing blasting zones and protecting existing structures from blast impacts will be followed.

The Applicant will conduct pre- and post-blast surveys on structures, wells, septic systems, drain tiles, and pipelines within one-half mile radius of the blasting area if requested by the property owner. Any damage determined to be a result of the blasting activities will be repaired. The Applicant will make all reasonable efforts for complete the post-blast survey within 30 days of a request from a property owner.

21(l) Identification and Evaluation of Reasonable Mitigation Measures Regarding Blasting Impacts

The utilization of blasting techniques may be required for this Project. Should blasting be required, an investigation and evaluation of reasonable mitigation measures will be provided with the Contractor Blasting Plan. To minimize impacts, blasting shall be designed and controlled to meet the limits for ground vibration set forth in the United States Bureau of Mines (USBM) Report of Investigation (RI) 8507 Figure B-1 and air overpressure shall be under the limits set forth in the Conclusion section in USBM RI 8485. Mitigation measures will include alternative technologies and/or relocation of structures in order to eliminate the need for blasting. Where reasonable alternative measures cannot be employed, blast mats and backfill will be utilized to control any excessive rock movement where blasting occurs in close proximity to identified structures. Additionally, if blasting is determined to be required for Project construction, the Applicant will develop a plan for securing compensation for damages that may occur as a result of blasting, including pre- and post-blast property surveys, if applicable.

21(m) Regional Geology, Tectonic Setting, and Seismology

In addition to the Preliminary Geotechnical Engineering Report in Appendix 21-1, several existing published sources were used to better understand regional geology, tectonic setting, and seismology within the Project Area. The sources include the Soil Survey of Cayuga County (USDA 1971), statewide bedrock geology mapping (NYSM/NYS Geological Survey, 1970), New York State surficial geology mapping (NYSM/NYS Geological Survey, 1970), 2014 New York

State Department of Homeland Security and Emergency Services (DHSES) Hazard Map, and USGS Earthquake Hazard Program (USGS, 2015).

Regional Geology

The Project Area is located within the Ontario lowland of New York State. The Ontario lowland is located south and east of Lake Ontario. The terrain is highly variable with elevations generally ranging from 246 feet to 1,100 feet above sea level. The landscape is composed of glacial features such as drumlin fields, moraines, kames, glacial lake plains, and kettles, with beaches and sand dunes bordering Lake Ontario. The Ontario lowlands are bordered to the north by the Tug Hill Transition and the Upper St. Lawrence Valley, east by the Mohawk Valley, west by the Erie-Ontario Lake Plain, and to the south by the Finger Lakes Uplands and Gorges (BPlant).

Publicly available surficial geologic mapping suggests that the Project Area is primarily kame, swamp, and till deposits. Kame deposits consist of kames, eskers, kame terraces, kame deltas, and coarse to fine gravel and/or sand. These deposits have a general thickness of 10 to 30 meters with lateral variability in sorting, coarseness, and thickness. These deposits tend to be locally cemented with calcareous cement. Swamp deposits consist of peat-muck, organic silt and sand in poorly drained areas, and may overlay marl and lake silts. These deposits have a general thickness of two to 20 meters and has a potential to be instable. Till deposits have variable texture including clay, silt-clay, boulders, etc. These deposits are relatively impermeable with potential land instability on steep slopes. The thickness generally ranges from one to 50 meters. A detailed description of the soils present in the Project Area is provided in Section 22(q). Bedrock material within the Project Area consists of Vernon Formation composed of shale and dolostone.

Tectonic Setting and Seismology

According to USGS Seismic Hazards database (USGS 2018), the Project Area is in an area of low seismic activity with a 2 percent probability of a magnitude 5.0 earthquake occurring in the next 50 years of peak acceleration exceeding 6 percent of the force of gravity. This indicates low probability for seismic activity and bedrock shift in the vicinity of the Project Area. In addition, the USGS Earthquake Hazards Program does not list any faults within the vicinity of the Project Area. Refer to Figure 21-4 for seismic hazards mapping of the Project Area and surrounding area. No faults were identified in the vicinity of the Project Area in a review of publicly available fault mapping data provided by the USGS.

(1) Underlying Carbonate Formation of the Ontario Lowlands

No specific karst features were observed in the Project Area during site investigations. The USGS delineates a narrow band of carbonate rocks with karst potential, which extends east to west across the state from Albany to Buffalo, following the Onondaga Limestone. This underlying geology creates the potential for sinkholes, caves, or other karst features at varying densities. Land subsidence, or sinkholes, are more commonly observed in karst formed by soluble or evaporated rock. Carbonate rock, consistent with that found within the Project Area is less soluble and takes more time to form. Collapses are relatively rare, with the most recent occurrence in New York State reported over 20 years ago (DHSES, 2014). Publicly available mapping indicates that karst topography underlies the Project Area or the surrounding county (Weary and Doctor 2014). The karst features mapped within the Project Area have been designated by USGS as carbonate rocks buried under less than 50 feet of glacially derived insoluble sediments in a humid climate (see Figure 22-5). As indicated above, no specific karst features were observed in the Project Area during site geotechnical investigations. Drilling and excavations for the Project are not expected to extend 50 feet below the ground surface, therefore impacts to the carbonate formations are not anticipated. The Applicant will minimize and avoid construction activities and excavation in karst-prone areas wherever possible through the use of best management practices.

(2) Karst Conditions Assessment

No specific karst features were observed in the Project Area during site investigations. Construction activities such as excavation, HDD, post installation, and in the unique circumstance, blasting, have the potential to increase sediment discharge, create loose or unstable soils, open voids in soils, and lower the water table. Impacts to karst features and aquifers may include sedimentation within caves, water quality deterioration, landform destruction, sinkhole development or collapse, and decreasing the amount of available water. The Applicant will minimize and avoid construction activities and excavation in karst-prone areas and aquifer regions wherever possible through the employment of best management practices. An assessment of the Project Area did not identify vulnerable karst features such as caves, sinkholes, and fractures.

The closest primary aquifer is the Baldwinsville Aquifer approximately 4.2 miles east of the Project Area and a principal aquifer crosses through the north-central portion to southwest corner of the Project Area. Impacts to aquifers are not anticipated as a result of excavation, HDD operations, limited blasting operations, and other soil disturbance activities due to their relative location to the Project Area. General risks to karst features and aquifers associated with HDD include creating loose, unstable soils and open voids along the drill path.

More specifically, there may be a loss of drilling fluid to cave areas within a karst feature, creating fractures within the bedrock and possible sinkhole formation. Although HDD has proven to be a safe and reliable method of crossing surface features with very minimal impact, the potential still exists for inadvertent releases of drilling fluid, which can have a detrimental impact on the environment. These releases typically occur as a result of seeps that can form when pressure in the drill hole exceeds the capability of the overburden to contain it, or when fluids find a pre-existing fault in the overburden. Bore depths for HDD will consider site-specific factors such as soil type and bedrock composition; however, an appropriate minimum depth based on site conditions in sound soil should be sufficient to prevent an inadvertent release and impacts to karst areas and aquifers. The subsurface conditions found within the borings drilled near the proposed HDD locations generally consisted of silt, sand and clay soils. Because HDD is not proposed in areas of the site where evidence of karst features is found, risks to karst features from HDD are not anticipated. Refer to the Preliminary Design Drawings in Appendix 11-1 of the Application for additional information on the HDD crossing methods, and the Inadvertent Return Plan in Appendix 21-2, which outlines the operational procedures and responsibilities for the prevention, containment, and cleanup of an inadvertent release.

Risks and impacts to karst features have the potential to occur as a result of excavation, post installation operations, HDD operations, limited blasting operations, and other construction-related soils disturbance activities where exposed rock exists. The risks and impacts of post installation to karst formations are generally limited. The main risk associated with post installation is the potential for highly variable depths to rock which was indicated in select areas in the borings. Karst formations can make achieving the required post lengths for the required capacity challenging. The piles will be embedded to a depth of approximately 7 to 12 feet and, therefore, should not impact any potentially unmapped karst features which could be present due to the shallow pile depths.

If blasting operations were to occur, blast-induced vibration and shock waves may result. Blasting could potentially cause fracturing of bedrock and limit ground-water availability and quality. The HDD locations proposed for the Project are not located within the areas containing known karst formations. The subsurface conditions found within the borings drilled near the proposed HDD locations generally consisted of glacial till and glacio-lacustrine deposits. Since HDD is not proposed in areas with evidence of karst features, risks to karst features from HDD are not anticipated.

As described in Exhibit 23 and Appendix 23-3 (SWPPP) of the Application, potential impacts to the local water table during the construction phase of the Project can be avoided and mitigated through the use of best management practices (BMPs) and the specific measures outlined in the Preliminary SWPPP. The Applicant will employ best management practices including utilization of erosion and sediment controls, stormwater management, and avoidance of sensitive features to preserve the existing geologic character of the Project Area wherever possible. Stormwater management features proposed for the Project will route stormwater around or away from earth disturbing activities and will slowly filter stormwater through the soil, preventing inundation of groundwater to underground features. Disturbed areas will be stabilized as soon as possible to prevent the transport of sediment and silt, and the Project Area will be revegetated following the completion of construction. In areas of excavation, trench breakers will be utilized to prevent erosion caused by the lateral movement of runoff of soil strata in the open trench. These breakers will be located within the trench on steep slopes above agricultural, cultural, or wetland/waterbody areas to avoid erosion, sediment build up, and the deposition of sediment into any of the predetermined sensitive resources in the Project Area.

The Project Area is located within an evaporite basin composed of buried evaporite rocks up to 7,000 feet below ground, as well as carbonite rocks buried beneath up to 50 feet of glacially derived insoluble sediments (Weary and Doctor, 2014). The carbonate rock areas are overlain by thin deposits of glacially derived sediments. In areas of evaporite basins, human activities such as fluid injection or the occurrence of leakage from well casings can cause the formation of large solution voids due to the physical properties and very high solubility of the evaporate ricks. Collapse of the voids is known to occur up to the surface from depths greater than 1,000 feet below the surface.

The underlying stratigraphic unit at the Project Area is the Vernon Formation, which is part of the Cobleskill Limestone and Salina Group with depths up to 700 feet. The Vernon Formation of the Salina Group contains at least four eurypterid-bearing black shale horizons. The Vernon Formation consists of red shale with local beds or lenses of green shale, dolomite, sandstone, or gypsum.

