July 31, 2020

# Gravel Pit Solar

## Application for Certificate of Environmental Compatibility and Public Need

**SUBMITTED TO**

Connecticut Siting Council

**APPLICANT**

Gravel Pit Solar, LLC
Gravel Pit Solar II, LLC
Gravel Pit Solar III, LLC
Gravel PIt Solar IV, LLC

**PREPARED IN ASSOCIATION WITH**

Pullman & Comley, LLC
Vanasse Hangen Brustlin, Inc.
Heritage Consultants, LLC
Environmental Design & Research D.P.C
Exponent Engineering and Scientific Consulting

# Gravel Pit Solar

## 120 MW Solar Photovoltaic Energy Generation Project in East Windsor, Connecticut

PREPARED FOR

Gravel Pit Solar, LLC
Gravel Pit Solar II, LLC
Gravel Pit Solar III, LLC
Gravel Pit Solar IV, LLC

1166 Avenue of the Americas, 9th Floor
New York, NY 10036

PREPARED BY

100 Great Meadow Road
Suite 200
Wethersfield, CT 06109

JULY 31, 2020

**APPLICATION OF GRAVEL PIT SOLAR**

# APPLICATION FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, OPERATION AND MAINTENANCE OF A 120 MW-AC SOLAR PHOTOVOLTAIC PROJECT NEAR APOTHECARIES HALL ROAD, PLANTATION ROAD, WAPPING ROAD, AND WINDSORVILLE ROAD IN EAST WINDSOR, CONNECTICUT

**JULY 31, 2020**

# Table of Contents

# List of Exhibits

| Exhibit No. | Description |
|---|---|
| Exhibit A | Figures |
| Exhibit B | DESRI Renewables, LLC Company Resumes |
| Exhibit C | Site Plans |
| Exhibit D | Abutters List and Notice |
| Exhibit E | List of Municipal Officials and Government Agencies Notice |
| Exhibit F | Municipal Correspondence |
| Exhibit G | Visibility Assessment |
| Exhibit H | Soil Scientist's Report |
| Exhibit I | Wildlife Evaluations Technical Memorandum |
| Exhibit J | CT DEEP NDDB Correspondence |
| Exhibit K | Vernal Pool Survey Technical Memorandum |
| Exhibit L | Stormwater Management Report |
| Exhibit M | SHPO Correspondence and Cultural Resources Survey |
| Exhibit N | Acoustical Study |
| Exhibit O | Carbon Debt Analysis |
| Exhibit P | Operations & Maintenance Plan |
| Exhibit Q | FAA Notice of Proposed Construction and Determinations of No Hazard |
| Exhibit R | GPS Emergency Management and Evacuation Plan |
| Exhibit S | Decommissioning Plan |
| Exhibit T | Agricultural Soil Protection Plan |

# List of Tables

# List of Acronyms and Definitions

| | |
|---|---|
| AC | Alternating Current |
| ATV | All-terrain vehicle |
| BFE | Base Flood Elevations |
| BMP | Best Management Practices |
| CECPN | Certificate of Environmental Compatibility and Public Need |
| CGS | Connecticut General Statutes |
| $CO_2$ | Carbon Dioxide |
| CT ESA | Connecticut Endangered Species Act |
| CT DEEP | Connecticut Department of Energy and Environmental Protection |
| CRP | Conservation Reserve Program |
| CWAP | Connecticut Wildlife Action Plan |
| dB | Decibels |
| dB(A) | A weighted decibels |
| DESRI | D.E. Shaw Renewable Investments |
| EDR | Environmental Design & Research D.P.C. |
| EMF | Electric and Magnetic Fields |
| ESA | Federal Endangered Species Act |
| FAA | Federal Aviation Administration |
| FEMA | Federal Emergency Management Agency |
| FERC | Federal Energy Regulatory Commission |
| FCA | Forward Capacity Auction |
| FCM | Forward Capacity Market |
| GCN | Greatest Conservation Need |
| IWWA | Inland Wetlands and Watercourses Agency |
| IPaC | Information for Planning and Conservation |
| ISO-NE | Independent System Operator of New England |
| kV | Kilovolt |
| LLC | Limited Liability Company |

| | |
|---|---|
| MW | Megawatt |
| MWh | Megawatt Hour |
| MT | Metric Tons |
| NAAQS | National Ambient Air Quality Standards |
| NAVD 88 | North American Vertical Datum of 1988 |
| NDDB | Natural Diversity Data Base |
| NEMA | National Electrical Manufacturers Association |
| NESC | National Electric Safety Code |
| NLEB | Northern long-eared bat |
| NRCS | Natural Resource Conservation Service |
| O&M | Operation and Maintenance |
| PPA | Power Purchase Agreement |
| POCD | Plan of Conservation and Development |
| ppb | Parts Per Billion |
| RCSA | Regulations of Connecticut State Agencies |
| RFP | Request for Proposals |
| ROW | Right of way |
| SFHA | Special Flood Hazard Area |
| SHPO | State Historic Preservation Office |
| SOM | Soil Organic Matter |
| URA | Upland Review Area |
| US EPA | United States Environmental Protection Agency |
| USFWS | United States Fish and Wildlife Services |
| VHB | Vanasse Hangen Brustlin, Inc. |
| WAP | Wildlife Action Plan |
| WOTUS | Waters of the United States |
| XLPE | Cross-linked polyethylene |

This page intentionally left blank.

# 1

# Introduction

This is an application for a Certificate of Environmental Compatibility and Public Need (CECPN) for the construction, operation and maintenance of the Gravel Pit Solar Project (GPS or the Project) proposed by Gravel Pit Solar, LLC, Gravel Pit Solar II, LLC, Gravel Pit Solar III, LLC, and Gravel Pit Solar IV, LLC (collectively Gravel Pit Solar or the Applicant) in the Town of East Windsor, Connecticut. The Project includes the development of a 120-megawatt (MW) alternating current (AC) ground-mounted solar photovoltaic system. The Project will encompass approximately 485 acres (the Project Area) and will be sited on eight parcels of land totaling approximately 737acres (the Project Site) located near Apothecaries Hall Road, Plantation Road, Wapping Road, and Windsorville Road (Refer to Project Location Map provided at Exhibit A).

Pursuant to Section 16-50k and Section 4-176(a) of the Connecticut General Statutes (CGS) and Section 16-50j-38 *et seq.* of the Regulations of Connecticut State Agencies (RCSA), the Applicant hereby petitions the Connecticut Siting Council (the Siting Council) for issuance of a CECPN for the Project.

CGS § 16-50k provides, in relevant part:

> *(a) Except as provided in subsection (b) of section 16-50z, no person shall exercise any right of eminent domain in contemplation of, commence the preparation of the site for, commence the construction or supplying of a facility, or commence any modification of a facility, that may, as determined by the council, have a substantial adverse environmental effect in the state without having first obtained a certificate of environmental compatibility and public need, hereinafter referred to as a "certificate", issued with respect to such facility or modification by the council. Any facility with respect to which a certificate is required shall thereafter be built, maintained and operated in conformity with such certificate and any terms, limitations or conditions contained therein.*
>
> *Notwithstanding the provisions of this chapter or title 16a, the council shall, in the exercise of its jurisdiction over the siting of generating facilities, approve by declaratory ruling (A) the construction of a facility solely for the purpose of generating electricity, (B) the construction or location of any fuel cell, unless the council finds a substantial adverse environmental effect, or of any customer-side distributed resources project or facility or grid-side distributed resources project or facility with a capacity of not more than sixty-five megawatts, as long as*

*such project meets air and water quality standards of the Department of Energy and Environmental Protection, and (C) the siting of temporary generation solicited by the Public Utilities Regulatory Authority pursuant to section 16-19ss.*

As described more fully herein, the construction, operation and maintenance of the proposed Project satisfies the criteria of CGS § 16-50k and will not have a substantial adverse environmental effect.

This Report has been prepared by Vanasse Hangen Brustlin, Inc. (VHB) under the direction of the Applicant. The description of the affected natural and social environments, and impact analyses were prepared by VHB and other consultants to the Applicant including Heritage Consultants, Inc. (Heritage) for cultural resources, Environmental Design & Research, D.P.C. (EDR) for visual resources, and Exponent Engineering and Scientific Consulting (Exponent) for electric and magnetic field analysis.

# 2

# Applicant

The Applicant's companies (Gravel Pit Solar, LLC, Gravel Pit Solar II, LLC, Gravel Pit Solar III, LLC and Gravel Pit Solar IV, LLC) are affiliates of D.E. Shaw Renewable Investments, L.L.C. (DESRI) and are Delaware limited liability companies headquartered at 1166 Avenue of the Americas, 9th Floor, New York, NY 10036. DESRI, through its affiliates, is a leading developer, owner, and operator of renewable energy projects across North America, including two commercial solar projects in Connecticut: Tobacco Valley Solar (26.4 MW) and Fusion Solar (20 MW).

Since its formation in 2011, DESRI has had a successful track record developing and owning high-quality, commercial wind and solar power plants, including 30 projects with more than 1.5 gigawatt (GW) of capacity in the last six years, and over 20 projects, totaling over 2.0 GW of development stage projects across the United States. The DESRI team (Refer to DESRI Renewables, LLC Company Resumes at Exhibit B) has significant experience financing renewable projects and has raised more than $10 billion in project financing, tax equity, mezzanine debt, corporate debt, equity, and other capital for its affiliates' projects over the last ten years. DESRI's strategic development partners in New England include North Light Energy, LLC and Bask Energy, LLC. Correspondence and/or communications regarding this Application should be addressed to:

| | |
|---|---|
| Aileen Kenney, Principal | (617) 852-7031 |
| Bask Energy, LLC | Kenney.aileen@gmail.com |
| c/o D.E. Shaw Renewable Investments | |
| 180 Linden St, Wellesley, MA 02482 | |

A copy of all such correspondence or communications should also be sent to the Applicant's attorney:

| | |
|---|---|
| Lee D. Hoffman | (860) 424-4315 (office) |
| Pullman & Comley, LLC | (860) 424-4370 (fax) |
| 90 State House Square | lhoffman@pullcom.com |
| Hartford, CT 06103-3702 | |

Both representatives' consent to service by electronic communications.

This page intentionally left blank.

# 3

# Proposed Project

## 3.1 Project History

The Project was developed to provide cost effective, stably priced, renewable energy to Connecticut, Massachusetts and Rhode Island customers. The Project leverages economies of scale to deliver low cost renewable energy to nearby electricity demand centers, including Hartford, Providence, and western Massachusetts. The Project interconnects to a robust section of the existing Independent System Operator New England (ISO-NE) Pooled Transmission Facility system, which allows electricity to be delivered seamlessly to offtakers throughout New England.

The Project Site was targeted for development after an analysis of other possible locations for commercial solar generation facilities in New England. The site selection criteria for commercial project sites included but were not limited to; avoiding impacts to sensitive natural and cultural resources, minimizing impacts to host communities, access to existing transmission system with sufficient capacity, minimizing environmental impact, and close proximity to large energy load centers.

The Project Site is currently used primarily for active sand and gravel mining, as well as for tobacco farming and other crops. The Project Site is adjacent to a landfill, two existing solar energy projects, and other gravel mining operations. The Project is crossed by two existing Eversource 115 kilovolt (kV) line (the 1100 Line and 1200 Line) and their associated rights-of-way (ROWs) and a Connecticut Department of Transportation (CT DOT) railway ROW. Refer to Figure: USGS Project Location Map and Site Location Map provided at Exhibit A.

In 2018, a portion of the Project was bid into the Zero Carbon Request for Proposals[1], and was selected by the Connecticut Department of Energy and Environmental Protection (CT DEEP) and Connecticut's investor owned utilities to provide renewable energy to Connecticut's rate payers. A portion of the Project's generation was subsequently approved by the Connecticut Public Utilities Regulatory Authority[2] (PURA). A portion of the Project's generation was also

1 Connecticut Legislature Special Session Public Act 17-3, An Act Concerning Zero Carbon Solicitation and Procurement

2 Docket No. 18-05-04, PURA Implementation of June Special Session Public Act 17-3, Final Decision, November 27, 2019.

selected and contracted for under the highly competitive Rhode Island Long-Term Contracting Standard RFP, and subsequently approved by the Rhode Island PUC [3]. The balance of the Project's capacity will provide energy to a number of New England's municipal light departments and/or other commercial offtakers.

## 3.2 Project Purpose and Need

The Project will provide a new source of renewable energy to help meet Connecticut's and the greater New England region's emission reduction goals. The Project is consistent with the vision for Connecticut's clean energy future described in Governor Lamont's Executive Order 3. The GPS Project will meaningfully reduce carbon emissions by offsetting energy generation from more carbon intensive energy sources while helping grow Connecticut's green economy. Connecticut currently has approximately 464 MW of installed solar generation capacity, much of it in small-scale projects and on roof tops, which is less than 30 percent of Massachusetts' installed solar capacity. The Project will increase Connecticut's installed solar energy capacity by approximately 25 percent at a single location, maximizing efficiencies of scale and reducing the cost of energy over smaller installations by a significant margin. Well-sited and effectively developed projects like GPS will help Connecticut meet its decarbonization goals, while boosting the local and state economy.

**Consistency with State Long Range Plan**

The 2008 Global Warming Solutions Act (GWSA) and the 2018 Act Concerning Climate Change Planning and Resiliency call for Connecticut to reduce its total greenhouse gas (GHG) emissions to 10 percent below 1990 levels by 2020, to 45 percent below 2001 levels by 2030, and to 80 percent below 2001 levels by 2050. Similarly, Connecticut's Renewable Portfolio Standards (RPS) require electric providers to purchase an increasing percentage of electric power from Class I renewable resources. Under current law, providers must obtain at least 24 percent of their retail loads from Class I renewable energy sources by January 1, 2022 and 40 percent by January 1, 2030; however, these required renewable energy levels likely increase in the ensuing years if the recommendations of Governor Lamont's Energy Policy Committee are followed. The Energy Policy Committee recommended revising the Class I RPS goals to 35 percent by 2025, 50 percent by 2030, 80 percent by 2040 and 100 percent by 2050, and those recommendations were subsequently embodied in Governor Lamont's Executive Order 3.

As part of Connecticut's 2014 Integrated Resources Plan (IRP) and the 2018 IRP Notice of Proceedings, Scoping Meeting, and Opportunity for Public Comment, CT DEEP has proposed several electric generating capacity and renewable resource procurement strategies that it believes will help the State of Connecticut reach the goal of achieving a reliable, clean, and cost-effective pool of energy supply. The development of the Project supports these strategies by adding 120 MW of renewable electricity generation. GPS will assist Connecticut in meeting its 80 percent greenhouse gas reduction goal by the year 2050.

3 R.I. Gen. Laws § 39-26.1-5(e)Long-Term Contracting Standard for Renewable Energy

The purpose of GPS is to generate clean energy in response to Connecticut's and the New England region's need for new sources of electric generating capacity and desire for renewable energy as established by the aforementioned Procurement Statutes and a growing need for capacity in New England.

**Need for New Sources of Electric Generating Capacity**

ISO-NE estimates more than "5,200 MW of oil, coal, and nuclear power plants will have retired from 2013 to 2022, and another 5,000 MW of coal- and oil-fired generation could be retiring in coming years." If all of these facilities retire, ISO-NE estimates that approximately 6,300 MW of new or repowered capacity will be needed to maintain reliability in the region.

ISO-NE assures there will be sufficient electric generating capacity for reliability via the Forward Capacity Market (FCM), the primary capacity procurement mechanism in the region, approved by the Federal Energy Regulatory Commission (FERC) in 2006. As members of ISO-NE, Connecticut load-serving entities rely upon ISO-NE's FCM capacity procurement mechanism to meet projected peak electricity demand plus a target amount of reserves (i.e., extra capacity ISO-NE determines the reliability-driven need for new capacity resources like GPS using the FCM).

Under the FCM, system-wide and localized needs for both existing and new capacity are determined through competitive declining auction processes called Forward Capacity Auctions (FCAs). Prior to the auction, ISO-NE identifies zones within ISO-NE based on a variety of factors including transmission constraints and participating capacity resources. Capacity resources that clear the FCA in their zone become ISO-NE system-wide capacity resources and zonal capacity resources, for the period covered by the FCA. Therefore, capacity resources that clear the FCA are, by definition, needed for reliability.

GPS will participate in FCAs over the term of its Power Purchase Agreements (PPAs) and is expected to clear each year. If GPS clears in any FCA, then ISO-NE (and, by proxy because GPS will be in a zone that includes Connecticut, Connecticut load-serving entities that are participants in ISO-NE) will have determined GPS to be needed for the reliability of Connecticut and the wider New England market.

**GPS has Demonstrated that it has Met the Burden of Demonstrating Public Need**

As the Council is also aware, GPS was selected through a competitive bidding process as authorized by Public Act 17-3. This process involved selection of the Project by both the CT DEEP and the Connecticut electric distribution companies as well as review and approval by the PURA. In order for GPS to be approved under this process, it had to demonstrate that the Project met all of the requirements of CGS § 16a-3m(e)(3), which provides, in pertinent part:

> *Any agreement entered into pursuant to subdivision (2) of this subsection shall be subject to review and approval by the Public Utilities Regulatory Authority. The electric distribution company shall file an application for the approval of any such agreement with the authority. The authority's review shall commence upon the filing of the signed power purchase agreement with the authority. The authority shall approve agreements*

> *that it determines (A) provide for the delivery of adequate and reliable products and services, for which there is a clear public need, at a just and reasonable price, (B) are prudent and cost effective, and (C) that the respondent to the solicitation has the technical, financial and managerial capabilities to perform pursuant to such agreement.*

After its selection by CT DEEP and the electric distribution companies, GPS submitted the contract that forms the basis of its offtake by the Connecticut electric distribution companies to PURA for its review and approval in Docket No. 18-04-04, *PURA Implementation of June Special Session Public Act 17-3*. PURA went to great lengths to examine the GPS Project and issued an Interim Decision on the matter on November 22, 2019. On page 5 of that Interim Decision, PURA found that the agreement for the GPS Project, along with other agreements: "1) procure electricity that the State needs and uses; 2) advance the State's carbon goals; 3) improve air quality and 4) reduce the electric system's reliance on natural gas, which improves winter reliability." PURA went on to state that the GPS Project, along with the other projects that were the subject of that docket "meet a clear public need." *Id.* at page 6.

PURA issued a Final Decision in that docket one week after it issued its Interim Decision. The Final Decision approved some minor changes to the underlying PPAs. With those edits having been approved, PURA re-affirmed its findings in its prior Interim Decision and found that the GPS Project "met all the requirements of Conn. Gen. Stat. §§ 16a-3m(e)(3)(A), (B) and (C)." Final Decision, Docket No. 18-04-04, *PURA Implementation of June Special Session Public Act 17-3*, November 27, 2019, at page 2. As such, PURA ruled that the GPS Project:

- Provided for the delivery of adequate reliable products and services;
- That there was a clear public need for such a project;
- That the project would provide its products at a just and reasonable price;
- That the project was prudent and cost-effective; and that,
- GPS had the "technical, financial and managerial capabilities" to complete such a project.

## 3.3 Site Selection

The Applicant undertook an intensive two-year site selection process before finally selecting the Project Site. The GPS team began prospecting suitable renewable energy project locations in anticipation of increasing demand caused by new RPS state mandates, as well as recent and planned traditional generator unit retirements. The team began by conducting a review of reasonably viable utility solar project locations throughout the ISO-NE market. Property considered suitable for a utility solar project met the following characteristics:

- Sufficient parcel size (i.e., ideally over 700 contiguous acres);
- No- or readily avoidable environmental (e.g. Wetlands, rare species, etc.) resource constrains;
- Few cultural resources;
- Generally level topography;
- Compatible land use regulation; and

› Proximity to existing transmission voltage electrical infrastructure with sufficient capacity to accommodate a utility generator.

The GPS team's site selection process included an iterative approach where prospective project locations were identified and accepted or rejected based on increasingly stringent criteria. The process relied on an intensive Geographic Information System (GIS) assessment and the team's experience siting, developing, constructing and operating utility projects in New England, and elsewhere. The first step was to locate large parcels of land within 2 miles of existing transmission lines and substations throughout New England. Broad areas of the region were immediately ruled out due to topography (e.g., mountains, rivers, streams), land-uses (e.g., cities and residential suburbs), and transmission constraints (e.g., congested portions of the ISO-NE grid including rural parts of Maine, New Hampshire, and Vermont).

A subset of parcels that met the criteria for suitable topography, land uses, and transmission were then reviewed for known environmental constraints using readily available local, state, and federal GIS databases. Those sites with few environmental constraints were analyzed further to vet community compatibility, regulatory approval viability, and cost of construction. Parcels with dense residential development adjacent to the site were considered not viable. Locations where regulatory authorities have created onerous restrictions on development were also ruled out. Factors that greatly affect the cost of construction, such as shallow soils (e.g., bedrock near the surface) and required transmission upgrades, were also evaluated. Concurrently, property owners of suitable project locations were approached to determine interest in selling or leasing their property. The result of this site selection process was a selection of a potentially viable locations that met the Project's financial, logistical, and regulatory viability requirements.

