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January 7, 2020

***Via Electronic Mail and First Class Mail***

Melanie A. Bachman, Esq.  
Executive Director  
Connecticut Siting Council  
10 Franklin Square  
New Britain, CT 06051

RE: ***Petition No. 1310A*** – Quinebaug Solar, LLC petition for a declaratory ruling, pursuant to Connecticut General Statutes §4-176 and §16-50k, for the proposed construction, maintenance and operation of a 50 megawatt AC solar photovoltaic electric generating facility on approximately 561 acres comprised of 29 separate and abutting privately-owned parcels located generally north of Wauregan Road in Canterbury and south of Rukstela Road and Allen Hill Road in Brooklyn, Connecticut. Reopening of this petition based on changed conditions pursuant to Connecticut General Statutes §4-181a(b)

Dear Ms. Bachman:

On behalf of the petitioner, Quinebaug Solar, LLC, enclosed please find an original and 15 copies of the Petitioner's Responses to the Siting Council's First Set of Interrogatories issued in the above-referenced proceeding. The Petitioner has provided its response to CSC-35 on a confidential basis, pursuant to the enclosed Motion for Protective Order, Protective Order and Affidavit of Hagen Lee.

Please feel free to contact David Bogan of this office (860-541-7711) or me if you have any questions or require additional information.

Sincerely,

A handwritten signature in cursive script that reads "Kate Boucher".

Kathryn E. Boucher

Enclosures

cc: Service List

**Petition No. 1310A**  
**Connecticut Siting Council Interrogatories**  
**Set One**

**January 7, 2020**

**Project Development**

1. Referencing Findings of Fact #49 and #50 of Petition No. 1310, has Quinebaug Solar LLC (Petitioner) sought to qualify and participate in the ISO-NE Forward Capacity Auction? If yes, which auction(s) and capacity commitment period(s)? Did the Petitioner receive a capacity supply obligation? If yes, please indicate which auction(s) and capacity commitment period(s)? If not, please explain.

**Company's Response:**

Yes, the Petitioner plans to participate in the ISO-NE Forward Capacity Auction (FCA). The Petitioner has completed the show of interest and qualification determination processes as part of its participation in the ISO-NE FCA. The Petitioner participated in FCA 14 in 2019, for Capacity Commitment Period 2022-2023, and received Qualified Summer Capacity in the amount of 24.9 MW. The actual capacity supply obligation will be determined by the auction results in early 2020.

**Proposed Site**

2. Page 3-4 of the Petition notes that, "Some of the Project Site parcels are currently classified under the Public Act 490 Program." Please identify such parcels and whether they are classified as forest or farmland.

**Company's Response:**

One parcel in Brooklyn, currently owned by Founders Bee Properties & Investments LLC (Tax Map Identification Number CT-019-30-12), is partially classified as open space under the Public Act 490 Program.

3. Referencing Findings of Fact #97 through #100 in Petition No. 1310, please update these Findings of Fact based on the updated distances to residences and land acreages.

**Company's Response:**

FOF #97. The Project site is comprised of 304 acres of unmanaged forest, 147 acres of agricultural fields, 68 acres of wetlands and open water, 11 acres of access roads, and 17 acres of shrub/scrub. There is also a gravel extraction operation within the area.

FOF #98. The closest off-site residences in Brooklyn to the proposed project perimeter fence are four residential parcels located on a gravel road accessed via Allen Hill Road. The parcel containing the gravel road is approximately 34 feet away from the proposed facility perimeter fence.

FOF #99. The closest off-site residences in Canterbury to the proposed project perimeter fence are located at 265 and 267 Wauregan Road at a distance of approximately 111 feet from the edge of the residential structures to the proposed facility perimeter fence.

FOF #100. The Sposato residence at 192 Wauregan Road in Canterbury is located approximately 98 feet west of the limits of construction of the existing southern access (to be improved) that is located off of Wauregan Road.

### **Energy Output**

4. Provide the megawatt output of the facility in direct current (DC).

**Company's Response:**

The facility has an installed 73.44 megawatts of direct current solar modules.