The Preliminary Geotechnical Engineering Report states that conditions encountered through the investigation are consistent with publicly available mapped surficial and bedrock geology. Near the surface, fine-grained sediments have the potential to become unstable during typical construction activities, especially following storm and precipitation events. Additionally, grading of these sediments could lead to possible undercutting if performed during the winter and spring months. As previously stated, best management practices, such as erosion and sediment control measures, will be used to minimize or mitigate any impacts to fine-grained sediment throughout the construction process.

21(n) Construction and Operation Impacts on Regional Geology

A Preliminary Geotechnical Engineering Report has been completed and is included in Appendix 21-1. In general, the conditions encountered are favorable for the Project. The available information suggests that the solar array areas will be underlain by sand and silt with varying amounts of gravel, cobbles, and possible boulders, potential very dense soil, and shallow, weathered bedrock, primarily in Zones 1 through 3 as described in Section 21(i) above and in the Preliminary Geotechnical Engineering Report. Based on the subsurface conditions encountered during the investigation performed to date, it appears that there is the risk of refusal of the installed posts within the proposed array areas within Zones 1 through 3. The recommended alternative to driven posts is pre-drilling the posts. A low likelihood of refusal is anticipated in Zones 4 and 5.

Given the nature of construction associated with Project development, minimal adverse impacts to regional geology and soils are expected during the construction phase, and little to no temporary or permanent impacts are expected once the facility is operational. Project facilities will be designed and sited to avoid or minimize impacts to geology, topography, and soils within the Project Area to the maximum extent practicable.

21(o) Seismic Activity Impacts on Project Location and Operation

The USGS Earthquake Hazard Program does not list any faults within the vicinity of the Project Area. Soils and bedrock encountered at the Project are consistent with a seismic site classification of D according to Section 20.4 of the American Society of Civil Engineers (ASCE) 7 and the International Building Code (IBC), indicating minimal potential for collapse under seismic loading. The racks that hold the energy storage system modules will be braced to the floor and to adjacent racks. In addition, prior to construction, seismic calculations are performed to ensure the bracing is sufficient for the given site location. In addition, the USGS Earthquake Hazard Program does not identify any young faults within the vicinity of the Project Area. Therefore, the impact due to seismic activity is considered to be negligible. Also, the design of current solar array technology allows for operational control and emergency shut off in case of an emergency such as a significant seismic event.

21(p) Soils Types Map

Figure 21-2 delineates soil types and areas of Prime Farmland within the Project Area utilizing the USDA NRCS Web Soil Survey application. A detailed discussion of each soil type is provided in Section 21(q), below.

21(q) Soil Type Characteristics and Suitability for Construction

Information regarding on-Site soils was obtained from on-Site investigations conducted by Terracon, and from existing published sources, including the Soil Survey of Cayuga County (USDA 1971) and USDA Web Soil Survey (2020).

The Soil Survey of Cayuga County, New York (USDA 1971) and the USDA Web Soil Survey indicate that all proposed facilities and solar arrays are sited within 42 soil types. The surveys indicate that the Project Area predominantly consists of gravelly, sandy, and silt loams, ranging from very poorly drained to excessively drained soils.

Alden series consists of very deep, very poorly drained soils. These soils are often found on depressions and low areas on upland till plains. The potential for surface runoff is negligible to very low. Alden soils are nearly level with slopes ranging from zero to three percent. Seasonal saturation occurs at the soil surface from November through June. Ponding is frequent in this series. Depth to carbonate rocks is greater than 40 inches.

> **Ac** is Alden mucky silt loam with zero to three percent slopes, found on toe slope depressions. These soils are typically up to 60 inches in thickness. The parent material consists of a silty mantle of local deposition overlying loamy till. Depth to a restrictive layer is greater than 80 inches. Shrink-swell potential is low and frost action potential is high. This soil has high risk of corrosion to steel. These soils are very poorly drained. This soil is rated as hydric and is considered not prime farmland. This soil unit contains 3.37 percent organic matter. The saturated hydraulic conductivity (Ksat) is moderately high. Refer to Figure 21-2 for NRCS Farmland Classifications.

Ad is Alden mucky silt loam, till substratum with zero to three percent slopes, found on toe slope depressions. These soils are typically up to 60 inches in thickness. The parent material consists of a silty mantle of local deposition overlying loamy till. The depth to a restrictive layer is greater than 80 inches. Shrink-swell potential is low and frost action potential is high. This soil has high risk of corrosion to steel. These soils are very poorly drained. This soil is rated as hydric and is considered not prime farmland. This soil unit contains 3.45 percent organic matter. The Ksat for this soil is moderately high.

Alluvial land (**Al)** is found on flooded plains. These soils are typically up to 70 inches in thickness. The parent material consists of alluvium with highly variable texture. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is high. This soil has high risk of corrosion to steel. These soils are somewhat to very poorly drained. This soil is rated as hydric and is considered not prime farmland. This soil unit contains 0.65 percent organic matter. The Ksat for this soil is high.

Alton series consist of very deep, well drained to somewhat excessively drained soils formed in gravelly glacial outwash deposits. These soils are often found on terraces, kames, alluvial fans, and remnant beach ridges. The potential for surface runoff ranges from very low to very high. Alton soils are variable with slopes ranging from zero to 45 percent. Seasonal saturation does not occur in this map unit. Ponding is frequent in this series. Depth to carbonate rocks range from 40 to 80 inches.

AnB is Alton gravelly sandy loam with three to eight percent slopes, found on outwash plains, proglacial deltas and terraces. These soils are typically zero to 120 inches in thickness. Parent material consists of gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from acidic rocks, with some limestone below 40 inches. Depth to a restrictive layer is greater than 80 inches. Shrink-swell potential is low and frost action is moderate. This soil has high risk of corrosion to steel. These soils are well drained. This soil is not rated as hydric and all areas are prime farmland. This soil unit contains 0.51 percent organic matter. The Ksat for this soil is high.

AnC is Alton gravelly sandy loam with eight to 15 percent slopes, found on outwash plains, terraces and deltas. These soils are typically zero to 120 inches in thickness. The parent material consists of gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from acidic rocks, with some limestone below 40 inches. Depth to a restrictive layer is greater than 80 inches. Shrink-swell potential is low and frost action is moderate. This soil has high risk of corrosion to steel. These soils are somewhat excessively drained. This soil is not rated as hydric and is considered farmland of statewide importance. This soil unit contains 0.51 percent organic matter. The Ksat for this soil is high.

Appleton and Lyons series consist of very deep, somewhat poorly to very poorly drained soils formed in calcareous loamy till as well as calcareous till derived from limestone, calcareous shale, and sandstone. These soils are often found on low ground moraines and on foot slopes of glaciated hills, ridges, and drumlins as well as upland till plains and depressions. The potential for surface runoff is negligible to very high. This soil series experiences seasonal saturation between the soil surface and eight inches below the surface from December to May. Ponding may occur in this series. Appleton and Lyons soils are variable with zero to 15 percent slopes. Depth to carbonates is from 12 to 40 inches and 46 to 81 inches.

AsB is Appleton and Lyons soils with zero to three percent slopes, found on foot slopes of plains, drumlins and ridges. These soils are typically up to 79 inches in thickness. The parent material consists of calcareous loamy lodgement till derived from limestone and shale. Depth to a restrictive layer is greater than 80 inches. Shrink-swell potential is low, and risk of frost action is high. This soil has high risk of corrosion to steel. These soils are somewhat poorly drained and is rated as hydric and is considered prime farmland if drained. This soil unit contains 1.23 percent organic matter. The Ksat for this soil is moderately high.

Cazenovia series consist of deep to very deep, moderately well drained soils formed in loamy till. These soils are often found on till plains. The potential for surface runoff is low to very high. This soil series experiences seasonal saturation at 27 inches from March to May. Ponding is not typical for this map unit. Cazenovia soils are variable with zero to 45 percent slopes. Depth to carbonates is from 18 to 45 inches.

CeB is Cazenovia silt loam with two to eight percent slopes, found on reworked lake plains and till plains. These soils are typically up to 60 inches in thickness. The parent material consists of loamy till that contains limestone with admixture of reddish lake-laid clays or reddish clay shale. Depth to a restrictive layer is greater than 80 inches. Shrink-swell potential is moderate and frost action potential is moderate. This soil has high risk of corrosion to steel. These soils are well drained. This soil is not rated as hydric and all areas are prime farmland. This soil unit contains 1.39 percent organic matter. The Ksat for this soil is moderately high.

CeC is Cazenovia silt loam with eight to 14 percent slopes, found on reworked lake plains and till plains. These soils are typically up to 60 inches in thickness. The parent material consists of loamy till that contains limestone with admixture of reddish lake-laid clays or reddish clay shale. Depth to a restrictive layer is greater than 80 inches. Shrink-swell potential is moderate and frost action potential is moderate. This soil has high risk of corrosion to steel. These soils are well drained. This soil is not rated as hydric and is considered farmland of statewide importance. This soil unit contains 1.39 percent organic matter. The Ksat for this soil is moderately high.

CeC3 is Cazenovia silt loam with five to 14 percent slopes, found on reworked lake plains and till plains. These soils are typically up to 60 inches in thickness. The parent material consists of loamy till that contains limestone with admixture of reddish lake-laid clays or reddish clay shale. Depth to a restrictive layer is greater than 80 inches. Shrink-swell potential is moderate and frost action potential is moderate. This soil has high risk of corrosion to steel. These soils are well drained. This soil is not rated as hydric and is considered not prime farmland. This soil unit contains 1.39 percent organic matter. The Ksat for this soil is moderately high.

Collamer series consist of very deep, moderately well drained soils formed in silty glacio-lacustrine sediments. These soils are often found on lake plains and till plains that have a thick mantle of lake sediments. The potential for surface runoff is low to very high. This soil series experiences seasonal saturation at 21 inches from March to May. Ponding is not typical for this map unit. Collamer soils are nearly level to moderately steep with zero to 25 percent slopes. Depth to carbonates is from 51 to 183 inches.

