

Exhibit A



Environmental Assessment

For the Proposed:

1.99 MW Solar Photovoltaic Array

Located At:

40 Old Colchester Road
Salem, Connecticut

Prepared For: *TRITEC Energy Development, LLC*
888 Prospect Street, Suite 200
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Date: November 24, 2025

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1.0 INTRODUCTION

Solli Engineering (Solli) has prepared this Environmental Assessment (EA) on behalf of TRITEC Energy Development, LLC, (Petitioner) as an exhibit to the Connecticut Siting Council for a Petition for a Declaratory Ruling that a Certificate of Environmental Compatibility and Public Need is not required for the construction, maintenance, and operation of a 1.99± megawatt (MW) alternating current (AC) ground-mounted solar photovoltaic array (Project/Facility) to be located at 40 Old Colchester Road in Salem, Connecticut (Site).

2.0 PROJECT DESCRIPTION

2.1 EXISTING SITE CONDITIONS

The Project area is comprised of a 10.43± acre portion of the 18.38± acre Site. The Site is bound by residential use to the north and west, residential use in the Town of Montville to the east, and Old Colchester Road to the south. The Site currently occupied by an existing residence with an associated driveway and an open field that had been historically used as a gravel quarry. The Site is located in the Rural Zone A (RuA) zoning district within the Town of Salem.

The Project area's topography slopes between 1%-25% from the north to the south. There are no wetland areas present on the property. There are areas of rock outcroppings within the Site that have slopes greater than 25%, however they are proposed to be removed.

2.2 PROPOSED DEVELOPMENT

As designed, the proposed solar photovoltaic array will consist of approximately (5,180) TrinaSolar TSM-540-DEG19C.20 540W modules, (16) Sungrow SG125HV 125kW inverters, (2) 2,000 kVA transformers, and (1) service interconnection line. The facility will consist of ground-mounted, single-axis tracking systems, which allow the panels to rotate from east to west for more efficient capture of sunlight. The steel racking structure will be anchored to the ground using steel piles. The arrays of panels and the equipment will be surrounded by a 7-ft tall chain link security fences. Access to the Project will be provided from Old Colchester Road via a proposed 12-ft wide, 195± foot long access drive (first 128± feet are paved per Eversource requirements, the rest will be gravel). The drive extends to the north to provide access to the proposed equipment. The drive will generate minimal traffic for the primary use of operation and maintenance of the photovoltaic arrays. The proposed utility interconnection service poles by Eversource will be located southwest of the Project near the access drive from Old Colchester Road. For more information regarding the proposed Project conditions, refer to Figure 3, Proposed Conditions Map, included in Appendix A.

2.2.1 PUBLIC HEALTH AND SAFETY

The Project has been designed to meet all applicable local, state, and federal standards related to electric power generation. The Facility will not consume any raw materials, will not produce any by-products, and will be unstaffed under normal operating conditions. No chemicals will be used during the operation of the facility.

The 7-ft tall chain link fence surrounding the development mitigates potential electric hazards and satisfies the requirements of the National Electric Code. The proposed equipment has internal fail-

safes to further mitigate the risk of electrical fires. A 26-ft wide gate is proposed at the entrance to the Project and will limit access to authorized personnel only. Town emergency response personnel will have access to the Project via a Knox padlock. The photovoltaic array will have the ability to be de-energized remotely in case of an emergency.

2.2.2 LAND USE PLAN

The proposed solar photovoltaic array has been designed in accordance with state and federal requirements and will support the State of Connecticut's energy goals by constructing a renewable energy resource with no substantial adverse environmental impact.

Per the *Connecticut Department of Energy & Environmental Protection (CT DEEP) Appendix I, Stormwater Management at Solar Array Construction Projects (Appendix I)*, the solar arrays have been designed to maintain a 100-ft buffer between all solar panels and any wetland or watercourse as well as a 50-ft buffer from any property line located downgradient of the panels. Tree lines will be maintained to the best extent practicable to provide a visual buffer to adjoining properties.

The distance, direction, and address of the nearest property line and nearest off-site residence from the proposed 7' chain link fence, transformer pad, and access drive is shown in Table 1. For more information regarding abutting parcels, refer to Figure 4, Abutting Parcels Map, included in Appendix A.

Table 1: Proposed Development Limits Table

	Distance (ft)	Direction	Address
Perimeter Fence to Property Line	22'	South	539 Norwich Road
Perimeter Fence to Residence	112'	North	625 Norwich Road
Inverters to Property Line	200'	South	539 Norwich Road
Inverters to Residence	514'	North	605 Norwich Road
Transformer Pad to Property Line	200'	South	539 Norwich Road
Transformer Pad to Residence	536'	North	605 Norwich Road
Access Drive to Property Line*	80'	South	539 Norwich Road
Access Drive to Residence*	647'	North	605 Norwich Road
Project Area to Nearest Town Line	17'	East	Montville

*Measured from parking area

Equipment

The proposed TrinaSolar TSM-DEG19C20 540W solar modules consist of a glass-cover, aluminum pane, and sealed back sheet, preventing rainwater from penetrating the panels and leaching out chemicals or substances. These solar panels have a width of 7.8 feet, a minimum height of 3 feet above grade, and a maximum height of 10 feet above grade when panels are at full tilt. The manufacturer of the solar panels, Trina Solar Co., Ltd., has conducted Toxicity Characteristic

Leaching Procedure (TCLP) testing of the proposed solar panels. The solar panels will not be classified as hazardous waste at the time of disposal. For more information refer to the TCLP test results attached in Appendix E, Product Information Sheets.

Medium voltage switchgear and the 2,000 kVa transformers are proposed to be installed on the proposed concrete pad that abuts the proposed access driveway. The proposed transformers are industry-standard, including by electrical distribution companies such as Eversource, and will contain mineral oil. Final dimensions of the switchgear and transformer will be available when equipment is ordered.

Six (6) utility poles are proposed to be located on the western side of the Project along Old Colchester Road to provide interconnection to a proposed utility pole on Old Colchester Road. The standard height for utility poles is approximately 55 feet. The poles will be mounted with Eversource and Petitioner owned and operated equipment. All necessary offsite improvements to facilitate the interconnection will be completed by Eversource.

2.2.3 STORMWATER MANAGEMENT PLAN

The Project has been designed in accordance with the *2024 Connecticut Stormwater Quality Manual*; the *National Pollutant Discharge Elimination System General Permit for the Discharge of Stormwater from Construction Activities* (General Permit), effective January 1, 2026; and the *Connecticut Department of Energy & Environmental Protection (CT DEEP) Appendix I, Stormwater Management at Solar Array Construction Projects* (Appendix I). The design addresses three primary concerns: the management of peak stormwater flows, water quality volume treatment and soil and sedimentation controls (SESC) throughout the construction period.

To safeguard water resources from potential impacts during construction, the Petitioner is committed to implementing protective measures in the form of a Stormwater Pollution Control Plan (SWPCP), subject to review and approval by the CT DEEP Stormwater Management team. The SWPCP will include monitoring of established SESC measures that are to be installed and maintained in accordance with the *2024 Connecticut Guidelines for Soil Erosion and Sediment Control and Appendix I*.

Perimeter Soil Erosion and Sediment Controls (SESC's) include, but are not limited to, temporary silt fencing lining the south of the perimeter of the development area, compost filter sock at discharge points along the eastern property boundary, and an anti-tracking pad at the proposed driveway along Old Colchester Road to prevent sediment from being traced into the roadway. Following the establishment of the anti-tracking pad, Phase One will commence. Phase One includes the establishment of the above-mentioned silt fencing as well as the establishment of parking, storage, and soil stockpile areas. Additionally, during Phase One, the perimeter of the Project area will be cleared and grubbed for the installation of a temporary sediment basin and erosion control matting will be placed on all slopes steeper than 3:1. This temporary sediment basin will be converted to a stormwater basin post-construction. The temporary sediment basin acts to store sediment-laden stormwater runoff and allow stormwater runoff and allow particulate to settle and stormwater to recharge into underlying soils. As outlined in Phase Two of the plan, throughout construction, the

remaining project limits will be cleared and grubbed. Denuded areas that will be inactive for 14 days or more will be seeded and mulched. These control measures have been provided to maximize protection to off-site areas. Monitoring and maintenance of all control measures are required to ensure efficacy throughout all phases of construction.

The proposed Project will not cause post-construction long-term adverse impacts from stormwater runoff as the project includes a minor increase in impervious/gravel surfaces. Two (2) stormwater basins are proposed in the project area, with one to be converted from the temporary sediment basin proposed to manage soil erosion and sedimentation during construction. The stormwater basins have been designed to provide adequate storage of the water quality volume. According to USDA NRCS mapping, soils within the project area is comprised of hydrologic soil group "A" and "B" soils. Per Table 10-2 of the *2024 Connecticut Stormwater Quality Manual*, an infiltration rate of 0.52 in./hr. was used for the "Loam" USDA Soil Textural Class. In Stormwater Basin 1, a proposed structure will outlet runoff to the existing culvert that runs south under Old Colchester Road. Runoff will exit Stormwater Basin 2 via a rip-rap spillway towards a channel at the eastern property line. The implementation and maintenance of these BMPs will protect stormwater quality and will ensure that post-construction peak discharge rates of stormwater runoff from the Project will be less than the pre-development for the 2-year, 25-year, 50-year, and 100-year storm events.

2.2.4 LANDSCAPE PLAN

The existing tree line provides a buffer on the eastern, western and northern sides of the Site. The project will be visible from Old Colchester Road, however existing vegetation on the southern side of Old Colchester Road will shield views of the project from neighboring properties. As such, no additional evergreen plantings are proposed.

Seed mixes for the proposed solar photovoltaic array include ERNMX-146 for final stabilization within the solar array and areas outside of the fence line and in non-array areas. New England Erosion Control / Restoration Mix for Stormwater Basins & Moist Sites will be used within the stormwater basin.

3.0 ENVIRONMENTAL CONDITIONS

This section provides a summary of the existing environmental conditions in and around the Site, as well as the potential impacts on the environment from the proposed photovoltaic array development. The results discussed in this section demonstrate that the development complies with CT DEEP air and water quality standards and will have no adverse effect on the existing environment and ecology.

3.1 AIR QUALITY

Solar energy generating facilities do not emit air pollutants during the operations of the facility. Therefore, this development will have no adverse effect on air quality.

During construction, temporary mobile source emissions may occur due to the presence of construction vehicles and equipment. Any of these potential air emissions that may occur during

construction can be considered de minimis. These emissions will be mitigated using measures such as limited idling times of equipment, regular maintenance of all vehicles and equipment, and watering/spraying of vehicles and equipment to minimize dust and particulate releases.

3.2 WATER RESOURCES

The site was assessed by William Kenny Associates (WKA) on October 1, 2024 to determine the presence or absence of wetlands and/or watercourse. The results of this investigation concluded that no wetlands or watercourses are present onsite. Further information on the methodology and results of this assessment are included in the attached Wetland and Watercourse Delineation Report (Appendix B).

3.2.1 WETLANDS AND WATERCOURSES

No inland wetlands or watercourses are present on the subject property. However, there is an apparent woodland wetland nearby, directly south, across Old Colchester Road. According to available mapping from the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), soils in the off-site woodland wetland system primarily consist of very poorly drained organic peats and mucks. The USFWS National Wetlands Inventory (NWI) classification for this system is Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded/Saturated and Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Seasonally Flooded/Saturated (PFO1/PSS1E). The approximate location of this wetland system is shown on Figures 2 and 3.

3.2.2 WETLAND AND WATERCOURSE IMPACTS

Land development has the potential to cause direct and indirect impacts to inland wetlands and watercourses in the short- and long-term from activities such as vegetation clearing, soil filling, soil excavation and/or pollution of stormwater. The proposed site improvements are designed to avoid direct impacts and minimize, to the greatest extent possible, adverse indirect impacts in the short and long-term. No wetlands or watercourses are present on the property, and as such, no direct impacts will occur. At its closest extent, construction of the proposed project will occur approximately 50 feet from the apparent off-site wetland system, south of Old Colchester Road, which consists of the minor work associated with the installation of the culvert exiting the proposed stormwater basin. As such, in the short-term during the project's construction, soil erosion and sedimentation control measures are proposed to prevent adverse indirect impacts to offsite wetlands and watercourses. These measures include silt fencing around the project's limit of disturbance and anti-tracking pads at the construction entrance to prevent the transport of sediment from the project site to Old Colchester Road. In the long-term, no adverse impacts from stormwater runoff to offsite wetlands or watercourses are expected due to the proposed vegetated surfaces and the proposed stormwater management plan. The solar arrays have been designed to maintain a 100-ft buffer between all solar panels and a minimum of 50 feet between the limit of construction activity and downgradient wetlands. The stormwater management plan has been designed to account for the proposed impervious surfaces. Information regarding the proposed best management practices (BMPs), such as soil erosion and sediment control measures and stormwater management measures is provided in Section 2.2.3.

3.2.4 FLOODPLAIN AREAS

The most recent available mapping from the Federal Emergency Management Agency (FEMA) was reviewed regarding the presence or absence of flood zones or floodways within or near the project site. According to the FEMA Flood Map Service Center (MSC), flood maps 09011C0326G and 09011C0327G, both effective on July 18, 2011, the property falls within "Zone X" which is defined as "the areas between the limits of the one-percent-annual-chance flood (or 100-year) and the 0.2 percent-annual-chance (or 500-year) flood". This indicates that the property is not within a regulated flood zone and requires no special considerations relative to flooding.

3.3 WATER QUALITY

The proposed facility will have no potable water uses or sanitary discharges due to the unmanned nature of the facility. The proposed development will result in approximately 3,310 square feet of impervious to semi-impervious cover via the gravel access drive and concrete equipment pads. As such, the development includes a stormwater management plan to control stormwater.

3.3.1 GROUNDWATER

The *CT DEEP Water Quality Classifications Salem, CT* map, dated October 2018, was reviewed to assess the quality of ground and surface water at the project site. The map classifies that the property falls within an area classified with 'GA' groundwater quality. 'GA' is defined as "existing private and potential public or private supplies of water suitable for drinking without treatment and baseflow for hydraulically-connected surface water bodies".

According to the CT DEEP Public Water Supply Map, the property does not fall within an aquifer protection area. The nearest aquifer protection area is approximately seven miles northwest of the property. The proposed facility will be unstaffed, and no potable water uses or sanitary discharges are planned.

Based on the project design, type, and use and proposed stormwater management measures, it is concluded that the project will have no adverse environmental impact on groundwater quality. Information regarding stormwater management BMPs is provided in Section 2.2.3.

3.3.2 SURFACE WATER

The property is situated within three local drainage basins, 3004-00, 3906-01-1, and 3906-00. The first local basin (3004-00), located in the southern portion of the property, is part of the larger Oxoboxo Brook Subregional Drainage Basin (3400) and the Thames Main Stem Regional Drainage Basin (30). The remaining two local drainage basins (3906-01-1 and 3906-00), located in the northern portion of the property, are both part of the larger Gardner Brook Subregional Drainage Basin (3906) and the Yantic River Regional Drainage Basin (39). All onsite regional drainage basins flow to the Thames River Major Drainage Basin (3).

Based on a site investigation conducted by WKA, no watercourses were identified at the property, nor are onsite watercourses identified on available United States Geological Survey (USGS)

mapping. The nearest offsite watercourse, as mapped by the USGS is Oxoboxo Brook, approximately 400 feet south of the property. Oxoboxo Brook is classified as having "Class 1" stream flow and "Class A" surface water quality. Class 1 stream flow is designated for those streams which are free flowing. Class A surface water quality's designated uses are defined as "habitat for fish and other aquatic life and wildlife; potential drinking water supplies; recreation; navigation; and water supply for industry of agriculture".

According to the *CT DEEP Public Water Supply Map*, the property does not fall within a drinking water watershed or a service area of community public water system. The closest active drinking water watershed is approximately 1.1-miles east of the property. The closest service area of community public system (St. Thomas More School – The Cove) is approximately 0.6-miles north of the property. Based on the project design, type, and use and proposed stormwater management measures, it is concluded that the project will have no direct adverse environmental impact on surface water quality.

3.4 HABITAT & WILDLIFE

The Property, which is shown on the attached Existing Conditions Map (Appendix A / Figure 2), is currently a relatively recently established meadow which is likely used for hay crop production. Improvements are relegated to the western portion of the property and consist of a single-family dwelling, asphalt driveway, and various small sheds and outbuildings. Much of the meadow area was a sand and gravel quarry until about 2008. Three upland habitat types are present at the property. These include Broadleaved Deciduous Woodland, Maintained Meadow, and Maintained Lawn. No wetlands or watercourses are present at the property. The onsite habitats are discussed in Section 3.4.1 and 3.2.1. A majority of wildlife species that can use the property are species common to the area. These species are discussed in Section 3.4.3 and the acreage of proposed habitat alteration is provided in Table 3.

3.4.1 HABITAT TYPES

Maintained Meadow (U1)

A Maintained Meadow is present throughout the majority of the site. According to historic aerial imagery, the western portion of this area was maintained as pastureland in 1934, while the eastern portion was a woodland. The historic western pastureland went unmaintained, and by 1970 had transitioned to woodland. Both the western and eastern areas remained a woodland from 1970 until sometime around 2000 when sand and gravel mining operations began. The gravel mining operations ceased sometime between 2004 and 2008. Since 2008, the area has slowly revegetated itself with herbaceous vegetation and appears to be routinely mowed for hay crop. The Maintained Meadow currently supports no trees or shrubs, save for a low quantity of saplings near the rock outcrop island in the northern portion of the habitat. As such, the Maintained Meadow has no canopy coverage. At the time of WKA's field investigations, vegetation in this habitat was maintained at approximately eight inches tall, and species primarily included native goldenrod, as well as non-native and invasive Queen Anne's lace and mugwort. Additional, less dominant species included native New York aster, timothy grass, smartweed, and frost aster. Soils are primarily well drained sand forming in human altered deposits. With the proposed project, approximately 91 percent, (10.0 of 11 acres) of the Maintained Meadow habitat is proposed to be converted to Grassland habitat.

The proposed Grassland will primarily be comprised of native graminoids and forbs. The Grassland will be maintained to limit shrub and tree growth within the habitat. The total acreage of habitat alteration is noted in Table 2.

Broadleaved Deciduous Woodland (U2)

A Broadleaved Deciduous Woodland is present to the west of the Maintained Meadow, with additional fringes bordering the northern, eastern and southern boundaries of the Maintained Meadow. According to historic aerial imagery, a majority of these portions of the property were maintained as pastureland in 1934, and as previously discussed, went unmaintained and transitioned to woodland by 1970. However, these areas were outside the limits of the early 2000's sand and gravel mining operation and as such, have remained a woodland since 1970. The Broadleaved Deciduous Woodland has a relatively closed canopy with approximately 70 percent coverage throughout. The canopy is dominated by pole-to-saw-timber-sized native red oak, white oak and red maple trees, with an understory of native sugar maple and American hornbeam trees. The shrub layer is sparse, primarily comprised of native maple-leaved viburnum and raspberry and groundcovers include native goldenrod, white wood aster, and clubmoss. Leaf litter and downed fine woody material are common throughout the habitat. Soils are primarily well to excessively well drained sandy loams formed in glaciofluvial deposits or are forming in human altered deposits. With the proposed project, approximately 6 percent, (0.4 of 6.1 acres) of the Broadleaved Deciduous Woodland on the property is proposed to be converted to Grassland habitat. The proposed Grassland will primarily be comprised of native graminoids and forbs. The Grassland will be maintained to limit shrub and tree growth within the habitat. The total acreage of habitat alteration is noted in Table 2.

Maintained Lawn (U3)

The westernmost portion of the property is developed with a residential dwelling, asphalt drive, various small sheds and outbuildings, and areas of maintained lawn. According to historic aerial imagery, this portion of the property was also maintained as pastureland in 1934. However, the area was continuously maintained as pastureland until the construction of the dwelling sometime between 1952 and 1970. From 1970 to present day, the area surrounding the dwelling has been maintained as lawn. Vegetation in this area primarily consists of scattered canopy trees such as native red and white oaks, various ornamental shrubs and lawn vegetation. Soils are primarily well drained sandy loams forming in human altered deposits. With the proposed project, no areas of the Maintained Lawn habitat are proposed to be altered or converted to Grassland. The total acreage of habitat alteration is noted in Table 2.

Table 2: Habitat Area Table

Habitat Type	Total Area Onsite (±Acres)	Area of Disturbance (±Acres)
Maintained Meadow	11.0	10.0
Broadleaved Deciduous Woodland	6.1	0.4
Maintained Lawn	1.4	0

3.4.2 CORE FOREST DETERMINATION

The Connecticut Department of Energy and Environmental Protection (CT DEEP) defines 'Core Forests' as forests surrounded by other forests, and in Connecticut, it has been defined as forest

features that are relatively far (more than 300 feet) from the forest-nonforest boundary. Core forests provide habitat for many species of wildlife that cannot tolerate significant disturbance. The loss of core forest cover diminishes water purification and habitat values, and could result in heavier runoff, which might lead to poorer water quality and impaired habitat”.

For the planning and approval of photovoltaic power stations, the CT DEEP uses the Forestland Habitat Impact Map to determine the presence or absence of Core Forest Areas. According to the map, approximately 4.8-acres of the property is considered Core Forest. The proposed project will replace approximately 0.5-acres of this system with a proposed grassland accommodating a solar array. It should be noted, however, that based on the surveyed tree-line, the Project will not result in the clearing of any trees. For more information refer to Figure 6, Forested Habitat Impact Map, included in Appendix A.

According to Public Act No. 17-218, “for a solar photovoltaic facility with a capacity of two or more megawatts, to be located on prime farmland or forestland...the Department of Agriculture represents, in writing, to the council that such project will not materially affect the status of such land as prime farmland or the Department of Energy and Environmental Protection represents, in writing, to the council that such project will not materially affect the status of such land as core forest.” The Project is below 2 MW AC; therefore, a letter from the Department of Energy and Environmental Protection is not required.

3.4.3 WILDLIFE

Development of the proposed project will primarily occur within the existing Maintained Meadow habitat, save for minor impacts to the Broadleaved Deciduous Woodland habitat. Both these habitats are fairly common within this region of Connecticut and support generalist wildlife species. The proposed development will minimally affect wildlife in three distinct ways: minimizing alterations to existing vegetation communities, excluding large species within the proposed Grassland habitat via chain link fencing, and minimizing anthropogenic disturbances during and post-construction.

The proposed project will convert approximately 91 percent of the existing, relatively young, Maintained Meadow, and seven percent of the Broadleaf Deciduous Woodland portion of the property into Grassland habitat. The primary change this conversion will result in is the alteration of vegetation available for grazing, browsing, and ground nesting. The existing Maintained Meadow area primarily provides herbaceous vegetation for grazing and browsing, such as invasive mugwort as well as native timothy grass and various asters. Under the proposed conditions, a Grassland accommodating a solar array, the physical solar panel units will provide small mammals and herpetofauna species overhead protection from avian predators and opportunities for raised avian nesting areas beneath the panels. The Grassland vegetation will provide additional opportunities for avian and mammal ground-nesting. Additionally, the relatively unmaintained Grassland will increase native grass and forb grazing opportunities for a variety of species and provide opportunities for pollination.

To satisfy a state requirement, wildlife-friendly fencing will be used to enclose the facility. This fencing, with a six-inch gap at the bottom, will allow a vast majority of wildlife to freely enter and

exit the proposed Grassland at any location. As such, a majority of wildlife species will not be affected by the fencing. The largest of Connecticut's wildlife species, such as the American black bear or white-tailed deer will be deterred by the fencing. While these species may lose out on the opportunity to bed or forage within the proposed 10.4-acres of Grassland, the property will maintain a forested connection to over 1,000 acres of privately owned, as well as CT DEEP protected, forest for these specie's use. As such, the sufficient quantity of quality habitat relative to the project site can be used by these species to satisfy their need for foraging, bedding, or travel.

During the project's construction, vegetation clearing, noise, light pollution and other anthropogenic activities may temporarily disrupt or displace wildlife. However, any wildlife disrupted or displaced during the short construction period (approximately 4-8 months), are expected to naturally move to the nearby forested habitat. Post-construction, the facility will be unstaffed and will likely only experience human presence during monthly site monitoring or during any equipment maintenance work, which typically will be very infrequent. Additionally, post-construction, the facility will not generate any significant noise or increase vehicle traffic along Old Colchester Road.

With the proposed project, the diversity and abundance of some wildlife using the project area is expected to increase, and others are expected to decrease. The conversion of the upland woodlands to a native vegetated Grassland will provide more opportunities for grazing, browsing, and pollinating and will maintain consistently vegetated, non-forested habitats within the overall forested surrounding landscape that will benefit all species. It is important to note that the majority of species inhabiting the property are common in the Town of Salem and the State of Connecticut. Generalist species are tolerant of site disturbance and will find other suitable habitats if they cannot adapt to the change. As such, the project is not expected to have significant adverse impacts to wildlife.

3.5 RARE SPECIES

Publicly available state and federal information was reviewed to determine whether listed species and/or critical habitats are known to be, or could potentially be, present, absent, or adjacent to the project site. State records indicate that seven listed species are present nearby the project site that may be affected by proposed project activities. Federal records indicate that the site may potentially serve as habitat for listed species and/or as a stop for protected migratory birds. A limited onsite review of the property was completed on October 1, 2024. Based on the results of the review of state and federal records and field investigations, and to increase the habitat value for wildlife and listed species utilizing the area, various construction and site management protection measures are proposed to be implemented before and during project construction and long-term habitat enhancement and management activities are proposed to be implemented post construction.

3.5.1 NATURAL DIVERSITY DATA BASE

The CT DEEP Natural Diversity Data Base (NDDDB) maintains a collection of maps that show the approximate locations in Connecticut where state-endangered, threatened and special concern species and important natural communities are known to have been present in the past. The locations shown on the maps are based on information collected over the years by DEEP personnel and others. The maps are intended to serve as a pre-screening tool for preventing potential impacts

to listed species. Maps are generated for each town. The map for the Town of Salem is dated December 2024. To protect individuals of listed flora and fauna, their exact locations are not shown on the maps. Rather the maps show broad zones that extend over and beyond known locations of listed individuals. These zones are shown with gray line hatching and areas of critical habitat are shown with green polygons. If a project site falls within or near a hatched area, a request for determination should be filed with the CT DEEP NDDDB for more accurate information and field work should occur to determine the presence or absence of these species onsite.

According to the CT DEEP NDDDB map for the Town of Salem, the property does not fall within a hatched buffer area. Nonetheless, a filing for NDDDB review request was submitted to the CT DEEP and the results of this review indicate that three state-listed flora species, and four state-listed fauna species have the potential to be impacted by the proposed project. The four state listed fauna species are the Northern long-eared bat (*Myotis septentrionalis*), Tri-colored bat (*Perimyotis subflavus*), Macropis cuckoo (*Epeoloides pilosula*), and the Fringed loosestrife oil-bee (*Macropis ciliata*). The three state listed flora species are Bush's sedge (*Carex bushii*), Dellenius' tick-trefoil (*Desmodium glabellum*), and Pale green orchid (*Platanthera flava var. herbiola*).

To provide adequate planning and more in-depth knowledge of the extent which listed flora species are present at the project site, a qualified botanist with the appropriate scientific collecting permits, Bryan Connolly, was retained to complete the following services:

- Inventory the properties vegetation and conduct intensive surveys throughout the listed plants growing season.
- Provide a detailed report of survey results including site mapping, site photographs, survey methodology and findings, along with a detailed description of onsite plant communities.

After an extensive search, none of the three listed flora species were located at the Site (of the 174 vascular plant species observed at the Site, none are state-listed).

Northern long-eared bats are listed as state 'endangered species' by the CT DEEP. These bats are non-migratory and spend their summers roosting (either solitarily or in maternal colonies) under tree bark or within tree cavities of live and dead trees. Some individuals may also roost within caves and mines. During the winter these bats hibernate in caves and mines.

Tri-colored bats are listed as state 'endangered species' by the CT DEEP. These bats are non-migratory and spend their summers roosting in colonies in cavities of live and dead trees along forest edges or open forested landscapes with water features. Occasionally, these bats roost in man-made structures. During the winter these bats hibernate in caves and abandoned mines.

As a precautionary conservation measure, the following is a summary of measures provided by the CT DEEP which will be used before, during and following construction to protect bat species that may potentially be encountered at the project site. Removal and cutting of trees greater than or equal to 3" in diameter must be conducted between November 1 and March 30, a time period in which bats are hibernating and are not inhabiting trees.

Pre-Construction:

- Worksite safety permitting, natural roosting resources including snags, trees with cavities, cracks or crevices, trees with exfoliating bark, coniferous trees and talus slopes should be identified beforehand and preserved if possible.
- Summer roosting opportunities occurring in man-made structures such as house-eaves or barns should be identified beforehand and preserved if possible.
- Preserve edge habitat due to its means as highways of travel for bat foraging, watering, and roosting activities.
- Take steps necessary to design, build and operate the proposed project in accordance with the standards and requirements of the LEED Green Building Rating System Pilot Credit #55.

Mid-Construction:

- Water sources in and around the project site should be maintained as clean for wildlife use and free of siltation during construction. Erosive sources that could contribute to siltation of natural and artificial waterbodies should be managed throughout construction.
- The use of pesticides in and around the project site should be avoided to minimize impacts to insect food sources.
- Down shield and position lighting away from natural, non-project site areas, to avoid potentially dangerous light hazards for bats and birds. Limit interior and exterior lighting at night.

