ENVIRONMENTAL ASSESSMENT

BRICK TOP SOLAR PROJECT

163 NORTH WINDHAM ROAD

WINDHAM, CONNECTICUT

Prepared for:

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Table of Contents

Figures

Figure No. **Title**

Table

Appendices

1 Introduction

All-Points Technology Corporation, P.C. ("APT") prepared this Environmental Assessment ("EA") on behalf of LSE Horologium LLC (the "Petitioner") for the proposed installation and utility interconnection of a solar-based electric generating facility (the "Site" or "Project"), with output of approximately 1.99 megawatts[1] ("MW") located in the North Windham section of the Town of Windham, Connecticut ("Town"). This EA has been completed to support the Petitioner's submission to the Connecticut Siting Council ("Council") of a petition for declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the construction, maintenance, and operation of the electric generating facility.

The results of this assessment demonstrate that the proposed development will comply with the Connecticut Department of Energy and Environmental Protection's ("DEEP") air and water quality standards and will not have an adverse effect on the existing environment and ecology. The Town is identified as a "distressed municipality" and therefore qualifies as an "environmental justice community"[2]. The proposed Project is not defined as an "affecting facility"[3] under Connecticut General Statutes § 22a-20a. Therefore, the Project is not subject to the requirements of that section.

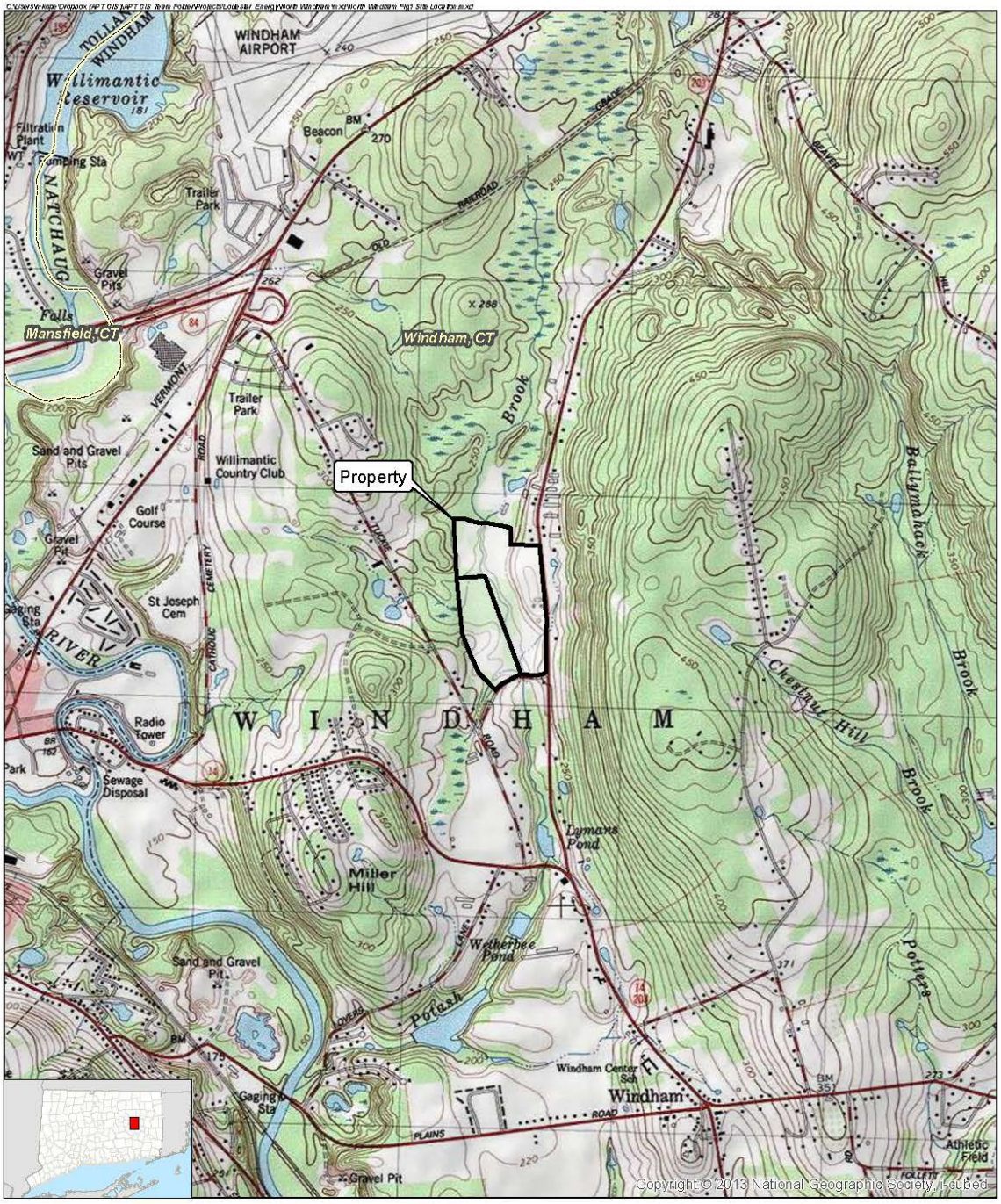
The Site would be located on two parcels (formerly a single property identified as 163 North Windham Road) located north and west of the intersection of North Windham Road and Brick Top Lane (together the "Property"). The Property totals ±67.36 acres. The east central portion of the Site is developed with a house, barn, greenhouses and remnants of former farm buildings. The northeast portion of the Site is fenced and under cultivation in connection with a pick-your-own berry farm and family farm stand.

Figure 1, *Location Map*, depicts the location of the Property and the immediate surrounding area.

[1] The output referenced is Alternating Current (AC).

[2] "Environmental justice community" means (A) a United States census block group, as determined in accordance with the most recent United States census, for which thirty per cent or more of the population consists of low income persons who are not institutionalized and have an income below two hundred per cent of the federal poverty level, or (B) a distressed municipality, as defined in subsection (b) of Connecticut General Statutes § 32-9p.

[3] "Affecting facility" is defined, in part, as any electric generating facility with a capacity of more than ten megawatts.



Legend

Property

Municipal Boundary

Map Notes:
Base Map Source: USGS 7.5 Minute Topographic Quadrangle Map, Willimantic, CT (1984)
Map Scale: 1 inch = 2,000 feet
Map Date: May 2023

2,000 1,000 0 2,000 Feet

Figure 1
Location Map

Proposed Solar Facility
Brick Top Lane Solar
163 North Windham Road
Windham, Connecticut

ALL-POINTS TECHNOLOGY CORPORATION

2 Proposed Site

2.1 Project Setting

The Project consists of four (4) solar panel arrays, two (2) in the southwestern portion of the Property (referred to as Arrays A and B on the Site Plan in Appendix A) and two (2) in the northern portion of the Property (referred to as Arrays C1 and C2 on the Site Plan in Appendix A). Access to the southwestern arrays will extend generally north from Brick Top Lane along a proposed 15-foot wide gravel drive. Access to the northern arrays will extend from North Windham Road west along a proposed 18-foot wide gravel drive, then generally north along a proposed 15-foot gravel drive. The electrical service interconnection line will extend west from North Windham Road, then diverge into two lines, heading west to the southwestern arrays and north to the northern arrays.

The Property's existing topography ranges from approximately 228 feet above mean sea level ("AMSL") to 271 feet AMSL. Grades within the southwestern arrays generally slope downward from north to south; grades within the northern arrays generally slope downward from east to west.

Figure 2, *Existing Conditions*, depicts current conditions on the Property.

The surrounding area includes residential development interspersed with wooded areas.

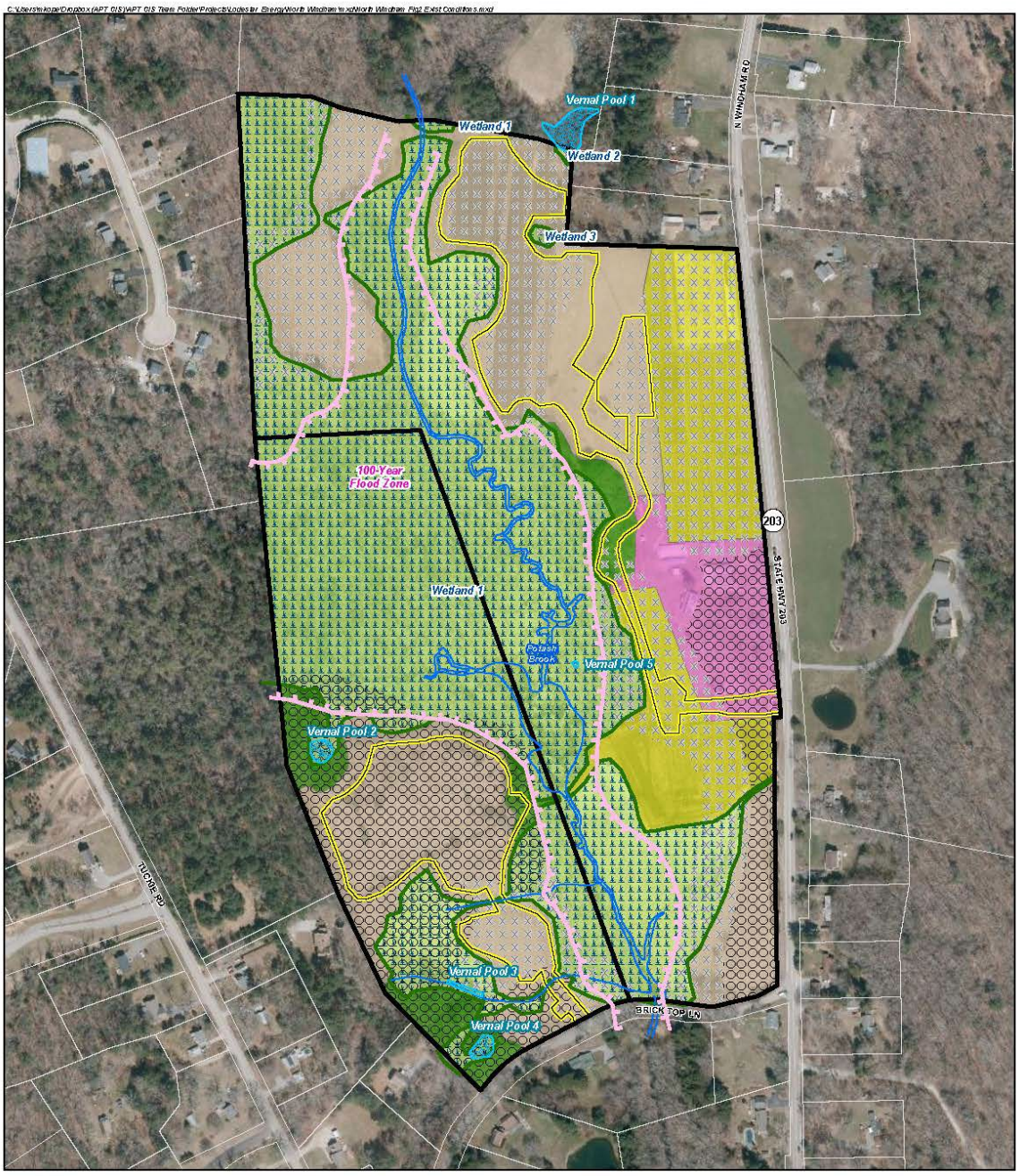


Figure 2
Existing Conditions

Proposed Solar Facility
Brick Top Lane Solar
163 North Windham Road
Windham, Connecticut

2.2 Project Development and Operation

Upon its completion, the solar electric energy generating facility (the "Facility") will consist of four (4) arrays with a total of 4,600 photovoltaic modules ("panels") and associated equipment. A ground-mounted racking system will be used to secure the panels. The Facility will be surrounded by a seven (7)-foot tall chain link fence, raised six (6) inches off the ground.

The Project will also require one (1) electrical service interconnection that will extend from the existing Eversource distribution system along the east side of North Windham Road. The interconnection route will extend into the east central area of the Facility via a series of four (4) new utility poles. From there, connections will extend underground to the arrays, with overhead wetland crossings to serve the southwestern arrays. Once complete, the entire fenced Facility will occupy approximately 7.5 acres of the Property (northern arrays - 4.06 acres, southwestern arrays - 3.45 acres) with an additional ±3.17 acres of improvements beyond the fenced limits (northern arrays - 1.32 acres, southwestern arrays – 1.3 acres) for a total Project Area of ±10.67 acres.

Proposed development drawings are provided in Appendix A, *Project Plans*.

The leading edge of the panels will be at least 24" above the existing ground surface, which will provide adequate room for any accumulating snow to "sheet" off. Any production degradation due to snow build-up has already been modeled into the annual system output and performance calculations. The Petitioner does not envision requiring any "snow removal" operations; rather, the snow will be allowed to melt or slide off.

Construction activities associated with the Project will include the following:

- installing erosion and sedimentation control measures;
- grading associated with drainage and stormwater management;
- improvement of existing wetland crossings;
- installing racking and modules;
- trenching for electrical service and interconnection;

- installing four (4) utility poles for interconnection to the existing electrical distribution system along North Windham Road and seven (7) utility poles over wetland crossings;[4] and
- stabilizing the Project Area.

Earthwork is required to allow the Project development to comply with DEEP's *Appendix I, Stormwater Management at Solar Array Construction Projects*. ("Appendix I") to the *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities* ("General Permit").

The Facility is unstaffed; after construction is complete and the Facility is operable, traffic at the Site will be minimal. It is anticipated that the Facility will require routine maintenance of the electrical equipment one (1) time per year. Annual maintenance will typically involve two (2) technicians for a day. Repairs will be made on an as-needed basis. It is expected that mowing would occur, at a minimum, one (1) time per year to suppress woody growth. Depending on site-specific conditions, additional mowings (2 to 3 times annually) may be required.

2.2.1 Access

The Facility will be accessed via two (2) gravel drives, one (1) extending west from North Windham Road and one (1) extending north from Brick Top Lane.

2.2.2 Public Health and Safety

The Project will meet applicable local, state, national and industry health and safety standards and requirements related to electric power generation. The Facility will not consume any raw materials, will not produce any by-products and will be unstaffed during normal operating conditions.

Each array will be enclosed by a seven (7)-foot tall chain link fence. The entrance to each array will be gated, limiting access to authorized personnel only. All Town emergency response personnel will be provided access via a Knox padlock. The Facility will be remotely monitored and will have the ability to remotely de-energize in the case of an emergency.

[4] None of the poles will be located in a wetland.

3 Environmental Conditions

This section provides an overview of the current conditions at the Site and an evaluation of the Project's potential impacts on the environment. The results of this assessment demonstrate that the Project will comply with the DEEP air and water quality standards and will not have an undue adverse effect on the existing environment and ecology.

Please refer to Figure 3, *Proposed Conditions* for a depiction of the Project and its relationship with the resources discussed herein.

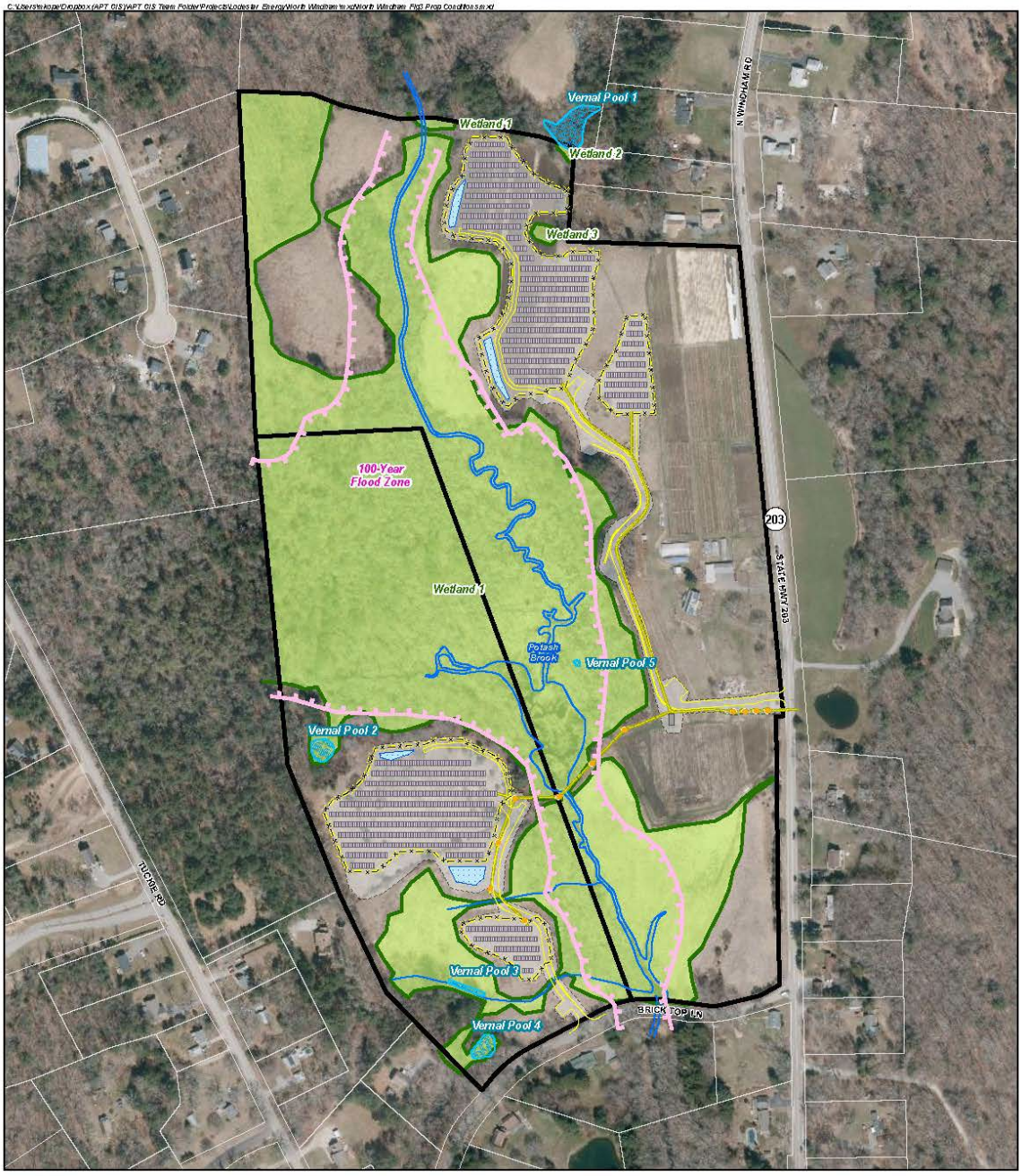


Figure 3
Proposed Conditions

Proposed Solar Facility
Brick Top Lane Solar
163 North Windham Road
Windham, Connecticut

3.1 Air Quality

Due to the nature of a solar energy generating facility, no air emissions will be generated during operations. Therefore, the operation of the Facility will have no adverse effects on air quality and no permit is required.

Temporary, potential, construction-related mobile source emissions will include those associated with construction vehicles and equipment. Any potential air quality impacts related to construction activities can be considered de minimis. Such emissions will be mitigated using available measures, including limiting idling times of equipment; proper maintenance of all vehicles and equipment; and watering/spraying to minimize dust and particulate releases. In addition, all on-site and off-road equipment will meet the latest standards for diesel emissions, as prescribed by the United States Environmental Protection Agency.

3.2 Water Resources

3.2.1 Wetlands and Watercourses

APT Registered Soil Scientists identified portions of three (3) wetlands on the Property during an initial field inspection and wetland investigation completed on December 13, 2022. Subsequent inspections were completed on April 3 and May 9, 2023. The results of the delineation are summarized below. The locations of these resources are depicted on Figure 2, *Existing Conditions*.

Wetland 1 consists of a large complex wetland system with a diversity of hydrological conditions, vegetative communities, and morphologies. This wetland complex encompasses the majority of the interior, southern, and western extents of the Site. Wetland margins and adjacent uplands are characterized by areas of historic disturbance associated with the active and former agricultural use of the Property. Wetland jurisdictional boundaries are generally well-defined within forested areas with a distinct slope break. Wetland margins are saturated with evidence of seasonal seepage from the contributing adjacent upland slopes. Forested wetland areas are dominated by mature hardwoods with red maple and swamp white oak dominating the overstory. Wetland 1 generally drains south with extant areas draining to the interior of the complex. This resource is associated with an interior perennial watercourse identified as Potash Brook, which enters the Property from the north and drains south under Brick Top Lane and off-Property. Within the central portions of the wetland complex a broad swamp surrounds Potash Brook with

evidence of former beaver activity (e.g., dams, girdled trees) having created areas of flooded wetlands, ponding water and numerous snags, backwater flooded pockets, and broad emergent marshes. Potash Brook consists of a five to eight food wide, silty bottom watercourse with a sinuous flow path that meanders south through the interior of Wetland 1. The brook eventually converges with the Shetucket River approximately 1.5 miles downstream of the Property. This wetland's hydrological conditions range from areas of permanent inundation within the interior (primarily within beaver impoundments) to seasonal saturation on the bordering wetland edges. Two historically dug channels within an agricultural field in the southwestern portion of the Site, classified as intermittent watercourses, drain in an east/west direction into Potash Brook.

The north-central and southern extents of this wetland encroach into open agricultural fields that have altered the vegetative communities into an emergent habitat dominated by reed canary grass, tussock sedge, wool grass, soft rush, sensitive fern, and broad-leafed cattail. Historic cut/fill and drainage swales have resulted in changes to the hydrology and morphology of these wetland resources. Additional historic anthropogenic influence was observed in the form of altered soils along the wetland boundaries (e.g., colluvium material from agricultural erosion and cultivation) and two constructed farm road wetland crossings. Two historically abandoned farm ponds within the western and southwestern portions of the Property result in areas of seasonal flooding.

Within the southern extents bordering Potash Brook, previously cleared land for pasture has been subject to ecological succession and re-vegetated by scrub-shrub habitat species dominated by black willow, speckled alder and red maple saplings.

A total of four cryptic-style vernal pools were identified throughout the interior of Wetland 1. These areas consist of seasonal inundation located in complexes of localized depressions.

Wetland 2 is located in the northeastern corner of the Property with the majority of the complex located to the north off-Property. This resource is characterized as a seasonally saturated to seasonally flooded red maple dominant forested wetland with interior hummock/hollow topography that contains interior vernal pool breeding habitat. Buttressed tree roots were observed along with 6 to 8 inches of standing water at the time of inspections. Numerous fallen branches provided a high amount of course woody debris utilized as attachment areas for vernal pool species egg masses. A moderate duff layer with mineral substrate was observed throughout Wetland 2.

Wetland 3 consists of a small seasonally saturated, isolated emergent wetland dominated by hard stem bulrush, green bulrush, silky dogwood and reed canary grass. This feature has experienced anthropogenic influences from mechanical surface compaction from agricultural uses within a localized shallow topographic depressional feature. Located at the base of a hillslope within a localized topographic saddle point, shallow seasonal (<2 inches) inundation was present during the initial inspection as hillside seepage interfaces with an underlying densic contact. This area was found not to support vernal pool breeding habitat.

3.2.2 Vernal Pools

The Department of the Army Regional General Permits for the State of Connecticut defines vernal pools as: depressional wetland basins that typically go dry in most years and may contain inlets or outlets, typically of intermittent flow. Vernal pools range in both size and depth depending upon landscape position and parent material(s). Several species of amphibians depend on vernal pools for reproduction and development. These species are referred to as obligate, or indicator, vernal pool species and their presence in a wetland during the breeding season helps to identify that area as a vernal pool. In most years, vernal pools support one or more of the following obligate indicator species: wood frog, spotted salamander, blue-spotted salamander, marbled salamander, Jefferson's salamander and fairy shrimp. However, they should preclude sustainable populations of predatory fish.

Vernal pool physical characteristics can vary widely while still providing habitat for obligate species. "Classic" vernal pools are natural depressions in a wooded upland with no hydrologic connection to other wetland systems. Often, vernal pools are depressions or impoundments within larger wetland systems. These vernal pool habitats are commonly referred to as "cryptic" vernal pools. "Anthropogenic" vernal pools are intentionally or unintentionally man-made depressions that support successful breeding by obligate species.

Four flooded depressions imbedded within Wetland 1 and a singular flooded depression within Wetland 2 were identified as potential vernal pool habitat during the initial site investigation on December 23, 2022. Follow-up vernal pool surveys were conducted on April 3, 2023 and May 9, 2023 during the early spring breeding period and mid-spring hatch-out period. Evidence of breeding was observed throughout these vernal pool complexes by typical obligate vernal pool species including spotted salamander (*Ambystoma maculatum*) and wood frog (*Lithobates*

sylvaticus) as well as other facultative species[5] including spring peeper (*Pseudacris crucifer*) and fingernail clam (*Pisidium moitessierianum*). The boundaries of the vernal pools were delineated and surveyed using field observations of the seasonally flooded extents. Survey methods included audial surveys to record chorusing wood frogs, visual surveys to search for adults, egg masses and larvae, and dip-netting within accessible areas to identify species within the water column and benthic material. Egg mass searches were conducted by slowly and methodically wading along the perimeter of accessible open water areas using polarized sunglasses for enhanced visual scanning under generally sunny skies. During the early-April inspection, observations were limited to egg mass surveys as tadpoles and larvae development were not yet present. Wood frog egg masses were observed within all five vernal pools while Vernal Pools 3 and 4 also contained spotted salamander egg masses.

A follow-up investigation was conducted on May 9, 2023 to confirm the five vernal pools were sustaining the necessary hydrology to complete larval development and also to determine if any late breeding had occurred. The May investigation documented the addition of spotted salamander egg masses within Vernal Pool 2 and wood frog larvae development; previously observed spotted salamander egg masses remained within Vernal Pools 3 and 4. All vernal pools generally retained previously observed depths of inundation from the December and April inspections and it is anticipated that during most years with average precipitation these pools would all sustain successful vernal pool breeding by the two obligate species observed.

Spotted salamanders and wood frogs generally occur statewide across all ecoregions and are two of the most common vernal pool indicator species. The five vernal pools identified throughout the Property are all characterized as cryptic style vernal pool habitat, located in interconnected depressional pockets imbedded within Wetlands 1 and 2. Vernal Pool 1 contained a maximum water depth of 6 to 8 inches with a moderate duff layer and high course woody debris, utilized for egg mass attachment. The system (Wetland 2) extends north off-Property to a larger complex where wood frog chorusing was heard. Vernal pools 2 through 4 are all located within Wetland 1. Vernal Pool 2 is highly eutrophic with high amounts of filamentous algae on the surface and deep (8 to 10-inch) organics. This pool is characterized by hummock/hollow microtopography

[5] Species that can occur both in wetlands and uplands.

which provides improved structure within the pool for breeding by obligate species. Vernal Pool 3 consists of a historically dug ditch with 8 to 10 inches of inundation caused by a restricted "pinch-point" in the ditch outlet that artificially creates the ponding. This pool is characterized by limited attachment sites and significant filamentous algae. Long-term sustainability of the hydrology in Vernal Pool 3 is questionable, given its artificial nature which could erode over time. Vernal Pool 4 is also an anthropogenically created area consisting of an apparent old dug farm pond with a deep (over 2 feet) organic/loose mineral layer and around 12 inches of inundation present. Limited attachment sites exist within this pool. Vernal Pool 5 is located within the emergent swamp bordering Potash Brook. Multiple pockets of shallow inundation were present throughout the resource, with one depressional area observed within a localized tree wind-throw. Wood frog egg masses were initially observed in approximately 6 to 8 inches of water within this isolated depression. The follow-up May investigation confirmed the presence of wood frog larvae.

Overall, the productivity observed in these five vernal pools is considered moderate to low when compared to similar types of vernal pool habitats in the local region. Usage by wood frogs was found to occur in all vernal pools on the Property with the number of wood frog egg masses far exceeding spotted salamander egg masses, which were only found in three of the five vernal pools. From a Property-specific comparative perspective, Vernal Pool 4 was found to support the highest level of productivity by vernal pool obligate species. Due to the proximity of Vernal Pools 2, 3, 4, and 5 to one another, this grouping of pools likely acts as a metapopulation (i.e., vernal pool network) with wood frogs and spotted salamanders spatially dispersing among these four vernal pools through population dynamics on a year-to-year cycle basis. Through this dynamic, the comparative productivity levels of each individual pool may change annually as a result of various factors including survivorship and meteorological conditions.

Vernal Pool Analysis

It is widely documented that vernal pool dependent amphibians are not solely reliant upon the actual vernal pool, which is limited to use for breeding and egg/larval development; they require surrounding upland forest habitat for most of their adult lives. Accepted studies recommend conservation of the majority of adjacent terrestrial habitat (optimally forested) up to 750 feet from the vernal pool edge for obligate pool-breeding amphibians (Calhoun, Klemens, 2002;

"BDP").[6] In order to evaluate potential impacts to the vernal pools and their surrounding upland habitat, the vernal pools occupying the Property were assessed using the U.S. Army Corps of Engineers New England District's *Vernal Pool Best Management Practices* ("BMPs"). This methodology evaluates the vernal pools' ecological significance based on biological value of the vernal pool (e.g., presence of state-listed species and the abundance and diversity of vernal pool indicator species) and conditions of the critical terrestrial habitat surrounding those pools. The terrestrial habitat is assessed based on the integrity of the vernal pools' two conservation zones: vernal pool envelope ("VPE" - within 100 feet of the pool's edge) and the critical terrestrial habitat ("CTH" - 100-750 feet of the pool's edge). Intact forest represents the highest value, or optimal, habitat within both of these conservation zones to support breeding opportunities for the various obligate vernal pool indicator species that rely on forested habitat (e.g., wood frog and spotted salamander). In addition, the BMPs establish the concept of "directional corridors" (identified herein as "Migratory Corridors"). Identification of Migratory Corridors allows a project to evaluate potential impacts to optimal pool-breeding amphibian habitat that focuses on conserving the most essential habitats that link breeding pools, forested wetlands, and forested uplands. These interrelated habitats form essential Migratory Corridors at a landscape scale generally confined within the CTH. The location of Migratory Corridors is established through an evaluation of both wetland and terrestrial habitat structure qualities (e.g., vegetative cover types, width of vegetated buffer, soil surface moisture, thickness of duff layer, abundance of cover objects, etc.) that determines the locations of "Suitable Non-Breeding Habitat" and "Non-Habitat" in proximity to the vernal pool. Migratory Corridors occur in areas that link vernal pools and Suitable Non-Breeding Habitat (both forested wetland and upland habitats). Non-habitat areas such as developed areas, maintained lawn, and agricultural fields do not support Migratory Corridors due to the lack of sufficient vegetative conditions that are often associated with higher levels of predation and human activity, which can result in direct mortality.

Based on observations of multiple obligate species breeding and intactness of the VPE and CTH in the existing conditions, Vernal Pools 2 and 4 appear to meet the biological criteria for a Tier 1 pool, considered to represent a relatively high ecological value. The remaining pools (Vernal Pools 1, 3, and 5) meet the criteria for a Tier 2 pool, moderate ecological value, based on the single

[6] Calhoun, A.J.K. and M.W. Klemens. 2002. Best Development Practices (BDPs): Conserving Pool-Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States. WCS/MCA Technical Paper No. 5.

indicator species identified, degraded condition of the VPE/CTH in their existing conditions, and fewer than 25 egg masses of a single species.

The landscape condition of each vernal pool was then evaluated to determine the pre- versus post-Project development condition of the Suitable Non-Breeding Habitat and Non-Habitat within both the VPE and CTH. When assessing potential impacts on a vernal pool's CTH and as discussed previously, the BMPs' guidance relies on preserving principal Migratory Corridors that link the vernal pool, forested aquatic habitats and forested terrestrial uplands (Suitable Non-Breeding Habitat) that cover vernal pool indicator species' breeding, foraging, cover, and hibernation habitats. In contrast, Non-Habitat located within the CTH consists of areas including active agricultural fields, roadways, or residential developments, all of which experience a high level of human activity and routine disturbance to the landscape.

The results of this analysis support that the Project would comply with BMPs by avoiding any direct impact to each of the identified vernal pools and the associated VPE, and generally avoiding impact to Suitable Non-Breeding Habitat and Migratory Corridors. The Facility will primarily be located within Open Field habitat, considered Non-Habitat due to the lack of forested habitats and prevalence of routine human activity.

In the existing condition, the Migratory Corridor for Vernal Pool 1 extends north/northwest into directly adjacent forested upland and wetland habitats. Residential development including maintained lawn areas to the west and open agricultural fields to the southwest are considered Non-Habitat due to the high level of human activity and suppression of vegetation through routine maintenance. The Facility will be located southwest of Vernal Pool 1, within an open field considered Non-Habitat. Based on this impact analysis, the Project will not result in any direct impacts to the Suitable Non-Breeding Habitat within the VPE or CTH of Vernal Pool 1.

The Migratory Corridors for Vernal Pools 2 and 5 extend north and west into bordering forested wetland and upland areas associated with Potash Brook, generally located away from the Project Area. Suitable Non-Breeding Habitat will generally remain intact with de minimis development increase within the CTH of Vernal Pools 2 and 5. Furthermore, Project impacts will not result in an impediment to any of the Migratory Corridors associated with Vernal Pool 2 or 5.

Vernal Pools 3 and 4 are located within areas of Non-Habitat associated with developed areas and open fields. Suitable Non-Breeding Habitat will generally remain intact with a de minimis

increase within the CTH of Vernal Pools 3 and 4. One of the principal Migratory Corridors connecting Vernal Pools 3 and 4 to forested wetlands associated with Potash Brook to the east extends over an existing degraded farm road crossing of a drainage ditch that functions as an intermittent watercourse. Due to the developed condition of this existing crossing and limited width of vegetative cover, amphibian migration through this Migratory Corridor is likely limited. The Project is proposing to improve this crossing through the installation of an oversized culvert which will be designed generally in accordance with Army Corps of Engineers' natural stream crossing standards. This oversized culvert will be embedded in natural streambed material and backfilled within the crossing structure, thereby improving conditions for amphibian crossing and enhancing the Migratory Corridor for Vernal Pools 3 and 4 towards Potash Brook. As a result, the Project will not adversely affect Migratory Corridors associated with Vernal Pools 3 and 4.

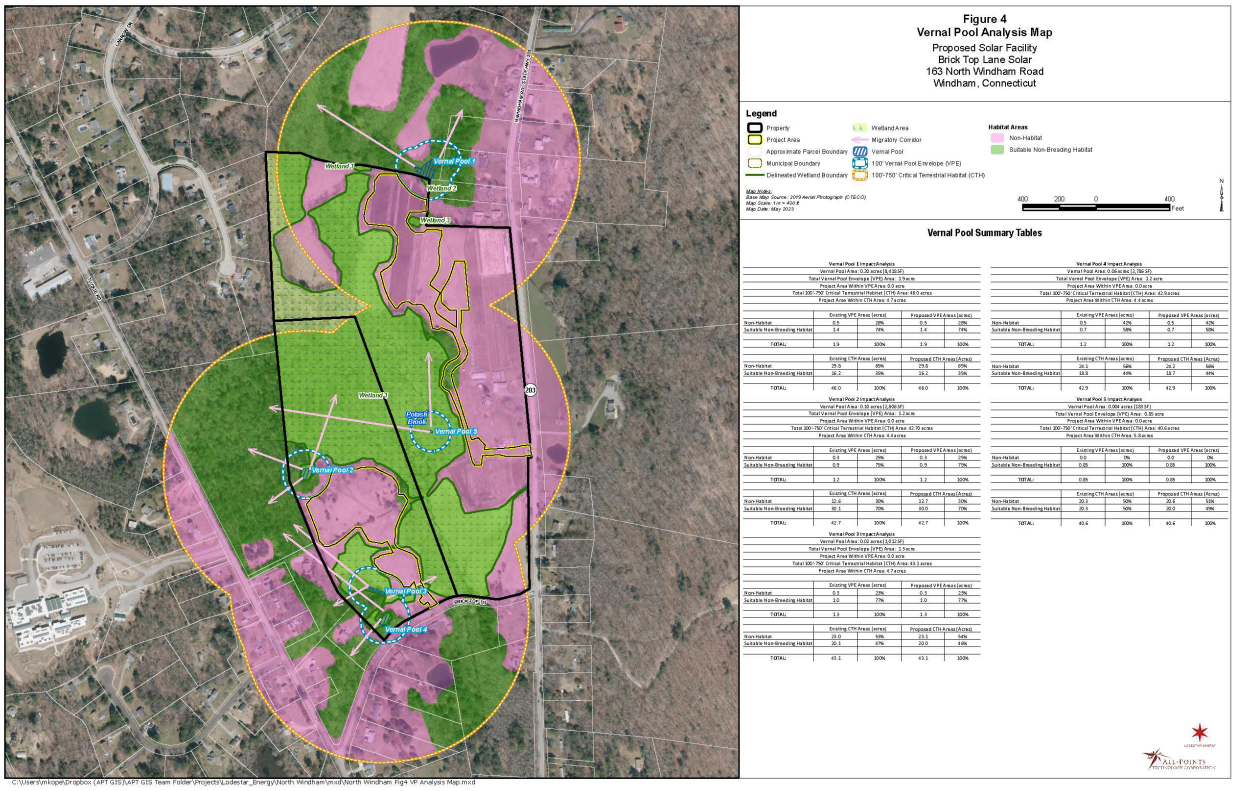
Although the proposed Facility is located within the CTH of all five vernal pools, all Project activities would be located primarily within open fields, habitat that supports suboptimal terrestrial habitat for obligate vernal pool species. Open fields are considered Non-Habitat in that they are suboptimal for obligate vernal pool species due to the lack of forest cover and the surface disturbance associated with former and/or routine agricultural use. Vernal pool species that use these pools for breeding would utilize nearby high quality undeveloped forested terrestrial and forested wetland habitats that adjoin the pools. The Facility represents a minimal increase in development within the overall portion of the CTH classified as Suitable Non-Breeding Habitat and will leave Migratory Corridors generally undisturbed (Vernal Pools 1, 2 and 5) or moderately improved (Vernal Pools 3 and 4). Considering these facts and the separating distances that are provided between the Project Area and vernal pools, no degradation would occur to the pools' tier rating. Limited traffic and human activity would be associated with operation of the Facility, and existing amphibian productivity is expected to remain relatively unaltered.

The potential exists for possible short-term impact to herpetofauna associated with the nearby vernal pools due to possible encounters with migrating and basking individuals that may intercept the proposed development footprint during construction. Any such short-term impacts within the terrestrial habitat proximate to the vernal pools would be minimized by the proper installation and maintenance of erosion and sedimentation controls in accordance with *2002 Connecticut Guidelines For Soil Erosion and Sediment Control*. Best Management Practices are proposed during construction to avoid/minimize the potential for short-term impact to herpetofauna.

Nonetheless, the Petitioner proposes to implement a Resource Protection Plan[7] to mitigate potential short-term impacts associated with construction activities occurring within the CTH. The Resource Protection Plan is intended to prevent incidental injury to any migrating vernal pool species by excluding them from entering the Project Area during construction. In addition, due to the proximity of the Project's proposed stormwater basins to vernal pools and the potential for the basins to act as "decoy pools", a permanent isolation barrier will be installed around the stormwater basins to prevent access by obligate vernal pool amphibians.

Figure 4, *Vernal Pool Analysis Map*, provides a depiction of the Project's development relative to the vernal pools.

[7] See Appendix A, *Project Plans,* Environmental Notes – Resource Protection Plan.