ClA is Collamer silt loam with zero to two percent slopes, found on lake plains. These soils are typically up to 60 inches in thickness. The parent material consists of silty and clayey glaciolacustrine deposits. Depth to a restrictive layer is greater than 80 inches. Shrink-swell potential is low and frost action potential is high. This soil has high risk of corrosion to steel. These soils are moderately well drained. This soil is rated as hydric and all areas are prime farmland. This soil unit contains 1.07 percent organic matter. The Ksat for this soil is moderately high.

ClB is Collamer silt loam with two to six percent slopes, found on lake plains. These soils are typically up to 60 inches in thickness. The parent material consists of silty and clayey glaciolacustrine deposits. Depth to a restrictive layer is greater than 80 inches. Shrink-swell potential is low and frost action potential is high. This soil has high risk of corrosion to steel. These soils are moderately well drained. This soil is rated as hydric and all areas are prime farmland. This soil unit contains 1.07 percent organic matter. The Ksat for this soil is moderately high.

Colonie series consist of very deep, well drained to excessively drained soils formed in glaciolacustrine, glaciofluvial, or eolian deposits dominated by fine sand and very fine sand. These soils are often found on Wisconsinan age lake plains, dunes, outwash plains, beach ridges, and deltas. The potential for surface runoff is negligible to medium. This soil series does not experience seasonal saturation. Ponding is not typical for this map unit. Colonie soils are nearly level to rolling, with some moderately steep to steep areas with zero to 60 percent slopes. Depth to carbonates is below 40 inches.

CmC is Colonie loamy fine sand with six to 12 percent slopes, found on proglacial beach ridges and deltas. These soils are typically up to 60 inches in thickness. The parent material consists of sandy glaciofluvial or eolian deposits. Depth to a restrictive layer is greater than 80 inches. Shrink-swell potential is low and frost action potential is low. This soil has low risk of corrosion to steel. These soils are somewhat excessively drained. This soil is not rated as hydric and is considered farmland of statewide importance. This soil unit contains 0.55 percent organic matter. The Ksat for this soil is high.

CnB is Colonie fine sandy loam with one to six percent slopes, found on proglacial beach ridges and deltas. These soils are typically up to 60 inches in thickness. The parent material consists of sandy glaciofluvial or eolian deposits. Depth to a restrictive layer is greater than 80 inches. Shrink-swell potential is low and frost action potential is low. This soil has low risk of corrosion to steel. These soils are somewhat excessively drained. This soil is not rated as hydric and all areas are prime farmland. This soil unit contains 0.55 percent organic matter. The Ksat for this soil is high.

Fonda series consist of very deep, very poorly drained soils formed in fine-textured, water-sorted sediments. These soils are often found on glacial lake plains and sediment filled depressions of upland till plains. The potential for surface runoff is negligible to very high. This soil series experiences seasonal saturation at the soil surface from December to May. Ponding is frequent in this map unit. Fonda soils are nearly flat with zero to one percent slopes. Depth to carbonates is from 20 to greater than 44 inches.

Fo is Fonda mucky silt loam with zero to one percent slopes, found on depressions. These soils are typically up to 60 inches in thickness. The parent material consists of clayey glaciolacustrine deposits. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is moderate and frost action potential is high. This soil has high risk of corrosion to steel. These soils are very poorly drained. This soil is rated as hydric and is considered not prime farmland. This soil unit contains 2.36 percent organic matter. The Ksat for this soil is moderately high.

Galen series consist of very deep, moderately well drained soils formed in sandy deltaic deposits. These soils are often found on lake plains. The potential for surface runoff is low. This soil series experiences seasonal saturation at 21 inches from March to May. Ponding is not typical of this map unit. Galen soils are nearly flat with zero to eight percent slopes. Depth to carbonates is greater than 48 inches.

GaB is Galen fine sandy loam with two to six percent slopes, found on proglacial deltas and lake plains. These soils are typically up to 60 inches in thickness. The parent material consists of deltaic deposits with a high content of fine and very fine sand. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is moderate. This soil has high risk of corrosion to steel. These soils are moderately well drained. This soil is not rated as hydric and all areas are prime farmland. This soil unit contains 0.93 percent organic matter. The Ksat for this soil is high.

Hilton series consist of very deep, moderately well drained soils formed in till of Wisconsin age. These soils are often found on till plains and glaciated dissected plateaus. The potential for surface runoff is very low to medium. This soil series experiences seasonal saturation at 21 inches from March to May. Ponding is not typical of this map unit. Hilton soils are variable with zero to 15 percent slopes. Depth to carbonates is from 29 to 48 inches thick.

HlA is Hilton loam with zero to three percent, found on ridges and till plains. These soils are typically up to 79 inches in thickness. The parent material consists of calcareous loamy lodgment till derived from limestone, sandstone, and shale. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is moderate. This soil has high risk of corrosion to steel. These soils are moderately well drained. This soil is not rated as hydric and all areas are prime farmland. This soil unit contains 1.13 percent organic matter. The Ksat for this soil is moderately high.

HlB is Hilton loam with three to eight percent, found on ridges and till plains. These soils are typically up to 79 inches in thickness. The parent material consists of calcareous loamy lodgment till derived from limestone, sandstone, and shale. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is moderate. This soil has high risk of corrosion to steel. These soils are moderately well drained. This soil is not rated as hydric and all areas are prime farmland. This soil unit contains 1.13 percent organic matter. The Ksat for this soil is moderately high.

Lamson series consist of very deep, poorly to very poorly drained soils formed in glaciofluvial, glaciolacustrine, and deltaic deposits. These soils are often found on glacial lake plains. The potential for surface runoff is negligible to very high. This soil series experiences seasonal saturation at the soil surface from December to May. Ponding frequent in this map unit. Lamson soils are nearly flat with zero to three percent slopes. Depth to carbonates is from 24 to 60 inches.

Lf is Lamson mucky fine sandy loam with zero to three percent slopes, found on depressions. These soils are typically up to 60 inches in thickness. The parent material consists of deltaic or glaciolacustrine deposits with a content of fine and very fine sand. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is high. This soil has high risk of corrosion to steel. These soils are very poorly drained. This soil is rated as hydric and is considered not prime farmland. This soil unit contains 2.77 percent organic matter. The Ksat for this soil is high.

Madalin series consist of very deep, poorly drained soils formed in water-deposited materials. These soils are often found on lake plains and depressions in the uplands. The potential for surface runoff is negligible to very high. This soil series experiences seasonal saturation at three inches from December to June. Ponding is not typical of this map unit. Madalin soils are nearly flat with zero to three percent slopes. Depth to carbonates is from 60 to 150 inches.

Mb is Madalin silt loam, sandy subsoil variant with zero to three percent slopes, found on depressions. These soils are typically up to 60 inches in thickness. The parent material consists of silty and glaciolacustrine deposits. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is high. This soil has high risk of corrosion to steel. These soils are poorly drained. This soil is rated as hydric and is considered farmland of statewide importance. This soil unit contains 1.79 percent organic matter. The Ksat for this soil is high.

Minoa series consist of very deep, somewhat poorly drained soils formed in deltaic sediments. These soils are often found on lowland lake plains. The potential for surface runoff is very low to very high. This soil series experiences seasonal saturation at 12 inches from February to April. Ponding is not typical of this map unit. Minoa soils are nearly flat to rolling with zero to eight percent slopes. Depth to carbonates is from 40 to 72 inches thick.

Mf is Minoa fine sandy loam with zero to three percent slopes, found on proglacial deltas on lake plains. These soils are typically up to 60 inches in thickness. The parent material consists of deltaic or glaciolacustrine deposits with high content of fine and very fine sand. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is high. This soil has high risk of corrosion to steel. These soils are somewhat poorly drained. This soil is not rated as hydric and is considered prime farmland if drained. This soil unit contains 1.29 percent organic matter. The Ksat for this soil is high.

Muck

Mr is Muck, deep with zero to two percent slopes, found on marshes and swamps. These soils are typically up to 60 inches in thickness. The parent material consists of deep organic material. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is high. This soil has high risk of corrosion to steel. These soils are very poorly drained. This soil is rated as hydric and is not prime farmland. This soil unit contains 82.50 percent organic matter. The Ksat for this soil is high.

Ms is Muck, shallow with zero to three percent slopes, found on marshes and swamps. These soils are typically up to 60 inches in thickness. The parent material consists of organic material over loamy glacial drift. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is high. This soil has high risk of corrosion to steel. These soils are very poorly drained. This soil is rated as hydric and is not prime farmland. This soil unit contains 48.51 percent organic matter. The Ksat for this soil is high.

Niagara series consist of very deep, somewhat poorly drained soils formed in silty glaciolacustrine deposits. These soils are often found on lake plains and valleys. The potential for surface runoff is high or very high. This soil series experiences seasonal saturation at 12 inches from December to May. Ponding is not typical of this map unit. Niagara soils are variable with zero to 15 percent slopes. Depth to carbonates is from 25 to 50 inches thick.

Na is Niagara fine sandy loam with zero to three percent slopes, found on proglacial lake plains. These soils are typically up to 60 inches in thickness. The parent material consists of silty and clayey glaciolacustrine deposits. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is high. This soil has high risk of corrosion to steel. These soils are somewhat poorly drained. This soil is not rated as hydric and is prime farmland if drained. This soil unit contains 1.58 percent organic matter. The Ksat for this soil is moderately high.

Nc is Niagara ad Canandaigua silt loam with zero to three percent slopes, found on proglacial lake plains and depressions. These soils are typically up to 60 inches in thickness. The parent material consists of silty and clayey glaciolacustrine deposits. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is high. This soil has high risk of corrosion to steel. These soils are somewhat poorly to poorly drained. This soil is partially rated as hydric and is considered prime farmland if drained. This soil unit contains 1.58 percent organic matter. The Ksat for this soil is moderately high.

Ontario series consist of very deep, well drained soils formed in loamy till which is strongly influenced by limestone and sandstone. These soils are often found on convex upland till plains and drumlins. The potential for surface runoff is low to very high. This soil series does not experience seasonal saturation. Ponding is not typical of this map unit. Ontario soils are variable with zero to 60 percent slopes. Depth to carbonates is from 34 to 48 inches.