Most prospective locations were ruled out early in the vetting process. Ultimately, the Project Site was the only site that met all of the aforementioned criteria for a viable utility solar project of approximately 120 MW based on available information at the time of our prospecting process. Many other sites were investigated, as during the process described above. The three sites that came closest to meeting applicable criteria, but that were ultimately rejected were:

**Alternative 1: Halifax/Middleborough, Massachusetts**

› **Criteria Met:** Alternative 1 was in close proximity to an existing 345-kV transmission system with known capacity, had sufficient already cleared acreage to support a utility project, and was generally flat.

› **Cause for Rejection:** Alternative 1 was rejected because of the cost required to cut a 345-kV transmission line and build a new substation. The site was also vetted for the occurrence of wetlands and rare species and was found to have a large percentage of wetlands and to support rare wildlife species. Further, the site was in close proximity to, and highly visible from, a number of residential areas.

**Alternative 2: Swanton and St. Albans area, Vermont**

- **Criteria Met:** Alternative 2 was in close proximity to existing 46-kV and 115-kV transmission systems, had sufficient acreage to support a utility project, was generally flat, and was in an area with little residential development.
- **Cause for Rejection:** Alternative 2 was rejected because of transmission constraints associated with the Sheffield Highgate Export Interface. The alternative site was also partially under a long-term agricultural easement, and thus not available for solar.

**Alternative 3: Torrington, Connecticut**

- **Criteria Met:** Alternative 3 was in close proximity to an existing 115-kV transmission system, had sufficient acreage to support a utility project and was generally not visible to abutting residential areas.
- **Cause for Rejection:** Alternative 3 would require a 115-kV line cut, similar to GPS, but the existing 115-kV line did not cross the property. Additionally, although Alternative 3 had sufficient acreage, it was entirely forested, had shallow soils, and had significant wetland areas.

The proposed location for GPS was deemed to be the most suitable alternative. Once that selection was made, GPS began negotiating with landowners. Once negotiations with the landowners were completed, GPS initiated site characterization studies at the Project Site. Concurrently, GPS began discussing the concept of a solar project with the Town of East Windsor. The Town was receptive to the idea of a solar project on the Project Site for a variety of reasons. The Town immediately saw the economic value of having a new taxpayer and new development in the community.

As stated above, the Project Site is currently an active sand and gravel mining operation as well as an active tobacco farm. The Project Site is also adjacent to other gravel mining operations, solar projects, a landfill, and farms. Additionally, according to conversations with abutters and Town staff, there have been frequent complaints about noise, truck traffic, and dirt on the roads near the gravel mines. The area also experiences extensive illicit and extensive all-terrain vehicle (ATV) traffic. The ATV traffic is a source of complaints from local residents and causes environmental damage to the landscape, in particular to Ketch Brook which is crossed by a number of improvised ATV trails. By developing a solar project on the Project Site, GPS would be eliminating large gravel mining operation and securing the Project Site with a perimeter fence, thereby limiting the ATV activity.

In addition to reducing noise pollution and further degradation to the land from current uses and ATV traffic, the proposed Project Site provides direct access to existing electrical infrastructure (two Eversource 115-kV transmission circuits currently traverse the Project Site). GPS is working with Eversource and ISO-NE to develop a Project Substation and necessary Transmission Owner (Eversource) Switchyard within the Project Site. The location of these facilities would be not be visible from abutting properties and would be located directly adjacent to the Project.

## 3.4 Property Description

The Project Area consists of a 485-acre portion of the eight Project Site parcels, located near Apothecaries Hall Road, Plantation Road, Wapping Road, and Windsorville Road in the Town of East Windsor. Refer to Figure: Site Location Map provided in Exhibit A.

| Parcel ID | Acreage[4] |
|---|---|
| 057-65-001 | 97.8 |
| 057-65-002 | 3.6 |
| 048-65-007 | 132.3 |
| 037-65-005A | 14.6 |
| 027-49-017C | 86.5 |
| 025-49-017A | 127.17 |
| 016-49-007 | 119.5 |
| 016-50-001 | 155.50 |
| **Total Area** | **737.2** |

4 Acreage as reported by VHB parcel survey

The Project Site is situated in the Connecticut River Valley and is generally characterized by sand and gravel quarries, tobacco fields, and forested land. The Project Site is located in the southern part of the Town of East Windsor. The Project Site is bounded by Windsorville Road on the south, Wapping Road on the east, Apothecaries Hall Road on the north, and Ketch Brook on the west.

The Project Site primarily contains approximately 76 acres of sand and gravel mining operations, approximately 230 acres of agricultural fields (primarily tobacco fields) and includes approximately 330 acres of wooded area. Unimproved dirt farm roads interconnect the fields and provide access from public roadways. In addition, the Eversource 1100 Line and 1200 Line 115-kV electrical transmission line crosses the Project Site from northwest to southeast, and a CT DOT railroad ROW extends north-south through the center of the Project Site. A small portion of the Project Site, approximately 15 acres, is classified as vacant commercial land.

Land uses adjacent to the Project Site include sand and gravel quarries, agricultural fields, a closed landfill, two, solar arrays, a gun club, an active freight railroad, a reclaimed lumber mill, a self-storage facility, and residential homes. The southern Project Site boundary abuts the town boundary between East Windsor and South Windsor.

## 3.5 Project Description

The Project includes the construction of solar photovoltaic arrays across an approximate 485-acre Project Area. The solar panels will be mounted on a mix of single-axis tracker mechanisms and fixed-tilt metal racking systems. Approximately 28 percent of the Project Site will be comprised of fixed-tilt metal racking system arrays, 19 percent single-axis tracker mechanism arrays, and 1 percent will be utilized for access roads. The remainder of the Project Site (approximately 42 percent) will be either left undeveloped, used for stormwater controls, or vegetative buffers. This equates to coverage of approximately 203 acres for

fixed-tilt system arrays, 138 acres for single-axis tracker system arrays and 10 acres for access roads. The proposed solar photovoltaic panels are likely to be between approximately 400 watts (W) and 550 W, and approximately 3.5 feet wide and 7 feet tall. Spacing between panels will be approximately 8.8 feet for fixed-tilt and 15.2 feet for single-axis trackers. There will be approximately 15-foot wide access roadways, with space provided for associated equipment and safety fencing. The fixed tilt panels will be arranged in east-west rows facing due south and will be supported on pile foundations. These solar panels will be fixed at a tilt of approximately 20 percent and will be elevated approximately 2 feet above ground and approximately 9 feet total height above grade. The tracker systems are oriented in north-south strings and will be elevated a minimum of 3 feet above grade with a maximum height of approximately 14.7 feet above grade.

The proposed photovoltaic panels are composed of crystalline silica cells supported in anodized aluminum frames. The panels are designed to have low irradiance (reflectance), and are approximately 97 percent efficient, meaning that very little light is reflected off the surface. The proposed array system is designed to absorb energy directly from the sun and should not be confused with the reflector-concentrator type systems that have been constructed in the western United States. The panels will be connected with cross-linked polyethylene (XLPE) cables which connect the panel arrays to electrical equipment pads.

Thirty-six inverter skids on piles with gravel aprons will be spaced throughout the Project footprint will contain transformers, inverters and electrical panels. This equipment is anticipated to have a height above adjacent grade of approximately 10 feet. The solar array will connect to the Switchyard described above via a buried XLPE electrical cable.

The facility will be surrounded by a minimum 7-foot-high agricultural fence topped with a single string of barbed wire.  Substation and switchyard fencing will be enclosed by an 8-foot chain link fence with barbed wire. The Project fence is required to be posted with safety signage providing the warning that high voltage equipment is stored inside the fence. The National Electric Safety Code (NESC) dictates the height of the fence and the signage. The NESC also dictates the distance between the fence and electrified equipment to minimize arcing, as well as grounding requirements for the fence itself for the safety of those potentially contacting the fence. The security fence is not an electric fence. Outside the fence, an approximately 100-foot-wide zone around the east, west and south sides of the Project Site will be cleared of vegetation and managed as meadow, low growing shrubs or other low growing vegetation for the lifetime of the facility operation, in some areas stumps may be left in place within the clearing.

Through much of the Site, the Project will conform to existing surface grades. Within the fence line, where panels are proposed and steeper slopes are present, grading will be required to achieve maximum slopes of 15 percent. Maximum grade within the Project Site for areas outside of proposed array areas is 3:1. Limited grading will be necessary around the Project perimeter to meet existing grades. Proposed array foundations will be driven piles, either steel H-piles or pre-drilled concrete. Any direct buried XPLE cable will be trenched in approximately 3 to 4 feet below grade.

Access to the Project Site during operations will be off Plantation Road and Windsorville Road. The Project access roadways will connect to the public roadway at these locations.

Locked gates will be installed at the entrances to discourage driving along the access roads by unauthorized individuals. Gates will be aesthetically consistent with the setting, and include landscaping, architectural gates and other features to improve the look of the entrances (see Section 7.6). Minimal signage identifying the facility will be provided at each of these locations and will include contact information for personnel and/or a designated operator in charge of managing the facility. These signs will be designed with consideration of the signage guidance provided in the Town of East Windsor Zoning Regulations.

Visual screening for the Project will include a combination of landscape plantings, architectural fencing and meadow or grass seeding. Proposed screening is described in Section 7.6.

The Project layout is depicted on Figure: Project Layout Map provided at Exhibit A and the Site Plans are provided in Exhibit C.

Construction of the Project is expected to begin as soon as the third quarter of 2021 and will likely be completed in the fourth quarter of 2022 or early in 2023. Refer to Section 7.10 for information on construction work hours.

## Interconnection

Electricity generated from the Project's solar panels will be collected via DC collector lines and combiner boxes, and then inverted to AC at the Project's 36 inverters. Electricity from the inverters will be transmitted back to the Project Substation at 34.5-kV. The Project Substation will step-up the 34.5-kV electricity to 115-kV, which is the voltage of the existing Eversource transmission lines. The Project (GPS) Substation will connect to the Transmission Owner (Eversource) Switchyard, which will be constructed adjacent to one another and are depicted on the Site Plans located at Exhibit C.

The GPS Substation will include:

- Main power transformer and secondary containment
- Circuit Breakers and disconnect switches
- Electrical bus and conductors
- Steel structures and concrete foundations for equipment support
- Masts for lightning protection and lighting
- Equipment enclosure containing protective relaying and monitoring systems

The Eversource Switchyard includes:

- Circuit breakers and disconnect switches
- Revenue metering equipment
- Electrical bus and conductors
- Steel structures and concrete foundations for equipment support
- Masts for lightning protection and lighting
- Equipment enclosure containing protective relaying and monitoring systems

**Ketch Brook Crossing Cable Route.** The Project array areas and inverters south of Ketch Brook will be electrically connected to the northern Project Area via medium voltage Collector Lines (34.5-kV). The Collector Lines will bring AC electricity from the 23 inverters south of Ketch Brook to the GPS Switchyard. The Collector Lines will be routed beneath Ketch Brook to avoid direct and indirect impacts to the stream. Despite the added construction costs, the Applicant concluded that a jack and bore or horizontal direction drill (HDD) method would be the least environmentally impactful method to install the Collector Lines across Ketch Brook. Boring will avoid the need for an overhead crossing of the brook, which would require tree clearing and permanent vegetation management near the stream. The Collector Lines will also be routed beneath the railroad, using either a jack and bore, HDD, or cut and cover installation method. There will likely be at least two bore sections to completely install the Collector Lines, and thus a temporary staging and bore staging area in an upland area, between Ketch Brook and the railroad is proposed (Refer to: Project Layout Map at Exhibit A and Site Plans at Exhibit C). A temporary access road is proposed from the northern array, through the Project Site and over the railroad ROW to the bore staging area.

**Plantation Road Crossing Cable Route.** The Project array areas and nine inverters south of Plantation Road will be electrically connected to the northern section via medium voltage Collector Lines (34.5 kV). The Collector Lines will bring AC electricity from the nine inverters south of Plantation Road to the array areas north of Plantation Road and to the GPS Switchyard. The Collector Lines will be conveyed underground across Plantation Road using either a cut and cover construction method or by boring.

## 3.6 Electrical Interconnection

On June 11, 2019, GPS submitted an interconnection request to the ISO-NE for 50 MW to be connected at the Eversource 1200 Windsor Locks to Barbour Hill 115-kV line, this request was assigned queue position ("QP") 892. A second interconnection request was filed on November 28, 2019 for an additional 25 MW at the same location as QP 892, and this request was assigned QP 940. On May 26, 2020 a third and final interconnection request was made for 45 MW (QP 1030), to bring the total interconnection requests to 120 MW. Concurrently GPS had an independent engineering group, Enerzinx, LLC, conduct a thermal and steady state analysis of the capacity of the 1200 line. This analysis indicated capacity for at least 120 MW of new generation.

Results from the QP 892 System Impact Study were received in June 2020, no network upgrades or adverse system impacts were identified in the study. GPS expects to enter into an interconnection agreement with Eversource for the Project in late 2020. In the interim, GPS is coordinating closely with Eversource's interconnection and engineering team to design and permit the required interconnection facilities for the both the GPS Substation and the Eversource Switchyard.

## 3.7 Project Schedule

GPS has already ordered certain equipment for the Project including transformers, as well as some racking, and panels, the remaining equipment including panels, racking, and inverters will be procured approximately three to nine months prior to construction. Procurement will occur concurrent with financial closing of construction term debt followed closely by contracting with the construction contractor. Construction of the Project will occur over an approximately 14 to 20-month period. Assuming the Project receives full approvals in early 2021, then construction of access roads, installation of stormwater controls, grading and stabilization may occur starting late summer / early fall 2021. Seeding with temporary and permanent vegetation may occur in fall 2021 and late winter / spring 2022. Panel racking and panel installation would likely start in spring 2022, with the installation of collector line and combiner boxes occurring concurrent to panel installs. Inverters will likely be installed in summer 2022. Construction of the GPS Switchyard and Eversource Switchyard will start as soon as late-summer 2021. Commissioning, testing, back-feed and in-service of the facility are planned for late-summer and fall 2022. Commercial operation of the Project is targeted for between November and December of 2022, if not sooner. Final minor construction punch list items and completion of certain minor features of the facility may not occur until spring or early summer 2023.

## 3.8 Project Costs

The estimated costs associated with the Project is considered protected confidential information and may be filed with the Siting Council pursuant to a motion for protective order, should the Siting Council desire this information.

This page intentionally left blank.

# 4

# Project Benefits

Pursuant to CGS § 16-50p(c)(3), a project provides a public benefit if a project "is necessary for the reliability of the electric power supply of the State or for a competitive market for electricity and a public need exists." The Project will generate the bulk of its power during the summer peak electricity demand period, thereby providing peaking resources when the New England grid has its greatest need. Moreover, the Project will help foster the State's goal of developing "renewable energy resources, such as solar and wind energy, to the maximum practicable extent" pursuant to CGS § 16a-35k.

The Project will provide substantial additional benefits to the State of Connecticut and the Town of East Windsor, including:

- Generation of 100 percent renewable energy
- Energy generation without any air emissions, including greenhouse gas emissions;
- Energy generation without any water consumption or pollution;
- Enhancement of existing farmland soils by use of long-term cover crops such as cool season grasses that sequester atmospheric carbon in the soil and improve soil health;
- Promote soil fertility by including species that fix atmospheric nitrogen into forms available to grasses in the seed mix;
- Conversion of gravel pit and high traffic ATV nuisance areas to a quieter and safer land use;
- Potential displacement of older fossil fuel generation, either in totality or through offsetting when such fossil fuel generation will place electricity into the grid;
- Increased distribution of generation resources in the State;
- Decreased reliance on the importation of fossil fuels;
- A reliable source of energy that diversifies the State's generation portfolio mix and contributes Class I renewable energy as articulated in the State's RPS; and,
- Numerous economic benefits to the Town and the area, including significant tax revenue to the Town of East Windsor.

Based on the United States Environmental Protection Agency (US EPA) conversion factors, a capacity of approximately 120 MW capacity factor, the Project is anticipated to generate

over 253,000 megawatt hours ("MWh") of Class I renewable energy in its first year of operation. The estimated annual emissions avoided by the Project is anticipated to be 107,463.6 metric tons (MT) of carbon dioxide ($CO_2$). To put this into perspective, the Project is anticipated to provide sufficient power to supply the electricity needs of approximately 23,000 households. The estimated annual emissions avoidance is equivalent to GHG emissions from:

- 23,217 passenger vehicles driven for one year
- 266,658,933 miles driven by an average passenger vehicle

The estimated carbon emissions are equivalent to the following:

- 12,401 homes' energy use for one year
- 18,194 homes' electricity use for one year
- 12,092,219 gallons of gasoline consumed
- 10,556,341 gallons of diesel consumed
- 118,410,089 pounds of coal burned

The Project is a state-of-the-art solar energy generation facility that offers significant economic, environmental, and unique societal benefits to the citizens of the Town of East Windsor and the State of Connecticut. The Project helps Connecticut and the region meet renewable energy goals and offset carbon emissions.

# 5

# Local Input and Public Notice

## 5.1 Public Notice

As required by RCSA § 16-50l, the Applicant provided notice of its intent to file this Application to: (a) those adjacent property owners listed (Exhibit D) and (b) the municipal officials and government agencies listed (Exhibit E). A copy of that notice is also included as part of the Exhibit. In addition, the Applicant provided a copy of the application to the Towns of East Windsor and South Windsor. The Town of South Windsor is within 2,500 feet of the Project Site, and consequently must receive notice of this Project. Refer to Figure: Site Radius Map is provided at Exhibit A.

## 5.2 Public Involvement and Outreach

This section documents the consultation process and design development based on the Applicant's interaction with state and municipal individuals. The following table presents a listing of the coordination and consultation meetings held prior to the filing of this Application.

**Table 1. Public Meetings and Consultation**

| Date of Meeting | Location | Attendees | Matter Discussed |
|---|---|---|---|
| August 20, 2019 | Telephone Conference | Ruben Flores-Marzan (Director of Planning and Development, Town of East Windsor), Aaron Svedlow (Director of Development, GPS) | Introduction of project concept and location. |

| Date of Meeting | Location | Attendees | Matter Discussed |
|---|---|---|---|
| December 9, 2019 | Town of East Windsor, Town Hall | Jason Bowsza (First Selectman, Town of East Windsor), Ruben Flores-Marzan (Director of Planning and Development, Town of East Windsor), Amanda Calve (Assistant to the Town Planner, Town of East Windsor), Melissa LaBelle (Executive Assistant to the First Selectman, Town of East Windsor), Judi Mosso (Assistant Town Planner, Town of East Windsor), Aaron Svedlow (Director of Development, GPS) | Permitting, community relations, general schedule for project. |
| December 23, 2019 | Telephone Conference | Jason Bowsza (First Selectman, Town of East Windsor), Aaron Svedlow (Director of Development, GPS) | Project schedule, updates and economic development |
| December 27, 2019 | Town of East Windsor, Town Hall | Jason Bowsza (First Selectman, Town of East Windsor), Len Norton (Director of Public Works/Town Engineer), Aaron Svedlow (Director of Development, GPS) | Project schedule, updates and economic development |
| January 7, 2020 | Town of East Windsor, Town Hall | Jason Bowsza (First Selectman, Town of East Windsor), Len Norton (Director of Public Works/Town Engineer), Aaron Svedlow (Director of Development, GPS) | Project schedule, updates and economic development |

| Date of Meeting | Location | Attendees | Matter Discussed |
|---|---|---|---|
| January 23, 2020 | Town of East Windsor, Town Hall | Jason Bowsza (First Selectman, Town of East Windsor), Len Norton (Director of Public Works/Town Engineer, Town of East Windsor), Ruben Flores-Marzan, Aileen Kenney (Director of Permitting GPS, Aaron Svedlow (Director of Development, GPS) | Project schedule, updates and economic development |
| March 5, 2020 | Telephone Conference | Ruben Flores-Marzan (Director of Planning and Development, Town of East Windsor), Susan Moberg (Principal, VHB), Aileen Kenney (Director of Permitting GPS), Aaron Svedlow (Director of Development, GPS) | Project schedule, planning, and inland wetlands. |
| April 23, 2020 | Telephone Conference | Jason Bowsza (First Selectman, Town of East Windsor), Aileen Kenney (Director of Permitting GPS), Aaron Svedlow (Director of Development, GPS) | Project schedule, updates and economic development |
| June 9, 2020 | Video Conference | Town of East Windsor Planning and Zoning Commission Members, Aaron Svedlow (Director of Development, GPS), Aileen Kenney (Director of Permitting, GPS), Jonathan Gravel (Project Development, GPS) | Project overview, schedule, and Town comment. Provided answers to questions from the Commission and the public. |

| Date of Meeting | Location | Attendees | Matter Discussed |
|---|---|---|---|
| June 15, 2020 | Telephone Conversation | Ruben Flores-Marzan (Town of East Windsor Planning and Zoning Director), Jonathan Gravel (Project Development) | Discuss town comments to draft certificate application and aspects of zoning and planning |
| July 27, 2020 | Telephone Conference | Connecticut Department of Agriculture Members – Jamie Smith, Stephen Anderson, Lance Shannon, Aaron Svedlow (Director of Development, GPS), Aileen Kenney (Director of Permitting, GPS), Jonathan Gravel (Project Development, GPS), Susan Moberg (Principal, VHB), Jeff Peterson (Sr. Soil & Wetland Scientist, VHB), and Lee Hoffman (Applicant Attorney, Pullman & Comley) | Discuss the Project, overview of extensive soil sampling which has occurred within the Project Site, and implications to Agricultural land. |
| July 28, 2020 | Project Site Walk | CT DEEP – Neal Williams, Chris Stone (Stormwater Division), Aaron Svedlow (Director of Development, GPS), Jonathan Gravel (Project Development, GPS), Steve Kochis (Engineer, VHB), Steve O'Neill (Director, VHB) | Site Walk to discuss Project and Stormwater measures to be implemented. |

In accordance with the CGS §16-50*l*(e) a draft of this application was filed with the Town of East Windsor on May 22, 2020. The Town of East Windsor Planning and Development Department responded to the draft Application on June 5, 2020. The East Windsor Department of Engineering and Public Works responded to the draft Application with comments and recommendations on June 8, 2020. GPS received feedback from and answered questions to the Town of East Windsor Planning and Zoning Commission during a video conference call. The Town of South Windsor did not provide comments within 60 days

of the draft application submittal. GPS has accommodated the recommendations of the Town of East Windsor, including the Planning and Development Department to the extent practicable. Those changes to the Project have been incorporated into the Application. Correspondence from the Town of East Windsor and South Windsor, if applicable, are included at Exhibit F.