Post-Construction:

- Artificial roosting structures (i.e. bat boxes) should be installed around the project site if natural roosting options post-project completion will be minimal.
- Protect existing and promote establishing a diversity of native vegetation at the project site that could serve as habitat for insect food sources.

Macropis cuckoos are listed as state 'endangered species' by the CT DEEP. These bees have an intertwined relationship with the fringed loostripe oil-bee and are found in habitats supporting the fringed loostripe-oil bee and their host plants. These habitats are usually open, sparsely vegetated areas that support plants such as Apocynum, Galax, Hustonia, and Rubs.

Fringed loostripe oil-bees are listed as 'state species of special concern' by the CT DEEP. These bees also rely on open habitats which support their host plants, especially those plants within the Lysimachia genus.

To provide adequate planning and more in-depth knowledge of the extent with the above-mentioned bee species are present at the project site, a qualified entomologist, Tracy Zarillo from The Connecticut Agricultural Experiment Station, was retained to complete the following services:

- Obtain a scientific collecting permit from the CT DEEP for the above-mentioned state listed species.
- Conduct intensive presence or absence surveys throughout the species active season, using various strategic survey techniques.
- Provide a detailed report of survey results including site mapping, site photographs, survey methodology and findings.
- If the listed fauna species or their host plants are found onsite, the entomologist will create a native bee protection and or conservation plan to the NDDB Program which focuses on ways to mitigate for the loss of habitat and for the restoration of native host plants.

The survey was conducted in 2025 and concluded that no individuals of the *Macropis* cuckoo bee or the fringed loosestrife oil-bee were identified at the Site. Nonetheless, because two plant host species utilized by these bee species occur at the Site, the CT DEEP has required that the Petitioner incorporate the recommendations outlined within the entomologists report of findings. As such the project will include a robust landscape plan, to be developed by William Kenny Associates, which will satisfy this requirement by incorporating the suggested vegetative strategies to the maximum extent practicable.

The preliminary NDDB Determination, dated November 27, 2024, is attached as Appendix C.

3.5.2 USFWS CONSULTATION

The United States Fish and Wildlife Service (USFWS) provides an online planning tool, its Information for Planning and Consultation (IPaC) system, allowing for project planners the ability to perform a regulatory review for protected species under the Endangered Species Act (ESA) that inhabit or potentially may inhabit their project sites. This resource is designed to provide a list of potential ESA-protected and/or candidate species, migratory bird species protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act, critical habitats, as well as the ability to consult whether a proposed project has the potential to result in "take" of listed species. "Take" refers to any means to "harass, harm, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct to threatened and endangered species". In consulting this resource, projects can determine whether they are following the ESA and other federal acts. William Kenny Associates filed on April 11, 2025, an IPaC review of the project site and received a letter report from the USFWS titled "*List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project*". The report is attached in Appendix. The report specifies that one endangered species, one proposed endangered species, one proposed threatened species and nine migratory bird species have the potential to be impacted by the proposed project. The endangered species is the northern long-eared bat (*Myotis septentrionalis*), the proposed endangered species is the tricolored bat (*Perimyotis subflavus*), the proposed threatened species is the monarch butterfly (*Danaus plexippus*), and the migratory birds are listed in the report in the attached Appendix B.

The northern long-eared bat is listed as endangered under the ESA. The northern long-eared bat's species range encompasses the entirety of Connecticut. The CT DEEP has compiled a map of Connecticut towns known for winter hibernacula and summer roosts of northern long-eared bat. Based on this map, the Town of Salem is known to have summer occurrences of the NLEB.

The tricolor bat is a species proposed under draft ruling by the USFWS to be endangered. A "Proposed Endangered" species is: "Any species the Service has determined is in danger of extinction throughout all or a significant portion of its range and the Service has proposed a draft rule to list as endangered. Proposed endangered species are not protected by the take prohibitions of section 9 of the ESA until the rule to list is finalized". Until the species is officially listed, this species is not entitled to legal protection under the ESA, and they are not considered when making a determination as to "take."

Nonetheless, to comply with the ESA, the IPaC Northern Long-Eared Bat and Tricolored Bat Range Wide Determination Key (DKey) was utilized to assess whether the project would result in the "take" of northern long-eared bats and or tricolored bats. The results of the DKey are in the attached report "*Technical assistance for 'Salem Solar 40 Old Colchester Road'*" (Appendix B). Per the letter, the proposed project "may affect, but is not likely to adversely affect" either bat species.

The monarch butterfly is a species proposed under draft ruling by the USFWS to be threatened. Proposed threatened species are "any species the service has determined is likely to become endangered within the foreseeable future throughout all or a significant portion of its range". Until the species is officially listed, this species is not entitled to legal protection under the ESA, and they are not considered when making a determination as to "take". At this time the USFWS does not provide any preliminary screening tools relating to the proposed project's effect on the monarch butterfly

3.6 SOILS & GEOLOGY

The project grading is expected to generate a net export of approximately 60± cubic yards of material. Before any fill material is removed or used, the topsoil will be stripped and stockpiled for later seeding of disturbed areas. Any soil exposed due to construction will be treated according to the *2024 Connecticut Guidelines for Soil Erosion and Sediment Control*.

The following soils exist onsite and in surrounding areas:

1. Hinckley loamy sand, 3 to 15 percent slopes.
2. Hinckley loamy sand, 15 to 45 percent slopes.
3. Canton and Charlton fine sandy loams, 3 to 15 percent slopes, extremely stony
4. Canton and Charlton fine sandy loams, 15 to 35 percent slopes, extremely stony

3.6.1 FARMLAND SOILS

Solli Engineering has reviewed the listed soils in accordance with the Code of Federal Regulations ("CFR") Title 7, part 657. Prime Farmland Soils are distinguishable based on soil type. These soils are to be identified under CFR Title 7, part 657 in order to know the extent and location of the best land for producing food, feed, fiber forage and oilseed crops. Upon review, the project contains no prime farmland soil within the Project area. For more information refer to Figure 5, Farmland Soils Map, included in Appendix A.

3.7 HISTORIC & ARCHAEOLOGICAL RESOURCES

Archaeological Consulting Services LLC performed a Phase 1A cultural resources assessment survey on behalf of Solli Engineering and the Petitioner. Their report discloses that a property National Register of Historic Places does not exist within the Site. This conclusion was reached by means of a literature search for previously recorded cultural resources in the area, a review of historical maps and aerial imagery depicting the project area, and a pedestrian survey complete with photo documentation of the project area to determine archaeological sensitivity.

This report was sent to SHPO, which issued a letter, dated September 27th, 2024, stating that "...it is the opinion of SHPO that no historical properties will be affected by the proposed solar facility and no additional archaeological investigation is warranted." For more information, refer to the Phase 1A report as well as the SHPO letter of correspondence in Appendix C, Cultural Resources.

3.8 SCENIC AND RECREATIONAL AREAS

No state road or local road will be affected physically or impaired visually by the Project. The closest open space is Gardner Lake State Park which is approximately 1,000 feet northwest of the Project. The Project will not physically affect or visually impair these spaces. For more information regarding resources located within one mile of the Site refer to Figure 7, Surrounding Features Map, included in Appendix A.

3.9 LIGHTING

Exterior lighting is not planned for the project. There may be onsite equipment that have small lights which will only be activated during maintenance.

3.10 FAA DETERMINATION

The closest federally obligated airport is Goodspeed Airport located approximately 12.5 miles west of the Site.

Solli used the Federal Aviation Administration ("FAA") Notice Criteria Tool to screen the Project Site to assess if the Project triggers the FAA Notice Criteria. The result of the initial screening on October 23, 2024, is that no additional FAA notice is required. For more information see Appendix E, FAA Determinations.

3.11 VISIBILITY

There will be solar trackers a maximum of 10-ft off finished grade within the solar panel facility. All disturbed areas will be contained within a 7-ft chain link fence. Trees constituting the existing tree line will be preserved and maintained to the best of the Petitioner's ability. Most neighbors in the vicinity of the subject property will only be able to view the solar panel facility on a seasonal basis due to tree coverage. For more information refer to Figure 8, Viewshed Map, included in Appendix A.

The solar panel products are designed in such a way that they are not highly reflective. Because the solar panel have tracking features, the panels will not reflect one direction for extended durations

3.12 NOISE

Noise from the construction of the solar panel facility is exempted under Connecticut regulations for the control of noise. For more information refer to RCSA 22a-69-1.8(g). During construction, the increase in noise will likely lead to a subsequent elevation in ambient sound levels in the immediate vicinity of the Project. Standard construction equipment will be used for the Project, and the highest level of noise generated from this equipment - such as backhoes, bulldozers, cranes and trucks – is expected to be approximately 88 dBA from the origin.

The primary sources of noise generation associated with the Facility will be the (2) 2,000 kVA transformers and (16) inverters. The tracker motors for the solar panels themselves also emit noise, however the level of noise for these motors is minimal. A summary of the equipment and manufacturer's listed sound data is provided below in Table 3.

Table 3: Equipment Sound Summary

Equipment	Number of Sources	Listed Sound Pressure (dBA)	Distance of Observed Sound Level (meters)
Sungrow SG125HV 125kW Inverters	16	61.6	1
2,000 kVA Transformers	2	61	1

The logarithmic decibel scale is utilized to combine sound levels and adjust for distance based on the Inverse Square Law. Total sound levels from the proposed equipment was calculated as shown below:

Calculate Anticipated Sound Level at Nearest Property Boundary

Multiple analysis points were studied along the property boundary to determine at which point the highest level of sound will be produced by the equipment on-site. Once the point was determined, following equation was used to determine the sound level of each piece of noise-producing equipment:

$$L_b = L_a - 20 \times \log_{10}\left(\frac{D_b}{D_a}\right)$$

Where:

L_b = Noise level at new distance (dBA)

L_a = Noise level at original distance (dBA)

D_b = New distance from source of noise (meters)

D_a = Original distance from source of noise (meters)

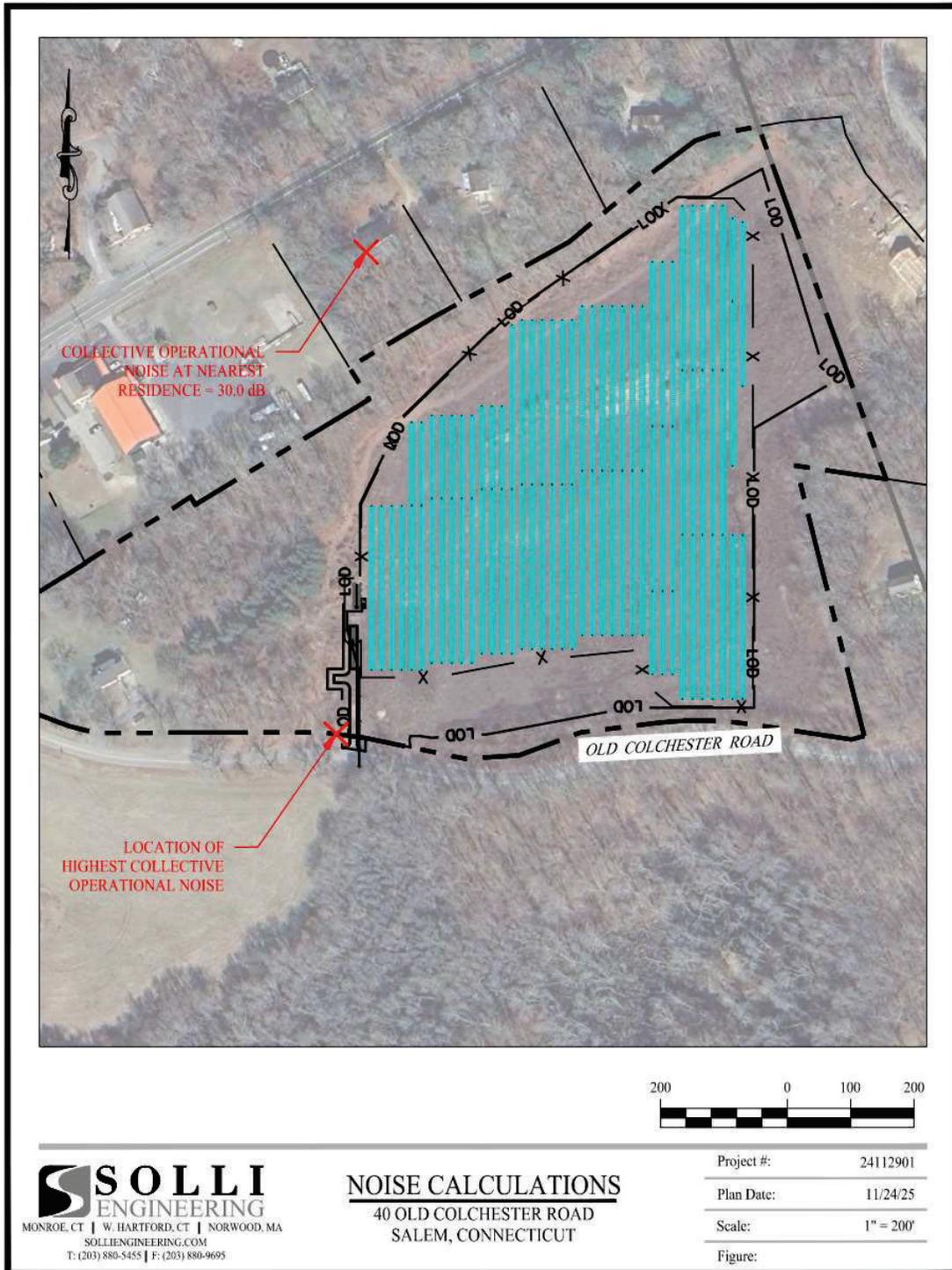
Using the data from Table 4, as well as the distances from each inverter and the transformers to the property line, the total anticipated sound level for each piece equipment was calculated.

Combining Sound Levels

To add multiple sound levels of different strength, the following equation was used:

$$L_t = 10 \log_{10} \left(\sum 10^{\frac{L_b}{10}} \right)$$

After combining all sound levels from each piece of equipment, it was determined that the highest collective operational noise at the property boundary would be 38.2 decibels. The collective operational noise at the nearest residence would be 30.0 dB at 605 Norwich Road. These noise levels meet applicable CT DEEP Noise Standards. Noise levels will effectively be reduced to zero during nighttime hours when the array is not generating electricity.

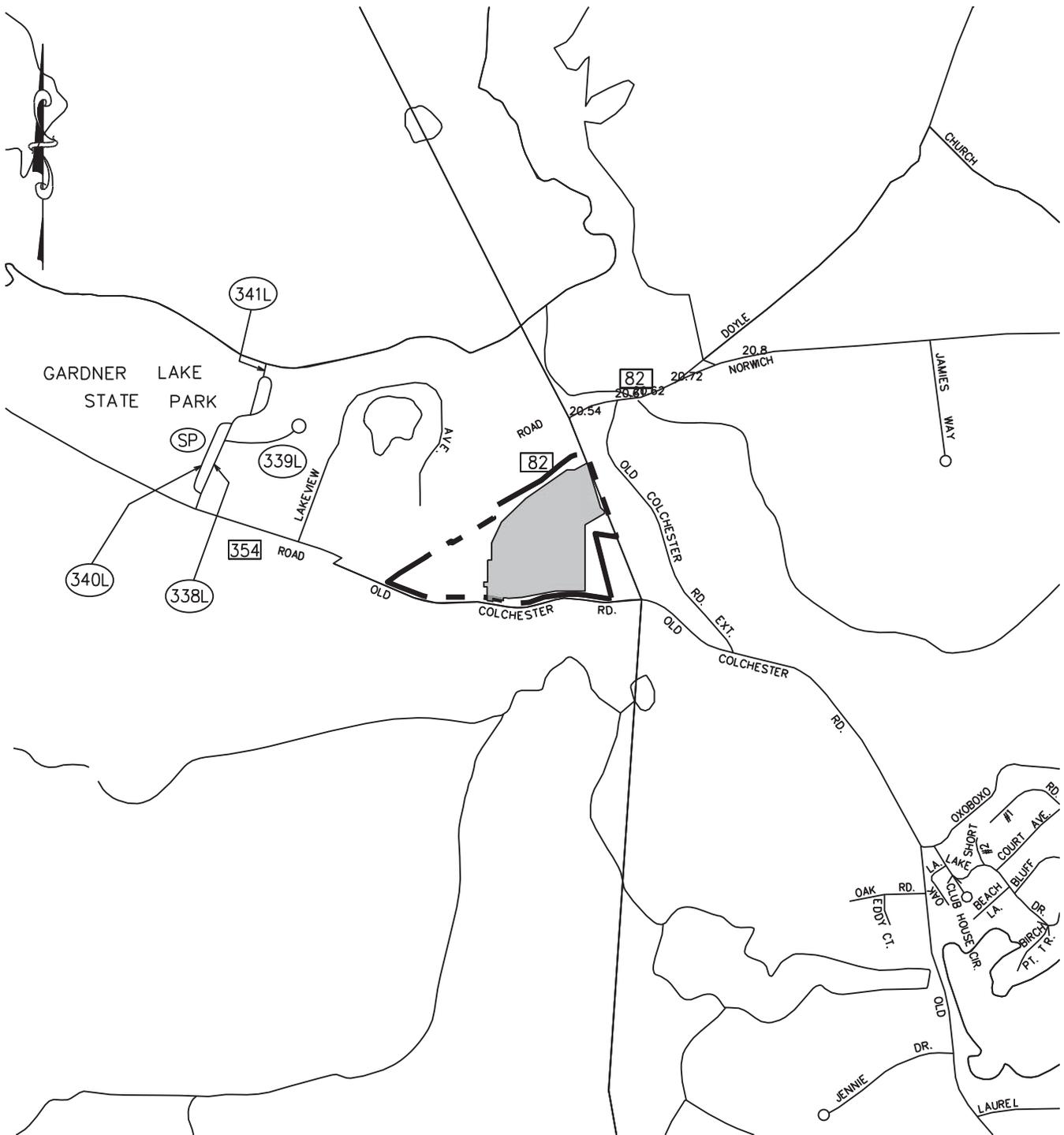


4.0 CONCLUSION

As demonstrated by the information outlined herein, the Project will have no air emissions, no significant adverse environmental impacts, and will comply with the CT DEEP air and water quality standards. The Petitioner, therefore, respectfully requests that the Council issue a declaratory ruling that the proposed Project will comply with CT DEEP air and water quality standards, will not have a substantial adverse environmental impact, and does not require the issuance of a Certificate of Environmental Compatibility and Public Need.

Appendix A: Figures

- Figure 1 – Site Location Map
- Figure 2 – Existing Conditions Map
- Figure 3 – Proposed Conditions Map
 - Figure 4 – Abutting Parcels Map
 - Figure 5 – Farmland Soils Map
- Figure 6 – Forested Habitat Impact Map
- Figure 7 – Surrounding Features Map
 - Figure 8 – Viewshed Map

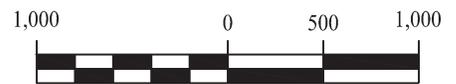


LEGEND

-  PROPERTY LINE
-  PROJECT AREA

MAP NOTES:

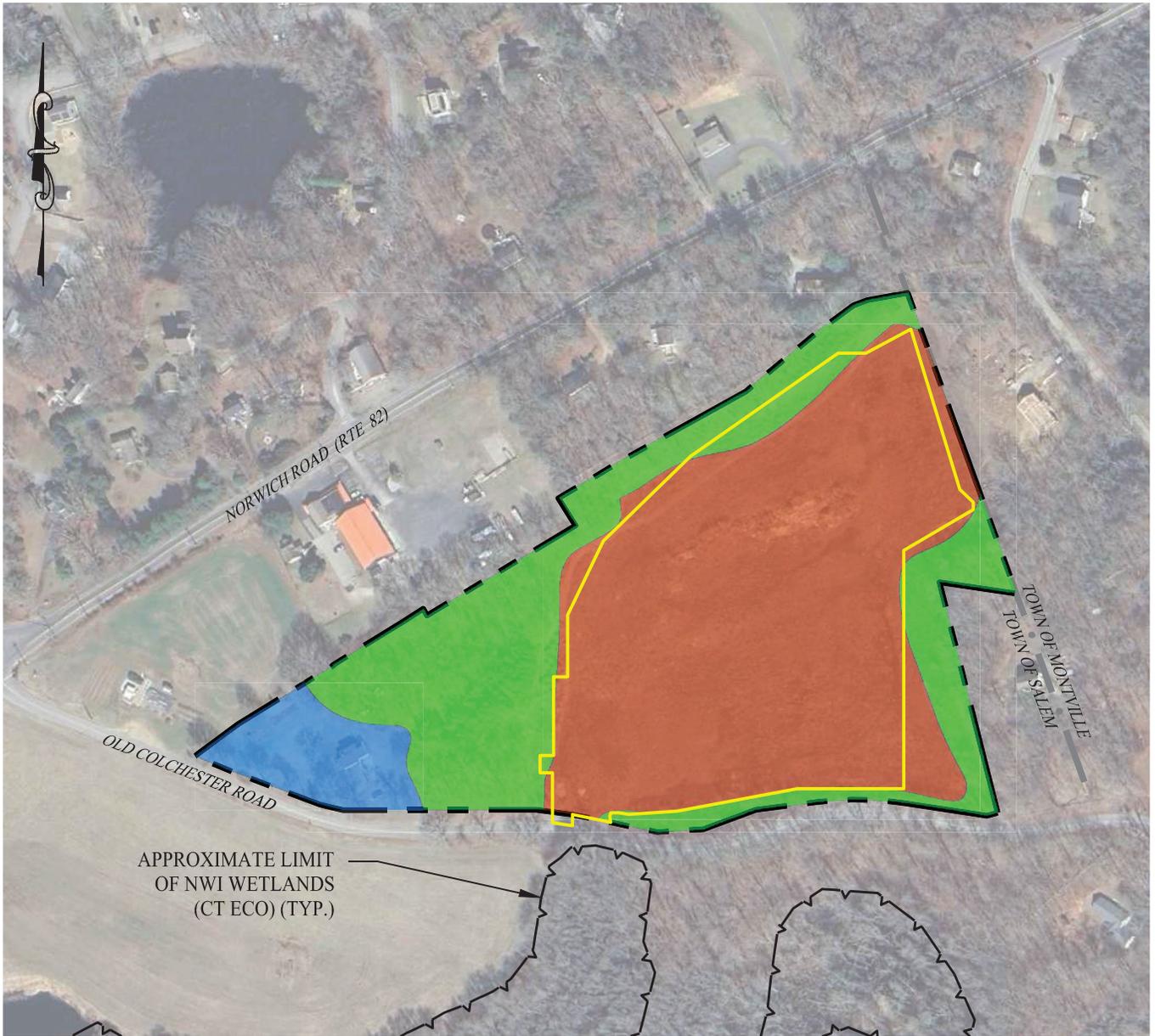
1. BASE MAP INFORMATION TAKEN FROM CT DOT TRU MAPS #85 & #120.



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SITE LOCATION MAP
40 OLD COLCHESTER ROAD
SALEM, CONNECTICUT

Project #:	24112901
Plan Date:	11/24/25
Scale:	1" = 1,000'
Figure:	1



LEGEND

-  PROPERTY LINE
-  TOWN LINE
-  PROJECT AREA
-  APPROXIMATE LIMIT OF NWI WETLANDS (CT ECO)

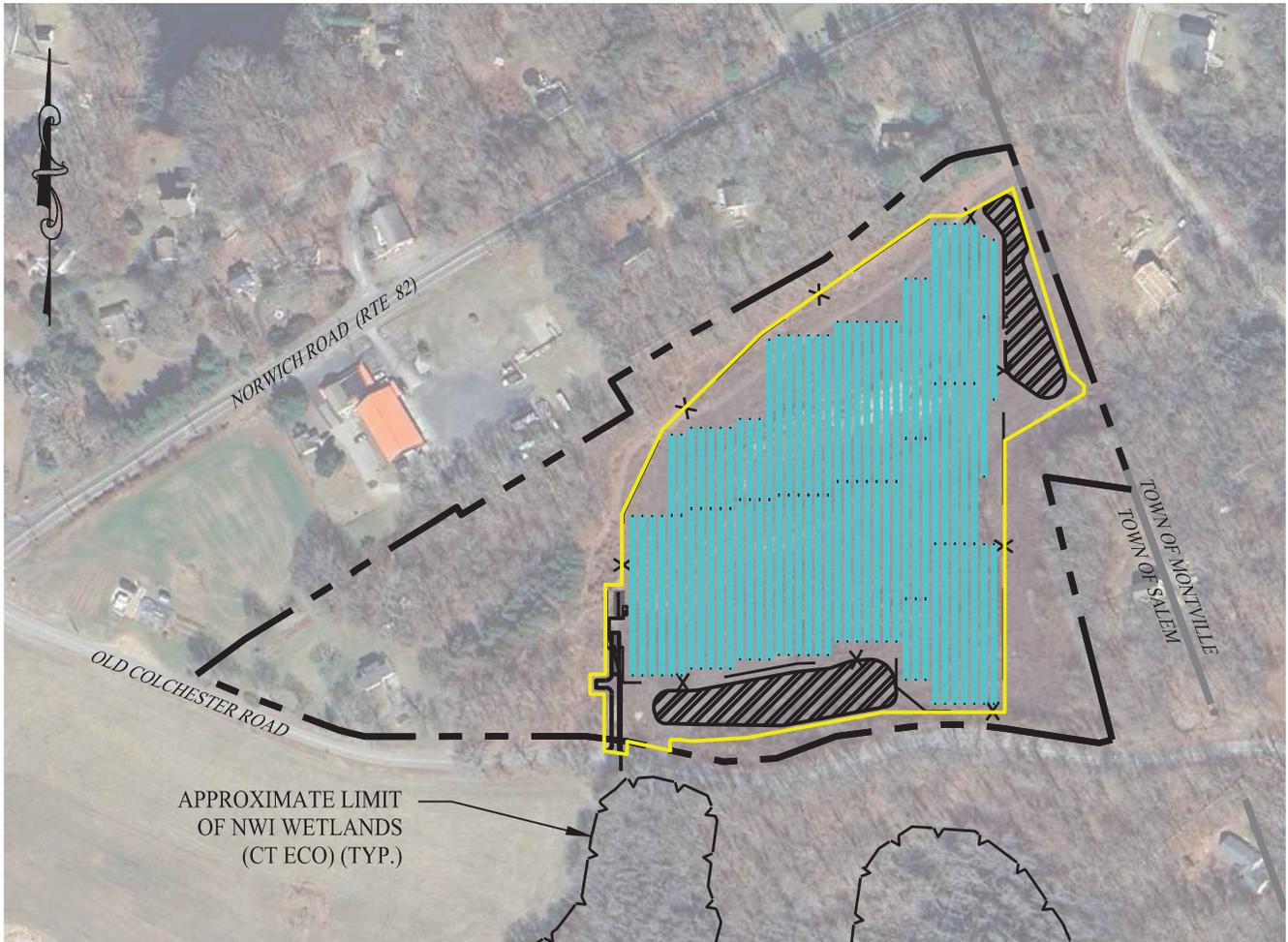
HABITAT COVER TYPES

-  MAINTAINED MEADOW
-  BROADLEAVED DECIDUOUS WOODLAND
-  MAINTAINED LAWN

MAP NOTES:

1. BASE MAP TAKEN FROM GOOGLE EARTH.
2. PROPERTY LINE & WETLANDS DELINEATED IN SURVEY ENTITLED "PROPERTY SURVEY OF 40 OLD COLCHESTER ROAD, SALEM, CONNECTICUT" BY ACCURATE LAND SURVEYING, LLC, DATED: 10/18/24.





APPROXIMATE LIMIT
OF NWI WETLANDS
(CT ECO) (TYP.)

LEGEND

	PROPERTY LINE
	TOWN LINE
	PROJECT AREA
	7' TALL CHAIN LINK FENCE
	TRINA 540W MODULES
	EDGE OF GRAVEL ROAD
	CONCRETE PAD
	STORMWATER BASIN AREA
	ELECTRIC CONDUIT
	OVERHEAD ELECTRIC LINE
	APPROXIMATE LIMIT OF NWI WETLANDS (CT ECO)

MAP NOTES:

1. BASE MAP TAKEN FROM GOOGLE EARTH.
2. PROPERTY LINE & WETLANDS DELINEATED IN SURVEY ENTITLED "PROPERTY SURVEY OF 40 OLD COLCHESTER ROAD, SALEM, CONNECTICUT" BY ACCURATE LAND SURVEYING, LLC, DATED: 10/18/24.