OfB is Ontario fine sandy loam with three to eight percent slopes, found on ridges and till plains. These soils are typically up to 79 inches in thickness. The parent material consists of calcareous loamy lodgment till derived from limestone, sandstone, and shale. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is moderate. This soil has low risk of corrosion to steel. These soils are well drained. This soil is not rated as hydric and all areas are prime farmland. This soil unit contains 1.15 percent organic matter. The Ksat for this soil is moderately high.

OfC is Ontario fine sandy loam with eight to 15 percent slopes, found on ridges and till plains. These soils are typically up to 79 inches in thickness. The parent material consists of calcareous loamy lodgment till derived from limestone, sandstone, and shale. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is moderate. This soil has low risk of corrosion to steel. These soils are well drained. This soil is not rated as hydric and is considered farmland of statewide importance. This soil unit contains 1.15 percent organic matter. The Ksat for this soil is moderately high.

OnB is Ontario loam with three to eight percent slopes, found on ridges and till plains. These soils are typically up to 79 inches in thickness. The parent material consists of calcareous loamy lodgment till derived from limestone, sandstone, and shale. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is moderate. This soil has low risk of corrosion to steel. These soils are well drained. This soil is not rated as hydric and all areas are prime farmland. This soil unit contains 1.15 percent organic matter. The Ksat for this soil is moderately high.

OnC is Ontario loam with eight to 15 percent slopes, found on ridges and till plains. These soils are typically up to 79 inches in thickness. The parent material consists of calcareous loamy lodgment till derived from limestone, sandstone, and shale. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is moderate. This soil has low risk of corrosion to steel. These soils are well drained. This soil is not rated as hydric and is considered farmland of statewide importance. This soil unit contains 1.15 percent organic matter. The Ksat for this soil is moderately high.

OnD is Ontario loam with 14 to 20 percent slopes, found on ridges and till plains. These soils are typically up to 79 inches in thickness. The parent material consists of calcareous loamy lodgment till derived from limestone, sandstone, and shale. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is moderate. This soil has low risk of corrosion to steel. These soils are well drained. This soil is not rated as hydric and is not prime farmland. This soil unit contains 1.15 percent organic matter. The Ksat for this soil is moderately high.

OtE is Ontario, Honeoye, and Lansing soils with 20 to 35 percent slopes, found on ridges, hills, and till plains. These soils are typically up to 79 inches in thickness. The parent material consists of calcareous loamy lodgment till derived from limestone, sandstone, and shale. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is moderate. This soil has low risk of corrosion to steel. These soils are well drained. This soil is not rated as hydric and is not prime farmland. This soil unit contains 1.15 percent organic matter. The Ksat for this soil is moderately high.

Ovid series consist of very deep, somewhat poorly drained soils formed in moderately fine textured, reddish colored till. These soils are often found on till plains. The potential for surface runoff is high to very high. This soil series experiences seasonal saturation at 15 inches from January to May. Ponding is not typical of this map unit. Ovid soils are variable zero to 15 percent slopes. Depth to carbonates is from 18 to 40 inches.

OvB is Ovid silt loam with two to six percent slopes, found on reworked lake plains and till plains. These soils are typically up to 60 inches in thickness. The parent material consists of loamy till with a significant component of reddish shale or reddish glaciolacustrine clays, mixed with limestone and some sandstone. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is high. This soil has high risk of corrosion to steel. These soils are somewhat poorly drained. This soil is not rated as hydric and is prime farmland if drained. This soil unit contains 1.56 percent organic matter. The Ksat for this soil is moderately high.

Palmyra series consist of very deep, well drained to somewhat excessively drained soils formed in glacial outwash. These soils are often found on deltas, outwash plains, and terraces. The potential for surface runoff is very low to very high. This soil series does not experience seasonal saturation. Ponding is not typical of this map unit. Palmyra soils are variable with zero to 40 percent slopes. Depth to carbonates is from 2 to 4 inches.

PaB is Palmyra gravelly sandy loam with three to eight percent slopes, found on outwash plains, proglacial deltas, and terraces. These soils are typically up to 60 inches in thickness. The parent material consists of loamy over sandy and gravelly glaciofluvial deposits, derived mainly from limestone and other sedimentary rocks. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is moderate. This soil has high risk of corrosion to steel. These soils are well drained. This soil is not rated as hydric and all areas are prime farmland. This soil unit contains 1.41 percent organic matter. The Ksat for this soil is high.

PaC is Palmyra gravelly sandy loam with eight to 15 percent slopes, found on outwash plains, proglacial deltas, and terraces. These soils are typically up to 60 inches in thickness. The parent material consists of loamy over sandy and gravelly glaciofluvial deposits, derived mainly from limestone and other sedimentary rocks. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is moderate. This soil has high risk of corrosion to steel. These soils are well drained. This soil is not rated as hydric and is considered farmland of statewide importance. This soil unit contains 1.41 percent organic matter. The Ksat for this soil is high.

PgB is Palmyra gravelly loam with three to eight percent slopes, found on outwash plains, proglacial deltas, and terraces. These soils are typically up to 60 inches in thickness. The parent material consists of loamy over sandy and gravelly glaciofluvial deposits, derived mainly from limestone and other sedimentary rocks. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is moderate. This soil has high risk of corrosion to steel. These soils are well drained. This soil is not rated as hydric and all areas are prime farmland. This soil unit contains 1.41 percent organic matter. The Ksat for this soil is high.

PgC is Palmyra gravelly loam with eight to 15 percent slopes, found on outwash plains, proglacial deltas, and terraces. These soils are typically up to 60 inches in thickness. The parent material consists of loamy over sandy and gravelly glaciofluvial deposits, derived mainly from limestone and other sedimentary rocks. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is moderate. This soil has high risk of corrosion to steel. These soils are well drained. This soil is not rated as hydric and is considered farmland of statewide importance. This soil unit contains 1.41 percent organic matter. The Ksat for this soil is high.

PmD is Palmyra soils with 15 to 25 percent slopes, found on outwash plains, proglacial deltas, and terraces. These soils are typically up to 60 inches in thickness. The parent material consists of loamy over sandy and gravelly glaciofluvial deposits, derived mainly from limestone and other sedimentary rocks. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is moderate. This soil has high risk of corrosion to steel. These soils are somewhat excessively drained. This soil is not rated as hydric and is not prime farmland. This soil unit contains 1.41 percent organic matter. The Ksat for this soil is high.

PnE is Palmyra, Howard, and Alton soils with 25 to 40 percent slopes, found on valley trains, outwash plains, proglacial deltas, and terraces. These soils are typically up to 60 inches in thickness. The parent material consists of loamy over sandy and gravelly glaciofluvial deposits, derived mainly from limestone and other sedimentary rocks; gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from acidic rocks, with some limestone below 40 inches; as well as gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, containing significant amounts of limestone. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is moderate. This soil has high risk of corrosion to steel. These soils are well to excessively drained. This soil is not rated as hydric and is not prime farmland. This soil unit contains 1.41 percent organic matter. The Ksat for this soil is high.

Phelps series consist of very deep, moderately well drained soils formed in loamy material overlying calcareous, stratified gravel and sand. These soils are often found on glacial outwash. The potential for surface runoff is low. This soil series experiences seasonal saturation at 21 inches from March to May. Ponding is not typical of this map unit. Phelps soils are nearly flat to rolling with zero to eight percent slopes. Depth to carbonates is from 18 to 72 inches.

Pv is Phelps gravelly silt loam with zero to three percent slopes, found on terraces and valley trains. These soils are typically up to 60 inches in thickness. The parent material consists of loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, containing significant amounts of limestone. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is high. This soil has high risk of corrosion to steel. These soils are moderately well drained. This soil is not rated as hydric and all areas are prime farmland. This soil unit contains 1.22 percent organic matter. The Ksat for this soil is high.

Riga and Lairdsville series consist of moderately deep, moderately well drained to well drained soils formed in till. These soils are often found on bedrock-controlled landforms. The potential for surface runoff is moderate to high. This soil series experiences seasonal saturation at 27 inches during March. Ponding is not typical of this map unit. Riga and Lairdsville soils are variable with zero to 45 percent slopes.

RgB is Riga and Lairdsville silt loams with two to six percent slopes, found on benches, ridges, and till plains. These soils are typically up to 33 inches in thickness. The parent material consists of clayey till dominated by reddish, weakly calcareous shale, with glaciolacustrine deposits included in some places. Depth to a restrictive layer is between 20 to 40 inches. Shrink-swell potential is moderate and frost action potential is moderate. This soil has high risk of corrosion to steel. These soils are moderately well drained. This soil is not rated as hydric and is considered farmland of statewide importance. This soil unit contains 2.96 percent organic matter. The Ksat for this soil is moderately high.

RlC3 is Riga and Lairdsville silty clay loams with six to 12 percent slopes, found on benches, ridges, and till plains. These soils are typically up to 33 inches in thickness. The parent material consists of clayey till or cryoturbated, strongly influenced by neutral or calcareous shale. Depth to a restrictive layer is between 20 to 40 inches. Shrink-swell potential is moderate and frost action potential is moderate. This soil has high risk of corrosion to steel. These soils are moderately well drained. This soil is not rated as hydric and is not prime farmland. This soil unit contains 2.96 percent organic matter. The Ksat for this soil is moderately high.

Stafford series consist of very deep, somewhat poorly drained soils formed in sandy glaciofluvial deposits. These soils are often found on deltas and sand plains. The potential for surface runoff is high to very high. This soil series experiences seasonal saturation at 12 inches from January to May. Ponding is not typical of this map unit. Stafford soils are nearly flat with zero to three percent slopes.

St is Stafford fine sandy loam with zero to three percent slopes, found on beach ridges, foot slopes of deltas. These soils are typically up to 60 inches in thickness. The parent material consists of sandy glaciofluvial or glaciolacustrine deposits. Depth to a restrictive layer is over 80 inches. Shrink-swell potential is low and frost action potential is moderate. This soil has high risk of corrosion to steel. These soils are somewhat poorly drained.

This soil is not rated as hydric and is considered farmland of statewide importance. This soil unit contains 1.35 percent organic matter. The Ksat for this soil is high.