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3.2.3 Wetland Impacts

Direct Project impacts to wetlands are limited to the crossing of two narrow intermittent watercourses associated with the southwestern portion of Wetland 1. In order to access the southwestern array areas, improvements to an existing farm road crossing and creation of a secondary crossing of a narrow drainage ditch feature are proposed. Historic alteration to the wetland areas within the proposed disturbances currently exists in the form of two linear drainage ditches draining in an easterly direction toward Potash Brook. These narrow features are classified as intermittent watercourses based on seasonal flows, artificially defined bank/channel, and a presence of vegetation consistent with intermittent flows. Although directly connected to Potash Brook and the bordering emergent swamp, these anthropogenically altered wetland features support limited functions and values due principally to their lack of ecological integrity with the primary function being conveyance for surface flows from wetland areas to the west. The lack of bordering wetlands, complex vegetative habitat structure, and channelized flows significantly diminish the quality and function of these features. The narrow anthropogenically formed channels do not have any significant biological functions or societal values. There is a secondary potential for sediment retention; however, the upgradient wetland contains established vegetation and a low erodibility potential. Given the depth of the channel, receiving groundwater discharge is another potential function; however, it is limited given the relatively level topography that slopes down toward the wetland interior, which is a more viable and likely area for discharge. Furthermore, adherence to the natural stream crossing design standards being employed would not further degrade the limited functions and values currently being supported and, in the case of the existing farm road crossing, they would actually be enhanced.

In light of these relatively minor direct wetland impacts, alternative access to the southwest solar arrays was evaluated to determine if a prudent and feasible alternative existed that would either avoid or minimize wetland impacts. Alternative access routes from Brick Top Lane are not available nor would either reduce or minimize wetland impacts. An alternative access from the Property's frontage along North Windham Road to the east was considered. In fact, an existing farm road currently provides access to the southwest portion of the Property from the current farm center near North Windham Road. However, that farm road contains a light weight timber bridge over Potash Brook and a portion of that road is encumbered by a flood hazard zone. The existing bridge would require complete replacement with a substantial structure to support construction and maintenance equipment for the Site and would result in significantly greater

impact to both Potash Brook and its bordering wetlands and floodplain, areas that support important functions and values in a much higher capacity than the two drainage ditch impact areas. Therefore, the currently proposed access off Brick Top Lane is considered the most prudent and feasible preferred alternative.

Installation of solar panels and perimeter fencing will encroach into several areas within 100 feet of Wetlands 1 and 2. The majority of those activities would occur within generally level topographic areas (+/- 5% grade) of the open fields and would not result in a significant amount of mature vegetation removal. Based on the Stormwater Management Report dated 5/11/2023 prepared by Civil One, all infiltration basins have been designed to infiltrate the 2-year design storm, removing in excess of 90% of total suspended sediments. All discharge locations occur on slopes less than 10% grade. Therefore, reduced setbacks to wetlands (minimum 50 ft. setback from solar panels, 25 ft. setback from infiltration basins/stormwater controls, and 10 ft. setback from access roads) are allowed under the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities Appendix I: Stormwater Management at Solar Array Construction Projects ("Appendix I"). Furthermore, the Petitioner has engaged in discussions with the CTDEEP Stormwater Division and these reduced buffers to wetlands have received favorable initial review.

Direct Project impact in close proximity to wetland resources (less than 100 ft.) occurs entirely in areas of existing dense vegetation and generally low erodibility potential resulting in the need for limited mature woody vegetation removal and grading. Considering the robust stormwater design, which exceeds the criteria established in Appendix I and the *2002 Connecticut Guidelines for Erosion and Sediment Control,* it is not anticipated the Project will result in a significant negative impact to nearby wetland resources. Any potential secondary impacts will be further mitigated through the implementation of a Resource Protection Plan that has been developed to further protect the abutting wetland resources. The details of the Resource Protection Plan can be found in Appendix A.

Table 1, Wetland Impacts provides the approximate impacts and distances from the Project to wetland resources located on the Property.

Table 1: Wetland Impacts		
Direct Impacts to Wetlands (+/- sq.ft.)		
Wetland 1	525 SF	
Project Proximity to Wetlands (from limit of disturbance)	Distance (+/- ft.)	Direction (of wetland from LOD)
Project Proximity to Wetland 1	N/A	Wetland 1 in LOD
Project Proximity to Wetland 2	70	NE
Project Proximity to Wetland 3	12	E

3.2.4 Floodplain Areas

APT reviewed the United States Federal Emergency Management Agency ("FEMA") Flood Insurance Rate Map ("FIRM") covering the Site. A FIRM is the official map of a community on which FEMA has delineated both the special hazard areas and risk premium zones applicable to the community. The Site is mapped on FIRM PANEL #090119 0004 D, dated November 6, 1998 and FIRM PANEL #090119 0005 D, dated November 6, 1998. Based upon the reviewed FIRM Maps, the majority of the Property is located in an area designated as Zone X, which is defined as an area of minimal flooding, typically above the 500-year flood level. Higher risk flood areas associated with Potash Brook are also located on the Site.

The fenced portions of the Site and access drives will not be located within a 100- or 500-year flood zone. Two poles associated with the overhead interconnect line to the southwest arrays will be located within the 100-year flood zone. However, no special design considerations or precautions relative to these pole installations are required. No impacts are anticipated to floodplain or downstream areas as a result of Project development or operation.

3.3 Water Quality

As discussed in this section, the Project will comply with DEEP's water quality standards. Once operative, the Facility will be unstaffed, and no potable water uses or sanitary discharges are planned. No liquid fuels are associated with the operation of the Facility. Stormwater generated by the proposed development will be properly handled and treated in accordance with the 2004 *Connecticut Stormwater Quality Manual* and Appendix I.

3.3.1 Groundwater

Groundwater underlying the Site is classified by publicly available DEEP mapping as "GA".[8] This classification indicates groundwater within the area is presumed to be suitable for human consumption without treatment. Based upon a review of available DEEP mapping, the Site is not located within a mapped (preliminary or final) DEEP Aquifer Protection Area, the nearest being approximately 6.9 miles north of the Property.

No public water system serves the area surrounding the Site; it is therefore presumed that neighboring developed properties are served by private wells. Typical construction techniques for installation of the Facility do not require blasting or other similar measures. Construction and operation of the Facility should have no impact to groundwater resources.

The Project will have no adverse environmental effect on ground water quality.

3.3.2 Surface Water

The Project will have no adverse environmental effect on surface water quality. Based upon DEEP mapping, the Property is located in Major Drainage Basin 3 (Thames River Basin), Regional Drainage Basin 38 (Shetucket River), Subregional Drainage Basin 3800 (Shetucket River), and Local Drainage Basin 3800-01 (Potash Brook at mouth above Shetucket River). According to DEEP mapping, the nearest mapped waterbody is Potash Brook, which flows southward across the central portion of the Property with the closest portion downgradient and approximately 100 feet from the closest portion of the fenced portion of the Facility. Potash Brook is classified as a Class A surface waterbody by the DEEP.[9] The Project will have no adverse effect on this surface waterbody.

Based upon the reviewed DEEP mapping, the Site is not located within a mapped Public Drinking Supply Watershed.

[8] Designated uses in GA classified areas include existing private and potential public or private supplies of drinking water and base flow for hydraulically connected surface water bodies.

[9] Designated uses for A classified waterbodies include potential drinking water supply, fish and wildlife habitat, recreational use, agricultural and industrial supply and other legitimate uses including navigation.

Provided that erosion and sediment ("E&S") controls are installed and maintained in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control and stormwater is managed in accordance with the 2004 Connecticut Stormwater Quality Manual and DEEP approvals, no adverse effect on surface water quality is anticipated from development and operation of the Project. Once operative, stormwater will be managed in accordance with the 2004 Connecticut Stormwater Quality Manual.

3.4 Habitat and Wildlife

Five (5) distinct habitat types (vegetative communities) separated by transitional ecotones are located on the Property. These habitats were assessed using remote sensing and publicly available datasets and were physically inspected during a December 23, 2022 field evaluation.

The habitats occupying the Site are as follows.

- Developed;
- Agricultural;
- Open Field;
- Upland Forest; and
- Wetland.

3.4.1 Habitat Types

Developed

The Developed habitat encompasses a portion of the eastern extents of the Property. This habitat consists of a residence, a large barn, numerous agricultural outbuildings, access roads and maintained lawn areas. These surfaces are routinely maintained, with areas of impervious surfaces, lawn, and landscaping limiting wildlife habitat utilization. The Developed habitat is primarily bordered by active agricultural fields utilized for growing vegetables and small fruits. Transitional narrow bordering Upland Forest habitat separates this Developed habitat from Wetland habitats farther west.

The Project will result in limited impacts to the Developed habitat. The Project's impact to this habitat type is primarily associated with a proposed access road to the northern solar arrays. Due to the highly disturbed nature of this area from historic and current agricultural practices and high

level of human activity, the Project is not anticipated to result in a significant negative impact to this habitat.

Agricultural Field

Agricultural Field encompasses eastern portions of the Property generally north and south/southwest of the Developed habitat. This habitat consists of cultivated fields of various small fruits and cut flowers (northern area), and vegetables/other crops (southern area). These surfaces are routinely maintained via cultivation techniques (e.g., plowing, harrowing, mowing) in association with their respective active agricultural use. Routine maintenance of these fields suppresses other herbaceous and shrub species, resulting in limited wildlife habitat utilization except for pollinator species when such cultivated plants are in flower. Transitional edge scrub/shrub habitats consisting of pockets of multiflora rose, a non-native invasive shrub, separate the Agricultural Field habitat from surrounding Wetland and Upland Forest habitats to the west.

Project impacts to Agricultural Field habitat are limited to areas associated with the Project's access road construction. The Project is not expected to represent a significant impact to this habitat due to the existing high level of human activity and disturbed nature of the area from historic and current agricultural practices.

Open Field

The Open Field habitat encompasses multiple areas in the northern and southern areas of the Property and is bordered by all four other habitat types at different locations. Open Field areas consist of active/abandoned hay/fallow fields. These surfaces display characteristics of routine maintenance based on the suppressed vegetation present throughout; although not currently in cultivation, these areas are maintained by at least annual mowing to suppress further succession. Dominant vegetation present within this habitat area consists of assemblages of various species of goldenrod, reed canary grass and cool-season grasses. Southern fields, which have been left fallow for a longer period of time, have cluster and windrows of red cedar, and various early scrub/shrub growth consistent with fallow fields. Due to the fragmented nature of these Open Field habitats, patch sizes are limited to fields less than 8 acres in size, making them less desirable for many grassland bird species that require larger patch sizes of grassland. Transitional edge

scrub/shrub habitats consisting of pockets of invasive species of multiflora rose and autumn olive separate this from surrounding Wetland and Upland Forest habitats.

Project impacts will encompass a majority of the Open Field habitat. While the Project will result in direct impacts to this habitat type, post-construction vegetative conditions will mimic the existing Open Field habitat type. In addition, similar Open Field habitats exist off-Property in proximity to the far north and west extents of those habitats. Due to the fragmented nature of this habitat type and considering that native pollinator seed mixes will be used to revegetate areas within and proximate to the Site (thereby enhancing the wildlife habitat value), Project related impacts are not anticipated to result in a significant negative impact to the Open Field habitat type.

Upland Forest

The Upland Forest habitat occupies a relatively small portion of the Property. This habitat differs from the adjacent Wetland habitat by occurring entirely within well-drained upland soils and having a significantly different vegetative species composition. This forested habitat is characterized as an even aged Eastern white pine, red maple, red oak, and shagbark hickory dominant overstory forest with an autumn olive and multiflora rose dominant shrub layer within and along transitional boundaries. Bittersweet and poison ivy were also observed on boundary edges throughout.

The Upland Forest habitat type will encompass limited areas of the proposed Site, primarily associated with access to the northern solar arrays and including the development of 'edge' portions of these habitat areas. Potential short-term impacts to this habitat will be minimized through the proper stabilization of soils during construction through strict adherence to the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control*. While the Project necessitates removal of a limited area of forest, similar forested habitat occurs in abundance through the Property interior as well as off-Site. Furthermore, impacts to the Upland Forest habitat are limited to isolated 'edge' type forest habitat and would not result in impacts to core forest as discussed in more detail in a subsequent section. As such, the Project is not anticipated to result in a significant impact to the Upland Forest habitat type.

Wetland

Wetland habitat occurs throughout the Site and borders all previously noted habitats with the exception of Developed areas. The on-Site wetlands consist of a diverse assemblage of vegetative communities and hydrology ranging from areas of seasonal saturation to permanent inundation. The centrally located perennial watercourse Potash Brook includes bordering swamp habitat that supports a variety of amphibian, bird, and reptilian species. Historic disturbances were observed with cut/fill areas and suppression of vegetation from historic agricultural activities particularly along the wetland edges that border on Agricultural Field and Open Field habitats, which are more evident and widespread within the southern portions of the Wetland habitat.

Direct impacts to wetlands consisting of two wetland crossing areas are proposed in the southwestern corner of the Property. These crossings will impact two historically dug ditches that function as surface water conveyance features and are classified as intermittent watercourses. As discussed previously in greater detail, alternative approaches were considered to access this portion of the Property for Site development; however, other alternative access routes would result in significantly greater impacts to higher functioning wetland resources. Robust erosion and sediment control measures are proposed along with implementation of a Resource Protection Plan to avoid potential secondary and short-term impacts to the adjacent Wetland habitats. Long-term impacts to this habitat are mitigated by implementing natural stream crossing design techniques at the two crossings and by the limited traffic and human level disturbances associated with the Project's operation.

Table 2, Habitat Areas provides the total acreages of each habitat type located on the Property.

Table 2: Habitat Areas

Habitat Type	Total Area on Property (+/- ac.)	Area Impacted by Site (+/- ac.)
Developed	3.36	0.31
Agricultural Field	8.13	0.41
Open Field	20.78	9.63
Upland Forest	2.56	0.30
Wetland	32.54	0.02

3.4.2 Wildlife

Development of the Site will primarily occur within Open Field habitat. The roughly 9.63-acre Open Field habitat provides limited value from a wildlife utilization standpoint as a result of historic management of these areas, small habitat block size, lack of diverse vegetative communities, and high level of human activity. Project-related impacts within this habitat are limited and are not anticipated to adversely affect wildlife.

Based on the surrounding land uses, the disturbed areas located in proximity to the Project Area are likely utilized by species that are more tolerant of human disturbance and habitat fragmentation. Generalist wildlife species common to the region, including several resident and migrant song birds and mammals such as raccoon, striped skunk, grey squirrel, Virginia opossum, white-tailed deer, and eastern chipmunk could be expected to use this area. Due to the relatively small size of this habitat patch, and given the abundance of more suitable habitat surrounding the Property that supports habitat needs of these common species, the Project is not anticipated to result in a significant impact to wildlife.

With the exception of the ±525 square feet associated with the two crossings, the Site will not encroach into the Wetland habitat. Those crossings are located within existing disturbed and developed areas. Noise and associated human activities during construction may result in limited, temporary disruption to wildlife using these Wetland habitats. Any possible wildlife displaced during construction would be expected to temporarily disperse deeper into the wetland habitat and nearby edge forest. Post-construction, operation of the Project will not result in a likely adverse effect to wildlife using these habitats because it will be unoccupied and does not generate any significant noise, traffic, or high level of human activity.

3.4.3 Core Forest Determination

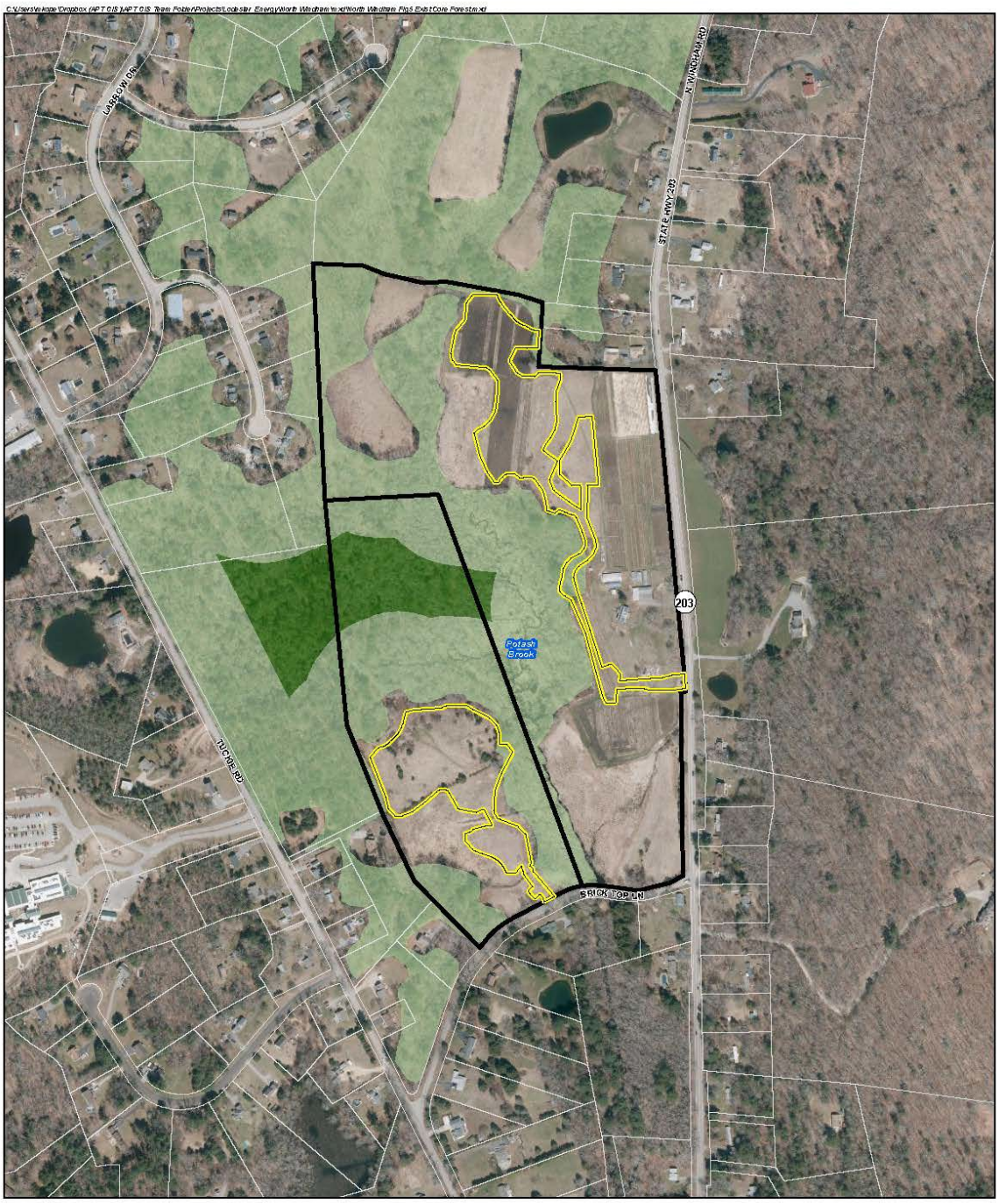
APT evaluated the size and extent of the contiguous interior forest block present within and adjacent to the Property using two (2) publicly available GIS-based datasets designed to assess impacts to core forest habitat. In addition, an independent evaluation was performed (based on GIS analysis of 2019 leaf-off aerial photography, recent field observations and professional experience). The results of these analyses demonstrate a small core forest exists on the Property.

The first dataset, the DEEP's *Forestland Habitat Impact Mapping*[10], depicts a small portion of the wooded area on the Property as core forest.

The second dataset, UConn's Center for Land Use Education and Research's ("CLEAR") Forest Fragmentation Analysis ("FFA")[11] study, designates "core forest" as greater than 300 feet from non-forested habitat. This 300-foot zone is referred to as the "edge width" and represents sub-optimal breeding habitat for forest-interior birds due to decreased forest quality, increased levels of disturbance, and increased rates of nest predation and brood parasitism within this transitional forest edge. The FFA study identifies three categories of core forest: small (< 250 acres); medium (250-500 acres); and large (>500 acres). Based on the FFA criteria and using APT's independent analysis, a small portion of the interior forested wetland area associated with the Potash Brook swamp would be considered a small core forest. Much of this small core forest is located off-Property to the west, bounded by Tuckie Road. The Project would only result in limited impact to existing edge forest from the proposed access to the northern array areas and will not result in any impacts to this small core forest block. Based on this evaluation, the Project will not materially affect core forest resources. See Figure 5, *Existing Core Forest* and Figure 6, *Proposed Core Forest.*

[10] Source: http://ctdeep.maps.arcgis.com/apps/webappviewer/index.html?id=7b81844bab634281b544c20bf2d7bfb8: This spatial screening layer identifies prime contiguous and connected core forestland blocks. If the project intersects with the Forestland Habitat Impact Map there is a potential for material effects to core forest.

[11] CLEAR's FFA: http://clear.uconn.edu/projects/landscape/ct-forestfrag



Legend

Property
Site
Approximate Parcel Boundary

*Existing Forest Block
Core Forest
Edge Forest

Map Notes:
Base Map Source: CTECO 2019 Aerial Imagery
**Existing forest block continues beyond map extent.*
Additional areas not shown for clarity
Map Scale: 1 inch = 500 feet
Map Date: May 2023

N
S
500 250 0 500
Feet

Figure 5
Existing Core Forest

Proposed Solar Facility
Brick Top Lane Solar
163 North Windham Road
Windham, Connecticut

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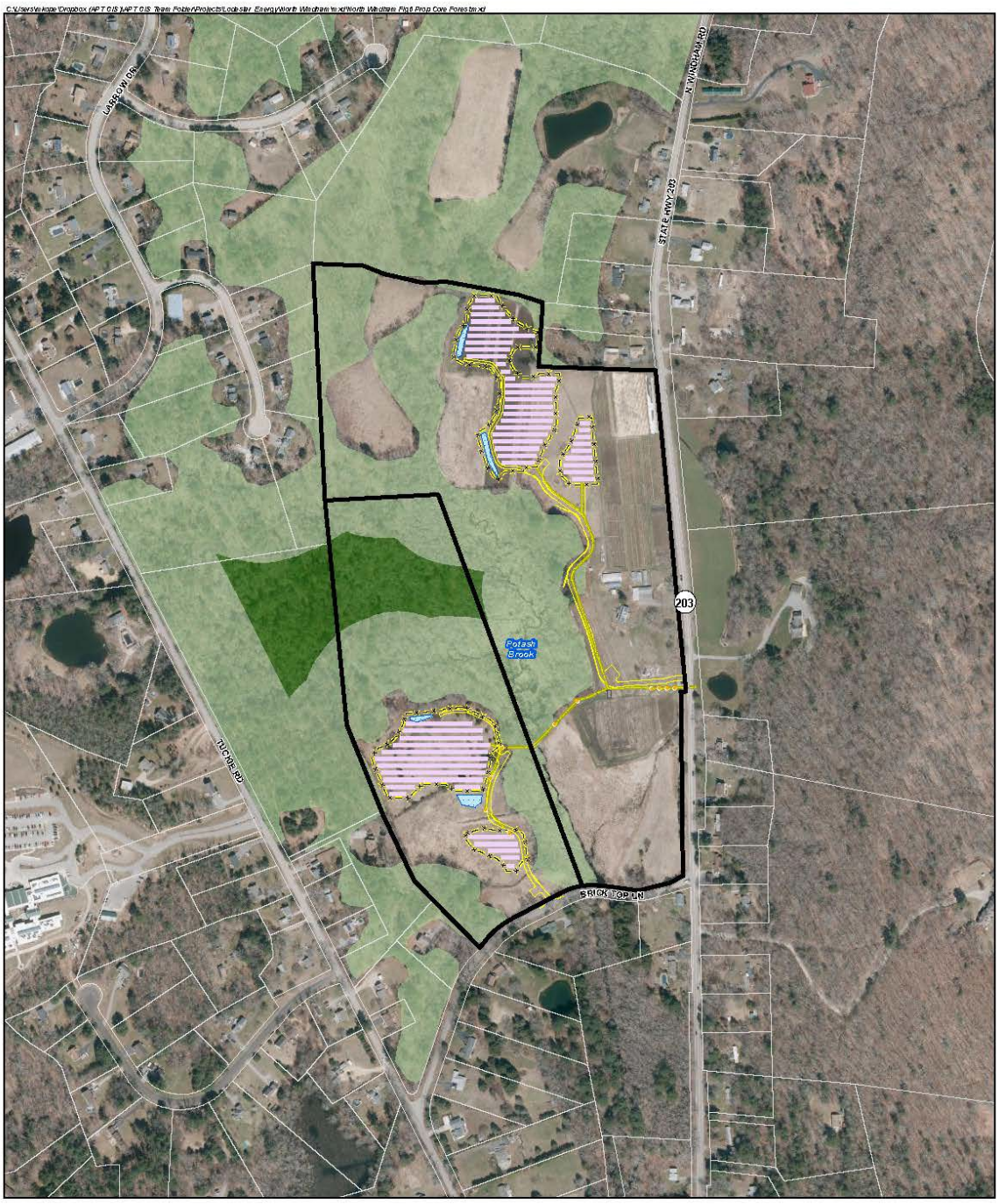

Legend

- Property
- Approximate Parcel Boundary
- Utility Pole
- Gravel Access Drive
- Interconnection Path
- Perimeter Fence
- Concrete Equipment Pad
- Infiltration Basin
- Solar Modules
- *Proposed Forest Block
- Core Forest
- Edge Forest

Map Notes:
Base Map Source: CTECO 2019 Aerial Imagery
**Existing forest block continues beyond map extent.*
Additional areas not shown for clarity
Map Scale: 1 inch = 500 feet
Map Date: May 2023

N

500 250 0 500 Feet

Figure 6
Proposed Core Forest

Proposed Solar Facility
Brick Top Lane Solar
163 North Windham Road
Windham, Connecticut

3.5 Rare Species

APT reviewed publicly available information to determine the potential presence of state/federally listed species and critical habitat on or proximate to the Site. A discussion is provided in the following sections.

3.5.1 Natural Diversity Data Base

The DEEP Natural Diversity Data Base ("NDDB") program performs hundreds of environmental reviews each year to determine the impact of proposed development projects on state-listed species and to help landowners conserve the state's biodiversity. In furtherance of this endeavor, the DEEP also developed maps to serve as a pre-screening tool to help Petitioners determine if there is the potential for project-related impact to state-listed species.

The NDDB maps represent approximate locations of (i) endangered, threatened and special concern species and, (ii) significant natural communities in Connecticut. The locations of species and natural communities depicted on the maps are based on data collected over the years by DEEP staff, scientists, conservation groups, and landowners. In some cases, an occurrence represents a location derived from literature, museum records and/or specimens. These data are compiled and maintained in the NDDB. The general locations of species and communities are symbolized as shaded (or cross-hatched) polygons on the maps. Exact locations have been masked to protect sensitive species from collection and disturbance and to protect landowner's rights whenever species occur on private property.

APT reviewed the most recent DEEP NDDB mapping (December 2022), which revealed that no known areas of state-listed species are located within 0.25 miles of the proposed development. The nearest NDDB polygon exists within ±0.45-mile east of the Property. Since the proposed Site is not located within an NDDB buffer area, consultation with DEEP is not required in accordance with their review policy[12] or the Connecticut Siting Council's review policy.

3.5.2 USFWS Consultation

Federal consultation was completed in accordance with Section 7 of the Endangered Species Act ("ESA") through the U.S. Fish and Wildlife Service's ("USFWS") Information, Planning, and

[12] DEEP Requests for NDDB State Listed Species Reviews

Conservation System ("IPaC"). Based on the results of the IPaC review, federally-listed[13] Endangered species northern long-eared bat ("NLEB"; *Myotis septentrionalis*) habitat range encompasses the Property. The NLEB's range encompasses the entire State of Connecticut and suitable NLEB roost habitat includes trees (live, dying, dead, or snag) with a diameter at breast height ("DBH") of three (3) inches or greater.

APT reviewed the DEEP's publicly available *Northern long-eared bat areas of concern in Connecticut to assist with Federal Endangered Species Act Compliance* map (February 1, 2016) to determine the locations of any known maternity roost trees or hibernaculum in the state. This map reveals that there are currently no known NLEB maternity roost trees within 0.25 miles of the Site. The nearest NLEB habitat resource to the Site is located in East Granby, approximately 32.7 miles to the northwest.

Effective March 31, the NLEB is classified as Endangered under the ESA. The reclassification eliminates use of the previous 4(d) rule for the NLEB, which is applicable only to Threatened species. An NLEB Interim Consultation Framework has been developed by USFWS to facilitate transition from the 4(d) rule to typical Endangered species consultation procedures for activities that are reasonably certain to occur before April 1, 2024 (date on which the NLEB Interim Consultation Framework expires). APT reviewed the new NLEB Determination Key for this Project and determined the Project will not likely result in an adverse effect or incidental take of NLEB and does not require a permit from USFWS. A USFWS letter dated May 10, 2023 confirmed the "No Effect" determination.

A full review of the Endangered Species Act (ESA) Compliance Determination and USFWS's Response Letter is provided in Appendix B, *USFWS and NDDB Compliance Statement*.

3.6 Soils and Geology

The construction of the water quality basins and swales and grading within the Project Area will generate some excess material that will be redistributed on Site. Topsoil will be segregated from underlying soil, stockpiled, and spread over disturbed areas being seeded. See Appendix A, Project Plans.

[13] Listing under the federal Endangered Species Act

All exposed soils resulting from construction activities will be properly and promptly treated in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control.

Based upon DEEP mapping, surficial materials within the Project Area are classified as primarily deposits of sand and gravel. Bedrock beneath the northwestern portion of the Site is identified as Tatnic Hill Formation. Tatnic Hill Formation is described as a medium to dark-gray, medium-grained gneiss or schist composed of quartz, andesine, biotite, garnet, and sillimanite, locally kyanite, muscovite, or K-feldspar, interlayered with locally mappable units and thinner layers of rusty-weathering graphitic pyrrhotitic two-mica schist, amphibolite, and calc-silicate rock. Bedrock beneath the central portion of the Site is identified as Waterford Group. Waterford Group is described as a light to dark, generally medium grained gneiss, composed of plagioclase, quartz, and biotite, with hornblende in some layers and microcline in others. Bedrock beneath the southeastern portion of the Site is identified as Fly Pond Member of Tatnic Hill Formation. Fly Pond Member of Tatnic Hill Formation is described as a light-gray, medium-grained, layered to massive calc-silicate gneiss, composed of andesine, quartz, hornblende or actinolite, epidote, and commonly diopside, biotite, and scapolite; some layers are calcitic.[14]

The Petitioner does not anticipate encountering bedrock during Project development.

3.6.1 Prime Farmland Soils

In accordance with the Code of Federal Regulations, CFR Title 7, part 657, farmland soils include land that is defined as prime, unique, or farmlands of statewide or local importance based on soil type. They represent the most suitable land for producing food, feed, fiber, forage, and oilseed crops.

According to the Connecticut Environmental Conditions Online Resource Guide[15], approximately 22.21 acres of prime farmland soils are mapped on the Property; of that, approximately 5.18 acres are within the proposed Project Area. Statewide important farmland soils are also mapped on the Property; a total of 14.34 acres is mapped, with approximately 4.15 acres within the Project Area.

[14] Connecticut Natural Resources Atlas Series: Bedrock Geological map, cteco.uconn.edu/maps/state/Bedrock_Geologic_Map_of_Connecticut.pdf

[15] Connecticut Environmental Conditions Online (CTECO) Resource Guide, www.cteco.uconn.edu

The Property owner will continue to utilize areas not designated for Site development for agricultural purposes.

3.7 Historic and Archaeological Resources

At the request of APT, and on behalf of the Petitioner, Heritage Consultants LLC ("Heritage") reviewed relevant historic and archaeological information to determine whether the Site holds potential historic or cultural resource significance. Their review of historic maps and aerial images of the Site, examination of files maintained by the Connecticut State Historic Preservation Office ("SHPO"), and a pedestrian survey of the Site revealed that no National Register of Historic Places ("NRHP"), State Register of Historic Places properties, or previously recorded archaeological sites are located within one (1) mile of the Site. In terms of archaeological potential, Heritage determined that certain portions of the Site retain a moderate to high potential to contain intact archaeological deposits in the subsoil.

That information was presented to the SHPO in a Phase 1A Cultural Resources Assessment Survey. The SHPO requested that a Phase 1B investigation be performed prior to construction in the area identified as possessing moderate to high potential to contain intact archaeological deposits. The results of that investigation were submitted to the SHPO for review. In a letter dated June 6, 2023, the SHPO determined "that no historic properties will be affected by the proposed development and no additional archaeological investigation is warranted."

See Appendix C, *SHPO Consultation*.

3.8 Scenic and Recreational Areas

No state or local designated scenic roads or scenic areas are located near the Site and therefore none will be physically or visually impacted by development of the Project. The nearest scenic road is a locally designed scenic road, Codfish Falls Road in Mansfield, approximately 6.2 miles northwest of the Property.

There are no Connecticut Blue Blaze Hiking Trails located proximate to the Site. The Natchaug State Forest is located approximately 0.27 mile to the north at its nearest point, and the Beaver Brook State Park Scenic Reserve is approximately 1.95 miles to the northeast at the nearest point. The Project will have no direct or indirect effects on either of these resources.

See Figure 7, *Surrounding Features Map,* for these and other resources located within one mile of the Project Area.

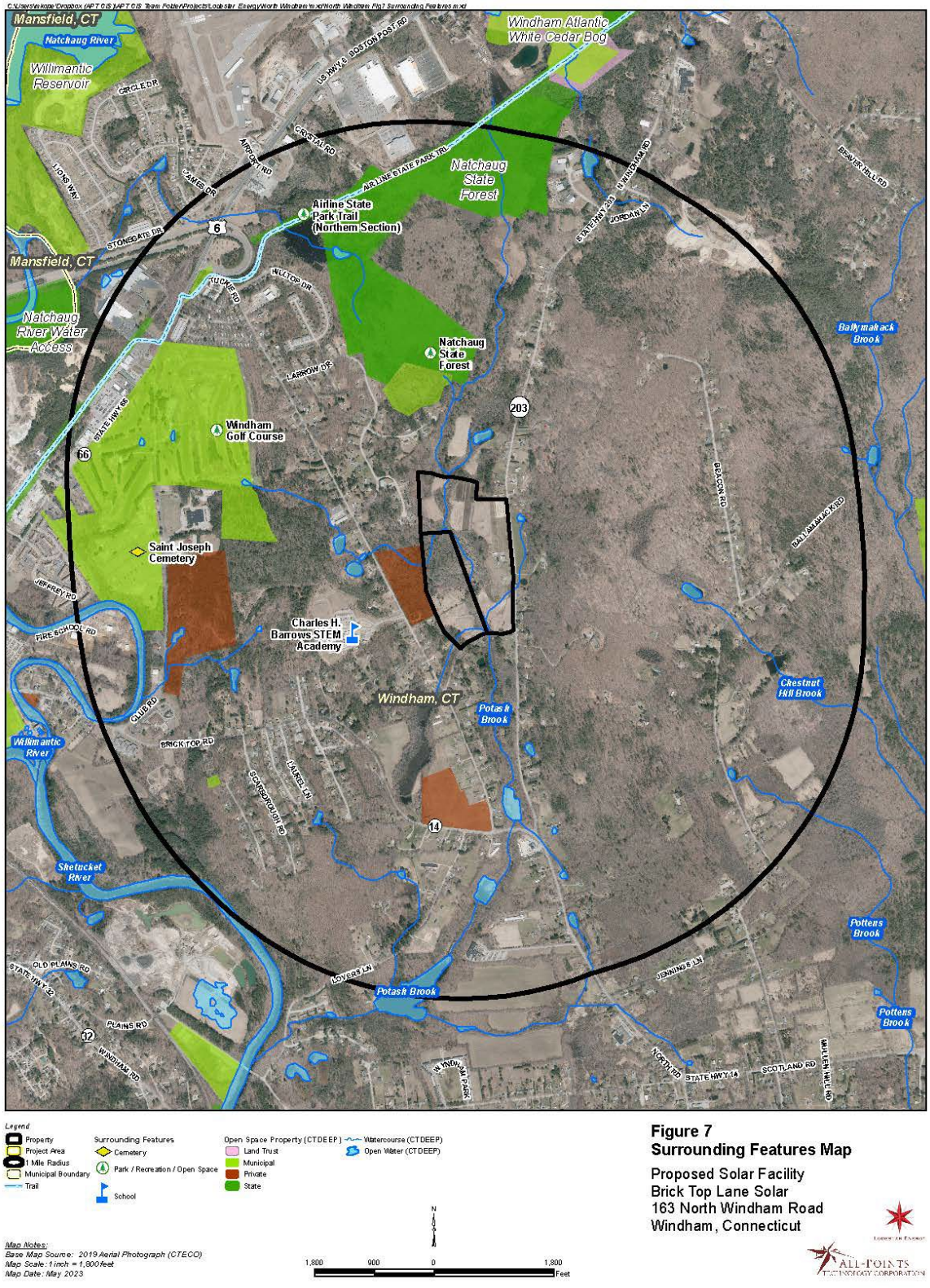

Figure 7
Surrounding Features Map

Proposed Solar Facility
Brick Top Lane Solar
163 North Windham Road
Windham, Connecticut

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3.9 Noise

The Property contains fields and cleared areas, residential and farm structures, and wooded land. Noise associated with human and agricultural activities is currently generated on and near the Property.

Construction noise is exempted under State of Connecticut regulations for the control of noise, RCSA 22a-69-1.8(h); the Town's noise ordinance exempts noise from construction equipment during daytime hours. During construction of the Facility, the temporary increase in noise would likely raise localized ambient sound levels immediately surrounding the Project Area. Standard types of construction equipment would be used for the Project. In general, the highest noise level from this type of equipment (e.g., backhoe, bulldozer, crane, trucks, etc.) is approximately 88 dBA at the source.

The Petitioner has completed a noise analysis, the results of which confirm that the Project will comply with State Noise Regulations.[16] The Facility would, conservatively, be considered a Class C (Industrial) noise emitter. Nearby properties are Class A noise receptors, with noise standards of 61 dBA daytime and 51 dBA at night. As demonstrated in the noise analysis, all off-Site receptors are of sufficient distances from the proposed Project-related equipment that noise levels during Facility operation will meet applicable State noise standards. See Appendix D, *Noise Analysis.*

3.10 Lighting

No exterior lighting is planned for the Project. There will be some small, non-intrusive lighting fixtures within the equipment to aid in maintenance.

3.11 FAA Determination

The Petitioner submitted relevant Project information to the Federal Aviation Administration ("FAA") for an aeronautical study to evaluate potential hazards to air navigation. The nearest airport is Windham Airport, located approximately 1.1 mile northwest of the Site. The FAA

[16] RCSA 22a-69-3.5. Noise Zone Standards

provided Determinations of No Hazard to Air Navigation on January 3, 2023. See Appendix E, *FAA Determinations.* Based on this determination, there is no need to conduct a glare analysis.