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PROPOSED CONDITIONS MAP
40 OLD COLCHESTER ROAD
SALEM, CONNECTICUT

Project #:	24112901
Plan Date:	11/24/25
Scale:	1" = 300'
Figure:	3



LEGEND

-  PROPERTY LINE
-  ADJOINING LOT LINE
-  PROJECT AREA
-  TOWN LINE

MAP NOTES:

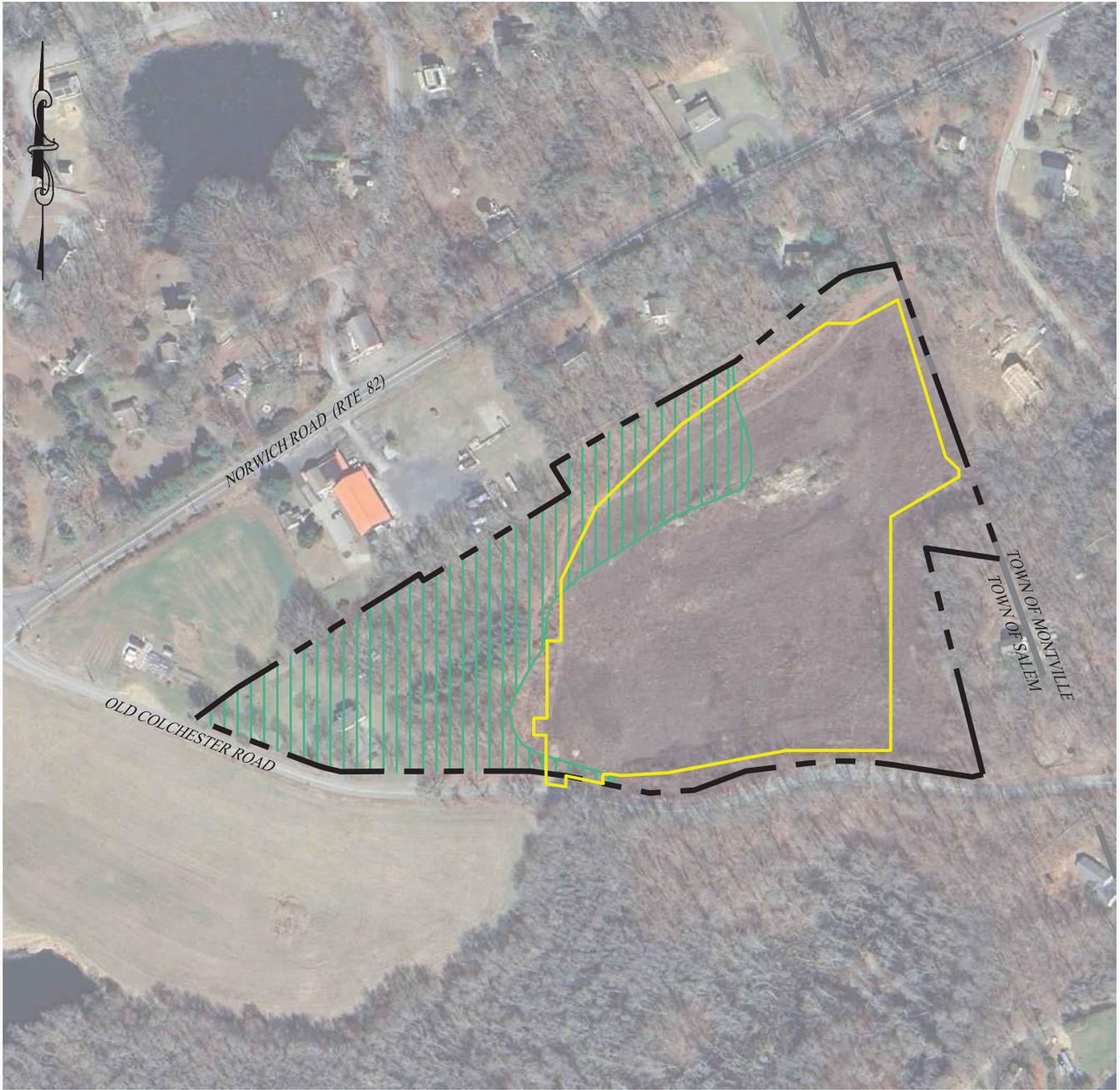
1. BASE MAP TAKEN FROM GOOGLE EARTH.
2. PROPERTY LINE DELINEATED IN SURVEY ENTITLED "PROPERTY SURVEY OF 40 OLD COLCHESTER ROAD, SALEM, CONNECTICUT" BY ACCURATE LAND SURVEYING, LLC, DATED: 10/18/24
3. PROPERTY INFORMATION TAKEN FROM TOWN OF SALEM GIS & TOWN OF MONTVILLE GIS.



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ABUTTING PARCELS MAP
40 OLD COLCHESTER ROAD
SALEM, CONNECTICUT

Project #:	24112901
Plan Date:	11/24/25
Scale:	1" = 300'
Figure:	4

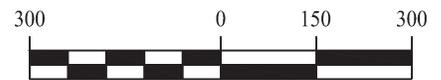


LEGEND

	PROPERTY LINE
	TOWN LINE
	PROJECT AREA
	PRIME FARMLAND SOILS
	FARMLAND SOILS OF STATEWIDE IMPORTANCE

MAP NOTES:

1. BASE MAP TAKEN FROM GOOGLE EARTH.
2. PROPERTY LINE DELINEATED IN SURVEY ENTITLED "PROPERTY SURVEY OF 40 OLD COLCHESTER ROAD, SALEM, CONNECTICUT" BY ACCURATE LAND SURVEYING, LLC, DATED: 10/18/24.
3. FARMLAND SOIL POLYGONS TAKEN FROM CT ECO ADVANCED VIEWER.



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FARMLAND SOILS MAP

40 OLD COLCHESTER ROAD
 SALEM, CONNECTICUT

Project #: 24112901

Plan Date: 11/24/25

Scale: 1" = 300'

Figure: 5

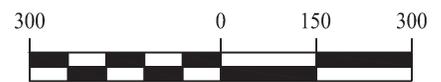


LEGEND

-  PROPERTY LINE
-  TOWN LINE
-  PROJECT AREA
-  CORE FOREST (CT DEEP)

MAP NOTES:

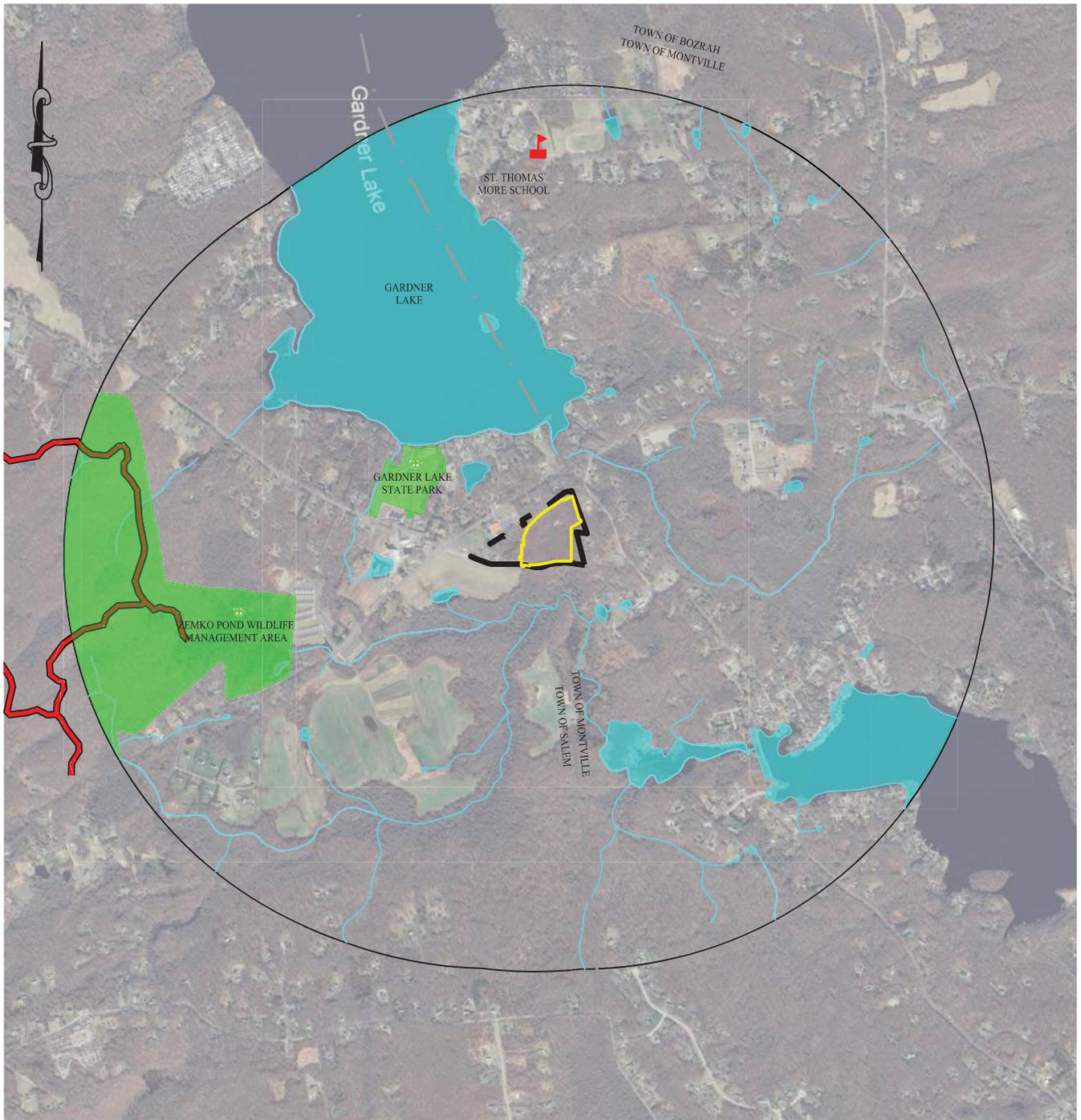
1. BASE MAP TAKEN FROM GOOGLE EARTH.
2. PROPERTY LINE DELINEATED IN SURVEY ENTITLED "PROPERTY SURVEY OF 40 OLD COLCHESTER ROAD, SALEM, CONNECTICUT" BY ACCURATE LAND SURVEYING, LLC, DATED: 10/18/24.
3. CORE FOREST INFORMATION TAKEN FROM CTDEEP FORESTLAND HABITAT IMPACT GIS MAPPING.



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**FORESTLAND HABITAT
 IMPACT MAP**
 40 OLD COLCHESTER ROAD
 SALEM, CONNECTICUT

Project #:	24112901
Plan Date:	11/24/25
Scale:	1" = 300'
Figure:	6

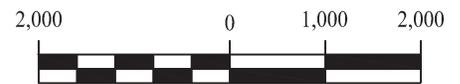


LEGEND

	PROPERTY LINE		OPEN WATER (CT DEEP)
	PROJECT AREA		OPEN SPACE (CT ECO)
	1 MILE RADIUS		SCHOOL
	TOWN BOUNDARY		CEMETERY
	HIKING TRAILS		PARK
	WATERCOURSES (CT DEEP)		

MAP NOTES:

1. BASE MAP TAKEN FROM GOOGLE EARTH.
2. SURFACE WATER TAKEN FROM CT DEEP HYDROGRAPHY. PROTECTED OPEN SPACES TAKEN FROM CT ECO ADVANCED VIEWER.





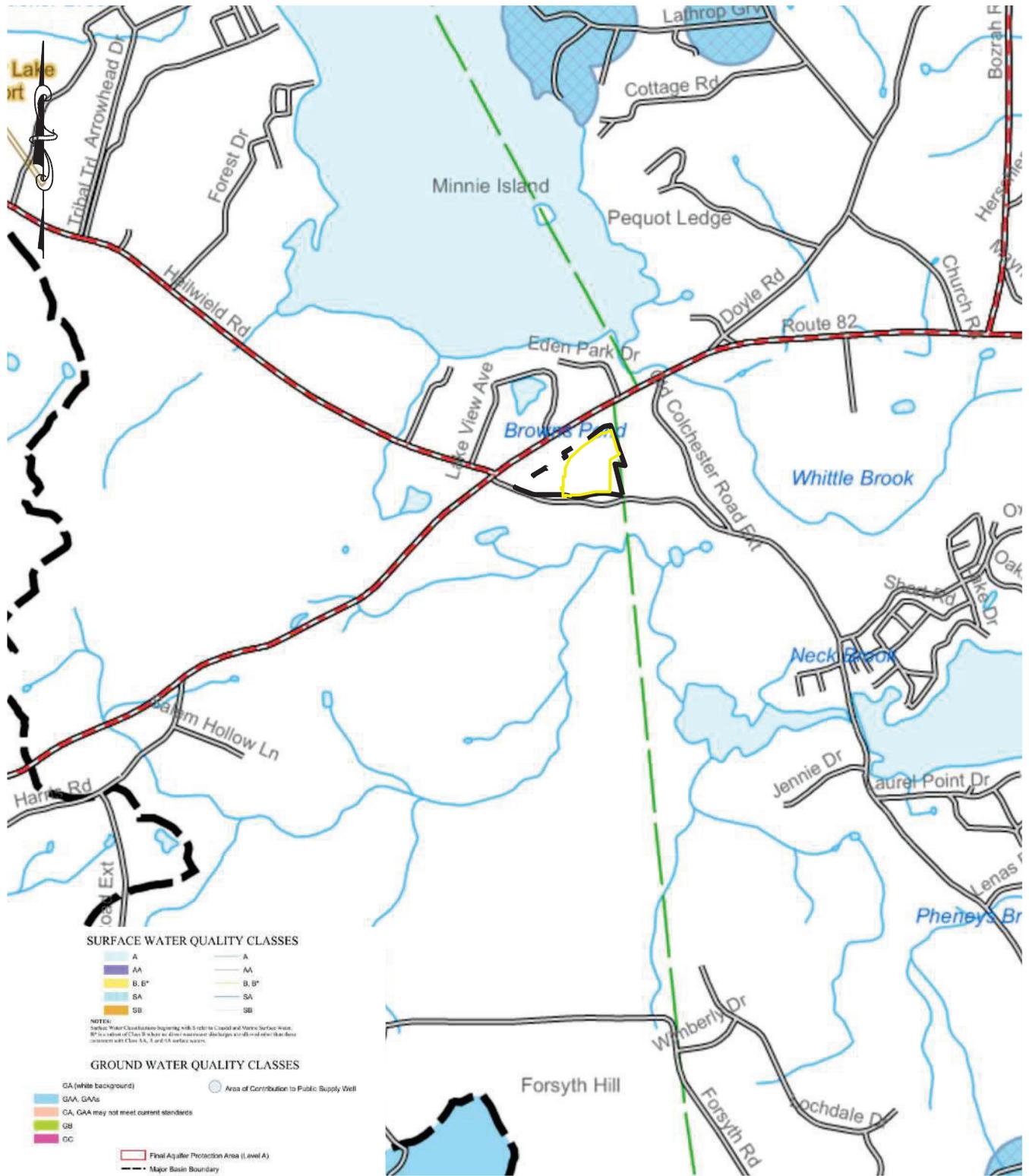
LEGEND

-  PROPERTY LINE
-  PREDICTED YEAR-ROUND VISIBILITY
-  PREDICTED SEASONAL VISIBILITY

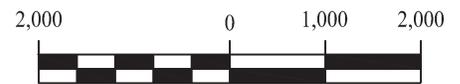
MAP NOTES:

1. BASE MAP TAKEN FROM GOOGLE EARTH.
2. PROPERTY LINE & WETLANDS DELINEATED IN SURVEY ENTITLED "PROPERTY SURVEY OF 40 OLD COLCHESTER ROAD, SALEM, CONNECTICUT" BY ACCURATE LAND SURVEYING, LLC, DATED: 10/18/24.





NOTE: BASE MAP INFORMATION TAKEN FROM CT DEEP, DATED: OCTOBER, 2018.



Appendix B: Ecological Resources

- Ecological Communities Map
Prepared by William Kenny Associates
 - USFWS IPaC DKey
 - USFWS IPaC Resource List
 - USFWS IPaC Species List
- Wetland and Watercourse Delineation Letter
 - CT DEEP NDDDB Letter
 - CT DEEP Streamflow Map

ECOLOGICAL COMMUNITY	
SYM.	NAME
UPLAND	
U1	MAINTAINED MEADOW
U2	BROADLEAVED DECIDUOUS WOODLAND
U3	MAINTAINED LAWN



ECOLOGICAL COMMUNITIES MAP

LOCATION:

40 OLD COLCHESTER ROAD
 SALEM, CONNECTICUT

DATE: JANUARY 27, 2025

SCALE: 1" = 100' 1" = 200'

REF. NO. 6138





United States Department of the Interior



FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To:
Project code: 2025-0003374
Project Name: Salem Solar 40 Old Colchester Road

04/11/2025 13:24:17 UTC

Federal Nexus: no
Federal Action Agency (if applicable):

Subject: Technical assistance for 'Salem Solar 40 Old Colchester Road'

Dear Jackson Smith:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on April 11, 2025, for 'Salem Solar 40 Old Colchester Road' (here forward, Project). This project has been assigned Project Code 2025-0003374 and all future correspondence should clearly reference this number. **Please carefully review this letter. Your Endangered Species Act (Act) requirements may not be complete.**

Ensuring Accurate Determinations When Using IPaC

The Service developed the IPaC system and associated species' determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into IPaC must accurately represent the full scope and details of the Project.

Failure to accurately represent or implement the Project as detailed in IPaC or the Northern Long-eared Bat and Tricolored Bat Range-wide Determination Key (Dkey), invalidates this letter. ***Answers to certain questions in the DKey commit the project proponent to implementation of conservation measures that must be followed for the ESA determination to remain valid. Note that conservation measures for northern long-eared bat and tricolored bat may differ. If both bat species are present in the action area and the key suggests more conservative measures for one of the species for your project, the Project may need to apply the most conservative measures in order to avoid adverse effects. If unsure which conservation measures should be applied, please contact the appropriate Ecological Services Field Office***

Determination for the Northern Long-Eared Bat and Tricolored Bat

Based upon your IPaC submission and a standing analysis completed by the Service, your project has reached the following effect determination(s):

Species	Listing Status	Determination
Northern Long-eared Bat (<i>Myotis septentrionalis</i>)	Endangered	NLAA
Tricolored Bat (<i>Perimyotis subflavus</i>)	Proposed Endangered	NLAA

Federal agencies must consult with U.S. Fish and Wildlife Service under section 7(a)(2) of the Endangered Species Act (ESA) when an action *may affect* a listed species. Tricolored bat is proposed for listing as endangered under the ESA, but not yet listed. For actions that may affect a proposed species, agencies cannot consult, but they can *confer* under the authority of section 7(a)(4) of the ESA. Such conferences can follow the procedures for a consultation and be adopted as such if and when the proposed species is listed. Should the tricolored bat be listed, agencies must review projects that are not yet complete, or projects with ongoing effects within the tricolored bat range that previously received a NE or NLAA determination from the key to confirm that the determination is still accurate.

Other Species and Critical Habitat that May be Present in the Action Area

The IPaC-assisted determination key for the northern long-eared bat and tricolored bat does not apply to the following ESA-protected species and/or critical habitat that also may occur in your Action area:

- Monarch Butterfly *Danaus plexippus* Proposed Threatened

You may coordinate with our Office to determine whether the Action may cause prohibited take of the animal species and/or critical habitat listed above. Note that if a new species is listed that may be affected by the identified action before it is complete, additional review is recommended to ensure compliance with the Endangered Species Act.

Next Steps

Coordination with the Service is complete. This letter serves as technical assistance. All conservation measures should be implemented as proposed. Thank you for considering federally listed species during your project planning.

If no changes occur with the Project or there are no updates on listed species, no further consultation/coordination for this project is required for the northern long-eared bat. However, the Service recommends that project proponents re-evaluate the Project in IPaC if: 1) the scope, timing, duration, or location of the Project changes (includes any project changes or amendments); 2) new information reveals the Project may impact (positively or negatively) federally listed species or designated critical habitat; or 3) a new species is listed, or critical habitat designated. If any of the above conditions occurs, additional coordination with the Service should take place before project implements any changes which are final or commits additional resources.

If you have any questions regarding this letter or need further assistance, please contact the New England Ecological Services Field Office and reference Project Code 2025-0003374 associated with this Project.

Action Description

You provided to IPaC the following name and description for the subject Action.

1. Name

Salem Solar 40 Old Colchester Road

2. Description

The following description was provided for the project 'Salem Solar 40 Old Colchester Road':

The proposed project seeks to develop approximately 10-acres of the property with a solar array field and associated gravel drives, fencing, landscape improvements, utility pads, and interconnection systems. The development will require only minor tree clearing as a majority of the proposed array is located within a current meadow. The development will require minor earthwork within the project area that will utilize standard construction practices. The project proposes to implement a variety of soil erosion and sediment control measures, such as silt fencing, anti tracking pads, and diversion swales to protect offsite wetlands and watercourses. No wetlands or watercourses are located on the approximate 18-acre property. Based on the animal and plant species identified by the USFWS to potentially be onsite, the project construction schedule will be managed to avoid impacts to seasonal breeding and maternity habitat of listed species. Also, non migratory listed species will be excluded from the work site until the completion of the project.

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@41.49835295,-72.21924380132094,14z>



DETERMINATION KEY RESULT

Based on the answers provided, the proposed Action is consistent with a determination of “may affect, but not likely to adversely affect” for a least one species covered by this determination key.

QUALIFICATION INTERVIEW

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of listed bats or any other listed species?

Note: Intentional take is defined as take that is the intended result of a project. Intentional take could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered or proposed species?

No

2. Is the action area wholly within Zone 2 of the year-round active area for northern long-eared bat and/or tricolored bat?

Automatically answered

No

3. Does the action area intersect Zone 1 of the year-round active area for northern long-eared bat and/or tricolored bat?

Automatically answered

No

4. Does any component of the action involve leasing, construction or operation of wind turbines? Answer 'yes' if the activities considered are conducted with the intention of gathering survey information to inform the leasing, construction, or operation of wind turbines.

Note: For federal actions, answer ‘yes’ if the construction or operation of wind power facilities is either (1) part of the federal action or (2) would not occur but for a federal agency action (federal permit, funding, etc.).

No

5. Is the proposed action authorized, permitted, licensed, funded, or being carried out by a Federal agency in whole or in part?

No

6. [Semantic] Is the action area located within 0.5 miles of a known bat hibernaculum?

Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency.

Automatically answered

No

7. Does the action area contain any winter roosts or caves (or associated sinkholes, fissures, or other karst features), mines, rocky outcroppings, or tunnels that could provide habitat for hibernating bats?

No

8. Does the action area contain (1) talus or (2) anthropogenic or naturally formed rock shelters or crevices in rocky outcrops, rock faces or cliffs?

No

9. Will the action cause effects to a bridge?

Note: Covered bridges should be considered as bridges in this question.

No

10. Will the action result in effects to a culvert or tunnel at any time of year?

No

11. Are trees present within 1000 feet of the action area?

Note: If there are trees within the action area that are of a sufficient size to be potential roosts for bats answer "Yes". If unsure, additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: <https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines>.

Yes

12. Does the action include the intentional exclusion of bats from a building or structure?

Note: Exclusion is conducted to deny bats' entry or reentry into a building. To be effective and to avoid harming bats, it should be done according to established standards. If your action includes bat exclusion and you are unsure whether northern long-eared bats or tricolored bats are present, answer "Yes." Answer "No" if there are no signs of bat use in the building/structure. If unsure, contact your local Ecological Services Field Office to help assess whether northern long-eared bats or tricolored bats may be present. Contact a Nuisance Wildlife Control Operator (NWCO) for help in how to exclude bats from a structure safely without causing harm to the bats (to find a NWCO certified in bat standards, search the Internet using the search term "National Wildlife Control Operators Association bats"). Also see the White-Nose Syndrome Response Team's guide for bat control in structures.

No

13. Does the action involve removal, modification, or maintenance of a human-made structure (barn, house, or other building) **known or suspected to contain roosting bats?**

No

14. Will the action cause construction of one or more new roads open to the public?

For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.).

No

15. Will the action include or cause any construction or other activity that is reasonably certain to increase average daily traffic permanently or temporarily on one or more existing roads?

Note: For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.). .

No

16. Will the action include or cause any construction or other activity that is reasonably certain to increase the number of travel lanes on an existing thoroughfare?

For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.).

No

17. Will the proposed Action involve the creation of a new water-borne contaminant source (e.g., leachate pond, pits containing chemicals that are not NSF/ANSI 60 compliant)?

Note: For information regarding NSF/ANSI 60 please visit <https://www.nsf.org/knowledge-library/nsf-ansi-standard-60-drinking-water-treatment-chemicals-health-effects>

No

18. Will the proposed action involve the creation of a new point source discharge from a facility other than a water treatment plant or storm water system?

No

19. Will the action include drilling or blasting?

No

20. Will the action involve military training (e.g., smoke operations, obscurant operations, exploding munitions, artillery fire, range use, helicopter or fixed wing aircraft use)?

No

21. Will the proposed action involve the use of herbicides or other pesticides other than herbicides (e.g., fungicides, insecticides, or rodenticides)?

No

22. Will the action include or cause activities that are reasonably certain to cause chronic or intense nighttime noise (above current levels of ambient noise in the area) in suitable summer habitat for the northern long-eared bat or tricolored bat during the active season?

Chronic noise is noise that is continuous or occurs repeatedly again and again for a long time. Sources of chronic or intense noise that could cause adverse effects to bats may include, but are not limited to: road traffic; trains; aircraft; industrial activities; gas compressor stations; loud music; crowds; oil and gas extraction; construction; and mining.

Note: Additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: <https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines>.

No

23. Does the action include, or is it reasonably certain to cause, the use of permanent or temporary artificial lighting within 1000 feet of suitable northern long-eared bat or tricolored bat roosting habitat?

Note: Additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: <https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines>.

No

24. Will the action include tree cutting or other means of knocking down or bringing down trees, tree topping, or tree trimming?

Yes

25. Will the proposed action occur exclusively in an already established and currently maintained utility right-of-way?

No

26. Does the action include emergency cutting or trimming of hazard trees in order to remove an imminent threat to human safety or property? See hazard tree note at the bottom of the key for text that will be added to response letters

Note: A "hazard tree" is a tree that is an immediate threat to lives, public health and safety, or improved property.

No

27. Does the project intersect with the 0- 9.9% forest density category?

Automatically answered

No

28. Does the project intersect with the 10.0- 19.9% forest density category map?

Automatically answered

No

29. Does the project intersect with the 20.0- 29.9% forest density category map?

Automatically answered

No

30. Does the project intersect with the 30.0- 100% forest density category map?

Automatically answered

Yes

31. Will the action cause trees to be cut, knocked down, or otherwise brought down across an area greater than 100 acres in total extent?

No

32. Will the proposed action result in the use of prescribed fire?

Note: If the prescribed fire action includes other activities than application of fire (e.g., tree cutting, fire line preparation) please consider impacts from those activities within the previous representative questions in the key. This set of questions only considers impacts from flame and smoke.

No

33. Does the action area intersect the northern long-eared bat species list area?

Automatically answered

Yes

34. [Semantic] Is the action area located within 0.25 miles of a culvert that is known to be occupied by northern long-eared or tricolored bats?

Automatically answered

No

35. [Semantic] Is the action area located within 150 feet of a documented northern long-eared bat roost site?

Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency.

Automatically answered

No

36. Is suitable summer habitat for the northern long-eared bat present within 1000 feet of project activities?

If unsure, answer "Yes."

Note: Additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: <https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines>.

Yes

37. Has a presence/probable absence summer bat survey targeting the northern long-eared bat following the Service's [Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines](#) been conducted within the project area?

No

38. Are any of the trees proposed for cutting or other means of knocking down, bringing down, topping, or trimming suitable for northern long-eared bat roosting (i.e., live trees and/or snags ≥ 3 inches dbh that have exfoliating bark, cracks, crevices, and/or cavities)?

Note: Additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: <https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines>.

Yes

39. Will any tree cutting/trimming or other knocking or bringing down of trees occur during the **Summer Occupancy season** for northern long-eared bats in the action area?

Note: Bat activity periods for your state can be found in Appendix L of the Service's Range-wide Indiana Bat and Northern long-eared Bat Survey [Guidelines](#).

No

40. Does the action area intersect the tricolored bat species list area?

Automatically answered

Yes

41. [Semantic] Is the action area located within 0.25 miles of a culvert that is known to be occupied by northern long-eared or tricolored bats?

Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency.

Automatically answered

No

42. Is suitable summer habitat for the tricolored bat present within 1000 feet of project activities?

(If unsure, answer ""Yes."")

Note: If there are trees within the action area that may provide potential roosts for tricolored bats (e.g., clusters of leaves in live and dead deciduous trees, Spanish moss (*Tillandsia usneoides*), clusters of dead pine needles of large live pines) answer ""Yes."" For a complete definition of suitable summer habitat for the tricolored bat, please see Appendix A in the [Service's Range-wide Indiana Bat and Northern long-eared Bat Survey Guidelines](#).

Yes

43. Do any of the trees proposed for cutting or other means of knocking down, bringing down, topping, or trimming provide potential roosts for tricolored bats (e.g., clusters of leaves in live and dead deciduous trees, Spanish moss (*Tillandsia usneoides*), clusters of dead pine needles of large live pine trees)?

Note: Additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: <https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines>.

Yes

44. Will any tree cutting/trimming or other knocking or bringing down of trees be conducted during the Pup Season for tricolored bat?

Note: Bat activity periods for your state can be found in Appendix L of the [Service's Range-wide Indiana Bat and Northern long-eared Bat Survey Guidelines](#).

No

45. Do you have any documents that you want to include with this submission?

No

PROJECT QUESTIONNAIRE

Enter the extent of the action area (in acres) from which trees will be removed - round up to the nearest tenth of an acre. For this question, include the entire area where tree removal will take place, even if some live or dead trees will be left standing.