Table 21-5. Summary of Soil Types

Map Unit Symbol	Map Unit Name	Slope (%)	Acres within Project Area
Ac	Alden mucky silt loam	0-3	40.1
Ad	Alden mucky silt loam, till substratum	0-3	10.7
Al	Alluvial land	0-5	3.1
AnB	Alton gravelly sandy loam	3-8	24.5
AnC	Alton gravelly sandy loam	8-15	17.5
AsB	Appleton and Lyons soils	0-3	41.3
CeB	Cazenovia silt loam	2-8	12.9
CeC	Cazenovia silt loam	8-14	5.2
CeC3	Cazenovia silt loam, eroded	5-14	6.5
ClA	Collamer silt loam	0-2	12.8
ClB	Collamer silt loam	2-6	1.3
CmC	Colonie loamy fine sand	6-12	3.1
CnB	Colonie fine sandy loam	1-6	7.0
Fo	Fonda mucky silt loam	0-1	2.5
GaB	Galen fine sandy loam	2-6	37.4
HlA	Hilton loam	0-3	16.1
HlB	Hilton loam	3-8	154.6
Lf	Lamson mucky fine sandy loam	0-3	92.9
Mb	Madalin silt loam, sandy subsoil variant	0-3	18.1

Table 21-5. Summary of Soil Types

Map Unit Symbol	Map Unit Name	Slope (%)	Acres within Project Area
Mf	Minoa fine sandy loam	0-3	11.5
Mr	Muck, deep	0-2	344.5
Ms	Muck, shallow	0-3	122.7
Na	Niagara fine sandy loam	0-3	41.9
Nc	Niagara and Canandaigua silt loams	0-3	12.0
OfB	Ontario fine sandy loam	3-8	114.0
OfC	Ontario fine sandy loam	8-15	102.4
OnB	Ontario loam	3-8	266.3
OnC	Ontario loam	8-15	257.6
OnD	Ontario loam	14-20	174.2
OtE	Ontario, Honeoye, and Lansing soils	20-35	130.2
OvB	Ovid silt loam	2-6	1.1
PaB	Palmyra gravelly sandy loam	3-8	7.8
PaC	Palmyra gravelly sandy loam	8-15	11.8
PgB	Palmyra gravelly loam	3-8	50.1
PgC	Palmyra gravelly loam	8-15	81.5
PmD	Palmyra soils	15-25	7.7
PnE	Palmyra, Howard, and Alton soils	25-40	12.8
Pv	Phelps gravelly silt loam	0-3	6.0

Table 21-5. Summary of Soil Types

Map Unit Symbol	Map Unit Name	Slope (%)	Acres within Project Area
RgB	Riga and Lairdsville silt loams	2-6	13.3
RlC3	Riga and Lairdsville silt clay loams, eroded	6-12	5.4
St	Stafford fine sandy loam	0-3	5.2
W	Water	0	1.0

The vast majority of soils in the Project area are sandy or silty loams. Soil drainage among mapped soil units is variable, with approximately 32.5 percent of soils classified as somewhat poorly to very poorly drained. For additional information about agricultural resources within the Project Area, including designated Agricultural District lands, see Exhibit 4 and Exhibit 22 of this Application.

Based on the assumptions outlined in Table 22-2 of Exhibit 22, disturbance to soils from all anticipated construction activities will total approximately 1,199.8 acres. However, of this total, only approximately 23.76 acres will be permanent impacts where soils are converted to access roads, array foundations (posts), and structures, while the remaining will be restored and stabilized following the completion of construction. Actual disturbance will include overlap of some components and will be highly variable based on the specific construction activity, the construction techniques employed, and soil/weather conditions at the time of construction. Additionally, an area of approximately 274.5 acres of grading is proposed. The remaining approximately 2,014.2-acres of land within the Project Area will not consist of permanent structures and will not be graded. Construction techniques will be in place to limit ground disturbances to the minimum amount required to facilitate construction.

Earth moving and general soil disturbance may increase the potential for wind/water erosion and sedimentation into surface waters. Soils within the Project Area exhibit low permeability silt and clay, limited depth to saturation and low to moderate capacity for transmitting water and are therefore rated as being most limited in infiltration capacity for stormwater management.

Implementing the erosion and sediment control measures outlined in the SWPPP will minimize impacts to steeper slopes and any highly erodible soils that may occur in the event of extreme rainfall or other event that could potentially lead to severe erosion and downstream water quality issues. In addition, impacts to soils will be further minimized by the following means:

- Public road ditches and other locations where Project-related runoff is concentrated will be armored with rip- rap to dissipate the energy of flowing water and to hold the soils in place.
- Prior to commencing construction activities, erosion control devices will be installed between the work areas and downslope areas, to reduce the risk of soil erosion and siltation. Erosion control devices will be monitored continuously throughout construction and restoration for function and effectiveness.
- During construction activities, hay bales, silt fence, or other appropriate erosion control measures will be placed as needed around disturbed areas and stockpiled soils.
- Following construction, all temporarily disturbed areas will be stabilized and restored in accordance with approved plans.

Impacts to soil resources will be minimized by adherence to best management practices that are designed to avoid or control erosion and sedimentation and stabilize disturbed areas. In addition, erosion and sedimentation impacts during construction will be minimized by the implementation of an erosion and sedimentation control plan developed as part of the SPDES General Permit for the Facility. Erosion and sediment control measures shall be constructed and implemented in accordance with a SWPPP (in Appendix 23-3). All excavations will comply with state and federal regulations.

Construction excavations may encounter areas of perched groundwater if construction occurs during a time when a seasonally high-water table may be present. In addition, construction during rainy periods may see an increase in perched groundwater due to the low to moderate hydraulic conductivity and low to moderate soil permeability within the Project Area. Temporary de-watering may be required during the construction if perched water, groundwater or seepage is encountered. Open sump pumping method is the most common and economical method of dewatering and is anticipated to be sufficient based on relatively low permeability soils anticipated at the site. As stated previously, the water will be discharged properly to an area identified within the Final SWPPP. Dewatering methods will involve pumping the water to a predetermined well-vegetated discharge point, away from wetlands, waterbodies, and other sensitive resources. Discharge of water will include measures/devices to slow water velocities and trap any suspended sediment. The Project shall not contain any facilities below grade that would require continuous de-watering.

21(r) Facility Construction and Operation Impacts to Drainage Features

A Preliminary Geotechnical Engineering Report has been completed and is included in Appendix 21-1. In general, the conditions encountered are favorable for the Project. The available information suggests that the solar array areas will be underlain by sand and silt with varying amounts of weathered shale and the potential shallow water table. Groundwater was experienced at depths ranging from approximately two feet below ground level to 23 feet below ground level, with several testing locations not encountering groundwater. Infiltration rates experienced at the Project Area varied from no infiltration to seven inches per hour. Based on the subsurface conditions encountered during the investigation performed to date, it appears that the primary geotechnical issue anticipated at the Project is instability in the form of caving, sloughing, and raveling during excavations. in fine-grained soils found at the surface, particularly following precipitation events. The recommendation is to install effective drainage prior to construction, to perform grading operations during drier periods of the year and use geotextile and similar sediment controls to stabilize excavated and disturbed slopes Contractors should also use bracing and sloping measures to create safe and stable working conditions.

Given the nature of construction associated with Project development, minimal adverse impacts to drainage features are expected during the construction phase, and little to no temporary or permanent impacts are expected once the facility is operational. Project facilities will be designed and sited to avoid or minimize impacts to existing drainage features within the Project Area to the maximum extent practicable. Excavations will likely require dewatering, however, impacts due to dewatering activities are anticipated to be minimal and erosion and sediment controls will be employed for dewatering facilities in accordance with the SWPPP. Additionally, the Applicant will adhere to recommendations regarding the protection of drainage features provided by the NYSAGM in their guidance document *Guidelines for Solar Energy Projects – Construction Mitigation for Agricultural Lands Revision 10/18/2019* to the maximum extent practicable.

Guidelines for measures to mitigate impact to existing drainage features during construction, restoration, remediation and decommissioning are provided below.

Construction Requirements

The measures to be followed for the construction of the Project to comply, to the maximum extent practicable, with the NYSAGM's October 2019 guidance document "Guidelines for Solar Energy Projects – Construction Mitigation for Agricultural Lands" are detailed as follows.

- Before any topsoil is stripped, representative soil samples shall be obtained from the areas to be disturbed. The soil sampling shall be consistent with Cornell University's soil testing guidelines, and samples should be submitted to a laboratory for testing PH, percent organic material, cation exchange capacity, Phosphorus/Phosphate (P), and Potassium/Potash (K). The results are to establish a benchmark that the soil's PH, Nitrogen (N), Phosphorus/Phosphate (P), and Potassium/Potash (K) are to be measured again upon restoration. Should soil sampling not be performed, the Applicant will obtain fertilizer and lime application recommendations for disturbed areas at: https://www.agriculture.ny.gov/ap/agservices/Fertilizer_Lime_and_Seeding_Recommendations.pdf.
- Stripped topsoil shall be stockpiled from work areas (e.g. parking areas, electric conductor trenches, along access roads, equipment pads) and kept separate from other excavated material (rock and/or sub-soil) until the completion of the facility for final restoration. For proper topsoil segregation, at least 25 feet of additional temporary workspace (ATWS) will be provided along "open-cut" underground utility trenches. All topsoil will be stockpiled as close as is reasonably practical to the area where stripped/removed and shall be used for restoration on that particular area. Any topsoil removed from permanently converted agricultural areas (e.g. permanent roads, etc.) shall be temporarily stockpiled and eventually spread evenly in adjacent agricultural areas within the project Limits of Disturbance (LOD); however not to significantly alter the hydrology of the area. Topsoil stockpile areas and topsoil disposal areas will be clearly designated in the field and on construction drawings; changes or additions to the designated stockpile areas may be needed based on field conditions in consultation with the Environmental Monitor (EM). Sufficient LOD (as designated on the site plan or by the EM) area shall be allotted to allow adequate access to the stockpile for topsoil replacement during restoration.
    - Topsoil stockpiles on agricultural areas left in place prior to October 31st shall be seeded with Aroostook Winter Rye or equivalent at an application rate of three

bushels (168 lbs.) per acre and mulched with straw mulch at rate of two to three bales per 1000 square feet.

    - Topsoil stockpiles left in place between October 31st and May 31st shall be mulched with straw at a rate of two to three bales per 1000 square feet to prevent soil loss.