4 Conclusion

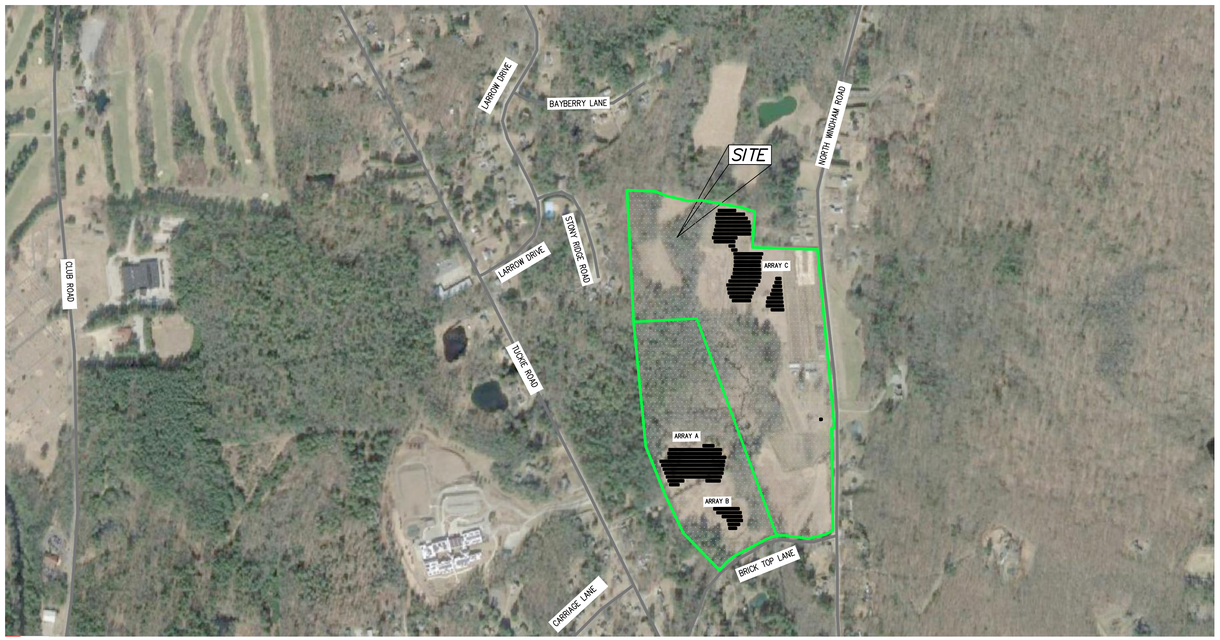
As demonstrated in this Environmental Assessment, the Project will comply with the DEEP air and water quality standards. Further, it will not have an undue adverse effect on the existing environment and ecology; nor will it affect the scenic, historic and recreational resources in the vicinity of the Project.

APPENDIX A

PROJECT PLANS

PARCEL A BRICK TOP LANE &
163 NORTH WINDHAM ROAD

PERMITTING DRAWINGS
WINDHAM, CONNECTICUT
ASSESSOR'S MAP 6-5, LOT 236-21



VICINITY MAP

500 0 250 500 1000

1 inch = 500 feet

APPLICANT
LSE HOROLOGIUM LLC
40 TOWER LANE
AVON, CT

OWNER
CONCKLIN TRUSTEES
163 NORTH WINDHAM ROAD
WINDHAM, CT

ENVIRONMENTAL CONSULTANT
ALL-POINTS TECHNOLOGY CORPORATION, P.C.
567 VAUXHALL STREET EXTENSION, SUITE 311
WATERFORD, CT

ENGINEER
CIVIL 1
43 SHERMAN HILL ROAD, SUITE D-101
WOODBURY, CT

CIVIL 1
CORNERSTONE PROFESSIONAL PARK, SUITE D-101
43 SHERMAN HILL ROAD
WOODBURY (203) 266-0778 CONNECTICUT

MARCH 17, 2023
REVISED MAY 31, 2023

SHEET NUMBER	DESCRIPTION
1 OF 1	ZONING LOCATION SURVEY
C – 1.1	EXISTING CONDITIONS MAP
C – 2.1	PROPOSED SOLAR ARRAY LAYOUT
C – 2.2	GRADING & DRAINAGE PLAN – AREAS A & B
C – 2.3	GRADING & DRAINAGE PLAN – AREA C ACCESS DRIVE
C – 2.4	GRADING & DRAINAGE PLAN – AREA C
C – 3.2	EROSION CONTROL PLAN – AREAS A & B
C – 3.3	EROSION CONTROL PLAN – AREA C ACCESS DRIVE
C – 3.4	EROSION CONTROL PLAN – AREA C
C – 4.1	NORTHERN ACCESS DRIVE PROFILE
C – 4.2	SOUTHERN ACCESS DRIVE PROFILE & WETLANDS CROSSINGS
C – 5.1	DETAILS
C – 5.2	DETAILS
C – 6.1	GENERAL NOTES AND EROSION CONTROL NOTES
C – 6.2	ENVIRONMENTAL PROTECTION NOTES

MAP REF

N/F
BYZANTINE RITE, DIOCESE OF STAMFORD INC.
156 TUCKIE ROAD

N/F
CINDY-LOU ST. MARTIN
136 TUCKIE ROAD

N/F
DONALD A. & ELIZABETH D. DIONNE
12 STONY RIDGE ROAD

N/F
ANGELICA LOPEZ LADINO & EGDAR CONCEPCION
10 STONY RIDGE ROAD

N/F
EVANGELO G. & LORI A. SFAKIOS
8 STONY RIDGE ROAD

N/F
ARMAND M. SACCOMANNO & EMILIE F. KRUEGER-SACCOMANNO
6 STONY RIDGE ROAD

N/F
JEREMY M. & KIMBERLY A. PAPLIOR
4 STONY RIDGE ROAD

STONY RIDGE ROAD

PINCH PIPE FOUND
TREESTAND
N08°50'08"E — 875.55'
PINCH PIPE FOUND
N11°35'20"E — 920.92'
PINCH PIPE FOUND
N07°27'00"W — 375.18'
PINCH PIPE FOUND
N11°09'00"W — 284.78'
DRAINAGE DITCH

N/F
DARICK ORANGE & MADDISON SMITH
24 BRICKTOP LANE

REBAR FOUND 1' OFF LINE
N29°58'20"W — 363.27'
S53°48'00"W 36.84'

TP#103
TP#102
TP#100
TP#101
PRIMARY & RESERVE LEACHING AREAS

PARCEL 'A'
983,361 Sq.Ft.
22.57 Acres

APPROXIMATE EDGE OF MARSH
APPROXIMATE EDGE OF MARSH
311.37'
441.37'
S 78°35'17" E
REBAR W/CAP SET
130.00'
MARSH
1052.27'

S 57°24'30"E 186.69'
S 53°50'40" E 85.00'
S 62°23'40" E 159.00'
S 79°10'10" E 88.50'
S 65°24'10" E 290.00'
S 57°32'20" E 86.14'

N/F
MARK HOVANEC
241 NORTH WINDHAM ROAD

BRICKTOP LANE
SNET 3853
S62°30'00"W 321.80'
L=31.22'
Δ=7°47'00"
R=230.00'
SNET 3852
GATE
Δ=18°41'42"
L=81.57'
R=250.00'
Δ=16°36'18"
L=72.45'
BRIDGE
BRIDGE
SNET 3853
N89°07'00"W 150.63'
N89°00'00"W 123.83'
S75°15'30"W 60.00'
CHD MONUMENT FOUND
CHD MONUMENT FOUND
99.75'
S 12°53'40" W
S 13°46'40" W — 529.20'
L=85.41'
Δ=0°51'36"
R=5690.00'
N 76°20'08" W 20.00'
S 09°03'20" W — 379.85'
S 08°59'20" W — 873.28'
45.47'

NEW PARCEL LINE
S05°46'41"E
1618.37'
REBAR W/CAP SET
BRIDGE
566.09'

REMAINING LAND OF
PETER & MARY CONCKLIN
163 NORTH WINDHAM ROAD
1,951,191 Sq.Ft.
44.79 Acres

S 18°14'30" W 250.00'
455.00'
S 73°48'30" E

N/F
DENNIS A. TETREAULT
209 NORTH WINDHAM ROAD

N/F
DARREN M. TOMPKINS
215 NORTH WINDHAM ROAD

TP#3
TP#1
TP#2
EXISTING LEACHING FIELD IS CODE COMPLAINT AREA
BRI HOUSE

NORTH WINDHAM ROAD ROUTE #203

LEGEND

- PROPERTY LINE
- EDGE WATER
- IRON PIN/PIPE FOUND OR SET
- CONC. MONUMENT FOUND
- UTILITY POLE
- TEST PIT
- PERCOLATION TEST
- ELEVATION CONTOUR

NOTES:

1. THIS MAP AND SURVEY HAVE BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300b-1 THROUGH 20-300b-20, "MINIMUM STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT". THIS IS A PROPERTY SURVEY OF PARCEL 'A' BASED ON A DEPENDANT RESURVEY AND A ORIGINAL SURVEY OF THE NEW PROPERTY LINE CONFORMING TO HORIZONTAL ACCURACY CLASS A-2. THE BOUNDARY OF THE REMAINING LAND IS AS DEPICTED IN THE SURVEY REFERENCED IN NOTE 3.A AND CONFORMS TO HORIZONTAL ACCURACY CLASS D.
2. BEARINGS DEPICTED ON THIS PLAN ARE BASED ON THE MAP REFERENCED IN NOTE 3.A. ELEVATIONS ARE BASED ON AN ASSUMED DATUM.
3. MAP REFERENCES:
   A. "PROPERTY OF CHARLES & BETTY DONDERO WINHAM, CONN" BY HARRY K. MEGSON, PE & LS HEBRON, CONN. DATE: 9-20-77. SCALE: 1"=100'. MAP NO: 23-77-1.
   B."SUBSURFACE SEWAGE DISPOSAL DESIGN PREPARED FOR PETER CONCKLIN 163 NORTH WINDHAM ROAD NORTH WINDHAM, CONNECTICUT" BY DATUM ENGINEERING & SURVEYING, LLC. DATED: 9/23/2009.
4. IMPROVEMENTS DEPICTED ON PARCEL 'B' ARE AS DEPICTED ON THE PLAN REFERENCED IN NOTE 3.B. AND ARE NOT THE RESULT OF A FIELD SURVEY.

I HEREBY DECLARE THAT, TO THE BEST OF MY KNOWLEDGE AND BELIEF, THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

Eric R. Peterson — L.S. 23430
ERIC R. PETERSON — REGISTRATION NO.

100 50 0 100 200 300
GRAPHIC SCALE 1"=100'

PRIMARY & RESERVE LEACHING AREAS FOR PARCEL 'A'
4-BEDROOM HOUSE
PERCOLATION RATE: <10.1 MIN/IN
577.5 SF ELA REQUIRED

MLSS:
DEPTH TO RESTRICTIVE: 18.0-22.0"
HYDRAULIC GRADIENT: 10.1-15.0%
HF=28
FF=1.75
PF=1.0
MLSS=28x1.75x1.0=49

PROVIDED:
2 ROWS STONE TRENCH (3 SF/LF) 97 FEET LONG
OR 582 SF ELA

TEST PIT DATA:
OBSERVED BY: LUIGI SATORI NORTH CENTRAL DISTRICT HEALTH DEPARTMENT & ERIC R. PETERSON, P.E. GARDNER & PETERSON ASSOCIATES, LLC

10/15/2020:
TP 100:
0-6" TOPSOIL
6-18" FINE SANDY LOAM
18-56" SLIGHTLY COMPACT SAND & GRAVEL
NO MOTTLING, NO SEEPAGE, NO LEDGE

TP 101:
0-6" TOPSOIL
6-19" FINE SANDY LOAM
19-52" SLIGHTLY COMPACT SAND & GRAVEL
NO MOTTLING, NO SEEPAGE, NO LEDGE

TP 102:
0-10" TOPSOIL
10-22" FINE SANDY LOAM
22-60" COMPACT TILL
MOTTLING @ 22" , NO SEEPAGE, NO LEDGE

TP 103:
0-6" TOPSOIL
6-19" FINE SANDY LOAM W/ COBBLES
19-54" SLIGHTLY COMPACT SAND & GRAVEL
NO MOTTLING, NO SEEPAGE, NO LEDGE

TEST PIT DATA:
OBSERVED BY RICK ZULICK, R.S.
9/16/2009
TP 1:
0-9" TOPSOIL
9-30" YELLOWISH BROWN LOAMY FINE SAND
30-84" GRAVEL
NO MOTTLING NO WATER
NO LEDGE

TP 2:
0-8" TOPSOIL
8-37" LOAMY FINE SAND
37-76" BROWNISH YELLOW LOAMY FINE SAND
76-90" GRAVEL
NO MOTTLING NO WATER
NO LEDGE

TP 3:
0-8" TOPSOIL
8-84" GRAVEL
NO MOTTLING NO WATER
NO LEDGE

PERCOLATION TEST DATA:
BY: ERIC R. PETERSON, P.E. GARDNER & PETERSON ASSOCIATES, LLC
10/15/2020:
BETWEEN TP 100 & TP 103
PRESOAK @ 11:00
DEPTH=18"
MARK AT GRADE

TIME	DEPTH
11:25	6"
11:35	12"
11:40	13½"
11:50	15"
12:00	16½"
12:07	DRY

RATE = 7 MIN/IN

BY: DATUM ENGINEERING & SURVEYING LLC
9/16/2009
PRESOAK @ 10:54

TIME	DEPTH
12:07	39⅝"
12:08	40"
12:09	41"
12:10	42¼"
12:11	43⅜"
12:12	43⅞"
12:13	44⅝"
12:14	45¼"
12:15	46"
12:16	46½"

RATE = 1.4 MIN/IN

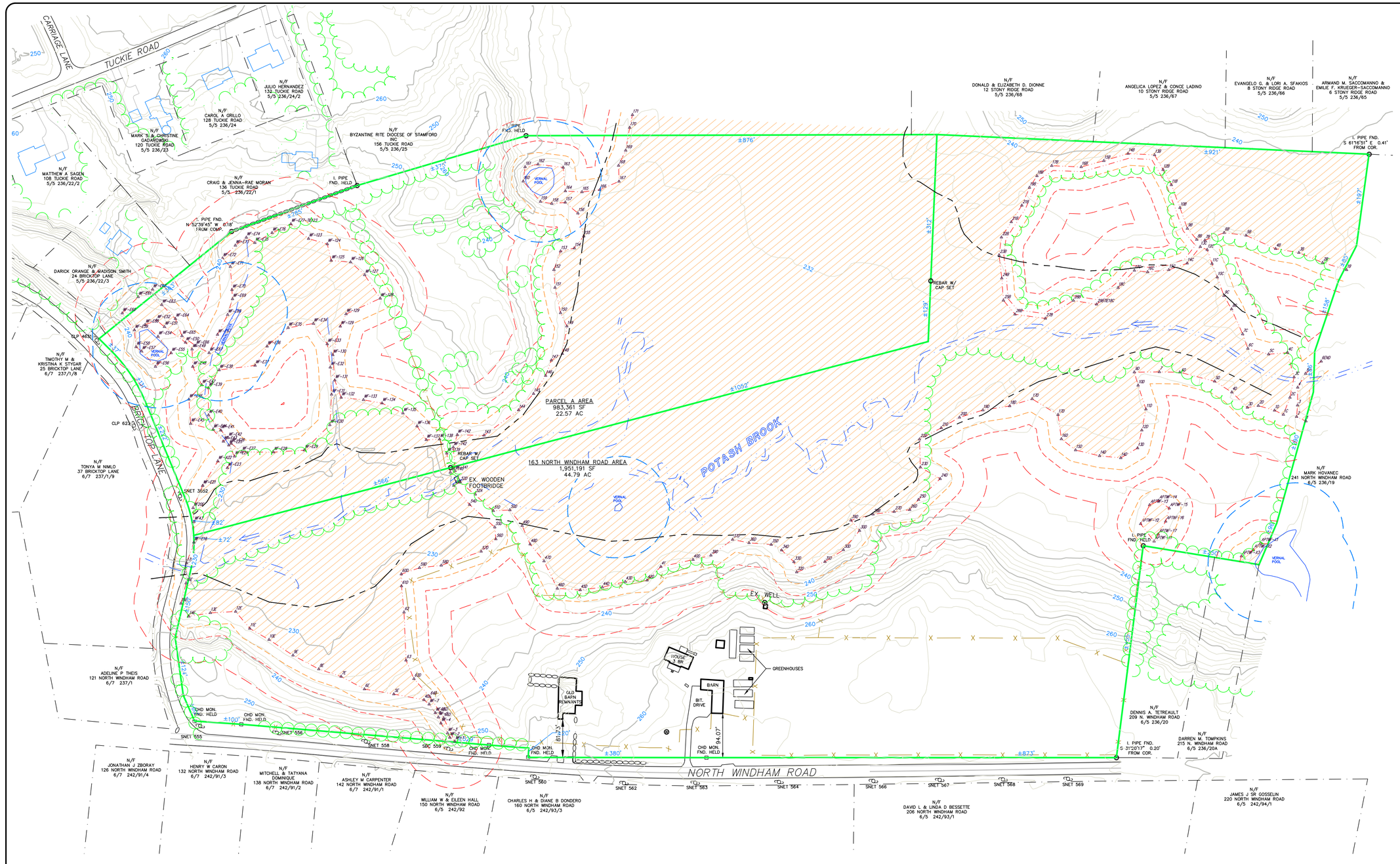
REVISIONS

PROPERTY SURVEY
PORTION OF LAND OF
PETER & MARY CONCKLIN
163 NORTH WINDHAM ROAD & BRICKTOP LANE
NORTH WINDHAM, CONNECTICUT

GARDNER & PETERSON ASSOCIATES, LLC
178 HARTFORD TURNPIKE
TOLLAND, CONNECTICUT
PROFESSIONAL ENGINEERS LAND SURVEYORS

BY	SCALE	DATE	SHEET NO.	MAP NO.
E.R.P.	1"=100'	10-25-2020	1 OF 1	10901A

G:\18yrs\10901\Survey\10-25-2020\10901A.pdf
10901.dwg \10901A.dwg



LEGEND

- PROPERTY LINE
- EXISTING GROUND CONTOUR
- WETLAND LINE
- 100' WETLAND BUFFER LINE
- 50' WETLAND BUFFER LINE
- 25' WETLAND BUFFER LINE
- 100' VERNAL POOL SETBACK
- 100 YEAR FLOOD PLAIN BASED ON FEMA MAPPING
- WETLAND FLAG
- WETLANDS AREA
- EXISTING WELL
- EXISTING FENCE
- EXISTING STONE WALL
- TREE LINE

NO.	REVISION	DATE
1	REV. SOLAR ARRAY LAYOUT	5/11/23
	Previous Editions Obsolete	

100 0 50 100 200

1 inch = 100 feet

LSE HOROLOGIUM LLC
40 TOWER LANE
AVON, CT

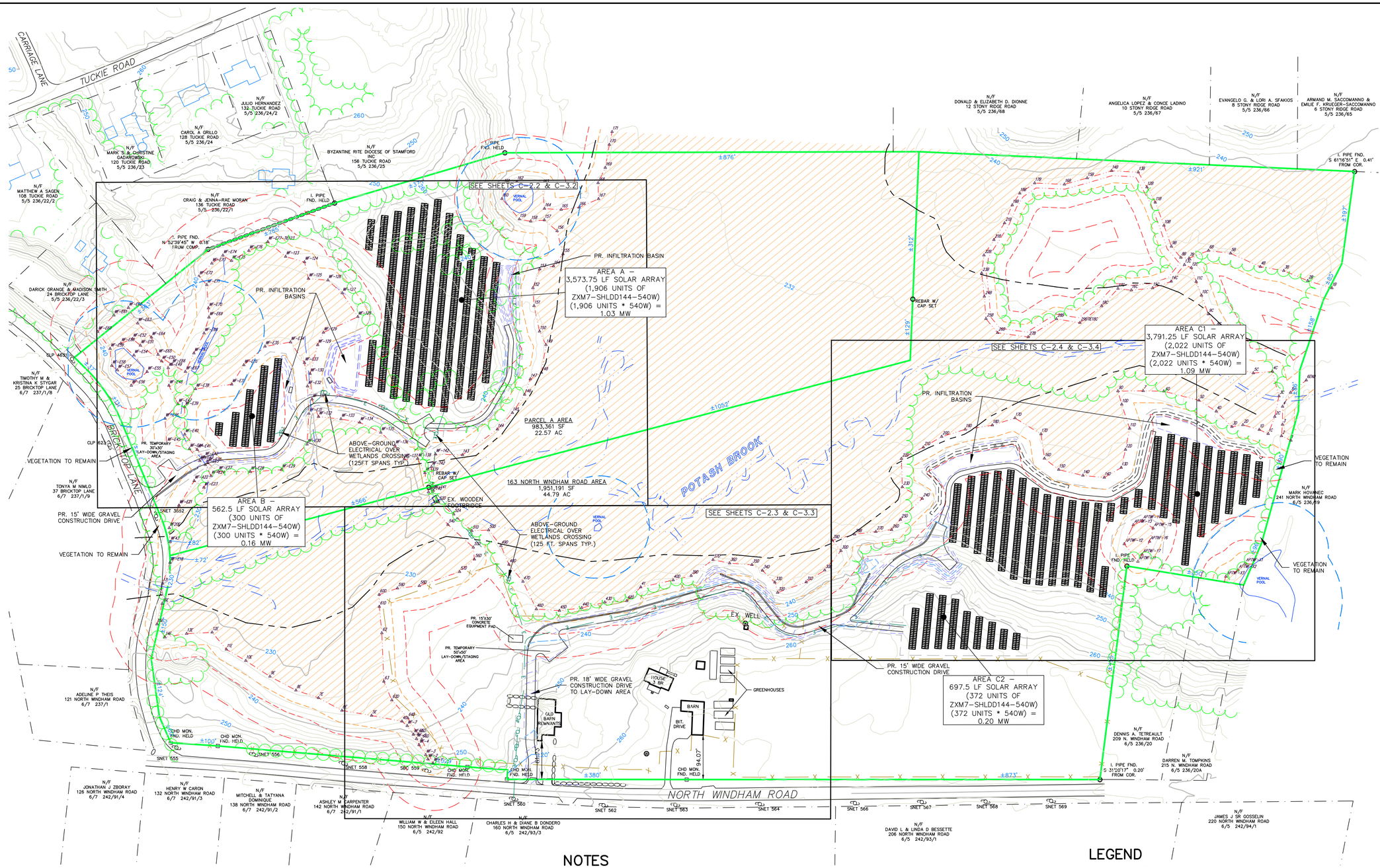
EXISTING CONDITIONS MAP

PARCEL A BRICK TOP LANE & 163 NORTH WINDHAM ROAD

WINDHAM CONNECTICUT

CIVIL C1
CORNERSTONE PROFESSIONAL PARK, SUITE D-101
43 SHERMAN HILL ROAD
WOODBURY (203) 266 - 0778 CONNECTICUT

DRAWN: BB	APPROVED: CJ
SCALE:	1" = 100'
DATE:	17 MAR 23
PROJ. NO.:	3983
CADD FILE NAME:	3983
DRAWING NO.:	C - 1.1



NOTES

1.) THE AREA OF PARCEL A BRICK TOP LANE IS 22.57 ACRES. THE AREA OF THE 163 NORTH WINDHAM ROAD PARCEL IS 44.79 ACRES.
2) THE ON-SITE WETLANDS WERE FLAGGED BY IAN COLE, PROFESSIONAL SOIL SCIENTIST AND DEAN GUSTAFSON, PROFESSIONAL SOIL SCIENTIST & SENIOR WETLAND SCIENTIST OF ALL-POINTS TECHNOLOGY AND WERE FIELD LOCATED BY CIVIL1.
3) PROPERTY LINE SURVEY WAS PROVIDED BY ALL SEASONS LAND SURVEYING.
4) TOPOGRAPHIC SURVEY IS BASED UPON UCONN CLEAR LIDAR 2016 TOPOGRAPHY AND SUPPLEMENTED BY FIELD TOPOGRAPHIC SURVEY COMPLETED BY CIVIL1.
5) HORIZONTAL DATUM IS NAD 83. VERTICAL DATUM IS NAVD 88.
6) SOIL TYPES WHERE INDICATED WERE TAKEN FROM THE USDA NATIONAL RESOURCES CONSERVATION SERVICE WEB SOIL SURVEY.
7) INFORMATION REGARDING THE LOCATION OF EXISTING UTILITIES HAS BEEN BASED UPON AVAILABLE INFORMATION AND MAY BE INCOMPLETE, AND WHERE SHOWN SHOULD BE CONSIDERED APPROXIMATE. THE LOCATION OF ALL EXISTING UTILITIES SHOULD BE CONFIRMED PRIOR TO BEGINNING CONSTRUCTION. CALL "CALL BEFORE YOU DIG", 1-800-922-4455.
8) ALL UTILITY LOCATIONS THAT DO NOT MATCH THE VERTICAL OR HORIZONTAL CONTROL SHOWN ON THE PLANS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER FOR RESOLUTION.
9) CIVIL 1 ACCEPTS NO RESPONSIBILITY FOR THE ACCURACY OF MAPS AND DATA WHICH HAVE BEEN SUPPLIED BY OTHERS.
10) ALL UTILITY SERVICES ARE TO BE UNDERGROUND UNLESS OTHERWISE NOTED ON THE PLANS. THE EXACT LOCATION AND SIZE OF ELECTRIC, TELEPHONE, CABLE AND ANY OTHER UNDERGROUND UTILITIES ARE TO BE DETERMINED BY THE RESPECTIVE UTILITY COMPANIES.

TOTAL SOLAR CAPACITY

8,625 LF SOLAR ARRAY
(4,600 UNITS OF
ZXM7-SHLDD144-540W)
(4,600 UNITS * 540W) = 2.48 MW

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- WETLAND LINE
- 100' WETLAND BUFFER LINE
- 50' WETLAND BUFFER LINE
- 25' WETLAND BUFFER LINE
- 100' VERNAL POOL SETBACK
- 100 YEAR FLOOD PLAIN BASED ON FEMA MAPPING
- WETLAND FLAG
- WETLANDS AREA
- PROPOSED SOLAR PANELS
- EXISTING WELL
- EXISTING FENCE
- EXISTING STONE WALL
- PROPOSED ELECTRIC
- TREE LINE
- PROPOSED LIMITS OF CONSTRUCTION

NO.	REVISION	DATE
1	REV. SOLAR ARRAY LAYOUT	5/11/23

Previous Editions Obsolete

100 0 50 100 200
1 inch = 100 feet

LSE HOROLOGIUM LLC
40 TOWER LANE
AVON, CT

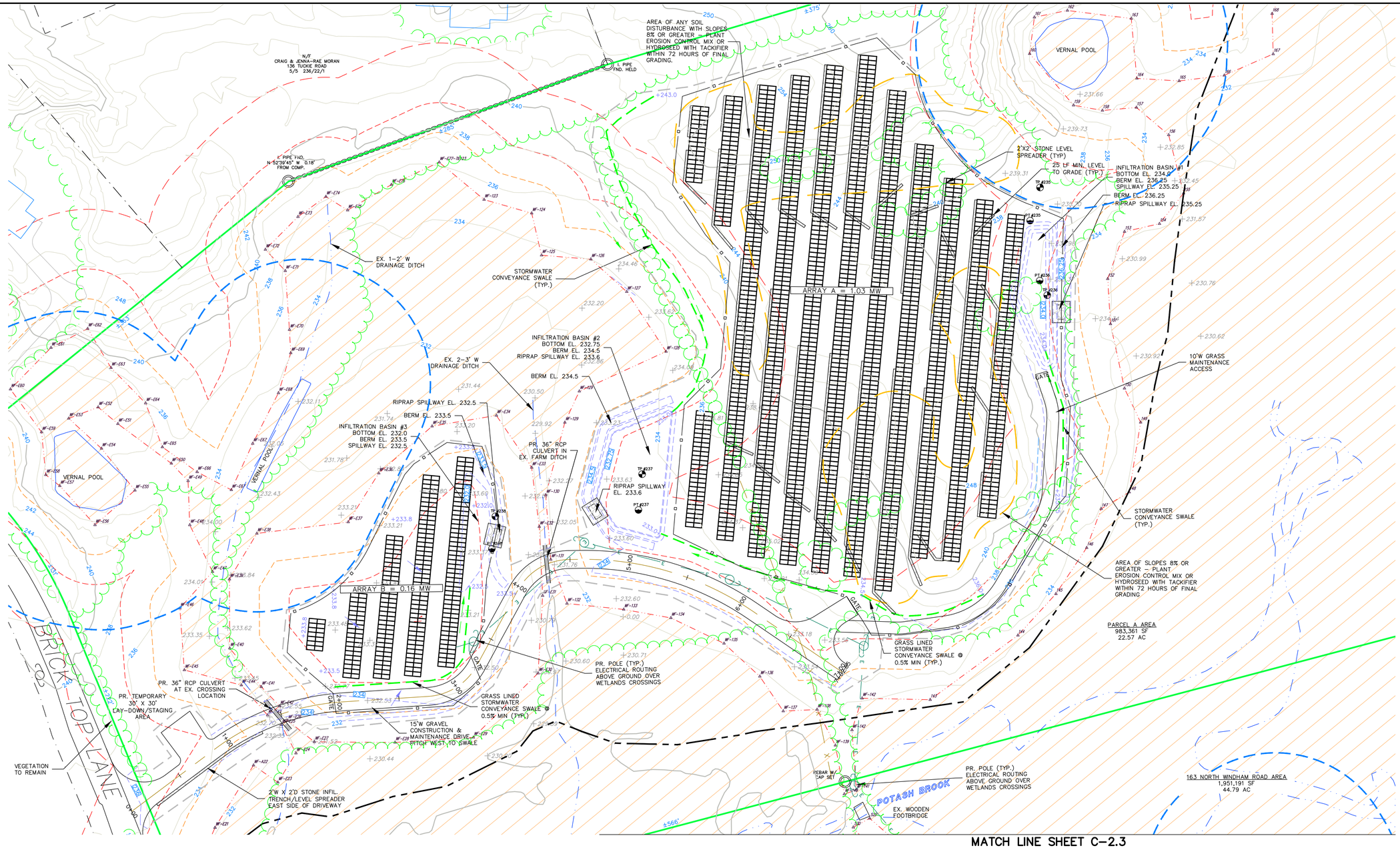
PROPOSED SOLAR ARRAY LAYOUT

PARCEL A BRICK TOP LANE & 163 NORTH WINDHAM ROAD

WINDHAM CONNECTICUT

CIVIL 1
CORNERSTONE PROFESSIONAL PARK, SUITE D-101
43 SHERMAN HILL ROAD
WOODBURY (203) 266-0778 CONNECTICUT

DRAWN: BB APPROVED: CJ
SCALE: 1" = 100'
DATE: 06 MAR 23
PROJ. NO.: 3983
CADD FILE NAME: 3983
DRAWING NO.: C - 2.1



MATCH LINE SHEET C–2.3

SOIL TESTING RESULTS

Deep Test Pit #235 Feb 16, 2023
0–12" Topsoil
12–37" Orange Brown Fine Silty Loam
37–96" Light Grey Fine Silty Sand
Mottling at 37"
No Groundwater Seep
No Standing Groundwater
No Ledge

Deep Test Pit #236 Feb 16, 2023
0–8" Topsoil
8–20" Orange Brown Fine Silty Loam
20–96" Light Grey Fine Silty Sand
Mottling at 25"
Groundwater Seep at 24"
No Standing Groundwater
No Ledge

Deep Test Pit #237 Feb 16, 2023
0–8" Topsoil
8–19" Orange Silty Loam
19–96" Fine Grey Sandy Silt
Mottling at 30"
Groundwater Seep at 60"
Standing Groundwater at 96"
No Ledge

Deep Test Pit #238 Feb 16, 2023
0–8" Topsoil
8–27" Orange Fine Silty Sand
27–96" Grey Fine Sand
Mottling at 26"
Groundwater Seep at 46"
Standing Groundwater at 96"
No Ledge

Infiltration Test #235 February 16, 2023
Depth of Hole: = 20" Presoak: 12:40PM
Time Reading
02:38 10"
02:48 27–3/4"
02:58 DRY
02:58 10"
03:08 27–3/4"
03:15 DRY
Percolation Rate = 1–10 minutes per inch

Infiltration Test #236 February 16, 2023
Depth of Hole: = 25" Presoak: 12:45AM
Time Reading
02:38 10"
02:48 18"
02:58 22–1/4"
03:08 25–1/4"
03:18 27"
03:28 28–3/4"
03:38 30"
Percolation Rate = 1–10 minutes per inch

Infiltration Test #237 February 16, 2023
Depth of Hole: = 20" Presoak: 01:30PM
Time Reading
02:40 10"
02:50 19"
03:00 22–1/4"
03:10 25–1/4"
03:20 26–3/4"
03:30 28–1/4"
03:40 29–3/8"
Percolation Rate = 1–10 minutes per inch

Infiltration Test #238 February 16, 2023
Depth of Hole: = 20" Presoak: 02:10PM
Time Reading
02:42 10"
02:52 25–1/2"
03:02 28–3/4"
03:12 DRY
03:12 10"
03:22 23–3/4"
03:32 27–7/8"
03:42 DRY
Percolation Rate = 1–10 minutes per inch

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- EXISTING SPOT GRADE
- PROPOSED CONTOUR
- PROPOSED SPOT GRADE
- WETLAND LINE
- 100' WETLAND BUFFER LINE
- 50' WETLAND BUFFER LINE
- 25' WETLAND BUFFER LINE
- 100' VERNAL POOL SETBACK
- 100 YEAR FLOOD PLAIN BASED ON FEMA MAPPING
- WETLAND FLAG
- WETLANDS AREA
- PROPOSED SOLAR PANELS
- EXISTING WELL
- EXISTING FENCE
- EXISTING STONE WALL
- PROPOSED ELECTRIC
- TREE LINE
- PROPOSED LIMITS OF CONSTRUCTION
- DEEP TEST PIT LOCATION
- INFILTRATION TEST LOCATION (BORE–HOLE METHOD)
- PROPOSED CHAIN LINK FENCE

NO.	REVISION	DATE
1	REV. SOLAR ARRAY LAYOUT	5/11/23
	Previous Editions Obsolete	

40 0 20 40 80
1 inch = 40 feet

LSE HOROLOGIUM LLC
40 TOWER LANE
AVON, CT

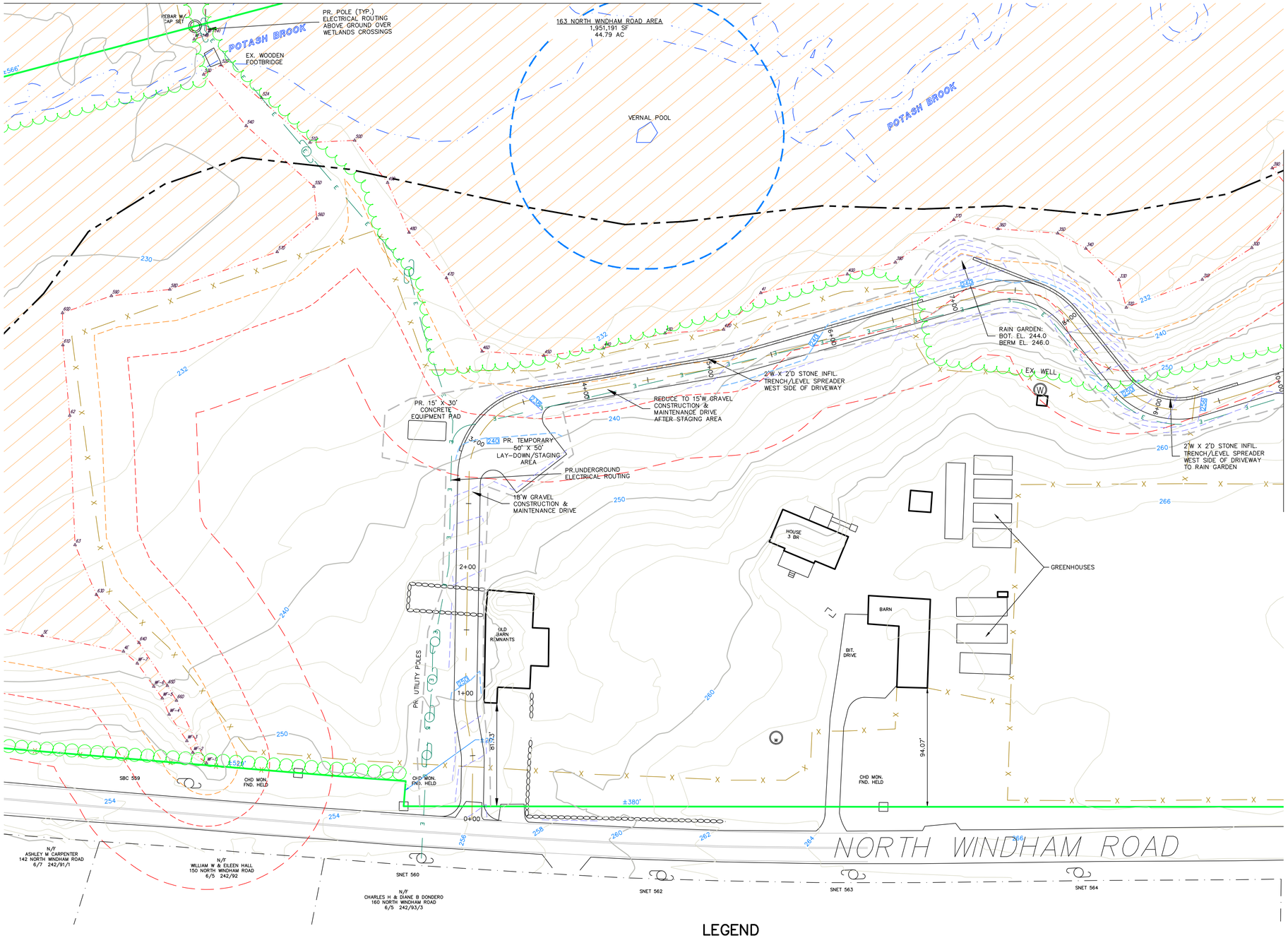
GRADING & DRAINAGE PLAN
AREAS A & B

PARCEL A BRICK TOP LANE & 163 NORTH WINDHAM ROAD
WINDHAM CONNECTICUT

CIVIL C1
CORNERSTONE PROFESSIONAL PARK, SUITE D-101
43 SHERMAN HILL ROAD
WOODBURY (203) 266-0778 CONNECTICUT

DRAWN:	BB
APPROVED:	CJ
SCALE:	1" = 40'
DATE:	17 MAR 23
PROJ. NO.:	3983
CADD FILE NAME:	3983
DRAWING NO.:	C - 2.2

MATCH LINE SHEET C-2.2



MATCH LINE SHEET C-2.4

LEGEND

	PROPERTY LINE
	EXISTING CONTOUR
+557.0	EXISTING SPOT GRADE
	PROPOSED CONTOUR
+557.0	PROPOSED SPOT GRADE
	WETLAND LINE
	100' WETLAND BUFFER LINE
	50' WETLAND BUFFER LINE
	25' WETLAND BUFFER LINE
	100' VERNAL POOL SETBACK
	100 YEAR FLOOD PLAIN BASED ON FEMA MAPPING
	WETLAND FLAG
	WETLANDS AREA
	PROPOSED SOLAR PANELS
W	EXISTING WELL
X X	EXISTING FENCE
	EXISTING STONE WALL
E	PROPOSED ELECTRIC
	TREE LINE
	PROPOSED LIMITS OF CONSTRUCTION
TP 633	DEEP TEST PIT LOCATION
PT 633	INFILTRATION TEST LOCATION (BORE-HOLE METHOD)
	PROPOSED CHAIN LINK FENCE