In addition to outreach with the Town, GPS has been working to connect with Project abutters to inform them of the Project, solicit feedback, and answer questions. GPS has called abutters and sent out postcards inviting abutters to view the Project website and attend a virtual Project open house. GPS has encouraged abutters, and the general public, to ask questions and provide feedback to GPS via the Project website, through email, and by phone. A GPS website was established in May 2020 (www.gravelpitsolar.com), and the virtual open house will be available in late July. Information will also be posted in the local newspaper to raise awareness of the virtual open house. GPS's voluntary outreach is intended to inform the public of the Project and function as a platform for public input with the goal of allowing GPS to directly incorporate public feedback, where possible, into the Project design.

This page intentionally left blank.

# 6

# Affected Environment

The Applicant performed an assessment of existing environmental and social resources in the vicinity of the Project Site. In accordance with the Siting Council Application Guide for a Renewable Energy Facility (April 2010), environmental considerations evaluated included air emissions, water consumption and discharge, floodplains, aquifers, and groundwater classification, Federal Aviation Administration (FAA) air hazard determination, forests and tree clearing, state and federal regulated rare, threatened and endangered species, wetlands and watercourses, vernal pools, carbon sequestration, and visual impacts, and other environmental considerations. Gravel Pit Solar has also included additional information in this Application regarding wildlife and habitat, stormwater treatment, cultural resources, acoustical analyses, public health and safety, and land use.

The following sections provide affected environmental evaluations.

## 6.1 General Site Description

The Project Site is approximately 737 acres consisting of eight separate parcels of land near Apothecaries Hall Road, Plantation Road, Wapping Road, and Windsorville Road in the Town of East Windsor. The Project Area is a 485-acre portion of the Project Site.

The Project Site is relatively flat and situated at elevations ranging from approximately 100 to 220 feet above mean sea level (AMSL), this generally follows the NAVD88 topographic survey data. The Project Site is primarily comprised of land zoned for manufacturing as well as agriculture. Currently the Project Site is used for active sand and gravel mining and tobacco farming operations. A small portion of the Project Site, approximately 15 acres, is vacant commercial land. The Project Site is also crossed by multiple transmission line ROWs and an active freight railway. Land uses adjacent to the Project Site include a gun club, additional sand and gravel mines, closed landfills, and solar arrays.

## 6.2 Wetlands

A delineation of inland wetlands and watercourses as regulated under the Connecticut Inland Wetlands and Watercourse Act (Sections 22a-36 through 22a-45 of the CGS) was completed within the Project Site between November 2019 and April 2020. The delineation

identified 16 wetland systems within the Project Site, 13 of which are within in the Project Area, as well as one perennial watercourse, one intermittent watercourse, and six vernal pools. Refer to Figure: Wetland Delineation Map provided at Exhibit A. A Soil Scientists Report is provided at Exhibit H.

## Wetland 1

Wetland 1 is a scrub-shrub and forested riparian wetland located along Ketch Brook, a perennial (cold water fishery) watercourse and tributary to the Scantic River (a stocked trout stream). Wetland soils within the delineation include the poorly drained Walpole and Raypol series on low terraces, and the poorly drained Rippowam, moderately well-drained Pootatuck, and well-drained Occum series in the active floodplain. Parts of the brook flow through deep valleys cut into glaciolacustral deposits. The woodlands in these cool valleys are typically dominated by eastern hemlock (*Tsuga canadensis*), red maple (*Acer rubrum*), and sycamore (*Platanus occidentalis*). Where the canopy is closed, the shrub stratum is sparse with spicebush (*Lindera benzoin*) and winged euonymus (*Euonymus alata*). Common herbaceous species include evergreen woodfern (*Dryopteris intermedia*), false hellebore (*Veratum viride*), jewelweed (*Impatiens capensis*) and skunk cabbage (*Symplocarpus foetidus*).

Beaver activity was noted along Ketch Brook, with several impoundments creating pools in the northern reaches of the stream. Additionally, a vernal pool was identified in backwater channel abandoned by Ketch Brook. The wetland buried by sediment remains jurisdictional, and its limits were approximated by digging several holes with a tile spade and classifying the soil beneath the one to four feet of sandy sediment.

## Wetland 2

Wetland 2 is a scrub-shrub and forested wetland located along the low terrace above the Ketch Brook floodplain. Soil within this wetland is similar to the poorly drained Raypol series. The small wetland is characterized by the presence of green ash (*Fraxinus pennsylvanica*), red maple, and sycamore tree species, as well as shrub and herbaceous strata dominated by jewelweed, multiflora rose (*Rosa multiflora*), skunk cabbage and spicebush but is shaded by upland trees growing outside of the wetland. This wetland drains by sheet flow into the downgradient intermittent watercourse which leads to the Ketch Brook floodplain.

## Wetland 3

Wetland 3 occupies the head of a steeply sloping swale. This scrub-shrub and forested wetland area hosts red maples and several umbrella-trees (*Magnolia tripetala*). This uncommon species is considered naturalized from the southeastern United States. Jewelweed, multiflora rose, and spicebush are also present in this small wetland.

Wetland 3 is a small discharge wetland that drains to an intermittent watercourse carved into a steep swale in the southwestern part of the Project Site.

## Wetland 4

Wetland 4 is a scrub-shrub and forested groundwater discharge wetland that drains to an intermittent watercourse carved into a steep swale that drains from the top of the terrace in the southwestern part of the Project Site to the Ketch Brook floodplain. Wetland 4 is formed on the opposite side of the intermittent watercourse from Wetland 2. The vegetation includes multiflora rose, red maple, and spicebush. Soils in this small wetland were identified as Raypol silt loam.

## Wetland 5

Wetland 5 is a scrub-shrub and forested wetland that drains into the same large swale carved into the outwash terrace as Wetland 3 and Wetland 4. Primary vegetation includes multiflora rose, red maple, and spicebush. Soils in this wetland are Raypol silt loam.

## Wetland 6

Wetland 6 is a forested, depressional wetland that held water, estimated at 2 feet deep, at the time of the investigation. Soils observed were identified as Raypol silt loams and the very poorly drained Scarboro series. Wetland 6 provides two vernal pool habitats critical to amphibians and several invertebrates. The vegetation within this wetland is dominated by red maple and white pine (*Pinus strobus*) with highbush blueberry (*Vaccinium corymbosum*), spicebush and winterberry (*Ilex verticillata*) as common shrubs. Cinnamon fern (*Osmunda cinnamomea*) and skunk cabbage are common herbaceous components.

## Wetland 7

Wetland 7 is a small depressional forested wetland with Raypol silt loam soils. This wetland is unlikely to have a hydroperiod long enough to function as a vernal pool in most years, and an ATV trail runs through the middle of this feature. Highbush blueberry, red maple, and white pine are common in this wetland.

## Wetland 8

Wetland 8 is a forested and open water, kettle hole depression. Wetland 8 was inundated during the investigation and provides vernal pool habitat. Soils observed were similar to the Raypol and Scarboro series. Vegetation in this wetland is characterized by eastern hemlock, pin oak (*Quercus palustris*), red maple and white pine tree species and cinnamon fern, sensitive fern (*Onoclea sensibilis*), and winterberry in the shrub and herbaceous layers.

## Wetland 9

Wetland 9 is an emergent, disturbed wet meadow near the eastern boundary near the railroad grade. It was likely created as a sediment basin for the adjacent closed landfill and is isolated from the adjacent Ketch Brook floodplain by an earthen berm. Soils observed in this area would be classified as Aquents due to the level of soil disturbance. Vegetation within

this wetland consists of cattail (*Typha latifolia*), climbing false buckwheat (*Polygonum scandens*), multiflora rose, and species of willow (*Salix sp*.).

## Wetland 10

This isolated emergent wetland occurs as a depression in compacted soils of an agricultural field. The wetland is a nearly circular depression and held 1 to 2 feet of water in its deepest portions on the day of the delineation. Soils around the perimeter of the wetland consist of saturated sandy loam and would be classified as Aquents. Vegetation includes cattail, soft rush (*Juncus effusus*), and woolgrass (*Scirpus cyperinus*). This wetland was heavily rutted by illicit ATV operation. This wetland does not show connectivity to Waters of the United States (WOTUS) and therefore is not jurisdictional to the United States Army Corps of Engineers (USACE).

## Wetland 11

Wetland 11 was created as part of the gravel pit reclamation plan. The wetland is a scrub-shrub, depressional wetland created with fill. Vegetation in this wetland includes common reed, multiflora rose, sensitive fern, and willow.

## Wetland 12

Wetland 12 is a small, scrub-shrub and forested depressional wetland, located adjacent to the CT DOT railroad. Drainage patterns in this area were changed when the railroad grade was constructed by filling and ditches directed water to low lying land impounded by the rail grade. Soils in each of these depressions were similar to the Walpole series. Wetland 12 is sparsely vegetated, with the fringes including a somewhat disturbed mix of vegetation including Buttonbush (*Cephalanthus occidentalis*), jewelweed, royal fern (*Osmunda regalis*), multiflora rose, poison ivy (*Toxicodendron radicans*), red maple, and spicebush. A vernal pool was identified in the northern part of Wetland 12.

## Wetland 13

Wetland 13 is a scrub-shrub and forested wetland that occupies a depression adjacent to the fill section of the CT DOT railroad. The slopes above this depression have accumulated sediment from years of farmland erosion. Soils in this depression were identified as Raypol and Scarboro series. Vegetation in the wetland was somewhat disturbed and includes American elm (*Ulmus Americana*), red maple and red oak (*Quercus rubra*) within the tree strata. The shrub and herbaceous layer were comprised of cottonwood (*Populus deltoides*), jewelweed, silky dogwood (*Cornus amomum*), spicebush, skunk cabbage, and wood-reed grass (*Cinna latifolia*).

### Wetland 14

Wetland 14 is a scrub-shrub wetland dominated by red maple and willow. Wetland hydrology is driven by surface runoff and discharge from the landfill slope cover and may be off-site.

### Wetland 15

Wetland 15 is a forested depression where this reflow enters the ground again and recharges the groundwater. This wetland likely formed in uplands after the adjacent landfill was capped. Water infiltrates into the friable soils above the impervious landfill cap and flows above the liner (through-flow) to the toe of slope where it breaks out onto the ground surface (reflow). The soil in this feature is similar to the Scarboro series as it has a thin muck surface tier above sand and gravel. Vegetation in this wetland was comprised of red maple and white pine with poison ivy and sensitive fern in the herbaceous stratum.

### Wetland 16

Wetland 16 occupies a kettle hole depression that intercepts the groundwater table. The wetland wraps around the east side of a kame knob with the wettest areas north and south of the kame. No watercourse enters or leaves this wetland. The wetland is forested, with red maple identified as the dominant species. Additional tree species present include eastern hemlock, silver maple (*Acer saccharinum*), white pine, and yellow birch (*Betula alleghaniensis*). Common shrubs include arrowwood viburnum (*Viburnum dentatum*), highbush blueberry and winterberry. Cinnamon fern, evergreen wood fern, jewelweed and sensitive fern were the dominate herbaceous species apparent during the early spring investigation.

An inundated depression, with elevation below 122 feet, in the southwest part of the wetland was determined to be a vernal pool. This pool was observed being utilized by wood frogs (*Lithobates sylvaticus*), spotted salamanders (*Ambystoma maculatum*) and fairy shrimp (*Eubranchipus vernalis*).

## 6.3 Wildlife and Habitat

VHB performed a wildlife evaluation of the Project Site. Wildlife resources were characterized through a series of surveys, including bird surveys, vernal pool surveys, mammal and reptile observations, and searches for host-plant species for State-listed Lepidoptera. These field efforts were conducted between late fall of 2019 and July 2020. A detailed description of investigation methods and a Conservation Measures Plan is provided in Exhibit I.

### Vegetation Cover Types

The existing cover types within the Project Site were evaluated to develop an understanding of the wildlife habitat function provided. The cover types were then used to identify anticipated species likely to be found in the available habitat types.

### Sand and Gravel Quarries

These earth material mines are grouped under the Manmade designation of Key Habitat 10, Sub-habitat Urban and Man-made Features in the Connecticut Wildlife Action Plan (CWAP). Approximately 76 acres of the Project Site are occupied by active sand and gravel quarries. Recently mined open areas within the quarries generally do not support vegetation or function as wildlife habitat. These quarries attract illicit recreational use by ATV users and dirt bikers. The southern pit is also used for firearm target practice.

Very little wildlife activity was noted in the floor and walls of the open pits. However, the early succession margins and partially restored areas attract species such as field sparrow (*Spizella pusilla*), song sparrow (*Melospiza melodia*) (Greatest Conservation Need (GCN) species), and wild turkey (*Meleagris gallopavo*).

### Agricultural Fields

In the CWAP, farmland corresponds to the Manmade designation portion of Key Habitat 10, Sub-habitat Agricultural Lands. Farmland occupy broad level terraces that consist of sandy outwash and or deltaic deposits capped by an aeolian mantle all resting on glacio-lacustral lakebed deposits. The Project Site is primarily farmed in shade tobacco, with some corn planted south of Plantation Road and elsewhere. Farmland along Plantation Road in the southern part of the Project Site have traditionally been used to produce shade-grown wrapper tobacco which is cured in one of the twenty tobacco barns around the field perimeters. Field margins and grounds associated with the tobacco barns and other outbuildings provide some edge habitat. Cover crops including annual rye grass and oats are sown in the fall after tobacco harvest provide a limited habitat for wintering songbirds and small mammals.

Along Plantation Road, three small fields were not planted in tobacco; one was planted in gourds, one in vegetables and a third was planted in seed corn that was not harvested in 2019. Similarly, the field between the gravel quarry was planted in seed corn that was not harvested. In the northern Project Site two fields along Apothecaries Hall Road were planted in seed corn and cut leaving only stubble in the fields.

The fields managed as a monoculture of tobacco provide little wildlife value. The two fields with corn stover and two with stubble provide forage for Canada goose (*Branta canadensis*), common grackle (*Quiscalus quiscula*), European starling (*Sturnus vulgaris*), and mourning dove (*Zenaida macroura*). Small mammals, such as southern red-backed vole (*Myodes gapperi*) and white-footed mouse (*Peromyscus leucopus*), along with some larger mammals, such as racoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), and white-tailed deer (*Odocoileus virginianus*), may also utilize these fields for foraging.

Disturbance associated with tillage, weed control, and insect pest control precludes utilization of farm fields by grassland birds. Barn swallow (*Hirundo rustica*), chipping sparrow (*Spizella passerina*), tree swallow (*Tachycineta bicolor*) and song sparrow were observed foraging over fields or along field edges. Barn swallows, European starlings, house sparrows (*Passer domesticus*), and tree swallows (*Tachycineta bicolor*) were observed following a

tractor tilling the winter cover crop, presumably to forage on insects flushed or exposed by the tractor.

At least two pairs of American kestrels (*Falco sparverius*), a state species of special concern, were observed along field margins and early successional habitats around gravel mines and off-site capped landfills in the southern Project Area. A northern harrier (*Circus cyaneus*), likely a migrant and a GCN species according to the CWAP, was identified along field margins north of Plantation Road.

**Early Successional Grassland and Shrubland**

These cover types correspond to the Upland Shrub designation portion of Key Habitat 2, Sub-habitat Reverting Field and Early Successional Shrubland. Approximately 61.6 acres of the Project Area are occupied by early successional habitat consisting of grassland with patches of shrubs, shrubland, or open woodland with low tree cover. These areas occur in partially reclaimed quarry areas, along the margins of agricultural fields (primarily tobacco), within the Eversource overhead electric transmission ROW, along the adjacent to the CT DOT railroad line, off-site on adjacent closed landfills and gravel pits, and as patches in recently harvested forest areas.

The vegetation in these areas is variable and may be dominated by cool season grasses such as fescues (*Festuca* spp.) and rye (*Lolium perenne*). Shrub and low tree species that are early colonizers include alder (*Alnus* sp.), autumn olive (*Elaeagnus umbellata*), black cherry (*Prunus serotina*), blackberry (*Rubus occidentalis*), multiflora rose. Cleared woodland patches are often quickly colonized by black birch (*Betula lenta*).

The early successional shrub and grass cover established around a process water pond in the northern gravel pit provided foraging habitat for a spotted sandpiper (*Actitis macularius*) in breeding plumage observed on April 28, 2020.

Depending on habitat size and the proportion of grass versus shrub cover, these areas provide nesting and foraging grounds for American goldfinch (*Spinus tristis*), eastern bluebird (*Sialia sialis*), eastern towhee (*Poecile atricapillus*), field sparrow, prairie warbler (*Setophaga discolor*) (GCN species), song sparrow, and yellow warbler (*Setophaga petechia*).

Wildlife that may utilize this scrub-shrub cover include mammals such as mice, voles, red fox (*Vulpes vulpes*), and striped skunk (*Mephitis nigra*). These areas also provide wintering habitat for songbirds including dark-eyed junco (*Junco hyemalis*) and white-throated sparrow (*Zonotrichia albicollis*).

**Mixed Deciduous and Coniferous Upland Forests**

The cover types within the upland forested portion of the Project Site correspond to the Upland Forest Key Habitat and includes the Mixed Hardwood Forest and Coniferous Forest Sub-habitats listed in the CWAP.

Forest and woodland are present throughout the Project Site and mostly occupy irregularly sloping ice-contact stratified drift deposits and terrace escarpments that are too rugged to farm. The forests comprised of approximately 330 acres of the Project Site and

approximately 91 acres of the Project Area. The forests can be generally classified as upland broad-leaved deciduous, accounting for approximately 264 acres of the Project Site, and upland coniferous evergreen, which comprises approximately 26.7 acres of the Project Site.

Upland deciduous forests mostly fall into the *Northern red oak / Maple-leaf viburnum* community[4] along terrace escarpments and low ice-contact stratified drift terraces. Kame summits support a community similar to the *Northern red oak-Black oak / Blue ridge blueberry* community proposed by the same authors. American beech (*Fagus grandifolia*), pignut hickory (*Carya glabra*), red maple, and sugar maple (*Acer saccharum*) are common trees. Most of these forests have been selectively cut, but still contain numerous standing snags and large trees with defects that provide nesting cavities.

The most common evergreen forest type is *Eastern hemlock* which occupies much of the steep terrace escarpment along Ketch Brook in the southern part of the Project Site. Other components of this forest include black oak (*Q. velutina*), pitch pine (*Pinus rigida*), red maple, red oak, sugar maple, and white pine. This community is deeply shaded and supports little understory.

The forests provide habitat for several year-round resident and neo-tropical migrant songbirds as well as several other classes of fauna, including mammals such as white-tailed deer, reptiles and amphibians, and invertebrates. Species commonly encountered include American red squirrel (*Tamiasciurus hudsonicus*), black-capped chickadee (*Poecile atricapillus*), downy woodpecker (*Dryobates pubescens*), eastern gray squirrel (*Sciurus carolinensis*), northern flicker (*Colaptes auratus*), pileated woodpecker (*Dryocopus pileatus*), red-bellied woodpecker (*Melanerpes carolinus*) and wild turkey. Potential summer breeding species, including magnolia warbler (*Setophaga magnolia*) and yellow-rumped warbler (*Setophaga coronata*) and suspected migrant species, including blackpoll warbler (*Setophaga striata*) were also observed.

**Mixed Deciduous and Coniferous Wetland and Floodplain Forests**

The forested wetland portion corresponds to the Forested Inland Wetland Habitat Key Habitat, Sub-habitats Floodplain Forest and Red Maple Forest Sub-habitats.

Wetland deciduous forests outside of the floodplain are typically dominated by red maple with American elm and pin oak often present. Spicebush and winterberry are common shrubs, with cinnamon fern, skunk cabbage and sensitive fern common herbaceous species. Sloping and discharge wetlands support associations similar to *Red Maple / Northern Spicebush* community and wetlands in kettle hole bottoms forests similar to the *Red Maple / Pin Oak* community. Both of these wetland forests may include eastern hemlock, pitch pine and white pine. Some of the kettle holes contain vernal pools which are special habitats described later in this section.