5. Have electrical loss assumptions been factored in to the output of the facility? What is the output (MW AC) at the point of interconnection?

**Company's Response:**

Electrical loss assumptions have been factored in to the output of the facility, such that the nameplate rating/output will be 49.36 MW AC at the point of interconnection (POI).

6. Do solar facilities present a challenge for the independent system operator for balancing loads and generation (to maintain the system frequency) due to the changing (but not controlled) MW output of a solar facility? What technology or operational protocols could be employed to mitigate any challenges?

**Company's Response:**

As a general matter, system control and dispatch is an area that is fully under the authority and operational control of independent system operators. The Petitioner will provide all forecast and real time project capabilities and telemetry as required by the system operator for inclusion in system control and dispatch. Although solar generation may have more variability due to real time solar exposure and weather patterns, the system operators employ advanced forecasting capabilities to establish expected output levels and incorporates these in the overall dispatch plans to ensure adequate system reserves and maintenance of overall grid reliability.

7. What is the projected capacity factor (expressed as a percentage) for the proposed project? For clarity, is this capacity factor based on a ratio of AC MWh to AC MWh, or a ratio of AC MWh to DC MWh?

**Company's Response:**

The Project's net capacity factor is estimated to be 22.2% in the first year of operations, and an average of 20.89% over the Project's 30-year life. The plant has a DC to AC ratio of 1.48. The capacity factor is based on the projected AC MWh divided by the AC MW (49.36 MWac) and divided by the number of hours in a year (8760 hours).

8. Would the power output of the solar panels decline as the panels age? If so, estimate the percent per year.

**Company's Response:**

Yes. The peak power output of the modules is estimated to degrade an average of 0.5% annually after the first year of operations.

9. Is the project being designed to accommodate a potential future battery storage system? If so, please indicate the anticipated size of the system, where it may be located on the site, and the impact it may have on the power purchase agreements (PPAs).

**Company's Response:**

A battery storage system is not contemplated in the Project design.

10. Could the project be designed to serve as a microgrid?

**Company's Response:**

No. Current contractual obligations under the Project's power purchase agreements and terms of the Project's generator interconnection agreement do not contemplate operations as a microgrid. Moreover, microgrid functionality would require the Project to have an energy storage component, and / or local connected load and dispatch capabilities which are not included in the Project's design.

11. If one section of the solar facility experiences electrical problems causing the section to shut down, could certain other sections of the system (e.g. solar arrays) still operate and transmit power to the grid?

**Company's Response:**

Yes. For example, if a fault occurs at one of the Project's inverters causing it to shut down, all of the Project's generation feeding into other inverters will be able to continue normal operations. Likewise, if a fault occurs at the string or combiner box level, the other strings and combiner boxes feeding into the same inverter will not be affected.

### **Site Components and Solar Equipment**

12. Referencing Tab O of the Petition – Revised Acoustic Analysis, was the proposed facility modeled as a Class B noise emitter and the abutting residences modeled as Class A noise receptors? Explain.

**Company's Response:**

The area is zoned residential agricultural and rural district in the Towns of Brooklyn and Canterbury, respectively. This would fall under Class A under the CTDEEP Noise Regulations. The Class B land use includes "utilities" as a category. Therefore, it was assumed that the solar project falls under Class B Emitter. The daytime sound limit for Class B Emitter to Class A Receiver is 55 dBA.

13. Page 3-7 of the Petition notes that there would be 24 inverter/transformer skids. Tab O of the Petition – Revised Acoustic Analysis notes that, "[E]quipment pads will house 25 inverters..." Were the transformers connected to each inverter also considered in the acoustic analysis, or would the inverters be the dominant noise source for each inverter/transformer pair? Please clarify the correct number of inverter/transformer pairs. If 24 is the correct number, is the acoustic analysis based on 25 conservative?

**Company's Response:**

Yes, the inverters/transformers total sound was considered in the acoustic analysis. The inclusion of 25 inverters compared to 24 inverters does not change the predicted sound levels at the receivers since inverters/transformers are spread out across the site.

14. With each proposed inverter having an AC power output of about 920 kW (or 0.92 MW), how would the Petitioner achieve 49.36 MW AC with about 24 to 25 inverters?