NO.	REVISION	DATE
1	REV. SOLAR ARRAY LAYOUT	5/11/23
	Previous Editions Obsolete	

40 0 20 40 80

1 inch = 40 feet

LSE HOROLOGIUM LLC
40 TOWER LANE
AVON, CT

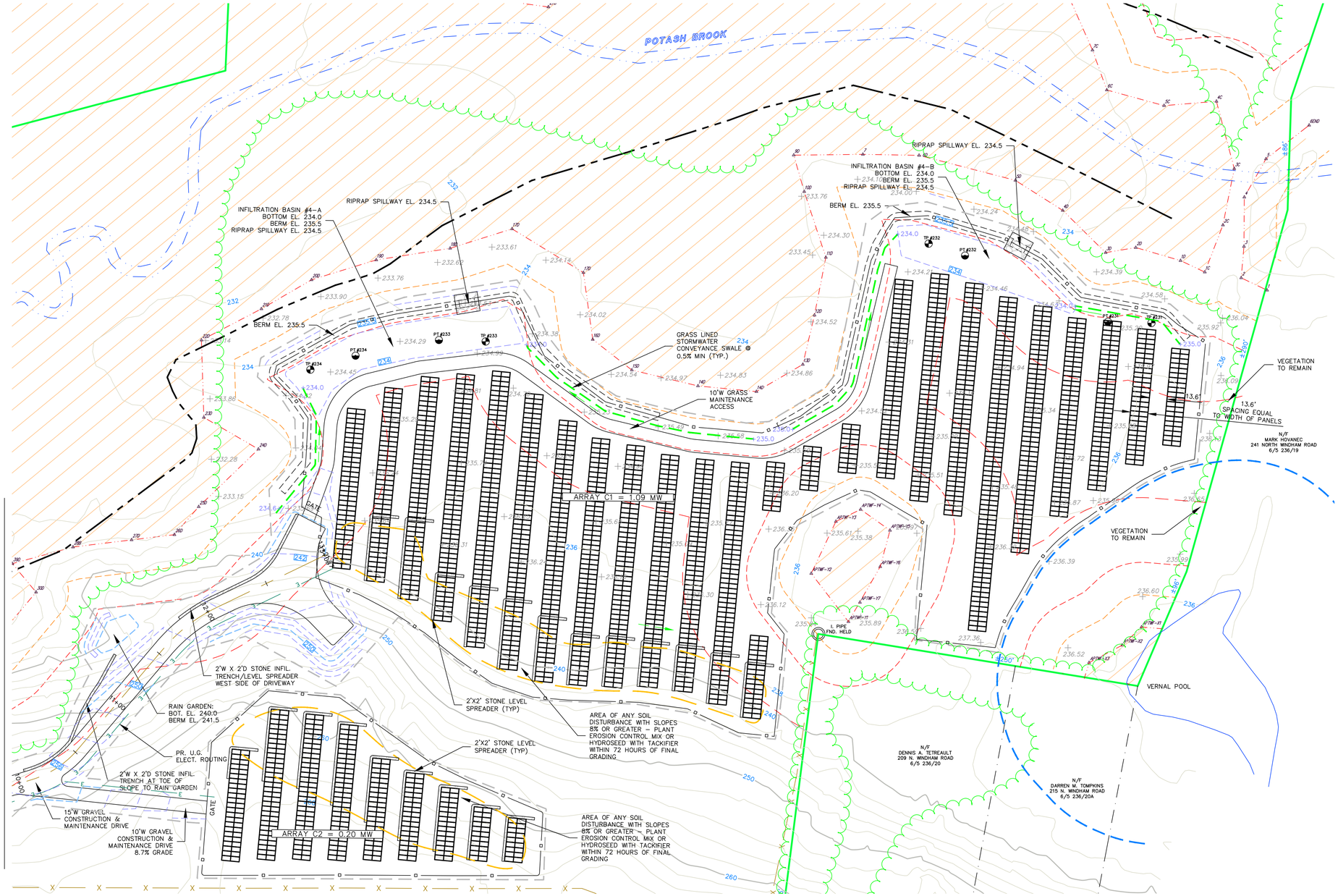
GRADING & DRAINAGE PLAN
AREA C ACCESS DRIVE

PARCEL A BRICK TOP LANE & 163 NORTH WINDHAM ROAD

WINDHAM CONNECTICUT

CIVIL C1
CORNERSTONE PROFESSIONAL PARK, SUITE D-101
43 SHERMAN HILL ROAD
WOODBURY (203) 266-0778 CONNECTICUT

DRAWN: BB	APPROVED: CJ
SCALE:	1" = 40'
DATE:	17 MAR 23
PROJ. NO.:	3983
CADD FILE NAME:	3983
DRAWING NO.:	C - 2.3



SOIL TESTING RESULTS

Infiltration Test #231 February 16, 2023
Depth of Hole: = 20" Presoak: 09:45AM
Time Reading
02:40 7"
02:50 13-7/8"
03:00 16-7/8"
03:10 19"
03:20 20-7/8"
03:30 21-7/8"
03:40 22-7/8"
Percolation Rate = 1-10 minutes per inch

Infiltration Test #232 February 16, 2023
Depth of Hole: = 22" Presoak: 10:10AM
Time Reading
02:40 2"
02:50 2-1/4"
03:00 2-1/2"
03:10 2-3/4"
03:20 3"
03:30 3-1/4"
03:40 3-1/2"
Percolation Rate = 40 minutes per inch

Infiltration Test #233 February 16, 2023
Depth of Hole: = 21" Presoak: 11:10AM
Time Reading
02:40 7-5/8"
02:50 25-5/8"
03:00 27-1/2"
03:10 28-1/8"
03:20 28-1/2"
03:30 28-7/8"
03:40 29-1/4"
Percolation Rate = 20.1-30 minutes per inch

Infiltration Test #234 February 16, 2023
Depth of Hole: = 21" Presoak: 11:00AM
Time Reading
02:40 11-1/2"
02:50 24-1/4"
03:00 28-1/8"
03:10 DRY
Percolation Rate = 1-10 minutes per inch

Deep Test Pit #231 Feb 16, 2023
0-8" Topsoil
8-36" Fine Brown Silty Sand
36-42" Dark Organic Sand
42-98" Light Grey Fine Sand
Mottling at 38"
Groundwater Seep at 40"
No Standing Groundwater
No Ledge

Deep Test Pit #232 Feb 16, 2023
0-8" Topsoil
8-24" Brown Medium Sand
24-96" Light Grey Fine Sand
Mottling at 32"
Groundwater Seep at 27"
Standing Groundwater at 96"
No Ledge

Deep Test Pit #233 Feb 16, 2023
0-10" Topsoil
10-26" Orange Fine Sandy Loam With Silt
26-48" Orange Fine Sandy Loam Bands With Grey Sand
48-96" Light Grey Fine Sand
Mottling at 27"
Groundwater Seep at 36"
No Standing Groundwater
No Ledge

Deep Test Pit #234 Feb 16, 2023
0-9" Topsoil
9-24" Orange Brown Fine Sandy Loam With Silt
24-48" Orange Brown Sand
48-98" Light Grey Fine Sand
Mottling at 22"
Groundwater Seep at 36"
No Standing Groundwater
No Ledge

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- EXISTING SPOT GRADE
- PROPOSED CONTOUR
- PROPOSED SPOT GRADE
- WETLAND LINE
- 100' WETLAND BUFFER LINE
- 50' WETLAND BUFFER LINE
- 25' WETLAND BUFFER LINE
- 100' VERNAL POOL SETBACK
- 100 YEAR FLOOD PLAIN BASED ON FEMA MAPPING
- WETLAND FLAG
- WETLANDS AREA
- PROPOSED SOLAR PANELS
- EXISTING WELL
- EXISTING FENCE
- EXISTING STONE WALL
- PROPOSED ELECTRIC
- TREE LINE
- PROPOSED LIMITS OF CONSTRUCTION
- DEEP TEST PIT LOCATION
- INFILTRATION TEST LOCATION (BORE-HOLE METHOD)
- PROPOSED CHAIN LINK FENCE

NO.	REVISION	DATE
1	REV. SOLAR ARRAY LAYOUT	5/11/23
	Previous Editions Obsolete	

40 0 20 40 80
1 inch = 40 feet

LSE HOROLOGIUM LLC
40 TOWER LANE
AVON, CT

GRADING & DRAINAGE PLAN
AREA C

PARCEL A BRICK TOP LANE & 163 NORTH WINDHAM ROAD
WINDHAM CONNECTICUT

CIVIL C1
CORNERSTONE PROFESSIONAL PARK, SUITE D-101
43 SHERMAN HILL ROAD
WOODBURY (203) 266-0778 CONNECTICUT

DRAWN:	BB
APPROVED:	CJ
SCALE:	1" = 40'
DATE:	17 MAR 23
PROJ. NO.:	3983
CADD FILE NAME:	3983
DRAWING NO.:	C - 2.4

N/T
CRAIG & JENNA-RAE MORAN
136 TUCKIE ROAD
5/5 236/22/1

1 PIPE FND. HELD

4" PIPE FND.
N 52°39'45" W 0.18'
FROM COMP.

AREA OF ANY SOIL DISTURBANCE WITH SLOPES 8% OR GREATER – PLANT EROSION CONTROL MIX OR HYDROSEED WITH TACKIFIER WITHIN 72 HOURS OF FINAL GRADING.

NO PROPOSED ACTIVITY WITHIN 100' OF VERNAL POOL

VERNAL POOL

2'X2' STONE LEVEL SPREADER (TYP)
25 LF MIN. LEVEL TO GRADE (TYP.)

INFILTRATION BASIN #1
BOTTOM EL. 234.0
BERM EL. 236.25
SPILLWAY EL. 235.25

BERM EL. 236.25
RIPRAP SPILLWAY EL. 235.25

EX. 1–2' W DRAINAGE DITCH

STORMWATER CONVEYANCE SWALE (TYP.)

NO PROPOSED ACTIVITY WITHIN 100' OF VERNAL POOL

SILT FENCE BACKED WITH STRAW WATTLES FOR ANY ACTIVITY WITHIN 25' OF WETLANDS

INFILTRATION BASIN #2
BOTTOM EL. 232.75
BERM EL. 234.5
RIPRAP SPILLWAY EL. 233.6

EX. 2–3' W DRAINAGE DITCH

BERM EL. 234.5

RIPRAP SPILLWAY EL. 232.5

BERM EL. 233.5

INFILTRATION BASIN #3
BOTTOM EL. 232.0
BERM EL. 233.5
SPILLWAY EL. 232.5

PR. 36" RCP CULVERT IN EX. FARM DITCH

TST-2
BOTTOM OF TST=231.75
233.63
RIPRAP SPILLWAY EL. 233.6

TST-1
BOTTOM OF TST=233.0

ARRAY A = 1.03 MW

10'W GRASS MAINTENANCE ACCESS

VERNAL POOL

VERNAL POOL

PANELS WITHIN 50' OF WETLANDS DO NOT DRAIN TOWARDS ADJACENT WETLANDS AREA TO THE SOUTHWEST. DRAINS TO SWALE TO THE NORTHEAST.

STORMWATER CONVEYANCE SWALE (TYP.)

AREA OF SLOPES 8% OR GREATER – PLANT EROSION CONTROL MIX OR HYDROSEED WITH TACKIFIER WITHIN 72 HOURS OF FINAL GRADING

ARRAY B = 0.16 MW

PARCEL A AREA
983,361 SF
22.57 AC

PR. POLE (TYP.)
ELECTRICAL ROUTING ABOVE GROUND OVER WETLANDS CROSSINGS

GRASS LINED STORMWATER CONVEYANCE SWALE @ 0.5% MIN (TYP.)

PR. 36" RCP CULVERT AT EX. CROSSING LOCATION

PR. TEMPORARY 30' X 30' LAY-DOWN/STAGING AREA

GRASS LINED STORMWATER CONVEYANCE SWALE @ 0.5% MIN (TYP.)

15'W GRAVEL CONSTRUCTION & MAINTENANCE DRIVE PITCH WEST TO SWALE

VEGETATION TO REMAIN

BRICK TOP LANE

STABILIZED CONSTRUCTION ENTRANCE

2'W X 2'D STONE INFIL. TRENCH/LEVEL SPREADER EAST SIDE OF DRIVEWAY

REBAR W/ CAP SET

PR. POLE (TYP.)
ELECTRICAL ROUTING ABOVE GROUND OVER WETLANDS CROSSINGS

POTASH BROOK

EX. WOODEN FOOTBRIDGE

163 NORTH WINDHAM ROAD AREA
1,951,191 SF
44.79 AC

MATCH LINE SHEET C–3.3

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- +557.0 EXISTING SPOT GRADE
- PROPOSED CONTOUR
- +557.0 PROPOSED SPOT GRADE
- WETLAND LINE
- 100' WETLAND BUFFER LINE
- 50' WETLAND BUFFER LINE
- 25' WETLAND BUFFER LINE
- 100' VERNAL POOL SETBACK
- 100 YEAR FLOOD PLAIN BASED ON FEMA MAPPING
- 1 WETLAND FLAG
- WETLANDS AREA
- PROPOSED SOLAR PANELS
- W EXISTING WELL
- X X EXISTING FENCE
- EXISTING STONE WALL
- E PROPOSED ELECTRIC
- TREE LINE
- PROPOSED SILT FENCE–BACK WITH STRAW WATTLES WHERE INDICATED ON PLAN
- PROPOSED LIMITS OF CONSTRUCTION
- STABILIZED CONSTRUCTION ENTRANCE
- TST-1 TEMPORARY SEDIMENT TRAP

NO.	REVISION	DATE
1	REV. SOLAR ARRAY LAYOUT	5/11/23
	Previous Editions Obsolete	

40 0 20 40 80
1 inch = 40 feet

LSE HOROLOGIUM LLC
40 TOWER LANE
AVON, CT

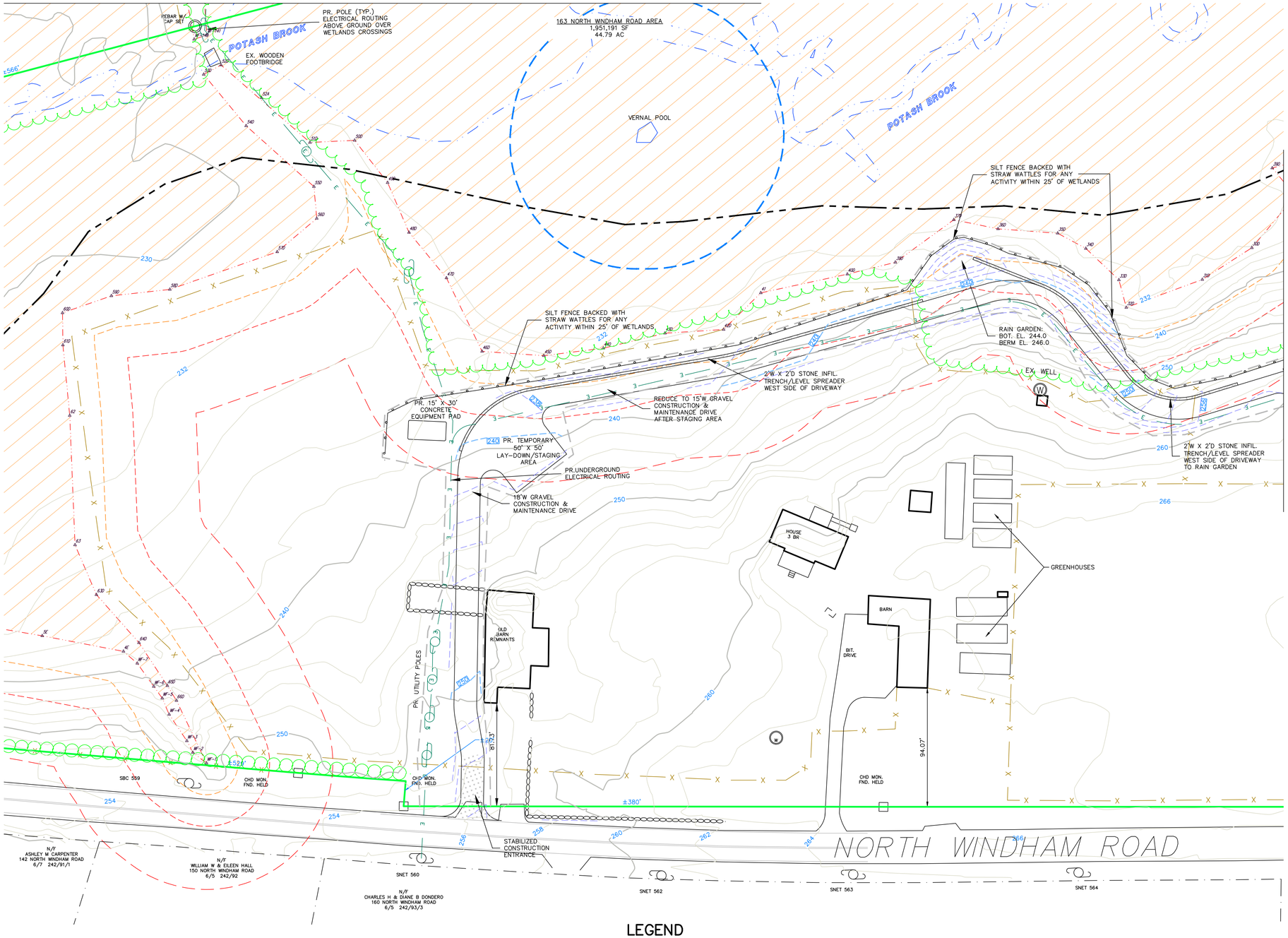
EROSION CONTROL PLAN
AREAS A & B

PARCEL A BRICK TOP LANE & 163 NORTH WINDHAM ROAD
WINDHAM CONNECTICUT

CIVIL C1
CORNERSTONE PROFESSIONAL PARK, SUITE D-101
43 SHERMAN HILL ROAD
WOODBURY (203) 266 - 0778 CONNECTICUT

DRAWN: BB APPROVED: CJ
SCALE: 1" = 40'
DATE: 17 MAR 23
PROJ. NO.: 3983
CADD FILE NAME: 3983
DRAWING NO.: C - 3.2

MATCH LINE SHEET C-3.2



MATCH LINE SHEET C-2.4

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- +557.0 EXISTING SPOT GRADE
- PROPOSED CONTOUR
- +557.0 PROPOSED SPOT GRADE
- WETLAND LINE
- 100' WETLAND BUFFER LINE
- 50' WETLAND BUFFER LINE
- 25' WETLAND BUFFER LINE
- 100' VERNAL POOL SETBACK
- 100 YEAR FLOOD PLAIN BASED ON FEMA MAPPING
- WETLAND FLAG
- WETLANDS AREA
- PROPOSED SOLAR PANELS
- EXISTING WELL
- EXISTING FENCE
- EXISTING STONE WALL
- PROPOSED ELECTRIC
- TREE LINE
- PROPOSED SILT FENCE-BACK WITH STRAW WATTLES WHERE INDICATED ON PLAN
- PROPOSED LIMITS OF CONSTRUCTION
- STABILIZED CONSTRUCTION ENTRANCE
- TST-1 TEMPORARY SEDIMENT TRAP

NO.	REVISION	DATE
1	REV. SOLAR ARRAY LAYOUT	5/11/23

Previous Editions Obsolete

40 0 20 40 80

1 inch = 40 feet

LSE HOROLOGIUM LLC
40 TOWER LANE
AVON, CT

EROSION CONTROL PLAN
AREA C ACCESS DRIVE

PARCEL A BRICK TOP LANE & 163 NORTH WINDHAM ROAD

WINDHAM CONNECTICUT

CIVIL C1
CORNERSTONE PROFESSIONAL PARK, SUITE D-101
43 SHERMAN HILL ROAD
WOODBURY (203) 266-0778 CONNECTICUT

DRAWN:	BB
APPROVED:	CJ
SCALE:	1" = 40'
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PROJ. NO.:	3983
CADD FILE NAME:	3983
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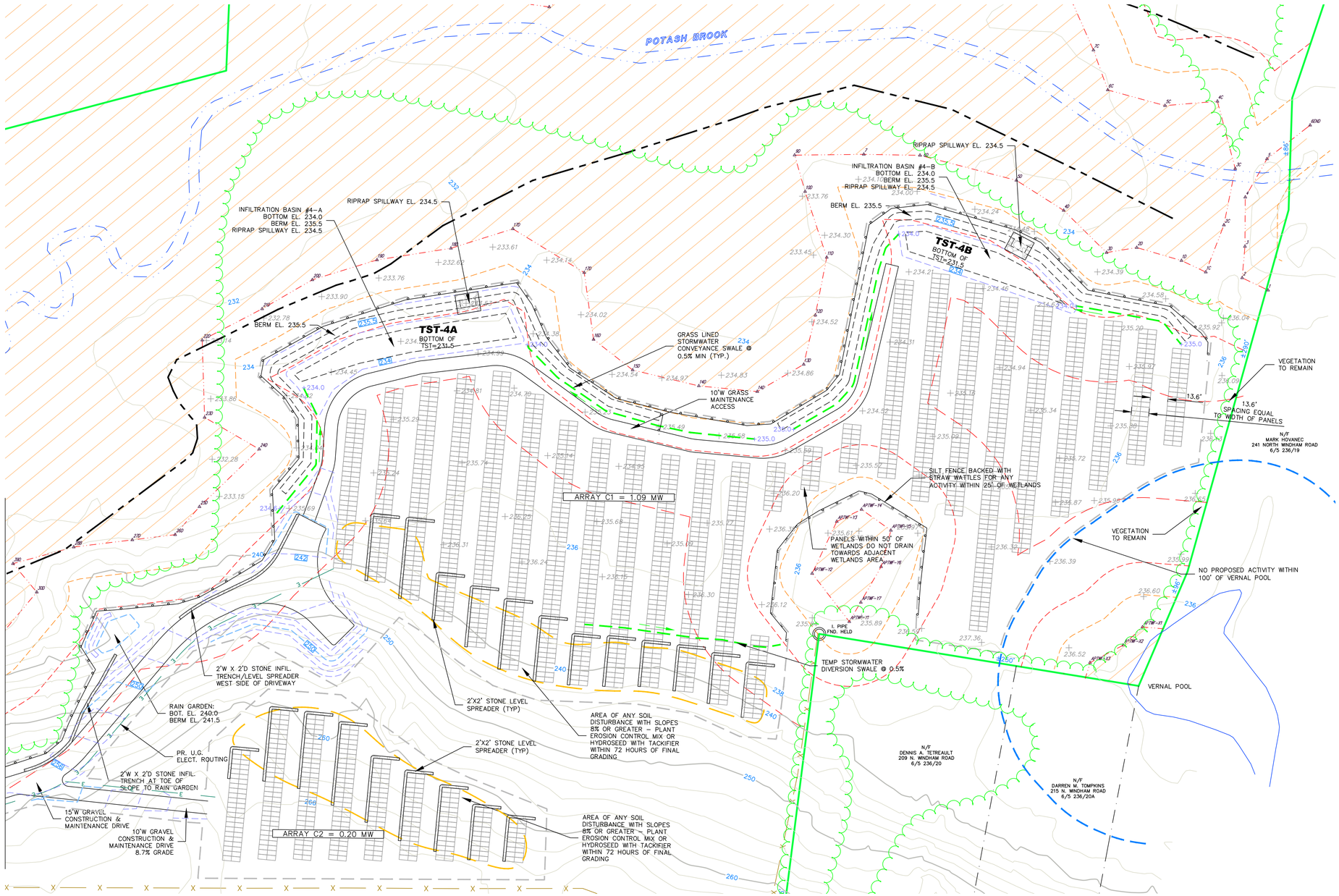

LEGEND

	PROPERTY LINE
	EXISTING CONTOUR
+557.0	EXISTING SPOT GRADE
	PROPOSED CONTOUR
+557.0	PROPOSED SPOT GRADE
	WETLAND LINE
	100' WETLAND BUFFER LINE
	50' WETLAND BUFFER LINE
	25' WETLAND BUFFER LINE
	100' VERNAL POOL SETBACK
	100 YEAR FLOOD PLAIN BASED ON FEMA MAPPING
	WETLAND FLAG
	WETLANDS AREA
	PROPOSED SOLAR PANELS
W	EXISTING WELL
X X	EXISTING FENCE
	EXISTING STONE WALL
E	PROPOSED ELECTRIC
	TREE LINE
	PROPOSED SILT FENCE–BACK WITH STRAW WATTLES WHERE INDICATED ON PLAN
	PROPOSED LIMITS OF CONSTRUCTION
	STABILIZED CONSTRUCTION ENTRANCE
TST-1	TEMPORARY SEDIMENT TRAP

NO.	REVISION	DATE
1	REV. SOLAR ARRAY LAYOUT	5/11/23
	Previous Editions Obsolete	

40 0 20 40 80

1 inch = 40 feet

LSE HOROLOGIUM LLC
40 TOWER LANE
AVON, CT

EROSION CONTROL PLAN
AREA C

PARCEL A BRICK TOP LANE & 163 NORTH WINDHAM ROAD

WINDHAM CONNECTICUT

CIVIL C1
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DRAWN:	BB
APPROVED:	CJ
SCALE:	1" = 40'
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PROJ. NO.:	3983
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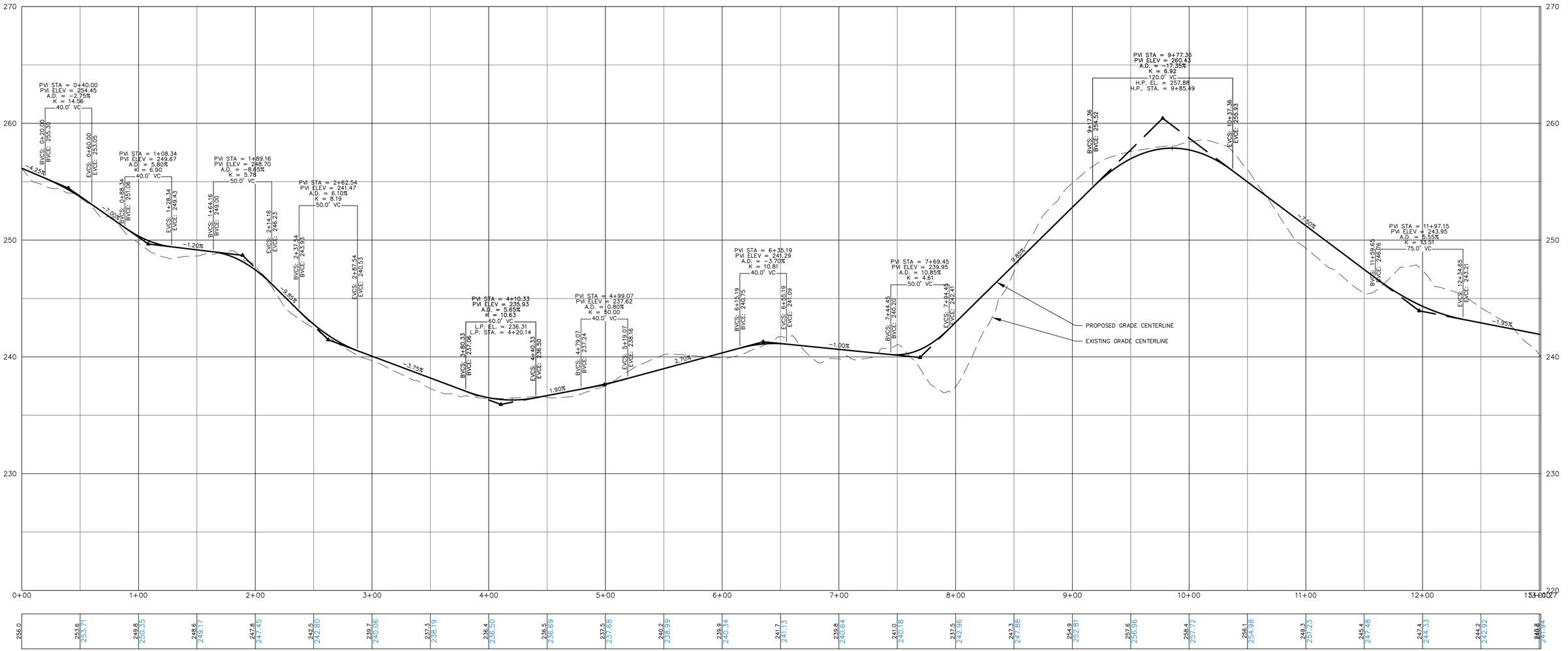
DRAWING NO.:	C - 3.4



NORTHERN ACCESS DRIVE

NO.	REVISION	DATE
1	REV. SOLAR ARRAY LAYOUT	5/11/23

Previous Editions Obsolete

40 0 20 40 80

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NORTHERN ACCESS DRIVE PROFILE

CIVIL C1

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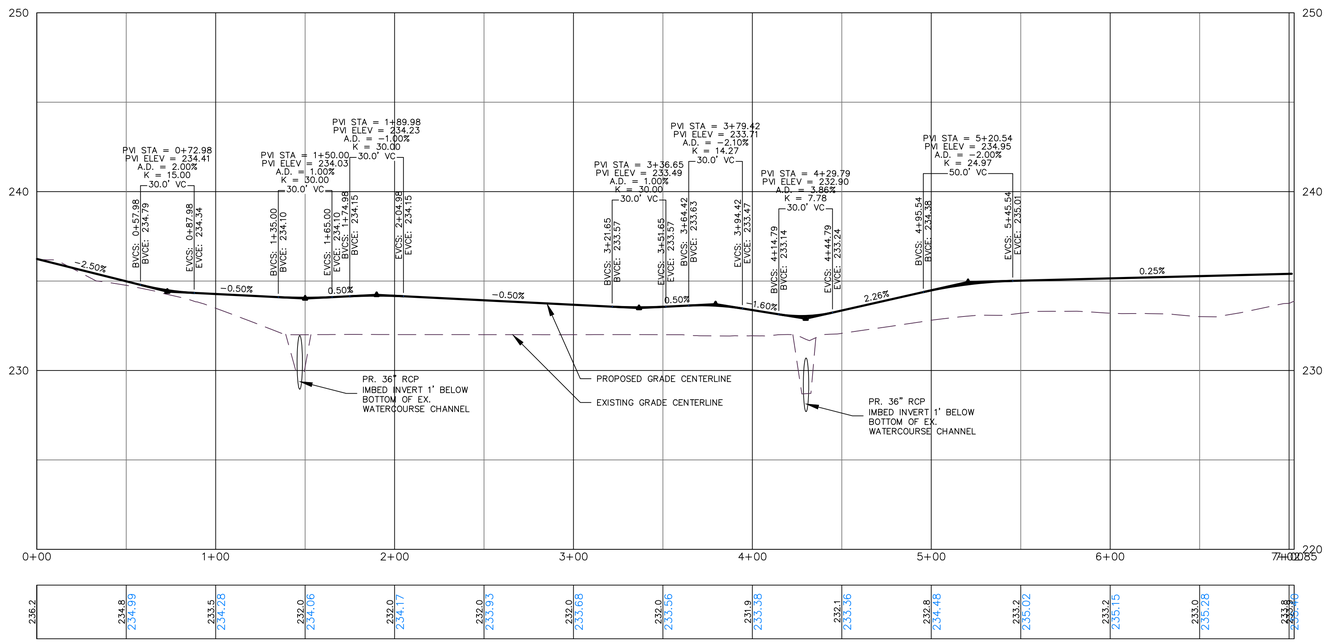
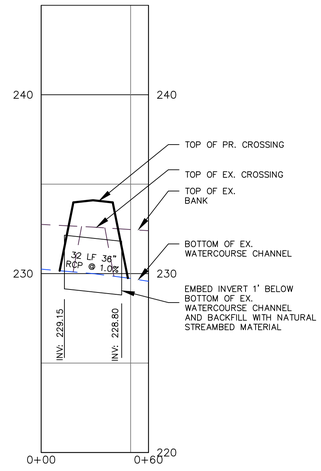
LSE HOROLOGIUM LLC
40 TOWER LANE
AVON, CT

PARCEL A BRICK TOP LANE & 163 NORTH WINDHAM ROAD
WINDHAM CONNECTICUT

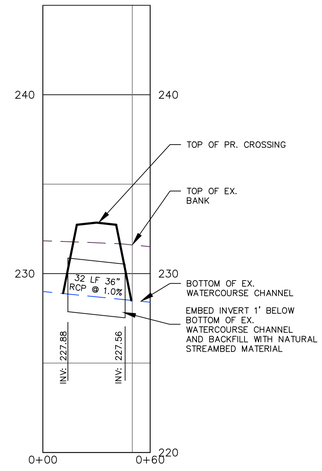
DRAWN: BB APPROVED: CJ
SCALE: 1" = 40' HOR. 1" = 4' VER.
DATE: 17 MAR 23
PROJ. NO.: 3983
CADD FILE NAME: 3983
DRAWING NO.: C - 4.1



SOUTHERN ACCESS DRIVE



SOUTHERN CROSSING



NORTHERN CROSSING

NO.	REVISION	DATE
1	REV. SOLAR ARRAY LAYOUT	5/11/23

Previous Editions Obsolete

40 0 20 40 80

1 inch = 40 feet

SOUTHERN ACCESS DRIVE PROFILE & WETLANDS CROSSINGS

CIVIL C1
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40 TOWER LANE
AVON, CT

PARCEL A BRICK TOP LANE & 163 NORTH WINDHAM ROAD
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DRAWN: BB APPROVED: CJ
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CADD FILE NAME: 3983
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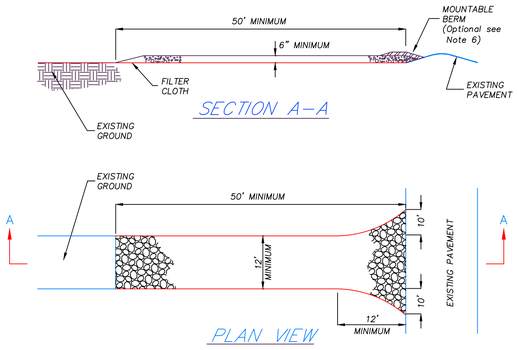
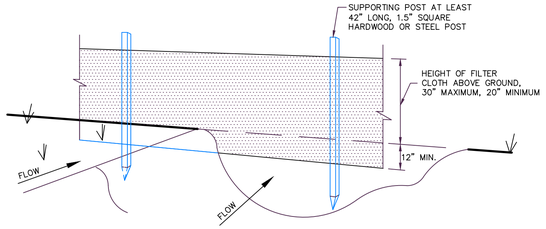


NOTES:

1. STONE SIZE – USE 1" – 2" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH – AS REQUIRED, BUT NOT LESS THAN 50 FEET.
3. THICKNESS – NOT LESS THAN SIX (6) INCHES.
4. WIDTH – 12 FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. 24 FOOT MINIMUM IF SINGLE ENTRANCE TO SITE.
5. FILTER CLOTH – TO BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OF FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURE USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DRIPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS–OF–WAY MUST BE REMOVED IMMEDIATELY.
8. WASHING – WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS–OF–WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

STABILIZED CONSTRUCTION ENTRANCE



CONSTRUCTION NOTES FOR SILT FENCE

1. EXCAVATE A TRENCH A MINIMUM OF 6 INCHES DEEP AND 6 INCHES WIDE ON THE UP SIDE OF THE FENCE LOCATION.

2. DRIVE SUPPORT POSTS ON THE DOWN SLOPE SIDE OF THE TRENCH TO A DEPTH OF AT LEAST 12 INCHES INTO ORIGINAL GROUND.

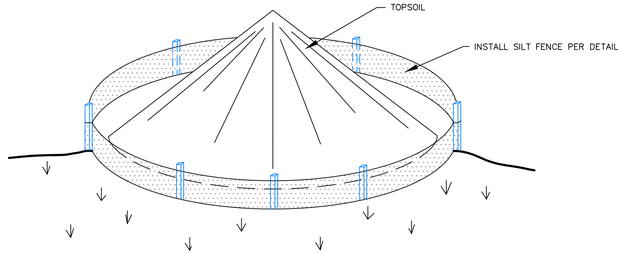
3. STAPLE OR SECURE THE GEOTEXTILE TO THE SUPPORT POSTS PER MANUFACTURER'S INSTRUCTIONS SUCH THAT AT LEAST 6 INCHES OF GEOTEXTILE LIES WITHIN THE TRENCH.

4. BACKFILL THE TRENCH WITH TAMPED SOIL OR AGGREGATE OVER THE GEOTEXTILE.

POSTS: 1.5" SQUARE HARDWOOD OR STEEL

FILTER CLOTH: MIRAFI 100X, ENVIROFENCE OR APPROVED EQUAL

SILT FENCE DETAIL

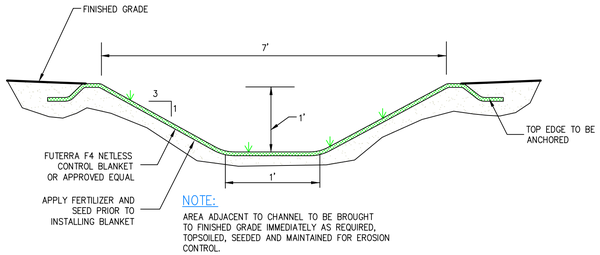


STOCKPILE MANAGEMENT PER 2002 CT GUIDELINES FOR E & S CONTROL:

1. LOCATE STOCKPILE SO THAT NATURAL DRAINAGE IS NOT OBSTRUCTED.
2. DIVERT RUNOFF WATER AWAY FROM OR AROUND THE STOCKPILE.
3. INSTALL A GEOTEXTILE SILT FENCE OR HAY BALE BARRIER AROUND THE STOCKPILE AREA APPROXIMATELY 10 FEET FROM PROPOSED TOE OF THE SLOPE.
4. THE SIDE SLOPES OF STOCKPILED MATERIAL SHOULD BE NO STEEPER THAN 2:1.
5. STOCKPILES THAT ARE NOT TO BE USED WITHIN 30 DAYS NEED TO BE SEEDED AND MULCHED IMMEDIATELY AFTER FORMATION OF THE STOCKPILE.
6. AFTER STOCKPILE HAS BEEN REMOVED, THE SITE SHOULD BE GRADED AND PERMANENTLY STABILIZED.

TEMPORARY TOPSOIL STOCKPILE

N.T.S.

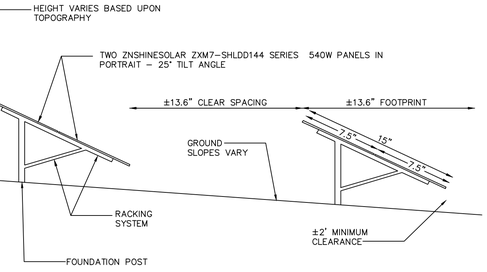


NOTE:

AREA ADJACENT TO CHANNEL TO BE BROUGHT TO FINISHED GRADE IMMEDIATELY AS REQUIRED, TOPSOILED, SEEDED AND MAINTAINED FOR EROSION CONTROL.

DRAINAGE SWALE

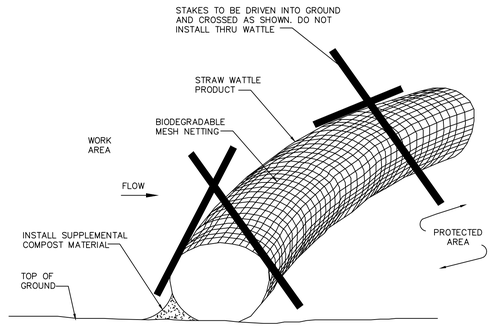
(N.T.S.)