While Ketch Brook is a relatively small, high-gradient stream, parts of its floodplain are broad in southern reaches within the Project Site. Floodplain levees with moderately well drained alluvium support a forest association similar to the *American sycamore-Boxelder* community.

[4] Community types in italics are taken from The Vegetation of Connecticut (Metzler and Barrett, 2006)

Dominant trees include American elm, eastern cottonwood (*Populus deltoides*), red maple, and occasional silver maple. The understory is largely colonized by the invasive winged euonymus with occasional spicebush and witch-hazel (*Hamamelis virginiana*). Well drained portions of the floodplain include Christmas fern (*Polystichum acrosticoides*) and round-leaved pyrola (*Pyrola americana*) in the herbaceous layer along with poison ivy. A garter snake (*Thamnophis sirtalis*) was observed in this floodplain forest. These wetland forests support several resident and neotropical migrant songbirds including common yellowthroat (*Geothlypis trichas*) and warbling vireo (*Vireo gilvus*).

These very poorly drained floodplain forests do not fit well into the floristic descriptions provided in by Metzler and Barrett (2006). The shrub layer is typically dominated by species such as arrowwood, silky dogwood, winterberry. Fowl mana (*Glyceria striata*), jewelweed and skunk cabbage are common in the herbaceous stratum.

ATV and dirt bike trails wind through the forested areas and create serious erosion on steep slopes and poorly drained. This degradation contributes to high turbidity within the brook.

**Ketch Brook**

Ketch Brook corresponds to the Freshwater Aquatic Key Habitat with Cold Water Stream as the Sub-habitat type in the CWAP. Ketch Brook is a perennial watercourse and tributary to the Scantic River. It flows north to south through three of properties that make up the Project Site and forms the northwestern boundary of a fourth. The corridor associated with the brook is forested, generally with a closed canopy. The Brook has a stony bottom throughout most of the Project Site with a strong preponderance of shallow riffles and only a few quiet pools. Beaver (*Castor canadensis*) have constructed several impoundments creating pools in the northern most reaches of the stream. Painted turtle (*Chrysemys picta*) were observed in a backwater impoundment near the Eversource electric transmission line crossing of Ketch Brook.

The southern reaches of the brook meander more and in places undercut floodplain banks and even terrace escarpments. Ketch Brook is thought to support a diverse collection of aquatic fauna, including brown trout (*Salmo trutta*), beaver, fallfish (*Semotilus corporalis*), and invertebrates such as caddisflies, mussels, odonates (damselflies and dragonflies), and stoneflies. Belted kingfisher (*Megaceryle alcyon*) and red shouldered hawk were observed above the stream.

The high aquatic habitat values attributed to this stream are diminished by uncontrolled use of ATVs within the stream channel and floodplain. These illicit activities contribute to bank erosion and turbid water conditions in the brook.

## Rare Threatened and Endangered Species

The Connecticut Endangered Species Act (CT ESA), passed in 1989, was enacted to protect Connecticut's rare plant and animal species from threats that could lead to their extirpation. The goal of the CT ESA is to conserve, protect, restore and enhance endangered or threatened species and their essential habitats. Under the CT ESA, species are listed

according to their level of risk for extirpation. Their status is reviewed every five years by CT DEEP. Species are listed in one of three designations:

- **"Endangered Species"** means any native species documented by biological research and inventory to be in danger of extirpation throughout all or a significant portion of its range within the state and to have no more than five occurrences in the state, and any species determined to be an "endangered species" pursuant to the federal Endangered Species Act (ESA).
- **"Threatened Species"** means any native species documented by biological research and inventory to be likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range within the state and to have no more than nine occurrences in the state, and any species determined to be a "threatened species" pursuant to the ESA, except for such species determined to be endangered by the Commissioner of the CT DEEP in accordance with section 4 of the CT ESA.
- **"Species of Special Concern"** means any native plant species or any native non-harvested wildlife species documented by scientific research and inventory to have a naturally restricted range or habitat in the state, to be at a low population level, to be in such high demand by man that its unregulated taking would be detrimental to the conservation of its population or has been extirpated from the state.

VHB initiated consultation with the CT DEEP Natural Diversity Data Base (NDDB) in December 2019 and February 2020 (refer to NDDB Correspondence provided at Exhibit J.) The CT DEEP NDDB species record information for the Project Site lists 15 State-listed species that have the potential to occur. The CT DEEP NDDB performs environmental reviews as part of the CT ESA to determine the impacts of proposed development projects on State-listed species to help conserve Connecticut's biodiversity.

**Table 2. State-listed Species Potentially Occurring Within or Adjacent to the Project Site**

| Common Name | Scientific Name | State-Listed Status | Habitat Type(S)1 |
|---|---|---|---|
| BIRD SPECIES | | | |
| American kestrel | *Falco sparverius* | Special Concern | Open country, farmland, cities, wood edges |
| Brown thrasher | *Toxostoma rufum* | Special Concern | Suburban and rural areas, particularly in thickets, brushy hillsides and woodland edges; open areas with patches of bare ground |
| Horned lark | *Eremophila alpestris* | Endangered | Beaches and open areas along the coast as well as open grassland and fallow agricultural fields |
| Red-headed woodpecker | *Melanerpes erythrocephalus* | Endangered | Forest edges, orchards, open pine woods, groves of tall trees in open country |
| Savannah sparrow | *Passerculus sandwichensis* | Special Concern | Grassy fields with damp soils and upland areas bordering on salt marshes |
| Short-eared owl | *Asio flammeus* | Threatened | Tundra, prairies, marshes, farmland. In winter also found in stubble fields, small meadows, coastal dunes, shrubby areas |

| Common Name | Scientific Name | State-Listed Status | Habitat Type(S)1 |
|---|---|---|---|
| HERPETOFAUNA | | | |
| Wood turtles | *Clemmys insculpta* | Special Concern | Riparian habitats bordered by floodplain, woodland, or Meadow |
| MAMMALS | | | |
| INVERTEBRATES | | | |
| Big sand tiger beetle | *Cicindela formosa generosa* | Special Concern | Exposed sandy substrates |
| Bronze copper | *Lycaena epixanthe* | Special Concern | Wet meadows, mud flats, and moist fields |
| Scribbled sallow moth | *Sympistis perscripta* | Special Concern | associated with infertile, droughty, open habitats |
| FRESHWATER MUSSELS | | | |
| Eastern pearlshell mussel | *Margaritifera* | Special Concern | Most often found in streams and small rivers that support trout or salmon populations (cold water fishery) |
| VASCULAR PLANTS | | | |
| American climbing Fern | *Lygodium palmatum* | Special Concern | Forest edges, forests, and swamps |
| Dwarf huckleberry | *Gaylussacia bigeloviana* | Threatened | Bogs, fens, sandplains and barrens |
| Purple milkweed | *Asclepias purpurascens* | Special Concern | Lower slopes of hill prairies, meadows in wooded areas, thickets and woodland borders, bluffs and open woodlands |
| Short-awned meadow foxtail | *Alopercurus aequalis* | Threatened | Meadow, ditches, shorelines and wet sandy places |

1 Habitat types based on descriptions from Bevier, ed. 1994, The Atlas of Breeding Birds of Connecticut

VHB developed a Conservation Measures Plan which was submitted to NDDB for review on July 17, 2020 as part of the consultation process (Refer to Exhibit J.) VHB has performed a series of surveys for the State-listed species and reported findings to NDDB.

The Official Species List generated by the United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) tool indicates the that the federally threatened northern long-eared bat (*Myotis septentrionalis*) has the potential to occur in the Project vicinity.

## Breeding Bird Inventory and Surveys

An inventory of potential breeding birds was developed based on information from field observations, the Atlas of Breeding Birds of Connecticut (Bevier ed. 1994) and New England Wildlife (DeGraaf and Yamasaki 2001), and NDDB data. Line transect surveys using call back surveys for State-listed species will be conducted during the appropriate time of year, May and June 2020, as specified through NDDB consultation.

Bird surveys were conducted by VHB biologists on April 28, May 4, May 5, and June 3, 2020. Surveys were based on visual observations and auditory identification of calls and songs. All birds within visual and auditory range were recorded. The surveys were conducted on clear days with low wind speeds that minimized interference with acoustic observations.

Habitat types that were most closely monitored included the perimeters of the agricultural fields and the early successional scrub-shrub cover within the recovering sand and gravel quarries and the capped landfills adjacent to the Project Site boundary. Observers separated to observe a pair of American kestrels south of Plantation Road and a second pair hunting over the southern gravel pit and off-site closed landfills simultaneously to confirm that two pairs. No other State-listed bird species were detected during the surveys.

Sharp-shinned hawk (*Accipiter striatus*) are common migrants in Connecticut in the spring and fall and recent records for short-eared owl (*Asio flammeus*) are only for wintering individuals. Call back surveys using recordings from the Audubon Birds Application amplified with Bluetooth speakers were played for short-eared owl and savannah sparrow (*Passerculus sandwichensis*) at early successional habitats around the gravel pits.

Surveys for red-headed woodpecker (*Melanerpes erythrocephalus*) and sharp-shinned hawk were conducted in late May and mid-June. Red-headed woodpecker surveys, including call back surveys, conducted to date have not led to any observations. A sharp-shinned hawk was believed to be heard calling from the forest along Ketch Brook during the early spring 2020 vernal pool investigations, but an individual was never spotted and therefore, presence was within the Project Site was not confirmed.

## Vernal Pool Survey

VHB biologists conducted vernal pools surveys of the Project Site on March 13, 24, 26, April 7, and May 6, 2020. Six vernal pools were identified during field investigation. Each of the pools were found to meet the criteria for vernal pool designation, which includes but is not limited to containing amphibian populations, lacking fish populations, and exhibiting the presence of one or more obligate species.

All the pools were observed within the forested wetlands. These included classic vernal pools formed in kettle holes and cryptic pools within larger wetland systems. Obligate species identified within the pools included adult wood frogs (*Lithobates sylvaticus*), wood frog egg masses, wood frog larvae, spotted salamander (*Ambystoma maculatum*) egg masses, and fairy shrimp (*Eubranchipus vernalis*). Vernal pools are critical habitat essential for obligate species to complete part of their life cycle. They provide habitat to facultative species such as gray tree frog (*Dryophytes versicolor*), green frog (*Lithobates clamitans*), and spring peeper (*Pseudacris crucifer*) and invertebrates such as caddisfly, predacious diving beetles, and water striders.

Further details concerning the vernal pool surveys are provided in a separate memo dated May 18, 2020, provided in Exhibit K.

### Mammals

VHB biologists documented observations of mammals during the several field investigations performed within the Project Site between November 2019 and July 2020. Additional surveys for state-listed species and/or species of Special Concern were conducted within the appropriate and specified time of year windows, primarily end of May through July of 2020. Direct and indirect observations of species that may utilize the Project Site were recorded during the numerous Project Site visits and are documented in Exhibit I. No notable mammalian population observations were made during field investigations.

### Plant Community Resources

East Windsor is situated in the Lower Connecticut River Valley subsection of the Eastern Broadleaf Forest Province (Keys et al., 1995). Aside from the gravel pit operation, the Project Site has two principle cover types, open agricultural lands (primarily tobacco fields) and forest lands. Forest types include stands dominated by mixed deciduous hardwoods, evergreen coniferous trees, and mixed stands containing coniferous and broad-leaved deciduous trees.

In summation, areas of the Project Site not currently utilized for tobacco farming or sand and gravel mining operations contain approximately 317 acres of forest or woodland. Within the 485-acre Project Area, there are approximately 124 acres of forest or woodland. The forests can be generally classified as upland broad-leaved deciduous, approximately 262.8 acres, upland coniferous evergreen which comprises approximately 26.7 acres, and forested wetland, largely along the floodplain of the Ketch Brook riparian corridor, which comprises approximately 27.5 acres of the Project Site. There is evidence of recent selective tree harvest within the forested areas, including marked trees, cut stumps, and logging roads.

ATV and dirt bike use throughout the forested area and particularly within the forested wetland has been observed throughout the Project Site. Continued use by these recreational vehicles within the forested floodplain of Ketch Brook has undermined the stream embankment in several areas which contributes to erosion and high turbidity within the brook. There are also several areas within the forested wetland that have been deeply rutted by tire tracks which have inhibited the growth of emergent wetland vegetation and created highly turbid pools that run off into the brook. Refer to Exhibit I for a detailed evaluation of plant communities.

## 6.4 Surface and Groundwater Resources

### Surface Water and Floodplain

Ketch Brook is the only principal surface water present in the vicinity of the Project Site. Ketch Brook headwater originates in Ellington Connecticut and flows westerly into East Windsor where it is impounded at Windsorville Pond in the vicinity of Wapping Road. Discharge from the pond flows westerly across the Project Site where two separate crossings exist. The easterly crossing is a culvert conveying an existing gravel road over the brook. The

second crossing is a stone arch bridge that conveys the CT DOT railroad across the brook. Ketch Brook ultimately discharges in the Scantic River southeast of the Project Site. Within the Project Site, Ketch Brook flows through woods and wetlands along the base of a steep terrace escarpments.

Ketch Brook is identified as a Class A Surface Water by the CT DEEP in the Connecticut Water Quality Standards (RCSA 22a-426-1 et seq.) The designated uses for Class A waters are habitat for fish and other aquatic life and wildlife; potential drinking water supplies; recreation; navigation; and water supply for industry and agriculture.

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for the Town of East Windsor (Panel numbers 09003C0239F and 09002C0245F, effective date September 26, 2008) identifies a Zone A Special Flood Hazard Area (SFHA) along Ketch Brook. Zone A is defined as areas subject to inundation by the 1% annual chance flood event where base flood elevations (BFE) have been determined. Flood elevations along the stream gradient are approximately 127 feet above the North American Vertical Datum of 1988 (NAVD 88) where the Brook leaves the Project Area.

Floodway is also mapped associated with Ketch Brook. FEMA defines Floodway as "the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height."

Refer to Figure: Floodplain, Surface & Groundwater Resources Map provided at Exhibit A.

## Groundwater Resources and Aquifer Protection

The Town of East Windsor and CT DEEP share responsibility for managing Aquifer Protection Zones, although CT DEEP is responsible for the overall program administration and establishing the land use regulations. The East Windsor Zoning Regulations (effective June 26, 2018) recognize Aquifer Protection Areas. The CT DEEP defines aquifer as any soil or rock formation that is capable of yielding usable amounts of water to a water supply well.

One Level A Aquifer Protection Area is present in the northern portion of the Project Site, within parcels 057-65-001, 057-65-002 and 057-65-007. In accordance with RCSA Section 22a-354i-1 through 10, aquifer protection areas are designated around well fields and recharge area that is serving over 1000 people. Designation as an Aquifer Protection Zone by the CT DEEP allows protection of these designated areas by the municipality in accordance with local regulations. A groundwater GAA classification zone extends onto parcel 057-65-001 in the northeast portion of the lot adjacent to Apothecaries Hall Road. GAA groundwater zones designate public drinking water supply well recharge and public drinking water supply reservoir watershed. Additionally, portions of Parcel 037-65-005A and 027-49-017C are mapped as groundwater quality zone GB. GB groundwater zones are presumed to have some degradation and are not suitable for drinking without treatment.

## 6.5 Stormwater

VHB performed an analysis of surface water runoff conditions in accordance with the Connecticut Stormwater Quality Manual (CT Department of Environmental Protection, 2004) (the Stormwater Manual). The Stormwater Manual defines stormwater runoff as "surface flow from precipitation that accumulates in and flows through natural or man-made conveyance systems during and immediately after a storm event or upon snowmelt." In some situations, runoff is a cause for concern because it may convey pollutants from a source, such as a parking lot, to sensitive receiving areas such as streams and wetlands. In other cases, runoff may cause soil erosion if the runoff flow rate is very high or the runoff flows over disturbed areas. Eroded soil would be transported downslope and deposited in the same sensitive streams and wetlands.

The Stormwater Manual outlines the process for modelling existing and future runoff characteristics by evaluating such parameters as surface topography, vegetation, soil properties, surficial geology, drainage patterns and area. Taking these characteristics into account, the model can be used to determine existing runoff flow rates and volumes discharging from a site into receiving waters or "design points". A similar process is undertaken for the proposed future conditions to determine future runoff rates and volumes.

The Stormwater Manual requires that changes to runoff rates, volumes or patterns cannot be caused by any proposed developments, and consequently, if the analysis described above identifies a change to drainage patterns or an increase in the rate of stormwater runoff, project developers are required to mitigate these alterations. Mitigation alternatives include detention basins, infiltration systems, swales, etc.

The Project Area is primarily managed as active mining and tobacco farming operations or as forested area with little existing impervious surface, beyond the farming buildings (greenhouses, tobacco sheds) and unimproved packed dirt farm roads. The soils within the Project Area are mostly derived from outwash and have high internal permeability rates. Under existing conditions precipitation can infiltrate into the ground or flow overland as runoff.

VHB Soil Scientists collected soil samples from operating farmland for laboratory testing to evaluate nutrient status and soil health. During these collections, a soil penetrometer was used to evaluate soil compaction. The upper tilled topsoil typically produced values of between 100 and 150 pounds per square inch. When the force applied to advance a penetrometer further into the soil exceeds 250 to 300 pound per square inch the compacted layer is considered impenetrable to roots and an impedance to infiltration. Every field sampled had an impenetrable layer or "plow pan" develop just below the tillage depth, typically nine to 12 inches below the soil surface. Soils with high silt content in the solum, such as the Enfield series widely mapped within the Project Site, are especially susceptible to compaction, especially when wet.

In agricultural fields, the rate and volume of runoff are influenced by conditions in the soil and by the cover on the soil. Runoff rates would be highest when the soil is frozen or

thoroughly saturated and there is little vegetative cover or stubble in the fields protecting the soil surface. Storm events during such periods would lead to accelerated soil erosion rates with the higher levels of suspended solids in stormwater runoff. In addition to fine soil separates, runoff from agricultural fields may contain higher levels of plant nutrients and other pollutants associated with crop management.

In forested areas, the tree canopy intercepts precipitation and the litter layer protects the mineral soil surface from the forces of rain drop impact. Forested parts of the Project Area with near level or gentle slopes favor infiltration. Runoff from forested areas is generally considered to be of higher quality as there is little opportunity for soil erosion and sediment transport in runoff.

VHB's analysis of existing conditions determined that under existing conditions, stormwater runoff from the northern parcels (057-65-001, 057-65-002, 048-65-007 and 037-65-005A) is generally self-contained within the parcel boundaries without discharge to a watercourse. Runoff from the central parcels north of Plantation Road (027-49-017C, 025-49-017A and 016-49-007) generally flows east towards the railroad tracks or north or west to Ketch Brook. Runoff from the southern parcel south of Plantation Road (016-50-001) generally flows to the south towards one of two large glacial meltwater valleys where runoff infiltrates or flows offsite to wetlands in the Scantic River watershed.

The results of the existing conditions analysis are provided in the Stormwater Report Exhibit L.

## 6.6 Scenic Values

GPS has engaged EDR, a firm with 41 years of experience providing visualization, visibility assessment, and visual impact analysis services. EDR has conducted an extensive assessment of the Project Site and abutting areas to:

- Describe the visible components of the proposed Project.
- Evaluate the potential visibility of the Project within the visual study area.
- Identify key views for visual assessment.
- Assess the potential visibility of the proposed Project.
- Identify potential mitigation measures to minimize Project visibility.

In order to conduct this analysis, EDR defined a visual study area of 0.5-mile buffer around the Project Site. Within that area, the existing visual character and the general land use were documented. The existing visual character of this area can be defined by gently rolling topography, tobacco fields and an active mining operation in the northern portion of the Project Site interspersed with residential and farming buildings interspersed with mature woodlots. Land use within the visual study area consists primarily of active tobacco fields, an active mining operation and woodlands with low density residential development scattered throughout.

These characteristics were used as the baseline conditions for the visual study area for use in the proposed conditions analysis. The proposed conditions analysis is discussed in Section

7.6. The Visual Analysis and mitigation measures are provided at Exhibit G. Visual mitigation designs and approach were partially informed by comments received from the Town of East Windsor.

## 6.7 Cultural Resources

VHB retained Heritage to conduct a Phase IA Cultural Resources Assessment (the Heritage survey) of the Project Site. The Heritage survey was prepared by conducting a contextual overview of the area's prehistory, history, and natural setting; literature search to identify and discuss previously completed cultural resources surveys and previously recorded cultural resources in the region encompassing the study area; a review of readily available historic maps and aerial imagery depicting the study area in order to identify potential historic resources and/or areas of past disturbance; a pedestrian survey and photo-documentation of the Project Area in order to determine its archaeological sensitivity; and preparation of the survey report. The Phase 1A Cultural Resource Survey Report is provided at Exhibit M. Refer to Figure: Phase 1A Cultural Resource Survey at Exhibit A.