**Company's Response:**

The project has been redesigned to consist of twenty-four (24) 2.43 MVA inverters which will provide a plant total capacity of 58.32 MVA. This level of MVA capacity is able to provide 49.36 MW at the point of interconnect to the transmission system considering real power losses and reactive power requirement as required by ISONE.

15. Estimate the maximum height of the inverter/transformer pairs in feet above grade.

**Company's Response:**

The height above grade of inverter/transformer skids will be approximately 10 feet.

16. Would the proposed solar panels be mounted in a portrait or landscape fashion?

**Company's Response:**

The solar panels are proposed to be mounted in a portrait fashion.

17. Is the wiring from the panels to the inverters installed on the racking? If wiring is external, how would it be protected from potential damage from weather exposure, vegetation maintenance, or animals?

**Company's Response:**

Depending on the location in the DC collection system, cables from modules to inverters will be installed on racking, direct buried or in a proprietary solar hanger system similar to the CAB system. The CAB system uses a carrier wire to support hangers that will provide support for the collection cables. As direct buried cable transition from below ground to aboveground, they will be encased in conduit. These various types of DC cable support methods have been used successfully in solar facilities with weather, vegetation and animal conditions similar to Quinebaug.

18. Would any wiring need to cross public roads? If yes, identify such locations, whether underground or overhead, and if DC solar panel wiring or 34.5-kV AC feeders.

**Company's Response:**

Yes, wiring will need to cross public roads (underground) at four proposed locations: two in the northeast portion of the Project Site and two in the southeast portion of the Project Site. Two of the proposed crossings will be underground 34.5-kV AC feeders and two of the proposed crossings will be underground DC solar panel wiring (1500V). See Exhibit CSC-18 – (Public Road Crossings).

### **Interconnection**

19. Estimate the height (above grade) of the tallest piece of equipment to be located within the proposed Collector Substation, e.g. terminal structure.

**Company's Response:**

The tallest piece of equipment in the substation will be the static mast which will be approximately 70 feet. The termination structure will be approximately 60 feet.

### **Public Safety**

20. Would the project comply with the National Electrical Code, the National Electrical Safety Code and any applicable National Fire Protection Association codes and standards?

**Company's Response:**

Yes, the project will comply with the applicable sections of the above referenced codes.

21. Where is the nearest federally-obligated airport? Provide the distance and direction from the proposed solar facility.

**Company's Response:**

According to “*Visualize It: See FAA UAS Data on a Map*”, an online tool from the Federal Aviation Administration, the nearest federally-obligated airport is Green Airport in Warwick, Rhode Island. It is located approximately 25 miles east of the proposed solar facility.

22. Referencing Exhibit P (FAA Correspondence) of the Petition, is it correct to say that there are 17 points that were evaluated by the FAA, not 16?

**Company's Response:**

Yes, the figure submitted with the FAA Determination of Hazard application had 17 points; all of which were evaluated by the FAA.

### **Environmental**

23. The Study Area now covers approximately 516 acres, an increase from the initial 451 acres. Beyond the increase due to Blackwell Brook and Cold Spring Brook, what areas were specifically added to the revised Study Area? Please provide a drawing indicating the Initial Study Area versus the Revised Study Area?

**Company's Response:**

The expanded Study Area mostly consists of the area surrounding Blackwell Brook and Cold Spring Brook on the western side of the Project site. Additional Study Area is included in the central portion of the Project site to capture areas that were not included in the wetland delineation report from 2016. Increasing the Study Area has allowed the Project to more accurately account for and protect sensitive natural resources and wildlife habitat that occur adjacent to the proposed development area. *See Exhibit CSC-23 – Quinebaug Solar Study Area Comparison (2017 to Present).*

24. Referencing Finding of Fact #131 in Petition No. 1310, please update the number of acres of vegetation clearing to minimize shading impacts.

**Company's Response:**

19 acres of the site will be selectively cleared with stumps left in place to minimize shading impacts.

25. Referencing Figure 1 of the Pre-filed Testimony of Katelin Nickerson and Dr. Kevin Ryan, please provide a larger scale drawing, e.g. 11" x 17" of Figure 1.