NOTE:
RACKING SYSTEM, AND FOUNDATION POSTS TO BE DETERMINED PENDING BEST AVAILABLE TECHNOLOGY AT TIME OF CONSTRUCTION AND STRUCTURAL GROUND TESTING.

CROSS SECTION OF FIXED–TILT PANEL ARRAY

N.T.S.

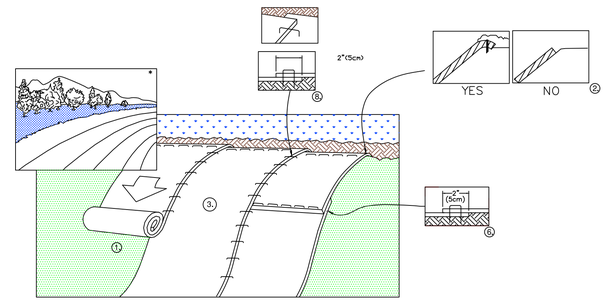


NOTES:
1. STRAW WATTLES SHALL OVERLAP A MINIMUM OF 12 INCHES

2. STRAW WATTLES SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS, AND REPAIR OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED.

STRAW WATTLE

N.T.S.



INSTALLATION PROCEDURE

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
   NOTE: WHEN USING CELL–O–SEED DO NOT SEED PREPARED AREA. CELL–O–SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. START UNROLLING THE FUTERRA F4 NETLESS 1–2' ABOVE THE SLOPE CREST.
3. ANCHOR TOP OF BLANKET ON 1' CENTERS
4. APPLY PINS OR STAPLES ALONG BLANKET LENGTH, ONE EVERY 2.5 LINEAR FEET. PLACE PIN OR STAPLE EVERY EVERY 5' DOWN CENTER OF BLANKET, CREATING AN X PATTERN WITH THE ANCHORING SYSTEM.
5. RAKE LOOSE SOIL OVER TOP EDGE ALONG BLANKET WIDTH. MOUND TO A MIN. HEIGHT OF 4".
6. OVERLAP SHINGLE STYLE A MAX. OF 2". ANCHOR ON 1' CENTER ACROSS THE ROLL WIDTH.
7. UNROLL THE NEXT BLANKET DOWN THE SLOPE.
8. OVERLAP ROLLS A MAX. OF 2". USE ONE PIN OR STAPLE EVERY 5'.

FUTERRA F4 NETLESS EROSION CONTROL BLANKETS
MATERIAL:
THERMALLY REFINED WOOD AND DEGRADABLE MAN–MADE FIBERS

CRITICAL POINTS
A. OVERLAPS AND SEAMS
B. PROJECTED WATER LINE
C. CHANNEL BOTTOM/SIDE SLOPE VERTICES

NOTE
1. HORIZONTAL STAPLE SPACING SHOULD BE ALTERED IF NECESSARY TO ALLOW STAPLES TO SECURE THE CRITICAL POINTS ALONG THE CHANNEL SURFACE.
2. IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS IN EXCESS OF 6" (15 CM) MAY BE NECESSARY TO PROPERLY ANCHOR THE BLANKETS.
3. SLOPE CREST TRENCHING MAY BE SPECIFIED ON SOME PROJECTS. TOP EDGE WIDTH OF THE FUTERRA F4 NETLESS SHOULD THEN BE STAPLED OR STAKED IN THE TRENCH BOTTOM. BACKFILL AND COMPACT SOILIN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15cm) MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.
4. FUTERRA F4 NETLESS CAN BE APPLIED HORIZONTALLY ON SHALLOW SLOPES.*

FUTERRA F4 NETLESS EROSION CONTROL BLANKET

N.T.S.

NO.	REVISION	DATE
	Previous Editions Obsolete	

LSE HOROLOGIUM LLC
40 TOWER LANE
AVON, CT

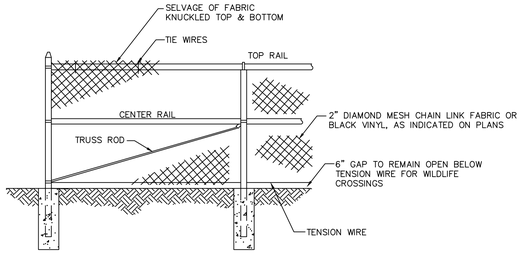
DETAILS

PARCEL A BRICK TOP LANE & 163 NORTH WINDHAM ROAD

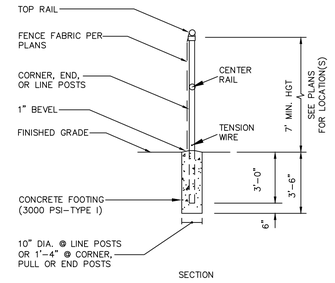
WINDHAM CONNECTICUT

CIVIL 1
CORNERSTONE PROFESSIONAL PARK, SUITE D-101
43 SHERMAN HILL ROAD
WOODBURY (203) 266 - 0778 CONNECTICUT

DRAWN: BB	APPROVED: CJ
SCALE:	AS NOTED
DATE:	17 MAR 23
PROJ. NO.:	3983
CADD FILE NAME:	3983
DRAWING NO.:	C - 5.1



ELEVATION



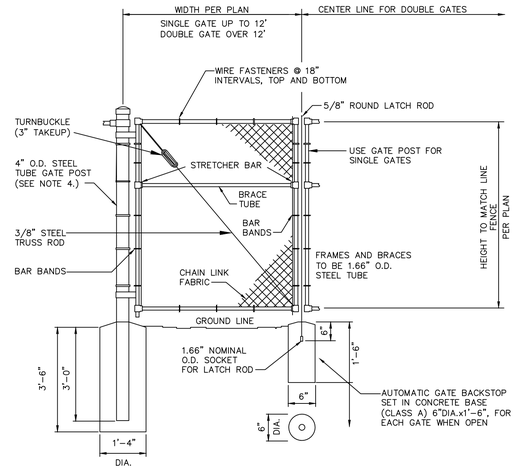
SECTION

NOTES:
1.
MATERIALS TO BE SUPPLIED AND INSTALLED IN CONFORMANCE WITH "CHAIN LINK MANUFACTURER'S INSTITUTE" PRODUCT MANUAL.

2.
CONTRACTOR TO REFER TO MANUFACTURER'S RECOMMENDATIONS FOR INSTALLATION

7' CHAIN LINK FENCE

N.T.S.



NOTES:
1. CHAIN LINK FABRIC FOR GATES TO BE THE SAME AS REQUIRED FOR FENCE.

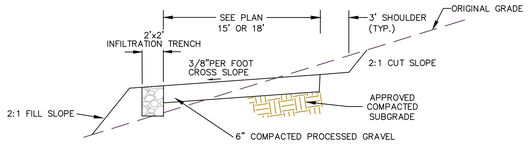
2. GATE POST BASE-PORTLAND CEMENT CONCRETE (3000 PSI).

3. FENCE FABRIC, POSTS, FRAMEWORKS, AND HARDWARE SHALL BE GALVANIZED STEEL OR BLACK VINYL (AS INDICATED ON PLANS) PER SPECIFICATIONS.

4. GATE POSTS TO BE USED ON EACH SIDE OF SINGLE AND DOUBLE GATE OPENINGS.

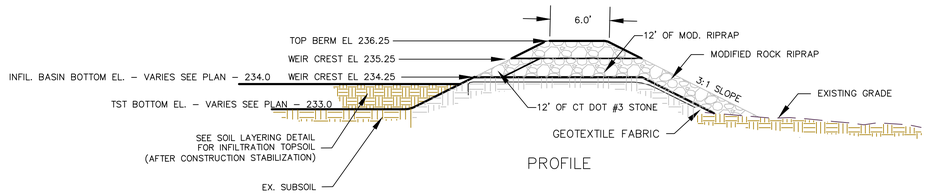
CHAIN LINK FENCE GATE

N.T.S.

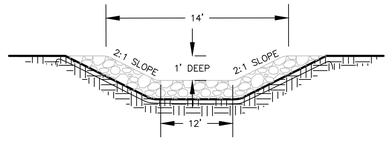


GRAVEL DRIVEWAY CROSS SECTION

UNPAVED AREAS
N.T.S.



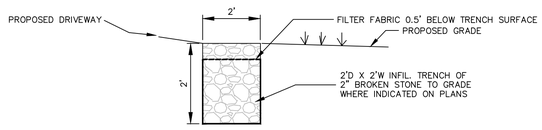
PROFILE



CROSS SECTION

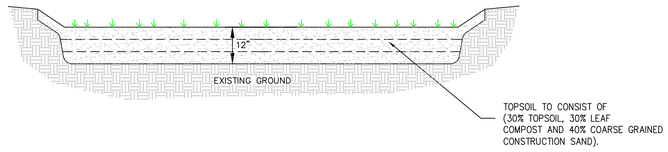
TYPICAL SPILLWAY SWALE FOR INFILTRATION BASINS

N.T.S



STONE INFILTRATION TRENCH

N.T.S.



INFILTRATION BASIN & RAIN GARDEN SOIL LAYERING DETAIL

N.T.S.

NOTES:
-EXCAVATE RAIN GARDEN AREAS TO PROPOSED INVERT DEPTHS AND SCARIFY EXISTING SOIL SURFACES, TAKING CARE NOT TO COMPACT THE IN-SITU MATERIALS
-PLACE TOPSOIL IN 8"-12" LIFTS, DO NOT COMPACT
-LIFTS MAY BE LIGHTLY WATERED TO ENCOURAGE NATURAL COMPACTION
-OVERFILL OF TOPSOIL IS REQUIRED TO ACCOMMODATE NATURAL SETTLEMENT TO PROPER GRADE

NO.	REVISION	DATE

Previous Editions Obsolete

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40 TOWER LANE
AVON, CT

DETAILS

PARCEL A BRICK TOP LANE & 163 NORTH WINDHAM ROAD

WINDHAM CONNECTICUT

CIVIL C1
CORNERSTONE PROFESSIONAL PARK, SUITE D-101
43 SHERMAN HILL ROAD
WOODBURY (203) 266-0778 CONNECTICUT

DRAWN:	BB
APPROVED:	CJ
SCALE:	AS NOTED
DATE:	17 MAR 23
PROJ. NO.:	3983
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DRAWING NO.:	C - 5.2

GENERAL CONSTRUCTION NOTES

GENERAL:

1. Contractor shall notify "call before you dig" (811 or 1-800-922-4455) at least 72 hours.

2. Contractor shall be responsible for site security and job safety. construction activities shall be in accordance with OSHA standards and local requirements.

3. Work within the local rights-of-way shall conform to local municipal standards.

4. Upon award of contract, contractor shall make necessary construction notifications and apply for and obtain necessary permits, pay fees, and post bonds associated with the work indicated on the drawings, in the specifications,and in the contract documents. do not close or obstruct roadways, sidewalks, and fire hydrants, without appropriate permits.

5. Areas outside the limits of proposed work disturbed by the contractor's operations shall be restored by the contractor to their original condition at the contractor's expense.

6. In the event that suspected contaminated soil. groundwater, and other media are encountered during excavation and construction activities based on visual, olfactory, or other evidence, the contractor shall stop work in the vicinity of the suspect material to avoid further spreading of the material, and shall notify the owner immediately so that the appropriate testing and subsequent action can be taken.

7. Contractor shall prevent sediment and debris from existing the site and shall be responsible for cleanup, repairs and corrective action if such occurs.

8. Damage resulting from construction loads shall be repaired by the contractor at no additional cost to the owner or developer.

9. The project disturbs more thaN five acres of land and will require adherence to and registration for the Connecticut Department of Energy & Environmental Protection General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, effective December 31, 2020.

10. Staging and stockpile areas shall not be located within any wetland and abutting resource area and shall be located within the limits of disturbance.

UTILITIES:

1. The locations, sizes and types of existing utilities are shown as an approximate representation. the owner or it's consultants have not independently verified this information as shown on the plans. the utility information shown does not guarantee the actual existence serviceability, or other data concerning the utilities, nor does it guarantee against the possibility that additional utilities may be present that are not shown on the plans. prior to ordering materials and beginning construction, the contractor shall verify and determine the exact locations, sizes, and elevations of the points of connections to existing utilities and, shall confirm that there are no interferences with existing utilities and the proposed utility routes, including routes within the public rights of way.

2. Where an existing utility is found to conflict with the proposed work. or existing conditions differ from those shown such that the work cannot be completed as intended, the location, elevation, and size of the utility shall be accurately determined without delay by the contractor, and the information furnished in writing to the owner's representative for the resolution of the conflict and contractor's failure to notify prior to performing additional work releases owner from obligations for additional payments which otherwise may be warranted to resolve the conflict.

3. The site contractor shall coordinate with the electrical contractor and shall provide excavation, installation and backfill of electrical materials such as pull boxes, conduits, duct banks ,light pole bases, and concrete pads. site contractor shall furnish concrete encasement of duct banks if required by the utility company and as indicated on the drawings.

LAYOUT AND GRADING:

1. Any existing property line monumentation disturbed during the construction shall be reset by a licensed surveyor at the expense of the contractor.

2. Prior to start of construction, contractor shall verify existing pavement elevations at interface with proposed pavements, and existing ground elevations adjacent to drainage outlets to assure proper transition between existing and proposed facilities.

3. Final layout is subject to conditions encountered in the field.

DEMOLITION:

1. Contractor shall dispose of demolition debris in accordance with applicable federal, state and local regulations, ordinances and statutes.

2. The demolition and clearing limits depicted in the plans is intended to aid the contractor during the bidding and construction process and is not intended to depict each and every element of demolition. the contractor is responsible for identifying the detailed scope of demolition before submitting its bid/proposal to perform the work and shall make no claims and seek no additional compensation for changed conditions or unforeseen or latent site conditions related to any conditions discovered during execution of the work.

3. Unless otherwise specifically provided on the plans or in the specifications, the engineer has not prepared designs for and shall have no responsibility for the presence, discovery, removal, abatement or disposal of hazardous materials, toxic wastes or pollutants at the project site. the engineer shall not be responsible for any claims of loss, damage, expense, delay, injury or death arising from the presence of hazardous material and contractor shall indemnify and hold harmless the engineer from any claims made in connection therewith. moreover, the engineer shall have no administrative obligations of any type with regard to any contractor amendment involving the issues of presence, discovery, removal, abatement or disposal of asbestos or other hazardous materials.

CONSTRUCTION SEQUENCE

ALL CONSTRUCTION ACTIVITIES ARE EXPECTED TO BEGIN IN THE SPRING/SUMMER OF 2023 AND BE COMPLETED BY THE END OF 2023. THE GENERAL CONSTRUCTION NOTES ARE AS FOLLOWS:

1. The site contractor shall be fully responsible to control construction such that sedimentation shall not affect roads/highways and their drainage system, neighboring properties, wetlands and regulatory protected areas, whether such sedimentation is caused by water, wind, or direct deposit. Designated access drives must be used to the maximum extents possible. It is required that the site contractor perform a daily inspection of all erosion and sediment control measures employed at the site.

2. A CT DEEP-approved qualified inspector shall be assigned to be responsible for performing inspections and preparing reports in accordance with section 5(b)(4)(B) of the construction general permit. these inspections shall take place weekly, at a minimum,and shall be required within 24 hours of a rainfall event exceeding 0.5 inches. the engineer of record shall be required to review and counter-sign the prepared weekly reports. It is also anticipated that representatives from CT DEEP and/or the State Conservation District may perform periodic inspections.

3. The engineer of record will perform monthly plan implementation inspections and prepare reports of the findings. These inspections shall last a minimum of three months or until the completion and stabilization of all erosion control measures at the site.

4. Throughout the course of the construction project, additional sediment and erosion control measures may be warranted at the discretion of the qualified inspector and/or design engineer. These improvements must be implemented in a timely fashion in accordance with the requirements of the construction general permit. Additionally, areas of proposed compacted native soil roads shall be converted to stable gravel roads if/as determined by the qualified inspector or engineer of record.

5. Prior to construction,the applicant shall provide the Town of Windham Land Use Office with the name of contact information for the developer and the site contractor. The contractor will also notify the Land Use Office 48 hours prior to the start of construction.

6. Contractor shall adhere to 2002 Connecticut Guidelines for Erosion and Sediment Control, as amended.

7. The contractor shall hold pre-construction meeting(s). Attendees shall include, but not be limited to developer, representatives of the general contractor, site contractor, CT DEEP, Town of Windham Land Use Office, engineer of record, and the qualified SWPPP inspector.

8. The contractor shall contact CALL-BEFORE-YOU-DIG (1-800-922-4455) prior to engaging in any excavation activities at the site.

9. No construction of site improvements may begin until the proper erosion control measures serving the area to be disturbed are in place.

10. Anticipated work hours will be between 7:00 AM and 5:00 PM.

11. Any dewatering by pump shall include an intake and/or discharge filtration system (i.e. dirtbag system) and be pumped to stable ground. contractor to ensure discharged water is running clean or alternate methods must be employed.

EROSION CONTROL CONSTRUCTION SEQUENCE:

1. Access roads shall be designated as early as feasible and used primarily for construction traffic. Clear areas of trees and vegtation where designated on the plans but do not grub (remove stumps) until all perimeter erosion control measures are in place.

2. Install erosion and sediment controls following the CT Guidelines, manufacturer's directions and the design plans. During construction, the contractor shall install measures as required by the engineer of record or qualified inspector, to prevent sediment-laden runoff from reaching wetlands or discharging offsite.

3. Remove stumps from clearing areas after erosion control measures have been installed.

4. Install access drives to array areas, this includes the two wetlands crossings for array areas A and B. Provide dewatering by using sand bags to block flow upgradient of the proposed crossings and pump through dirtbags to dishcarge below the area of construction.

5. Install the proposed 36" RCPs at the crossing locations and embed the pipes 1' below the watercourse channel to allow for watercourse bed re-establishment within the pipes. Backfill pipes, place topsoil and seed/mulch slopes immediately.

6. Complete access drives into the sites.

7. Install temporary sediment traps and conveyance swales in accordance with the approved site-specific SWPCP and CT Guidelines. The engineer of record shall inspect features to confirm required storage capacities are provided and that outlets and/or spillways are constructed correctly. Discharge areas below outfalls must be inspected to confirm flow will be over stable ground and sheet flow is encouraged. If disturbed soils are present,the engineer of record to provide correct measures to address condition.

8. Seed and protect disturbed soils around sediment traps within 14 days of completion. Secure seed with mulch or biodegradable erosion control matting.

CONSTRUCTION SEQUENCE:

1. Perform earthwork on the site. this shall only include minimal shaping within the array areas for storm water measures including temporary diversion ditches and berms as indicated on the plans.

2. Topsoil shall be replaced over regraded areas upon completion of mass earthwork activities and areas which were disturbed by mass earthwork operations shall be re-seeded within 14 days of completion.

3. Throughout construction, the contractor shall address ongoing erosion problems using temporary diversions and filling and grading gullies. A stapled biodegradable erosion control blanket without monofilament mesh is an acceptable alternative for hydroseeding.

4. Install piles and/or ground screws for solar panel racking. Install infiltration trenches and level spreaders at panel drip edge locations as indicated on plans prior to panel installation

5. Upon completion of any grading, all disturbed areas shall be seeded and stabilized. Areas with slopes in excess of 8% grade shall be stablizied with biodegradable erosion control matting or hydroseeding with a tackifier.

6. Install electrical conduit, poles and overhead wires as required by the electrical design plans.

7. The installation of racking shall follow the pile/ground screw installation by roughly one week starting from the same point

8. Install solar panel modules in the racking. much of this work is anticipated to be performed by hand and light construction equipment which will cause minimal disturbance compared to the use of heavy equipment.

9. Upon completion of construction, re-seed all disturbed areas within 14 days and prevent vehicular trafficking over these areas. install final landscaping.

10. Clean any silt from the temporary sediment traps to prepare them for converstion into the post construction infiltration basins. Loosen existing subsoil in the basins and install the final topsoil/sand mix in the basins and install final seed mix in accordance with the design plans.

11. After site is stabilized, and after inspection by design engineer and/or CT DEEP representative, remove temporary erosion and sediment controls including silt fence and any temporary diversion swales. entire site shall be checked for and cleaned of sediment as needed.

GENERAL EROSION CONTROL PRINCIPLES

The following general principles shall be maintained as effective means of minimizing erosion and sedimentation during the development process.

Stripping away of vegetation, regrading or other development shall be done in such a way as to minimize erosion.

Grading and development plans shall preserve important natural features, keep cut and fill operations to a minimum, and insure conformity with topography so as to create the least erosion potential and adequately handle the volume and velocity of surface water runoff.

Whenever feasible, natural vegetation shall be retained, protected and supplemented wherever indicated on the site development plan.

The undisturbed area and the duration of exposure shall be kept to a practical minimum.

Disturbed soils shall be stabilized as quickly as possible.

Temporary vegetation and/or mulching shall be used to protect exposed critical areas during development when expected to be exposed in excess of 7 days.

The permanent (final) vegetation and mechanical erosion control measures shall be installed as soon as practical during construction.

Sediment in the runoff water shall be trapped until the disturbed areas are stabilized by the use of debris basins, sediment basins, silt traps or similar measures.

All lots, tracts or developments shall be final graded to provide proper drainage away from buildings and dispose of it without ponding, and all land within a development shall be graded to drain and dispose of surface water without ponding.

Land disturbance will be kept to a minimum. Restabilization will be scheduled as soon as practical.

Catch basins will be protected with haybale and/or silt sack filters throughout the construction period and until all disturbed areas are thoroughly stabilized.

Haybale filters will be installed at the toe of slope of all critical cut and fill slopes.

All control measures will be maintained in effective condition throughout the construction period.

The responsibility for implementing the erosion and sediment control plan will rest with the owner of record. He acknowledges that he is responsible for informing all concerned of the requirements of the plan and for notifying the planning administration of any transfer of responsibility.

Additional control measures will be installed during construction if necessary or required.

Concentration of surface runoff shall be only permitted by piping and/or through drainage swales or natural watercourses.

Excavation and Fills --

Slopes created by cuts or fills shall not be steeper than 2:1 unless noted specifically on the plans and shall be restabilized by temporary or permanent measures, as required during the development process.

Adequate provisions shall be made to prevent surface water from damaging the cut face of excavations or the sloping surfaces of fills.

Cuts and fills shall not endanger adjoining property.

All fills shall be compacted to provide stability of material and to prevent undesirable settlement. The fill shall be spread in a series of layers each not exceeding twelve (12) inches in thickness and shall be compacted by a mechanical roller or other approved method after each layer is spread.

Fills shall not encroach on natural watercourses, constructed channels or regulated flood plain areas, unless permitted by license or permit from authority having jurisdiction.

Fills placed adjacent to natural watercourses, constructed channels or flood plains shall have suitable protection against erosion during periods of flooding.

During grading operations, necessary planning and measures for dust control shall be exercised in accordance section 5-2-12 of the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control and other best management practices including limiting exposed soils to the greatest extent feasible, mechanical sweeping, watering, soil tackifer and construction of wind breaks with tarps/brush piles.

All erosion and sediment control measures will be constructed in accordance with the standards and specifications of the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control (2002) - State of Connecticut DEP Bulletin 34.

FILL MATERIAL & COMPACTION REQUIREMENTS

1. Fill material shall be free of brush, rubbish, large rocks, logs, stumps, building debris and other objectionable material that would interfere with, or prevent construction of, satisfactory fills, where embankments are to be constructed on slopes steeper than 3:1. Deeply scarify the existing slope or cut into steps before filling is begun.

2. Place and compact all fill in layers not exceeding 1 foot in thickness. No fill should be placed on surfaces of snow, ice or frozen or unstable surfaces. If fill placement is not completed within 1 day, then install temporary erosion and sediment controls such as a temporary fill berm to redirect runoff water away from the unstable slope until fill placement resumes.

3. No frozen material be incorporated into the fill envelope. Material shall be placed in horizontal layers in 12 inch loose lifts and each layer compacted. During construction, the surface of the material shall be sloped to drain. The material shall be free from lenses, pockets, streaks, or layers of material differing substantially in texture or gradation from the surrounding material.

4. The moisture content of the material shall be controlled to meet the necessary requirements of compaction. When necessary, moisture shall be added by the use of approved sprinkling equipment. Water shall be added uniformly and each layer shall be thoroughly disked or harrowed to provide proper mixing. Any layer found too wet for compaction shall be allowed to dry before rolling. Placing or rolling of materials will not be permitted during or immediately after rainfalls which increase the moisture content beyond the limit of satisfactory compaction.

5. The material shall be brought up uniformly and its top shall be kept graded and sloped so that a minimum of rain water will be retained thereon. Compacted material damaged by runoff shall be replaced immediately by the contractor.

6. Material shall be compacted to 95% of the standard proctor density at or near optimum moisture content and by the compaction equipment specified herein. The compaction equipment shall traverse the entire surface of each layer of material. Approved tamping rollers shall be used for compacting. The contractor shall demonstrate the effectiveness of the roller by actual soil compaction test results of the soil with laboratory work performed by an approved soil testing laboratory. Compaction tests shall include modified proctor and nuclear density tests made at the Engineer's discretion.

RESPONSIBILITY FOR THE PLAN

The responsibility for implementing and maintaining the Erosion and Sedimentation Control Plan rests with the DEVELOPER & CONTRACTOR, where any development of the parcel gives cause to erosion and sedimentation. The DEVELOPER & CONTRACTOR shall be held responsible for informing all concerned regarding responsibility of the plan.

The responsibility of all drainage, erosion and sedimentation control measures will therefore rest with the DEVELOPER & CONTRACTOR.

Whenever sedimentation is caused by stripping vegetation and/or grading, it shall be the responsibility of the person, corporation or other entity having responsibility to remove sedimentation from all lower properties, drainage systems and watercourses and to repair any damage at their expense as quickly as possible.

Maintenance of all drainage facilities and watercourses within any land development shall be the responsibility of the DEVELOPER & CONTRACTOR All control measures will be maintained in effective condition throughout the construction period. Surface inlets shall be kept open and free of sediment and debris. The system shall be checked after every major storm and sediment shall be disposed of at an approved location consistent with the plan.

It shall be the responsibility of any person, corporation or other entity engaging in any act on or near any stream, watercourse or swale or upon the flood plain or right-of-way thereof to maintain as nearly as possible in its present state that same stream, watercourse, swale, flood plain or right-of-way for the duration of the activity and to return it to its original or equal condition after such activity is completed.

No person, corporation or other entity shall block, impede the flow of, alter, construct any structure or deposit any material or thing or commit any act which affects normal or flood flow in any communal stream or watercourse without having obtained prior approval from the Town.

SEEDING AND PLANTING REQUIREMENTS

Seedbed Preparation
Fine grade and rake surface to remove stones larger than 2" in diameter. Install needed erosion control devices such as surface water diversions. Grade stabilization structures, sediment basins or drainage channels to maintain grassed areas. Apply limestone at a rate of 2 tons/Ac. or 90 lbs/1000 SF unless otherwise required according to soil test results. Apply fertilizers with 10-10-10 at a rate of 300 lbs./Ac. or 7.5 lbs/1000 SF. At least 50% of the nitrogen shall be from organic sources. Work lime and fertilizer into soil uniformity to a depth of 4" with a whisk, springtooth harrow or other suitable equipment following the contour lines.

Seed Application
Apply grass mixtures at rates specified by hand, cyclone seeder or hydroseeder. Increase seed mixture by 10% if hydroseeder is used. Lightly drag or roll the seeded surface to cover seed. Seeding for selected fine grasses should be done between April 1 and June 1 or between August 15 and October 15. If seeding cannot be done during these times, repeat mulching procedure below until seeding can take place or seed with a quick germinating seed mixture to stabilize slopes.

Mulching
Immediately following seeding, mulch the seeded surface with straw, hay or wood fiber at a rate of 1.5 to 2 tons/Ac. except as otherwise specified elsewhere. Mulches should be free of weeds and coarse matter. Spread mulch by hand or mulch blower. Punch mulch into soil surface with track machine or disk harrow set straight up. Mulch material should be "tucked" approximately 2- 3" into the soil surface. Chemical mulch binders or netting, in combination with the straw, hay or wood fibers, will be used where difficult slopes do not allow harrowing by machines.

Seed Mixes:

Basin and rain garden bottoms:
- Retention Basin Wildlife Mix - ERNMX-127
  This mix has a variety of species that do well in both damp and moist soils and provide pollinator friendly species, including milkweed.

All other areas should receive a blend of the following seed mixes:
- Fuzz & Buzz Mix - Premium - ERNMX-147 - 40% by volume
- Ernst Solar Farm Seed Mix - ERNMX-186 - 30% by volume
- Quick Erosion Control Cover Mix - ERNMX-104 - 30% by volume
  By blending these seed mixes, the quick erosion control mix will establish stabilization quickly and provide a nurse crop for the other two seed mixes while also providing for pollinator friendly species, including milkweed.

IN CASE OF AN EMERGENCY (e.g. severe flooding, rains, or other environmental problems): THE DEVELOPER AND THE TOWN'S LAND USE OFFICE SHALL BE NOTIFIED.

WETLAND & WETLAND BUFFER AREA ACTIVITY

ACTIVITY WITHIN 0-100 FOOT WETLAND BUFFER AREA FOR DRIVEWAYS, SOLAR PANELS, INFILTRATION BASINS, STORMWATER TREATMENT MEASURES AND ASSOCIATED GRADING:
266,880 SF = 6.13 ACRES

ACTIVITY WITHIN 0-50 FOOT WETLAND BUFFER AREA FOR DRIVEWAYS, SOLAR PANELS, INFILTRATION BASINS, STORMWATER TREATMENT MEASURES AND ASSOCIATED GRADING:
90,010 SF = 2.07 ACRES

ACTIVITY WITHIN 0-25 FOOT WETLAND BUFFER AREA FOR ACCESS DRIVEWAYS AND ASSOCIATED GRADING:
14,425 SF = 0.33 ACRES

ACTIVITY WITHIN WETLANDS AREAS = 405 SF FOR SOUTHERN WETLANDS CROSSING + 420 SF FOR NORTHERN WETLANDS CROSSING = 825 SF TOTAL = 0.019 ACRES = 0.06% OF ON-SITE WETLANDS.

TOTAL AREA OF WETLANDS ON PROPERTY = 1,417,379 SF = 32.58 ACRES

AREA OF TREE CLEARING REQUIRED FOR PROPOSED ACTIVITY WITHIN 0-100 FOOT WETLANDS BUFFER AREA = 17,940 SF = 0.41 ACRES

AREA OF CONSTRUCTION ACTIVITY

TOTAL AREA OF CONSTRUCTION FOR NORTHERN ARRAY: 206,877 SF = 4.75 ACRES

TOTAL AREA OF CONSTRUCTION FOR SOUTHERN ARRAYS: 257,937 SF = 5.92 ACRES

TOTAL AREA OF CONSTRUCTION FOR ENTIRE PROJECT: 464,814 SF = 10.67 ACRES (15.8% OF THE TOTAL 67.36 ACRES OF THE PROJECT PROPERTIES)

NO.	REVISION	DATE
1	REV. SOLAR ARRAY LAYOUT	5/11/23
	Previous Editions Obsolete	

LSE HOROLOGIUM LLC
40 TOWER LANE
AVON, CT

GENERAL NOTES & EROSION CONTROL NOTES

PARCEL A BRICK TOP LANE & 163 NORTH WINDHAM ROAD

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ENVIRONMENTAL NOTES – RESOURCES PROTECTION MEASURES

RESOURCE PROTECTION PROGRAM

As a result of the Facility's location in the vicinity of sensitive wetland and vernal pool habitat the following Protection Program shall be implemented by the Contractor to avoid unintentional impacts to these resources including proximate wetland resources or mortality to vernal pool herpetofauna (i.e., wood frog, salamanders, turtles, etc.) during construction activities. The vernal pool specific protection measures shall be implemented should construction activities occur during peak amphibian movement periods (early spring breeding [March 1st to May 15th] and late summer dispersal [July 15th to September 15th]). Protection measures associated with wetlands shall be implemented regardless of the time of year.

It is of the utmost importance that the Contractor complies with the requirement for the installation of protective measures and the education of its employees and subcontractors performing work on the project site. The wetland and vernal pool protection measures shall be implemented and maintained throughout the duration of construction activities until permanent stabilization of site soils has occurred.

All-Points Technology Corporation, P.C. ("APT") will serve as the Environmental Monitor for this project to ensure that these protection measures are implemented properly and will provide an education session on the project's proximity to sensitive wetlands and associated vernal pool herpetofauna prior to the start of construction activities. The Contractor shall contact Dean Gustafson, Senior Wetland Scientist at APT, at least 5 business days prior to the pre-construction meeting. Mr. Gustafson can be reached by phone at (860) 552–2033 or via email at dgustafson@allpointstech.com.

This resource protection program consists of several components including: education of all contractors and sub-contractors prior to initiation of work on the site; installation of erosion controls; petroleum materials storage and spill prevention; protective measures; rare species protection measures; herbicide, pesticide, and salt restrictions; and reporting.

1. Contractor Education:

   a. Prior to work on site and initial deployment/mobilization of equipment and materials, the Contractor shall attend an educational session at the pre-construction meeting with APT. This orientation and educational session will consist of information such as, but not limited to: identification of wetland resources proximate to work areas, representative photographs of typical herpetofauna that may be encountered, typical species behavior, and proper procedures if species are encountered, and the environmentally sensitive nature of the development site.

   b. The Contractor's Project Monitor will be provided with cell phone and email contacts for APT personnel. Educational poster materials will be provided by APT and displayed on the job site to maintain worker awareness as the project progresses.

   c. APT will also post Caution Signs throughout the project site for the duration of the construction project providing notice of the environmentally sensitive nature of the work area.

2. Erosion and Sedimentation Controls/Isolation Barriers

   a. Plastic netting used in a variety of erosion control products (i.e., erosion control blankets, fiber rolls [wattles], reinforced silt fence) has been found to entangle wildlife, including reptiles, amphibians, birds and small mammals. No permanent erosion control products or reinforced silt fence will be used on the project. Temporary erosion control products that will be exposed at the ground surface and represent a potential for wildlife entanglement will use either erosion control blankets and fiber rolls composed of processed fibers mechanically bound together to form a continuous matrix (netless) or netting composed of planar woven natural biodegradable fiber to avoid/minimize wildlife entanglement.

   b. The extent of the erosion controls will be as shown on the site plans. The Contractor shall have additional sedimentation and erosion controls stockpiled on site should field or construction conditions warrant extending devices. In addition to the Contractor making these determinations, requests for additional controls will also be at the discretion of the Environmental Monitor.

   c. Installation of erosion and sedimentation controls, required for erosion control compliance and creation of a barrier to possible migrating/dispersing herpetofauna (only applicable during the seasonal restriction period and will be installed at the discretion of the Environmental Monitor), shall be performed by the Contractor if any soil disturbance occurs or heavy machinery is anticipated. The Environmental Monitor will inspect the work zone area prior to and following erosion control barrier installation. In addition, work zones in proximity to vernal pool resources will be inspected prior to and following erosion control barrier installation to ensure the area is free of herpetofauna and the barrier is satisfactorily installed. The intent of the barrier is to segregate the majority of the work zone from migrating/dispersing herpetofauna. Oftentimes complete isolation of a work zone is not feasible due to accessibility needs and locations of staging/material storage areas, etc. In those circumstances, the barriers will be positioned at the discretion of the Environmental Monitor to deflect migrating/dispersal routes away from the work zone to minimize potential encounters with herpetofauna.

   d. The Contractor shall be responsible for daily inspections of the sedimentation and erosion controls for tears or breaches and accumulation levels of sediment, particularly following storm events that generate a discharge, as defined by and in accordance with applicable local, state and federal regulations. The Contractor shall notify the APT Environmental Monitor within 24 hours of any breaches of the sedimentation and erosion controls and any sediment releases beyond the perimeter controls that impact wetlands, the vernal pool, or areas within 100 feet of wetlands. The APT Environmental Monitor will provide periodic inspections of the sedimentation and erosion controls throughout the duration of construction activities only as it pertains to their function to protect nearby wetlands. Such inspections will generally occur once per month. The frequency of monitoring may increase depending upon site conditions, level of construction activities in proximity to sensitive receptors, or at the request of regulatory agencies. If the Environmental Monitor is notified by the Contractor of a sediment release, an inspection will be scheduled specifically to investigate and evaluate possible impacts to wetland resources.

   e. Third party monitoring of sedimentation and erosion controls will be performed by other parties, as necessary, under applicable local, state and/or federal regulations and permit conditions.

   f. No equipment, vehicles or construction materials shall be stored within 100 feet of wetland resources.

   g. All silt fencing and other erosion control devices shall be removed within 30 days of completion of work and permanent stabilization of site soils. If fiber rolls/wattles, straw bales, or other natural material erosion control products are used, such devices will not be left in place to biodegrade and shall be promptly removed after soils are stable so as not to create a barrier to wildlife movement. Seed from seeding of soils should not spread over fiber rolls/wattles as it makes them harder to remove once soils are stabilized by vegetation.

3. Petroleum Materials Storage and Spill Prevention

   a. Certain precautions are necessary to store petroleum materials, refuel and contain and properly clean up any inadvertent fuel or petroleum (i.e., oil, hydraulic fluid, etc.) spill due to the project's location in proximity to wetland resources.

   b. A spill containment kit consisting of a sufficient supply of absorbent pads and absorbent material will be maintained by the Contractor at the construction site throughout the duration of the project. In addition, a waste drum will be kept on site to contain any used absorbent pads/material for proper and timely disposal off site in accordance with applicable local, state and federal laws.

   c. Servicing of machinery shall not occur within 100 feet of wetlands.

   d. At a minimum, the following petroleum and hazardous materials storage and refueling restrictions and spill response procedures will be adhered to by the Contractor.

      i. Petroleum and Hazardous Materials Storage and Refueling
         1. Refueling of vehicles or machinery shall occur a minimum of 100 feet from wetlands and shall take place on an impervious pad with secondary containment designed to contain fuels.
         2. Any fuel or hazardous materials that must be kept on site shall be stored on an impervious surface utilizing secondary containment a minimum of 100 feet from wetlands.
      ii. Initial Spill Response Procedures
         1. Stop operations and shut off equipment.
         2. Remove any sources of spark or flame.
         3. Contain the source of the spill.
         4. Determine the approximate volume of the spill.
         5. Identify the location of natural flow paths to prevent the release of the spill to sensitive nearby wetlands and vernal pool.
         6. Ensure that fellow workers are notified of the spill.
      iii. Spill Clean Up & Containment
         1. Obtain spill response materials from the on-site spill response kit. Place absorbent materials directly on the release area.
         2. Limit the spread of the spill by placing absorbent materials around the perimeter of the spill.
         3. Isolate and eliminate the spill source.
      iv. Reporting
         1. Complete an incident report.
         2. Submit a completed incident report to local, state and federal agencies, as necessary, including the Connecticut Siting Council.