- The surface of access roads located outside of the Project's security fence and constructed through agricultural fields shall be level with the adjacent field surface. If a level road design is not feasible, all access roads should be constructed to allow a farm crossing (for specific equipment and livestock) and to restore/ maintain original surface drainage patterns.
- Culverts and waterbars shall be installed to maintain the natural drainage patterns.
- Vehicles or equipment will not be allowed outside the planned LOD without the EM seeking prior approval from the landowner (and/or agricultural producer), and associated permit amendments as necessary. All vehicle and equipment traffic, parking, and material storage will be limited to the access road and/or designated work areas, such as laydown areas, with exception the use of low ground pressure equipment. Where repeated temporary access is necessary across portions of agricultural areas outside of the security fence, preparation for such access shall consist of either stripping / stockpiling all topsoil linearly along the access road, or the use of timber matting.
- Proposed permanent access shall be established as soon as possible by removing topsoil according to the depth of topsoil as directed by the EM. Any extra topsoil removed from permanently converted areas (e.g. permanent roads, equipment pads, etc.) shall be temporarily stockpiled and eventually spread evenly in adjacent agricultural areas within the project Limits of Disturbance (LOD); however not to significantly alter the hydrology of the area.
- For open-cut trenching, topsoil will be stripped from the work area adjacent to the trench (including segregated stockpile areas and equipment access). Trencher or road saw like equipment will not be allowed for trench excavation in agricultural areas, as the equipment does not segregate topsoil from subsoil. HDD installations, primarily designed to avoid impacts to wetlands and an existing pipeline, will also help to minimize agricultural ground disturbances. Any HDD drilling fluid inadvertently discharged will be removed from agricultural areas. Narrow open trenches less than 25 feet long involving

a single directly buried conductor or conduit (as required) to connect short rows within the array, will be considered exempt from topsoil segregation.

- Electric collection, communication and transmission lines installed above ground can create long term interference with mechanized farming on agricultural land. Thus, interconnect conductors outside of the security fence are proposed to be buried in agricultural fields wherever practicable. Where overhead utility lines are required, (e.g., from the switchyard to the POI) installation will be located outside field boundaries or along permanent access road(s) wherever possible. Should overhead utilities must cross farmland, agricultural impacts will be minimized by using taller structures that provide longer spanning distances and locate poles on field edges to the greatest extent practicable.
- All buried utilities located within the Project's security fence will have a minimum depth of 18-inches of cover if buried in a conduit or a minimum depth of twenty-four inches of cover if directly buried (e.g. not routed in conduit).
- The following requirements shall apply to all buried utilities located outside of the generation facility security fence:
    - In cropland, hayland, and improved pasture buried electric conductors shall have a minimum depth of 48 inches of cover. In areas where the depth of soil over bedrock is less than 48 inches, the electric conductors shall be buried below the surface of the bedrock if friable/rippable, or as near as possible to the surface of the bedrock.
    - In unimproved grazing areas or on land permanently devoted to pasture the minimum depth of cover shall be 36 inches.
    - Where electrical conductors are buried directly below the Project's access road or immediately adjacent (at road edge) to the access road, the minimum depth of cover shall be 24 inches. Conductors shall be close enough to the road edge as to be not subject to agricultural cultivation/subsoiling.
- Should buried utilities alter the natural stratification of soil horizons and natural soil drainage patterns, the Applicant will rectify the effects with measures such as subsurface intercept drain lines. The Applicant shall consult the local Soil and Water Conservation District concerning the type of intercept drain lines to install to prevent surface seeps and the seasonally prolonged saturation of the conductor installation zone and adjacent

areas. The Applicant shall install and/or repair all drain lines according to NRCS conservation practice standards and specifications. Drain tiles shall meet or exceed the AASHTO M-252 specifications. Repair of subsurface drains tiles shall be consistent with the NYSAGM's details for "Repair of Severed Tile Line" found in the pipeline drawing A- 5[2].

- In pasture areas, it may be necessary to construct temporary fencing (in addition to the Project's permanent security fences) around work areas to prevent livestock access to active construction areas and areas undergoing restoration. For areas returning to pasture, temporary fencing will be erected to delay the pasturing of livestock within the restored portion of the LOD until pasture areas are appropriately revegetated. Temporary fencing including the project's required temporary access for the associated fence installations shall be included within the LOD as well as noted on the construction drawings. The Applicant will be responsible for maintaining the temporary fencing until the EM determines that the vegetation in the restored area is established and able to accommodate grazing. At such time, the Applicant shall be responsible for removal of the temporary fences.

Restoration Requirements

Agricultural areas temporarily disturbed during construction will be de-compacted to a depth of 18 inches to a level no more than 250 pounds per square inch when measured with a soil penetrometer. In areas where topsoil was stripped, soil decompaction will be conducted prior to replacing the topsoil. Rocks four inches and larger will be removed from the subsoil surface prior to topsoil replacement. The topsoil will be replaced to the original depth and contours where possible.

Rocks four inches and larger will be removed from the surface of the topsoil. Subsoil decompaction and topsoil replacement will be avoided after October 1. If areas are restored after October 1, provisions will be made to restore and reseed eroded and exposed areas the following spring to establish proper vegetative cover.

Access roads will be re-graded as needed to allow farm equipment crossing and to restore the original drainage patterns or incorporate the newly designed drainage pattern. Existing drain tiles will be identified and located before construction as much as is reasonably possible based

[2] (http://www.agriculture.ny.gov/ap/agservices/Pipeline-Drawings.pdf)

primarily on consultation with the landowner. During and after construction operations, any existing drain tiles within the area of disturbance will be checked for damage, and damaged drain tiles will be repaired or replaced consistent with the NYSAGM's details for "Repair of Severed Tile Line" to the maximum extent practicable. The Applicant will coordinate with the landowner to continue to monitor drain tiles post-construction to ensure repairs are properly functioning.

Restored agricultural areas will be seeded as specified by the landowner to maintain consistency with the surrounding areas.

Restoration practices will be postponed until favorable soil conditions exist. Restoration will not occur when soils are in a wet or plastic state of consistency. Regrading stockpiled topsoil and de-compacting subsoils will not occur until the plasticity, as determined by the Atterberg field test, is adequately reduced. Restoration activities will not occur on agricultural fields between October and May unless favorable soil conditions exist.

Construction debris will be removed from the Project Area following restoration efforts and disposed of in a licensed facility.

Monitoring and Remediation

The Applicant will provide monitoring and remediation for a period no less than 365 days following the date upon which the solar arrays are in commercial operations. The monitoring and remediation will identify remaining agricultural impacts associated with construction that need mitigation and follow-up restoration.

Monitoring efforts will assess the topsoil thickness, relative content of rock and large stones, trench settling, crop production, drainage and repair/replacement of severed subsurface drain line, fences, etc. If necessary, topsoil will be imported to the Project Area to repair trench settling and topsoil deficiency issues. Visual inspection will determine the presence of excessive amounts of rock and oversized stone material. Excess rocks and large stones will be removed as appropriate.

When the subsequent crop productivity within affected areas is less than half that of adjacent unaffected agricultural land, the Applicant and other associated parties must determine the appropriate rehabilitation measures to be implemented.

Decommissioning

When the solar arrays are decommissioned, all above ground structures will be removed from the Project Area. Concrete piers, footer, and other supports will be removed to a depth of 48 inches below the soil surface and underground electrical lines will be abandoned in place. The Project Area will be restored to as close to the previous condition as practicable. Previous agricultural lands will be restored with recommendations from the landowner, the Soil and Water Conservation District, and the NYSAGM. Access roads in agricultural areas will be removed unless specified otherwise by the landowner.

Prior to commencing decommissioning activities, the Applicant will develop a SWPPP for the removal of Project Components. The SWPPP will outline erosion and sediment controls and stormwater management measures to be employed during decommissioning to prevent adverse impacts to surface waters, wetlands, and sensitive areas. Existing drain tiles will be identified prior to initiating any excavation to the maximum extent possible. Drain tiles shall be inspected from damage following decommissioning construction activities and repaired or replaced per the requirements of the landowner lease agreements. Monitoring of repairs will continue post-construction to ensure proper functioning. Disturbed soils shall be stabilized, seeded, and mulched to revegetate the Project Area.

Decommissioning activities will occur in accordance with the Decommissioning Plan. Refer to Exhibit 29 and Appendix 29-1 for additional information.

21(s) Bedrock and Underlying Bedrock Maps, Figures, and Analyses

Figure 21-3 depicts anticipated depth of bedrock within the Project Area based on soils data from the USDA (USDA 2020). According to this figure, depth to bedrock within the Project Area is predominately greater than 78 inches below the ground surface, with two minor areas 20-39 inches below the ground surface. However, restrictive layers may be encountered at shallower depths as described in Section 21(q).

Results of test borings performed to date by Terracon indicate that the majority of bedrock is weathered rock at depths ranging from 8 to 18 feet BGS with layers of weathered shale within solar array boring locations and 29.5 to 48 feet BGS within substation boring locations. The majority of the bedrock encountered consists primarily of grayish green to grey weathered shale.

Groundwater was encountered at 16 of the boring locations at depths ranging from 2 to 23 feet BGS, while drilling/excavating. The groundwater conditions may vary with seasonal changes and weather conditions

Maps, figures, and analyses on depth to bedrock, underlying bedrock types, vertical profiles of soils, bedrock, the water table, seasonal high groundwater (using New York State Museum Data and the USDA NRCS Web Soil Survey), foundation depths, roadways to be constructed, and all off-Site interconnections required to serve the Project are provided in the Preliminary Geotechnical Engineering Report, provided as Appendix 21-1. Additionally, Appendix 21-1 provides an evaluation of the potential impacts due to Project construction and operation, including any on-Site water disposal systems and closed landfills, if applicable. These analyses were based on information obtained from publicly available maps, scientific literature, a review of technical studies conducted on and in the vicinity of the Facility, and on-Site field observations, test pits and/or borings as available. Details for the stockpiling of spoils and fill materials can be seen in Appendix 11-1, the Preliminary Design Drawings.

21(t) Evaluation of Suitable Equipment Foundations

Foundation construction for Project Components within the collection substation and switchyard occurs in several stages, which typically include excavation; pouring of the concrete mud mat, rebar, and bolt cage assembly; outer form setting, casting, and finishing of the concrete; removal of the forms; backfilling and compacting; and site restoration. Excavation and foundation construction will be conducted in a manner that will minimize the size and duration of excavated areas required to install foundations.