The Heritage survey identified several potentially historically significant above ground structures at the Project Site and abutting areas including: 32 tobacco sheds, three barns, three residential buildings, a water tower, and two ancillary structures. Additionally, Heritage identified 19 more modern buildings within the Project Site, including: 11 greenhouses, five steel sheds, and three tobacco sheds. Lastly, Heritage used combined data from the historic map and aerial image investigations, chain of title research, and a pedestrian survey to stratify the proposed study area into zones of no/low, moderate, and high archaeological sensitivity. These results are presented on Figure: Phase 1A Cultural Resource Survey.

Heritage recommended a combination of further investigation into the moderate to high archeologically sensitive areas as well as thorough documentation and investigation of the existing tobacco barns/buildings within the Project Site. The results of this investigation will allow accurate determination of the approximate age of these structures and document current conditions. Preliminary consultation with Connecticut State Historic Preservation Office (CT SHPO) indicated agreement with Heritage's approach to determine the historical significance of the structures present (see Exhibit M). Cultural surveys and consultation with CT SHPO in regard to investigation and potential mitigation methods are on-going.

## 6.8 Aeronautical Facilities

There are three airports in the general vicinity of the Project Site:  Bradley International Airport in Windsor, Ellington Airport in Ellington and Skylark Airpark in East Windsor. The airports are located in the FAA New England Region, and are subject to FAA regulation. Refer to the Aeronautical Resources Figure provided at Exhibit A.

Bradley International Airport (BDL) is located approximately 36,960 feet (7 miles) northwest of the Project Site. The airport has three runways (Runway 6/24, Runway 15/33, and Runway 1/19), approximately 9,510 feet, 6,847 feet, and 4,268 feet in length respectively. The airport is publicly owned and operated by the Connecticut Airport Authority and supports 64 based

aircraft. Bradley International Airport is operated with an Air Traffic Control Tower (ATCT) and is used for commercial, military, and general aviation purposes.

Ellington Airport (7B9) is located approximately 26,400 feet (5 miles) northeast of the Project Site. The airport has one asphalt runway approximately 1,800 feet in length and 50 feet in width. The airport is privately owned and is operated by the Bridgeport Flight Service Station. The Ellington Airport is used by the public for general aviation purposes.

The Skylark Airpark (7B6) is located within approximately 14,520 feet (2.75 miles) north of the Project Site and 6 miles from Ellington Airport. Skylark has two hard surface runways approximately 2,642 feet in length and 60 feet in width. This airport is privately owned and operated by the Experimental Aircraft Association (EAA) Chapter 1310 of East Windsor. Skylark is attended during daylight hours and does not have an ATCT. Skylark is used for training and general aviation purposes.

## 6.9 Air Quality

The National Ambient Air Quality Standards (NAAQS) are established by the (US EPA for pollutants considered harmful to public health and the environment. Under the NAAQS, six principal pollutants, also called "criteria pollutants", are required to be monitored by the CT DEEP on yearly, daily and hourly intervals dependent on the pollutant. The six principal pollutants are: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide.

The US EPA 2012 Annual Report on Air Quality in New England identifies Connecticut as an ozone 8-hour non-attainment zone. The US EPA 2012 Annual Report includes monitoring data at the East Hartford monitoring station that showed exceedances of the 75 parts per billion (ppb) ozone standard. The EPA report indicated compliance with standards for the remaining criteria pollutants. Although a more recent Air Quality Report for East Hartford was not located or identified, the State of Connecticut submitted a design report to the EPA for approval in 2015. No actual values were recorded in this document.

Operation of the GPS Project will not result in generation of any air pollution or greenhouse gases.

## 6.10 Noise

Noise is defined as unwanted or excessive sound. Sound becomes unwanted when it interferes with normal activities such as sleep, communication, work, or recreation. How people perceive sound depends on several measurable physical characteristics, which include the following:

- **Intensity** – Sound intensity is often equated to loudness.
- **Frequency** – Sounds are comprised of acoustic energy distributed over a variety of frequencies. Acoustic frequencies, commonly referred to as tone or pitch, are typically measured in Hertz. Pure tones have all their energy concentrated in a narrow frequency range.

Sound levels are most often measured on a logarithmic scale of decibels (dB). The decibel scale compresses the audible acoustic pressure levels which can vary from the threshold of hearing (zero dB) to the threshold of pain (120 dB). Because sound levels are measured in dB, the addition of two sound levels is not linear. Adding two equal sound levels creates a 3 dB increase in the overall level. Research indicates the following general relationships between sound level and human perception:

- A 3 dB increase is a doubling of acoustic energy and is the threshold of perceptibility to the average person.
- A 10 dB increase is a tenfold increase in acoustic energy but is perceived as a doubling in loudness to the average person.

The human ear does not perceive sound levels from each frequency as equally loud. To compensate for this phenomenon in perception, a frequency filter known as A weighted [dB(A)] is used to evaluate environmental noise levels.

VHB conducted an Acoustical Study for the Project which involved measuring existing condition sound levels at sensitive receptor locations surrounding the Project and calculating Project-generated sound levels using manufacturer's sound data and the principles of acoustical propagation of sound over distance. The Acoustical Study is provided at Exhibit N. The sound levels were compared to the CT DEEP noise control regulations (RCSA, Title 22a, Section 22a-69-1 to 22a 69-7).

A monitoring program was developed to measure existing ambient sound levels. The existing sound levels were measured using Type 1 sound analyzers (Larson Davis SoundExpert LxT and 831). Measurements were conducted for a 24-hour period from approximately 10:00 AM on March 2, 2020 to approximately 10:00 AM on March 3, 20120. During the daytime period, the measured sound levels data under existing conditions were composed of noise from vehicles on local roadways in the vicinity of the monitoring locations, the nearby gravel pit and wildlife. The existing measured sound level data are presented in Table 3.

**Table 3. Existing Ambient Sound Levels, DB(A)**

| | CTDEEP Residential Zone Noise Standard | | Measured L90[3] Sound Levels | |
|---|---|---|---|---|
| Monitoring Location[1] | Daytime[2] | Nighttime[3] | Daytime | Nighttime |
| M1 – Windsorville Rd | 55 | 45 | 36-45 | 32-39 |
| M2 – Wapping Rd | 55 | 45 | 36-46 | 34-41 |
| M3 – Rye St | 55 | 45 | 32-41 | 35-41 |
| M4 – Plantation Rd | 55 | 45 | 36-43 | 33-42 |
| M5 – Napoleon Dr | 55 | 45 | 35-41 | 35-39 |
| M6 – Apothecaries Hall Rd | 55 | 45 | 34-45 | 33-39 |

1 Daytime is from 7:00 AM to 10:00 PM.
2 Nighttime is from 10:00 PM to 7:00 AM.
3 L90 is the A-weighted sound level, which is exceeded for 90 percent of the time during the time period. The L90 is generally considered to be the background sound level. It should be noted that the L90 eliminates the highest 10 percent of the sound levels that occur in the study area

Based on measurements collected, the L90 sound levels range from 32 dB(A) to 46 dB(A) during the daytime period and from 32 dB(A) to 42 dB(A) during the nighttime period. The result of the monitoring program indicates that the daytime and nighttime sound levels within the study area are currently below the CT DEEP's daytime and nighttime standard of 55 dB(A) and 45 dB(A), respectively.

## 6.11 Public Health and Safety

GPS prioritizes safety and the Project incorporates several elements to promote safety and security to comply with applicable regulations and industry practices. This includes (but is not limited to) appropriate fencing, signage, vegetation management, and fire prevention measures.

Under current conditions, there is generally unrestricted access to the Project Area. Public accessing the property are exposed to various hazards such as small arms and rifle fire, large kettle holes and steep, uneven terrain, high ATV use, dumping of garbage, wind-borne dust, trip hazards associated with irrigation equipment, and natural hazards such as insects, steep banks, and natural toxins, such as poison ivy. Much of the property is remote, uneven terrain and not readily accessible by emergency vehicles. Additionally, heavy ATV use has caused significant alteration of the existing terrain and disturbance to the property and adjacent landowners.

## 6.12 Land Use

### Municipal Zoning

A review of the Zoning Ordinance for East Windsor, Connecticut (2018) was performed to identify and understand the Town's intended use for the Project Site parcels.

The following table identifies the Zoning District for each parcel in the Project Site (Site Location Map in Exhibit A):

**Table 4. Parcel Zoning Designations**

| Parcel ID | Zoning Designation |
|---|---|
| 057-65-001 | R-M-1, and A-1 |
| 057-65-002 | R-3 |
| 048-65-007 | R-3, M-1, and A-1 |
| 037-65-005A | A-2 |
| 025-49-017C | R-3 |
| 025-49-017A | R-3 |
| 016-49-007 | M-1 |
| 016-50-001 | M-1 |

Zoning designations are depicted on Figure: Site Location Map provided at Exhibit A.

**Zone A-1** is defined in the Zoning Ordinance as an Agricultural/Residential District.

**Zone A-2** is defined as an Agricultural/Residential (floodplain and steep slopes) District.

**Zone M-1** is defined as a Manufacturing Zone and is intended to provide area for small to large scale manufacturing, warehousing, wholesale, and other forms of commercial and industrial activities.

**Zone R-3** is defined in the Zoning Ordinance as a Single-Family Residential District.

Per Chapter IV of the Town of East Windsor's Zoning Regulations, public utilities are a permitted use in any zoning district with the except of the R-2 Zone, which would require a Special Use Permit. All Zones, with the exception of the M-1 Zone, have the same maximum lot coverage allowance of 15% for buildings and 25% impervious surfaces. The maximum height in these Zones (A-1, A-2, and R-3) is 30 feet; with accessory structure height requirements varying from 35 feet in Zones A-1 and A-2 to 20 feet in Zone R-3. The M-1 Zone allows for 35% maximum coverage for buildings and 75% impervious surface as well as a maximum height requirement of 60 feet.

There are no daycare centers, schools, hospitals or group homes within a half mile of the Project Site.

**CT DOT Railway ROW Easement**

As part of the Project, GPS will obtain a Permanent License Agreement from the CT DOT for a private utility crossing of the railroad ROW that bisects the Project Site. The railroad ROW is owned by CT DOT and operated by Central New England Railroad. As part of the CT DOT Permanent License Agreement process, GPS will also obtain a Temporary Right of Entry from CT DOT for the construction of a temporary access road across the railroad ROW to construct HDD pits. The HDD pits will be used to facilitate the installation of buried 34.5-kV lines under the railroad ROW to connect the two sides of the Project Site.

The GPS team has met with CT DOT's Office of Rails-Property Management Unit and Office of Rails-Design Unit on March 10,2020 and June 30, 2020, respectively. These meetings provided an overview of the Project to CT DOT and allowed for review and discussion of the Permanent License Agreement and Temporary Right of Entry process and requirements. According to CT DOT, the Central New England Railroad is not a heavily used line and CT DOT will provide the design requirements for the construction of the temporary access road across the railroad ROW and the permanent private utility crossing. In accordance with CT DOT guidance, GPS will prepare design plans and other requested Project-related information for CT DOT review and comment. Upon incorporating CT DOT comments and/or requested revisions, GPS will finalize design plans and supporting information for CT DOT's approval. This final design package will also be used in preparing the Permanent License Agreement for the private utility crossing and Temporary Right of Entry for the construction of the temporary access road in support of the HDD operation. Consultation with CT DOT to obtain the Temporary Right of Entry and Permanent License Agreement is on-going.

**Buckeye Petroleum Pipeline**

An existing petroleum pipeline bisects the Project Area parallel to and within the same right-of-way as the CT DOT railway. Consultation with Buckeye Petroleum is on-going.

## Future Land Use

VHB reviewed the Town of East Windsor Plan of Conservation and Development (2016) (POCD) to identify the Town's future land use plans for the Project Area and vicinity. Generally, related to renewable energy, the Town states their future plans include "encouraging energy conservation, the use of solar and other renewable forms of energy; and energy efficient patterns of development."

Primary Strategies of the POCD include:

- Protecting rural, village, agricultural and business characteristics;
- Preservation of open space;
- Protecting environmental quality; and
- Economic Development.

Encouraging development that provides economic benefits it one of the basic visions of the POCD. Under this Plan, the Town recognizes the importance of an "economic balance" and proposes to consider new approaches for commercial development.

Key planning elements highlighted in the POCD include:

- Preserving open space, preservation of local assets and protection of environmental quality. The Project Area brings new purpose to a heavily disturbed industrial and manufacturing areas.
- The Business and Commercial Development Plan includes increasing the tax base and regional economic vitality.
- Future Land Use of the POCD identifies the Project Area as targeted areas for farmland preservation, dedicated open space, and railroad industry.
- The POCD highlights protection of rivers, streams, wetland, lakes, and major ground water sources.
- The POCD prioritizes preservation of wildlife habitats.
- Protecting scenic roads and proposing scenic road ordinances.

## Agriculture

The Connecticut General Statutes Section 16-50k(a) as well as the Connecticut Department of Agriculture *Solar Energy Project Considerations* guidance (dated January 16, 2020) were referenced while assessing the Project Site.

Farmland is present within five of the eight properties that comprise the Project Site. Less than one third of the Project Site consists of tilled farmland. Parts of the existing agricultural fields are designated as Prime Farmland or Farmland of Statewide Importance by the Natural

Resource Conservation Service (NRCS) (see Table 5 and Farmland Figure at Exhibit A). Farmland Soils of Local Importance do not exist within the Town of East Windsor, and therefore, the Project Site.

**Table 5. Project Site Properties and Farmland Areas**

| Parcel ID | Parcel Area (ac) | Farm Field ID | Area Tilled (ac) |
|---|---|---|---|
| 057-65-001 | 97.8 | A & B | 22.0 |
| 057-65-002 | 3.6 | -- | 0 |
| 048-65-007 | 132.3 | -- | 0 |
| 037-65-005A | 14.6 | -- | 0 |
| 025-49-017C | 86.5 | C | 6.7 |
| 025-49-017A | 127.17 | D & E | 45.5 |
| 016-49-007 | 119.5 | F & G | 74.1 |
| 016-50-001 | 155.50 | H, I, & J | 81.5 |
| **Total Area** | **737.2** | | **229.8** |

Source: Town of East Windsor Assessor's Office, VHB, ESRI

**Prime Farmland** is defined as Land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses.

**Farmland Soils of Statewide Importance**[5] are defined as Soils that fail to meet one or more of the requirements of prime farmland, but are important for the production of food, feed, fiber, or forage crops. They include those soils that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods.

The NRCS assigns Prime Farmland and Farmland of Statewide Importance designations to specific map units in the cooperative soil survey (see Table 6 and Mapping at Exhibit A). Several criteria factor into a map unit being assigned Prime Farmland status including slope, surface stoniness, texture, climate and the availability of irrigation. We used the latest USDA data available from the Soil Survey Geographic (SSURGO) database to produce this analysis.[6]

Table 6 provides an inventory of the Prime Farmland and Farmland of Statewide Importance within the Project Site that were in production or fallow in 2019. The soil map units identified as Prime Farmland are assigned this designation regardless of whether they are farmed. Large areas of Prime Farmland map units have been irretrievably lost by earth materials mining operations in the northern part of the Project Site. In the future when revisions are made to soil maps, reclaimed areas within the former mines will be mapped as Udorthents, soils where the evidence of natural soil development has been destroyed. Portions of Prime Farmland Map units that have been altered by grading around farm and non-farm infrastructure have also been deducted from this inventory.

[5] https://cteco.uconn.edu/guides/resource/CT_ECO_Resource_Guide_Soils_Farmland.pdf

[6] https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

Based on GIS analysis of the 2019 CTECOS aerial photogrammetry and field reconnaissance there are approximately 229.8 acres of farmland, that were planted or fallow in 2019, within the 737.2-acre Project Site. Nearly all of this cropped farmland is classified as Prime Farmland. There are approximately 5,783 acres of Prime Farmland mapped within the Town of East Windsor according to the NRCS. According to the National Agricultural Statistics Service, in 2019 there were 5,500 farms operating in Connecticut covering 380,000 acres. The percentage of this operating farmland that is Prime Farmland is not reported.

**Table 6. Prime Farmland and Farmland of Statewide Importance**

| Field ID | Area Tilled (ac) | NRCS Map Units[7] | Prime Farmland (ac) | Farmland of Statewide Importance (ac) |
|---|---|---|---|---|
| A & B | 22.0 | **704A**, 37E | 21.7 | 0.0 |
| C | 6.7 | **704A**, 33B, 37E | 4.7 | 1.5 |
| D | 41.4 | **704A**, 37E | 41.2 | 0 |
| E | 4.1 | **704B** | 4.1 | 0 |
| F | 70.0 | **704A** | 70.0 | 0 |
| G | 4.1 | **704A**, **704B** | 4.1 | 0 |
| H & I | 69.1 | **704A**, **704B, 29A**, **29B**, **33A**, 37C | 68.8 | 0.3 |
| J | 12.4 | **704A**, **704B** | 12.4 | 0 |
| **Total** | **229.8** | | **227** | **1.8** |

Prime Farmland Map Units (**BOLD**): **704A**: Enfield silt loam, 0 to 3 percent slopes; **704B** Enfield silt loam, 3 to 8 percent slopes; **29A** Agawam fine sandy loam, 0 to 3 percent slopes; **29B** Agawam fine sandy loam, 3 to 8 percent slopes; **33A** Hartford sandy loam, 0 to 3 percent slopes, Farmland of Statewide Importance 37C Manchester gravelly sandy loam, 3 to 15 percent slopes. Not Prime Farmland: 37E Manchester gravelly sandy loam 15 to 45 percent slopes. Source: NRCS Web Soil Survey, ESRI, VHB.

Some of the factors that make Prime Farmland ideal for agriculture also make these areas attractive to competing land uses such as residential, commercial, and Industrial development. When residential, commercial or industrial developments occur on Prime Farmland, the soil resource is irretrievably lost.

In contrast, the ground-based solar array will occupy the Project Area for approximately 35 to 40 years. Once the useful life of the Project has been completed the Project Area, including areas of current Prime Farmland, will be decommissioned in accordance with the plan approved by the Connecticut Siting Council. Specific measures have been included in the Project layout, engineering design, and proposed management to avoid and minimize alteration of the existing farmland soil resources. The Decommissioning Plan will require mitigation for soil compaction or other soil degradation which may have been caused by the Project operation or decommissioning activities.

[7] https://data.nal.usda.gov/dataset/soil-survey-geographic-database-ssurgo

### Existing Agricultural Practices

VHB Soil Scientists initiated wetland investigations in the fall and winter of 2019-2020. During this time, they collected notes on cropping patterns in the agricultural fields that had been planted in 2019 (refer to Table 7). Farming practices have a strong influence on soil health.

**Table 7. Summary of Crop and Cover Crop Practices in Project Site Farmland**

| Field ID | Area Tilled (ac) | Crop Planted | Cover Crop |
|---|---|---|---|
| A & B | 22.0 | Corn (feed) | Rye/tillage radish |
| C | 6.6 | Corn (feed) | Corn Stover |
| D | 41.4 | Shade tobacco | Rye |
| E | 4.1 | Gourds | Oats |
| F | 70.0 | Shade tobacco | Rye/oats |
| G | 4.1 | Corn (feed) | Corn Stover |
| H & I | 69.1 | Shade tobacco | Rye/oats |
| J | 12.4 | Vegetables | Oats |
| **Total** | **229.8** | | |

All of the fields within the Project Site are tilled each year before planting. None of the farmland present within the Project Site is being managed in no-till practices, field grasses, or perennial crops. Tilling breaks down the natural soil structure that forms when permanent soil cover such as grasses, shrubs or forest are maintained. The loss of soil structure reduces the infiltration rate of precipitation and the ability of the soil to exchange gases necessary for root respiration and microbial respiration.

In early spring 2020, soil scientists collected soil samples from fields across the Project Site for analysis including standard nutrient testing, pH, soil texture and soil organic matter (SOM) content to provide a preliminary assessment of soil fertility and tilth. During sample collection soil penetrometer[8] tests were conducted to evaluate soil compaction. When the force applied to advance a penetrometer further into the soil exceeds 250 to 300 pounds per square inch (psi) the underlying compacted layer is described as impenetrable to roots. In farmland that is plowed for each crop an impenetrable layer can develop just below the tillage depth. This feature is called a "plow pan" and it impairs the soil internal drainage and rooting depth of plants. A summary of soil test results are provided in Table 8, below.

[8] Dickey-John

**Table 8. Preliminary Chemical and Physical Characterization of Farmland, Forest Control and Reclaimed Gravel Pit Soils**

| Field ID | Texture | Organic Matter (%) | pH | Penetrometer (psi) 0-6 in / 6-18 in | Comments |
|---|---|---|---|---|---|
| A | SiL | 2.7 | 6.2 | >300 / >300 | Excess P, compacted |
| B | FSL | 3.0 | 6.2 | > 300 />300 | Excess P, compacted |
| C | FSL | 0.8 | 5.4 | 150 / >250 | Low OM, Ca, Mg |
| D & E | L | 2.4 | 6.3 | 150 / >300 | Excess P, low Ca |
| F & G | L / SL | 2.3 | 5.8 | 125 / >300 | Excess P, low Ca |
| H & I | FSL | 2.1 | 6.2 | 100 / >300 | Excess P, low Ca |
| J | SL | 1.9 | 6.3 | 150 / >300 | Excess P, low Ca |
| Control | FSL | 3.8 | 4.5 | 100 / 175 | Acid, high Al |
| Reclaimed | SL | 2.0 | 5.0 | 100 / >300 | Low Ca, Mg |

SiL – silt loam; FSL – fine sandy loam; L – loam; SL – sandy loam; P – phosphorus; OM – organic matter; Ca – calcium;

All of the farm fields tested exhibited excessive compaction within 18 inches of the surface. Several fields had the restrictive layer within 12-inches of the soil surface seriously limiting rooting depth, internal soil drainage, and gas exchange. In Fields A and B along Apothecaries Hall Road the fields were compacted within six inches of the surface (Farmland Figure at Exhibit A). Water remained in low points in the field days after rainfall as the soils had been puddled and sealed by compaction. The farmer managing these fields included tillage radish as a cover crop which is used to penetrate and decompact soils.