4. Wetland and Vernal Pool Protective Measures

   a. A thorough cover search of the construction area will be performed by APT's Environmental Monitor for herpetofauna prior to and following installation of the silt fencing barrier to remove any species from the work zone prior to the initiation of construction activities. Any herpetofauna discovered would be translocated outside the work zone in the general direction the animal was oriented. Periodic inspections will be performed by APT's Environmental Monitor throughout the duration of the construction.

   b. Any ruts or artificial depressions that could hold water created intentionally or unintentionally by site clearing/construction activities will be properly filled in and permanently stabilized with vegetation to avoid the creation of vernal pool "decoy pools" that could intercept amphibians moving toward the vernal pools. Stormwater management features such as level spreaders will be carefully reviewed in the field to ensure that standing water does not endure for more than a 24-hour period, where feasible at the discretion of the Environmental Monitor, to avoid creation of decoy pools and may be subject to field design changes. Any such proposed design changes will be reviewed by the design engineer to ensure stormwater management functions are maintained.

   c. Erosion control measures will be removed no later than 30 days following final site stabilization so as not to impede migration of herpetofauna or other wildlife.

5. Herbicide, Pesticide, and Salt Restrictions

   a. The use of herbicides and pesticides at the Facility shall be minimized. If herbicides and/or pesticides are required at the Facility, their use will be in accordance with current Integrated Pest Management ("IPM") principles with particular attention to avoid/minimize applications within 100 feet of wetland and vernal pool resources.

   b. Maintenance of the facility during the winter months shall not include the application of salt or similar products for melting snow or ice.

6. Reporting

   a. Compliance Monitoring Reports (brief narrative and applicable photos) documenting each APT inspection will be submitted by APT to the Permittee and its Contractor for compliance verification of these protection measures. These reports are not to be used to document compliance with any other permit agency approval conditions (e.g., DEEP Stormwater Permit monitoring). Any non–compliance observations of erosion control measures or evidence of erosion or sediment release will be immediately reported to the Permittee and its Contractor and included in the reports along with any observations of vernal pool herpetofauna.

   b. Following completion of the construction project, APT will provide a final Compliance Monitoring Report to the Permittee documenting implementation of the resource protection program and monitoring observations. The Permittee is responsible for providing a copy of the final Compliance Monitoring Report to the Connecticut Siting Council for compliance verification.

NO.	REVISION	DATE
1	REV. SOLAR ARRAY LAYOUT	5/11/23
2	ADDED ENVIRONMENTAL NOTES	5/31/23
	Previous Editions Obsolete	

LSE HOROLOGIUM LLC
40 TOWER LANE
AVON, CT

ENVIRONMENTAL PROTECTION NOTES

PARCEL A BRICK TOP LANE & 163 NORTH WINDHAM ROAD

WINDHAM CONNECTICUT

CIVIL C1
CORNERSTONE PROFESSIONAL PARK, SUITE D-101
43 SHERMAN HILL ROAD
WOODBURY (203) 266-0778 CONNECTICUT

DRAWN: BB APPROVED: CJ
SCALE: AS NOTED
DATE: 17 MAR 23
PROJ. NO.: 3983
CADD FILE NAME: 3983
DRAWING NO.: C - 6.2

APPENDIX B

NDDB AND USFWS

COMPLIANCE MEMO

USFWS & NDDB COMPLIANCE

May 10, 2023

LSE Horologium LLC
40 Tower Lane – Suite 145
Avon, Connecticut 06001

Re: LSE Horologium LLC: 163 North Windham Road, North Windham, CT
APT Job No: CT606180

On behalf of LSE Horologium LLC ("LSE"), All-Points Technology Corporation, P.C. ("APT") performed an evaluation with respect to possible Federally- and State-listed, Threatened, Endangered or Special Concern species in order to determine if the proposed referenced solar energy generation facility ("Facility") would result in a potential adverse effect to listed species.

APT understands that LSE proposes the construction of a solar energy generation facility to be located on a ±65.75-acre agricultural property located at 163 North Windham Road in North Windham, Connecticut ("Subject Property").

USFWS

The federal consultation was completed in accordance with Section 7 of the Endangered Species Act through the U.S. Fish and Wildlife Service's ("USFWS") Information, Planning, and Conservation System ("IPaC"). Based on the results of the IPaC review, one Federally listed[1] Endangered species is known to occur in the vicinity of the Subject Property documented as the northern long-eared bat ("NLEB"; *Myotis septentrionalis*). Please refer to the enclosed official species list. As a result of this preliminary finding, APT performed an evaluation to determine if the proposed referenced Facility would result in a likely adverse effect to NLEB.

The proposed Facility would be located within previously cultivated fields with access requiring some selective tree removal that could potentially impact NLEB habitat; trees potentially provide NLEB habitat. A review of the Connecticut Department of Energy & Environmental Protection ("CTDEEP") Wildlife Division Natural Diversity Data Base ("NDDB") NLEB habitat map[2] revealed that the proposed Facility is not within 150 feet of a known occupied NLEB maternity roost tree and is not within 0.25 mile of a known NLEB hibernaculum. The nearest NLEB habitat resource to the proposed Facility is located ±32.7 miles to the northwest in East Granby.

On November 30, 2022, the USFWS published reclassification of NLEB as Endangered under the ESA. The reclassification now eliminates use of the previous 4(d) rule for NLEB; 4(d) rules may only be applied to Threatened species. A NLEB Interim Consultation Framework has been developed by USFWS for projects that are reasonably certain to occur before April 1, 2024 (date on which the NLEB

[1] Listing under the federal Endangered Species Act
[2] *Northern long-eared bat areas of concern in Connecticut to assist with Federal Endangered Species Act Compliance* map. February 1, 2016.

Interim Consultation Framework expires) to facilitate transition from the 4(d) rule to typical ESA consultation procedures for Endangered species. APT submitted the effects determination using the new NLEB Determination Key ("DKey") within the IPaC system for this Facility and determined it would have "No Effect" on NLEB. No further consultation/coordination for this project is required with USFWS. Please refer to the enclosed USFWS May 10, 2023 letter confirming the NLEB "No Effect" determination and ESA compliance for the Facility.

NDDB

No known areas of State-listed species are currently depicted on the most recent CTDEEP NDDB Maps in the location or vicinity of the proposed Facility or Subject Property. Please refer to the enclosed NDDB Map which depicts the nearest NDDB buffer ±0.45-mile east of the Subject Property. Since the proposed Facility and Subject Property are not located within a NDDB buffer area, consultation with DEEP is not required in accordance with their review policy[3] or the Connecticut Siting Council's review policy.

Therefore, the proposed Facility is not anticipated to adversely impact any Federal or State Threatened, Endangered, or Special Concern species.

Sincerely,
All-Points Technology Corporation, P.C.

Dean Gustafson
Senior Biologist

Enclosures

[3] DEEP Requests for NDDB State Listed Species Reviews.
http://www.ct.gov/deep/cwp/view.asp?a=2702&q=323466&deepNav_GID=1628%20

USFWS Consultation

- Official Species List
- NLEB DKey Letter

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: May 10, 2023
Project Code: 2023-0032725
Project Name: LSE Horologium LLC - North Windham CT

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 ECOS-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: 2023-0032725
Project Name: LSE Horologium LLC - North Windham CT
Project Type: Power Gen - Solar
Project Description: LSE Horologium LLC (LSE) intends to lease portions of a 44.79-acre parcel identified as 163 North Windham Road in the North Windham section of Windham, Connecticut for development of a solar electric generating facility. The proposed Facility will also occupy a 22.57-acre adjoining parcel off Bricktop Lane owned LSE. The commercial PV solar Facility will have a capacity of approximately 2.48 MW.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@41.7210804,-72.16930071063973,14z

Counties: Windham County, Connecticut

ENDANGERED SPECIES ACT SPECIES

There is a total of 2 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 Fisheries[1], 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.

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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 *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

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.

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: 2023-0032725
Project Name: LSE Horologium LLC - North Windham CT

May 10, 2023

Federal Action Agency (if applicable): Army Corps of Engineers

Subject: Record of project representative's no effect determination for 'LSE Horologium LLC - North Windham CT'

Dear Deborah Gustafson:

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 May 10, 2023, for 'LSE Horologium LLC - North Windham CT' (here forward, Project). This project has been assigned Project Code 2023-0032725 and all future correspondence should clearly reference this number. **Please carefully review this letter.**

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 the 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 Rangewide Determination Key (Dkey), invalidates this letter.

Determination for the Northern Long-Eared Bat

Based upon your IPaC submission and a standing analysis, your project has reached the determination of "No Effect" on the northern long-eared bat. To make a no effect determination, the full scope of the proposed project implementation (action) should not have any effects (either positive or negative), to a federally listed species or designated critical habitat. Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may

include consequences occurring outside the immediate area involved in the action. (See § 402.17).

Under Section 7 of the ESA, if a federal action agency makes a no effect determination, no consultation with the Service is required (ESA §7). If a proposed Federal action may affect a listed species or designated critical habitat, formal consultation is required except when the Service concurs, in writing, that a proposed action "is not likely to adversely affect" listed species or designated critical habitat [50 CFR §402.02, 50 CFR§402.13].

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

The IPaC-assisted determination for the northern long-eared 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* Candidate

You may coordinate with our Office to determine whether the Action may affect the animal species listed above and, if so, how they may be affected.

Next Steps

Based upon your IPaC submission, your project has reached the determination of “No Effect” on the northern long-eared bat. If there are no updates on listed species, no further consultation/ coordination for this project is required with respect to 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 to ensure compliance with the Act.

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 2023-0032725 associated with this Project.

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

1. Name

LSE Horologium LLC - North Windham CT

2. Description

The following description was provided for the project 'LSE Horologium LLC - North Windham CT':

> LSE Horologium LLC (LSE) intends to lease portions of a 44.79-acre parcel identified as 163 North Windham Road in the North Windham section of Windham, Connecticut for development of a solar electric generating facility. The proposed Facility will also occupy a 22.57-acre adjoining parcel off Bricktop Lane owned LSE. The commercial PV solar Facility will have a capacity of approximately 2.48 MW.

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@41.7210804,-72.16930071063973,14z

DETERMINATION KEY RESULT

Based on the information you provided, you have determined that the Proposed Action will have no effect on the Endangered northern long-eared bat (Myotis septentrionalis). Therefore, no consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required for those species.

QUALIFICATION INTERVIEW

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of the northern long-eared bat 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

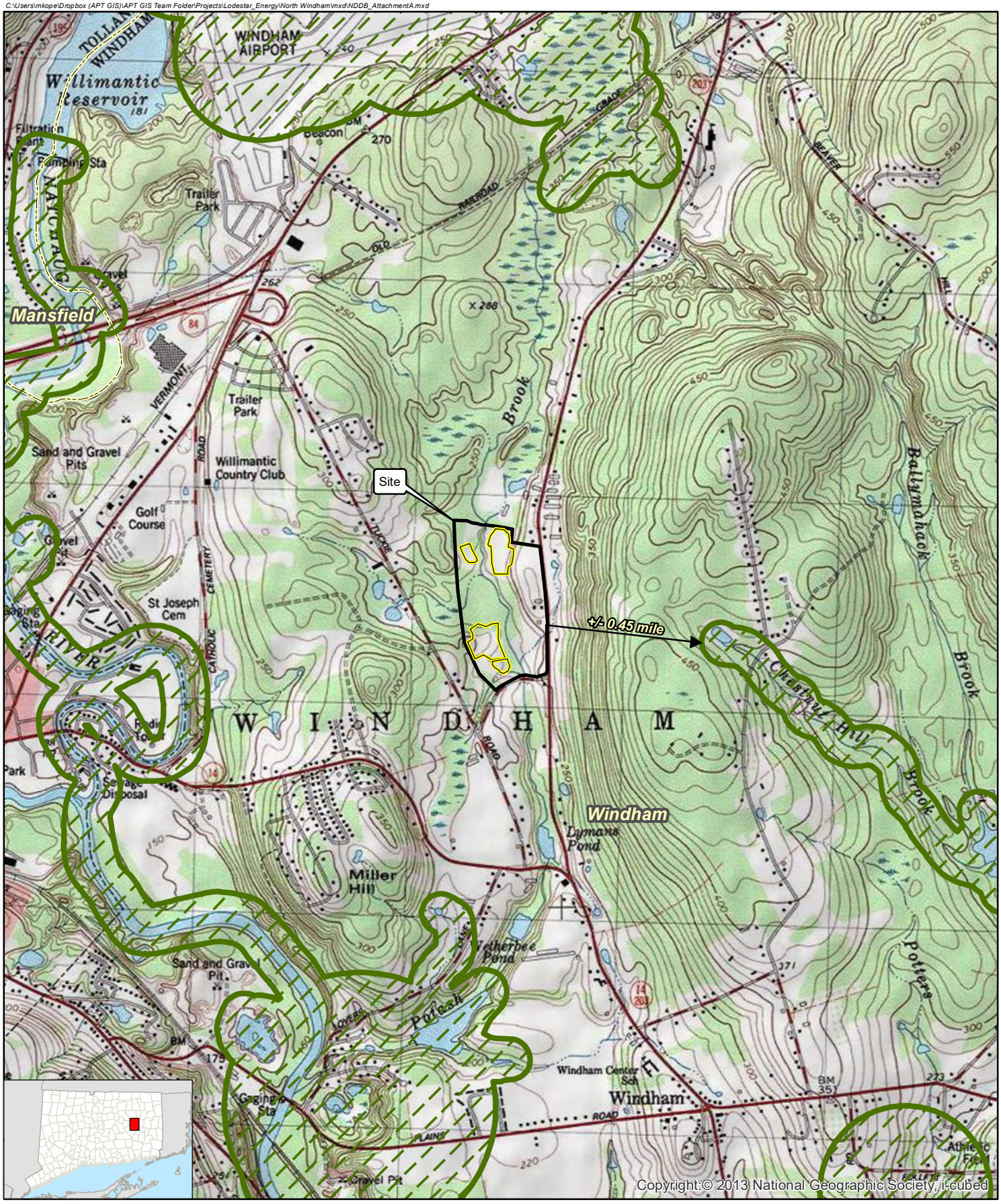
2. The proposed action does not intersect an area where the northern long-eared bat is likely to occur, based on the information available to U.S. Fish and Wildlife Service as of the most recent update of this key. If you have data that indicates that northern long-eared bats <u>are</u> likely to be present in the action area, answer "NO" and continue through the key.

   Do you want to make a no effect determination?

   Yes

NDDB Map

C:\Users\mkope\Dropbox (APT GIS)\APT GIS Team Folder\Projects\Lodestar_Energy\North Windham\mxd\NDDB_AttachmentA.mxd



Legend

- Site
- Approximate Project Area
- CTDEEP Natural Diversity Database (updated Dec 2022)
- Municipal Boundary

N
W E
S

1,000 500 0 1,000 Feet

NDDB Map

Proposed Solar Facility
163 North Windham Road
Windham, Connecticut

LODESTAR ENERGY

ALL-POINTS TECHNOLOGY CORPORATION

Map Notes:
Base Map Source: USGS 7.5 Minute
Topographic Quadrangle Map: Willimantic, CT (1984)
Map Scale: 1:24,000
Map Date: January 2023

APPENDIX C

SHPO CONSULTATION

June 6, 2023

Mr. David George
Heritage Consultants, LLC
830 Berlin Turnpike
Berlin, CT 06037
(sent only via email to dgeorge@heritage-consultants.com)

Subject: Archaeological Reconnaissance Survey of the Bricktop Solar Project
163 North Windham Road
Windham, Connecticut

Dear Mr. George:

The State Historic Preservation Office (SHPO) has reviewed the following reports prepared by Heritage Consultants (Heritage) in support of an application to the Connecticut Siting Council and stormwater discharge permitting from the Connecticut Department of Energy and Environmental Protection through the authority of the Environmental Protection Agency:

Phase IB Cultural Resources Reconnaissance Survey of the Proposed Bricktop Solar Project in Windham, Connecticut (dated April 2023)

Letter Report for Supplemental Phase IB Cultural Resources Reconnaissance Survey of the Bricktop Lane Solar Project in Windham, Connecticut (dated May 25, 2023)

The submitted reports are comprehensive and meet the standards set forth in the *Environmental Review Primer for Connecticut's Archaeological Resources.* The fieldwork was completed at the request of this office in a letter dated January 11, 2023. SHPO understands that the proposed project entails the construction of a ground-mounted solar voltaic facility within an approximately 8.5-acre portion of a larger 67.7-acre parcel. The proposed facilities will include access roads, security fencing, utilities, concrete pads, and brush clearing.

A previously completed archaeological assessment survey of the project parcel determined that 8.5 acres of the project area as well as a single proposed access road retained moderate/high archaeological sensitivity. Updated project plans included the addition of an approximately 0.65 acre solar array and associated access road. A supplemental archaeological assessment of the additional project items was completed by Heritage in April of 2023 and determined that they retained a moderate/high archaeological sensitivity assessment. Subsequent subsurface testing entailed the excavation of 110 of 116 planned shovel tests at 15-meter intervals throughout all identified moderate/high archaeological sensitivity areas. The planned but unexcavated shovel tests were located in areas that contained recently planted crops and were not excavated at the request of the landowner.

The field effort resulted in the recovery of 4 Pre-Contact period artifacts and 39 Post-Contact artifacts all from a plowzone context. Pre-Contact artifacts included three quartz flakes and a chalcedony projectile point of an unknown temporal affiliation. Heritage determined that the

identified Pre-Contact deposits represented isolated finds from a disturbed context and were not eligible for inclusion on the National Register of Historic Places (NRHP). Recovered Post-Contact material included domestic ceramic sherds, window and bottle glass shards, ferrous metal fragments, nails, a kaolin pipe stem, and coal dating from the nineteenth to twentieth century. The Post-Contact archaeological deposits were recorded as the Raspberry Knoll Site and determined to not be eligible for listing on the NRHP. As a result, Heritage recommended no further archaeological examination. Based on the information submitted to this office, it is the opinion of SHPO that no historic properties will be affected by the proposed development and no additional archaeological investigation is warranted. This comment is conditional upon the submission of two bound copies of the final report; one will be kept for use in the office and the other will be transferred to the Thomas J. Dodd Research Center at the University of Connecticut (Storrs) for permanent archiving and public accessibility.

SHPO appreciates the cooperation of all interested parties in the professional management of Connecticut's historic resources. Comments are provided in accordance with the National Historic Preservation Act and the Connecticut Environmental Policy Act. This letter updates and supersedes all previous correspondence regarding the proposed project. Do not hesitate to contact Cory Atkinson, Staff Archaeologist and Environmental Reviewer, for additional information at (860) 500-2458 or cory.atkinson@ct.gov.

Sincerely,

Jonathan Kinney
State Historic Preservation Officer

April 2023

Phase IB Cultural Resources Reconnaissance Survey of the Proposed Bricktop Solar Project in Windham, Connecticut

Prepared For:

ALL-POINTS TECHNOLOGY CORPORATION
567 Vauxhall Street Extension – Suite 311
Waterford, Connecticut 06385

Prepared By:

HERITAGE CONSULTANTS
830 Berlin Turnpike
Berlin, Connecticut 06037

ABSTRACT

This report presents the results of a Phase IB Cultural Resources Reconnaissance survey of a proposed solar project at Brick Top Lane and 163 North Windham Road in Windham, Connecticut. Heritage Consultants, LLC previously conducted a Phase IA cultural resources assessment survey of the development parcels, which indicated that 8.5 acres of the larger 66.7-acre project area along with one access road retained moderate/high archaeological sensitivity. The Phase IB survey consisted of the archaeological examination of four sensitivity areas referred to as, SA-1 through SA-4 and one access road, AR-1. These areas are defined by level topography characterized by fallow agricultural fields and wetlands associated with Potash Brook, which bisects the parcel extending north/northwest through the Project area. The Phase IB cultural reconnaissance survey was completed in March of 2023. A total of 102 of 108 (95 percent) planned shovel tests, plus 14 radial test pits, were excavated across the Project area. The six planned but unexcavated shovel tests fell within the area of a planted asparagus crop. The subsurface testing of the project area resulted in 16 shovel tests that yielded cultural material and the recovery of 41 artifacts. A total of four of the artifacts were classified as precontact era material and 37 dated from the post-European Contact period. The precontact era artifacts consisted of two quartz flakes, one quartz biface reduction flake, and a single untyped chalcedony projectile point fragment. Due to a lack of significant concentrations from stratified soils, as well as an absence of temporally diagnostic artifacts, the precontact era component, which consisted of two find spots, was assessed as not eligible for listing on the National Register of Historic Places applying the criteria for evaluation (36 CFR 60.4 [a-d]).

In addition, the Phase IB survey resulted in the identification of a post-European agricultural site, referred to as the Raspberry Knolls Farm Site. The site likely encompasses the entire project parcel and consists of above-referenced collected artifacts, as well as a ditch feature, barn structure, and eroding refuse pile. The observed artifact assemblage included examples of glass, ceramic, coal, and nails with a general date range spanning late nineteenth through the twentieth century. The barn structure is located outside of the proposed development area, and while it meets the requirement of being 50 years or older it was assessed as ineligible for listing on the State or National Register of Historic Places, due to the lack of historical and/or architectural significance applying the criteria for evaluation (36 CFR 60.4 [a-d]). While the Raspberry Knoll Farm Site is clearly indicative of the agrarian activity that has taken place on the parcel throughout the nineteenth and twentieth centuries, the lack of significant concentrations of artifacts and diagnostic materials recovered from stratified soils indicated that the site is ineligible for listing on the for listing on the National Register of Historic Places applying the criteria for evaluation (36 CFR 60.4 [a-d]). Thus, no further archaeological investigation of the development area is recommended prior to construction.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF PHOTOS

CHAPTER I
INTRODUCTION

This report presents the results of a Phase IB Cultural Resources Reconnaissance survey of a proposed solar project (the Project) at Brick Top Lane and 163 North Windham Road in Windham, Connecticut. The Project parcel encompasses 66.7 acres of land including an existing farm known as Raspberry Knoll Farm. A previously conducted Phase IA cultural resources assessment survey determined that a total of 8.5 acres of the Project area and one access road retained moderate/high archaeological sensitivity (Figure 1). All-Points Technology Corporation (All-Points) requested that Heritage Consultants, LLC (Heritage) complete the Phase IB cultural resources reconnaissance survey of the archaeological sensitivity areas, SA-1 through SA-4, and a single access road, AR-1, prior to Project development. The Phase IB survey was completed by Heritage in March of 2023. All work associated with this project was performed in accordance with the *Environmental Review Primer for Connecticut's Archaeological Resources* (Poirier 1987) promulgated by the Connecticut State Historic Preservation Office (CT-SHPO).

Project Description, Methods, & Results Overview

The proposed Project will consist of a solar center that will be situated within a larger 66.7 acres of land in Windham, Connecticut (Figure 2). The Project area is situated at elevations ranging from 70 to 81 meters (229 to 265 feet) NGVD. The parcel is bound by residential development and vegetated landscape in all directions. The Phase IB survey consisted of the archaeological examination of four sensitivity areas (SA-1 through SA-4) totaling 8.5 acres in extent, as well as one access road (AR-1) that extends approximately 372 meters (1,220 feet) in length. These areas are defined by level topography characterized by fallow agricultural fields and wetlands associated with Potash Brook, which bisects the parcel extending north/northwest through the Project area. The field methods employed during the Phase IB survey consisted of pedestrian survey, mapping, photo documentation, and subsurface testing throughout Sensitivity Area SA-1 through SA-4 and AR-1. The details of the field methods used, as well as the results of the Phase IB survey, are reviewed below.

The examination of the identified Sensitivity Areas was completed through the excavation of shovel test pits spaced at 15 meter (49 foot) intervals located along survey transects positioned 15 meters (49 feet) apart. The Access Road was investigated through shovel tests placed at 15 meter (49 foot) intervals along the proposed route. Radial shovel tests surrounding test pits positive for precontact era cultural material were situated at 7.5 meters (24 feet) in the four cardinal directions off the initial positive shovel test. All shovel tests excavated measured 50 x 50 centimeters (19.4 x 19.4 inches) in size and were excavated until glacially derived C-Horizon soils or immovable objects (boulders, large tree roots) were encountered.

The Phase IB survey effort resulted in a total of 102 of 108 (95 percent) planned shovel tests, as well as 14 radial test pits, excavated across the Project area. The six planned but unexcavated shovel tests fell within the area of a planted asparagus crop and could not be excavated. The subsurface testing of the Project area resulted in 16 positive shovel tests and the recovery of 41 artifacts, of which four were classified as precontact era material and 37 dated from the post-European Contact period.

A total of four precontact era artifacts were recovered from Sensitivity Area SA-3. They included 2 quartz flakes, 1 quartz biface reduction flake, and a single untyped chalcedony projectile point fragment. These artifacts were recovered from the Ap (plowzone) soil horizon and therefore are considered out of

their original cultural context. Due to the precontact era material not being recovered in significant concentrations, from stratified soils, and the lack of temporal diagnostic artifacts, the precontact era component was characterized as two find spots that are not eligible for listing on the National Register of Historic Places applying the criteria for evaluation (36 CFR 60.4 [a-d]).

The Phase IB survey resulted in the identification of a post-European Contact agricultural site, which was referred to as the Raspberry Knolls Farm Site. A total of 37 post-European Contact period artifacts were collected from 14 shovel tests across Sensitivity Areas SA-2 through SA-4 and AR-1. These artifacts included examples of green and colorless glass shards, porcelain sherds, redware sherds, whiteware sherds, kaolin pipe fragments, coal, and nails; they have a general date range spanning the twentieth century. In addition to the collected artifacts, an agricultural ditch feature and a barn structure were identified within the Project parcel, as well as an eroding refuse pile. The barn structure is located outside of the proposed Project development area. While the barn retains some of its original elements such as its foundation, it has been considerably altered over the course of its lifecycle. While it meets the requirement of being 50 years or older, it was assessed as ineligible for listing on the State or National Register of Historic Places due to the likely lack of historical and/or architectural significance applying the criteria for evaluation (36 CFR 60.4 [a-d]). Thus, no additional architectural investigation of the structure is required prior to Project development. The refuse pile was located outside of the direct Project area of impact and therefore was documented but not collected nor subjected to further testing. While the Raspberry Knoll Farm Site is clearly indicative of the agrarian activity that has taken place on the parcel throughout the nineteenth and twentieth centuries, the lack of significant concentrations of artifacts and diagnostic materials recovered from stratified soils determined the site is ineligible for listing on the for listing on the National Register of Historic Places applying the criteria for evaluation (36 CFR 60.4 [a-d]). Thus, no further archaeological investigation of the site is recommended prior to Project development.

Project Personnel

Key personnel for this investigation included David R. George, M.A., RPA, (Principal Investigator), Chris Brouillette, B.A, (Field Director), Brenna Pisanelli, M.A. (Project Manager), Nita Vitaliano, M.A. (Historian), and Sean Buckley, M.A., (GIS Specialist).

CHAPTER II
NATURAL SETTING

Introduction

This chapter provides a brief overview of the natural setting of the region containing the Project area, in Windham, Connecticut. Previous archaeological research has documented that specific environmental factors can be associated with both precontact era and post-European Contact period site selection. These include general ecological conditions, as well as types of fresh water sources present, degree of slopes, and soils situated within a given study area. The remainder of this chapter provides a brief overview of the ecology, hydrological resources, and soils present within the Project area and the larger region in general.

Ecoregions of Connecticut

Throughout the Pleistocene and Holocene Periods, Connecticut has undergone numerous environmental changes. Variations in climate, geology, and physiography have led to the "regionalization" of Connecticut's modern environment. It is clear, for example, that the northwestern portion of the state has different natural characteristics than the coastline. Recognizing this fact, Dowhan and Craig (1976), as part of their study of the distribution of rare and endangered species in Connecticut, subdivided the state into various ecoregions. Dowhan and Craig (1976:27) defined an ecoregion as:

> "An area characterized by a distinctive pattern of landscapes and regional climate as expressed by the vegetation composition and pattern, and the presence or absence of certain indicator species and species groups. Each ecoregion has a similar interrelationship between landforms, local climate, soil profiles, and plant and animal communities. Furthermore, the pattern of development of plant communities (chronosequences and toposequences) and of soil profile is similar in similar physiographic sites. Ecoregions are thus natural divisions of land, climate, and biota."

Dowhan and Craig defined nine major ecoregions for the State of Connecticut. They are based on regional diversity in plant and animal indicator species (Dowhan and Craig 1976). Only one of the ecoregions is germane to the current investigation: Southeast Hills Ecoregion. A summary of this ecoregion is presented below. It is followed by a discussion of hydrology and soils found in and adjacent to the Facility area.

<u>Southeast Hills Ecoregion</u>

The Southeast Hills ecoregion consists of "coastal uplands, lying within 25 miles of Long Island Sound, characterized by low, rolling to locally rugged hills of moderate elevation, broad areas of upland, and local areas of steep and rugged topography" (Dowhan and Craig 1976). Elevations in the Southeast Hills ecoregion generally range from 75.7 to 227.2 m (250 to 750 ft) above sea level (Dowhan and Craig 1976). The bedrock of the region is composed of schists, and gneisses deposited during the Paleozoic. Soils in the region have developed on top of glacial till in upland locales, and on top of stratified deposits of sand, gravel, and silt in the local valleys and upland areas (Dowhan and Craig 1976). Freshwater sources located in the region containing the proposed project items include Williams Pond, Trent Pond, Salmon River, Nipsic Brook, and Wildcat Brook, as well as other unnamed streams, ponds and wetland areas.

Hydrology of the Study Region

The Project area is located within close proximity of several streams, rivers and wetlands. The major fresh water sources in this area include the Natchaug River, the Mt. Hope River, Potash Brook, Chestnut Hill

Brook, Lake Marie, and Frog Pond. Potash Brook bisects the Project Parcel, extending north and northwest throughout the Project area. Previously completed archaeological investigations in Connecticut have demonstrated that streams, rivers, and wetlands were focal points for precontact era occupations because they provided access to transportation routes, sources of freshwater, and abundant faunal and floral resources. These water sources also provided the impetus for the construction of water powered mill facilities during the eighteenth and nineteenth centuries.

Soils Comprising the Project Area

Soil formation is the direct result of the interaction of several variables, including climate, vegetation, parent material, time, and organisms present (Gerrard 1981). Once archaeological deposits are buried within the soil, they are subject to many diagenic processes. Different classes of artifacts may be preferentially protected, or unaffected by these processes, whereas others may deteriorate rapidly. Cyclical wetting and drying, freezing, and thawing, and compression can accelerate chemically and mechanically the decay processes for animal bones, shells, lithics, ceramics, and plant remains. Lithic and ceramic artifacts are largely unaffected by soil pH, whereas animal bones and shells decay more quickly in acidic soils such as those that are present within the Project area. In contrast, acidic soils enhance the preservation of charred plant remains.

A total of four soil types were identified within the previously identified sensitivity areas, SA-1 through SA-3. These soil types can be grouped into two categories, well-drained and poorly drained. Three out of the four identified soil types are classified as well drained, Hinckley, Sudbury, and Ninigret and Tisbury Soils. When well to excessively drained soil types remain undisturbed and on less than eight percent slope, they are generally well correlated with precontact period and post-European Contact period site locations and are considered to have higher archaeological sensitivity. In contrast, poorly drained soils such as Walpole soils, are typically wet and associated with areas such as shorelines, flood plains, lake plains, outwash plains, till plains, and moraines. As a result, they are poorly correlated with archaeological material and are therefore considered less sensitive. The majority of the Project area is defined by well-drained soil types; below is a summary of each specific soil group identified within the sensitivity areas.

<u>Hinckley Soils (Soil Code 38C and 38E)</u>

The Hinckley series consists of very deep, excessively drained soils formed in glaciofluvial materials. They are nearly level through very steep soils on outwash terraces, outwash plains, outwash deltas, kames, kame terraces, and eskers. Hinckley soils comprise a small fraction of the northern segment of the proposed work area. Typical sequence, depth and composition of this soil is as follows: **Oe**--0 to 3 cm; moderately decomposed plant material derived from red pine needles and twigs; **Ap**--3 to 20 cm; very dark grayish brown (10YR 3/2) loamy sand; weak fine and medium granular structure; very friable; many fine and medium roots; 5 percent fine gravel; very strongly acid; abrupt smooth boundary; **Bw1**--20 to 28 cm; strong brown (7.5YR 5/6) gravelly loamy sand; weak fine and medium granular structure; very friable; common fine and medium roots; 20 percent gravel; very strongly acid; clear smooth boundary; **Bw2**--28 to 41 cm; yellowish brown (10YR 5/4) gravelly loamy sand; weak fine and medium granular structure; very friable; common fine and medium roots; 25 percent gravel; very strongly acid; clear irregular boundary; **BC**--41 to 48 cm; yellowish brown (10YR 5/4) very gravelly sand; single grain; loose; common fine and medium roots; 40 percent gravel; strongly acid; clear smooth boundary; **C--**48 to 165 cm; light olive brown (2.5Y 5/4) extremely gravelly sand consisting of stratified sand, gravel and cobbles; single grain; loose; common fine and medium roots in the upper 20 cm and very few below; 60 percent gravel and cobbles; moderately acid.

Sudbury (Soil Code 23A)

The Sudbury series consists of very deep, moderately well and somewhat poorly drained soils on outwash plains. They are nearly level through strongly sloping soils in slight depressions and on terraces and foot slopes in areas of outwash or glaciofluvial deposits. Slope ranges from 0 through 15 percent. A typical soil profile is as follows: **Ap** -- 0 to 13 inches (0 to 33 centimeters); very dark grayish brown (10YR 3/2) fine sandy loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; very friable; many fine roots; 5 percent gravel; moderately acid; abrupt smooth boundary; **Bw** -- 13 to 19 inches (33 to 48 centimeters); yellowish brown (10YR 5/6) sandy loam; weak medium granular structure; very friable; common grass roots; 10 percent fine gravel; few fine and medium prominent dark reddish gray (5YR 4/2) areas of iron depletion in the lower 3 inches (8 centimeters); moderately acid; abrupt wavy boundary; **2CB** -- 19 to 26 inches(48 to 66 centimeters) ; yellowish brown (10YR 5/4) gravelly coarse sand; single grain; loose; few fine roots; yellowish red (5YR 4/8) coatings on some sand grains; 20 percent gravel; many fine prominent dark reddish brown (2.5YR 3/4) and common coarse prominent reddish yellow (5YR 6/8) masses of iron accumulations; moderately acid; abrupt wavy boundary; **2C** -- 26 to 65 inches (66 to 165 centimeters); light olive brown (2.5Y 5/4) very gravelly coarse sand; single grain; loose; many sand grains coated with strong brown (7.5YR 5/6) and some sand grains slightly cemented, and many pebbles and cobbles coated with black (5YR 2/1); few fine roots; strata of sand and gravel consisting of about 50 percent gravel and some cobbles; common medium prominent strong brown (7.5YR 5/6) masses of iron accumulation; moderately acid.

Ninigret and Tisbury Soils (Soil Code 21A)

The Ninigret series consists of very deep, moderately well drained soils formed in loamy over sandy and gravelly glacial outwash. They are nearly level to strongly sloping soils on glaciofluvial landforms, typically in slight depressions and broad drainage ways. Slope ranges from 0 through 15 percent. A typical soil profile is as follows: **Ap**--0 to 8 inches; very dark grayish brown (10YR 3/2) fine sandy loam; pale brown (10YR 6/3) dry; weak medium granular structure; very friable; many fine roots; strongly acid; **Bw1**--8 to 16 inches; yellowish brown (10YR 5/6) fine sandy loam; weak coarse granular structure; very friable; few fine roots; strongly acid; **Bw2**--16 to 26 inches; yellowish brown (10YR 5/4) fine sandy loam; very weak coarse granular structure; very friable; very few fine roots; common medium distinct light brownish gray (10YR 6/2) and brownish yellow (10YR 6/6) redoximorphic features; strongly acid; **2C**--26 to 65 inches; pale brown (10YR 6/3) loamy sand and few lenses of loamy fine sand; single grain; loose; many medium distinct light olive gray (5Y 6/2) and many prominent yellowish brown (10YR 5/8) redoximorphic features; strongly acid.

The Tisbury series consists of very deep, moderately well drained loamy soils formed in silty eolian deposits overlying outwash. They are nearly level and gently sloping soils on outwash plains and terraces, typically in slight depressions and broad drainageways. The slope ranges from 0 to 3 percent. A typical soil profile is as follows: **Ap**--0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam; weak coarse granular structure; friable; many very fine and fine roots; few scattered pebbles; strongly acid; abrupt smooth boundary. (6 to 12 inches thick) **Bw1**--8 to 18 inches; yellowish brown (10YR 5/6) silt loam; weak medium and coarse subangular blocky structure; very friable; common very fine and fine roots; few scattered pebbles; strongly acid; clear wavy boundary. **Bw2**--18 to 26 inches; brownish yellow (10YR 6/6) silt loam; massive; very friable; few fine roots; few scattered pebbles; common medium prominent grayish brown (2.5Y 5/2) iron depletions and common medium distinct strong brown (7.5YR 5/6) masses of iron accumulation; strongly acid; clear wavy boundary. (Combined thickness of the Bw horizons is 12 to 36 inches) **2C**--26 to 60 inches; grayish brown (10YR 5/2) extremely gravelly sand; single grain; loose; 60 percent gravel; common medium prominent strong brown (7.5YR 5/6) masses of iron accumulation and common medium faint light brownish gray (10YR 6/2) iron depletions; strongly acid.

Walpole Series (Soil Code 13)

The Walpole series consists of very deep, poorly drained sandy soils that have formed in outwash and stratified drift. They are found on nearly level to gently sloping soils in low-lying positions on terraces and plains with slopes ranging from 0 to 8 percent. Typical sequence, depth, and composition of the Walpole Series soil is as follows: **Oe**--0 to 3 cm (0 to 1 in); black (10YR 2/1) moderately decomposed forest plant material. **A**--3 to 18 cm (1 to 7 in); very dark brown (10YR 2/2) sandy loam; weak medium granular structure; very friable; many fine and medium roots; 8 percent gravel; very strongly acid; clear smooth boundary; **Bg**--18 to 53 cm (7 to 21 in); dark grayish brown (2.5Y 4/2) sandy loam; massive; friable; common fine and few medium roots in the upper part of the horizon and few fine roots in the lower part; 10 percent gravel; common medium prominent strong brown (7.5YR 5/6) and common medium prominent yellowish brown (10YR 5/4) and yellowish brown (10YR 5/6) masses of iron accumulation and common medium distinct light brownish gray (10YR 6/2) iron depletions; strongly acid; gradual smooth boundary; **BC**--53 to 63 cm (21 to 25 in); light olive brown (2.5Y 5/4) gravelly sandy loam; massive; friable; 20 percent gravel; common medium prominent yellowish brown (10YR 5/6) masses of iron accumulation and light brownish gray (10YR 6/2) and dark grayish brown (2.5Y 4/2) iron depletions; strongly acid; clear smooth boundary; **C1**--63 to 104 cm (25 to 41 in); light yellowish brown (2.5Y 6/4) very gravelly loamy sand; single grain; very friable; 30 percent gravel and 5 percent cobbles; common medium distinct strong brown (7.5YR 5/6) and yellowish brown (10YR 5/4) masses of iron accumulation; strongly acid; gradual smooth boundary; and **C2**--104 to 165 cm (41 to 65 in); light brownish gray (10YR 6/2) very gravelly sand, few brown (10YR 5/3) streaks; single grain; loose; 35 percent gravel and 5 percent cobbles; moderately acid.

Summary

A review of mapping, geological data, ecological conditions, soils, slopes, and proximity to freshwater, suggests that portions of the Project area appear to be amenable to both precontact era and post-European Contact period occupations. This includes areas of low to moderate slopes with well drained soils located near freshwater sources. The types of Native American sites that may be contained in these areas include task specific, temporary, or seasonal base camps, which may include areas of lithic tool manufacturing, hearths, post-molds, and storage pit.