0.2

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Jackson Smith
Address: 1899 Bronson Road
City: Fairfield
State: CT
Zip: 06824
Email: jsmith@wkassociates.net
Phone: 8609131480

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Project information

NAME

Salem Solar 40 Old Colchester Road

LOCATION

New London County, Connecticut



DESCRIPTION

Some(The proposed project seeks to develop approximately 10-acres of the property with a solar array field and associated gravel drives, fencing, landscape improvements, utility pads, and interconnection systems. The development will require only minor tree clearing as a

majority of the proposed array is located within a current meadow. The development will require minor earthwork within the project area that will utilize standard construction practices. The project proposes to implement a variety of soil erosion and sediment control measures, such as silt fencing, anti tracking pads, and diversion swales to protect offsite wetlands and watercourses. No wetlands or watercourses are located on the approximate 18-acre property. Based on the animal and plant species identified by the USFWS to potentially be onsite, the project construction schedule will be managed to avoid impacts to seasonal breeding and maternity habitat of listed species. Also, non migratory listed species will be excluded from the work site until the completion of the project.)

Local office

New England Ecological Services Field Office

☎ (603) 223-2541

📠 (603) 223-0104

70 Commercial Street, Suite 300
Concord, NH 03301-5094

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species¹ and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries²).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

-
1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
 2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat <i>Perimyotis subflavus</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> Wherever found There is proposed critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act ² and the Migratory Bird Treaty Act (MBTA) ¹. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide avoidance and minimization measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

There are Bald Eagles and/or Golden Eagles in your [project](#) area.

Measures for Proactively Minimizing Eagle Impacts

For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the [National Bald Eagle Management Guidelines](#). You may employ the timing and activity-specific distance recommendations in this document when designing your project/activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to [Bald Eagle Nesting and Sensitivity to Human Activity](#).

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional [Migratory Bird Office](#) or [Ecological Services Field Office](#).

If disturbance or take of eagles cannot be avoided, an [incidental take permit](#) may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the [Do I Need A Permit Tool](#). For assistance making this determination for golden eagles, please consult with the appropriate Regional [Migratory Bird Office](#) or [Ecological Services Field Office](#).

Ensure Your Eagle List is Accurate and Complete

If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the [Supplemental Information on Migratory Birds and Eagles](#), to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

Review the FAQs

The FAQs below provide important additional information and resources.

NAME

BREEDING SEASON

Bald Eagle *Haliaeetus leucocephalus*

Breeds Oct 15 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "[Supplemental Information on Migratory Birds and Eagles](#)", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (I)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

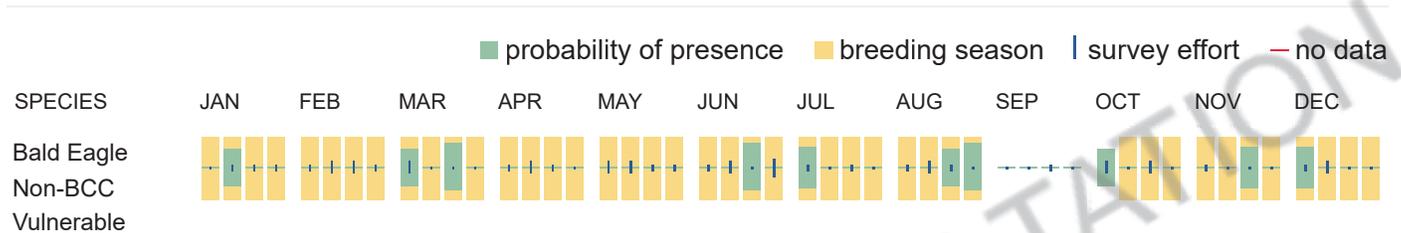
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (-)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Bald & Golden Eagles FAQs

What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are an eagle ([Bald and Golden Eagle Protection Act](#) requirements may apply).

Proper interpretation and use of your eagle report

On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort line or no data line (red horizontal) means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide you in knowing when to implement avoidance and minimization measures to eliminate or reduce potential impacts from your project activities or get the appropriate permits should presence be confirmed.

How do I know if eagles are breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the [RAIL Tool](#) and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If an eagle on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in

your "IPaC PROBABILITY OF PRESENCE SUMMARY" at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:

The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Migratory birds

The Migratory Bird Treaty Act (MBTA) ¹ prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service). The incidental take of migratory birds is the injury or death of birds that results from, but is not the purpose, of an activity. The Service interprets the MBTA to prohibit incidental take.

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

Measures for Proactively Minimizing Migratory Bird Impacts

Your IPaC Migratory Bird list showcases [birds of concern](#), including [Birds of Conservation Concern \(BCC\)](#), in your project location. This is not a comprehensive list of all birds found in your project area. However, you can help proactively minimize significant impacts to all birds at your project location by implementing the measures in the [Nationwide avoidance and minimization measures for birds](#) document, and any other project-specific avoidance and minimization measures suggested at the link [Measures for avoiding and minimizing impacts to birds](#) for the birds of concern on your list below.

Ensure Your Migratory Bird List is Accurate and Complete

If your project area is in a poorly surveyed area, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the [Supplemental Information on Migratory Birds and Eagles document](#), to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

Review the FAQs

The FAQs below provide important additional information and resources.

NAME	BREEDING SEASON
American Oystercatcher <i>Haematopus palliatus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8935	Breeds Apr 15 to Aug 31

Bald Eagle <i>Haliaeetus leucocephalus</i>	Breeds Oct 15 to Aug 31
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	
Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i>	Breeds May 15 to Oct 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	
Blue-winged Warbler <i>Vermivora cyanoptera</i>	Breeds May 1 to Jun 30
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	
Bobolink <i>Dolichonyx oryzivorus</i>	Breeds May 20 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	
Chimney Swift <i>Chaetura pelagica</i>	Breeds Mar 15 to Aug 25
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	
Prairie Warbler <i>Setophaga discolor</i>	Breeds May 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	
Scarlet Tanager <i>Piranga olivacea</i>	Breeds May 10 to Aug 10
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	
Wood Thrush <i>Hylocichla mustelina</i>	Breeds May 10 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "[Supplemental Information on Migratory Birds and Eagles](#)", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (—)

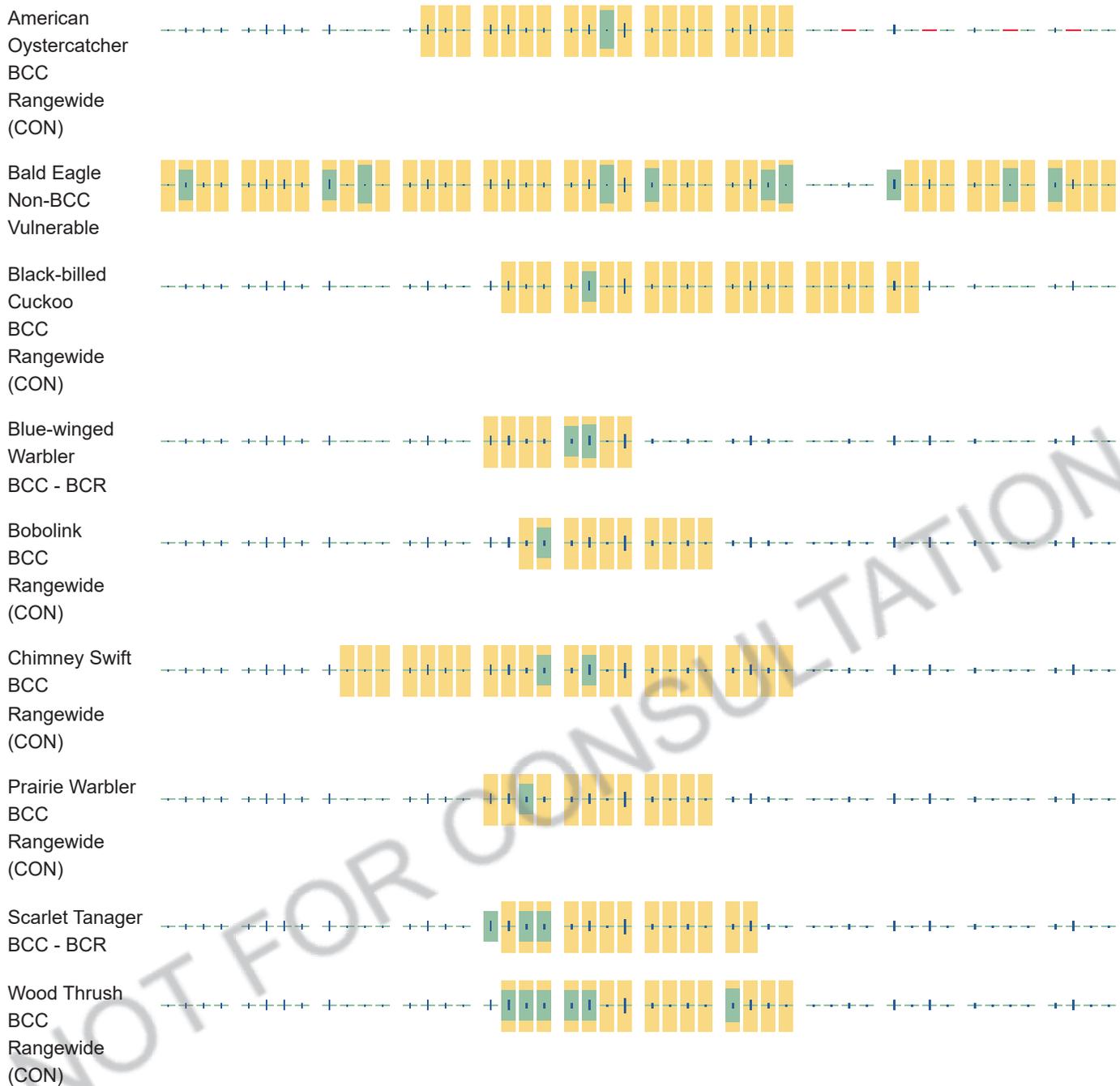
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

■ probability of presence ■ breeding season | survey effort — no data

SPECIES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC



Migratory Bird FAQs

Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Avoidance & Minimization Measures for Birds](#) describes measures that can help avoid and minimize impacts to all birds at any location year-round. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is one of the most effective ways to minimize impacts. To see when birds are most likely to occur and breed in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location, such as those listed under the Endangered Species Act or the [Bald and Golden Eagle Protection Act](#) and those species marked as "Vulnerable". See the FAQ "What are the levels of concern for migratory birds?" for more information on the levels of concern covered in the IPaC migratory bird species list.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) with which your project intersects. These species have been identified as warranting special attention because they are BCC species in that area, an eagle ([Bald and Golden Eagle Protection Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, and to verify survey effort when no results present, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

Why are subspecies showing up on my list?

Subspecies profiles are included on the list of species present in your project area because observations in the AKN for **the species** are being detected. If the species are present, that means that the subspecies may also be present. If a subspecies shows up on your list, you may need to rely on other resources to determine if that subspecies may be present (e.g. your local FWS field office, state surveys, your own surveys).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the [RAIL Tool](#) and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your "IPaC PROBABILITY OF PRESENCE SUMMARY" at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Bald and Golden Eagle Protection Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially BCC species. For more information on avoidance and minimization measures you can implement to help avoid and minimize migratory bird impacts, please see the FAQ "Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Proper interpretation and use of your migratory bird report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list does not represent all birds present in your project area. It is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide implementation of avoidance and minimization measures to eliminate or reduce potential impacts from your project activities, should presence be confirmed. To learn more about avoidance and minimization measures, visit the FAQ "Tell me about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:

The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

This location did not intersect any wetlands mapped by NWI.

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate

Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION



United States Department of the Interior



FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To:

04/11/2025 13:18:22 UTC

Project Code: 2025-0003374

Project Name: Salem Solar 40 Old Colchester Road

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

Updated 4/12/2023 - Please review this letter each time you request an Official Species List, we will continue to update it with additional information and links to websites may change.

About Official Species Lists

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Federal and non-Federal project proponents have responsibilities under the Act to consider effects on listed species.

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested by returning to an existing project's page in IPaC.

Endangered Species Act Project Review

Please visit the “**New England Field Office Endangered Species Project Review and Consultation**” website for step-by-step instructions on how to consider effects on listed

species and prepare and submit a project review package if necessary:

<https://www.fws.gov/office/new-england-ecological-services/endangered-species-project-review>

NOTE Please do not use the **Consultation Package Builder** tool in IPaC except in specific situations following coordination with our office. Please follow the project review guidance on our website instead and reference your **Project Code** in all correspondence.

Northern Long-eared Bat - (Updated 4/12/2023) The Service published a final rule to reclassify the northern long-eared bat (NLEB) as endangered on November 30, 2022. The final rule went into effect on March 31, 2023. You may utilize the **Northern Long-eared Bat Rangewide Determination Key** available in IPaC. More information about this Determination Key and the Interim Consultation Framework are available on the northern long-eared bat species page:

<https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis>

For projects that previously utilized the 4(d) Determination Key, the change in the species' status may trigger the need to re-initiate consultation for any actions that are not completed and for which the Federal action agency retains discretion once the new listing determination becomes effective. If your project was not completed by March 31, 2023, and may result in incidental take of NLEB, please reach out to our office at newengland@fws.gov to see if reinitiation is necessary.

Additional Info About Section 7 of the Act

Under section 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether projects may affect threatened and endangered species and/or designated critical habitat. If a Federal agency, or its non-Federal representative, determines that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Federal agency also may need to consider proposed species and proposed critical habitat in the consultation. 50 CFR 402.14(c)(1) specifies the information required for consultation under the Act regardless of the format of the evaluation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<https://www.fws.gov/service/section-7-consultations>

In addition to consultation requirements under Section 7(a)(2) of the ESA, please note that under sections 7(a)(1) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Please contact NEFO if you would like more information.

Candidate species that appear on the enclosed species list have no current protections under the ESA. The species' occurrence on an official species list does not convey a requirement to

consider impacts to this species as you would a proposed, threatened, or endangered species. The ESA does not provide for interagency consultations on candidate species under section 7, however, the Service recommends that all project proponents incorporate measures into projects to benefit candidate species and their habitats wherever possible.

Migratory Birds

In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see:

<https://www.fws.gov/program/migratory-bird-permit>

<https://www.fws.gov/library/collections/bald-and-golden-eagle-management>

Please feel free to contact us at **newengland@fws.gov** with your **Project Code** in the subject line if you need more information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat.

Attachment(s): Official Species List

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office

70 Commercial Street, Suite 300

Concord, NH 03301-5094

(603) 223-2541

PROJECT SUMMARY

Project Code: 2025-0003374

Project Name: Salem Solar 40 Old Colchester Road

Project Type: Power Gen - Solar

Project Description: The proposed project seeks to develop approximately 10-acres of the property with a solar array field and associated gravel drives, fencing, landscape improvements, utility pads, and interconnection systems. The development will require only minor tree clearing as a majority of the proposed array is located within a current meadow. The development will require minor earthwork within the project area that will utilize standard construction practices. The project proposes to implement a variety of soil erosion and sediment control measures, such as silt fencing, anti tracking pads, and diversion swales to protect offsite wetlands and watercourses. No wetlands or watercourses are located on the approximate 18-acre property. Based on the animal and plant species identified by the USFWS to potentially be onsite, the project construction schedule will be managed to avoid impacts to seasonal breeding and maternity habitat of listed species. Also, non migratory listed species will be excluded from the work site until the completion of the project.

Project Location:

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@41.49835295,-72.21924380132094,14z>



Counties: New London County, Connecticut

ENDANGERED SPECIES ACT SPECIES

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat <i>Perimyotis subflavus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

INSECTS

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> There is proposed critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Jackson Smith
Address: 1899 Bronson Road
City: Fairfield
State: CT
Zip: 06824
Email: jsmith@wkassociates.net
Phone: 8609131480

October 1, 2024

Mr. Eric Labatte
Solli Engineering, LLC
501 Main Street, Suite 2-A
Monroe, CT 06468

Re: Wetland and Watercourse Determination
40 Old Colchester Road, Salem, Connecticut

Dear Mr. Labatte:

As requested, we visited your referenced property to determine the presence or absence of wetlands and/or watercourses, to demarcate (flag) the boundaries of wetlands and watercourses identified, and to identify onsite soil types. This letter includes the methods and results of our investigation, which we completed today, October 1, 2024. In summary, no inland wetlands or watercourses were observed at the property.

Regulatory Definitions

The Inland Wetlands and Watercourses Act (Connecticut General Statutes §22a-38) defines inland wetlands as “land, including submerged land...which consists of any soil types designated as poorly drained, very poorly drained, alluvial, and floodplain.” Watercourses are defined in the act as “rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs and all other bodies of water, natural or artificial, vernal or intermittent, public or private, which are contained within, flow through or border upon the state or any portion thereof.” The Act defines Intermittent Watercourses as having a defined permanent channel and bank and the occurrence of two or more of the following characteristics: A) evidence of scour or deposits of recent alluvium or detritus, B) the presence of standing or flowing water for a duration longer than a particular storm incident, and C) the presence of hydrophytic vegetation.

Methodology

A second order soil survey in accordance with the principles and practices noted in the USDA publication *Soil Survey Manual* (1993) was completed at the subject site. The classification system of the National Cooperative Soil Survey was used in this investigation. Soil map units identified at the project site generally correspond to those included in the *Soil Survey of Fairfield County, Connecticut* (USDA 2005).

Wetland determinations were completed based on the presence of poorly drained, very poorly drained, alluvial, or floodplain soils. Soil types were identified by observation of soil morphology (soil texture, color, structure, etc.). To observe the morphology of the property's soils, test pits and/or borings (maximum depth of two feet) were completed at the site.

Intermittent watercourse determinations were made based on the presence of a defined permanent channel and bank and the occurrence of two or more of the following characteristics: A) evidence of scour or deposits of recent alluvium or detritus, B) the presence of standing or flowing water for a duration longer than a particular storm incident, and C) the presence of hydrophytic vegetation.

The wetland and watercourse boundaries are subject to change until adopted by local, state, or federal regulatory agencies.

Results

The approximate 18.5-acre residential and agricultural property is located at 40 Old Colchester Road in Salem, Connecticut. Old Colchester Road borders the southern boundary of the property. Property improvements include a single-family residence, a storage shed and an asphalt driveway. The primary vegetative cover in the central and eastern portions of the property is a meadow. A broadleaved deciduous woodland is present in the western portion of the property.

No inland wetlands or watercourses were observed at the property. The identified onsite soils are neither poorly drained, very poorly drained, or from alluvial deposits. They are well drained and formed from glaciofluvial deposits or are forming from human altered deposits.

Three soil map units were identified on the property. Each map unit represents a specific area on the landscape and consists of one or more soils for which the unit is named. Other soils (inclusions that are generally too small to be delineated separately) may account for 10 to 15 percent of each map unit. The mapped units are identified in the following table by name and symbol and typical characteristics (parent material, drainage class, high water table, depth to bedrock, and slope). These characteristics are generally the primary characteristics to be considered in land use planning and management. A description of each characteristic and their land use implications follows the table. A complete description of each soil map unit can be found in the *Soil Survey of Fairfield County, Connecticut* (USDA 2005), and at <https://soilseries.sc.egov.usda.gov/osdname.aspx>. On the day of the review, the soil was moist. The sky was clear and air temperatures were in the 60's ° F.

<u>Sym.</u>	<u>Map Unit</u>		<u>Parent Material</u>	<u>Slope (%)</u>	<u>Drainage Class</u>	<u>High Water Table</u>			<u>Depth To Bedrock (in)</u>
	<u>Name</u>					<u>Depth (ft)</u>	<u>Kind</u>	<u>Mos.</u>	
<i>Upland Soil</i>									
38	Hinckley	Graciofluvial	3-8	Excessively Drained	>6.0	--	--	>60	
	<i>gravelly sandy loam</i>								
305	Udorthents -Pits Complex,	Excavated or Filled Soil (>2 feet)	0-65	Moderately Well Drained	1.5->6.0	Apparent	Nov-Apr	>60	
	<i>gravelly</i>								

<u>Map Unit</u> <u>Sym.</u>	<u>Map Unit</u> <u>Name</u>	<u>Parent</u> <u>Material</u>	<u>Slope</u> <u>(%)</u>	<u>Drainage</u> <u>Class</u>	<u>High Water Table</u>			<u>Depth To</u> <u>Bedrock</u> <u>(in)</u>
					<u>Depth</u> <u>(ft)</u>	<u>Kind</u>	<u>Mos.</u>	
308	Udorthents, Smoothed	Excavated or Filled Soil (>2 feet)	0-45	Well Drained	>6.0	--	--	>60

Parent material is the unconsolidated organic and mineral material in which soil forms. Soil inherits characteristics, such as mineralogy and texture, from its parent material. Glacial till is unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice. Glacial outwash consists of gravel, sand, and silt, which are commonly stratified and deposited by glacial melt water. Alluvium is material such as sand, silt, or clay, deposited on land by streams. Organic deposits consist of decomposed plant and animal parts.

A soil's texture affects the ease of digging, filling, and compacting and the permeability of a soil. Generally sand and gravel soils, such as outwash soils, have higher permeability rates than most glacial till soils. Soil permeability affects the cost to design and construct subsurface sanitary disposal facilities and, if too slow or too fast, may preclude their use. Outwash soils are generally excellent sources of natural aggregates (sand and gravel) suitable for commercial use, such as construction sub base material. Organic layers in soils can cause movement of structural footings. Compacted glacial till layers make excavating more difficult and may preclude the use of subsurface sanitary disposal systems or increase their design and construction costs if fill material is required.

Generally, soils with steeper slopes increase construction costs, increase the potential for erosion and sedimentation impacts, and reduce the feasibility of locating subsurface sanitary disposal facilities.

Drainage class refers to the frequency and duration of periods of soil saturation or partial saturation during soil formation. Seven classes of natural drainage classes exist. They range from excessively drained, where water is removed from the soil very rapidly, to very poorly drained, where water is removed so slowly that free water remains at or near the soil surface during most of the growing season. Soil drainage affects the type and growth of plants found in an area. When landscaping or gardening, drainage class information can be used to assure that proposed plants are adapted to existing drainage conditions or that necessary alterations to drainage conditions (irrigation or drainage systems) are provided to assure plant survival.

High water table is the highest level of a saturated zone in the soil in most years. The water table can affect the timing of excavations; the ease of excavating, constructing, and grading; and the supporting capacity of the soil. Shallow water tables may preclude the use of subsurface sanitary disposal systems or increase design and construction costs if fill material is required.

The depth to bedrock refers to the depth to fixed rock. Bedrock depth affects the ease and cost of construction, such as digging, filling, compacting, and planting. Shallow depth bedrock may preclude the use of subsurface sanitary disposal systems or increase design and construction costs if fill material is required.

Mr. Eric Labatte
Re: 40 Old Colchester Road, Salem, CT

October 1, 2024
Page 4

Conclusions

Today, we investigated the property located at 40 Old Colchester Road in Salem, Connecticut. No inland wetlands or watercourses were observed at the property. Thank you for the opportunity to assist you. If you should have any questions or comments, please do not hesitate to contact us.

Sincerely,

A handwritten signature in black ink, reading "William L. Kenny". The signature is written in a cursive, flowing style with a large, prominent "W" and "K".

William L. Kenny, PWS, PLA
Soil Scientist

Enclosure

Ref. No. 6138

SOIL LEGEND

- UPLAND
- 38 HINCKLEY GRAVELLY SANDY LOAM
- 305 UDORRTHENT'S -PIT'S COMPLEX
- 308 UDORRTHENT'S, SMOOTHED

WILLIAM KENNY ASSOCIATES
 LANDSCAPE ARCHITECTURE • ECOLOGICAL SERVICES
 1899 Bronson Road Fairfield CT 06824
 203.366.0588 www.wkassociates.net



SOIL MAP

**40 OLD COLCHESTER ROAD
 SALEM, CONNECTICUT**

SCALE: NOT TO SCALE
 DATE: OCTOBER 1, 2024 - DRAFT

Ref. No. 6138



I CERTIFY THAT THIS SOIL MAP
 SUBSTANTIALLY REPRESENTS THE SOILS
 MAPPED IN THE FIELD



WILLIAM L. KENNY, SOIL SCIENTIST

- NOTES:**
- INFORMATION SHOWN ON THIS DRAWING IS APPROXIMATE.
 - SOIL INFORMATION PROVIDED BY WILLIAM KENNY ASSOC.
 - OTHER INFORMATION TAKEN FROM A TOWN OF SALEM GIS MAP.
 - 73_308 AND 3 ARE SOIL MAPPING UNIT SYMBOLS. SEE DETERMINATION REPORT FOR THE SOIL MAP UNIT NAMES AND ADDITIONAL RELATED INFORMATION.



November 27, 2024

Jackson Smith
William Kenny Associates
1899 Bronson Road
Fairfield, CT 06824
jsmith@wkassociates.net

Project: New Salem Solar Facility Located at 40 Old Colchester Road in Salem, Connecticut
NDDDB Portal Filing No.: 119190
NDDDB Preliminary Assessment No.: 202410212
NDDDB Expiration Date: November 27, 2025

Dear Jackson Smith,

I have reviewed Natural Diversity Data Base maps and files regarding the area delineated on the map provided for the proposed Salem Facility Solar Located at 40 Old Colchester Road in Salem, Connecticut. Please be advised that this is a preliminary review and not a final determination. A more detailed review will be necessary to move forward with any subsequent environmental permit applications submitted to DEEP for the proposed project. **This preliminary assessment letter cannot be used or submitted with your permit applications at DEEP. This letter is valid for one year.**

The following species are known to occur within the vicinity of your project site:

Myotis septentrionalis (Northern long-eared bat) - Federal and State Endangered
Perimyotis subflavus (Tri-colored bat) – State Endangered
Epeoloides pilosula (Macropis cuckoo) – State Endangered
Macropis ciliata (Fringed loosestrife oil-bee) – State Special Concern
Carex bushii (Bush's sedge) – State Special Concern
Desmodium glabellum (Dillenius' tick-trefoil) – State Special Concern
Platanthera flava var. *herbiola* (Pale green orchid) – State Special Concern

Protection for State Listed Plants

To prevent impacts to State Endangered, Threatened and Special Concern plant species, botanical field surveys of the site should be performed by a qualified botanist with the appropriate scientific collecting permits at a time when these target species are identifiable. A report summarizing the results of such surveys should include:

1. Survey date(s) and duration.
2. Site descriptions and photographs.
3. List of component vascular plant and animal species within the survey area (including scientific binomials).
4. Data regarding population numbers and/or area occupied by State-listed species. Include special plant and/or animal forms found at:
https://www.ct.gov/deep/cwp/view.asp?a=2702&q=323460&deepNav_GID=1628
5. Detailed maps of the area surveyed including the survey route and locations of State listed species.
6. Conservation strategies or protection plans that indicate how impacts may be avoided for all state listed plant species present on the site.

7. Statement/résumé indicating the botanist's qualifications. Please be sure when you hire a consulting qualified biologist to help conduct this site survey that they have the proper experience with target taxon.

The botanical site surveys report should be sent to our CT DEEP-NDDDB Program (deep.nddbrequest@ct.gov) for further review by our program biologists. Incomplete reports may not be accepted.

Protection for State Listed Bee Species

Epeoloides pilosula (Macropis cuckoo) – State Endangered

Habitat: Open sparsely vegetated areas and nectars on species of *Apocynum*, *Galax*, *Houstonia* and *Rubus*.

Macropis ciliata (Fringed loosestrife oil-bee) – State Special Concern

Habitat: These bees prefer open habitats supporting host plants, especially *Lysimachia* Plants (yellow loosestrifes) nearby.

The NDDDB application indicates that this project site is an open meadow. The site should be surveyed by taxonomic expert, familiar with these two native bee species to determine if the bees may be present on this project site and provide a conservation plan to minimize impacts to the populations. Please provide a native bee protection/conservation plan to the NDDDB Program, developed by a taxonomic expert. The conservation plan should focus on ways to mitigate for the loss of habitat and for the restoration of native host plants.

Protection for State Listed Bat Species

Northern long-eared bat

The Northern long-eared bat is one of the species most impacted by White Nose Syndrome. Populations in Connecticut have declined by over 90%, and it has been Federally listed as Threatened as of May 4, 2015. During the summer northern long-eared bats roost singly or in maternal colonies underneath bark, in cavities or in crevices of both live trees and snags (dead trees). Males and non-reproductive females may also roost in cooler places, like caves and mines. Northern long-eared bats seem to be flexible in selecting roosts, choosing roost trees based on suitability to retain bark or provide cavities or crevices. This bat has also been found rarely roosting in structures, like barns and sheds. Northern long-eared bats spend winter hibernating in caves and mines, called hibernacula. The presence of northern long-eared bat (*Myotis septentrionalis*), a federally threatened and state endangered species, may require consultation with the US Fish and Wildlife Service Ecological Field Office in order to be in compliance with the Federal Endangered Species Act if the proposed project requires federal permits or uses federal funds. For more information on federal requirements visit: <http://www.fws.gov/midwest/endangered/mammals/nleb/>

Tri-colored bat

Populations of Tri-colored bats have declined over 90% as a result of White Nose Syndrome. This bat is associated with forested edges and open forested landscapes with water features. Maternity colonies will form in tree cavities of mature trees, they will occasionally roost on man-made structures. They are among the most sensitive bats to cold temperatures and in winter they hibernate in caves and abandoned mines where temperatures and humidity levels are stable.

Given the known concentrated seasonal use of this area by bats, we recommend that tree cutting and other land-clearing activities be conducted during the hibernation period of these animals.

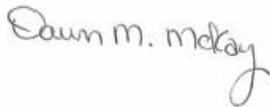
- **Tree cutting should only be conducted from November 1st through March 30th to ensure that bats are safely situated in their hibernacula.**
- Retaining larger diameter trees (12-inch DBH and larger) wherever possible on-site, may additionally minimize the potential for negative impacts to bats.
- Trees with loose, rough bark such as maples, hickories and oaks are more desirable than other tree species due to the increased cover that the loose bark provides.
- Large trees with cavities are also utilized by different bat species.
- The NDDDB Program recommends the installation of bat houses to help mitigate for trees that must be eliminated as part of this project.