Results from the University of Connecticut Soil Lab indicated the nutrient status of the soils managed in tobacco were all maintained in a productive range. These soils had acceptable levels of organic matter in the topsoil but could be improved by further additions. The topsoil and subsoil in the tobacco fields had weak structure due to the effects of repeated tillage. All the tobacco fields had excessive levels of phosphorus typical for this crop and all were low in calcium, an important nutrient.

Field C, north of the Sand and Gravel Mine, (Farmland Figure at Exhibit A) has been poorly managed with an organic matter content less than one percent, low pH, and areas of severely accelerated, unchecked soil erosion.

The control sample collected in a woodland east of Field F (Farmland Figure at Exhibit A). had an organic matter content of 3.8 percent a full percent greater than the adjacent tobacco fields and strongly acid pH of 4.5. Soils were friable without a root inhibiting layer within 18 inches of the soil surface. The soil also had moderate structure with aggregates visible on the sides of the hand dug pits. A soil sample from a reclaimed part of the Charbonneau Gravel Pit in a stand of black locust (*Robinea pseudoacacia*) had moderate organic matter content and low nutrient status.

Soil samples were collected for the Comprehensive Assessment of Soil Health by the Cornell Soil Laboratory in Ithaca, New York (Table 9, below). The tests requested include active carbon, autoclave-citrate extractable (ACE) protein, and soil respiration. The active carbon test assesses that portion of SOM that is available to the soil microbial community for food or energy supporting soil food web in a healthy soil that enhances nutrient cycling and

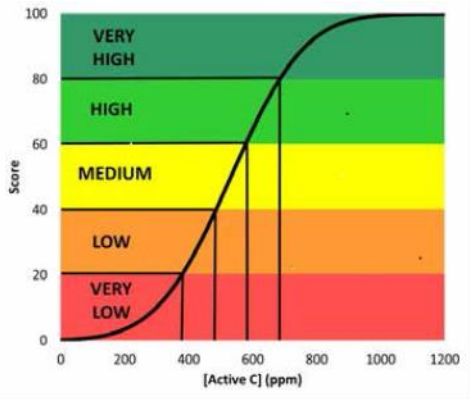
availability to crops. The ACE test measures the soil protein content as an indicator of the biological and chemical quality of the soil. Soil respiration is a measure of biological activity with the soil. Results from these tests have been delayed significantly as the lab shut down for months in response to COVID-19.

**Table 9. Comprehensive Assessment of Soil Health within the Project Site**

| Sample Number | Field ID | Crop ID | Active C mg C/kg soil | Score | Respiration mg CO2/g soil | Score | Protein mg/g soil | Score |
|---|---|---|---|---|---|---|---|---|
| 1 | F | ST | 409.6 | 42 | 0.30 | 16 | 4.38 | 26 |
| 2 | F | ST | 391.5 | 39 | 0.32 | 18 | 4.70 | 29 |
| 3 | C | SC | 192.7 | 10 | 0.14 | 6 | 2.08 | 9 |
| 4 | F | ST | 413.2 | 43 | 0.36 | 21 | 4.79 | 30 |
| 5 | B | SC | 545.2 | 68 | 0.52 | 40 | 6.77 | 53 |
| 6 | A | SC | 603.0 | 78 | 0.57 | 46 | 7.44 | 61 |
| 7 | D | ST | 465.6 | 53 | 0.42 | 28 | 5.01 | 33 |
| 8 | J | V | 377.1 | 36 | 0.30 | 16 | 4.17 | 24 |
| 9 | H | ST | 386.1 | 37 | 0.34 | 20 | 4.42 | 26 |
| 10 | R | F | 476.5 | 55 | 0.46 | 32 | 10.53 | 89 |
| 11 | C | F | 718.7 | 91 | 0.61 | 51 | 18.04 | 100 |

Cornell Soil Health Lab, G01 Bradfield Hall, Ithaca, NY. Crop ID Codes: ST Shade Tobacco, SC: Silage Corn, V: vegetables, F: Forest

Color delineations apply to all parameters.




The five samples taken from area managed in shade tobacco averaged a score just above the very low/low classifications (average 20.6). Soil protein also scored low with an average value of 28.8. These low scores may reflect the effects of the various pesticides applied to the crop to produce a high-quality tobacco leaf. Active carbon scored in the medium range which is probably influenced by the beneficial use of cover crops as green manure. These crops are fall seeded after harvest and grow in during the early spring before the fields are tilled.

The soils in Fields A and B used to grow silage corn in the northern part of the Project Site scored high for active carbon (see Figure 1). A cover crop was used on this soil and poultry manure was applied in liquid form in the late fall of 2019. Soil respiration was medium and soil protein medium to high. The poorly managed, heavily eroded silage corn Field C next to the mid-Project Site gravel pit was not included in this discussion. The soil health results from this field confirmed the general observations of degraded soils.

Field J had been planted in vegetables during the 2019 growing season (see Figure 1). The health profile of the soil sample from this field was similar to the soil results from the shade tobacco fields. This field had been used in tobacco production in the past.

The soil sample taken from a reclaimed portion of a gravel pit which supports a stand of black locust scored very high in extractable protein and medium in active carbon and low in soil respiration. These values are anticipated to increase as a topsoil layer develops and biodiversity increases. The control sample taken from a native oak forest scored very high for active carbon demonstrating how nutrients are cycled through the forest and for extractable proteins associated with the soil ecosystem. Soil respiration was only medium but represented the highest individual rating of all the samples collected.

## Other Environmental Considerations

As directed in the Siting Council's Application Guide for a Renewable Energy Facility, VHB reviewed available databases for consideration of impacts to additional environmental concerns. None of the following were found to be present within or adjacent to the Project Site.

- Coastal Consistency Analysis (CGS §22a-90)
- Connecticut Heritage Areas (CGS §16a-27)
- Ridgeline Protection Zones (CGS §8-1aa)
- DOT Scenic Lands (CGS §13a-85a)
- State Parks and Forests (CGS §23-5)
- Wild and Scenic Rivers (CGS §25-199)
- Protected Rivers (CGS §25-200)
- Core Forest (PA 17-218)

# 7

# Environmental Consequences

Utilizing the Project design data and the results of the Affected Environment Analysis, VHB prepared an analysis of the environmental consequences potentially resulting from the Project.

## 7.1 Tree Clearing and Vegetation Management

### Tree Clearing

As required by the Siting Council, VHB performed a carbon debt analysis for the Project. The Project will cumulatively result in 91 acres of new tree clearing across the entire Project Area. The purpose of this analysis was to determine whether the Project can have a net improvement in carbon reduction compared to the loss of 91 acres of trees. Approximately 330 acres of the 737-acre Project Site is forested. Proposed tree clearing represents 27 percent of the total forested area within Project Site parcels (see Figure: Tree Clearing Plan at Exhibit A).

The analysis relied upon a US EPA conversion factor to identify the amount of carbon sequestered in one year by one acre of average United States forest: 0.77 metric tons (MT) $CO_2$ (US EPA, 2020). As the Project requires the removal of approximately 91 acres of trees, the associated "carbon debt" is estimated to be 2,864.4 MT $CO_2$ over 30 years with a one-time release of carbon stock of 10,538.1 MT $CO_2$. Further, cropland conversion has an associated "carbon debt" of 1,030.5 MT $CO_2$ 30-year emission avoidance and 30-year sequestration. The one-time release of carbon stock is estimated at 5,212.7 MT $CO_2$. Upstream activities of the solar PV system are 212,520.0 MT $CO_2$.

The Project is expected to produce approximately 253,000 MWh of energy in its first year of operation. Using an emission factor specific to the Project's eGrid region: NPCC New England (US EPA, 2018), the estimated annual carbon offset of the Project is 107,463.6 MT $CO_2$. Greenhouse gas equivalencies for this estimated offset, could include:

- 23,217 passenger vehicles driven for one year; and,
- 12,401 homes' energy use for one year.

Anticipating an annual "carbon debt" of 230,104.8 MT $CO_2$ and an annual production benefits of 107,463.6 MT $CO_2$, it would take the Project approximately 2.1 years (or 25.7 months) to have a net improvement in greenhouse gas emissions.

The Carbon Debt Analysis is provided at Exhibit O.

### Vegetation Maintenance

Outside of the  security fence, the Project requires an approximately 100-foot zone (buffer area) maintained free of tall vegetation so that sunlight reaches the solar panels un-obstructed. Much of this area is already cleared and where necessary, existing trees will be removed as described above. In this buffer area, it is not necessary to remove or "grub" tree stumps. Consequently, the Applicant is proposing to cut trees so that stumps are nearly level with the ground and leave them in place to limit soil disturbance and protection of Farmland soil that may be present. This buffer area will be planted with a combination of grass and meadow seed mixtures to promote soil stabilization and provide some wildlife habitat. This area will be mowed, or otherwise treated mechanically (e.g., bush hogged), once or twice annually to discourage the establishment of woody species. Refer to the Operations and Maintenance Plan provided at Exhibit P.

Within the array area inside , the ground surface will be stabilized with a permanent grass cover to reduce erosion and promote infiltration. These grassed areas will be mowed periodically to eliminate the establishment of woody vegetation and reduce the accumulation of dry grasses and vines. These actions will minimize the probability of brush fires spontaneously igniting.

## 7.2 Wetlands

The Project has been designed to minimize direct impacts to wetlands. One exception is Wetland 10, an isolated, poorly developed wetland that has been subject to routine disturbance during farming and gravel mining operations. The Project proposes to eliminate this wetland.

The Town of East Windsor Conservation Commission / Inland Wetland and Watercourse Agency (IWWA) regulates activities with 150 feet of wetlands and watercourses which is referred to in the East Windsor Inland Wetlands Regulations [9] as the Upland Review Area (URA). The Project avoids impact to the URA to the extent practicable. The Project extends into some URAs which were previously developed and are currently used for agriculture and some locations will result in new development within URA. Refer to Figure: Wetland Delineation Map provided at Exhibit A and Soil Scientists Report is provided at Exhibit H.

In addition to avoidance and/or minimization of wetland impacts, GPS is proposing crossing under the wetland area near the CT DOT railway property as well as Ketch Brook via HDD or another similar methodology.

[9] Town of East Windsor Inland Wetlands and Watercourses Regulations, 2013. http://www.East Windsor-ct.gov/conservation-commission-inland-wetlands-agency/links/inland-wetlands-watercourses-regulations

Prior to construction, GPS will prescribe the application of best management practices (BMPs) to avoid and minimize indirect wetland impacts and natural resource impacts during construction. This will likely consist of several components, including:

- Appropriate erosion control measures;
- Temporary crossing guidelines,
- Protective measures for wildlife;
- Contractor and sub-contractor education,
- Construction equipment storage and material staging requirements/restrictions; and
- Periodic monitoring and reporting.

## 7.3 Wildlife and Habitat

As documented in Section 6.3, existing vegetative cover types were mapped on the Project Area. Cover types are an indicator of the various wildlife habitats provided and are linked to the habitat needs of individual species. VHB analyzed the ecological integrity and alteration of vegetative cover types resulting from the Project as an indicator of potential impacts to wildlife utilizing the Project Area. The Wildlife Evaluations Technical Memorandum is provided at Exhibit I.

The Project Area is primarily comprised of industrial and manufacturing zone designations and is subject to significant disturbance as a result of the active mining operations. In addition to this scarified land that will be regraded and utilized for solar panel placement, approximately 230 acres of primarily tobacco fields will be converted to host solar arrays. Both of these current land uses will undergo alteration and improvement as a result of Project activities. For instance, permanent grass cover will be established under the array and along the perimeters of the arrays. The grassland cover will be mown approximately one to two times per year to prevent establishment of woody vegetation. Additionally, approximately 91 acres of deciduous-coniferous and successional/reclaimed forest will be cleared. These cleared areas will also be planted in grasses and legumes.

Approximately 57.4 acres of forested upland will be converted for the Project, which will result in some habitat loss for forest-dwelling species. The CT DEEP GIS coverage for East Windsor indicates that the Project does not contain Core Forest.

No streams or forested wetlands will be impacted by the Project and BMPs will be employed during construction to prevent sedimentation and/or runoff from entering the ponds, streams, or wetlands.

**Table 10. Cover Types with Project Parcels: Existing Area and Areas to be Altered (Acres)**

| Cover Type | Existing Area | Area to be Altered | Area not Altered |
|---|---|---|---|
| Agricultural Fields | 229.8 | 209.7 | 20.1[1] |
| Sand and Gravel Quarry | 78.0 | 61.2 | 16.8 |
| Deciduous Forest | 264.4 | 42.2 | 220.6 |
| Coniferous Forest | 26.7 | 15.2 | 11.5 |
| Forested Wetland | 39.4 | 0.4 | 39.0 |
| Shrubland | 61.6 | 35.4 | 26.2 |

1 The acreage supporting the solar array panels will all be managed as cool season grassland. Agricultural fields not occupied by solar arrays will also be converted to grassland or other landscape area.
2 Primarily Public Utility Transmission Corridor.

Aside from habitat conversion, a review of the literature indicated the potential for direct collisions with the solar arrays by birds presumably caused by confusing the panels with water.

Pre-construction wildlife usage patterns are anticipated to resume after the construction period is completed.

## Mitigative Actions

To avoid the potential impacts to wildlife during construction, the Applicant proposes the following measures:

- If construction activities are to occur during the nesting period for avian species (between early May and mid-August), vegetation removal, including forest tree removal and agricultural clearing, should be conducted before May 1 and after August 15.
- If vegetation removal must occur within the May 1 to August 15 avoidance window, areas to be cleared should first be surveyed to determine if breeding birds would be disturbed. If the survey concludes that breeding birds would be disturbed, a modified vegetation removal schedule will be implemented.
- Install nest boxes for American kestrel in suitable areas.
- Environmental monitoring during construction in potential State-listed reptile habitats will be conducted by a qualified inspector to ensure avoidance of impacts to these organisms, to the extent practicable.
- Any State-Listed species encounters will be reported to the CT DEEP NDDB.
- To minimize the possibility of "incidental take" of roosting bat species, the Applicant will follow the guidance provided in the USFWS Final 4(d) Rule issued for the NLEB on January 14, 2016 (USFWS, 2017). The Applicant will not perform any tree removal activities during the bat pupping season between June 1 and July 31 (USFWS, 2017).
- Plant surveys for the State-listed plants for which there is suitable habitat within the Project Area will be performed during the blooming period for each plant. Any observed occurrences of the state-listed plant species will be cordoned off with protective flagging

to prevent disturbance to these areas during construction. If avoidance is impracticable, additional coordination will be undertaken to comply with the CT ESA.

## 7.4 Surface and Groundwater Resources

The CT DEEP has mapped an Aquifer Protection Area within the northern portion of the Project Site. The East Windsor Zoning Regulations restrict development of certain new land use activities that use, store, handle or dispose of hazardous materials and requires existing regulated land uses to register and follow best management practices. Although the panels, transformers and inverters may contain hazardous oils and/or chemicals, it cannot be released into the environment or removed unless the equipment is broken. Hazardous materials will not be stored on the Project Area during operation of the Project but may be present during the construction phases. GPS will adhere to the Connecticut Department of Public Health's General Construction Best Management Practices for Sites within a Public Drinking Water Supply Area (July 2014).

The Project will not utilize on-site water sources, leaving more water available for base flow in streams. Once in operation, GPS will be unstaffed and does not require potable water uses or result in sanitary discharges. Portable sanitary facilities will be required on-site during construction and will be the responsibility of the company or firm which undertakes the construction phase work associated with the Project. Additionally, GPS believes a solar facility occupying the Project Area and portions of the identified Aquifer Protection Area, in comparison to the current land use (active mining operations), poses less risk of spill or leak fuel storage.

The FEMA Flood zones were established to promote public health, safety, and general welfare and to minimize losses caused by periodic flooding. While these areas are present along Ketch Brook, no work or obstruction is proposed in any SFHAs.

Ground and surface water quality can also be affected by land management. Soil erosion and sedimentation can contribute to the degradation of surface water quality and may become a public nuisance if tracked onto area roadways or allowed to become airborne. Standard BMPs provided in the 2012 Connecticut Guidelines for Soil Erosion and Sediment Control will be incorporated in the Stormwater Pollution Control Plan and construction documents. Structural measures such as sediment traps, anti-tracking stone construction exits, erosion control blankets, hydraulically applied mulch, perimeter and intermediate sediment control silt fence and wattles will be employed during construction. Any sediment that gets past these BMPs and is tracked off-Site during construction will be swept at the end of each workday. Disturbed areas associated with construction activities will be graded, covered with topsoil, and permanently stabilized with conservation grasses and legumes.

Long term grass cover will reduce the hazard of wind and water erosion in agricultural fields by eliminating the periods when the soil surface is exposed after cultivation and seed bed preparation. Inputs of fertilizer and pesticides will also be reduced under grassland management. These factors can improve the quality of ground and surface waters.

## 7.5 Stormwater

The stormwater management system design will adhere to the guidelines provided within the 2004 Connecticut Stormwater Quality Manual. The Project creates little new impervious surface as the solar arrays are elevated above the ground on racking so that permanent grass cover is established beneath the racks. This vegetation not only protects the soil from erosion, but long-term management as grassland will increase the organic matter content of the soils and enhance soil structure. Improved soil structure increases the infiltrative capacity at the soil surface and the internal permeability of the soil reducing the percentage of precipitation converted to runoff.

Learning from experience designing and constructing other solar projects in Connecticut, the GPS Project approach to stormwater management has emphasized the use of non-structural controls such as pre-seeding and establishing permanent vegetation cover before construction starts. In this case site preparation is anticipated in the summer and fall of the year preceding the spring start of construction. Similarly, the Project will mitigate increases in peak discharge rates by promoting infiltration into the sandy soils present at various depths below finer textured soil mantles. The Project will utilize the natural terrain of upland depressions (kettle holes) and upland glacial meltwater valleys to retain and infiltrate stormwater runoff. This infiltration will also provide the water quality treatment required under the CT DEEP regulations and guidance documents. This approach has been developed in consultation with CT DEEP personnel.

Based on the engineering analysis provided in the Stormwater Management Report (Refer to Exhibit L), implementation of the Project will not increase peak discharge rates or volumes generated by the design storms modeled. These rates will be maintained at or below existing levels at all design points studied.

## 7.6 Scenic Values

EDR performed a Visibility Assessment (VA) for the Project, a copy is provided in Exhibit G. The VA consisted of viewshed analysis, field verification, and visual simulations. Generally, the VA used lidar topographic point cloud information, topographic data, Project data and ESRI ArcGIS® software with the Spatial Analyst extension to identify where views into the Project Site exist within the study area. Field verification was performed to confirm these viewpoints, obtain photographs for use in visual simulations, and further document the character of the study area. The visual simulations were prepared utilizing aerial photographs, LIDAR data, and GPS data collected in the field to create an AutoCAD Civil 3D® drawing. The VA is provided at Exhibit G.

Several viewpoint locations were selected as particularly sensitive for abutters and the public travelling on area roadways. These viewpoints were photo-documented and used for visual simulations. By simulating the future viewshed conditions proposed conditions, specific needs for screening such as vegetation or fencing were identified. The simulations were then remodeled with proposed screening features.

## Visibility Analysis

The results of the visibility assessment are summarized as follows:

- The viewshed analysis suggests that potential views of the Project will be contained within the Project Area, with the exception of some public roads and properties directly abutting the Project property. Approximately 3.9 percent of the half mile visual study area (VSA) could have potential views of some portion of the Project (i.e. 96.1% of the VSA is fully screened from view). Most visible areas are actually contained within the boundaries of the Project Area.
- Field review indicated that the viewshed results were generally accurate, and existing structures and vegetation will be effective in screening views of the Project in most locations. However, where forest vegetation is thin and/or understory vegetation is lacking, some visibility may be experienced from public roads and homes directly abutting the Project Area.
- Homes along Apothecaries Hall Road directly adjacent to the Project Site may experience some level of visual impact due to the introduction of the solar panels and perimeter fencing. Vegetative mitigation may be effective in reducing impacts to these residential areas.
- Homes located along Plantation Road may have some limited views into the Project Area through an existing hedgerow and may also benefit from some supplemental screening to minimize Project visibility.
- A few homes along Rye Street have some limited views into the Project Area and may experience some level of visual impact resulting from visibility of portions of the Project. Selective plantings may be effective in reducing or eliminating visibility from these locations.

Four visual simulations provided in the VA (Refer to Exhibit G) illustrate representative views of the Project from various foreground locations within the visual study area.