CHAPTER III
PRECONTACT ERA SETTING

Introduction

Prior to the late 1970s and early 1980s, very few systematic archaeological surveys of large portions of the State of Connecticut had been undertaken. Rather, the precontact period of the region was studied at the site level. Sites chosen for excavation were highly visible and they were in such areas as the coastal zone, e.g., shell middens, and Connecticut River Valley. As a result, a skewed interpretation of the precontact period of Connecticut was developed. It was suggested that the upland portions of the state, i.e., the northeastern and northwestern hills ecoregions, were little used and rarely occupied by precontact Native Americans, while the coastal zone, i.e., the eastern and western coastal and the southeastern and southwestern hills ecoregions, were the focus of settlements and exploitation in the precontact era. This interpretation remained unchallenged until the 1970s and 1980s when several town-wide and regional archaeological studies were completed. These investigations led to the creation of several archaeological phases that subsequently were applied to understand the precontact period of Connecticut. The remainder of this chapter provides an overview of the precontact setting of the region encompassing the Project area.

Paleo-Indian Period (12,000 to 10,000 Before Present [B.P.])

The earliest inhabitants of the area encompassing the State of Connecticut, who have been referred to as Paleo-Indians, arrived in the area by ca., 13,000 B.P. (Gramly and Funk 1990; Snow 1980). Due to the presence of large Pleistocene mammals at that time and the ubiquity of large fluted projectile points in archaeological deposits of this age, Paleo-Indians often have been described as big-game hunters (Ritchie and Funk 1973; Snow 1980); however, as discussed below, it is more likely that they hunted a broad spectrum of animals. While there have been over 50 surface finds of Paleo-Indian projectile points throughout the State of Connecticut (Bellantoni 1995), only three sites, the Templeton Site (6-LF-21) in Washington, Connecticut, the Hidden Creek Site (72-163) in Ledyard, Connecticut, and the Brian D. Jones Site (4-10B) in Avon, Connecticut have been studied in detail and dated using the radiocarbon method (Jones 1997; Moeller 1980; Singer 2017a; Leslie et al. 2020).

The Templeton Site (6-LF-21) is in Washington, Connecticut and was occupied between 10,490 and 9,890 years ago (Moeller 1980). In addition to a single large and two small, fluted points, the Templeton Site produced a stone tool assemblage consisting of gravers, drills, core fragments, scrapers, and channel flakes, which indicates that the full range of stone tool production and maintenance took place at the site (Moeller 1980). Moreover, the use of both local and non-local raw materials was documented in the recovered tool assemblage, suggesting that not only did the site's occupants spend some time in the area, but they also had access to distant stone sources, the use of which likely occurred during movement from region to region. More recently, the site has undergone re-investigation by Singer (2017a and 2017b), who has determined that most tools and debitage are exotic and were quarried directly from the Hudson River Valley. Recent research has focused on task-specific loci at the Templeton Site, particularly the production of numerous Michaud-Neponset projectile points, as identified through remnant channel flakes.

The Hidden Creek Site (72-163) is situated on the southeastern margin of the Great Cedar Swamp on the Mashantucket Pequot Reservation in Ledyard, Connecticut (Jones 1997). While excavation of the Hidden Creek Site produced evidence of Terminal Archaic and Woodland Period components (see below) in the upper soil horizons, the lower levels of the site yielded artifacts dating from the Paleo-Indian era.

Recovered Paleo-Indian artifacts included broken bifaces, side-scrapers, a fluted preform, gravers, and end-scrapers. Based on the types and number of tools present, Jones (1997:77) has hypothesized that the Hidden Creek Site represented a short-term occupation, and that separate stone tool reduction and rejuvenation areas were present.

The Brian D. Jones Site (4-10B) was identified in a Pleistocene levee on the Farmington River in Avon, Connecticut; it was buried under 1.5 m (3.3 ft) of alluvium (Leslie et al. 2020). The Brian D. Jones Site was identified by Archaeological and Historical Services, Inc., in 2019 during a survey for the Connecticut Department of Transportation preceding a proposed bridge construction project. It is now the oldest known archaeological site in Connecticut at +12,500 years old. The site also provides a rare example of a Paleo-Indian site on a river rather than the more common upland areas or on the edges of wetlands. Ground-penetrating radar survey revealed overbank flooding and sedimentation that resulted in the creating of a stable ancient river levee with gentle, low-energy floods. Archaeological deposits on the levee were therefore protected.

Excavations at the Brian D. Jones Site revealed 44 soil anomalies, 27 of which were characterized as cultural features used as hearths and post holes, among other uses. One hearth has been dated thus far (10,520 ± 30 14C yr BP; charred Pinus; 2-sigma 12,568 to 12,410 CAL BP) (Leslie et al. 2020:4). Further radiocarbon testing will be completed in the future. Artifact concentrations surrounded these features and were separated in two stratigraphic layers represented at least two temporally discrete Paleo-Indian occupations. The recovered lithic artifacts are fashioned from Normanskill chert, Hardyston jasper, Jefferson/Mount Jasper rhyolite, chalcedony, siltstone, and quartz. They include examples of a fluted point base, preforms, channel flakes, pièces esquillées, end scrapers, side scrapers, grinding stones, bifaces, utilized flakes, gravers, and drilled stone pendant fragment. Lithic tools numbered over 100, while toolmaking debris was in the thousands. The channel flakes represent the production of spear points used in hunting. Scrapers, perforators, and grinding stones indicate animal butchering, plant food grinding, the production of wood and bone tools, and the processing of animal skins for clothing and tents. Other collected cultural materials included charred botanicals and calcined bone. Botanicals recovered in hearth features included burned remains of cattail, pin cherry, strawberry, acorn, sumac, water lily, and dogwood. In addition, pieces of ochre were recovered during the excavations; these, in combination with the drilled pendant fragment, are the earliest evidence of personal adornment and artistic expression identified in Connecticut (Leslie et al. 2020). Approximately 15,000 artifacts were collected in total.

The scarcity of identified Paleo-Indian sites suggests a low population density during this period. The small size of most Paleo-Indian sites, their likely inundation by rising sea levels, and the high degree of landscape disturbance over the past 10,000 years likely contribute to poor site visibility, although the presence of two deeply alluvially buried Paleo-Indian sites in Connecticut suggests that other sites may be located along stable rivers (Leslie et al. 2021).

Archaic Period (10,000 to 2,700 B.P.)

The Archaic Period, which succeeded the Paleo-Indian Period, began by ca., 10,000 B.P. (Ritchie and Funk 1973; Snow 1980), and it has been divided into three subperiods: Early Archaic (10,000 to 8,000 B.P.), Middle Archaic (8,000 to 6,000 B.P.), and Late Archaic (6,000 to 3,400 B.P.). These periods were devised to describe all non-farming, non-ceramic producing populations in the area. Regional archeologists recently have recognized a final "transitional" Archaic Period, the Terminal Archaic Period (3,400-2,700 B.P.), which was meant to describe those groups that existed just prior to the onset of the Woodland Period and the widespread adoption of ceramics into the toolkit (Snow 1980; McBride 1984;

Pfeiffer 1984, 1990; Witthoft 1949, 1953).

Early Archaic Period (10,000 to 8,000 B.P.)

To date, very few Early Archaic sites have been identified in southern New England. As a result, researchers such as Fitting (1968) and Ritchie (1969), have suggested a lack of these sites likely is tied to cultural discontinuity between the Early Archaic and preceding Paleo-Indian Period, as well as a population decrease from earlier times; however, with continued identification of Early Archaic sites in the region, and the recognition of the problems of preservation, it is difficult to maintain the discontinuity hypothesis (Curran and Dincauze 1977; Snow 1980).

Like their Paleo-Indian predecessors, Early Archaic sites tend to be very small and produce few artifacts, most of which are not temporally diagnostic. While Early Archaic sites in other portions of the United States are represented by projectile points of the Kirk series (Ritchie and Funk 1973) and by Kanawha types (Coe 1964), sites of this age in southern New England are identified on the basis of a series of ill-defined bifurcate-based projectile points. These projectile points are identified by the presence of their characteristic bifurcated base, and they generally are made from high quality raw materials. Moreover, finds of these projectile points have rarely been in stratified contexts. Rather, they occur commonly either as surface expressions or intermixed with artifacts representative of later periods. Early Archaic occupations, such as the Dill Farm Site and Sites 6LF64 and 6LF70 in Litchfield County, are represented by camps that were relocated periodically to take advantage of seasonally available resources (McBride 1984; Pfeiffer 1986). In this sense, a foraging type of settlement pattern was employed during the Early Archaic Period.

Another localized cultural tradition, the Gulf of Maine Archaic, which lasted from ca. 9,500 to 6,000 14C BP, is beginning to be recognized in Southern New England (Petersen and Putnam 1992). It is distinguished by its microlithic industry, which may be associated with the production of compound tools (Robinson and Peterson 1993). Assemblages from Maine (Petersen et al. 1986; Petersen 1991; Sanger et al. 1992), Massachusetts (Strauss 2017; Leslie et al. 2022), and Connecticut (Forrest 1999) reflect the selection of local, coarse-grained stones. Large choppers and hoe-like forms from southeastern Connecticut's Sandy Hill Site likely functioned as digging implements. Woodworking tools, including adzes, celts, and gull-channeled gouges recovered at the Brigham and Sharrow sites in Maine (Robinson and Petersen 1993:68) may have been used for dugout canoe manufacture. The deeply stratified Sandy Hill (Forrest 1999; Jones and Forrest 2003) and Sharrow sites (Petersen 1991), with their overlapping lenses of "black sand" floor deposits, suggest intensive site re-occupations according to an adaptation that relied, in part, on seasonally available wetland resources. Thus far, sites from this tradition have only been identified within coastal and near-coastal territories along the Gulf of Maine, in southeastern Connecticut, and in Massachusetts.

Middle Archaic Period (8,000 to 6,000 B.P.)

By the onset of the Middle Archaic Period modern deciduous forests had developed in the region (Davis 1969). Increased numbers and types of sites associated with this period are noted in Connecticut (McBride 1984). The most well-known Middle Archaic site in New England is the Neville Site in Manchester, New Hampshire studied by Dincauze (1976). Careful analysis of the Neville Site indicated that the Middle Archaic occupation dated from between 7,700 and 6,000 years ago. In fact, Dincauze obtained several radiocarbon dates from the Middle Archaic component of the Neville Site associated with the then-newly named Neville type projectile point, ranging from 7,740$\pm$280 and 7,015$\pm$160 B.P. (Dincauze 1976).

In addition to Neville points, Dincauze (1976) described two other projectile points styles that are attributed to the Middle Archaic Period: Stark and Merrimac projectile points. While no absolute dates were recovered from deposits that yielded Stark points, the Merrimac type dated from 5,910±180 B.P. Dincauze argued that both the Neville and later Merrimac and Stark occupations were established to take advantage of the excellent fishing that the falls situated adjacent to the site area would have afforded Native American groups. Thus, based on the available archaeological evidence, the Middle Archaic Period is characterized by continued increases in diversification of tool types and resources exploited, as well as by sophisticated changes in the settlement pattern to include different site types, including both base camps and task-specific sites (McBride 1984:96).

Late Archaic Period (6,000 to 3,700 B.P.)

The Late Archaic Period in southern New England is divided into two major cultural traditions that appear to have coexisted. They include the Laurentian and Narrow-Stemmed Traditions (Funk 1976; McBride 1984; Ritchie 1969a and b). Artifacts assigned to the Laurentian Tradition include ground stone axes, adzes, gouges, ulus (semi-lunar knives), pestles, atlatl weights, and scrapers. The diagnostic projectile point forms of this time period in southern New England include the Brewerton Eared-Notched, Brewerton Eared and Brewerton Side-Notched varieties (McBride 1984; Ritchie 1969a; Thompson 1969). In general, the stone tool assemblage of the Laurentian Tradition is characterized by flint, felsite, rhyolite, and quartzite, while quartz was largely avoided for stone tool production.

In terms of settlement and subsistence patterns, archaeological evidence in southern New England suggests that Laurentian Tradition populations consisted of groups of mobile hunter-gatherers. While a few large Laurentian Tradition occupations have been studied, sites of this age generally encompass less than 500 m^2 (5,383 ft^2). These base camps reflect frequent movements by small groups of people in search of seasonally abundant resources. The overall settlement pattern of the Laurentian Tradition was dispersed in nature, with base camps located in a wide range of microenvironments, including riverine as well as upland zones (McBride 1978, 1984:252). Finally, subsistence strategies of Laurentian Tradition focused on hunting and gathering of wild plants and animals from multiple ecozones.

The second Late Archaic tradition, known as the Narrow-Stemmed Tradition, is unlike the Laurentian Tradition, and it likely represents a different cultural adaptation. The Narrow-Stemmed Tradition is recognized by the presence of quartz and quartzite narrow stemmed projectile points, triangular quartz Squibnocket projectile points, and a bipolar lithic reduction strategy (McBride 1984). Other tools found in Narrow-Stemmed Tradition artifact assemblages include choppers, adzes, pestles, antler and bone projectile points, harpoons, awls, and notched atlatl weights. Many of these tools, notably the projectile points and pestles, indicate a subsistence pattern dominated by hunting and fishing, as well the collection of a wide range of plant foods (McBride 1984; Snow 1980:228).

The Terminal Archaic Period (3,700 to 2,700 B.P.)

The Terminal Archaic, which lasted from ca., 3,700 to 2,700 BP, is perhaps the most interesting, yet confusing of the Archaic Periods in southern New England precontact period. Originally termed the "Transitional Archaic" by Witthoft (1953) and recognized by the introduction of technological innovations, e.g., broadspear projectile points and soapstone bowls, the Terminal Archaic has long posed problems for regional archeologists. While the Narrow-Stemmed Tradition persisted through the Terminal Archaic and into the Early Woodland Period, the Terminal Archaic is coeval with what appears to be a different technological adaptation, the Susquehanna Tradition (McBride 1984; Ritchie 1969b). The Susquehanna Tradition is recognized in southern New England by the presence of a new stone tool industry that was based on the use of high-quality raw materials for stone tool production and a

settlement pattern different from the "coeval" Narrow-Stemmed Tradition.

The Susquehanna Tradition is based on the classification of several Broadspear projectile point types and associated artifacts. There are several local sequences within the tradition, and they are based on projectile point type chronology. Temporally diagnostic projectile points of these sequences include the Snook Kill, Susquehanna Broadspear, Mansion Inn, and Orient Fishtail types (Lavin 1984; McBride 1984; Pfeiffer 1984). The initial portion of the Terminal Archaic Period (ca., 3,700-3,200 BP) is characterized by the presence of Snook Kill and Susquehanna Broadspear projectile points while the latter Terminal Archaic (3,200-2,700 BP) is distinguished by Orient Fishtail projectile points (McBride 1984:119; Ritchie 1971).

In addition, it was during the late Terminal Archaic that interior cord marked, grit tempered, thick-walled ceramics with conoidal (pointed) bases made their initial appearance in the Native American toolkit. These are the first ceramics in the region, and they are named Vinette I (Ritchie 1969a; Snow 1980:242); this type of ceramic vessel appears with much more frequency during the ensuing Early Woodland Period. In addition, the adoption and widespread use of soapstone bowls, as well as the implementation subterranean storage, suggests that Terminal Archaic groups were characterized by reduced mobility and longer-term use of established occupation sites (Snow 1980:250).

Finally, while settlement patterns appeared to have changed, Terminal Archaic subsistence patterns were analogous to earlier patterns. The subsistence pattern still was diffuse in nature, and it was scheduled carefully. Typical food remains recovered from sites of this period consist of fragments of white-tailed deer, beaver, turtle, fish, and various small mammals. Botanical remains recovered from the site area consisted of *Chenopodium* sp., hickory, butternut, and walnut (Pagoulatos 1988:81). Such diversity in food remains suggests at least minimal use of a wide range of microenvironments for subsistence purposes.

Woodland Period (2,700 to 350 B.P.)

Traditionally, the advent of the Woodland Period in southern New England has been associated with the introduction of pottery; however, as mentioned above, early dates associated with pottery now suggest the presence of Vinette I ceramics appeared toward the end of the preceding Terminal Archaic Period (Ritchie 1969a; McBride 1984). Like the Archaic Period, the Woodland Period has been divided into three subperiods: Early, Middle, and Late Woodland. The various subperiods are discussed below.

<u>Early Woodland Period (ca., 2,700 to 2,000 B.P.)</u>

The Early Woodland Period of the northeastern United States dates from ca., 2,700 to 2,000 B.P., and it is thought to have been characterized by the advent of farming, the initial use of ceramic vessels, and increasingly complex burial ceremonialism (Griffin 1967; Ritchie 1969a and 1969b; Snow 1980). In the Northeast, the earliest ceramics of the Early Woodland Period are thick walled, cord marked on both the interior and exterior, and possess grit temper. Archaeological investigations of Early Woodland sites in southern New England resulted in the recovery of narrow stemmed projectile points in association with ceramic sherds and subsistence remains, including specimens of white-tailed deer, soft and hard-shell clams, and oyster shells (Lavin and Salwen: 1983; McBride 1984:296-297; Pope 1952). McBride (1984) has argued that the combination of the subsistence remains and the recognition of multiple superimposed cultural features at various sites indicates that Early Woodland Period settlement patterns were characterized by multiple re-use of the same sites on a seasonal basis by small co-residential groups.

Middle Woodland Period (2,000 to 1,200 B.P.)

The Middle Woodland Period is marked by an increase in the number of ceramic types and forms utilized (Lizee 1994a), as well as an increase in the amount of exotic lithic raw material used in stone tool manufacture (McBride 1984). The latter suggests that regional exchange networks were established, and that they were used to supply local populations with necessary raw materials (McBride 1984; Snow 1980). The Middle Woodland Period is represented archaeologically by narrow stemmed and Jack's Reef projectile points; increased amounts of exotic raw materials in recovered lithic assemblages, including chert, argillite, jasper, and hornfels; and conoidal ceramic vessels decorated with dentate stamping. Ceramic types that are indicative of the Middle Woodland Period includes Linear Dentate, Rocker Dentate, Windsor Cord Marked, Windsor Brushed, Windsor Plain, and Hollister Stamped (Lizee 1994a:200).

In terms of settlement patterns, the Middle Woodland Period is characterized by the occupation of village sites by large co-residential groups that utilized native plant and animal species for food and raw materials in tool making (George 1997). These sites were the principal place of occupation, and they were positioned close to major river valleys, tidal marshes, estuaries, and the coastline, all of which would have supplied an abundance of plant and animal resources (McBride 1984:309). In addition to villages, numerous temporary and task-specific sites were utilized in the surrounding upland areas, as well as in closer ecozones such as wetlands, estuaries, and floodplains. The use of temporary and task-specific sites to support large village populations indicates that the Middle Woodland Period was characterized by a resource acquisition strategy that can best be termed as logistical collection (McBride 1984:310).

Late Woodland Period (ca., 1,200 to 350 B.P.)

The Late Woodland Period in southern New England dates from ca., 1,200 to 350 B.P., and it is characterized by the earliest evidence for the use of corn in the lower Connecticut River Valley (Bendremer 1993; Bendremer and Dewar 1993; Bendremer et al. 1991; George 1997; McBride 1984); an increase in the frequency of exchange of non-local lithics (Feder 1984; George and Tryon 1996; McBride 1984; Lavin 1984); increased variability in ceramic form, function, surface treatment, and decoration (Lavin 1980, 1986, 1987; Lizee 1994a, 1994b); and a continuation of a trend towards larger, more permanent settlements in riverine, estuarine, and coastal ecozones (Dincauze 1974; McBride 1984; Snow 1980).

Stone tool assemblages associated with Late Woodland occupations, especially village-sized sites, are functionally variable and they reflect plant and animal resource processing and consumption on a large scale. Finished stone tools recovered from Late Woodland sites include Levanna and Madison projectile points; drills; side-, end-, and thumbnail scrapers; mortars and pestles; nutting stones; netsinkers; and celts, adzes, axes, and digging tools. These tools were used in activities ranging from hide preparation to plant processing to the manufacture of canoes, bowls, and utensils, as well as other settlement and subsistence-related items (McBride 1984; Snow 1980). Finally, ceramic assemblages recovered from Late Woodland sites are as variable as the lithic assemblages. Ceramic types identified include Windsor Fabric Impressed, Windsor Brushed, Windsor Cord Marked, Windsor Plain, Clearview Stamped, Sebonac Stamped, Selden Island, Hollister Plain, Hollister Stamped, and Shantok Cove Incised (Lavin 1980, 1988a, 1988b; Lizee 1994a; Pope 1953; Rouse 1947; Salwen and Ottesen 1972; Smith 1947). These types are more stylistically diverse than their predecessors with incision, shell stamping, punctation, single point, linear dentate, rocker dentate stamping, and stamp and drag impressions common (Lizee 1994a:216).

Summary of Connecticut Precontact Period

The precontact period of Connecticut spans from ca., 13,000 to 350 B.P., and it is characterized by numerous changes in tool types, subsistence patterns, and land use strategies. Much of this era is characterized by local Native American groups who practiced a subsistence pattern based on a mixed economy of hunting and gathering plant and animal resources. It is not until the Late Woodland Period that incontrovertible evidence for the use of domesticated species is available. Further, settlement patterns throughout the precontact period shifted from seasonal occupations of small co-residential groups to large aggregations of people in riverine, estuarine, and coastal ecozones. In terms of the region that includes the proposed Project area, a variety of precontact site types may be expected, ranging from seasonal camps utilized by Paleo-Indian and Archaic populations to temporary and task-specific sites of the Woodland era.

CHAPTER IV
POST EUROPEAN CONTACT SETTING OVERVIEW

Introduction

The proposed solar Project is located at Brick Top Lane and 163 North Windham Road in the town of Windham, in Windham County, Connecticut. This chapter presents an overview of Windham County and the town of Windham, as well as data specific to the Project parcel. Incorporated in 1692, Windham originally included the towns of present-day Mansfield and Scotland, as well as portions of Chaplin and Hampton. The town experienced development and change during the nineteenth and twentieth centuries. The current boundaries of Windham were not established until 1857, and the town includes the city of Willimantic, which was consolidated within the town due to the dissolution of the city's government in 1983. Windham remains a town with agricultural areas, a distinct Main Street culture, and is the home of Eastern Connecticut State University, originally constructed as the Willimantic State Normal School in 1889 as a teacher training school.

Windham County

Windham County was established in 1726 by an act of the Connecticut General Court with lands from Hartford and New London Counties. Located in northeastern Connecticut, it is bounded north by the State of Massachusetts, east by the State of Rhode Island, south by New London County, and west by Tolland County. Windham County is 521.5 square miles with a population of 116,418 individuals, and the most populous town is Windham (Connecticut 2021; United States Census Bureau [USCB] 2023a). Often referred to as the Quiet Corner, Windham County is the least populous county in Connecticut. The topography of Windham County includes parallel ridges of hills, aligned primarily north-to-south (Eves 2022). The landscape included terrain that is "rugged and broken" but with numerous streams and falls, thus limiting large scale agriculture except for in the fertile valleys but providing a strong basis for early industrial development on waterways (Bayles 1889:2). Important waterways associated with Windham County include the Quinebaug, Five Mile, Willimantic, Shetucket, and Natchaug River (Bayles 1889).

Woodland Period to the Seventeenth Century

During the Woodland Period of northeastern North American history (ca., 3,000 to 500 years ago), the Indigenous peoples who resided along the shoreline in central Connecticut were part of the greater Algonquian culture of northeastern North America (Lavin 2013). They spoke local variations of Southern New England Algonquian (SNEA) languages and lived in extended kinship groups on lands they maintained for a variety of horticultural and resource extraction purposes (Goddard 1978). Indigenous people in the region practiced subsistence activities including hunting, fowling, and fishing, along with the cultivation of various crops, the most important of which were maize, squash, and beans. They supplemented these foods seasonally by collecting shellfish, fruits, and plants during warmer periods, and gathering nuts, roots, and tubers during colder times. Additionally, these communities came together in large groups to hunt deer in the fall and winter. Indigenous peoples lived with their immediate or extended families in large settlements, often concentrated along rivers and/or wetlands. Some villages were fortified by wooden palisades. Their habitation, known as a *weetu* or *wigwam,* was usually constructed of a tree-sapling frame and covered in reed matting during warm months and tree bark throughout the winter. These varied in size from a small, individual dwelling, to an expansive "long house," which could accommodate several families. Native communities commonly traded among their immediate neighbors and often maintained long-distance networks (Lavin 2013).

Seventeenth Century through Eighteenth Century

As Indigenous communities maintained oral tradition rather than a written record, most surviving information of the Indigenous people of present-day Connecticut was recorded by European observers who were Dutch or English colonists (Lavin 2013). Prior to the arrival of Europeans, present-day Windham was located on the boundary of the Mohegans to the south and the Nipmucks to the north (Eves 2022). Within Windham itself, three distinct communities were documented, the Willimantic, the Nawbesetuck, and the Mamaquaug, but these communities were not occupied during European settlement of the area in 1670 (Spiess 1934). Native communities in Windham were closely connected with other Native groups through kinship, culture, language, and trade (De Forest 1852; Lavin 2013; Trumbull 1886).

The earliest Europeans known to have sailed along Long Island Sound and the Connecticut River were the Dutch around 1614 (Love 1903). The Dutch developed trade relationships with local Native communities. By the early 1620s, Dutch traders entered into an agreement with the Pequot of present-day southeastern Connecticut in which the Pequot supplied wampum (polished shells) and furs in return for European goods. In 1624, the Dutch West India Company formally established New Netherland Colony centered around Manhattan and the Hudson River with its eastern bounds extending as far as Cape Cod, including much of present-day Connecticut (Jacobs 2009). Through their relationship with the Dutch, the Pequot accessed a variety of trade goods they distributed to tributaries and traded with other groups in the region. The Pequot extended their dominance over the region, bringing all the Native nations in the area into a tributary relationship under their leadership (Hauptman & Wherry 2009; McBride 2013).

In 1633, the Pequot allowed the Dutch to build a fortified trading post, the *Huys de Hoop,* on the Connecticut River at the site of present-day Hartford to further cement both parties' domination over the flow of wampum, fur, and trade goods. To break from the Pequot, several Connecticut River sachems invited the English to the valley who then settled Windsor (1633), Wethersfield (1634), and Hartford (1635), as well as Saybrook Colony (1635) at the mouth of the river (Trumbull 1886; Van Dusen 1961). Increased European interaction resulted in exposure to diseases and epidemics Indigenous people had never encountered and to which they had no natural immunity. Illnesses such as smallpox, measles, tuberculosis, and cholera devastated Native communities. In 1633, one epidemic spread from Plimoth Colony to Connecticut, impacting the Pequot and the people of the Connecticut River Valley in 1634 (Trumbull 1886). Tensions between Native and European groups in the region resulted in the death of several English traders in 1634 and 1636, which were blamed on the Pequot. In retaliation, English forces from Massachusetts Bay destroyed Pequot and Niantic villages on the Pequot (Thames) River in August of 1636, which began the Pequot War. The Pequot laid siege to Saybrook Fort at the mouth of the Connecticut River during the winter of 1636-1637 and attacked Wethersfield in April of 1637. The Connecticut Colony declared war on the Pequot and were joined by Native warriors from the Connecticut River and Mohegans under the Sachem Uncas (Oberg 2006). In May of 1637, English allied forces destroyed the fortified Pequot village at Mistick and in July they pursued refugees west. The Pequot were defeated in present-day Fairfield and the war soon came to an end (Cave 1996). Afterwards, the English considered Pequot territory, including land in the Connecticut River Valley, to be conquered lands and they were claimed by Connecticut Colony (Trumbull 1886).

In January of 1639, the Connecticut River towns adopted the "fundamental orders" which outlined the framework for Connecticut Colony, a self-governed colony separate from Massachusetts Bay or Plimoth (Trumbull 1886). In the aftermath of the Pequot War, the Sachem Uncas claimed much of northeastern Connecticut colony, the lands of former Pequot tributaries, as Mohegan lands through both right of conquest and hereditary claims (Larned 1874; Oberg 2006). This included Wabbaquasset and Quinebaug lands and Uncas' sons were sent to live in the respective communities. The Mohegan pushed back

against proselytizing efforts of the Reverend John Eliot who established English-styled "Praying Towns" in Wabbaquasset country in the 1670s (Larned 1874; Oberg 2006). During the upheaval of King Philip's War (1675-1676) much of present-day Windham County was depopulated of Native communities. The Narragansett settlements at Egonk Hill were removed during the war and the Nipmuc peoples at Wabbaquasset either fell in with the Mohegan or sided with the greater Nipmuc nation that fought alongside Metacom's Native coalition against the English (Bowen 1926; Oberg 2006). Connecticut Colony recognized the Mohegan Sachem Uncas's claims to the Wabbaquassett territory, and when Uncas died his lands were divided between his two sons, Attawanhood (Joshua) and Owaneco. Joshua received the land between the Willimantic and Appaquage Rivers, and when he died in 1676 the land was bequeathed to Captain John Mason. By 1692, the Connecticut General Court chartered the town of Windham, which was incorporated into Hartford County in 1694. Due to the large geographic size of Windham, initial proposals to subdivide it into further towns began as early as 1703 with the township of Mansfield (Bayles 1889).

During the American Revolution (1775-1783), the state of Connecticut played an important role in the process of recruiting soldiers, supplying food stores, and providing a variety of military goods for the war effort. Throughout the war, Connecticut was a leader in sourcing provisions for American forces, due to a rationing system set up by individual towns, including in Windham, which contributed 159 men in service (Van Dusen 1961; Bayles 1889). Additionally, General Rochambeau's troops marched through Windham in 1781 on their way to rendezvous with General Washington in Virginia; Rochambeau's engineers documented this march on a map of Windham (Eves 2022). Following the war, on January 9, 1788, Connecticut ratified the U.S. Constitution to become the fifth state (Van Dusen 1961).

Nineteenth Century through the Twenty-First Century

Windham's industrial legacy began in the early 1700s with the availability of waterpower on the Natchaug and Willimantic Rivers for gristmills, sawmills, and carding mills. This continued through the nineteenth century when the first Fourdrinier paper-making machine in the U.S. was erected in a North Windham paper mill in 1827. Although that firm went bankrupt in 1837, the site was purchased by Charles Smith and re-established as the paper-making firm Smith, Winchester, and Company (Roth 1981). Transportation modernized and changed in Windham as well. In 1847 the New London, Willimantic, and Springfield Railroad was chartered and later merged with the New London, Willimantic, and Springfield Railroad, after the commencement of the Norwich and Worcester Railroad in 1840. Increased connectivity between the whaling city of New London, with its access to other markets, as well as the growing industrial output of Windham and Willimantic helped spur further growth and infrastructure (Turner and Jacobus 1989).

As industry continued to develop in Windham, cloth and linen production increased. The Willimantic Linen Company was founded in 1854. During the Civil War, Willimantic Linen Company was one of the largest mills in America and was incredibly prosperous given the wartime demand for thread, coupled with tariff on foreign thread at that time (Niven 1965). By 1864, increasing demand led to the construction of a second mill (Roth 1981). Like many Connecticut towns, Windham provided men and resources during the conflict. From Windham, 318 men served in the Union army (Hines 2002). Following the Civil War, the New Haven, Middletown, and Willimantic Railroad was proposed to further connect eastern Connecticut markets with Boston. Construction to Willimantic was completed in 1873, but due to complications in construction and debt the railroad filed for bankruptcy in 1875 (Turner and Jacobus 1989).

By the beginning of the twentieth century, immigration had changed the demographics of Windham, and particularly Willimantic, where 31.5% of the population was foreign-born in 1910 (Eastern Connecticut State University 2023). Windham, and Willimantic in particular, were bustling areas of industrial development, relying on newly arrived labor forces from Ireland, French Canada, and Scandinavia (Connecticut 2023a). Industrial mills established sports teams and organizations that connected workers in town with one another, and recreational spaces such as Windham Company's Park (later Memorial Park) and the American Thread Company's park (later Rec Park) were established as areas for leisure (Connecticut 2023a). At the beginning of the twentieth century, Windham contributed personnel and resources during the First World War. Over 600 men and women served in the Allied forces, including in auxiliary roles and as ambulance drivers (Lincoln 1920). Despite these changes and challenges associated with modernization in the early twentieth century, manufacturing in Windham progressed and the town continued to grow. As of 1920, Windham had 13,801 residents and in addition to agriculture, the town's principal industries included the production of spool cotton, velvet goods, silk twists, silk and cotton fabrics, and agriculture (Connecticut 1920, 2022c; Table 1). By mid-century, the suburbanization trend began to take hold in the state, which was bolstered by the modifications and improvements to highways such as Route 6, which passes through Windham (Oglesby 2012). Due to the growing cost to operate both a town, Windham, and the city of Willimantic within the town, discussions began in 1950 to officially consolidate the two into the town of Windham. Work began in earnest in 1981, beginning a 13 month process to determine the form of government, establish the cost of consolidation, and prepare for a vote on the issues. Ultimately, the measure passed by a margin of 309 votes (Hamilton 1983).

At the beginning of the twenty-first century, Windham had pivoted away from components of its industrial and agricultural past. As of 2021, most jobs in Windham were in health care, social assistance, and retail trade, and key employers included Eastern Connecticut State University and Hartford Healthcare/Windham Hospital (AdvanceCT and CTData Collaborative 2021). Principal industries include the manufacture of fiber optic cable and industrial abrasives (Connecticut 2021). Windham also remains an agricultural town as roughly 14 percent of the land in town is used for agricultural purposes (Windham 2017). The town of Windham aims to protect the rural character of areas away from the town center, while retaining and attracting businesses in downtown area and Willimantic into the future (Windham 2017).

Table 1. Population of Windham, Connecticut, 1890 through 202 (2023c-e; USCB 203

Town	1890	1900	1910	1920	1930	1940	1950
Town of Windham, Windham County, Connecticut	10,032	10,137	12,604	13,801	13,773	13,824	15,884
	1960	1970	1980	1990	2000	2010	2020
	16,973	19,626	21,062	22,039	22,857	25,268	24,425

History of the Project Area

The proposed solar Project is located at Brick Top Lane and 163 North Windham Road in Windham. Woodford's 1856 map shows that the proposed Project area in Windsor is located north of a town center with more densely populated residences and a school (Figure 3). The Project parcel is west of a hilly area and present-day North Windham Road and includes the Potash Brook. The property of J.W. Robbins, a farmer, was located within the Project area (Figure 3; USCB 1850). Gray's map of Windham

from 1869 no longer depicts the property of J.W. Robbins, but places that of S.K. Bates within the boundaries of the proposed Project area, likely Solomon Bates, a farmer (Figure 4; USCB 1870).

During the twentieth and early twenty-first centuries, the surrounding environs of the proposed project area slowly transformed from agricultural land to more residential areas. Aerial photography from 1934 shows that the site of the proposed solar Project included agricultural land, both cleared and forested (Figure 5). Bisecting the Project parcel, from north to south is the Potash Brook, which largely divides the cleared land from that which is forested. By 1951, the aerial photography shows that the Project parcel has not undergone any changes; however, the area adjacent to the northeast corner of the Project area saw the construction of new homes and agricultural buildings (Figure 6). Continued residential growth is evident in 1970. Additionally, some of the wooded portions of the western side of the Project parcel were cleared of wooded land and replaced with open space (Figure 7). By 1991 an increasing number of single-family homes is evident south and west of the proposed solar facility, and new homes were constructed adjacent to the northwest corner of the Project parcel by 2004 (Figure 8; Figure 9). The aerial photograph from 2019 shows the continuation of the trend of residential development near the Project area (Figure 10).

Currently, 163 North Windham Road is the site of Raspberry Knoll Farm, LLC, a 65-acre farm operated by Mary and Pete Concklin (Raspberry Knoll Farm 2023). The Concklins purchased the land in August 2009 which includes a five-bedroom, two-bathroom home built in 1850, which has undergone renovations, and two barns (Zillow 2023). The home and barns are not expected to be impacted as part of the Project. Raspberry Knoll Farm opened in 2011 and the land is used to grow diverse crops including flowers, herbs, corn, strawberries, and a variety of raspberries, blackberries, and blueberries (Lentz 2019).

Conclusions

The post-European Contact period investigation indicates that the proposed Project parcel is unlikely to be associated with any significant cultural resources. Based on the past and present use of the land for agriculture, there is the possibility of encountering remains of farmhouses, outbuildings, stonewalls, or other evidence of post-European Contact era farming. Any archaeological deposits associated with the site are not likely to be considered culturally significant.

CHAPTER V
PREVIOUS INVESTIGATIONS

Previously Recorded Archaeological Sites and National/State Register of Historic Places Properties
This chapter presents the results of research regarding previous archaeological investigations completed within the vicinity of the Project in Windham, Connecticut. It provides the comparative data necessary for assessing the results of the Phase IB survey, while also ensuring that the potential impacts to all previously recorded cultural resources located within and adjacent to the Project area are taken into consideration. Specifically, this section reviews previously identified archaeological sites, National/State Register of Historic Places properties, and inventoried historical standing structures situated in the project region (Figure 11 and Figure 12).

A review of data currently on file at the CT-SHPO, as well as the electronic site files maintained by Heritage, did not detect any previously recorded archaeological sites located within 1.6 km (1 mi) of the Project area in Windham, Connecticut. Further, no National/State Register of Historic Places districts/properties were identified within 1.6 km (1 mi) of the Project area. While no archaeological sites have been previously recorded in the Project region to date, this is likely due to the lack of professional archaeological surveys rather than an actual absence of archaeological deposits. Therefore, the identification of precontact eraand post-European Contact period occupation sites in the Project area cannot be ruled out.

CHAPTER VI
METHODS

Introduction

This chapter describes the research design and field methods used to complete the Phase IB cultural survey of the archaeologically sensitive area within the Project area in Windham, Connecticut. In addition, the location and point-of-contact for the facility at which all cultural material, drawings, maps, photographs, and field notes generated during the survey will be curated is provided below.

Research Design

The current Phase IB cultural resources reconnaissance survey was designed to identify all precontact and post-European Contact period cultural resources located within the Sensitivity Areas SA-1 through SA-4 in Windham, Connecticut. Fieldwork for the survey was comprehensive in nature and project planning considered the distribution of previously recorded archaeological sites located near the Project area, as well as an assessment of the natural qualities of the parcel. The methods used to complete this investigation were designed to provide complete and thorough coverage of all portions of the moderate/high sensitivity areas (Sensitivity Areas SA-1, SA-2, and SA-4). This undertaking entailed pedestrian survey, systematic subsurface testing, detailed mapping, and photo-documentation.

Field Methods

Following the completion of all background research, the Sensitivity Areas were subjected to a Phase IB cultural resources reconnaissance survey utilizing pedestrian survey, photo-documentation, GPS recordation, and systematic shovel testing. The field strategy was designed such that the entirety of the sensitivity areas was examined visually and photographed. The pedestrian survey portion of this investigation included visual reconnaissance of all of the Sensitivity Areas. The subsurface examination was completed through the excavation of shovel tests at 15 meter (49 feet) intervals along survey transects positioned 15 meters (49 feet) apart throughout each sensitivity area. Radial test pits were excavated around shovel tests positive for precontact period cultural material at 5 meter (16 foot) intervals in each cardinal direction. Each shovel test measured 50 x 50 centimeters (19.7 x 19.7 inches) in size, and each was excavated until glacially derived C-Horizon or immovable object (e.g., boulders, large tree roots) were encountered. Each shovel test was excavated in 10 centimeter (3.9 inch) arbitrary levels within natural strata, and the fill from each level was screened separately. All shovel test fill was screened through 0.635-centimeter (0.25 in) hardware cloth. Soil characteristics were recorded in the field using Munsell Soil Color Charts and standard soils nomenclature. Each shovel test was backfilled after it was fully documented.