Natural Diversity Database information includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Natural History Survey, cooperating units of DEEP, landowners, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the NDDDB should not be substitutes for onsite surveys necessary for a thorough environmental impact assessment. The result of this review does not preclude the possibility that listed species may be encountered on site and that additional action may be necessary to remain in compliance with certain state permits.

Please note that if the information requested in this letter is not received by November 27, 2025, we will be unable to provide a determination. Materials already submitted will not be retained or returned. You will need to initiate a new review request by submitting a new and complete *Request for Natural Diversity Database (NDDDB) State Listed Species Review* via DEEP's ezFile Portal. For more information and guidance on submitting a request for a Natural Diversity Data Base review visit our website. **Please reference the filing number 119190 on all correspondence regarding this request.**

Please contact me if you have further questions at deep.nddbrequest@ct.gov . Thank you for consulting the Natural Diversity Data Base. Thank you for consulting the Natural Diversity Data Base.

Sincerely,



Dawn M. McKay
Environmental Analyst 3

Info



Legend

Details

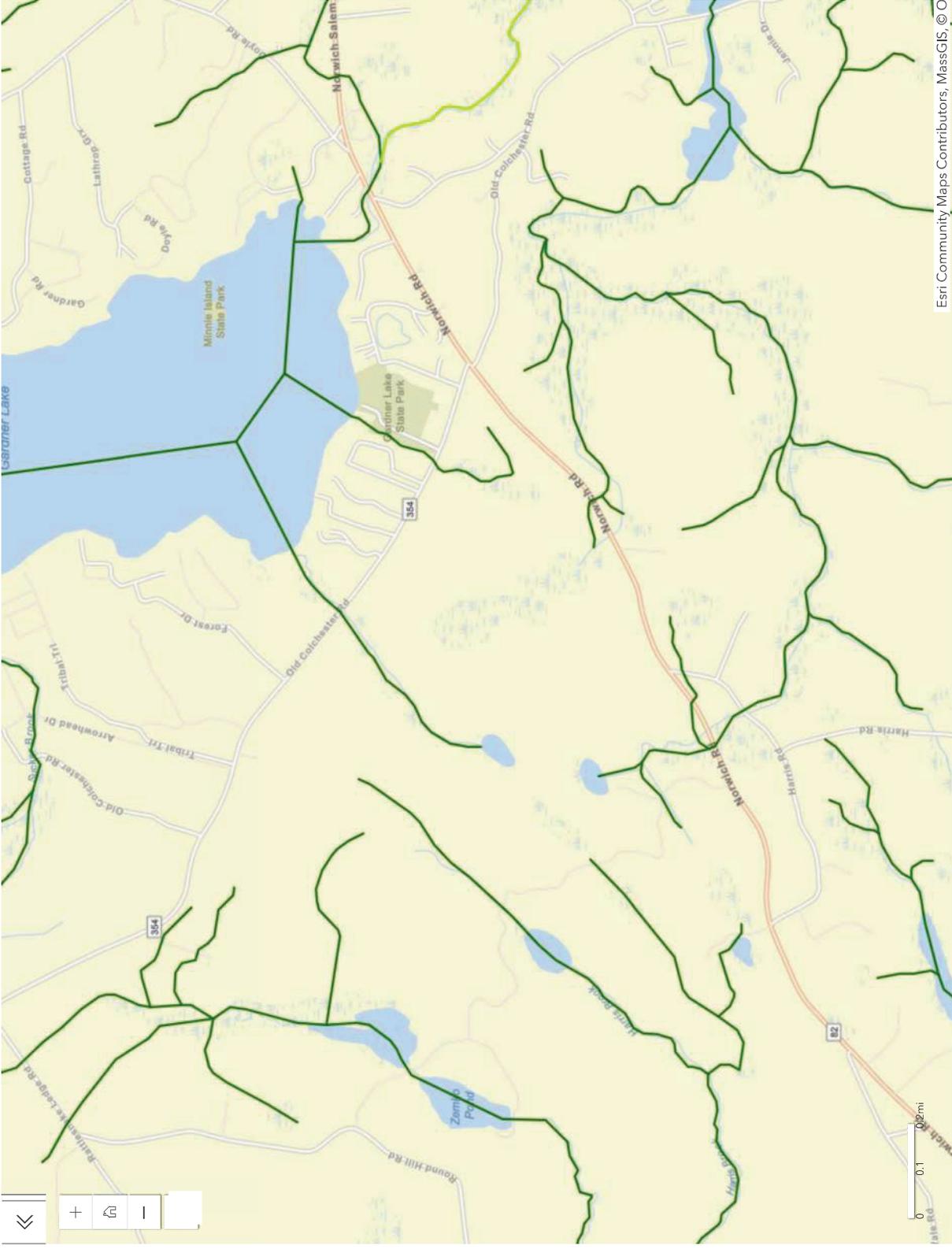
Stream Flow Classifications

1

2

3

4



Appendix C: Cultural Resources

- Phase 1A Archaeological Study
Prepared by Archaeological Consulting Services
- Phase 1A SHPO Letter (Dated September 27th, 2024)

Phase Ia Archaeological Assessment Survey
Proposed Solar Photovoltaic Array
40 Old Colchester Road
Town of Salem, Connecticut

August, 2024



ACS

◆ Archaeological Consulting Services ◆

**Phase Ia Archaeological Assessment Survey
Proposed Solar Photovoltaic Array
40 Old Colchester Road
Town of Salem, Connecticut**

by

**Gregory F. Walwer, Ph.D.
and
Dorothy N. Walwer, M.A.**

of

ACS

for

Solli Engineering
501 Main Street, Suite 2A
Monroe, CT 06468
(203) 880-5455

August, 2024

ACS

◆ *Archaeological Consulting Services* ◆
118 Whitfield Street
Guilford, Connecticut 06437
(203) 458-0550
www.acsarchaeology.com
acsinfo@yahoo.com

Abstract

This report contains the results of a Phase Ia archaeological assessment survey conducted by ACS (Archaeological Consulting Services) during the month of August, 2024. The project calls for an evaluation of potential cultural resources to be affected by the construction of a solar farm on a property that measures 18.46 acres in Salem, Connecticut. The project property consists of one lot at 40 Old Colchester Road (Route 354) near its intersection with Norwich Road (Route 82) in eastern Salem. The project area is limited to about one-half of the total acreage in the central part of the property. The project is being coordinated by Solli Engineering, a civil engineering firm based in Monroe, Connecticut. Solli supplied site plans which show the proposed development and existing conditions. The project is subject to review by the Connecticut Siting Council and the Connecticut State Historic Preservation Office (SHPO).

Background research indicates a low statistical sensitivity for potential prehistoric cultural resources, with a prehistoric landscape sensitivity model developed and utilized by ACS indicating a high score of 13.6 out of a possible 100.0, and therefore within the low sensitivity range (0-20). Despite the presence of excessively drained Hinckley gravelly sandy loam in the northwest section of the property that would have provided favorable habitation conditions, the rocky context of the rest of the property and the distance to substantial bodies of water results in a low likelihood for prehistoric site contexts being present. Further, the property was used historically as a gravel quarry, thus any former site contexts are likely disturbed. There are no previously recorded prehistoric sites in the area other than one at the northern end of Gardner Lake.

Land records and historic maps do not reveal any prior historic developments within the project area itself, although the land was owned by occupants of the adjacent DeWolf house and previously the Bland family during the early to mid-19th century. To the west on the other side of Norwich Road, the primary Bland House or tavern was built around 1810. Both Old Colchester Road and Norwich Road were established early in the history of the town, thus early historic site contexts could be located within several hundred feet of Colchester Road in the project property, although the lack of mapped or historically referenced structures and the extensive nature of prior historic gravel quarrying at the property results in a low likelihood for any surviving historic site contexts. ACS therefore recommends no further archaeological conservation efforts for potential historic cultural resources on the project property.

Project Summary

Project Name: Proposed Solar Photovoltaic Array.

Project Purpose: To investigate possible cultural resources which may be impacted by the construction of a solar farm in Salem, Connecticut, in compliance with requirements of the Connecticut Siting Council and the Connecticut State Historic Preservation Office.

Project Funding: TRITEC Americas, LLC, La Jolla, California.

Project Location: 40 Old Colchester Road, Salem, Connecticut.

Project Size: 18.46 acres (project property).

Investigation Type: Phase Ia archaeological assessment survey.

Investigation Methods: Background research, pedestrian surface survey.

Dates of Investigation: August, 2024.

Performed by: ACS (Archaeological Consulting Services), 118 Whitfield Street, Guilford, Connecticut 06437, (203) 458-0550 (telephone), (203) 672-2442 (fax), acsinfo@yahoo.com.

Principal Investigators: Gregory F. Walwer, Ph.D. and Dorothy N. Walwer, M.A.

Submitted to:

Solli Engineering (Eric Labatte, Director of Operations), 501 Main Street, Suite 2A, Monroe, CT 06468, (203) 880-5455.

Connecticut Office of State Archaeology (Dr. Sarah Sportman, State Archaeologist), University of Connecticut, 354 Mansfield Road, Storrs, Connecticut 06269-1176, (860) 486-5248.

Reviewing Agency:

Connecticut State Historic Preservation Office (Catherine Labadia, Staff Archaeologist), 450 Columbus Boulevard, Hartford, Connecticut 06103, (860) 500-2329.

Recommendations: No further archaeological conservation efforts for either prehistoric or historic cultural resources.

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CHAPTER 1: INTRODUCTION

Project Description

This report provides the results of a Phase Ia archaeological assessment survey conducted by ACS for the planned development of a solar voltaic array, or solar farm, in Salem, New London County, Connecticut. The owner of the project is TRITEC Americas, LLC of La Jolla, California. The project is contained within a lot owned by John S. And Ruth A. Gadbois, and measures 18.46 acres. The lot mostly contains an open field recently used for gravel quarrying, surrounded by scrub growth and wooded contexts. Some residential, commercial, and open farm lots lie directly to the north. The address for the parcel is 40 Old Colchester Road (Route 354), and is recorded with the Salem Town Assessor as Tax Map 12, Lot 9. The project area is in eastern Salem to the east of the intersection between Old Colchester and Norwich Roads on the north side of Old Colchester Road, and to the west of the Montville town border. A house built in 1959 occupies the western end of the project property, although there are no structures within the project area itself.

ACS was contacted by Solli Engineering, a civil engineering firm based in Monroe, Connecticut to conduct the archaeological assessment survey for the project. Solli supplied ACS with a survey map, indicating that the survey was likely required for review by the Connecticut State Historic Preservation Office (SHPO) and Connecticut Siting Council. The survey map shows the proposed development and existing conditions, including topography and wetlands. The bulk of the proposed development would be in just over one-half of the total acreage in the central part of the property on about ten acres.

ACS conducted the assessment survey in conformance with the *Environmental Review Primer for Connecticut Archaeological Resources* issued by SHPO. The assessment survey evaluated the potential need, if any, for a Phase Ib archaeological reconnaissance survey. The archaeological assessment survey consisted of a thorough background research effort and pedestrian surface survey to evaluate the potential sensitivity of the project area for any prehistoric and/or historic cultural resources, with SHPO to serve as review agency for the final report.

CHAPTER 2: BACKGROUND

Environmental Setting

The project area is located in the Town of Salem, New London County, Connecticut. The project setting is in the Southeast Hills (IV-C) ecoregion of Connecticut. The project area lies in the eastern section of Salem, to the east of the intersection between Old Colchester Road (Route 354) and Norwich Road (Route 82). Most of the project area is in the central part of the project property that measures 18.46 acres, on an open field which had been historically used for gravel quarrying (Figure 1). There are no structures within the project impact area, although a house built in 1959 is located in the far western end of the lot.

Underlying bedrock for the property is dominated by Rope Ferry Gneiss (Zwr), a pre-Cambrian metamorphic formation in excess of 590 million years old (Rodgers 1985). The formation is part of the Avalonian Terrane of southeast Connecticut that was formerly part of the African continental plate, with the Lake Char dividing fault separating it from the Oceanic Terrane of the rest of Connecticut located just to the north at Gardner Lake. Bedrock exposures in the area reveal bedding dips on the order of 15 to 35 degrees to the northwest. The area containing the property is dominated by glacial outwash sediments of gravel (g), derived from glacial riverine deltaic topset deposits or proximal fluvial deposits at the melting edge of a retreating glacier (Stone et al. 1992). The resulting landscape is gently to moderately sloping, with elevations for the project area at about 430 feet above mean sea level in the northern section, to just over 400 feet above mean sea level near Old Colchester Road, with a general dip to the south but with substantial undulations (Figure 2). There is no substantial vegetation within the project area other than low scrub growth and secondary forest cover along the perimeter.

The project area is at the boundary between two drainage basins, including Oxoboxo Brook (#3004) to the south that flows east about eight miles into the Thames River, and Gardner Brook (#3906) to the north that contains Gardner Lake. Gardner Brook eventually feeds the Yantic River to the north and also the Thames River (McElroy 1991). There are no wetlands within the project property, with the closest body of water consisting of some wetlands and a feeder stream of Oxoboxo Brook well to the south of Old Colchester Road.

There are two main soil types within the project area (Figure 3) (Crouch 1983; USDA NRCS websoil survey 2024). Most of the project area contains units of interdigitated Canton and Charlton fine sandy loam (CdC / 62C, CdD, 62D), very rocky, well drained soils generally found on hill slope land forms. Typical stratigraphic profiles of Canton soil include a surface layer of black fine sandy loam only one inch thick, followed by a subsoil of dark yellowish brown fine sandy loam and sandy loam to two feet deep, and a substratum of grayish brown gravelly sand to five feet deep or more. The Charlton counterpart typically has a surface layer of very dark grayish brown fine sandy loam to three inches deep, followed by 26 inches of dark yellowish brown, yellowish brown, and light olive brown fine sandy loam, and a substratum of grayish brown fine sandy loam to five feet deep or more. In the northwest section of the project area, a unit of Hinckley gravelly sandy loam (HkC / 38A) dominates. The excessively drained soil includes a surface layer of dark brown gravelly sandy loam to seven inches deep, followed by a subsoil of yellowish brown gravelly loamy sand 15 inches thick, and a substratum of brownish yellow gravelly coarse sand to five feet deep or more. The Hinckley soils are suited for cultivated crops where irrigated, but the overall rocky and sloping context of the project area would not have been conducive to prehistoric or early historic agricultural efforts.

Figure 2: USGS 7.5' Topographic Map, Montville and Fitchville Quadrangles

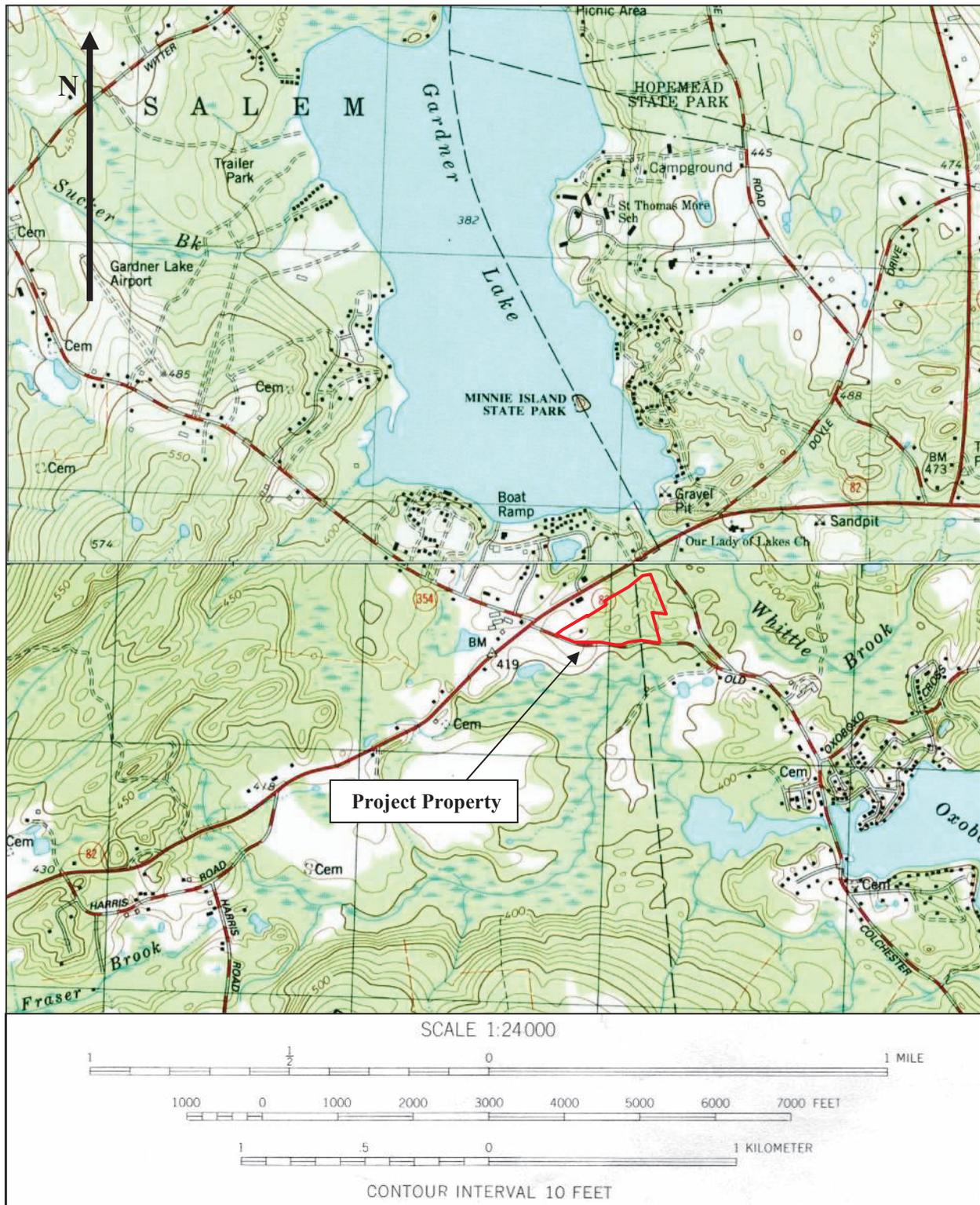


Figure 2: From USGS 1983a and 1983b.

Figure 3: USDA Websoil Survey Map



Figure 3: From USDA NRCS websoil survey.

Cultural Setting

Regional Prehistory

The prehistory of the project region and New England in general can be broadly divided into periods reflecting changes in environment, Native American subsistence and settlement patterns, and the material culture which is preserved in the archaeological record. Although it remains controversial today, the conservative estimates for the first occupations of North America are about 18,000 to 15,000 years ago, just after the maximum extent of the last glaciation and the broadest extent of the Bering land bridge (Kehoe 1981:7; Parker 1987:4; Jennings 1989:52). Southern Connecticut itself remained glaciated until about 15,200 B.P. (Snow 1980:103; Gordon 1983:71; Parker 1987:5; McWeeney 1994:181, 1999:6).

Paleo-Indian

The Paleo-Indian period is documented in Connecticut after 13,000 years ago and extends to roughly 9,500 B.P. (Swigart 1974; Snow 1980:101; Lavin 1984:7; Moeller 1984, 1999). The earliest radiocarbon date in Connecticut was secured recently at the Brian D. Jones site, at about 12,500 B.P. (Leslie and Sportman 2020). An unpublished date of 12,600 B.P. was also obtained from the site (Sportman pers. comm. 2022). This was a period of climatic amelioration from full glacial conditions, and a rise in sea levels which fell short of inundating the continental shelf. It was during this time that tundra vegetation was replaced by patches of boreal forests dominated by spruce trees (Snow 1980:114; Parker 1987:5-6), and eventually white pine and several pioneering deciduous genera (McWeeney 1994:182, 1999:7). Early in the period, the environment was conducive to the existence of large herbivores and a low population density of humans who procured these animals as a major subsistence resource, although warming temperatures and denser forests contributed to the extinction of certain species. The projected human social and settlement patterns are those of small bands of semi-nomadic or restricted wandering people who hunted mammoth, mastodon, bison, elk, caribou, musk ox, and several smaller mammals especially after the extinction of megafauna (Ritchie 1969:10-11; Snow 1980:117-120; Jones and Forrest 2003). Episodes of sparse vegetation during this period encouraged the use of high lookout points over hollows and larger valleys by people in pursuit of large game. The southern part of New England had an earlier recovery from glacial conditions when compared to areas to the north, however, with a higher density of vegetation that might have precluded Paleo-Indians of Connecticut from focussing heavily on the larger mammals (McWeeney 1994:182).

The cultural material associated with this period includes large to medium-sized, fluted projectile points (cf. Clovis), in addition to knives, drills, pieces esquillees and graters, scrapers, perforators, awls, abraders, spokeshaves, retouched pieces, utilized flakes, and hammerstones (Wilbur 1978:5; Snow 1980:122-127; Moeller 1980). Although numerous finds from this period have been found in Connecticut, only a few, small *in situ* sites exist throughout the state. Finds tend to be located near very large streams in the lower Connecticut River Valley, and in rockshelters of other regions (McBride 1981). A survey performed by the Connecticut Office of State Archaeology and the Archaeological Society of Connecticut resulted in the documentation of 53 Paleo-Indian "find spots" in Connecticut (Bellantoni and Jordan 1995), while a more updated research survey indicates up to 72 locations and sites (Bouchard 2014). Many more sites have likely been eradicated by rising sea levels since the Paleoindian period (Anderson 2001).

Early Archaic

The Early Archaic period lasted from approximately 9,500 B.P. to 7,500 B.P. (Snow 1980:159; Lavin 1984:9; Moeller 1984). Sea levels and temperatures continued to rise during this period as denser stands of forests dominated by pine and various deciduous species replaced the vegetation of the former period (Davis 1969:418-419; Snow 1980:114; Parker 1987:9; McWeeney 1994:184-185, 1999:8-9). This environmental change was rapid and caused a major shift in the animals it supported, including deer, moose, other small to medium-sized mammals, migratory birds, fish, and shellfish. The material culture changed along with the environmental conditions to include the atlatl and smaller stemmed and bifurcated projectile points (Stanly, cf. Kanawha and Lecroy) for procuring smaller, faster game in more closed settings (Wilbur 1978:6-7). The expanded tool set included choppers and anvil stones. Fish weirs and nets with stone weights could have been used as early as the Early Archaic in Connecticut (Wegner 2018). Settlement patterns were probably becoming more territorialized towards a central-based wandering character (Snow 1980:171; see also Forrest 1999), and possibly a greater focus on wetlands (Jones and Forrest 2003). Some semi-subterranean habitation structural features are evident in the region at this time, and may be part of a Gulf of Maine Archaic tradition in which there was a focus on quartz as a lithic resource without a high emphasis on projectile points (Robinson et al. 1992; Forrest 1999) and instead more of a focus on more expedient tool forms than the more formalized Paleoindian toolkit (Anderson 2001). The Early Archaic period is poorly represented in Connecticut and the lower coastal river valleys, probably resulting from a combined effect of low population densities in response to rapidly changing environmental conditions, as well as site location and preservation factors (Snow 1980:168; McBride 1981; McBride and Dewar 1981:45; Lavin 1984:9; McWeeney 1986; see also Forrest 1999).

Middle Archaic

The Middle Archaic period extended from approximately 7,500 B.P. to 6,000 B.P. (Snow 1980:173; Lavin 1984:9; McBride 1984; Jones 1999). It was by the end of this period of increased warming that sea levels and coastal configurations had stabilized and approached their present conditions (Kehoe 1981:211; Gordon 1983:82; Parker 1987:9). The period is marked by the establishment of forests with increasing proportions of deciduous hardwoods in relation to the pine predecessors in Connecticut (Davis 1969; Snow 1980:114; McWeeney 1999:10). The material culture included square or contracting-stemmed points (Neville, Stark, and Merrimac), semi-lunar groundstone knives, ground and winged banner stones for atlatls, plummets for nets, gouges, denticulates, perforators, percussed celts and adzes and grooved axes for woodworking (Snow 1980:183-184), as well as tools used in previous periods and rare triangular projectile points that may be precursors of Squibnocket points of the Late Archaic (Forrest 2010). This more extensive range of material culture indicates a broader subsistence base than in previous periods, including greater fish and shellfish procurement (Wilbur 1978:8; Snow 1980:178-182; Anderson 2001) which was associated with the stabilization of sea levels towards the end of the period. The increased breadth of subsistence resources had the effect of increasing scheduling efforts and may have caused settlement patterns to take on more of a central-based or seasonally circulating pattern with bands joining and dispersing on a seasonal basis (Snow 1980:183). Sites found in the lower Connecticut River Valley region suggest that a wider range of environments and associated site types were exploited, including both large and special task sites in upland areas (McBride 1981, 1984:56). This regional pattern may confirm the suggested settlement

pattern of central-based, seasonally circulating or restricted circulating groups of people supported by logistical procurement sites throughout the state. Middle Archaic sites are fairly rare in Connecticut, again a combined product of rising sea levels and poor site preservation (see Forrest 1999).

Late Archaic

The Late Archaic period ranged from approximately 6,000 B.P. to 3,700 B.P. (Snow 1980:187; Lavin 1984:11; McBride 1984; Pfeiffer 1984; Cassedy 1999). This period is marked by a warm-dry maximum evident from pollen cores in the region (Davis 1969:414; Ogden 1977; Anderson 2001). Hardwood, oak-dominated forests very similar in character to ones established today covered most of Connecticut by the Late Archaic (Parker 1987:10). The Late Archaic in Connecticut has been divided into two traditions: the Laurentian and the Narrow Point (Lavin 1984:11), with the former perhaps being distributed more in the interior. The Laurentian tradition is defined by wider-bladed, notched and eared triangular points, and ground slate points and ulus, while the Narrow Point tradition includes smaller, thicker, and narrower points, which as a succinct tradition may have survived well into the Woodland era (Millis and Millis 2007). The tool kit and general material culture became even more expanded during this period, with the advent of ground stone manos, nut mortars, pestles, and bowls, as well as stone pipes, bone tools, corner-notched (Vosburg, Brewerton, and Vestal), side-notched (Otter Creek, Brewerton, Normanskill), smaller narrow-stemmed (Dustin, Lamoka, Squibnocket, and Wading River), and triangular points (Squibnocket, Brewerton, and Beekman), grooved and perforated weights, fish weirs and harpoons, and decorative gorgets (Wilbur 1978:15-24; Snow 1980:228-231). The groundstone material has been inferred as being associated with an increased vegetable diet that consisted of berries, nuts, and seeds (Snow 1980:231; Lavin 1984:13), including acorn, butternut, chestnut, walnut, hickory, bayberry, blackberry, goose foot, cranberry, partridge berry, service berry, strawberry, and swamp current (Cruson 1991:29). Deer continued to be the predominant meat source, although animal remains recovered from archaeological sites in the region include black bear, raccoon, woodchuck, rabbit, otter, gray squirrel, red fox, gray fox, wolf, wild turkey, grouse, pigeon, migratory fowl, and anadromous and freshwater fish and shellfish (Cruson 1991:28-29). Various sea mammals and fish were procured along the coast.

The increasing breadth of the subsistence base and material culture was in turn associated with a central-based settlement pattern in which a restricted range of seasonally scheduled and used areas were exploited in a more semi-sedentary fashion than previously (Lavin 1984:13; Dincauze 1990:25). Sites in the lower Connecticut River Valley suggest that the larger rivers served more as long-term bases within a central-based circulating system than in the Middle Archaic (McBride 1981; McBride and Dewar 1981:48). The interior uplands of Connecticut may have supported a relatively independent set of seasonally circulating groups which used larger wetlands as long-term bases (Wadleigh 1981). Mortuary practices of the time suggest some sedentism for certain groups of people who were buried in specialized secondary cremation cemeteries and who may have had some control over restricted resources (e.g. riparian transportation routes) (Walwer 1996). Although the cremation sites largely include utilitarian funerary objects, some contain non-local materials which suggest trade association with cultures to the west of Connecticut (Walwer 1996).

Terminal Archaic

The Terminal Archaic period extended from approximately 3,700 B.P. to 2,700 B.P., as defined by the Susquehanna and Small-Stemmed traditions (Swigart 1974; Snow 1980:235; Lavin 1984:14; Pfeiffer 1984; Pagoulatos 1988; Cruson 1991; Cassedy 1999). Steatite, or soapstone, was a frequently used material by this time, and could be fashioned into bowls and other objects. The mass, permanency, and labor intensiveness of creating these heavy items have led to the inference of more sedentary base camps, especially on large rivers where the development of a canoe technology had become fully established and increased the effective catchment area within which groups of people were gathering resources on a continuous basis. The material culture of the period was very similar to the Late Archaic, with a proliferation of stemmed projectile point types including Snook Kill, Bare Island and Poplar Island stemmed points, Orient Fishtail points, Sylvan and Vestal side-notched points, and Susquehanna corner-notched points. The resource base continued to consist of deer and small mammals, nuts, shellfish, turtles, and birds (Snow 1980:249). The first signs of ceramics (Vnette I pottery) tempered with steatite fragments appeared during this period (Lavin 1984:15; Lavin and Kra 1994:37; see also Cassedy 1999:131), and archaeological evidence of trade with other regions becomes more substantial for this time (Pfeiffer 1984:84).