**Company's Response:**

See enclosed figure printed on 11x17 paper.

26. Referencing page 3 of the Motion to Reopen Petition No. 1310, the proposed project increases wetland and watercourse buffers by 300%, while maintaining the original capacity of the project. Please describe how this was accomplished, and indicate where the displaced solar panels are relocated.

**Company's Response:**

The original petition proposed 50-foot setbacks to wetlands, watercourses and vernal pools. These buffer areas totaled approximately 40 acres. Since the 2017 petition, the project was completely redesigned, including reevaluation of wetlands, surveying the floodplain system of Cold Spring Brook and Blackwell Brook, and increasing buffers to meet a more broadly accepted standard of 100 feet with only a few exceptions. Due to these changes, the total buffer area has increased to approximately 172 acres an increase of 132 acres or approximately an increase of 330 percent.

In addition to the site redesign, new technology including higher output panels has been used to optimize the Project. Additional panels have been added in previously impacted areas, such as the gravel removal area on the southeast side of Wauregan adjacent to the Project substation.

27. Referencing Findings of Fact #215 through #218 in Petition No. 1310, please respond to the following:

- a) Would the proposed project impact any identified resources within The Last Green Valley National Heritage Corridor?
- b) Would the proposed project be visible from any nationally-designated, state-designated or locally-designated scenic roads? If yes, describe the visibility.
- c) Describe the visibility of the facility from the Quinebaug River Wildlife Management Area, the nearest recreational area as referenced on page 6-7 of the Petition.

**Company's Response:**

- a) The proposed Project will not result in a direct impact to any identified resources within The Last Green Valley National Heritage Corridor. The Blackwell Brook Trail is the closest identified resource located approximately 155 feet west of the Limit of Work/Development Area and approximately 220 feet west of the perimeter fence. This approximate 2-mile loop trail is located on a property currently managed as a transfer station. The Project will maintain a natural vegetation buffer and no visual impacts are anticipated. This natural vegetative buffer will reduce any potential temporal noise impacts during construction and no noise impacts are anticipated during the operation of the Project.
- b) Route 169 is a State-designated scenic road. Given the distance from Route 169 to the proposed facility, the visual impact is not expected to be significant. Figure 20 in Exhibit I of the petition shows the proposed view of the facility from Route 169.
- c) As stated on page 6-7 of the Petition, the Quinebaug River Wildlife Management Area (WMA) is located immediately adjacent to the southernmost Project parcel and is the nearest recreational area to the proposed Project. The Quinebaug River WMA totals more than 1,400 acres and is inclusive of the Sugar Brook Field Trial Area (approximately 0.6 miles from the Project Site) and the Quinebaug Valley State Trout Hatchery (approximately 0.20 miles from the Project Site).

The Quinebaug River WMA is a State hunting area. The Sugar Brook Field Trail Area is a public hunting area that features marked and unofficial trails. Field trial clubs sanctioned by the American Kennel Club, North American Versatile Hunting Dog Association, or Connecticut Amateur Shooting Dog Field Trial Association may obtain permits to use the area for field trials. The State Trout Hatchery features fourteen wells each of which can provide the 5,000 gallons per minute necessary for fish production. There is an onsite children's fishing pond which is frequently stocked with fish.

It is anticipated that privately-owned parcels, site topography, proposed vegetative screening and existing vegetation located outside of and within the Project situated between the Project Site and these resources will prevent significant viewshed impacts to recreational open space.

28. Where is the nearest national, state and/or locally-designated historic area from the proposed site? Describe the visibility of the proposed project from the nearby historic area(s).

**Company's Response:**

The nearest historic property listed on the National Register of Historic Places is the Wauregan Historic District. This historic district, which consists of a mill village, was established around a cotton mill that was powered by the Quinebaug River. It was listed on the National Register of Historic Places in 1979. The Wauregan Historic District is located approximately 0.5 miles from the eastern edge of the limit of work associated with the proposed solar facility. The region between the solar facility and Wauregan Historic District consists of undulating topography, residential neighborhoods, and large stands of mature forest. Due to its distance from the limit of work, the Wauregan Historic District will not be impacted directly by the proposed solar facility. The viewshed from the historic district also will not be impacted by the proposed project because of the hilly and forested nature or the terrain between the proposed solar facility and the historic district.