Some equipment may be supported on shallow foundations, while other structures may be supported on deep foundations consisting of drilled shafts, and direct embedded poles. Based on the subsurface conditions encountered in the soil borings and test pits, the proposed collection substation and switchyard will be constructed at locations where glacial till and glacio-lacustrine soils are underlain by weathered bedrock and not planned near the noted fine-grained soils subject to instability. Five zones were identified in the Project Area, segregated by soil conditions observed in the geotechnical investigations and suitability for construction. Foundation design specifications are provided for each foundation type by zone in the Preliminary Geotechnical Engineering Report (Appendix 21-1). General considerations are described below.

Settlement potential of shallow foundations was analyzed using soil compressibility properties derived from the Standard Penetration Test borings drilled in the planned array area, collection substation, and switchyard locations and assumed structural loads. Estimated total settlements will be less than one inch provided column loads are less than 150 kips and the applied bearing pressure of small, isolated slabs or mats is less than about 2,500 psf. Shallow foundation systems for support of lightly-loaded buildings and equipment pads will be acceptable provided these maximum loads are not exceeded.

Proposed collection substation and switchyard structures may also be supported as direct embed poles or poles supported on drilled shaft foundations designed using the soil properties presented in the Preliminary Geotechnical Engineering Report. Shaft drilling is anticipated to be somewhat difficult in areas of weathered shale or bedrock observed on site and may require concentrated effort where those conditions exist. Additionally, groundwater was encountered throughout the site, therefore temporary casing may be required in some areas. Shaft excavations will be cleaned of water and loose material before placing steel or concrete reinforcements. Drilled shafts should be constructed as straight shafts at least 30 inches in diameter. Settlement of drilled shaft foundations using design properties presented in this report is expected to be less than one inch. All building structure foundations should bear on suitable natural soil, or on properly compacted structural fill. Compaction recommendations for structural fill are provided in the Preliminary Geotechnical Engineering Report (Appendix 21-1).

(1) Preliminary Engineering Assessment

The Preliminary Geotechnical Engineering Report analyzed spread footing and isolated reinforced concrete support slab foundations and drilled shaft foundation alternatives for the substation and switchyard foundations. All techniques used to complete the analysis conformed to applicable building codes and industry standards. The spread footing and isolated slab foundations were determined to be acceptable to support light-loaded buildings and equipment pads provided the maximum loads are not exceeded. If drilled shaft foundations are utilized for the Project, a minimum shaft diameter of 30 inches is recommended for the foundations. Soils at or near the surface consisted of fine-grained materials which may be subject to instability during construction, particularly following precipitation events. Implementation of effective drainage systems early in construction and maintenance throughout as well as restricting construction to drier months should reduce the risk of undercutting or replacement of unstable subgrade. Refer the Appendix 21-1 for additional information regarding the foundation engineering assessment and design recommendations.

The available information suggests that substation and point of interconnection (POI) switchyard foundations will be underlain by glacial till and glacio-lacustrine deposits underlain by weathered bedrock.

Solar array racking will be installed by one of four methods. First, the post may be driven directly into the soil. This is the primary method of installation. Second, a ground screw type post will be installed directly into the soil if the posts cannot be directly driven into the soil. Third, in cases of bedrock or post driving refusal, a post hole will be pre-drilled into the rock to an appropriate depth, the post will be installed, and the post hole will be grouted. Fourth, in situations with very hard rock, an oversized hole may need to be pre-drilled and then backfilled with gravel or grouted after the post is installed. See Preliminary Design Drawings included in Appendix 11-1.

Design frost depth is four feet in the Project Area, and foundations must bear below this depth to prevent movement due to frost heave. Additionally, the soil conditions observed on site indicate that embedment of 7 to 12 feet is required to support racking and panels.

The glacial till and glacio-lacustrine deposits found throughout much of the Project Area typically provides high bearing strength and good short-term excavation stability if it is left undisturbed. The glacial till and glacio-lacustrine deposits contain a significant percentage of silt and sand and loses strength rapidly if saturated and subjected to dynamic loading such as that imparted by construction equipment. Due to the potential for a variable rock surface, there is the potential for foundations to be partially founded on bedrock, natural soils, and/or compacted structural fill. If a mixed bearing grade condition exists, where the bearing surface transitions from bedrock to soil, the rock will be undercut at least twelve inches over a length extending back at least ten feet from the transition to soil. The undercut will be backfilled with compacted imported structural fill.

Assuming the foundation excavations are properly managed during construction, an allowable bearing pressure of 2,500 pounds per square foot is appropriate for shallow foundations bearing on soils typical of the Project Area for spread footing foundations. An allowable bearing pressure of 2,000 pounds per square foot is estimated for mat foundations.

(2) Potential Pile Driving Impact Assessment

Pile driven foundations are not proposed for the substation and switchyard foundations, therefore engineering feasibility and impact assessments were not conducted. If pile driven foundations are determined to be necessary for Project construction, the foundation will be assessed for impacts to surrounding properties and structures, mitigation methods for vibration will be evaluated, and the daily and total pile driving work estimates will be determined.

It is anticipated that the posts for the panel racking system will be installed with end bearing either in the glacial till and glacio-lacustrine underlain by weathered shale. Based on manufacture specifications approximately 300 posts/megawatt (MW) will be required for a total of approximately 100,000 posts. The posts will be approximately 6 to 12 feet in length. Posts are galvanized steel and load-carrying capacity will vary based on post dimensions and installation methods. Installation is typically completed using an excavator equipped with a vibratory driving attachment or drilling, setting, and backfilling posts. It is anticipated that the posts can be installed in 150 days utilizing 4 post installation crews working 10 hours per day.

Based on soil types throughout the Project Area, the posts are anticipated to be driven with a vibratory hammer. Helical posts (i.e., pile screws), if utilized, will be installed with the minimum required torque per manufacturer's recommendations. If refusal is encountered during installation, the posts will be installed into pre-drilled holes and filled with grout.

The primary impacts from post installation operations are noise and vibration. The equipment used in post installation is not expected to generate any off-Site noise impacts (see Exhibit 19).

(3) Post Installation Minimization Measures

In order to minimize impacts associated with noise, post installation activities will be designed to minimize impacts to nearby residences and existing structures. Post installation will be restricted to hours of construction allowed in the Project's Certificate Conditions and will conform to the setbacks from residences as approved by the Siting Board

As mentioned in Section 21(s)(2), pile driven foundation systems are not proposed to support the collection substation and switchyard. Minimization measures, therefore, are not required for these components.

(4) Vibrational Impacts

All post installation operations which are set back from nearby residences, buildings, structures, utilities, or other facilities will be undergone with specific planning and insight from industry professionals, contractors, inspectors, and the Applicant, with full consideration for all forces and conditions involved and with the safety as the top priority. To the extent practicable, facilities have been sited to avoid existing structures. Based on air-borne induced vibration modeling conducted by Epsilon Associates, Inc. (Epsilon), no receptors were found to experience sound levels equal to or greater than 65 dB at 16, 31.5, or 63 Hz. This analysis is further discussed in Exhibit 19 and provided in Appendix 19-1.

Post installation for a solar facility is a smaller scale compared to pile driving for heavy infrastructure (i.e., building foundations or bridges). Typically, posts are driven into the ground using hydraulic ram machinery, which is about the size of a small tractor or forklift and have much less vibrational impacts than equipment utilized for heavy infrastructure. Additionally, many posts in the array will require pre-drilling holes which will minimize the use of the hammer to install the posts. As such, no vibrational impacts are anticipated. The closest distance to a structure where panel installation is proposed is over 0 feet, however that structure is on a participating landowner’s property and the agreement provides that it will be removed during construction. The next closest structure is approximately 54 feet from the proposed panel installation; however, a majority of the panels are well over 100 feet from structures in most locations.

As mentioned in Section 21(s)(2), pile driven foundation systems are not proposed to support the collection substation and switchyard. Mitigation measures for vibrational impacts are not required for these components.

21(u) Evaluation of Earthquake and Tsunami Event Vulnerability at the Project Area

The Project Area is located in an area of relatively low seismic activity. The USGS Seismic Hazards database indicates a 2 percent chance of an earthquake occurring in the next 50 years of peak acceleration exceeding 6 percent of the force of gravity in the Project Area. The Project Area is in an area of low seismic activity. The Project Area has a dense soil cover and will not provide significant amplification of seismic waves. Geophysical surveys are part of the overall scope of services but were not authorized for this phase of the investigation and no site-specific shear wave velocity data is available. The Project Area appears to have minimal vulnerability associated with seismic events based on review of publicly available data. The findings were provided in Section 21(o) above.

The Project is located entirely inland, however, is within approximately 14 miles of Lake Ontario. Meteotsunamis, though rare, are tsunamis caused by meteorological conditions and not earthquakes, have been recorded on Lake Ontario. Meteotsunamis are frequently observed on large bodies of inland water, including the Great Lakes (NOAA 2020). Although these meteotsunamis have been observed to reach heights of 6 feet or more, it is unlikely the Project would experience the effects of such an event. The Project Area is approximately 150 ft higher in elevation compared to the shores of Lake Ontario.

21(v) Corrosion Potential Evaluation

A majority of soils found within the Project Area as identified by USDA are considered to be acidic and highly corrosive. Acidic soils are likely to be corrosive to steel and concrete. Steel may need a protective coating and concrete may require additives in the mixture to protect against corrosion. Soil moisture, acidity, texture, and soluble salts are factors that correlate to the corrosion class for soils. Soils with a pH of 4.0 or less typically correlate with a high risk of corrosion.

During corrosion testing, 16 samples were collected at depths of approximately 1 to 4 feet below the existing ground surface. The samples were tested for pH, water soluble sulfate, sulfides, chloride content, sulfides, oxygen reduction potential, total salts, and electrical resistivity. Refer to Table 21-4 and Section 21(i) above for more detailed corrosion testing information. Additional corrosion potential information is included in the Preliminary Geotechnical Engineering Report in Appendix 21-1. Detailed design requirements will be determined during the final engineering phase.

21(w) Consistency with New York State Department of Agriculture and Markets Guidelines

As noted previously, the Project will be in compliance with the NYSAGM *Guidelines for Solar Energy Projects – Construction Mitigation for Agricultural Lands Revision 10/18/2019,* to the maximum extent practicable.