The distribution of sites and site types in the lower Connecticut River Valley during this period suggests that there was a change in settlement to one with fewer, yet larger sites in riverine settings, and associated satellite task-specific sites in the uplands (McBride 1981; McBride and Dewar 1981:49). The implications are less foraging-strategy residential movement and more task-oriented collection activities within a radiating settlement pattern, but probably one in which some degree of seasonal circulation of settlement took place. Pagoulatos (1988) has shown that while sites associated with the Small-Stemmed tradition tend to suggest a more mobile settlement pattern in the interior uplands, sites of the Susquehanna tradition indicate a semi-sedentary collector strategy in major riverine and estuarine environments. At least certain groups exhibited semi-sedentism and some control over restricted resources, as indicated by the elaborate burials of the Terminal Archaic (Walwer 1996). Mortuary practices from the period include secondary cremation interments in formalized cemetery areas, with individual pits containing fragmented utilitarian material from communal cremation areas, as well as highly stylized funerary objects from non-local material (Walwer 1996). The lack of other, less formalized burial types evident in the archaeological record may be a matter of poor preservation, in which case it has been proposed that the cremation cemeteries are representative of a stratified society in which a portion of the people (of the Susquehanna "tradition") were able to generate a surplus economy that supported a semi-sedentary settlement pattern. This surplus may have been generated by the procurement and control over the transportation of steatite from various areas in Connecticut and surrounding territory.

Early Woodland

The Early Woodland period in Connecticut extended from about 2,700 B.P. to 2,000 B.P. (Lavin 1984:17; Juli and McBride 1984; Cruson 1991; Juli 1999). A cooling trend during the Early Woodland (Davis 1969:414; Parker 1987:10; McWeeney 1999:11; Fiedel 2001) is thought to have reduced population sizes and regional ethnic distinction as the hickory nut portion of the resource base was significantly decreased, although the apparent decline in populations may

possibly be related to other factors such as the inability to confidently distinguish Early Woodland sites from those of other periods (Filios 1989; Concannon 1993). Climatic deterioration and depopulation are in turn thought to have inhibited the progression towards, and association with, more complex social structures and networks that were developing further to the west and south (Kehoe 1981:215). A proliferation of tobacco pipes may indicate the beginnings of agricultural efforts in the northeast. The Early Woodland of this region, however, exhibits no direct traces of subsistence crop remains, indicating continuity with previous periods in terms of subsistence practices (Lavin 1984:18).

Materially, the period is marked by a substantial development of a ceramic technology, with the Early Windsor tradition of pottery being dominant in the Early Woodland of Connecticut (Rouse 1980:68; Lavin 1984:17, 1987). Both Early Windsor cord-marked and Linear Dentate ceramic forms were being produced at this time. Diagnostic projectile points can be developmentally traced to indigenous points of previous periods, consisting of many stemmed forms in addition to Meadowood and Fulton side-notched points, Steubenville points, and Adena-Rossville types, but now may have been used in conjunction with the bow and arrow (Lavin 1984:18). Adena-like boatstones are also found in this period. Although rare contact with the Adena culture is evident throughout assemblages of the period, the Early Woodland in southern New England remained a very gradual transitional period (Snow 1980:279,287; Lavin 1984:19).

A heightened use of ceramics has been erroneously promoted as an automatic indication of increased sedentism in many areas. Instead, central-based camps with restricted seasonal encampments appear to be the dominant settlement pattern (Snow 1980:287). Minimal archaeological evidence from the lower Connecticut River Valley appears to suggest a similar settlement pattern to the Terminal Archaic in which large riverine sites served as central bases with upland seasonal dispersal or specific task sites (McBride 1981; McBride and Dewar 1981:49), but with a lesser degree of sedentism. Interior uplands populations also decreased during the Woodland era, perhaps related to the intensification of agricultural resources along major riverine and coastal areas (Wadleigh 1981:83). The trend towards greater mobility may in part be attributed to the decline in the use of steatite that no longer gave certain groups control over critical and restricted resources, as indicated by the declining ceremonialism of burial sites at the time which were more often located in habitation sites and exhibited combinations of secondary cremation features and primary inhumations (Walwer 1996). This transition in the socio-economics of the region was brought about by the decrease in importance of steatite as ceramics obscured its value for producing durable containers. Partially preserved primary inhumations appear for the first time in the region based on preservation considerations.

Middle Woodland

The Middle Woodland period lasted from about 2,000 B.P. to 1,000 B.P. (Lavin 1984:19; Juli and McBride 1984; Cruson 1991; Juli 1999). The climate was returning to the conditions basically witnessed today (Davis 1969:420; McWeeney 1999:11). It is a period which exhibited considerable continuity with previous periods in terms of both subsistence and material culture. Cylindrical pestles and groundstone hoes are tools diagnostic of the period and reflect developing agricultural efforts, including the cultivation of squash, corn, and beans on a seasonally tended basis (Snow 1980:279). Direct evidence for agriculture in the form of preserved vegetal remains, however, does not generally appear until the early Late Woodland (Lavin 1984:21) when corn is

thought to have been introduced into the Connecticut River Valley from the upper Susquehanna and Delaware River Valleys (Bendremer and Dewar 1993:386). Projectile point forms from the period include Snyders corner-notched, LongBay and Port Maitland side-notched, Rossville stemmed, and Greene lanceolate types. A proliferation of ceramic styles was witnessed during the Middle Woodland (Rouse 1980; Lavin 1984:19-20, 1987; Lavin and Kra 1984:37), including Rocker Dentate, Windsor Brushed, Sebonac Stamped, Hollister Stamped, Selden Island, and Windsor Plain types that were all also produced in the Late Woodland, with the exception of the Rocker Dentate. Net and fabric-marked ceramics are key indicators of the shift into the Windsor tradition that would follow into the Late Woodland (Wink and Leslie 2021), although ceramic forms from the Early Woodland were still being produced as well. Minor traces of the Hopewell cultures to the west are also present in the archaeological record of this period. Site types and distributions in the lower Connecticut River Valley imply that a moderate increase of sedentism with aspects of a radiating settlement pattern took place on large rivers, supported by differentiated upland task sites (McBride 1981; McBride and Dewar 1981:49). This trend may have been supported by the expansion of tidal marshes up larger rivers (McBride 1992:14).

Late Woodland

The Late Woodland period extended from approximately 1,000 B.P. to 1600 A.D., the time of widespread European contact in the broader region (Snow 1980:307; Kehoe 1981:231; Lavin 1984:21; Feder 1984, 1999). A warmer climate and increased employment of large scale agriculture for subsistence in New England were associated with increased population densities, more sedentary settlements, and more permanent living structures and facilities in larger villages. Settlements in Connecticut, however, tended to remain smaller with only small scale agricultural efforts, and as part of a seasonal round in which smaller post-harvest hunting and task-specific settlements were established in fall, and protected settlements occupied in winter (Guillette 1979:CI5-6; McBride and Bellantoni 1982; Lavin 1984:23; Starna 1990:36-37). Instead of maintaining permanent villages near agricultural plots, aboriginal populations engaged in the slashing and burning new plots and let old plots lie fallow periodically (Salwen 1983:89). In this area, domestic resources included corn, beans, squash, Jerusalem artichoke, and tobacco (Guillette 1979:CI5; Starna 1990:35). Agriculture was largely maintained by women, with the exception of tobacco (Salwen 1983:89; Starna 1990:36). Deer, small mammals, fish and shellfish, migratory birds, nuts and berries, and other wild foods continued to contribute significantly to the diet (Waters 1965:10-11; Russell 1980). Many of the foods produced were dried and/or smoked and stored in baskets and subterranean holes or trenches.

The increasing diversity of wild estuary resources may have served to increase sedentism in the coastal ecoregions of Connecticut (Lavin 1988:110; Bragdon 1996:67), while agriculture and sedentism may have been even more prominent along the larger river bottoms as floodplains stabilized and experienced less flooding (Bragdon 1996:71; Forrest et al. 2008:11). Late Woodland settlement patterns of groups in the uplands interior ecozones of Connecticut may have included the highest degree of mobility, while many sites from the central lowlands represent task-specific sites associated with larger settlements along the Connecticut River (McBride 1992:16). House structures consisted of wigwams or dome-shaped wooden pole frameworks lashed and covered with hides or woven mats, and clothing was made from animal hides (Guillette 1979:CI7-8; Starna 1990:37-38). Pottery for the period is defined as the Late Windsor tradition in Connecticut (Rouse 1980:68; Lavin 1984:22, 1987). Most of the ceramic

forms of the Middle Woodland were still being produced, in addition to the newer Niantic Stamped and Hackney Pond forms. Ceramics of the East River tradition also appear in the area during the Late Woodland, having originated and been concentrated in the New York area (Rouse 1980; Wiegand 1987; Lavin 1987). The period exhibits some continuity in terms of projectile point forms, although the Jack's Reef, Madison triangular, and Levanna points are considered diagnostic for the period. As likely with earlier periods, the material culture included various textile products such as baskets and mats, and wooden utensils such as bowls, cups, and spoons (Willoughby 1935; Russell 1980:56).

Unlike groups of the Mississippi valley, the overall cultural pattern for the entire Connecticut Woodland era exhibits considerable continuity. Interregional contact increased during this period, however, with non-local lithic materials increasing from as low as 10% to as high as 90% from the early Middle Woodland to the Late Woodland (McBride and Bellantoni 1982:54; Feder 1984:105), although most trade appears to have been done between neighboring groups rather than initiated through long-distance forays (Salwen 1983:94). The lack of enormous agricultural surpluses for the time is indicated by the low density of small storage features in habitation sites, as well as the ubiquitous primary inhumation of people without a select portion of graves exhibiting special treatment that would require high energy expenditure (Walwer 1996). As confirmed by early ethnohistoric accounts, this suggests a largely egalitarian and relatively mobile society for the Late Woodland despite the fact that this period marks the highest development of food production (i.e. agriculture) during the course of prehistory in the region. Corn was undoubtedly important, however, as a disproportionate amount of the simple, flexed burials were oriented towards the southwest which was the aboriginally acknowledged direction for the origins of corn and the Spirit Land.

Local Sites and Surveys

According to site files of the Connecticut Office of State Archaeology (CT OSA 2024) and Connecticut State Historic Preservation Office (CT SHPO 2024), there are no previously recorded prehistoric archaeological sites in close proximity to the project area, and just one prehistoric site previously found within two miles of the project area (Figure 4). The Pearson's Field site (13-001) is located in a plowed field at the north end of Gardner Lake in Bozrah over one mile to the north of the project area, representing the closest previously recorded site. Avocational archaeologists reported the recovery of a Madison projectile point and also a long-stemmed quartz point that likely indicate a Late Woodland and earlier occupation of the site.

Summary

A low density of prehistoric archaeological sites has been recorded in the region surrounding the project area. This is likely attributable to the low density of professional surveys, but also the uplands environment away from major drainages. More sites are likely yet to be discovered in the area, and probably located according to well established settlement models with a focus on proximity to fresh water sources and well drained soils, and sites more abundantly located on the larger streams further along the drainages. The glacial outwash sediments of the project area and proximity to Gardner Lake would have made surrounding territory attractive for prehistoric settlement.

Figure 4: Prehistoric Sites of the Region

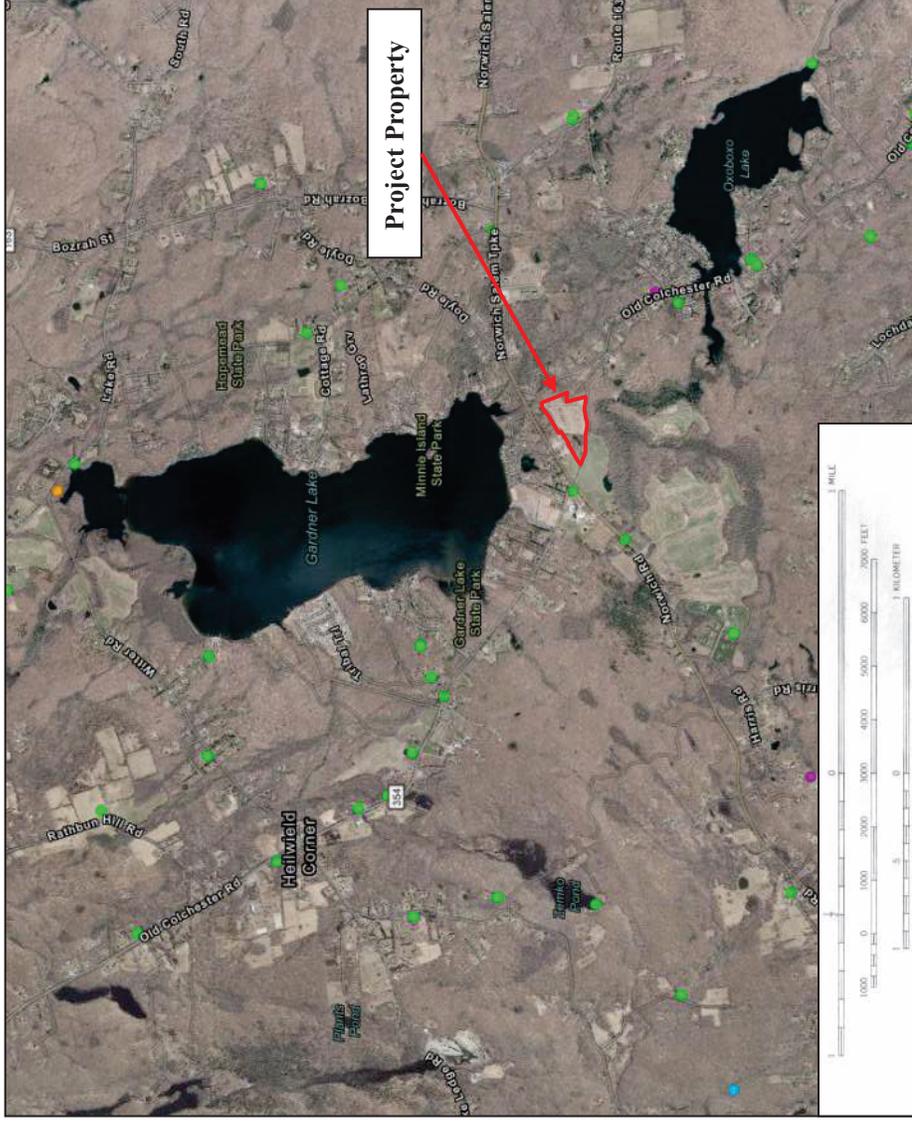


Figure 4: From CT SHPO 2024. Orange dot is the only previously recorded prehistoric archaeological site within two miles of the project area. Green dots are state historic inventory properties, including the Bland House west of the project area and Rogers Cemetery to the southwest. Purple dots are Connecticut State Register of Historic Places properties, including the George Dolbreare House to the southeast.

Local History

Contact Period

The Contact period is designated here as the time ranging from the first substantial contact between European explorers and Native American inhabitants of Connecticut to the time of intensive occupation by European settlers, roughly 1600 to 1700. Initial contact in the broader region occurred in 1524 when Verrazano reached the coast of New England (Terry 1917:16). Others followed in the first decade of the 1600s (Salwen 1983), and in 1614 Dutch explorers reached the Connecticut River (DeForest 1852:70; DeLaet 1909 [1625-1640]). The Dutch were met by the Quinnipiacs at New Haven Harbor in 1625 (Brusic 1986:9) when they initiated fur trading relationships with several local tribes. The trade relationship between local tribes and the Dutch was short-lived, however, coming to an abrupt end by the mid 1630s (Guillette 1979:WP2) when substantial English settlements were being established in the area. DeForest (1852:48) estimates about 6,000 to 7,000 Native Americans in pre-epidemic Connecticut (early 1630s), while others consider the aboriginal population to have been as high as 16,000 to 20,000 or more (Trumbull 1818:40; Gookin 1970 [1674]; Cook 1976; Snow 1980:35; Bragdon 1996:25).

The spatial configuration of tribal territories at the time of initial contact is fairly well known, although boundaries are also known to have fluctuated significantly, as did the political alliances by which the tribes could be defined (Thomas 1985:138). Three major divisions of Algonkian speaking groups can be delineated in eastern Connecticut, and their original territories conform well to present ecozone distributions (see Dowhan and Craig 1976:26 and Speck 1928:Plate 20). Centralized in East Windsor and South Windsor (Trumbull 1818:40; DeForest 1852:54-55; Spiess 1933), the Podunks occupied that part of the Connecticut River drainage basin which constitutes the North-Central Lowlands east of the river. Linguistically, the Podunks were part of the Wappinger or Mattabesec Confederacy of tribes that extended west of the Connecticut River and onto Long Island (Speck 1928). The validity of the Wappinger-Mattabesec Confederacy as a cultural entity has been challenged (Salwen 1983:108-109), however, with many smaller and somewhat independent tribes known to occupy much of the western half of the state. In the northeast part of the state, the Nipmucs occupied areas covering the Northeast Uplands and Northeast Hills ecoregions, but were centrally based in Massachusetts (Gookin 1970 [1674]; Van Dusen 1975:21; DeForest 1852:57). Blanketing the Southeast Hills and Eastern Coastal regions east of the Connecticut River, the territory of the Pequots lay adjacent to the Narragansetts of Rhode Island to the east (Speck 1928).

Several cultural distinctions can be made at a higher level of resolution within these three broad divisions. For instance, the Western Nehantics were concentrated just east of the Connecticut River on the coast, while the Eastern Nehantics occupied the southeast corner of the state and part of Rhode Island (Speck 1928: Plate 20; Swanton 1952:31 and map insert). Although considered to be two separate cultural groups, the Nehantics may have been historically divided by an incursion of the Mohegan-Pequots. The Western Nehantics are frequently cited as confederates of the Pequots (Guillette 1979:WP2), while the Eastern Nehantics may have been more aligned with the Narragansetts of Rhode Island (Caulkins 1895:20).

There is considerable debate as to the origins of the Pequots, or Mohegan-Pequots who would eventually split into two distinct tribes. Many authors believe that they originated in the

Hudson Valley or upstate New York (Caulkins 1895:21; Learned 1903:52; Speck 1909:184; Tantaquidgeon 1972:65; Fawcett 1995:10), with cultural and traditional knowledge links to the Lenni Lenape (Delaware) of the Pennsylvania region who have stories of their wolf clan having moved to the northeast, later migrating to southeastern Connecticut during the late 16th to early 17th Century. Others cite archaeological and linguistic evidence to support the idea that they developed *in situ* (Salwen 1969, 1983:107; Rouse 1980). The Pequots may have received their name from an Algonkian word for "destroyers" (Salwen 1969:81; Guillette 1979:WP1) or "powerful ones" (Avery 1901:254) or "invaders" (Fawcett 1995:10). Alternatively, it may have derived from the informal name of several Pequot Sachems shortly before the arrival of Europeans, including Wopiguand (Wo-pequoit or Wo-pequand or Pekoath) (Caulkins 1895:21) or Tamaquashad (Pekoath or Pequot) (Guillette 1979:WP1).

Most early historic accounts describe the Pequots as an invading tribe which had forcibly entered southeast Connecticut, although it is not clear what their motivation for migration might have been. While the Pequots were concentrated near the southern coast between the Thames River and the Pawcatuck or Wecapaug River (Guillette 1979:WP2), Pequot political control was more extensive, in the form of tributes exacted on aboriginal populations on parts of Long Island and some of the "river" tribes to the west. Narragansetts were principal rivals of the Pequots, for they were most able to resist Pequot aggression (Guillette 1979:WP2). Tribes who were subject to Pequot power approached Dutch traders and English colonists in Massachusetts with offers of attractive settlement areas in order to help defend against Pequot domination (DeForest 1852).

The fluctuating nature of tribal territory boundaries can be partly attributed to aspects of mobility and subsistence. Ethnohistoric sources offer descriptions of terminal Woodland and early Contact subsistence-settlement strategies of the area (McBride and Bellantoni 1982; Starna 1990:36-37). Spring settlements were located to take advantage of anadromous fish runs in larger drainages and along the coast. By late spring, attention was focussed on tending corn fields on alluvial terraces and glacial meltwater features along perennial streams and rivers. Semi-sedentary settlements near these fields were supported by task-specific hunting and gathering sites. Dispersal in the late fall and winter brought smaller groups into protected, upland or interior valleys where hunting and gathering continued. This model is confirmed by an archaeological survey of the lower Connecticut River Valley (McBride and Dewar 1981:49-50) in which large, early Contact period villages were found to be a part of a central-based circulating settlement pattern. Family units were clustered in major villages on a seasonal basis. The dispersal phase had a longer duration in the Contact period than the Late Woodland, and consisted of smaller subsistence units (single families).

The fortification of some larger villages in the early Contact period was likely a response to intertribal and intercultural political conflicts resulting from increased economic pressures induced by Euroamerican trade relationships (Salwen 1983:94; McBride 1990:101; but see Thomas 1985:136). The fortified villages are representative of the trend towards increasing sedentism and territoriality during the Contact period. Eventually, Native American populations became dispersed and afflicted by disease, warfare, and intertribal conflict to the point that small, scattered reservations served as the final restricted territories for some indigenous populations.

The economic base for Native Americans in eastern Connecticut continued to consist of hunting deer and small mammals, gathering berries, nuts, and roots, and procuring shellfish and fish on larger drainages and along the coast (Waters 1965:7; Salwen 1970:5). This basic

subsistence strategy was supported by various horticultural products, including corn as a staple, squash, beans, Jerusalem artichoke, and tobacco (Guillette 1979:CI5; Starna 1990:35). The importance of corn is evident in historic descriptions of ritual activities, including variations of the Green Corn Festival that extended with various groups, including the Mohegans, into the present day (Speck 1909:194; Speck 1928:255; Tantaquidgeon 1972:81; Fawcett 1995:54-57). Elderly women possessed extensive knowledge of wild plants which provided a host of medicines and treatments (Russell 1980:35-37).

The material culture included a mix of aboriginal forms and European goods such as metal kettles and implements (e.g. knives and projectile points), cloth, glass beads, and kaolin pipes (Salwen 1966, 1983:94-96). Wigwams continued to serve as the principal form of housing, in some cases well into the 18th Century (Sturtevant 1975). Unlike the Late Woodland, Contact aboriginal lithic products were predominantly manufactured from local quartz sources (McBride and Bellantoni 1982:54). Dugout canoes may have continued to provide a major form of transportation in larger drainages (Salwen 1983:91). Late Contact period Euroamerican trade goods included various metal tools, glass bottles, ceramic vessels, kaolin clay pipes, and nails (McBride and Grumet 1992).

Wampum (shell beads) served as an important item for exchange by Native Americans with European traders, but their original use was in the form of belts as symbolic signs of allegiance or reciprocity between tribes, and as sacred markers or tokens of honor for individuals (Guillette 1979:CI8; Ceci 1990:58-59; Salisbury 1990:87; Fawcett 1995:59). With European metal drill bits, tribes along the coast were now mass producing wampum for trade with the Dutch and English, who in turn used the shell beads to trade with other tribes farther inland (Salwen 1983:96; Ceci 1990:58). Control of wampum production along the eastern Connecticut coast may have contributed to Pequot dominance over other tribes at this time. Although wampum was initially traded for Euroamerican goods, it was eventually used to pay fines imposed by colony governments on the tribes for "illegal" acts. While colonization brought new material goods to Native Americans in the area in exchange for fur, land, and services, the indigenous inhabitants became increasingly subject to legislative economic restrictions by the colonists (Salisbury 1990:83).

Sachems and councils of leading males formed the basic political unit for groups of villages (Gookin 1970 [1674]; Simmons 1986:12). The authoritative roles of clan mothers had diminished as a result of a strong European leadership bias towards males in trade relationships (Fawcett pers. comm. 1996). Tributes paid to sachems were generally used as reserves for the tribe at large. Although sachems were generally assigned by hereditary lineage, this was not always the case (Bragdon 1996:140-141). Additionally, authority was usually enforced by persuasion of a council. Shamans were "magico-religious" specialists of the tribes who also had a considerable role in leadership and decision-making (Speck 1909:195-196; Simmons 1986:43; Starna 1990:42-43). Other special status roles included warriors and persons who had visions, thus social status was largely based on achievement and recognition. Rules of obligation and reciprocity operated on all levels of tribal-wide decision-making (Bragdon 1996:131-134), serving to diffuse centralized authority. While the assignment of lineality (i.e. matrilineal vs. patrilineal) for the area tribes is still debated (Bragdon 1996:157), the well established practice of bride-pricing and traditional accounts support the contention of a patrilineal social organization (Speck 1909:193; Salwen 1983:97). Post-marital residence appears to have been ambilocal.

On a larger scale, more powerful tribes demanded tributes from smaller ones, often resulting in loose alliances between the latter. This process created a dynamic political environment that prompted intertribal conflict, especially after contact with Euroamericans (Guillette 1979; Bragdon 1996). The European settlers of the Contact period used this embedded rivalry system to their advantage in trade relationships and the procurement of land. The colonists were placed at a further political advantage because of the severe reduction in aboriginal populations as a result of disease (Starna 1992). Major epidemics occurred between 1616 and 1619, and more severely around 1633 (Snow and Lanphear 1988; Starna 1990:45; Snow and Starna 1989). Diseases introduced into the Americas included chicken pox, cholera, diphtheria, malaria, measles, oncocercosis, poliomyelitis, scarlet fever, smallpox, tapeworms, trachoma, trichinosis, typhoid fever, whooping cough, and yellow fever (Newman 1976:671).

The Pequot Sachem Wopiguand was killed in the early 1630s by the Dutch over trade disagreements (DeForest 1852:73), essentially ending the Dutch-Pequot trade relationship and initiating a pattern of increased hostilities between Euroamericans and Native Americans of the region (Hauptman 1990). Political turmoil ensued within the Pequot tribe as to who should succeed Wopiguand and how best to engage the Europeans. The choice of Sassacus to lead the tribe and subsequent disputes as to tribal policy with respect to the Europeans prompted Uncas and his supporters to defect as the Mohegan tribe (DeForest 1852:84; Fawcett 1995:11). The Mohegan base of settlement was situated at the confluences of the Shetucket, Quinebaug, and Yantic Rivers, and along the Thames River in Montville (Baker 1896:10; Speck 1909:185). The Mohegans were, however, still largely under the control of the Pequots, as were the southern groups of Nipmucs (i.e. Quinebaugs) who occupied northeast Connecticut (Gookin 1970 [1674]:7).

When the Plymouth Colony began to make plans for settlement in Connecticut in the early 1630s, the Dutch resisted the idea because of their perceived proprietorship over the area by "right of discovery" (Guillette 1979:WP3). The Dutch responded by creating a trading post in Hartford, while the English followed with a fortified post in Windsor. In 1635, English colonists of the Massachusetts Bay Colony established other settlements on the Connecticut River (Hauptman 1990:71). Isolation of the Dutch was completed that year when Winthrop built a settlement at the mouth of the river in Saybrook (Guillette 1979:WP4). Conflicts in the trade relationship between the Pequots, neighboring tribes, Dutch traders, and English colonists heightened in the mid 1630s. In response to these tensions, the Pequots maintained fortified villages at Pequot Hill in Groton, and later Fort Hill near Noank. Further conflicts resulted in several skirmishes between the Pequots and English colonists, culminating in the "Pequot War" (DeForest 1852:96).

In 1637, a contingent of soldiers from the Connecticut colonies was joined by the Mohegan sachem Uncas, who led his newly divergent tribe and some Narragansetts on a campaign against the Pequots (Hauptman 1990:73). Most of the latter were massacred at Mystic Fort, the survivors of which were forced to scatter widely. The Mohegan acceptance of some of the conquered Pequots into its tribe caused hostilities to emerge between the Narragansett sachem Miantonomo and Uncas. The defeat of the Pequots and the emergent hostilities between the Mohegans and Narragansetts led to the Tripartite Treaty of 1638, which in theory allied the Mohegans and Narragansetts, forbade any reorganizing attempts by the Pequots, redistributed Pequot prisoners between the Mohegans and Narragansetts, and provided ownership of Pequot

territory to the Connecticut colonists (DeForest 1852:159,181). Some young male Pequots were sold into slavery in the West Indies (Salwen 1983:108; Campisi 1990:118), while many of the Pequots held by the Narragansetts left to be with or near the Mohegans, causing further hostilities between the latter two tribes. The English colonists granted Uncas territory that had not been part of the Tripartite Treaty, heightening the antagonism between the Narragansetts and Mohegans which would continue into the 1640s (Fawcett 1995:14-15). Speck (1909:186) cites several Mohegan forts which were built partly in response to heightened intertribal warfare, including the one on Fort Hill, one on Uncas Hill, and the nationally registered Fort Shantok.

The Connecticut English favored alliances with the Mohegans because of proximity and a greater role in the subjugation of the Pequots (Guillette 1979:M6). After numerous skirmishes between the two sachems, the Connecticut government effectively sanctioned the execution of Miantonomo by Uncas (DeForest 1852:195). The Mohegans and the Connecticut colonists continued to exhibit mutual support in King Philip's War of 1675, when they defeated attempts of the Wampanoags of Massachusetts, the Nipmucs, and some Podunks, to thwart the expansion of Euroamerican settlement (Gookin 1836 [1677]; Barber 1838:20-21; DeForest 1852:288). This war effectively ended any military threat or potential resistance to full fledged settlement of southern New England by the Europeans (Fawcett 1995:16).

The Pequot War set a trend of English control over, and arbitration between, native groups (Twitchell 1899; Hauptman 1990:69). Most of the tribes looked favorably on this situation at first, for it had relieved them of control by the Pequots. This control, however, was merely shifted to the English colonists who demanded shell bead payments in return for protection and as penalties for "crimes" (Ceci 1990:61). Eventually, demand for wampum decreased as the fur trade was diminished following the widespread depletion of commercially targeted animals (Salisbury 1990:90). The colonists then turned to land as the principal aboriginal resource to be tapped through "fines." Native American subsistence patterns were becoming increasingly hindered by English settlement, and closure of the surrounding land further prevented adequate use of hunting ranges. Colonist encroachments on "unused" portions of reservations occurred without reasonable chance of recourse by legal means (McBride 1990:107; Campisi 1990).