29. Referencing page 4 of the Pre-filed Testimony of Katelin Nickerson and Dr. Kevin Ryan, it states, “Formal vernal pool surveys were conducted in 2016 and again in 2018. Informal checks on select pools were done during the spring of 2019.” Explain why only certain “select pools” were informally checked in 2019?

**Company’s Response:**

Vernal pool surveys were completed in 2016 and 2018. While the wetland delineation review was underway during the 2019 spring season, known pools were visited while field staff were on site. In addition to checking the known pools, one additional vernal pool was identified during the spring 2019 surveys. This pool is located in an area that is not proposed for development and was not included in the 2018 surveys. VP09 is located directly adjacent to Wauregan Road in Canterbury at the southern edge of a narrow piece of land included in the option with the current landowner. A full natural resource survey of this area was completed to ensure all land in the lease areas was included in the survey results.

30. Referencing page 45 of the Phase 1A Cultural Resources Assessment Survey under Tab Q of the Petition, it notes, “A construction buffer of 5m (16.4 ft) is recommended around the town line boundary marker, and a buffer of 15 m (50 ft) is recommended around the Bennett/Taylor/Gallagher Cemetery. No construction should be planned in the buffered areas so that these two cultural resources may be protected in place.” Would the Petitioner be able to accommodate such recommendations?

**Company’s Response:**

Yes, the recommendations have been incorporated into the project design. The limit of work shown on the permit drawings excludes work within these areas.

31. What is the length of the posts and to what depth would the posts be driven into the ground to provide structural stability? Are any impacts to groundwater quality anticipated? If so, how would the petitioner manage and/or mitigate these impacts?

**Company’s Response:**

The posts will average 10-16 feet in length and approximately 6 to 9 feet in embedment depth. Due to the composition of the posts, and the limited amount of post material that will be in contact with the ground, no impacts to groundwater quality are anticipated.

32. Referencing page 3 of the Pre-filed Testimony of Hagen Lee, it states, “We are working to obtain Final State Historic Preservation Office Concurrence and will provide it to the Council upon receipt.” Has the Petitioner received a response from the State Historic Preservation Office? If yes, provide a copy of such correspondence.

**Company’s Response:**

The Petitioner has not yet received final State Historic Preservation Office Concurrence. The Petitioner will provide a copy of the concurrence letter to the Council when received.

33. Referencing page 7 of the Pre-filed Testimony of Katelin Nickerson and Dr. Kevin Ryan, it states, “The Petitioner continues to promote an open dialogue, answer questions, provide additional information and work with Department of Energy and Environmental Protection (DEEP) Natural Diversity Database (NDDB) to secure a Final Determination that will be provided to the Council upon receipt.” Has the Petitioner received a final determination from DEEP NDDB? If yes, provide a copy of such correspondence.

**Company’s Response:**

The Petitioner has not yet received a Final Determination from DEEP NDDB. The Project team met with staff from DEEP NDDB on December 18, 2019 to discuss the Project and a path forward for receiving a Final Determination. Based on this meeting, the Petitioner is working with NDDB and will update the Council accordingly.

**Traffic**

34. Please update Findings of Fact #143 through #145 with regard to traffic.

**Company’s Response:**

The Findings of Fact remain accurate with the updated project design.

**Facility Construction**

35. Referencing Finding of Fact #117 from Petition No. 1310. Provide the updated estimated cost of the proposed project.

**Company’s Response:**

**This response is provided pursuant to a Motion for Protective Order.**

The current estimated total cost of the project is approximately [REDACTED].

36. Referencing page 5 of the Pre-filed Testimony of Katelin Nickerson and Dr. Kevin Ryan, it states, “A comprehensive erosion and sedimentation control plan is being developed for the Project. This plan will be included as part of the Stormwater Management Report to be submitted to DEEP for the Stormwater General Permit (General Permit).” What types of erosion and sedimentation control measures are being considered for this project? Explain.