## Visual Mitigation

Potential vegetative screening mitigation treatments for several of the aforementioned locations that may experience minor visual impacts may be sufficient. However, additional mitigation measures would also minimize visual impacts; the following may be considered for inclusion in the Project:

- Burial of interconnection cables to minimize visibility.
- Increased setbacks from residences and known sensitive locations to minimize visibility of solar facilities.
- Positioning inverters and transformers within solar arrays and away from public vantage points.

Some of these mitigation measures have already been included in the Project design Additionally, in response to the Town of East Windsor's comments, GPS has added an agricultural fencing option and enhanced the access road entry points to further reduce adverse visual impacts.

## 7.7 Cultural Resources

The Heritage survey report described in Section 6.7 was submitted to the CT SHPO to initiate consultation on May 13, 2020. The Applicant, VHB and Heritage had a formal meeting with the CT SHPO on May 19, 2020 to discuss additional studies being proposed to identify potential cultural resources and structures of potential historical significance. Heritage recommended a combination of further investigation into the moderate to high archeologically sensitive areas as well as thorough documentation and investigation of the numerous tobacco barns/buildings within the Project Site. The results of this investigation will allow accurate determination of the approximate age of these structures and document current conditions. Preliminary consultation with CT SHPO indicated agreement with Heritage's approach to determine historical significance of the structures present. Cultural surveys and consultation with CT SHPO in regard to investigation results and preservation or mitigation methods is on-going. Refer to Exhibit M.

## 7.8 Aeronautical Facilities

On behalf of GPS, VHB filed 19 Notice of Proposed Construction or Alteration - Off Airport (Form 7460-1) notifications with the FAA. Copies of the 7460-1 filings are provided at Exhibit Q. The filings were made on May 8, 2020 and provided required information about the Project such as the type of activity/construction, the latitude and longitude of the facility, the height of equipment above ground, and ground elevations.

FAA made a Determination of No Effect for the Project on June 12, 2020. Upon completion of construction, the FAA has required that GPS file FAA Form 7460-2, Notice of Actual Construction or Alteration, following construction of the facility. The initial consultation and response from FAA have been included at Exhibit Q.

## 7.9 Air Quality

Minor construction related impacts to air quality could include emissions produced by the operation of construction machinery or fugitive dust emissions, but such impacts would not be expected to be greater than the use of agricultural and gravel mining equipment that is currently taking place. In order to reduce and mitigate such potential impacts to air quality, exposed soils will be periodically sprayed with water as necessary during construction and that crushed stone aprons be installed at access road entrances for dust control. Additionally, the quantity of earth to be moved or disturbed during construction will be minimized to comply with state guidelines.

The Project will have minimal emissions of regulated air pollutants and greenhouse gases during the construction phase and no emissions during operation. Therefore, an air permit is not required for the construction or operation of the solar facility.

# 7.10 Noise

VHB conducted an acoustical study to evaluate the sound levels from the mechanical equipment associated with the Project. The Project-related noise sources consist of the electrical inverters and transformers used to convert the solar energy to electricity and motors associated with the trackers. The Project-generated sound levels were calculated using manufacturer's sound data and the principles of acoustical propagation of sound over distance. An Acoustical Analysis is provided at Exhibit N.

## Noise Impact Regulatory Criteria

The CT DEEP has developed noise impact criteria that establish sound level thresholds deemed to result in adverse impacts. The acoustic analysis for the Project used these criteria to evaluate whether the Project will generate sound levels that result in adverse impacts.

The CT DEEP's noise control regulations identify the limits of sound that can be emitted from specific premises and what activities are exempt. The noise control regulations (Title 22a, §§ 22a-69-1 to 22a 69-7) are contained in the RCSA. Even though the proposed Project would be considered a Class C (Industrial) emitter, the acoustic analysis for the Project assumed the more stringent noise standard for a Class B (Commercial) Emitter Zone and a Class A (Residential) Receptor Noise Zone for the receptor locations. A Class C land use is defined as generally industrial where protection against damage to hearing is essential, and the necessity for conversation is limited. The land use for Class B is defined as generally commercial in nature, where human beings converse, and such conversations are essential to the intended use of the land. The land use in Class A is defined as generally residential where human beings sleep or areas where serenity and tranquility are essential to the intended use of the land.

The CT DEEP policy states that a source (emitter) located in the various zones shall not emit noise exceeding the levels stated in Table 11 at the adjacent noise zones.

**Table 11. CT DEEP Noise Zone Standards**

| | Receptor Noise Zone | | | |
|---|---|---|---|---|
| **Emitter Zone** | **Class A (Daytime)** | **Class A (Nighttime)** | **Class B** | **Class C** |
| Class A (Residential) | 55 | 45 | 55 | 62 |
| Class B (Commercial) | 55 | 45 | 62 | 62 |
| Class C (Industrial) | 61 | 51 | 66 | 70 |

Source: Control of Noise (Title 22a, Section 22a-69-1 to 22a-69-7.4), RCSA, Revised 2015-3-6.

## Receptor Locations

Fifty-six receptor locations were identified in the vicinity of the Project Area and represent residential parcels that surround the Project. The receptor locations were selected based on their proximity to the Project Area and their land use. These receptor locations represent the

most sensitive locations in the immediate area that may experience changes in sound levels once the Project is in operation. They include:

- R1 – 363 Rye Street
- R2 – 359 Rye Street
- R3 – 357 Rye Street
- R4 – 353 Rye Street
- R5 – 351 Rye Street
- R6 – 349 Rye Street
- R7 – 345 Rye Street
- R8 – 341 Rye Street
- R9 – 20 Plantation Road
- R10 – 25 Plantation Road
- R11 – 281 Rye Street
- R12 – 281 Rye Street
- R13 – 271 Rye Street
- R14 – 265 Rye Street
- R15 – 263 Rye Street
- R16 – 259 Rye Street
- R17 – 257 Rye Street
- R18 – 247 Rye Street
- R19 – 169 Rye Street
- R20 – Rye Street
- R21 – 30 Apothecaries Hall Road
- R22 – 45 Apothecaries Hall Road
- R23 – 47 Apothecaries Hall Road
- R24 – 51 Apothecaries Hall Road
- R25 – 53 Apothecaries Hall Road
- R26 – 57 Apothecaries Hall Road
- R27 – 141-79 Windsorville Road
- R28 – 85 Apothecaries Hall Road
- R29 – 87 Apothecaries Hall Road
- R30 – 89 Apothecaries Hall Road
- R31 – 91 Apothecaries Hall Road
- R32 – 93 Apothecaries Hall Road
- R33 – 95 Apothecaries Hall Road
- R34 – 97 Apothecaries Hall Road
- R35 – 99 Apothecaries Hall Road
- R36 – 142 Windsorville Road
- R37 – 145 Windsorville Road
- R38 – 147 Windsorville Road
- R39 – 153 Windsorville Road
- R39A – 159 Windsorville Road
- R40 – 166 Windsorville Road
- R40A – 169 Windsorville Road
- R41 – 176 Windsorville Road
- R42 – 22 Wapping Road
- R43 – 36 Wapping Road
- R44 – 20 Wapping Road
- R45 – 40 Wapping Road
- R46 – 60-134 Wapping Road
- R47 – 80 Wapping Road
- R48 – Rye Street
- R49 – Rye Street
- R51 – 140 Wapping Road
- R52 – 223-169 Wapping Road
- R53 – 46 Plantation Road
- R54 – Plantation Road

## Future Conditions Model

The acoustical analysis evaluated the potential sound level impacts associated with the Project's proposed mechanical equipment at the nearby sensitive receptor locations. This analysis evaluated the potential sound level impacts from the 36 inverters, two transformers, and 1,133 tracking system motors operating simultaneously.

Project-generated sound levels were calculated for each sensitive receptor location based on manufacturer-provided reference sound level data. The reference sound level data included the following:

- TMEiC Solar Ware Ninja Inverters - 82.5 dBA at 3.3 feet;
- Transformers – 79 dB to 80 dB at 6 feet; and

› NEXTracker's Horizon Single Axis Tracker motor – 69.6 dB at 3.3 feet.

The reference sound levels for transformers are based on data obtained from National Electrical Manufacturers Association (NEMA) TR1 publication. These reference sounds levels were adjusted to reflect the distances -generated sound levels were projected to the receptor locations using the properties of sound propagation for soft ground terrain in the acoustic modeling software CadnaA (Computer Aided Noise Abatement).

Finally, the existing and proposed Project-generated sound levels were added together to determine the proposed mechanical equipment's' potential impact on existing sound levels. These results were compared to the CT DEEP noise impact criteria for determining compliance.

## Results of the Acoustical Study

The potential sound level impact associated with the Project was determined by comparing existing and future sound levels to the CT DEEP's noise standards. The existing sound levels were based upon sound level measurements. The future sound levels were calculated by combining existing sound levels and sound levels from the proposed equipment. The sound levels were adjusted based upon distance, properties of sound propagation over terrain, applicable blockage, and, if necessary, noise attenuation measures, which may include an acoustical wall.

The results of the acoustical analysis demonstrated that the operation of the proposed equipment will comply with CT DEEP's noise standards at the sensitive receptor locations. The sound levels attributed to the proposed equipment ranges from approximately 14 dB(A) to 42 dB(A). During the daytime period, the receptor locations will experience overall sound levels (ambient plus project contributions) ranging from approximately 33 dB(A) to 46 dB(A). These sound levels are below CT DEEP's daytime criteria of 55 dB(A). Due to the nature of the project, the equipment will not be operating during the nighttime period.

Table 12 summarizes the sound levels at the receptor locations.

**Table 12. Sound Levels at Receptor Locations, DB(A)**

| Receptor Locations | CT DEEP Noise Standard Daytime* | Project Generated Sound Levels | Overall Sound Levels |
|---|---|---|---|
| R1 – 363 Rye Street | 55 | 27.0 | 33 - 41 |
| R2 – 359 Rye Street | 55 | 27.7 | 33 - 41 |
| R3 – 357 Rye Street | 55 | 28.1 | 33 - 41 |
| R4 – 353 Rye Street | 55 | 28.3 | 34 - 41 |
| R5 – 351 Rye Street | 55 | 28.3 | 34 - 41 |
| R6 – 349 Rye Street | 55 | 28.3 | 34 - 41 |
| R7 – 345 Rye Street | 55 | 28.3 | 34 - 41 |
| R8 – 341 Rye Street | 55 | 31.6 | 37 - 43 |

| Receptor Locations | CT DEEP Noise Standard Daytime* | Project Generated Sound Levels | Overall Sound Levels |
|---|---|---|---|
| R9 – 20 Plantation Road | 55 | 30.0 | 37 - 43 |
| R10 – 25 Plantation Road | 55 | 36.1 | 39 - 44 |
| R11 – 295 Rye Street | 55 | 40.4 | 42 - 45 |
| R12 – 281 Rye Street | 55 | 22.1 | 36 - 43 |
| R13 – 271 Rye Street | 55 | 14.1 | 36 - 43 |
| R14 – 265 Rye Street | 55 | 18.6 | 36 - 43 |
| R15 – 263 Rye Street | 55 | 18.3 | 36 - 43 |
| R16 – 259 Rye Street | 55 | 17.5 | 36 - 43 |
| R17 – 257 Rye Street | 55 | 22.2 | 36 - 43 |
| R18 – 247 Rye Street | 55 | 20.5 | 36 - 43 |
| R19 – 169 Rye Street | 55 | 20.6 | 36 - 43 |
| R20 – Rye Street | 55 | 27.5 | 36 - 42 |
| R21 – 30 Apothecaries Hall Road | 55 | 28.7 | 36 - 42 |
| R22 – 45 Apothecaries Hall Road | 55 | 30.6 | 36 - 46 |
| R23 – 47 Apothecaries Hall Road | 55 | 32.0 | 36 - 46 |
| R24 – 51 Apothecaries Hall Road | 55 | 33.3 | 37 - 46 |
| R25 – 53 Apothecaries Hall Road | 55 | 33.2 | 37 - 46 |
| R26 – 57 Apothecaries Hall Road | 55 | 31.3 | 36 - 46 |
| R27 – 141-79 Windsorville Road | 55 | 27.2 | 35 - 45 |
| R28 – 85 Apothecaries Hall Road | 55 | 25.9 | 35 - 45 |
| R29 – 87 Apothecaries Hall Road | 55 | 26.0 | 35 - 45 |
| R30 – 89 Apothecaries Hall Road | 55 | 26.1 | 35 - 45 |
| R31 – 91 Apothecaries Hall Road | 55 | 26.1 | 35 - 45 |
| R32 – 93 Apothecaries Hall Road | 55 | 26.2 | 35 - 45 |
| R33 – 95 Apothecaries Hall Road | 55 | 26.3 | 35 - 45 |
| R34 – 97 Apothecaries Hall Road | 55 | 26.3 | 35 - 45 |
| R35 – 99 Apothecaries Hall Road | 55 | 26.4 | 36 - 45 |
| R36 – 142 Windsorville Road | 55 | 26.3 | 36 - 45 |
| R37 – 145 Windsorville Road | 55 | 26.2 | 36 - 45 |
| R38 – 147 Windsorville Road | 55 | 26.5 | 36 - 45 |
| R39 – 153 Windsorville Road | 55 | 26.7 | 36 - 45 |
| R39A – 159 Windsorville Road | 55 | 26.3 | 36 - 45 |
| R40 – 166 Windsorville Road | 55 | 26.5 | 36 - 45 |
| R40A – 169 Windsorville Road | 55 | 25.6 | 36 - 45 |
| R41 – 176 Windsorville Road | 55 | 28.9 | 37 - 45 |
| R42 – 22 Wapping Road | 55 | 23.3 | 36 - 45 |
| R43 – 36 Wapping Road | 55 | 24.9 | 36 - 46 |
| R44 – 20 Wapping Road | 55 | 23.3 | 36 - 46 |

| Receptor Locations | CT DEEP Noise Standard Daytime* | Project Generated Sound Levels | Overall Sound Levels |
|---|---|---|---|
| R45 – 40 Wapping Road | 55 | 23.8 | 36 - 46 |
| R46 – 60-134 Wapping Road | 55 | 25.7 | 36 - 46 |
| R47 – 80 Wapping Road | 55 | 27.1 | 36 - 46 |
| R48 – Rye Street | 55 | 27.2 | 36 - 46 |
| R49 – Rye Street | 55 | 29.0 | 37 - 46 |
| R50 – Rye Street | 55 | 31.1 | 37 - 43 |
| R51 – 140 Wapping Road | 55 | 36.4 | 39 - 44 |
| R52 – 223-169 Wapping Road | 55 | 31.9 | 37 - 46 |
| R53 – 46 Plantation Road | 55 | 28.7 | 34 - 41 |
| R54 – 47 Plantation Road ** | 62 | 42.2 | 43 - 46 |

* Noise standard for Class B emitter and Class A receptor.
** Noise standard for Class B emitter and Class B receptor for commercial use location.

Since the model for the future sound level relied upon assumed transformer and inverter equipment which will be subject to change as the Project proceeds to construction, the Applicant commits to remodeling the projected sound levels once the specific equipment models and corresponding sound levels are identified. If this pre-construction analysis reveals any non-compliance with CT DEEP sound level criteria, sound mitigation will be employed in the final design. Sound mitigation typically consist of walls or other structure that blocks the line of sight between the sound emitter and the sound receptor. Such screening would be positioned directly at the noise source.

## Construction Activities

Construction activities may result in temporarily increases of nearby sound levels due to the intermittent use of heavy machinery. The Project is expected to generate typical sound levels associated with construction, including truck movements, heavy equipment operations, and general construction activities. Heavy machinery, such as front-end loaders, graders, bull dozers, and backhoes, would be used intermittently throughout construction.

Section 22a-69-1.8(g) of the CT DEEP's noise control regulation states that noise associated with construction activities are exempt from the regulation. However, even though construction noise is exempt from the regulation, construction activities such as excavation/grading and installation of the solar panel systems would typically be limited to normal daytime working hours. Construction activities beyond normal daytime work hours would be minimized to the extent practicable and would adhere to local noise regulations.

If noise concerns arise during construction, the Applicant will evaluate and implement appropriate noise abatement measures to reduce or minimize noise from the construction activities. Construction vehicles and equipment would be required to maintain their original engine noise control equipment. Specific mitigation measures may include, but not limited to, the following:

- Install and properly operate appropriate noise muffler systems on construction equipment;
- Implement appropriate traffic management techniques during the construction period to minimize roadway traffic noise impact;
- Implement procedures for proper operation and maintenance, and prohibition of excessive idling of construction equipment engines; and
- Install quieter-type (manually adjustable or ambient-sensitive) backup alarms on construction vehicles.

## 7.11 Public Health & Safety

GPS prioritizes safety and the Project incorporates several elements to promote safety and security and comply with applicable regulations and industry practices. For instance, the facility will be monitored remotely 24 hours a day, and transformers with alarms have been selected for installation at the Project Site. In addition to these engineered safety mechanisms, the Applicant will open dialogues with, and provide input and/or training for, area local responders. Appropriate protective gear as well as technical specifications for the equipment on-site will also be provided. Information pertaining to Project safety and emergency response considerations and procedures can be identified in the GPS Operation and Management Plan (Exhibit P) and the GPS Emergency Management and Evacuation Plan (Exhibit R).

### Fencing

The facility will be surrounded by minimum 7-foot-high fence for security. The fence is required to be posted with safety signage providing the warning that high voltage equipment is stored inside the fence. The NESC dictates the height of the fence and the signage. The NESC also dictates the distance between the fence and electrified equipment to minimize arcing, as well as grounding requirements for the fence itself for the safety of those potentially contacting the fence. The security fence is not an electric fence. In certain areas, architectural fencing and plantings are proposed for visual screening, see Exhibit G: Visibility Assessment.

### Signage

Signage identifying the facility will be provided at each driveway location and will include contact information for GPS personnel in charge of managing the facility. These signs will be designed with consideration of the signage guidance provided in the Town of East Windsor Zoning Regulations. The chain-link fence will be posted with safety signage providing the warning that high voltage equipment is stored inside the fence.

### Vegetation Management

Areas of the Project planted in grass or meadow cover will be mowed once or twice annually to discourage the establishment of woody species. Areas outside the limits of the Project

footprint and buffer will be left in a natural state. Vegetation management is further outlined in the Operations and Management Plan provided at Exhibit P.

## Fire Prevention

The facility will have an Emergency Management and Evacuation Plan which is provided at Exhibit R that will be coordinated with first responders prior to the completion of construction. Local emergency responders, including the police and fire departments for both the Town of East Windsor and Town of South Windsor, have been identified for their proximity to the Project.

- Town of East Windsor
  - East Windsor Police Department located at: 25 School St, East Windsor CT 06088
  - Broad Brook Fire Department located at: 125 Main St, Broad Brook CT 06016
- Town of South Windsor
  - South Windsor Police Department located at: 151 Sand Hill Rd, South Windsor CT 06074
  - South Windsor Fire Department located at: 1175 Ellington Rd, South Windsor CT 06074

Specifically, the Responders will have access to GPS through gates. Additionally, the gravel roads will also act as a fire break and be sufficient to support response for equipment rapidly and in a timely fashion. Fire prevention practices are further outlined in the Operations and Management Plan provided at Exhibit P and Emergency Management and Evacuation Plan at Exhibit R.

## Emergency Access/Training

Applicant will provide appropriate training and access to individuals with authorized or emergency access to the facility to allow for rapid response to individuals that have actual knowledge of the operation and risks associated with the facility. First responder training is further outlined in the Operations and Management Plan provided at Exhibit P.

## Electric and Magnetic Fields

Sources that generate, transmit, or use electricity produce electric and magnetic fields (EMF). Electric currents travels from distant generating sources on high-voltage transmission lines to substations, then on to local distribution lines, and finally to our homes and workplaces. All things connected to our electrical system—power lines; wiring in our homes, businesses, and schools; and all electric appliances and machines—are sources of EMF. In North America, the vast majority of electricity is transmitted as alternating current (AC) at a frequency of 60 cycles per second measured in Hertz (Hz), i.e., 60 Hz. The EMF from these AC sources are commonly referred to as power-frequency or extremely low frequency EMF.

Electric fields are present whenever voltage exists on a wire and do not depend on the magnitude of the current flow. The magnitude of the electric field is primarily a function of the configuration and operating voltage of the line and decreases with the distance from the

source. Electric fields are shielded (i.e., the strength is reduced) by grounded conducting objects, including trees, fences, walls, buildings, and most types of structures.

Magnetic fields are present whenever current flows in a conductor and are not dependent on the voltage present on the conductor. The magnetic field strength resulting from a transmission line is a function of both the current flow on the conductor and the configuration of the transmission line. The strength of these fields also decreases with distance from the source. However, unlike electric fields, most common materials do not shield magnetic fields.

The Applicant does not anticipate that EMF levels at the boundary of the Project Site will significantly increase since the fields from sources within the property generally decrease very rapidly with distance. The currents generated by the solar panels will flow on the transmission lines passing through the Project Site and increase existing levels of magnetic fields around the lines. The levels of both electric and magnetic fields when the solar facility is operating, however, will remain far below international guideline levels recommended by the International Commission on Non-ionizing Radiation Protection and the International Committee on Electromagnetic Safety. A Project-specific EMF study is being conducted and the results and conclusions will be submitted as an addendum to this Application.