The Applicant will hire an EM to oversee construction and restoration work on agricultural land. The EM will coordinate with the NYSAGM Division of Land and Water Resources as necessary to ensure the guidelines are being met to the maximum extent practicable. The EM will contact the NYSAGM Division of Land and Water Resources if a farm resource concern, management matter pertinent to the agricultural operation, and/or site-specific implementation conditions, cannot be resolved.

Guidelines for measures to mitigate impact to existing drainage features during construction, restoration, monitoring and remediation, and decommissioning are detailed in Section 21(r) above.

21(x) Soil Suitability and Shrink/Swell Potential

The extent to which a soil shrinks or swells changes with soil moisture content, and soils with high shrink-swell potential may cause damage to roads and structures. The shrink-swell potential is influenced by the amount and type of clay in the soil. The subsurface materials observed during geotechnical investigations consist of silt and sand mixtures, some clay and gravel, and rock/cobble fragments (see Appendix 21-1) and have low to moderate shrink-swell potential (USDA 2020). Soil shrink-swell and frost action potential are not anticipated to have any effect on underground cables, based on the depth of the underground cables themselves. As a result, specific construction procedures associated with potential expansive clay will likely not be required.

Frost action for the soils found in the Project Area is moderate to high throughout (USDA 2020). Geotechnical investigations determined that soils within the Project Area may be frost-susceptible based on the following conditions:

- The thickness of ice on the frozen ground;
- The bond with the steel pile surface and the adfreeze stress; and
- The surface area of the steel pile in the seasonally frozen ground.

Frost action may cause uplift of foundation systems which are not designed to withstand the forces of frost heave. To prevent the impacts of frost action, foundations for new site structures will be below 24 inches from the soil surface. In accordance with the New York State Building Code, concrete foundations and/or piers will be constructed to a minimum depth of 30 inches and adhere to all of the American Society for Civil Engineers (ASCE) 32 standards. Additionally, pile driven foundations will be designed to withstand frost heave of 1,500 pounds per square foot (psf) along the pile perimeter to depths up to 30 inches, per recommendations provided in the geotechnical report (Appendix 21-1).

Soils on site may be suitable for re-use as structural fill, crushed stone or NFS material, provided proper compaction occurs during construction. However, should construction occur during wet months, many of the on-Site soils will have higher moisture content than allowable to achieve required compaction. Soils that have excessive moisture content and cannot be compacted will be removed from the site or used as common fill in non-structural areas to re-establish grade. Soil types meeting these designations are discussed in Appendix 21-1. Samples of material to be used as structural fill will be provided to the geotechnical engineer for evaluation prior to use.

21(y) Quarries and Mines Map

No mines or quarries or were identified in the Project Area based on publicly available data. Two mines were identified within 2 miles of the Project Study Area (NYSDEC 2021). Figure 21-5 illustrates the mines, quarries, oil and gas wells, and pipelines within the Project Area and Study Area. One mine identified is the Town of Conquest, Town Pit, a past producer of sand and gravel, which was never permitted. This mine is located approximately within 845 feet west of the Project Area and was opened in 1977. It is classified as Unconsolidated Mines by the New York State Department of Environmental Conservation (NYSDEC). The second mine was identified as Blue Heron Compost – Baker Road, which was utilized for the extraction of glacial till material and has since been reclaimed and is not active. It is classified as an Unconsolidated Mines Reclaimed by NYSDEC. This mine was closed in 1997 after 6 years of operation. The two mines are above ground. The locations of these mines and quarries are shown in Figure 21-5. No USGS mines or quarries were identified within the 2-mile Study Area.

21(z) Existing Oil and/or Natural Gas Wells

(1) Identification of Oil and/or Natural Gas Wells Within 500 feet of Project Area

Figure 21-5 shows the locations of identified oil and gas wells within the Project Area and Study Area, located within 500 feet of the Project Area, as identified in the NYSDEC Oil and Gas Database (NYSDEC 2019). Additionally, geographic information system (GIS) data on the NYSDEC wells was extracted from the Rextag energy mapping database (Rextag 2020) and cross-referenced with the NYSDEC dataset. Both databases indicated that no wells were located within the Project Area. Both databases also identified 2 wells within 500 feet of the Project Area, though none are reported as active. Locations are provided in Table 21-6. There are 13 wells located in the 2-mile Study Area, and one is currently listed as active. Locations are provided in Table 21-7.

Table 21-6. NYSDEC-Regulated Oil and Gas Wells within 500 feet of the Project Area

Well Name	API Well Number[3]	NYSDEC Reported Status	Rextag Well Status	Lon	Lat
Brooks 1	31011008730000	Unknown Not Found	Unknown	-76.609820	43.133400
Cato Bank Tinker Lot	31011008740000	Unknown Located	Unknown	-76.599080	43.120230

Table 21-7. NYSDEC-Regulated Oil and Gas Wells within the 2-mile Study Area

Well Name	API Well Number	NYSDEC Reported Status	Rextag Well Status	Lon	Lat
Whitford Silas	31011005900000	Unknown Located	Unknown	-76.588890	43.125950
Hoffman Walter 1	31011008710000	Unknown Not Found	Unknown	-76.592830	43.116320
Cato Bank Tinker Lot	31011008740000	Unknown Located	Unknown	-76.599080	43.120230
Slayton H 2	31011010030000	Active	Active	-76.593370	43.122050
Slayton F H 1	31011008720000	Unknown Located	Unknown	-76.593330	43.122490
Lyons 1	31011175110000	Expired Permit	Cancelled	-76.573600	43.130430
Brooks 1	31011008730000	Unknown Not Found	Unknown	-76.609820	43.133400
Assaro Sam	31011115930000	Unknown Not Found	Unknown	-76.633100	43.080510
Hunter A&B 1	31011175080000	Plugged and Abandoned	Inactive, P/A	-76.561400	43.129050
Taylor 1	31011231450000	Plugged Back Multilateral	Inactive, P/A	-76.561552	43.102372

[3] American Petroleum Institute

Table 21-7. NYSDEC-Regulated Oil and Gas Wells within the 2-mile Study Area

Well Name	API Well Number	NYSDEC Reported Status	Rextag Well Status	Lon	Lat
Taylor 1A	31011231450100	Plugged Back Multilateral	Inactive, P/A	-76.561553	43.102372
Taylor 1-A	31011231450101	Plugged and Abandoned	Inactive, P/A	-76.561553	43.102372
Karim 1	31011067790000	Unknown Located	Unknown	-76.561688	43.108848

(2) Project Components outside of NYSDEC 100-foot buffer area

No wells are located within 100 feet of Project Components; therefore, the Applicant will comply with NYSDEC's recommended 100-foot buffer area.

(3) Well Location and Project Component Map

Figure 21-5 includes oil and gas wells known to exist. No magnetometer surveys were performed as there are no records of oil or gas wells within the Project Area.

As there are no wells identified within the Project Area, the Project will be designed and sited to avoid a 100-foot buffer area. The two wells identified in Table 21-6 are greater than 100 feet from the Project Area boundaries and will not be impacted by the Project.

(4) Controls for Minimizing Impacts to Existing Gas Infrastructure

As stated above, there are no wells identified within the Project Area, the Project will be designed and sited to avoid a 100-foot buffer area. The two wells identified in Table 21-6 are greater than 100 feet from the Project Area boundaries and will not be impacted by the Project.

In the event that an unknown existing or abandoned well is discovered during construction, the contractor will immediately suspend ground intrusion work and notify the affected landowner, the NYSDEC Chief of the Energy Project Management Bureau, and the NYSDEC Region 7 Regional Engineer of the discovery. The Project Supervisor and landowner will be contacted and notified. The Applicant and its contractors shall have a decontamination pad for construction equipment in the event that oil or gas infrastructure is encountered. The Applicant will consult with the New

York State Department of Public Service (DPS) Gas Safety Staff if abandoned gas lines are identified as soon as reasonably practicable. The performance of any site cleanup, including containment or remediation of any existing contamination, to cap, plug, remove, or otherwise contain any existing wells or pipelines that it might discover will be subject to applicable laws. The global positioning system (GPS) coordinates for and access to the newly discovered well location will be provided by the Engineering, Procurement, and Construction (EPC) Contractor Project Supervisor to the NYSDEC Region 7 Regional Engineer and the NYSDEC Division of Environmental Permits, Chief of the Energy Project Management Bureau, subject to the requirements of the Project's certificate conditions.

(5) Petroleum-impacted Material Protocols

In the event that petroleum-impacted materials are encountered during construction activities, the contractor will immediately suspend ground intrusion work and notify the NYSDEC Region 7 Regional Engineer, DPS, and the NYSDEC's Spill Hotline of the discovery. The EPC Contractor Project Supervisor and landowner will also be contacted and notified. In addition, the excavated impacted material will be segregated and temporarily stored on the site until the material can be delivered to the disposal facility. Any impacted stockpiled material will be placed on 20-mil polyethylene sheeting and will be covered with heavy duty tarps specifically manufactured for this purpose and secured with heavy sandbags. All impacted material will be managed and transported in accordance with applicable state and federal laws and regulations, including but not limited to 6 NYCRR Part 360 and Part 364. Any construction equipment that comes in contact with the impacted material will be washed with potable water and a detergent and rinsed with potable water to remove impacted material adhered to the tires, tracks, undercarriage, and other parts of vehicle exteriors. The wash water and solids from the decontamination activities will be collected, contained, tested, removed from the site, and properly disposed at a licensed and approved facility. Decontamination will be performed on a decontamination pad specifically set up for that purpose. The pad will be curbed and lined with an impermeable membrane to contain the used cleaning solution, including any overspray, and any impacted debris removed during the cleaning process. All cleaning solution and impacted materials will be collected and transported by a waste hauler with a valid 6 NYCRR Part 364 Waste Transporter Permit. To the extent practicable, the Applicant and Project engineer will adjust ground intrusive construction activities at the site to avoid working within the limits of impacted material discovered during construction. If the limits of impacted material cannot be avoided, the Applicant, in consultation with the landowner, will evaluate options for planning and implementing remediation activities.

Any necessary remediation activity work will be performed pursuant to certificate conditions previously adopted by the Board.

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