**Company’s Response:**

The Project is proposed to be constructed in phases to minimize disturbance. Within each Phase, sub-phases will be designed to be less than 10 acres and each sub-phase will have a temporary sediment basin or trap as required. Other construction phase erosion and sediment controls will include structural controls such as conveyance swales, perimeter controls, check dams, and other measures as required during construction to manage stormwater. Structural controls are designed in accordance with the 2002 Guidelines for Soil Erosion and Sediment Control manual.

37. With regard to earthwork required to develop the site, provide the following:
- Will the site be graded? If so, in what areas?
  - What is the desired slope within the solar array areas?
  - Estimate the amounts of cut and fill in cubic yards for the access road(s)

- d) Estimate the amounts of cut and fill in cubic yards for solar field grading.
- e) If there is excess cut, will this material be removed from the site property or deposited on the site property?

**Company's Response:**

The topography of the site will not significantly change as a result of the Project. Within the solar array, micro-grading, or the grading of existing undulations, will occur prior to installation of the solar array. While the proposed site roads and stormwater basins require both areas of cut and fill and steeper areas within the array area require grading for more gradual slopes, general site topography will be maintained.

- a) The site will be graded around the site roads, collector substation, to create stormwater basins, and in steep areas to accommodate the solar array. Proposed grading is shown on sheets C-044 to C-084 in Exhibit G of the Petition.
- b) The maximum desired slope in the solar array area is 15%.
- c) The access roads are estimated to require 7,227 cubic yards of cut and 14,325 cubic yards of fill.
- d) The solar field grading is estimated to require 62,195 cubic yards of cut and 28,150 cubic yards of fill.
- e) The topsoil removed will be redistributed in a broadcast manner on site and stabilized within the limit of work. Refer to the Farmland Soil Mitigation Plan in Exhibit E of the Petition.

**Maintenance Questions**

38. Referencing Tab H of the Petition – Operations and Maintenance Plan, Snow Maintenance, has snow accumulation on the solar panels been modeled into the predictions for annual electrical energy output? Was the angle of the panels and spacing under the panels chosen to facilitate the melting and sliding off of snow from the panels?