## Environmental Justice

Pursuant to CGS. §22a-20a, any "affecting facility" with a capacity of more than 10 MW that is proposed to be located in an "environmental justice community" and is seeking to obtain any certificate under PURA or a new or expanded permit or siting approval from the Siting Council or DEEP must file a "Meaningful Public Participation Plan." The definition of an "affecting facility" excludes facilities using non-emitting and nonpolluting renewable resources. As the proposed Project falls under this exclusion, being a solar energy farm, it is not required to file an Environmental Justice Public Participation Plan.

Moreover, the site of the proposed Project is not an environmental justice community as defined by CGS §22a-20a. Such communities include any United States census block group for which 30 percent or more of the population consists of low-income persons with income below 200 percent of the federal poverty level or a "distressed municipality" as defined under CGS §32-9p.

The proposed Project is located in United States census block groups 090034842002 and 090034842003. According to the 2013-2017 American Community Survey 5-Year Estimates, the population of these geographies is 1,912 and 911, respectively. Among these populations, the portion of low-income individuals is 10 percent in block group 090034842002 and 0 percent in block group 090034842003, compared to the State of Connecticut at 23 percent. These values derive from the USEPA's EJSCREEN (Version 2019) tool, which uses a threshold for "low-income" that is consistent with the definition provided above relative to the federal poverty level.

Furthermore, based on annual lists compiled by the Department of Economic and Community Development, the Town of East Windsor is not a "distressed municipality" as defined under CGS §32-9p.

## 7.12 Land Use

GPS has reviewed and is compatible with the Town of East Windsor's POCD. The Town's future land use plans for the Project Site and vicinity as well as the primary strategies of this plan align with the development proposed by GPS.

Primary Strategies of the POCD as they related to the Gravel Pit Solar Project:

- *Preserving open space, preservation of local assets and protection of environmental quality*. The Project brings new purpose to heavily disturbed industrial and manufacturing areas. The proposed Project eliminates the need to create additional open space to accommodate renewable energy generation facilities, which are both an economic and environmental benefit.
- *The Business and Commercial Development Plan includes increasing the tax base and regional economic vitality*. The Project will bring consistent tax revenue to the Town. Furthermore, portions of the Project Area are targeted for industrial and/or manufacturing development, consistent with current zoning.
- *Future Land Use of the POCD identifies the Project Site as targeted areas for farmland preservation, dedicated open space, and railroad industry*. Use of the proposed Project Site enhances the land and minimizes future impacts and scarification. Additionally, the Project allows the Prime Farmland soils to rest during the life of the panel operation, which preserve the farmland long-term.
- *The POCD highlights protection of rivers, streams, wetland, lakes, and major ground water sources.* These resources are either not located within the Project Area or will not be impacted as a result of Project activities.
- *The POCD prioritizes preservation of wildlife habitats.* The majority of the Project Area is disturbed land and lacks pristine habitat for many species.
- *Protecting scenic roads and proposing scenic road ordinances.* The Project Site is not near designated scenic resources nor near identified scenic roadways.

Additionally, a decommissioning plan will be implemented at the end of the useful life of the Project, see draft included in Exhibit S. Prior to decommissioning, the decommissioning plan will be updated to be compliance with rules and regulations in effect at that time.

### Agriculture

The factors that make Prime Farmland ideal for agriculture also make these areas attractive to competing land uses such as residential, commercial, and Industrial development. The North Central lowlands of Connecticut with its large, near level, outwash terraces and glacial lakebed deposits have witnessed recent substantial losses of Prime Farmland most notably with larger professional office, industrial and commercial distribution developments such as Griffin Center, New England Tradeport, and Phoenix Crossing.

When residential, commercial or industrial developments occur on Prime Farmland, the soil resource is irretrievably lost. In contrast, the Project will occupy the Project Area for approximately 35 to 40 years. Once the useful life of the Project has been completed the site,

including current Prime Farmland will be decommissioned in accordance with the plan provided in Exhibit S. Specific measures have been included in the Project layout, engineering design, and proposed management to avoid and minimize alteration of the existing farmland soil resources. These efforts were taken to facilitate a potential return to agricultural management after decommissioning. A summary of these considerations is provided below.

## Minimizing Grading and Construction Effects

Prime Farmland soils are degraded when they are altered by cutting, filling or regrading. Since most of the soil fertility and soil/plant root interactions affecting productivity occur the topsoil layers, grade changes can influence productivity.

Wherever practicable, the Project has been designed to avoid grade changes in the agricultural fields that will be utilized for the solar development. Figure: Farmland Soils provided at Exhibit A depicts the extent of within the Project Site and within the currently active agricultural field.

The Project grading plan preserves the existing topography within Prime Farmland that is currently cropped to the furthest extent practicable. The farmland soils within the solar array layout will be planted with perennial grasses and legumes to minimize soil losses to erosion and will sequester atmospheric carbon that will be incorporated as SOM in the topsoil during the operational phase of the Project.

Farmland can also be degraded by excavation and mixing the topsoil with subsoil layers. The thickness of the topsoil in the farm fields was evaluated by VHB by digging shallow holes with a tile spade and with a soil auger. These observations found that the farm has been subject to repeated deep tillage. Unless eroded and lost, the thickness of the plow layer was typically between within six to 12 inches. The solar panel foundations will consist of direct driven piles or screw piles. Typical installations involve a pile installed approximately 8-foot on center along rows with approximately nine-feet for fixed-tilt and 15 feet for tracker between rows. Installation and removal of these piles will result in little soil disturbance. Conduit interconnecting collectors along rows will be buried in a shallow trench. The backfill for these conduit trenches does not require excessive compaction. Larger conduit and direct buried lines used to interconnect rows to inverters can be installed in deeper trenches by segregating topsoil and placing it back on top of the trench during backfill.

Service roads will be constructed across Prime Farmland to inspect and service the solar fields. Typical road construction involves the removal of the topsoil layer and replacement with a processed gravel base. To preserve the topsoil in place, service roads will be constructed by installing a non-woven geotextile fabric on the ground surface and then spreading a layer of processed stone over the geotextile to provide soil separation. During decommissioning, the processed stone will be stripped exposing the geotextile. The geotextile will then be removed and disposed revealing the original soil surface. The compacted soil beneath the road fill may require ripping with a subsoiler plow to loosen it before it can be returned to crop production.

## Soil Health

The Prime Farmland designation is assigned to certain map units developed by the Cooperative Soil Survey. Map units consist of similar natural soil groups based on parent material, mode of surficial geologic deposition, topography, drainage class and other physical and chemical factors. The concept of soil health considers factors beyond the mostly inherited abiotic soil characteristics used to identify Prime Farmland. Soil health recognizes the importance of maintaining the diverse biologically driven processes inherit in natural soils that make it productive. Soil health recognizes the importance that soil biodiversity plays in sustaining the fertility and productivity of the soils along with other ecological services provided by soils such as carbon sequestration, clean air, water infiltration and improvements to human and wildlife habitat.

One of the simplest predictors of soil health is the quantity of SOM in the soil. In general, higher levels of SOM and reduced levels of mechanical disturbance support greater soil biodiversity. In healthy soils, the exudates of microbes enhance soil structure by cementing individual soil particles together into relatively permanent aggregates called peds. This improved soil structure enhances infiltration of precipitation and the exchanges of gases necessary for microbial and root respiration. A well-structured soil with higher levels of SOM also improves the moisture holding capacity of the soil and the ability of crops to resist drought.

Stable forms of humified SOM improve soil fertility by providing charged exchange sites for nutrient cations and anions. Nutrients are also released by biological activity which mineralizes organic matter.

In agricultural settings, soil health is strongly affected by management practices. Tillage is one of the practices that reduces the organic matter level in the soil. Each time the soil is tilled, it is aerated. As the decomposition of organic matter and the liberation of carbon are aerobic processes, the oxygen stimulates or accelerates the action of soil microbes, which feed on organic matter. Decomposition increases liberation of CO2 to the atmosphere and reduces SOM. As levels of SOM decrease, so does biodiversity.

The United States Department of Agriculture (USDA) operates the Conservation Reserve Program (CRP) and the Conservation Reserve Enhancement Program which provides financial supports to farmers who remove farmland from production to implement long-term conservation measures, typically for 10 to 15-year time spans. Studies have examined the values of grasslands planted on these CRP and other agricultural lands for carbon sequestration. Acharya et al. (2012) compared agricultural lands converted in grasslands and found carbon sequestration rates increased with grassland age up to the study limit of 17 years. Swan et al. (2015) scored the potential carbon sequestration increases which would be anticipated for various standard NRCS conservation practices. For practice No. 327, converting marginal croplands to conservation cover, the value is an additional 0.42 to 0.94 Mg C ha-1 y-1 (360 to 820 lbs C ac-1 y-1) to be sequestered.

In addition to increased rates of carbon sequestration and enhancements to soil biodiversity, a long-term grassland cover will virtually stop the ongoing soil erosion that is occurring at different rates across the different farm fields.

The Applicant believes that farmland sites can be developed and managed as a renewable energy facility while preserving and enhancing farmland soils through grassland management during its operation. The near level fields now managed primarily in tobacco or silage corn can be developed with little to no grading required preserving the soil profile. An Agricultural Soil Protection Plan has been included at Exhibit T.

## Decommissioning

GPS has prepared a draft Decommissioning Plan which is included in Exhibit S. GPS will remove buried infrastructure to a depth of 3 feet to avoid future conflicts with farming operations and, in agricultural areas, soil will be amended and decompacted to return a soil resource with favorable tilth for future agricultural production.

# 8

# Conclusion

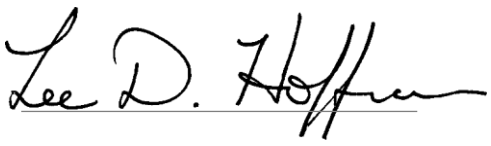
The Project will provide numerous benefits to the Town of East Windsor, the State of Connecticut, and its citizens. It will place the Town of East Windsor at the forefront of green energy development while producing sustainable environmental benefits with minimal environmental impacts. Pursuant to CGS § 16-50k(a), the Siting Council shall review this Application for authorization of a CECPN for the construction or location of a grid-side distributed resources project or facility with a capacity of more than sixty-five (65) MW. The GPS Project meets requirements of this request, as well as CT DEEP air and water quality standards criteria.

The Project will not produce air emissions, will not utilize water to produce electricity, was designed to minimize sensitive area and wetland impacts, will employ a stormwater management plan that will result in no net increase in runoff to any surrounding properties, will not generate significant noise, will not have substantial adverse impacts on visual resources, land use, recreation, cultural resources or the environment, and furthers the State's energy policy by developing and utilizing renewable energy resources. In addition, as demonstrated above, the Project will not have a substantial adverse environmental effect in the State of Connecticut.

For the foregoing reasons the Applicant requests that the Siting Council issue a CECPN for the construction, operation and maintenance of the Project.

Respectfully submitted, Gravel Pit Solar, LLC, Gravel Pit Solar II, LLC, Gravel Pit Solar III, LLC, and Gravel Pit Solar IV, LLC

By



Lee D. Hoffman Pullman & Comley, LLC
90 State House Square Hartford, CT 06103
Phone: (860) 424-4315
Fax: (860) 424-4370
Email: lhoffman@pullcom.com

This page intentionally left blank.

# 9

# References

Acharya, Bharat Sharma, Jim Rasmussen, Jørgen Eriksen. 2012. Grassland carbon sequestration and emissions following cultivation in a mixed crop rotation.

Agriculture, Ecosystems and Environment 153: 33–39

Bevier, L. R. (Ed.). Atlas of Breeding Birds of Connecticut. 1994. Bulletin 113. State Geological and Natural History Survey of Connecticut. 461 p.

Bowers-Altman, J. (undated). Freshwater Mussels of New Jersey. New Jersey Endangered and Nongame Species Program, New Jersey Department of Environmental Protection.http://www.conservewildlifenj.org/downloads/cwnj_657.pdf. Accessed April 21, 2020.

Bryant, D. M., Hails, C. J. and Tatner, P. (1984) 'Reproductive Energetics of Two Tropical Bird Species. 'The Auk. American Ornithologists' Union, 101(1) pp. 25–37.

Calhoun, A. J. K. and M. W. Klemens. 2002. Best development practices: Conserving pool-breeding amphibians in residential and commercial developments in the northeastern United States. MCA Technical Paper No. 5, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York.

Connecticut Association of Wetland Scientists vernal pool web page fact sheet: http://www.ctwetlands.org/forms/CAWS_VernalPoolMonitoring_FactSheet.pdf

Connecticut Department of Energy and Environmental Protection. 2003. A Field Guide to Freshwater Mussels of Connecticut. Bureau of Natural Resources.

Connecticut Department of Energy and Environmental Protection. 2015. Connecticut Wildlife Action Plan.

Connecticut Department of Energy and Environmental Protection. February 2016. Northern long-eared bat areas of concern in Connecticut to assist with Federal Endangered Species Act Compliance.http://www.ct.gov/deep/lib/deep/endangered_species/images/nleb_approved2_16.pdf.Accessed April 21, 2020.

Connecticut Department of Environmental Protection, 2004. 2004 Connecticut Stormwater Quality Manual, Hartford, CT.

Cryan, P. M. Seasonal Distribution of Migratory Tree Bats (Lasiurus and Lasionycteris) In North America. Journal of Mammalogy, 84(2):579–593, 2003Fernald, M. L. 1970.

Gray's Manual of Botany, Eight Edition. D. Van Nostrand Co, New York, New York, 1632 pp.

DeGraaf, R.M. and Yamasaki, M. 2001. New England Wildlife: Habitat, Natural History, and Distribution. University Press of New England, Hanover, NH.

DeVault, T. L., Seamns, T.W., Schmidt J.A., Belant, J.L., Blackwell, B.F., Moores, N., Tyson, L.A., Van Pelnt,L. 2014. Bird use of solar photovoltaic installations at US airports: implications for aviation safety. Landsc. Urban Plan. 122**,** 122–128

Donahue, D. F. 1996. A guide to the identification and protection of vernal pool wetlands in Connecticut. University of Connecticut Cooperative Extension Program.

East Windsor Zoning Commission, 2016. Zoning Regulations Town of East Windsor, Connecticut.

East Windsor Planning Commission, 2016. Plan of Conservation and Development.

Fernald, M. L. 1970. Gray's Manual of Botany, Eight Edition. D. Van Nostrand Co, New York, New York, 1632 pp.

Greif, S. and Siemers, B. M. 2010. Innate recognition of water bodies in echolocating bats. Nature Communications. Nature Publishing Group, 1, November, p. 107.

Haines, A. 2011. Flora Novae Angliae: A Manual for the Identification of Native and Naturalized Higher Vascular Plants of New England. Yale University Press. New Haven and London.

Harrison, C., Llyod, H., and Field, C. 2016. Evidence review of the impact of solar farms on birds, bats, and general ecology. Manchester Metropolitan University. Natural England, 1st ed.

Independent System Operator New England (ISO-NE), 06/14. "Infrastructure Needs: Electricity-Natural Gas Interdependencies." Prepared by ISO-NE President Gordon van Welie for the Regional Energy Forum. June 30, 2014. Online. Available: http://newenglandcouncil.com/assets/ISONE_June30_NewEnglandCouncil_FINAL.pdf

ISO-NE, 09/14. "Managing the Reliability of the Electric Grid While the Power Industry Undergoes Rapid Transformation." Prepared by ISO-NE President Gordon van Welie for Massachusetts Restructuring Roundtable. September 19, 2014. Online. Available: http://www.iso-ne.com/static-assets/documents/2014/09/ma_roundtable_9_19_14_gvw_final.pdf

Keys, Jr., J. C., C. Carpenter, S. Hooks, F. Koenig, W. H. McNab, W. Russell, and M. L. Smith. 1995. Ecological units of the Eastern United States – first approximation. U.S. Department of Agriculture, Forest Service, Atlanta, GA.

Klemens, M. W. 1993. Amphibians and reptiles of Connecticut and adjacent regions. State Geological and Natural History Survey of Connecticut, Bulletin No. 112, Connecticut Department of Environmental Protection, Hartford, CT.

Kunz, T.H. (1982) Lasionycteris noctivagans. Mammalian Species, 172: 1-5.

Massachusetts Natural Heritage & Endangered Species Program. 2015. Rapids clubtail (Gomphus quadricholor) Species Description. http://www.mass.gov/eea/docs/dfg/nhesp/species-and conservation/nhfacts/gomphus-quadricolor.pdf. Accessed April 21, 2020.

Metzler, K., and J. Barrett. 2006. The vegetation of Connecticut: A preliminary classification. State Geological and Natural History Survey, Report of Investigations No. 12. Connecticut Natural Diversity Database, Hartford.

Michigan State University (MSU). (2017). *US Cropland Greenhouse Gas Calculator*. Retrieved 3 April 2017, from http://surf.kbs.msu.edu/

National Audubon Society. The Audubon Bird Guide Application. http://www.audubon.org/apps. Downloaded June 2, 2017.

Natural Resource Conservation Service. 2011. Pollinator Habitat Conservation Reserve Program Job Sheet No. CP42.

Nedeau, E. J. 2008. Freshwater Mussels and the Connecticut River Watershed. Connecticut River Watershed Council, Greenfield, Massachusetts. 132 pp.

New England Flower Society. 2003. New England Plant Conservation Program for Davis' Sedge (*Carex davisii*).

New York Natural Heritage Program. 2015. Online conservation guide for *Schinia spinosae*. http://www.acris.nynhp.org/guide.php?id=8172. Accessed April 21, 2020.

New York Natural Heritage Program. 2017. Synopsis for Scribble sallow (*Sympistis perscripta*). http://www.dec.ny.gov/docs/wildlife_pdf/spcnbuttermoths.pdf. Accessed April 20, 2020

Pollinator Health Task Force. June 2016. Pollinator Partnership Action Plan. Washington DC.

Shump, K.A. and Shump, A.U. 1982. Lasiurus borealis. Mammalian Species, 183: 1-6.

Shump Jr, K.A. and Shump, A.U. 1982a. Lasiurus cinereus. Mammalian Species, 185: 1-5.

State of Connecticut. 2016. Substitute Senate Bill No. 231/Public Act No. 16-17. An Act Concerning Pollinator Health. Enacted January 1, 2017.

Swan, A., S.A. Williams, K. Brown, A. Chambers, J. Creque, J. Wick, and K. Paustian. 2015. COMET Planner. Carbon and greenhouse gas evaluation for NRCS conservation practice planning. A companion report to www.comet-planner.com. http://comet-planner.nrel.colostate.edu/COMET-Planner_Report_Final.pdf

The Climate Registry. (2015). 2016 Default Emissions Factors. Retrieved from https://www.theclimateregistry.org/wp-content/uploads/2015/04/2015-TCR-Default- EF-April-2015-FINAL.pdf

University of Connecticut, Center for Land Use Education and Research. 2009. Forest Fragmentation in Connecticut: 1985-2006. http://clear.uconn.edu/projects/landscape/forestfrag/. Accessed March 28, 2020.

United States Department of Health and Human Services National Institutes of Health. Electromagnetic Fields and Cancer. https://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/electromagnetic-fields-fact-sheet. Accessed April 21, 2020.

United States Environmental Protection Agency (US EPA), 2013. 2012 Annual Report on Air Quality in New England. United States Environmental Protection Agency, Region 1, New England Regional Laboratory, North Chelmsford, MA 01863.

US EPA. (2017). *Greenhouse Gases Equivalencies Calculator - Calculations and References*. Retrieved April 21, 2020, from https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator- calculations-and-references

United States Fish and Wildlife Service (USFWS). 2015. Northern long-eared bat (*Myotis septentrionalis*) Fact Sheet. https://www.fws.gov/midwest/endangered/mammals/nleb/nlebFactSheet.html. Accessed May 5, 2020.

USFWS. May 2017. Northern long-eared bat (*Myotis septentrionalis*) status: Threatened with 4(d) Rule. https://www.fws.gov/Midwest/endangered/mammals/nleb/index.html. Accessed June 12, 2017.

USFWS. Official Species Consultation. Information for Planning and Consultation. https://ecos.fws.gov/ipac/. Accessed November 12, 2019.

Wagner, D. L. 2015. Connecticut Expansion Project: Invertebrate Habitat Assessment. Prepared for AECOM. http://www.nae.usace.army.mil/Portals/74/docs/Topics/Tennessee%20Pipeline%20Project/Conecticut/Attachment%20K/Attachment%20K(D)%20Terrestrial%20Invertebrate%20Report.pdf. Accessed June 16, 2017.

Wagner, D. L., D. F. Schweitzer, J. B. Sullivan, and R. C. Reardon. 2008. Owlet Caterpillars of Eastern North America: Noctudiae).

Walston, L. J., Rollins, K. E., LaGory, K. E., Smith, K. P. and Meyers, S. A. 2016. A preliminary assessment of avian mortality at utility solar energy facilities in the United States. Renewable Energy, 92, July, pp. 405–414.

Whitworth, W. R. 1996. Freshwater Fishes of Connecticut. 2nd ed. State Geological and Natural History Survey of Connecticut Bulletin 114, Connecticut Department of Environmental Protection, Hartford, CT.