Pequot populations were reduced from at least several thousand to less than a thousand towards the end of the 17th Century (Cook 1976:52), while almost all land had been lost following the war. Uncas and the Mohegans fared better at first, gaining territory in various areas of Connecticut through marriages and alliances with tribes such as the Podunks. But Mohegan territories also dwindled through ambiguous land transactions with the Euroamerican colonists (DeForest 1852:292). Various tracts sold by Uncas and his son Owaneco, for example, had overlapping boundaries (Guillette 1979:M13). By the time Uncas died in 1682, Mohegan land was reduced to tracts on the west side of the Thames between New London and Norwich as the main focus of Mohegan populations, an area just north of Lyme, and the "Mohegan Hunting Grounds" which included an area between Norwich, Lebanon, Lyme, Haddam, Middletown, and Colchester (DeForest 1852:297,311; Guillette 1979:M14,16). The trend of land divestiture witnessed by the Pequots and the Mohegans similarly affected the Quinebaug (southern Nipmucs) and Western Nehantics (DeForest 1852:376,385).

New London County was organized in 1666, with the New London area having been settled by Europeans as early as 1646 (Caulkins 1878:87; Baker 1896:71). Euroamerican

settlement spread from there up the Thames River and along the coast. By 1659, Uncas had deeded Major Mason of the Connecticut Colony nine square miles of the greater Norwich area, while 300 acres were deeded back to Uncas' son Owaneco near the confluence of the Shetucket and Quinebaug Rivers (Woodward 1868:45-46; Caulkins 1878:57-59). The land of the future Salem was obtained through several transactions. Niantic Sachem, Sannup, or Sanhop, deeded an eight mile square tract of land near the Connecticut River, including the current southwestern area of Salem, to Matthew Griswold, Sr. in 1664 (Corriveau 2006:7,79; Wordell 1969:1). However, disputes arose from conflicting claims of ownership, and were not resolved until the 18th century with the Griswold family ultimately awarded title to the land (Rossano and Donohue 2003:11). An eight mile square tract of land known as Paugwonk lands was deed to William Lord by Chappattoe, a Mohegan kinsman of Uncas, in 1669 (Wordell 1969:1; Rossano and Donohue 2003:11; Corriveau 2006:79). Uncas also deeded several thousand acres of the Chesterfield area of Montville and extending into southeastern Salem in 1683 to Samuel Chester (Wordell 1969:1). Owaneco, son of Uncas, deeded 500 acres west of Gardiner's Lake in 1686 to Daniel Mason of Stonington, and in 1699 sold large tracts of hunting grounds to Whethersfield resident, Nathaniel Foot, which would become the northern area of Salem (Wordell 1969 2; Rossano and Donohue 2003:19). As much of the southern area of Salem had been obtained by Matthew Griswold or his son, it was easily acquired in the early 18th century by large plantation owner, Colonel Samuel Browne, who would become influential in the Salem region.

18th Century

Estimates for the Mohegan population in the region are as low as 750 for the beginning of the 18th Century (Speck 1909:185), while Pequot reservation populations dropped from approximately 1,500 to less than 200 between 1674 and 1731 (Speck 1928:213). Early attempts to convert aboriginal populations to Christianity met with little success (Gookin 1836 [1677]:435; DeForest 1852:179,252). Because it tended to cause rifts in the tribes, Uncas and other sachems came to oppose what they initially thought were harmless teachings (Guillette 1979:M11). Efforts to convert and assimilate local aboriginal populations gained momentum during the 18th Century, however. A schoolhouse for educational and "moral" instruction was ordered to be built in 1726 for the Mohegans (Guillette 1979:M18). By the 1740s, the Great Awakening period of increased Christianity among Euroamericans also started to gain support among the Mohegans, Pequots, and Quinebaugs (DeForest 1852:380,430; Simmons 1990:148). The movement was incorporated by many Mohegans with the conversion of Samson Occum, a highly visible and active member of the tribe who was a founder of Moore's Indian Charity School in Lebanon (Guillette 1979:M21). Christianity among Native Americans was on the decline by the end of the century, however, as Occum and many others left the region.

Euroamerican efforts to assimilate Native American populations included attempts to create privately owned land within tribal territories that could then be sold. Encroachment by Euroamerican settlers on Pequot and Mohegan lands continued through various other means during the 18th Century (DeForest 1852; Campisi 1990). Intratribal political strife developed as different factions encouraged opposing approaches to land transactions with Euroamerican settlers. In 1769, the Mohegan Sachemship and its political structure was effectively outlawed by the Connecticut Colony as a result of the failure of the tribe to support a colony-endorsed sachem (Fawcett 1995:17-18). Such tribal rifts were perpetuated as a result of excessive land

sales by English-backed sachems (Simmons 1986:32). Ironically, many Mohegans and Pequots served on the side of the English in the French and Indian War of the 1750s, as well as the Revolutionary War in the late 1770s and others to follow.

Salem was established from land of Colchester and Lyme. As the neighboring towns of Colchester and Lyme grew, development expanded into the Paugwonk area, creating difficult access to for its inhabitants of the parish to attend church (Rossano and Donohue 2003:11). Therefore, the outlying settlers of northern Lyme and southern Colchester petitioned for the creation of a separate parish, and in 1725, these residents established what became the parish of New Salem (Rossano and Donohue 2003:12). By 1726, land had been donated by resident James Harris, for a meetinghouse, cemetery, training field, and school, and by 1728, its inhabitants established Christ Church as their own church (Marshall 1922:289; Rossano and Donohue 2003:12).

Roads were laid out as transportation needs in the area grew. Established on old paths and trails, these roads were crucial in the town's development. The Hartford New London Turnpike, later known as Route 82, was laid out in 1716 and provided stage coach services until the late 19th century (Rossano and Donohue 2003;13; Corriveau 2006:9). The Norwich Essex Turnpike crossed the Hartford New London Turnpike (Route 82), creating the important Four Corners area of central Salem, which became the hub of the community in the next centuries (Corriveau 2006:9). Several sawmills and gristmills were established in the 18th century. Records reveal that early residents of the area established a fulling mill and sawmill, an ash works were built on the property of Jabez Jones, and a dam and mill had been built on the farm of early resident, Pelatia Bliss (Rossano and Donohue 2003:14).

The early Euroamerican settlers of the Salem area included Colonel Samuel Browne of Salem, Massachusetts (Rossano and Donohue 2003:12; Corriveau 2006:7). Between 1718 and 1729, Browne, a wealthy merchant, established a plantation of nearly 9,500 acres of land in what is now south Salem, obtained through sales with the Griswold family of Lyme and Colchester (Rossano and Donohue 2003:12,14; Corriveau 2006:7). Utilizing slave labor to clear the land, Browne's plantation was farmed from 1718 to 1781 (Rossano and Donohue 2003;16; Corriveau 2006:7). Large houses were constructed for his overseers, including Samuel Gilbert, James Harris, Lebbeus Harris, John Mumford, Sr. and John Mumford, Jr. (Rossano and Donohue 2003:15). A homestead for one of his overseers of the estate was constructed and became the first inn in Salem along Governor's Road (Rossano and Donohue 2003:14; Corriveau 2006:7,127).

The regional pattern of large plantations utilizing slave labor to grow large, marketable quantities of produce existed in the region due to their ability to access markets easily. Produce from Browne's plantation was easily brought to the markets by several routes, including the Connecticut River, ports in New London and Newport, and also northern ports such as Boston (Rossano and Donohue 2003:15). Large quantities of wheat were ultimately sold in the West Indies and southern colonies (Rossano and Donohue 2003:15). Mast timbers for the extensive shipbuilding industry in the area were collected on Browne's property, and other products of the plantation included barrel staves, horses, cattle, and dried beef (Rossano and Donohue 2003:15). The plantation also leased farms to tenants required to clear and improve the land, while also requiring a home to be built on the land (Rossano and Donohue 2003:16). The Browne estate was ultimately confiscated by the state of Connecticut following the Revolutionary War, and the

Browne family heir, William Browne, fled to England in 1776 (Rossano and Donohue 2003:17). Lots of the 9,500 acre estate were laid out and subsequently sold (Rossano and Donohue 2003:17). In 1769, New Salem parish was divided, with the southeastern part becoming Chesterfield, and Montville was established in 1786 after part of Chesterfield and the eastern part of Salem parish were set off (Wordell 1969: 4).

19th Century

Salem was officially established as a town in 1819 and consisted of close to 30 square miles of the southern part of Colchester and the northern area of Lyme (Marshall 1922:178; Rossano and Donohue 2003:12;Corriveau 2006:7). Although many inhabitants of the area had emigrated away from Connecticut due to the area's medium quality land and abundant outcrops of ledge, industry and infrastructure were quickly established (Rossano and Donohue 2003:20). The area was incorporated to a network of turnpikes and other roads by the early 19th century, which provided easy access to external markets and other industry (Rossano and Donohue 2003:20). The Salem and Hamburg Turnpike was chartered in 1824, and the Essex Turnpike was established in 1833, with taverns and inns established along the routes (Rossano and Donohue 2003:22). The network of improved roads and turnpikes connected most of Connecticut towns by 1825 (Rossano and Donohue 2003:21). They serviced transportation, stimulated commerce and communication, and led to the construction or boosting of already established taverns and inns along the routes, including the Bland tavern constructed around 1810 on Norwich Road to the west of the project area (Rossano and Donohue 2003:21).

Agriculture remained the main industry in Salem at this time, with most rural farms producing grains, corn, turnips, flax, fruit, and maintaining small herds of sheep and cattle (Rossano and Donohue 2003:26). Dairy farming increased in the area by the late 19th century, and creameries were established (Rossano and Donohue 2003:27). By 1820, Salem's African American population had been reduced to 34 free black residents and no slaves (Rossano and Donohue 2003:25).

The first post office in Salem was established in 1816, and by the mid-19th century, six schoolhouses, seven sawmills, two grist mills, four churches, a piano factory, a cotton mill, and an ink factory had all been established in Salem (Rossano and Donohue 2003:20, 25; Corriveau 2006:7). The Whittlesey brothers' piano factory created expensive pianos made from mahogany, rosewood, and mother of pearl (Corriveau 2006:7). In 1835, Oramel Whittlesey established the Music Vale Seminary, the first music school in the country authorized to confer degrees of music (Corriveau 2006:7,37). Fire destroyed the school during pyrotechnics in an operetta performance at the school when gun powder flashes were used to create lightning in the performance (Corriveau 2006:41; Nortz 2012(1), 2012(2)). The rebuilt structure was also destroyed by fire in 1876 (Corriveau 2006:42).

Along Route 85, located approximately one mile north of the Salem Four Corners, is the Salem town green (Corriveau 2006:19). Several civic buildings were constructed on the green, including the Episcopal Church in 1831, the Salem Congregational Church in 1838, and the Center School in 1885 (Rossano and Donohue 2003:23; Corriveau 2006:19). Several banks were established in the area after the middle of the 19th century (Rossano and Donohue 2003:22).

Historic maps of the area (Figures 5a and 5b) show no structural developments within the project area during the 19th century. The "Bland House" is shown to the west where the tavern

was located, and what may have been an outbuilding or secondary residence of the property to the west on the north side of Old Colchester Road was located just west of the project area at the far western end of the project property. By the 1860s, that secondary structure is indicated as owned by William DeWolf, and referred to as a dwelling house in land records. Just to the north of the project area on the south side of Norwich Road (Salem & Norwich Turnpike), there was a Ten Pin Alley, likely associated with the Gardiner's Lake Hotel located on the north side of the road, and reflecting a relatively early entertainment establishment. The Bland family owned the project property, which at that time included 60 acres and a dwelling house, until sold in 1854 to Eliphath Beckwith (Salem Land Records, volume 3, page 215). The Bland House tavern to the west was built around 1810, benefitting from the establishment of the turnpike about ten years later. The original owner was David Bland, who died in 1832 but was succeeded by his wife Anna who continued to live there (Rossano and Donohue 2003: SAL-16). The Beckwiths sold the project property in 1859 to William DeWolf (SLR 4/215), and the property sold again to the Miner family in 1877 (SLR 4/459).

20th Century+

The population of Salem continued its decline in the early 20th century (Rossano and Donohue 2003:30). By 1930, there were only 403 inhabitants of Salem (Rossano and Donohue 2003:30). This population decrease caused some outlying school buildings to close (Rossano and Donohue 2003:30). Agriculture and dairy farming continued to be the main industry in the area, but poultry farming and egg production became increasingly important (Rossano and Donohue 2003:32). By 1930, there was an influx of Eastern European immigrant farmers, particularly Polish and Jewish farmers, that moved to the Salem area (Rossano and Donohue 2003:32). The Baron de Hirsch Fund, now the Jewish Agricultural and Industrial Aid Society / Jewish Agricultural Society, was established to help Jewish emigrants from Russia and Europe, and provided mortgages to settlers of Salem in the late 19th and early 20th centuries (Rossano and Donohue 2003:32). Nearly 100 mortgages/deeds in Salem were recorded by the Fund in the early 20th century (Rossano and Donohue 2003:32).

The Four Corners area, at the intersection of Hartford Road and Norwich Road, became a hub of activity by the 20th century. On the corners were the Country Store, the McCalls' house, and Willows Garage (Corriveau 2006:9). Owning the Willows Garage for over 75 years, the McCall family lived in the adjacent house, and provided a local hangout for the residents of Salem at the garage where customers convened and played pool (Corriveau 2006:14). The lot across from the Willows Garage became a scrap metal depot for the World War II effort (Corriveau 2006:53)

In 1918, the first hydroelectric plant in the area was constructed by inventor, Frederick Rawolle, on his nearly 3,000 acre estate in the Fairy Lake area of Salem (Rossano and Donohue 2003:34; Corriveau 2006:8,79). After making a fortune from his compact explosive invention used to fracture oil wells, he built his dream/show farm, known as Fairy Lake Farm, in Salem using the hydroelectricity of Fairy Lake to provide power for his entire estate (Corriveau 2006:8,79). Vegetables and other produce were grown on Fairy Lake Farm, and pigs, chickens, and cattle were raised (Corriveau 2006:81). This farm was one of eight farms formally certified to produce milk in the state, and the only one in the county (Corriveau 2006:82). In 1922, Rawolle also built a store in the Four Corners area utilizing the rare and revolutionary

Figure 5a: Historic Sites of the Area (1854 Map)



Figure 5a: From Walling 1854.

Figure 5b: Historic Sites of the Area (1868 Map)



Figure 5b: From Beers 1868.

refrigeration and freezing technology of the time (Corriveau 2006:8,10,82). In 1942, the first firehouse was built in Salem along Route 85 (Corriveau 2006:57).

By the early 20th century, Gardner Lake bordering Salem, Bozrah, and Montville, became a recreation attraction where visitors could fish, canoe, boat, and cut ice in the winter (Corriveau 2006:72). Many camps were located in the area, attracting campers from all over the state, but were closed and sold off in the mid-20th century to make way for large lake homes (Corriveau 2006:72). A house was reportedly sunk in Gardner Lake when the owners attempted to move it to a new location across the frozen lake in winter in the late 19th century, and visitors still attempt to locate the wreckage on the bottom of the lake (Corriveau 2006:78; Nortz 2012(1):10). By 1940, the population of Salem was 504, and by 1980, it had reached 2,333 (Rossano and Donohue 2003:36). The decline of agriculture in the area continued after the middle of the 20th century (Rossano and Donohue 2003:36). New municipal buildings and complex were constructed, and retail buildings grew in the area (Rossano and Donohue 2003:36). Influential residents of Salem included those from the Mitchell, Tiffany, and Bingham families (Rossano and Donohue 2003:33).

The 60 acres containing the project property, including land to the west of the intersection between Norwich Road and Old Colchester Road, traded hands a few times in the early 20th century, and particularly to eastern European immigrants with family names such as Kudlick (1909 SLR 8/19), Muisal (1909 SLR 8/20), Zagacki and Garynska (1912 SLR 8/81) and Katula (1915 SLR 8/163). In 1922, the property was sold to Sydney and Eva Dolbeare (SLR 8/305), who sold it to the Gadbois family in 1939 (SLR 11/3). In 1959, the eastern 25 acres containing the project property and exclusively to the east of the major intersection was set off (SLR 12/398), but still owned by the Gadbois family with a dwelling house built at the site of the former house that year (Figures 5c and 5d). Subdivisions from that parcel, particularly lots along Norwich Road, have reduced it to its current size of 18.46 acres, with the existing house well west of the project impact area. The Gadbois family gave an extensive interview for an oral history of Salem (Nortz 2012(1)), in which they indicated their farm was used for milking cows and growing corn, but also many other products that made them relatively self sufficient. Signage on the property today reveals that it was subject to gravel quarrying late in the historic sequence.

Local Sites and Surveys

There are no previously recorded historic archaeological sites within two miles of the project area according to Connecticut Office of State Archaeology (CT OSA 2024) or Connecticut State Historic Preservation Office (CT SHPO 2024) site files. As indicated earlier, the project property is associated historically with the Bland Tavern property to the west at 550 Norwich Road. The historic house at that location is currently a historic resource inventory property listed with SHPO (Rossano and Donohue 2003). The tavern was likely built prior to the time the Norwich-Salem turnpike was established in the 1820s (Rossano and Donohue 2003:21-22, 28). The two-story gambrel-roofed cape style home features a raised brick foundation, second story dormers, two end chimneys, a rear ell, and numerous outbuildings.

Other significant historic resources are nearby. The Rogers historic cemetery is located to the southwest of the project property on a knoll residing on east side of Norwich Road. To the southeast of the project area by about one-half mile lies the George Dolbreare Sr. house, listed

Figure 5c: Historic Sites of the Area (1934 Map)



Figure 5c: From Fairchild 1934.

Figure 5d: Historic Sites of the Area (1939 and 1943 Maps)

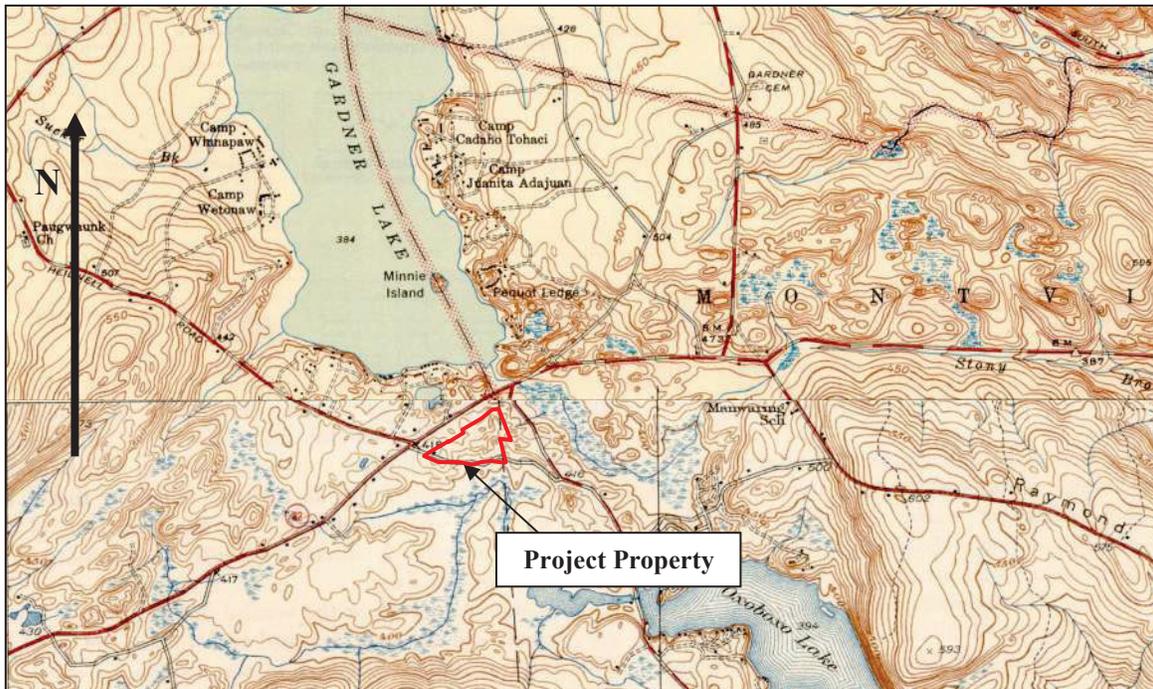


Figure 5d: From USGS 1939 and 1943.

with the Connecticut Register of Historic Places. Built around 1740, the Colonial house features a cut stone chimney. Other historic resource inventory listings of historic homes dot the landscape on historic roads, with the nearest property listed with the National Register of Historic Places (NRHP) consisting of the Salem Historic District lying several miles to the west, and featuring the Greek and Gothic Town House, Music Valley Seminary, and numerous homes of the 18th and 19th centuries (Paine 1977). While historic maps and land records reveal a house at the far western end of the project property outside the project impact area, that house was replaced in 1959 by the current structure.

Summary

There is a low density of previously recorded historic archaeological sites in the Salem area, and none within two miles of the project area. The most prominent historic resources of the area consist of historic homes along the major historic roads, in this case the Bland House and tavern that occupies the property west of the project property, and whose family also owned the project property in the early 19th century. The property occupies the very eastern part of Salem that was part of the outskirts of Mohegan territory during the Contact period. The 18th century history of Salem was marred by the establishment of large plantations benefitting from slave labor to produce surplus goods transported along a newly formed network of roads that would have included Norwich Road and Old Colchester Road, the former established in 1820 about ten years after the Bland House was built. A dwelling house on the project property was occupied by William DeWolf by the mid-19th century, and then some eastern European immigrant families during the early 20th century. The Gadbois family acquired the project property in 1939, and descendants still own it today. The current house on the project property to the west of the project impact area was built in 1959. The project area itself has been quarried for gravel.

CHAPTER 3: CONCLUSION

Prehistoric Sensitivity

Background research and the pedestrian surface survey indicate a low sensitivity for potential prehistoric cultural resources within the project area. ACS conducted a pedestrian surface survey of the project property that did not reveal any prehistoric artifacts or feature contexts at the surface. The surface survey included regularly spaced traverses in approximate 100-foot intervals throughout the existing open field, occupied by scrub growth (Figures 6 and 7). An entryway on the north side of Old Colchester Road reveals some gravel quarrying activity in the past, and the surface slope is undulating, with a general slope from north to south. There is a prominent rock outcrop in the north-central part of the property, although rounded and low without any reasonable probability of having served as a prehistoric rockshelter (Figure 8). Ground visibility was fair during the surface survey, with the scrub growth low and dispersed enough to view something on the order of 20 percent of the ground surface. There were no prehistoric or early historic artifacts observed, and in many instances gravelly or rocky contexts to indicate some general disturbance in the past. A neighbor interviewed during the surface survey confirmed gravel excavations in the past and recent attempts to revegetate the property. There are no previously recorded prehistoric archaeological sites in close proximity to the project area, the closest located at the north end of Gardner Lake.

A statistical prehistoric landscape sensitivity model developed and employed by ACS utilizes eight environmental variables to rank sections of project properties relative to a scale of 100.0 (www.acsarchaeology.com/sensitivity-model.html). In this case, the project area has a high score of 13.6 out of a possible 100.0, and therefore solidly within the low (0-20) sensitivity range. The project area benefits greatly from its excessively drained gravelly soil, particularly in the northwest section of the property, although it is about 600 feet to the nearest water source which is a low rank order stream on the other side of Old Colchester Road (Figure 9). In addition, much of the project area has been clearly disturbed, and likely to deep contexts by past gravel excavations. ACS therefore recommends no further archaeological conservation efforts with respect to potential prehistoric cultural resources.

Historic Sensitivity

The historic course of Old Colchester Road courses along the southern boundary of the project property. While this would have in itself afforded at least a moderate sensitivity for potential historic cultural resources on the project property, historic mapping and land records do not reveal any structural developments on the parcel since at least the early 19th century, about the time the town was incorporated. The nearest historic occupation appears to be that of the DeWolf family just west of the project property, and formerly of the Bland family whose primary house and tavern was further west across Norwich Road. Further, historic gravel quarrying would have likely eradicated any historic subsurface cultural material. ACS therefore recommends no further archaeological conservation efforts with respect to potential historic cultural resources.

Figure 6: Property Entrance



Figure 6: Northwest view of property entrance on the north side of Old Colchester Road. Tree stand has an overgrown sign referencing former gravel quarrying activity.

Figure 7: Northwest Section



Figure 7: West view of unpaved path leading to the northwest section of the property that undulates, Hinckley gravelly soil unit at end of path and to the right.

Figure 8: Rock Outcrop



Figure 8: Southeast view of same path leading east, low rock outcrop at right, Hinckley soil unit in foreground.

Figure 9: View Towards Old Colchester Road



Figure 9: South view of open field. Tree line in background along Old Colchester Road, Hinckley soil unit at right.

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September 27, 2024

Dr. Gregory F. Walwer
Archaeological Consulting Services
118 Whitfield Street
Guilford, CT 06437
(sent only via email to acsinfo@yahoo.com)

Subject: Cultural Resources Assessment Survey of a Proposed Solar Development
40 Old Colchester Road
Salem, Connecticut

Dear Dr. Gregory F. Walwer:

The State Historic Preservation Office (SHPO) received the technical report prepared by Archaeological Consulting Services (ACS) titled *Phase I Archaeological Reconnaissance Survey: Proposed Solar Photovoltaic Array, 40 Old Colchester Road, Town of Salem, Connecticut* dated August 2024. The completed investigation meets the standards set forth in the *Environmental Review Primer for Connecticut's Archaeological Resources*. SHPO understands that the proposed project will consist of the construction of a new solar facility including associated infrastructure and access roads within a parcel measuring approximately 18.46 acres. Because the project will require approval from the Connecticut Siting Council, it is subject to review by this office.

The archaeological assessment survey consisted of comprehensive background research that examined historic maps and aerial imagery as well as previously identified cultural resources in proximity to the Area of Potential Effect (APE) for the project. The assessment survey failed to identify any previously recorded archaeological sites or properties listed on the National Register of Historic Places (NRHP) within a mile of the APE. The assessment survey concluded, and a pedestrian survey confirmed, that the entirety of the APE has been previously disturbed by past gravel operations. As a result, ACS determined that the APE retained no/low archaeological sensitivity and recommended no further investigation. Based on the information provided to our office, it is the opinion of SHPO that no historic properties will be affected by the proposed solar project and no additional archeological investigations are warranted.

This office appreciates the opportunity to review and comment upon this project. For additional information, please contact Cory Atkinson, Staff Archaeologist and Environmental Reviewer, at (860) 500-2458 or cory.atkinson@ct.gov.

Sincerely,



Jonathan Kinney
State Historic Preservation Officer

Appendix D: Product Information Sheets

- TrinaSolar TSM-540-DEG19C.20 540W Module Test Report
 - TDP™ 2.0 Turnkey Solar Tracker Datasheet
- Trina Solar TSMDEG19C.20 540W Module Datasheet
 - Sungrow SG125HV Inverter Datasheet

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检测
TESTING
CNAS L0599

Test Report

REPORT No.: SHE21-01442/1 DATE RECEIVED: 2021/02/24

ATTENTION: Ya XIAO ANALYSIS DATE : 2021/02/24~2021/03/10

CUSTOMER: Trina Solar Co., Ltd. DATE REPORTED: 2021/03/10

No.2 TianHe Road, Trina PV
Industrial Park, New District,
Changzhou City, Jiangsu Province
213031 SAMPLE (S): Solid waste (1)

REFERENCE: -

REMARKS

- 1.The results apply to the sample(s) as received
- 2.The report is translated from SHE21-01442.

Edited by: 周敏
Min ZHOU

Reviewed by: 孟俊
Jun MENG

Approved by: 王礼捷
Honglou WANG



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6. Should you have any queries or objection to the test report, please contact us within 10 days after receiving the report.