**Company's Response:**

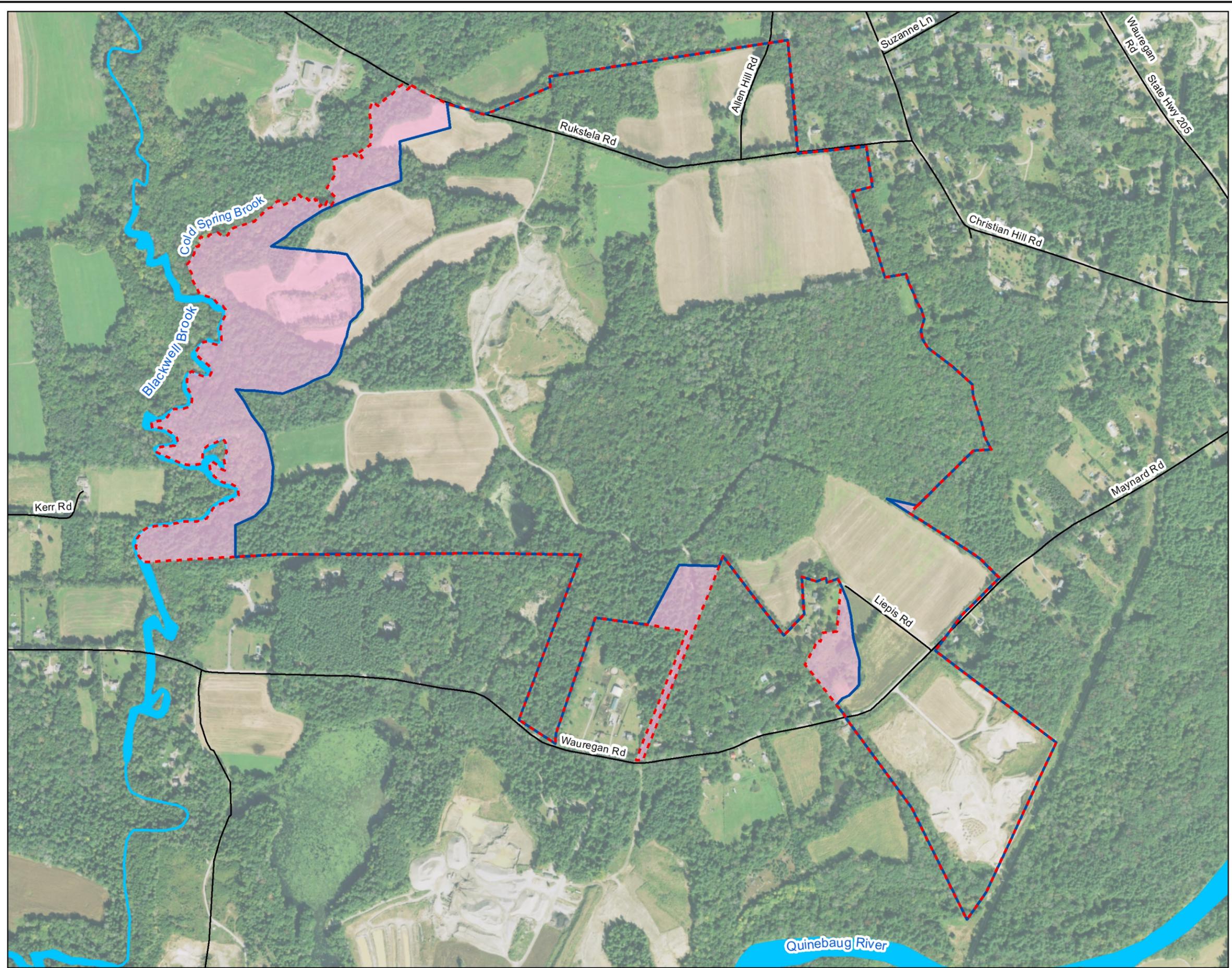
Snow accumulation has been included in the energy production models for this Project. The fixed-tilt panels are installed at an angle above horizontal to optimize sun to facilitate melting. This angular mounting also allows most snow and ice to slide off the panels onto the ground once the sun rises and begins to warm the panels. The racking design takes into account heavy snow and ice; there is not any anticipated need for the snow/ice to be removed for structural reasons.

39. Would the petitioner store any replacement modules on-site in the event solar panels are damaged or are not functioning properly? If so, where? How would damaged panels be detected?

**Company's Response:**

A storage container will be located on the property and store spare parts including solar panels. NextEra uses proprietary software to detect output anomalies and the need for a technical inspection to detect any damage.





**Legend**

- Current Study Area (516 acres)
- 2017 Study Area (451 acres)
- Study Area Expansion (65 acres)
- Watercourse (NHD)
- Road

MA  
NY  
CT  
RI  
Project Location

0 400 800 1,600 Feet

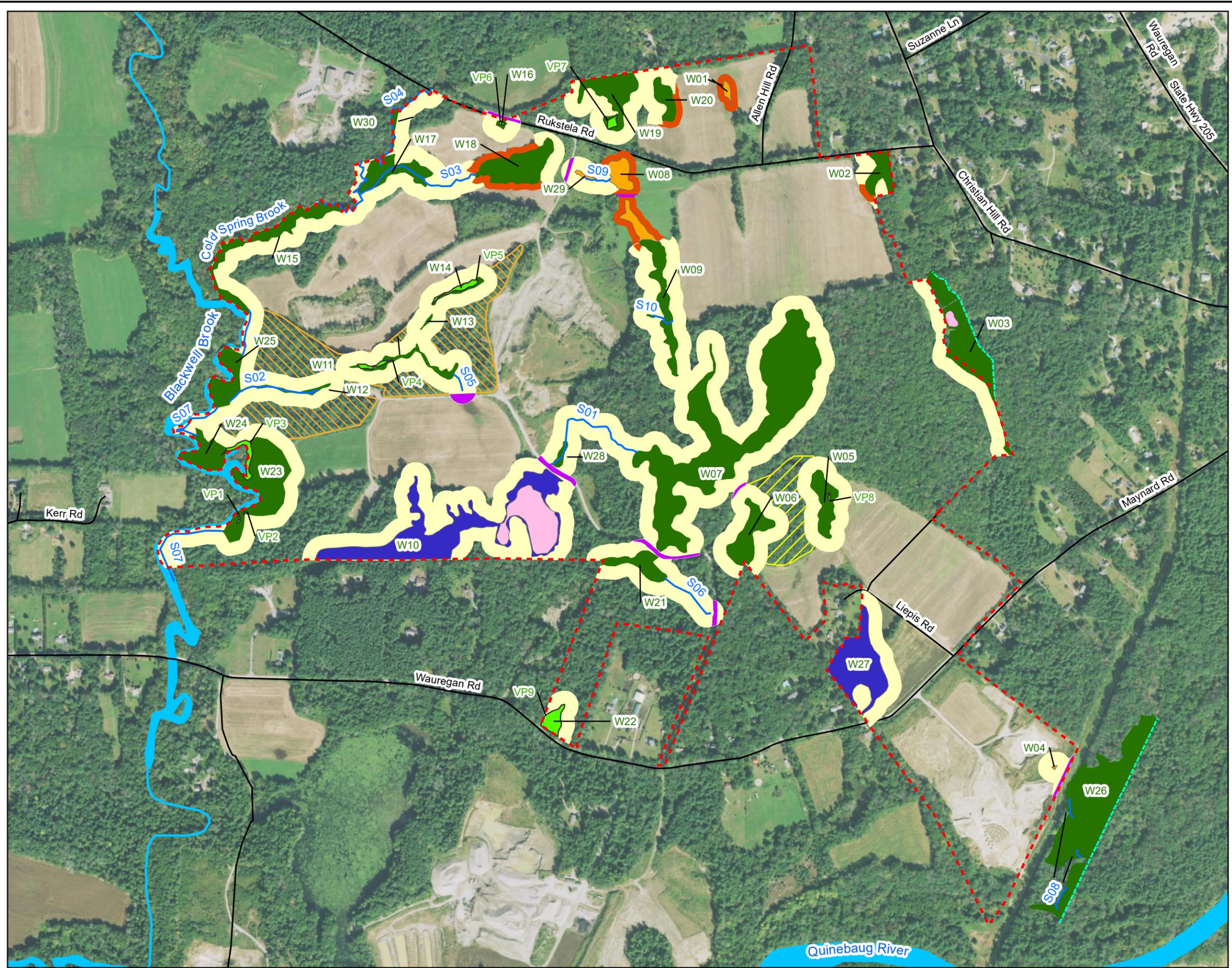
**Quinebaug Solar Study Area Comparison (2017 to present)  
Brooklyn/Canterbury, CT**

Prepared For: **NEXTERA ENERGY TRANSMISSION**

Prepared By: **TETRA TECH** Date: **12/2019**

Source: NAIP Imagery 2018; NextEra 2017, USGS National Hydrography Dataset 2019; U.S. Bureau of Census Transportation 2018

Coordinate System: North American Datum 83 Universal Transverse Mercator, Zone 19 North



**Legend**

- Study Area
- Delineated Watercourse
- Limit of Wetland Survey
- Road
- Watercourse (NHD)
- Encroachment Area (Along or Adjacent to Existing Roads)
- No Development, Herpetofauna Protection Area
- Vernal Pool
- 50' Buffer
- 100' Buffer
- Directional Buffer

**Delineated Wetlands**

- Emergent Wetland
- Forested Wetland
- Emergent/Scrub-Shrub/Forested Wetland
- Unconsolidated Bottom/Open Water



0 400 800 1,600 Feet

**Wetlands and Watercourse Buffers  
Quinebaug Solar Project  
Brooklyn/Canterbury, CT**

Prepared For: 

Prepared By:  **TETRA TECH** Date: **08/2019**

Source: NAIP Imagery 2018; NextEra 2017, USGS National Hydrography Dataset 2019; U.S. Bureau of Census Transportation 2018

Coordinate System: North American Datum 83 Universal Transverse Mercator, Zone 19 North