Legend

NA The sample was not analysed for this analyte

↑ Detection limit raised

↓ Detection limit lowered

ND Not Detected



INORGANIC & ORGANIC ANALYSIS

Report No.: SHE21-01442/1

Customer Reference: -

Lab ID	SHE21-01442.001
Customer ID	TSM-530DEG19C.20
Order No	SHES2102003321TX
Serial No	A08210100400137
Date Received	2021/02/24

TCLP ITEM	METHOD	MDL	UNIT	Limit	Solid waste
Arsenic (As)	USEPA 200.8-1994	0.050	mg/L	≤5	<0.050
Barium (Ba)	USEPA 200.8-1994	0.010	mg/L	≤100	0.195
Cadmium (Cd)	USEPA 200.8-1994	0.001	mg/L	≤1	<0.001
Chromium (Cr)	USEPA 200.8-1994	0.010	mg/L	≤5	<0.010
Lead (Pb)	USEPA 200.8-1994	0.010	mg/L	≤5	<0.010
Selenium (Se)	USEPA 200.8-1994	0.050	mg/L	≤1	<0.050
Silver (Ag)	USEPA 200.8-1994	0.010	mg/L	≤5	<0.010
Mercury (Hg)	USEPA 7473-2007	0.005	mg/L	≤0.2	<0.005
2,4-D	USEPA 8151A-1996	0.0005	mg/L	≤10	<0.0005
2,4,5-TP (Silvex, Fenopop)	USEPA 8151A-1996	0.0005	mg/L	≤1	<0.0005
Benzene	USEPA 8260D-2018	0.0005	mg/L	≤0.5	<0.0005
Carbon tetrachloride	USEPA 8260D-2018	0.0005	mg/L	≤0.5	<0.0005
Chlorobenzene	USEPA 8260D-2018	0.0005	mg/L	≤100	<0.0005
Chloroform	USEPA 8260D-2018	0.0005	mg/L	≤6	<0.0005
1,4-Dichlorobenzene	USEPA 8260D-2018	0.0005	mg/L	≤7.5	<0.0005
1,2-Dichloroethane	USEPA 8260D-2018	0.0005	mg/L	≤0.5	<0.0005
1,1-Dichloroethene	USEPA 8260D-2018	0.0005	mg/L	≤0.7	<0.0005
2-butanone(MEK)	USEPA 8260D-2018	0.020	mg/L	≤200	<0.020
Tetrachloroethene	USEPA 8260D-2018	0.0005	mg/L	≤0.7	<0.0005
Trichloroethene	USEPA 8260D-2018	0.0005	mg/L	≤0.5	<0.0005
Vinyl chloride	USEPA 8260D-2018	0.0005	mg/L	≤0.2	<0.0005
2,4-Dinitrotoluene	USEPA 8270E-2018	0.0005	mg/L	≤0.13	<0.0005
Hexachlorobenzene	USEPA 8270E-2018	0.0005	mg/L	≤0.13	<0.0005
Hexachlorobutadiene	USEPA 8270E-2018	0.0005	mg/L	≤0.5	<0.0005



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INORGANIC & ORGANIC ANALYSIS

Report No.: SHE21-01442/1

Customer Reference: -

Lab ID	SHE21-01442.001
Customer ID	TSM-530DEG19C.20
Order No	SHES2102003321TX
Serial No	A08210100400137
Date Received	2021/02/24

TCLP ITEM	METHOD	MDL	UNIT	Limit	Solid waste
Hexachloroethane	USEPA 8270E-2018	0.0005	mg/L	≤3	<0.0005
Nitrobenzene	USEPA 8270E-2018	0.0005	mg/L	≤2	<0.0005
Pentachlorophenol	USEPA 8270E-2018	0.0025	mg/L	≤100	<0.0025
Pyridine	USEPA 8270E-2018	0.002	mg/L	≤5.0	<0.002
2,4,5-Trichlorophenol	USEPA 8270E-2018	0.0005	mg/L	≤400	<0.0005
2,4,6-Trichlorophenol	USEPA 8270E-2018	0.0005	mg/L	≤2	<0.0005
Methylphenol	USEPA 8270E-2018	0.001	mg/L	≤200	<0.001
2-Methylphenol	USEPA 8270E-2018	0.0005	mg/L	≤200	<0.0005
3&4-Methylphenol	USEPA 8270E-2018	0.0005	mg/L	≤200	<0.0005
Endrin	USEPA 8270E-2018	0.0005	mg/L	≤0.02	<0.0005
γ-BHC	USEPA 8270E-2018	0.0005	mg/L	≤0.4	<0.0005
Toxaphene	USEPA 8270E-2018	0.050	mg/L	≤0.5	<0.050
Methoxychlor	USEPA 8270E-2018	0.0005	mg/L	≤10	<0.0005
Heptachlor	USEPA 8270E-2018	0.0005	mg/L	≤0.008	<0.0005
Chlordane(Total)	USEPA 8270E-2018	0.001	mg/L	≤0.03	<0.001

Remark:

- 1.Preparative method:USEPA1311-1992(Toxicity Characteristic Leaching Procedure)
- 2.The Limits comes from CFR(code of federal regulations) title 40 part 261.24.



Method List

USEPA 200.8-1994 Metals ICP-MS
 USEPA 7473-2007 Metals-Hg
 USEPA 8151A-1996 Acid Herbicides in Water by GC-MS
 USEPA 8260D-2018 VOCs
 USEPA 8270E-2018 SVOCs

Equipment Information

Method:USEPA 200.8-1994

Equipment Name	Model	Equipment Number	Serial Number
ICP-MS	Agilent 7900	CHEM-998	JP16311502

Method:USEPA 7473-2007

Equipment Name	Model	Equipment Number	Serial Number
Hg analyzer	Milestone DMA-80	CHEM-958	16041979

Method:USEPA 8151A-1996

Equipment Name	Model	Equipment Number	Serial Number
GC-MS	Agilent 7890A/5975C	CHEM-ENV085	CN12371032/US12362A17

Method:USEPA 8260D-2018

Equipment Name	Model	Equipment Number	Serial Number
PT-GC-MS	AQUATEk100&Agilent7890B/5975A	CHEM-937	US15240014/CN15423234/US1541452

Method:USEPA 8270E-2018

Equipment Name	Model	Equipment Number	Serial Number
GC-MS	Agilent 7890B/5977B	CHEM-1175	CN18293008/US1824R018

Method:USEPA 8270E-2018

Equipment Name	Model	Equipment Number	Serial Number
GC-MS	Agilent 7890B/5977B	CHEM-1175	CN18293008/US1824R018



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APPENDIX 1

Report No.:SHE21-01442/1

Customer Reference: -



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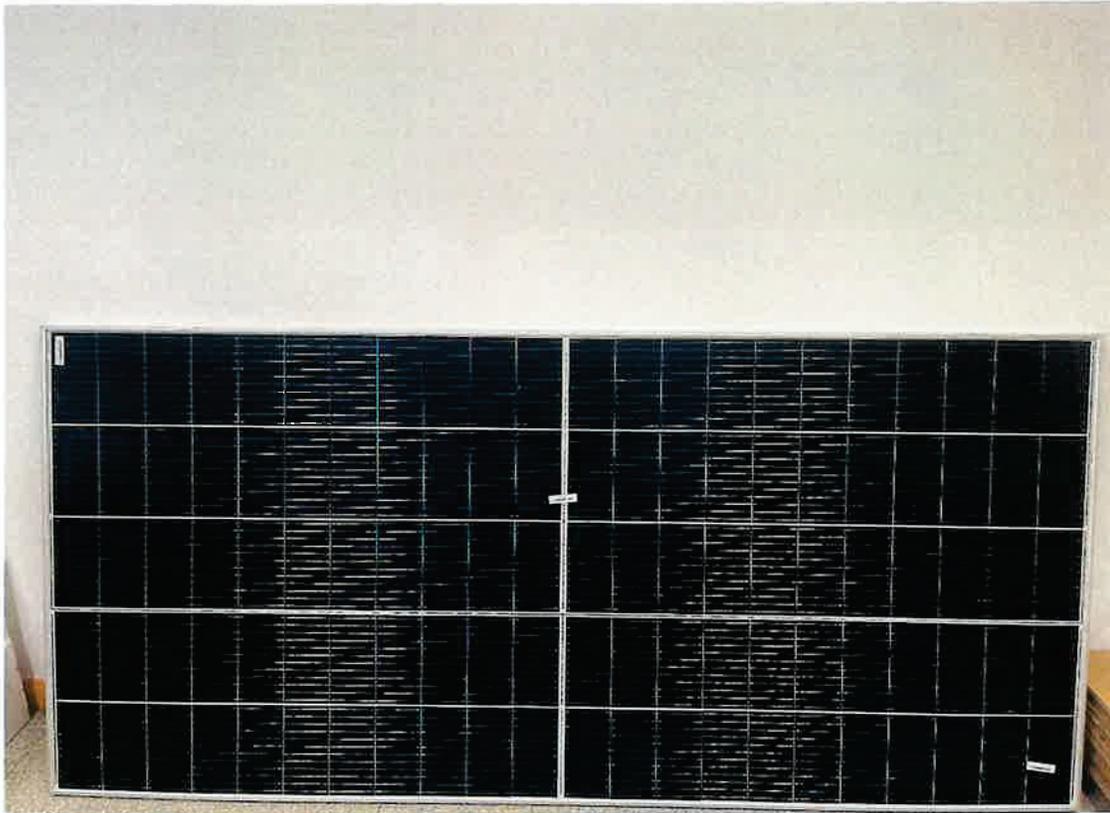
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APPENDIX 2

Report No.:SHE21-01442/1

Customer Reference: -



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APPENDIX 3

Report No.: SHE21-01442/1

Customer Reference: -



End of report



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TDP™ 2.0 TURNKEY SOLAR TRACKER With *BalanceTrac*

™ TDP is a trademark of Solar FlexRack



Tough, Reliable Tracker & Team of Experts at Your Service

Solar FlexRack's new TDP 2.0 Turnkey Solar Tracker with complete project support services for commercial and utility-scale solar installations introduces an advanced design featuring new *BalanceTrac*. This next-generation technology enables solar power plants to increase energy yield while significantly reducing project risks. That translates to smart installation cost-savings across your project budget.

The Only Tracker Solution with:

- Full Design
- Installation
- Commissioning Services

Increased Energy Yield

TDP 2.0 with new *BalanceTrac* is efficiently designed to support more modules per row, a rotational range of up to 110°, and is compatible with 1,000 and 1500V modules. These key features enable significant energy production gains in solar power plants.

Greater Adjustability To Maximize Performance

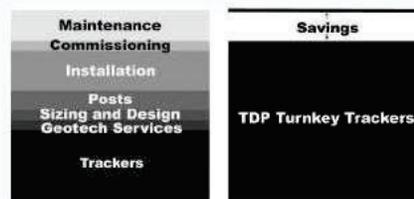
TDP 2.0 Tracker has up to a 10% slope tolerance that can eliminate the need to level land. Independently driven rows provide easy access for mowing, cleaning and maintenance. Autonomous tables increase design flexibility to maximize ground coverage on irregular and non-adjacent lots. Programmable granular backtracking, snow shedding and new wind damper technology mitigate inclement climatic events and reduce risk of tracker damage. All of these features compound to increase system performance.

Installations Fly with Solar FlexRack

No special equipment or additional steps are required to square your racking. The proprietary design allows modules to easily slide into place, accelerating the process, and reducing installation time.

Complete Support Services Reduce Project Risks And Costs

A tracker solution that comes with all the critical associated support services and an unmatched team of experts that will significantly reduce your risks and project costs. Project management is simplified, redundancies are eliminated, and you have one highly-experienced supplier-instead of many.



Increased Yield & Reduced Costs

- More modules per row (up to 90)
- Rotational range of up to 110° (±55°)
- Optimized for 1,000 & 1,500V modules
- Lower per-unit fixed costs for balance of system savings
- Allows shorter piles
- Programmable technology to mitigate inclement climatic conditions
- installations fly with no prying, adjusting or special tools
- Built to last, the robust design reduces amount of tracker components and wear
- Autonomous tables increase design flexibility to maximize land use
- Smart backtracking reduces row shading to optimize energy production
- Independently driven rows provide easy access for mowing, cleaning and other maintenance

TDP™ 2.0 Turnkey Solar Tracker with *BalanceTrac*

TESTING

Rain, wind, sleet, snow, heat – every day and everywhere, our products are battling the elements.

We perform ongoing extensive testing in these key areas: wind tunnel, structural load, electrical bonding, and life cycle.

Solar FlexRack trackers also undergo wind tunnel testing performed by RWDI, per American Society Of Civil Engineers Standard ASCE 7.

UL COMPLIANCE

All Solar FlexRack systems have gone through UL testing.

Each component-connection point within the system conforms to NEC codes for electrically bonded and conductive systems.

Testing is performed by TUV Rheinland in accordance with UL 2703.

Certification covers both United States and Canada.

Find out more about Solar FlexRack product reliability and testing at <http://solarflexrack.com/products/testing>



Learn more about our Preferred Installer Program: <http://solarflexrack.com/resources/preferred-installer-program/>

TRACKING	
Tracking method	Single-axis horizontal, distributed drive
Backtracking	Smart backtracking - customized to terrain for maximum production
Tracking range	Up to 110° (± 55°)
Ground coverage ratio (GCR)	Configurable (0.33 to 0.50)
Tracking accuracy	2°
Stow Angle	Configurable

ARRAY CONFIGURATION	
Panels per tracker	Up to 90
Trackers per controller	1
String voltage	Up to 1,500 Volts
Panel configurations	1 in portrait (crystalline) 2 in landscape (crystalline) 4 in landscape (thin film)
Drive type	Slew 24 Volts dc

OPERATIONS & MAINTENANCE	
Scheduled maintenance	None
Warranty	10 Years: Structural and Controllers 5 Years: Drives and Electrical
Certifications	UL 2703
Dynamic load management	Limited progressive damping technology
Snow management	Programmable snow shedding

INSTALLATION & TOLERANCES	
North-south slope tolerance	Up to 10%
North-south post spacing	± 1.5 inches
East-west post alignment	± 0.625 inches
Post height	± 1 inch
Post plumb	± 1°
Post twist	± 2°
Tube twist	± 2°

CONSTRUCTION	
Structural materials	Hot dip galvanized steel
Bearings	UV-rated engineering plastic, no lubrication needed
Mechanical connections	Bolted - no welding, drilling or cutting required

CONTROL SYSTEM	
Data feed	Ethernet, Zigbee, SCADA
Power consumption	31 kWh per tracker per year

ENVIRONMENTAL	
Operating temperature	-30 °C to +60 °C
Wind Stow	105 mph (Up to 130 mph) 35 mph
Snow load	10 psf (standard) Higher snow load available upon request



TDP 2.0 TURNKEY SOLAR TRACKER With *BalanceTrac*

Support Services

- ✓ Geotechnical Services
- ✓ Structural Analysis
- ✓ Layout & Design
- ✓ Foundation Design Services
- ✓ Post Driving
- ✓ Pull Testing
- ✓ Tracking System Installation
- ✓ Visual Inspection of Trackers
- ✓ Preferred Installer Network
- ✓ Post, Rack & Module Installation
- ✓ Configuration of Tracker Controls
- ✓ Configuration of Network Controls
- ✓ Project Management
- ✓ PE Stamp
- ✓ Onsite Training
- ✓ Commissioning
- ✓ Remote Data Monitoring & Reporting

Over 2.0 Gigawatts of Solar FlexRack Installed

Solar FlexRack, a division of Northern States Metals, is an integrated solar company that offers custom-designed, fixed tilt ground mount and single-axis solar tracking systems in the commercial, community solar and utility-scale solar mounting industries. Solar FlexRack offers full turnkey packages including engineering, geotechnical, pullout testing, field, layout, and installation services to address the actual site conditions of an installation and provide a full scope of services from design to delivery and installation. Solar FlexRack has completed over 2 GW of solar racking installations in 40 states across America and five countries globally.

For more information on Solar FlexRack visit: www.solarflexrack.com



BIFACIAL DUAL GLASS MONOCRYSTALLINE MODULE

PRODUCT: **TSM-DEG19C.20**

PRODUCT RANGE: **525-550W**

550W+

MAXIMUM POWER OUTPUT

0~+5W

POSITIVE POWER TOLERANCE

21.0%

MAXIMUM EFFICIENCY



High customer value

- Lower LCOE (Levelized Cost Of Energy), reduced BOS (Balance of System) cost, shorter payback time
- Lowest guaranteed first year and annual degradation
- Designed for compatibility with existing mainstream system components
- High return on Investment



High power up to 550W

- Up to 21.0% module efficiency with high density interconnect technology
- Multi-busbar technology for better light trapping effect, lower series resistance and improved current collection



High reliability

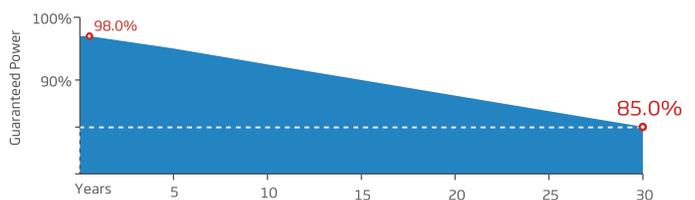
- Minimized micro-cracks with innovative non-destructive cutting technology
- Ensured PID resistance through cell process and module material control
- Resistant to harsh environments such as salt, ammonia, sand, high temperature and high humidity areas
- Mechanical performance up to 5400 Pa positive load and 2400 Pa negative load



High energy yield

- Excellent IAM (Incident Angle Modifier) and low irradiation performance, validated by 3rd party certifications
- The unique design provides optimized energy production under inter-row shading conditions
- Lower temperature coefficient (-0.34%) and operating temperature
- Up to 25% additional power gain from back side depending on albedo

Trina Solar's Vertex Bifacial Dual Glass Performance Warranty



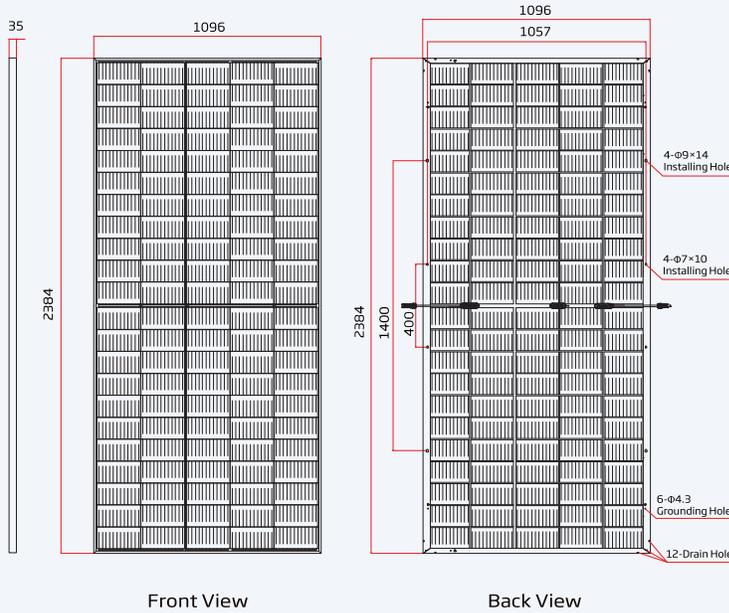
Comprehensive Products and System Certificates



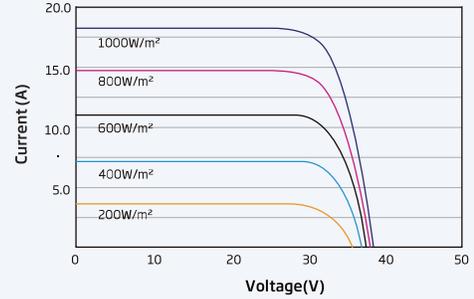
IEC61215/IEC61730/IEC61701/IEC62716/UL61730
 ISO 9001: Quality Management System
 ISO 14001: Environmental Management System
 ISO14064: Greenhouse Gases Emissions Verification
 ISO45001: Occupational Health and Safety Management System



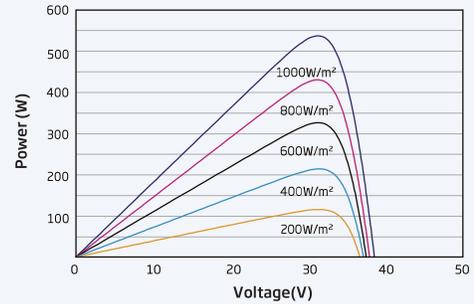
DIMENSIONS OF PV MODULE(mm)



I-V CURVES OF PV MODULE (540 W)



P-V CURVES OF PV MODULE(540 W)



ELECTRICAL DATA (STC)

Peak Power Watts -P _{MAX} (Wp)*	525	530	535	540	545	550
Power Tolerance -P _{MAX} (W)	0 ~ +5					
Maximum Power Voltage -V _{MPP} (V)	30.8	31.0	31.2	31.4	31.6	31.8
Maximum Power Current -I _{MPP} (A)	17.04	17.11	17.16	17.21	17.24	17.29
Open Circuit Voltage -V _{OC} (V)	37.1	37.3	37.5	37.7	37.9	38.1
Short Circuit Current -I _{SC} (A)	18.14	18.19	18.24	18.30	18.35	18.39
Module Efficiency η _m (%)	20.1	20.3	20.5	20.7	20.9	21.0

STC: Irradiance 1000W/m², Cell Temperature 25°C, Air Mass AM1.5. *Measuring tolerance: ±3%.

Electrical characteristics with different power bin (reference to 10% Irradiance ratio)**

Total Equivalent power -P _{MAX} (Wp)	562	567	573	578	583	589
Maximum Power Voltage -V _{MPP} (V)	30.8	31.0	31.2	31.4	31.6	31.8
Maximum Power Current -I _{MPP} (A)	18.23	18.31	18.36	18.41	18.45	18.50
Open Circuit Voltage -V _{OC} (V)	37.1	37.3	37.5	37.7	37.9	38.1
Short Circuit Current -I _{SC} (A)	19.41	19.46	19.52	19.58	19.63	19.68
Irradiance ratio (rear/front)	10%					

Power Bifaciality: 70±5%.

ELECTRICAL DATA (NOCT)

Maximum Power -P _{MAX} (Wp)	398	401	405	409	413	416
Maximum Power Voltage -V _{MPP} (V)	28.6	28.8	29.0	29.2	29.4	29.5
Maximum Power Current -I _{MPP} (A)	13.88	13.93	13.97	14.02	14.08	14.10
Open Circuit Voltage -V _{OC} (V)	35.0	35.1	35.3	35.5	35.7	35.9
Short Circuit Current -I _{SC} (A)	14.62	14.66	14.70	14.75	14.79	14.82

NOCT: Irradiance at 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s.

MECHANICAL DATA

Solar Cells	Monocrystalline 210mm PERC
No. of cells	110 cells
Module Dimensions	2384×1096×35 mm (93.86×43.15×1.38 inches)
Weight	32.6 kg (71.9 lb)
Front Glass	2.0 mm (0.08 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	EVA/POE
Back Glass	2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)
Frame	35mm (1.38 inches) Anodized Aluminium Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4,0mm ² (0,006 inches ²), Portrait: 280/280 mm (11.02/11.02 inches) Landscape: 1400/1400 mm (55.12/55.12 inches)
Connector	Trina TS4*/MC4 EV02

*Please specify connector on your order

TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of P _{MAX}	-0.34%/°C
Temperature Coefficient of V _{OC}	-0.25%/°C
Temperature Coefficient of I _{SC}	0.04%/°C

MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1500V DC (IEC)
	1500V DC (UL)
Max Series Fuse Rating	35A

WARRANTY

- 12 year Product Workmanship Warranty
- 30 year Power Warranty
- 2% first year degradation
- 0.45% Annual Power Attenuation

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

- Modules per box: 31 pieces
- Modules per 40' container: 527 pieces

** Back-side power gain varies depending upon the specific project albedo

SG125HV

String Inverter for 1500 Vdc System



HIGH YIELD

- Patented five-level topology, max. efficiency 98.9 %, European efficiency 98.7 %, CEC efficiency 98.5 %
- Full power operation without derating at 50 °C
- Patented anti-PID function

EASY O&M

- Virtual central solution, easy for O&M
- Compact design and light weight for easy installation

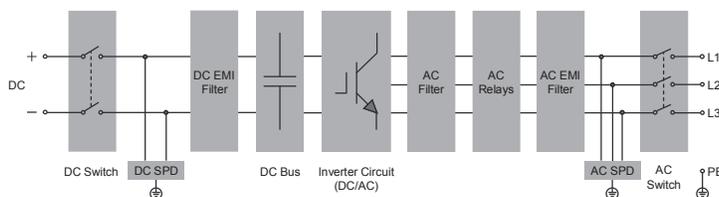
SAVED INVESTMENT

- DC 1500V, AC 600V, low system initial investment
- 1 to 5MW power block design for lower AC transformer and labor cost
- Max.DC/AC ratio up to 1.5

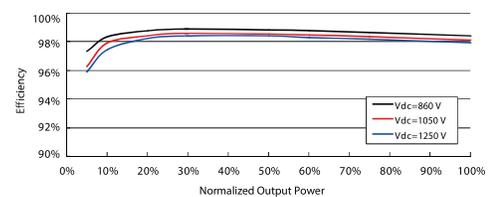
GRID SUPPORT

- Compliance with both IEC and UL safety, EMC and grid support regulations
- Low/High voltage ride through(L/HVRT)
- Active & reactive power control and power ramp rate control

CIRCUIT DIAGRAM



EFFICIENCY CURVE



Type designation	SG125HV
Input (DC)	
Max. PV input voltage	1500 V
Min. PV input voltage / Start-up input voltage	860 V / 920 V
Nominal PV input voltage	1050 V
MPP voltage range	860 – 1450 V
MPP voltage range for nominal power	860 – 1250 V
No. of independent MPP inputs	1
No. of DC inputs	1
Max. PV input current	148 A
Max. DC short-circuit current	250 A
Output (AC)	
AC output power	125 kVA @ 50 °C
Max. AC output current	120 A
Nominal AC voltage	3 / PE, 600 V
AC voltage range	480 – 690 V
Nominal grid frequency / Grid frequency range	50 Hz / 45 – 55 Hz, 60 Hz / 55 – 65 Hz
THD	< 3 % (at nominal power)
DC current injection	< 0.5 % I _n
Power factor at nominal power / Adjustable power factor	> 0.99 / 0.8 leading - 0.8 lagging
Feed-in phases / connection phases	3 / 3
Efficiency	
Max. efficiency / European efficiency	98.9% / 98.7%
CEC efficiency	98.5%
Protection	
DC reverse connection protection	Yes
AC short-circuit protection	Yes
Leakage current protection	Yes
Grid monitoring	Yes
DC switch	Yes
AC switch	Yes
Q at night function	optional
Anti-PID function	Yes
Overvoltage protection	DC Type II / AC Type II
General Data	
Dimensions (W*H*D)	670*902*296 mm 26.4"*35.5"*11.7"
Weight	76 kg 167.5 lb
Isolation method	Transformerless
Degree of protection	IP 65 NEMA 4X
Night power consumption	< 4 W
Operating ambient temperature range	-30 to 60 °C (> 50 °C derating) -22 to 140 °F (> 122 °F derating)
Allowable relative humidity range (non-condensing)	0 – 100 %
Cooling method	Smart forced air cooling
Max. operating altitude	4000 m (> 3000 m derating) 13123 ft (> 9843 ft derating)
Display / Communication	LED, Bluetooth+APP / RS485
DC connection type	OT or DT terminal (Max. 185 mm ² 350 Kcmil)
AC connection type	OT or DT terminal (Max. 185 mm ² 350 Kcmil)
Compliance	UL1741, UL1741SA, IEEE1547, IEEE1547.1, CSA C22.2 107.1-01-2001, FCC Part15 Sub-part B Class A Limits, California Rule 21, IEC 62109-1/-2, IEC 61000-6-2/-4, IEC 61727, IEC62116, BDEW, EN50549,VDE-AR-N 4110:2018, VDE-AR-N 4120:2018, UNE 206007-1:2013, P.O.12.3, UTE C15-712-1:2013, CEI 0-16:2017, IEC 61683, PEA, NTCO
Grid Support	LVRT, HVRT, ZVRT, active & reactive power regulation, PF control, soft start/ stop



Appendix E: FAA Determination



Notice Criteria Tool

Notice Criteria Tool - Desk Reference Guide V_2018.2.0

The requirements for filing with the Federal Aviation Administration for proposed structures vary based on a number of factors: height, proximity to an airport, location, and frequencies emitted from the structure, etc. For more details, please reference [CFR Title 14 Part 77.9](#).

You must file with the FAA at least 45 days prior to construction if:

- your structure will exceed 200ft above ground level
- your structure will be in proximity to an airport and will exceed the slope ratio
- your structure involves construction of a traverseway (i.e. highway, railroad, waterway etc...) and once adjusted upward with the appropriate vertical distance would exceed a standard of 77.9(a) or (b)
- your structure will emit frequencies, and does not meet the conditions of the [FAA Co-location Policy](#)
- your structure will be in an instrument approach area and might exceed part 77 Subpart C
- your proposed structure will be in proximity to a navigation facility and may impact the assurance of navigation signal reception
- your structure will be on an airport or heliport
- filing has been requested by the FAA

If you require additional information regarding the filing requirements for your structure, please identify and contact the appropriate FAA representative using the [Air Traffic Areas of Responsibility map](#) for Off Airport construction, or contact the [FAA Airports Region / District Office](#) for On Airport construction.

The tool below will assist in applying Part 77 Notice Criteria.

* Structure Type:	CRANE Mobile Crane
Please select structure type and complete location point information.	
Latitude:	41 Deg 29 M 51 S N
Longitude:	72 Deg 13 M 17.8 S W
Horizontal Datum:	NAD83
Site Elevation (SE):	405 (nearest foot)
Structure Height :	40 (nearest foot)
Is structure on airport:	<input checked="" type="radio"/> No <input type="radio"/> Yes

Results

You do not exceed Notice Criteria.



Notice Criteria Tool

[Notice Criteria Tool - Desk Reference Guide V_2018.2.0](#)

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The tool below will assist in applying Part 77 Notice Criteria.

* Structure Type:	SOLAR Solar Panel ▼			
	Please select structure type and complete location point information.			
Latitude:	41 <input type="text"/> Deg	29 <input type="text"/> M	51 <input type="text"/> S	N <input type="button" value="▼"/>
Longitude:	72 <input type="text"/> Deg	13 <input type="text"/> M	17.8 <input type="text"/> S	W <input type="button" value="▼"/>
Horizontal Datum:	NAD83 <input type="button" value="▼"/>			
Site Elevation (SE):	405 <input type="text"/> (nearest foot)			
Structure Height :	10 <input type="text"/> (nearest foot)			
Is structure on airport:	<input checked="" type="radio"/> No <input type="radio"/> Yes			

Results

You do not exceed Notice Criteria.