Curation

Following the completion and acceptance of the Final Report of Investigations, all cultural material, drawings, maps, photographs, and field notes will be curated with:

Dr. Sarah Sportman
Office of Connecticut State Archaeology
Box U-1023
University of Connecticut
Storrs, Connecticut 06269

CHAPTER VII
RESULTS OF THE INVESTIGATION & MANAGEMENT RECOMMENDATIONS

Introduction

This chapter presents the results of the Phase IB cultural resources reconnaissance survey of Sensitivity Areas SA-1 through SA-4 and AR-1 associated with the proposed Project at Brick Top Lane and 163 North Windham Road in Windham, Connecticut (Figure 13; Sheet 1 through 3 and Photos 1 through 22). As discussed in Chapters I and IV, the Phase IB fieldwork included pedestrian survey augmented by systematic shovel testing and photo-documentation throughout the limits of each archaeological sensitivity area (Figure 10; Sheet 1 through 3). The results of the Phase IB effort are presented below.

Results of Phase IB Cultural Resources Reconnaissance Survey

As stated earlier, the proposed Project parcel encompasses a total of 67.7 acres of land, including an existing farm known as Raspberry Knoll Farm. The parcel is bounded by residential development and vegetated landscape in all directions. The Project area is situated at elevations ranging from 70 to 81 meters (229 to 265 feet) NGVD. The previously conducted Phase IA Cultural Resources Assessment Survey resulted in the identification of four sensitivity areas (SA-1 through SA-4) encompassing 8.39 acres of land, and one access road measuring 372 meters (1,220 feet) in length. The sensitivity areas are defined by level topography characterized by fallow agricultural fields and wetlands associated with Potash Brook, which bisects the parcel extending north/northwest through the Project area.

During the Phase IB survey, 102 of 108 (95 percent) planned shovel tests, as well as 14 radial test pits, were excavated across Sensitivity Areas, SA-1 though SA-4 and AR-1, as presented below in Table 2. The six planned but unexcavated shovel test pits fell within a planted asparagus crop and were not excavated at the request of the landowner. The Phase IB subsurface testing effort resulted in 16 shovel test pits that yielded cultural material and the recovery of 41 artifacts. A total of four of them consisted of precontact artifacts; the remaining 37 artifacts dated from the post-European contact period. The precontact era materials were recovered from two locations within Sensitivity Area 3, while artifacts related to the Post-European Contact period agricultural site referred to as the Raspberry Knolls Farm Site were ubiquitous across the Project area. The sensitivity areas and the cultural material that resulted from the investigation are discussed below in detail.

Table 2. Overview of Phase IB shovel testing results.

Area	Acreage/Length	# of Planned STPs	# of Excavated STPs	# Of Positive STPs	Recommendations
SA-1	0.02	2	2	0	No Further Investigation
SA-2	4.38	45	45	5	No Further Investigation
SA-3	3.97	40	54	5	No Further Investigation
SA-4	0.297	4	4	3	No Further Investigation
AR-1	372 m	17	11	3	No Further Investigation

Sensitivity Area SA-1

The Sensitivity Area SA-1 is located on the southwest end of the Project parcel and it is situated 65 meters (213 feet) west of Potash Brook and 29 meters (95 feet) south of Sensitivity Area SA-2. SA-1 encompasses 0.02 acre and was investigated through the excavation of two shovel tests along one transect (Figure 13; Sheet 1 and Table 3). The area was characterized by level to gently sloping

topography and wetlands (Photo 1). The shovel tests excavated in this area exhibited three hydric soil horizons in profile and were excavated to 56 to 60 centimeters below surface (cmbs) (22-23 inches below surface (inbs)), terminating at the water table. The Ap Horizon (plowzone) extended from the surface to approximately 23 cmbs (0 to 9 inbs) and was characterized by a very dark greyish brown (10YR 3/2) sandy loam. The underlying B horizon was defined as a layer of dark yellowish brown (10YR 4/6) medium grained sand that reached from 25 to 46 cmbs (9 to 18 inbs). Finally, the glacially derived C Horizon consisted of a layer of yellow (10YR 7/8) coarse sand which extended from 46 to 60 cmbs (18 to 23 inbs) where the presence of the water table resulted in termination of the shovel test (Figure 14). No cultural material was recovered from the subsurface testing effort of Sensitivity Area SA-1. Therefore, no additional archeological investigation of the area is recommended prior to Project development.

Sensitivity Area SA-2

The Sensitivity Area SA-2 is located on the southwest side of the Project parcel and approximately 40 to 72 meters (131 to 236 feet) to the west of Potash Brook. It encompasses 4.38 acres of land characterized by agricultural fields with level topography (Figure 13; Sheet 1 and Photos 2 through 4). The pedestrian survey of this area resulted in the identification of an irrigation ditch that bisects the sensitivity area from east to west. The ditch, which was designated as Feature 1, measures approximately 123 meters (403 feet) in length by 2 meters (6 feet) wide. The berms of the ditch were approximately 0.9 meters (3 feet) in height; the depth of the ditch is unknown due to it being filled with water. The ditch is visibly present as early as the 1934 aerial (Figure 5) suggesting its continual use for at least 89 years. The southern berm of the ditch, which extended east towards the Brook, can be seen in the right frame of Photo 2; shovel tests were not placed on or within the irrigation ditch. The ditch is considered to be associated with the Raspberry Knoll Site, discussed in detail below.

Sensitivity Area SA-2 was investigated through the excavation of 45 of 45 (100 percent) of planned shovel tests, across 10 transects (Figure 13; Sheet 1 and Table 3). The subsurface testing of Sensitivity Area SA-2 led to the identification of two dominant depositional soil contexts. The first, which was present in the southern half of the area, exhibited up to five soil horizons in profile and extended from a range of 36 to 70 cmbs (14 to 27 inbs) as a result of the varying depths of the water table. The Ao Horizon extended from 0 to 7 cmbs (0 to 2 inbs) and was described as a layer of very dark brown (10YR 2/2) silty medium grain sand. The Ap Horizon (plowzone) ranged from 7 to 30 cmbs (2 to 11 inbs) and consisted of a deposit of dark yellowish brown (10YR 4/6) medium grain sand. The underlying B Horizon was characterized as a layer of dark yellowish brown medium grain sand that extended from 30 to 48 cmbs (11 to 18 inbs). There were two C horizons identified; the C1 Horizon, which ranged in depth from 48 to 62 cmbs (18 to 24 inbs) was defined as a layer of olive yellow (2.5Y 5/6) mottled with a pale yellow (2.5Y 7/3) coarse compact sand. Finally, the C2 Horizon was described as a deposit of light gray (2.5Y 7/1) coarse compact sand which extended from 62 to 70 cmbs (24 to 27 inbs) as seen in Figure 15.

The second typical soil context identified was characteristic of the northern half of Sensitivity Area SA-2. A total of five soil horizons were exhibited in profile and the shovel tests ranged from 70 to 100 cmbs (27 to 39 inbs). The Ao extended from 0 to 5 cmbs (0 to 2 inbs). The Ap horizon (plowzone) was characterized by a layer of dark brown (10YR 3/3) fine sandy loam and extended from 5 to 24 cmbs (2 to 9 inbs). The underlaying B1 was defined as a layer of dark yellowish brown (10YR 4/6) loamy fine sand that ranged from 24 to 66 cmbs (9 to 25 inbs) in depth. The subsequent B2 Horizon extended from 66 to 89 cmbs (25 to 35 inbs) and consisted of brownish yellow (10YR 6/6) loamy fine sand. Finally, the glacially derived C Horizon was characterized by 2.5Y light yellowish brown (2.5Y 6/3) compact fine sand which extended from 89 to 100 cmbs (35 to 39 inbs) as seen in Figure 16.

Of the 45 shovel tests excavated throughout Sensitivity Areas SA-2, five were positive for Post-European Contact period cultural material. These shovel tests yielded nine artifacts (Figure 13; Sheet 1 and Table 4). The artifacts recovered from this area included colorless glass, redware, whiteware, and coal. While the artifacts recovered are part of the Raspberry Knolls Site, which is discussed in detail below, due to their lack of density and diagnostic nature they are considered ineligible for listing on the National Register of Historic Places applying the criteria for evaluation (36 CFR 60.4 [a-d]). Therefore, no additional investigation of the Sensitivity Area 2 is recommended prior to Project development.

Sensitivity Areas SA-3

The Sensitivity Area, SA-3, is located at the north end of the Project parcel and approximately 127 meters (416 feet) to the west of North Windham Road and 30 to 70 meters (98 to 229 feet) to the east of Potash Brook. The area encompasses 3.97 acres and is characterized by level to gently sloping topography with vegetation indicative of wetlands and a high-water table (Figure 13; Sheet 2 and Photos 5 through 10). Subsurface testing of the area was completed through the excavation of 40 of 40 (100 percent) planned shovel tests along six transects. An additional 14 delineation test pits were excavated within the area, resulting in a total of 54 excavated shovel tests.

A typical shovel test excavated within this area exhibited three soil horizons in profile and extended from 34 to 90 cmbs (11 to 35 inbs), terminating at the water table. The Ap Horizon (plowzone) was characterized as deposit of black (10YR 2/1) silty fine sand that extended to 20 cmbs (8 inbs). The underlying B Horizon extended from 20 to 35 cmbs (8 to 13 inbs) and was defined as a layer of yellowish brown (10YR 6/8) silty medium sand. Finally, the C Horizon was classified as a layer of olive yellow (2.5Y 6/6) coarse sand that extended from 35 cmbs (13 inbs) to the end of test pit or water table.

Of the 40 planned shovel tests excavated throughout Sensitivity Area, SA-3, three, which were located along transect three, yielded cultural material. Of the three shovel tests, T3, STP-1 yielded precontact era artifacts, T3, STP-4 contained post-European Contact period artifacts, and T3, STP-7 produced both precontact era and post-European Contact period artifacts. The STPs that contained precontact material (T3,STP-1 and T3,STP-7) were delineated to further explore the contextualization of the artifacts. This resulted in two additional positive shovel tests, Delineation Test STP-1; D3 and STP-7;D4. A total of four precontact artifacts were recovered from these shove test pits. The recovered cultural material included 3 quartz flakes and 1 chalcedony projectile point, (Table 3 and Photos 9 and 10). The recovered projectile point had a missing base and therefore was not temporally diagnostic. However, further analysis of the asymmetry and use wear indicates that the point was likely used as a knife based on the type and amount of hafting damage on the well-defined shoulder; thus, it is likely that the base broke as a result of pressure applied to the tool while utilizing it as a knife. The precontact era cultural material was recovered from the Ap (plowzone) soil horizon, indicating that the location of the artifacts is a result of plowing and soil disturbance and not due to intact cultural deposits. As a result, these artifacts were considered to be out of context and therefore categorized as isolated finds. The precontact material described above was assessed as not significant applying the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]. No further investigation of the precontact era component in this area is recommended prior to Project development.

In addition to the precontact era cultural material recovered during the subsurface testing of SA-3, eight post-European artifacts were recovered from three shovel tests (T3, STP-4; T3, STP-7; and STP-1; D3). These artifacts included coal fragments, as well as an iron hook, bolt, and indeterminate iron fragments (Figure 13; Sheet 2; Table 4). These artifact were considered part of the Raspberry Knoll Site discussed below; however, due to their lack of density and diagnostic nature they are considered ineligible for

listing on the National Register of Historic Places applying the criteria for evaluation (36 CFR 60.4 [a-d]). Therefore, no additional investigation of them or Sensitivity Area 3 is recommended prior to Project development.

Table 3. Precontact cultural material recovered during the Phase IB shovel testing effort.

Area	Soil Horizon	Artifact Class	Artifact Type	Material	Total
SA-3	Ap	Lithic Debitage	Flake	Crystal Quartz	1
				Quartz	1
			Biface Reduction Flake	Quartz	1
		Flaked Tool	Projectile Point	Chalcedony	1
	Total				**4**

Sensitivity Area SA-4

Sensitivity Area SA-4 is a small area located on the southeastern end of the Project parcel; it is situated approximately 91 meters (298 feet) to the east of Potash Brook. The area measures 0.297 acres in size and was investigated through the excavation of four shovel tests placed along two transects (Figure 13; Sheet 3). The shovel tests excavated throughout Sensitivity Area SA-4 exhibited three soil horizons in profile and extended to a depth of 60 to 70 cmbs. The first soil horizon was the Ap Horizon (plowzone), which extended from 0 to 28 cmbs (0 to 11 inbs) and consisted of a layer of very dark grayish brown (10YR 3/2) silty medium sand mixed with cobbles. The underlying B horizon was characterized as a deposit of dark yellowish brown (10YR 4/6) silty medium sand mixed with cobble inclusions; it extended from 28 to 60 cmbs (11 to 23 inbs). Finally, the glacially derived C Horizon was defined as a layer of light yellowish brown (2.5Y 6/4) loamy coarse sand mixed with gravel and cobble inclusions that extended from 60 cmbs to termination of the test pits at 70cmbs (23 to 27 inbs).

A total of four of four (100 percent) planned shovel tests were excavated throughout the Sensitivity Area SA-4. Their excavation resulted in the collection of five post-European Contact period artifacts from three shovel tests. Artifacts recovered from this area included porcelain, coal, glass, and an iron nail (Table 4). While the artifacts recovered are part of the Raspberry Knolls Site, discussed in detail below, their lack of density and diagnostic rendered them ineligible for listing on the National Register of Historic Places applying the criteria for evaluation (36 CFR 60.4 [a-d]). Therefore, no additional investigation of the Sensitivity Area SA-4 is recommended prior to Project development.

Access Road AR-1

Access Road AR-1 extends for 372 meters (1,220 feet) along the eastern side of the Project parcel. The proposed access road runs from the southern side of Sensitivity Area SA-3 in a southeastern direction for approximately 297 meters (974 feet) where it turns to extend in an east/west direction for 81 meters (265 feet); it terminates at North Windham Road (Figure 13; Sheet 2-3 and Photos 11 and 12). The access road was investigated through shovel tests placed at 15 meter (49 foot) intervals along the proposed route. A total of 11 of 17 (65 percent) planned shovel tests were excavated Access Road AR-1. The six unexcavated planned shovel tests fell into the area of a planted asparagus field, and therefore were not excavated in order to avoid disturbing the crop.

A typical shovel test in this area exhibited three soil horizons in profile and extended from 60 to 80 cmbs (23 to 31 inbs). The Ap horizon (plowzone) extended from 0 to 38 cmbs (0 to 14 inbs) and was characterized as a deposit of very dark grey brown (10YR 3/2) silty loam. The underlying B horizon consisted of a layer of dark yellowish brown (10YR 4/6) silty sand and extended from 38 to 67 cmbs (14

to 26 inbs). Finally, the glacially derived C horizon extended from 67 to 80 cmbs (26 to 31 inbs) and was defined as a deposit of light yellow brown (2.5Y 6/4) light yellow brown silty fine sand (Figure 16).

The subsurface testing of Access Road AR-1 resulted in the collection of 15 post-European Contact period artifacts that were recovered from three positive shovel tests. The artifacts were recovered from the Fill, Ap, and B soil horizons and consisted of examples of colorless glass, whiteware, porcelain, and a kaolin pipe stem (Table 4). In addition to the artifacts recovered during the subsurface testing, a refuse dump was located approximately 12 meters (39 feet) to the east of STP-12 (Photo 12). The refuse pile was likely buried and is now eroding to the surface as a result of tree growth/roots pushing the material to the surface. The artifacts observed on the surface included a fragment of a metal bucket, four mason jars, a metal saw blade, and indeterminate metal scraps. Due to the refuse pile being located outside of the proposed area of impact, the artifacts were not collected, and no additional shovel testing was done in the area. While the artifacts recovered and observed in Access Road AR-1 are part of the Raspberry Knolls Site, discussed in detail below, due to their lack of density and diagnostic nature they are considered which is discussed below, they are ineligible for listing on the National Register of Historic Places applying the criteria for evaluation (36 CFR 60.4 [a-d]). Therefore, no additional investigation of the access road is recommended prior to Project development.

Raspberry Knoll Site

The Raspberry Knoll Site, portions of which were found throughout most of the archaeologically sensitive area, is indicative of the agrarian history of the larger Project parcel. The site, which likely encompasses the entire parcel, has been utilized for agricultural land since the nineteenth century according to maps and aerial images (Figure 3 through 10). The artifact assemblage associated with the site is indicative of the continued use of the land. Artifacts recovered from the site included examples of glass, ceramic, coal, and metal objects that have a general date range spanning late nineteenth and twentieth centuries (Table 4). While the artifacts were present across Sensitivity Areas SA-2 though SA-4, as well as Access Road AR-1, they were not recovered in large quantities or concentrations. The artifact assemblage lacked diagnostic materials and is likely indicative of associated agricultural field scatter rather than a specific event.

In addition to the artifact assemblage observed on the site, an irrigation ditch and a barn structure were identified on the Project parcel. As discussed earlier, the ditch bisects Sensitivity Area SA-1. The barn foundation is located to the northeast of Sensitivity Area SA-4 and to the north of Access Road AR-1. The foundation is dried laid stone with plaster on the interior. The barn has undergone several modifications throughout its life. The barn does not appear to be structurally sound and is not currently in use. A structure in the current location was present as early as 1934 (Figure 6), suggesting that the barn remnants likely dates from the early twentieth century. The barn is located outside of the proposed Project area, and therefore should not be affected by the development Project. Further, while the former meets the requirement of being 50 years or older, it was assessed as ineligible for listing on the State or National Register of Historic Places due to the likely lack of historical and/or architectural significance. Thus, no additional architectural investigation of the barn is required prior to Project development.

While the Raspberry Knoll Farm Site is clearly indicative of the agrarian activity that has taken place on the parcel throughout the nineteenth and twentieth centuries, the lack of significant concentrations of artifacts recovered from stratified soils indicated that the site lacks depositional integrity and the qualities of significance applying the National Register of Historic Places criteria for evaluation (36 CFR

60.4 [a-d]). Thus, no further archaeological investigation of the site is recommended prior to Project development.

Table 4. Post-European Contact cultural material recovered during Phase IB shovel testing effort.

Site	Area	Soil Horizon	Artifact Class	Artifact Type	Total
The Raspberry Knoll Site	SA-2	Ap	Ceramic	Redware	3
			Glass	Colorless	2
			Mineral	Coal	3
		Total			**8**
		B	Ceramic	Whiteware	1
		Total			**1**
	Total				**9**
	SA-3	Ap	Iron	bolt	1
				hook	1
				Indeterminate	3
			Mineral	Coal	3
		Total			**8**
	Total				**8**
	SA-4	Ap	Ceramic	Porcelain	1
			Iron	Nail	1
			Glass	Dark Green	1
			Mineral	Coal	2
		Total			**5**
	Total				**5**
	AR-1	Fill	Glass	Colorless	5
		Total			**5**
		Buried A	Ceramic	Porcelain	2
			Glass	Colorless	4
		Total			**6**
		Ap	Ceramic	Whiteware	1
				Kaolin pipe	3
		Total			**4**
	Total				**15**
Total					**37**

Summary and Management Recommendations

The Phase IB cultural resources reconnaissance survey resulted in the excavation of 102 of 108 (94 percent) of planned shovel tests, as well as 14 delineation shovel tests, across Sensitivity Areas SA-1 through SA-4, as well as along Access Road AR-1. As a result, 41 artifacts were collected from 16 positive shovel tests, resulting in the identification of two isolated precontact era find spots and a single post-European Contact agricultural site (the Raspberry Knolls Site). These resources have been assessed as ineligible for listing on the National Register of Historic Places applying the criteria for evaluation (36 CFR 60.4 [a-d]). Therefore, no further archaeological investigation of the Project area is recommended prior to Project development.

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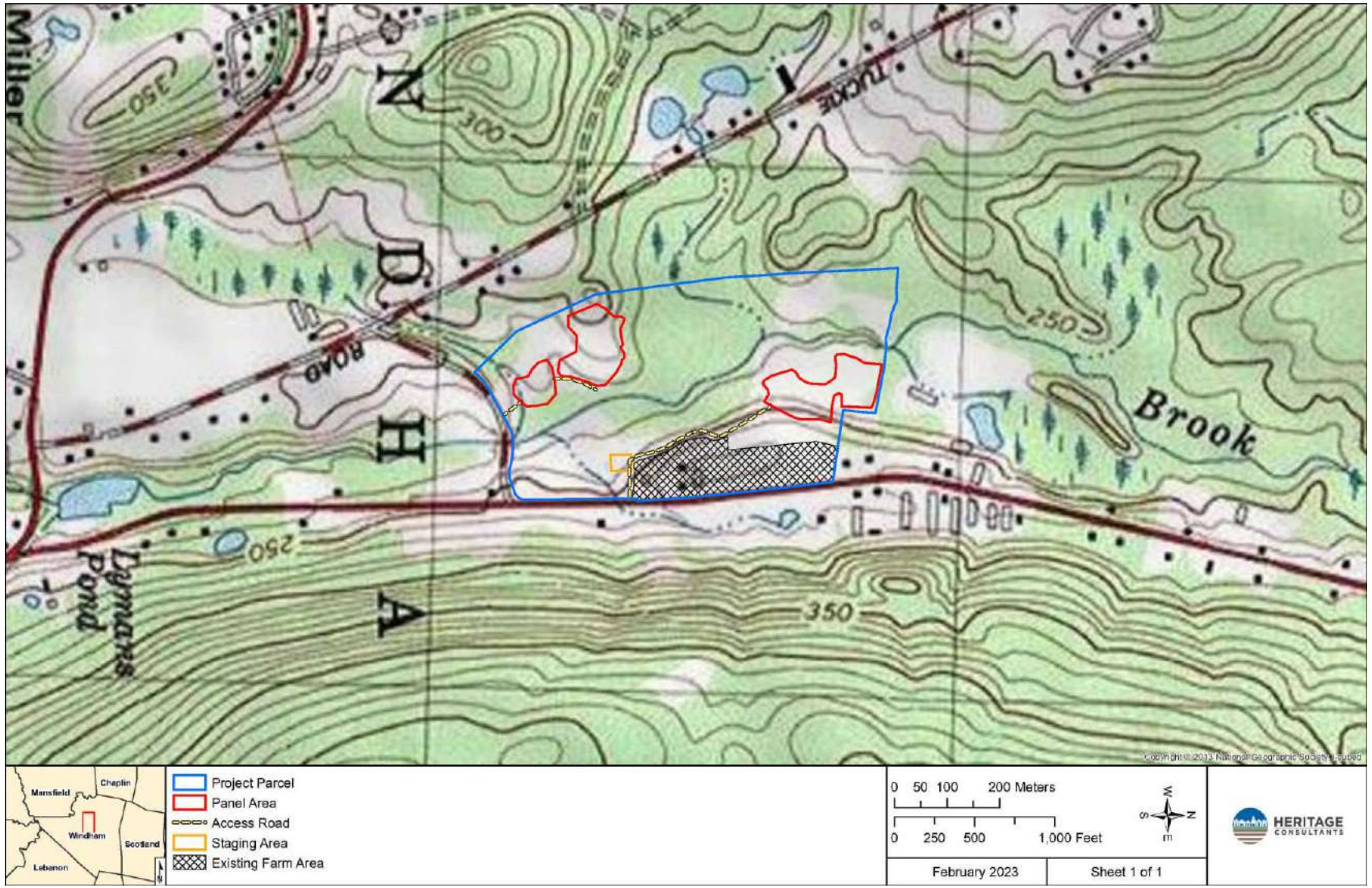

Figure 1. Excerpt from a USGS 7.5' series topographic quadrangle image showing the location of the project parcel in Windham, Connecticut.

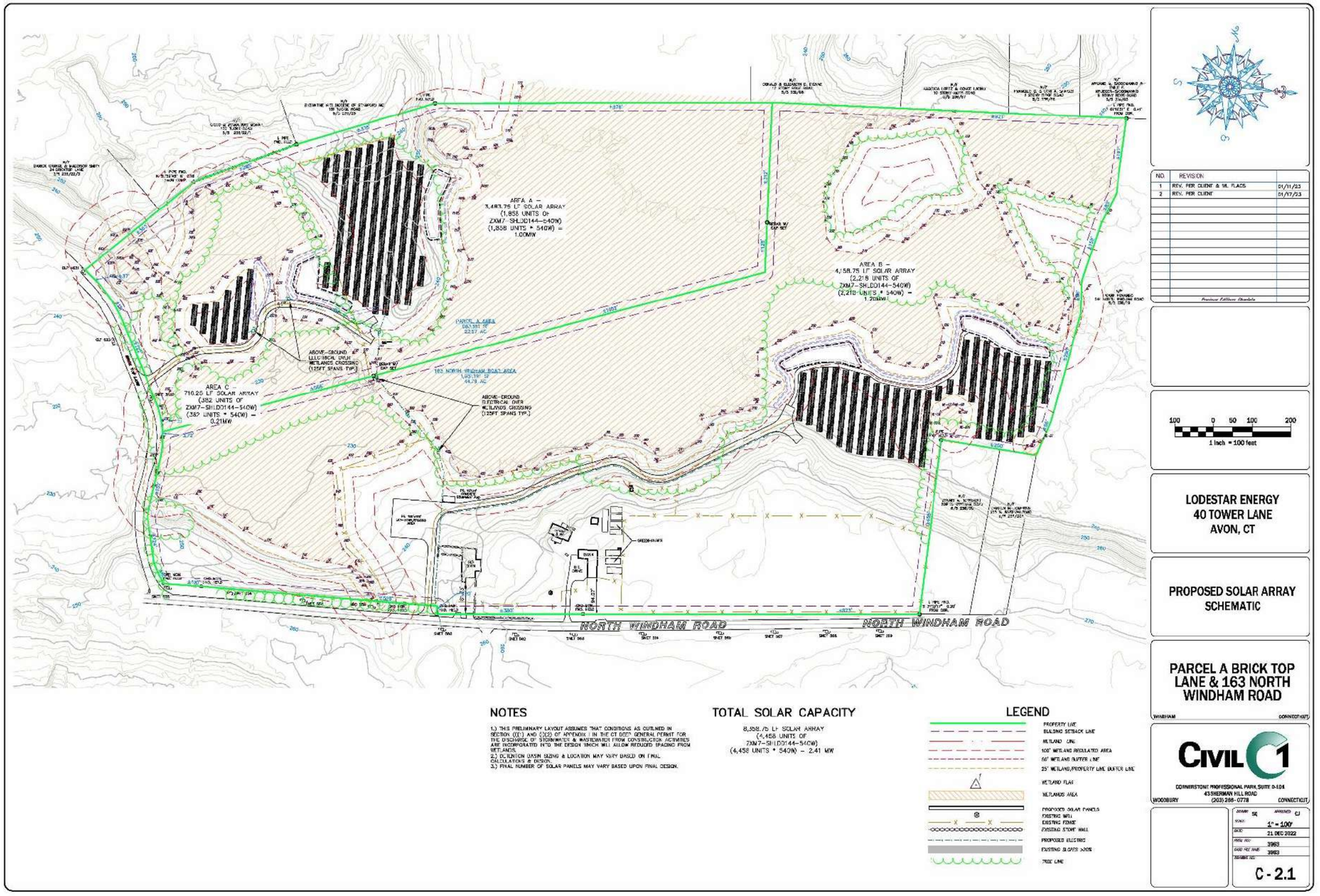

Figure 2. Project Plans provided by All-Points Technology Corporation.

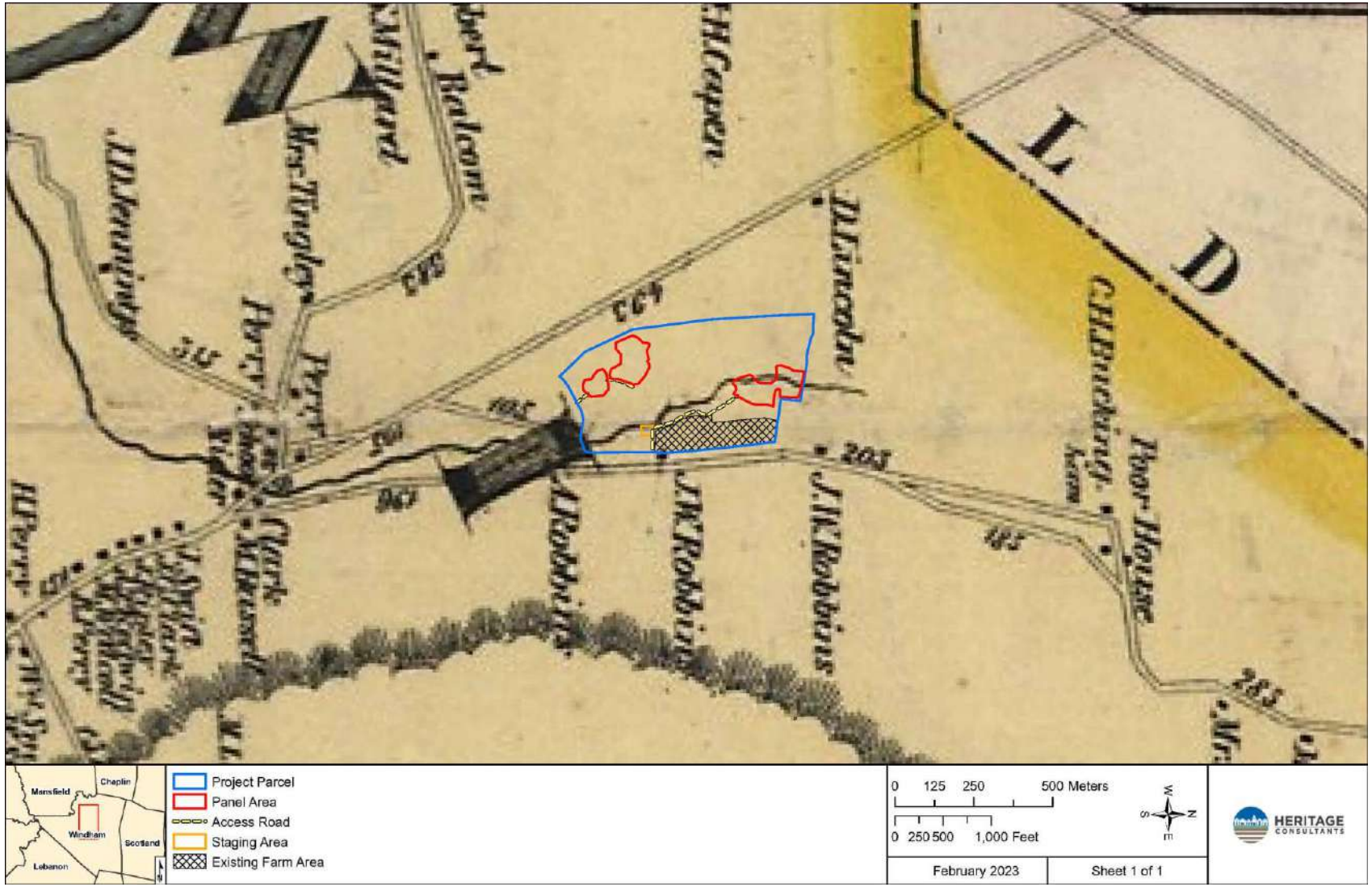

Figure 3. Excerpt from an 1856 historical map showing the location of the project parcel in Windham, Connecticut.

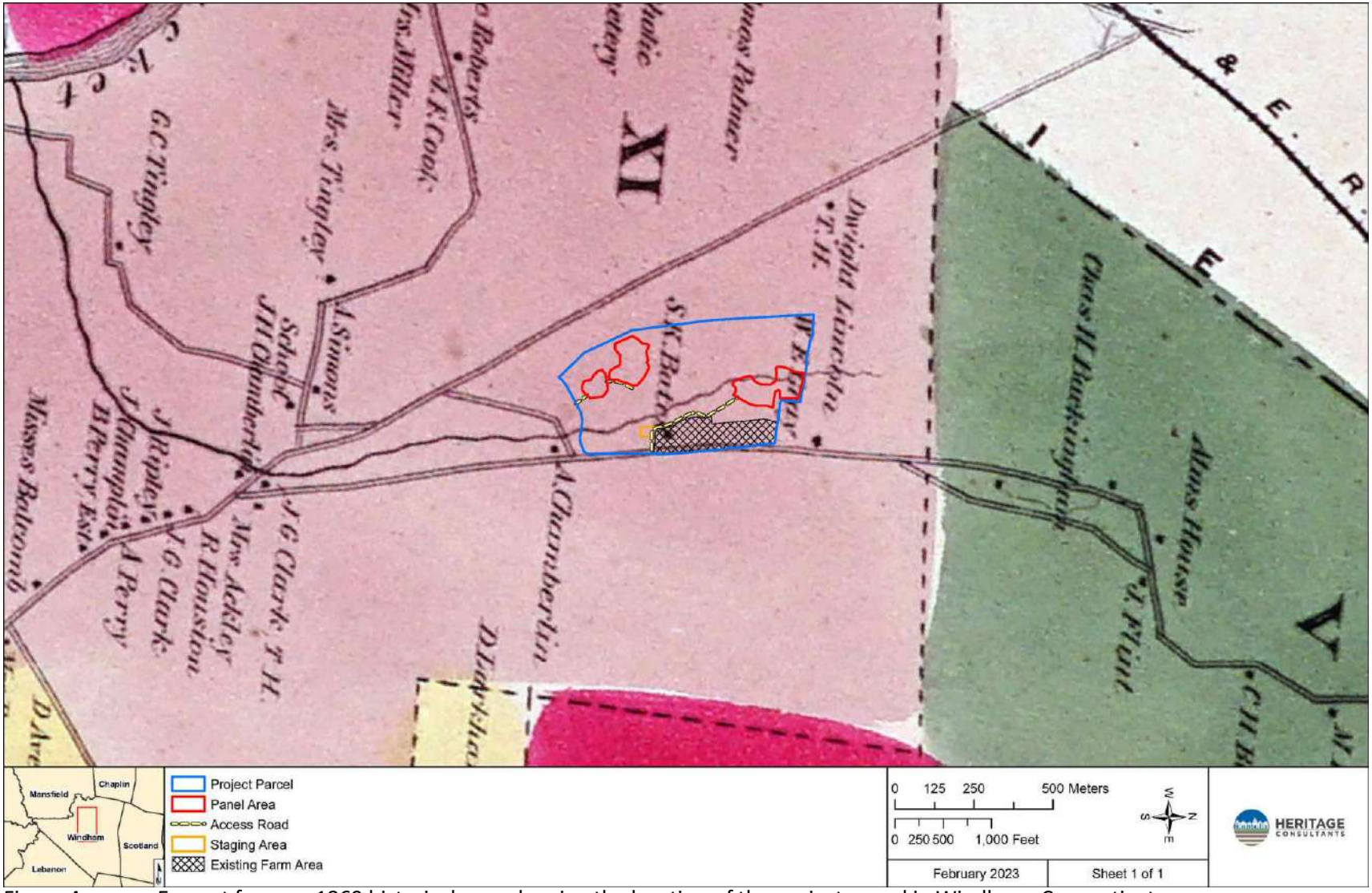

Figure 4. Excerpt from an 1869 historical map showing the location of the project parcel in Windham, Connecticut.

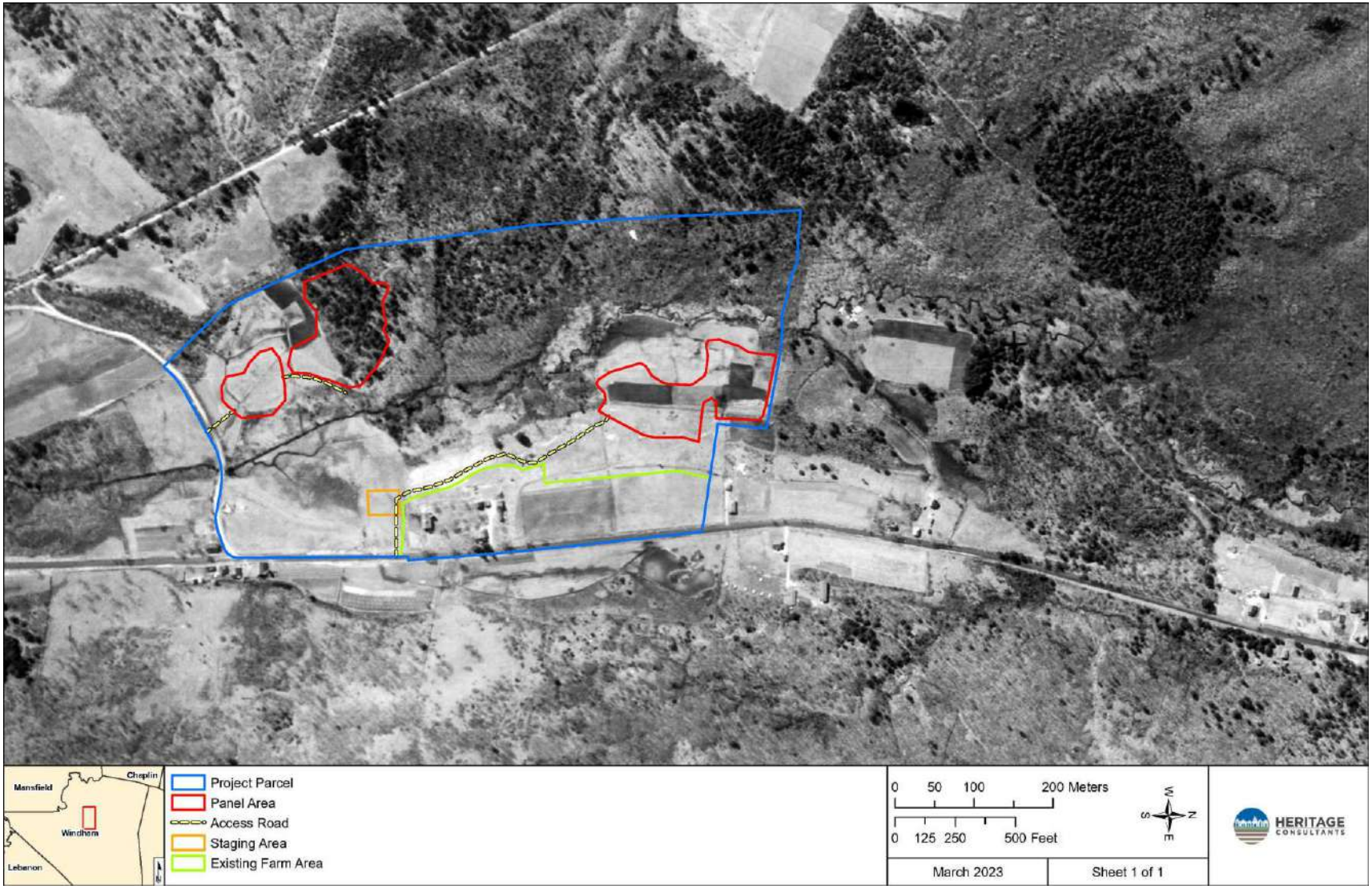

Figure 5. Excerpt from a 1934 aerial photograph showing the location of the project parcel in Windham, Connecticut.

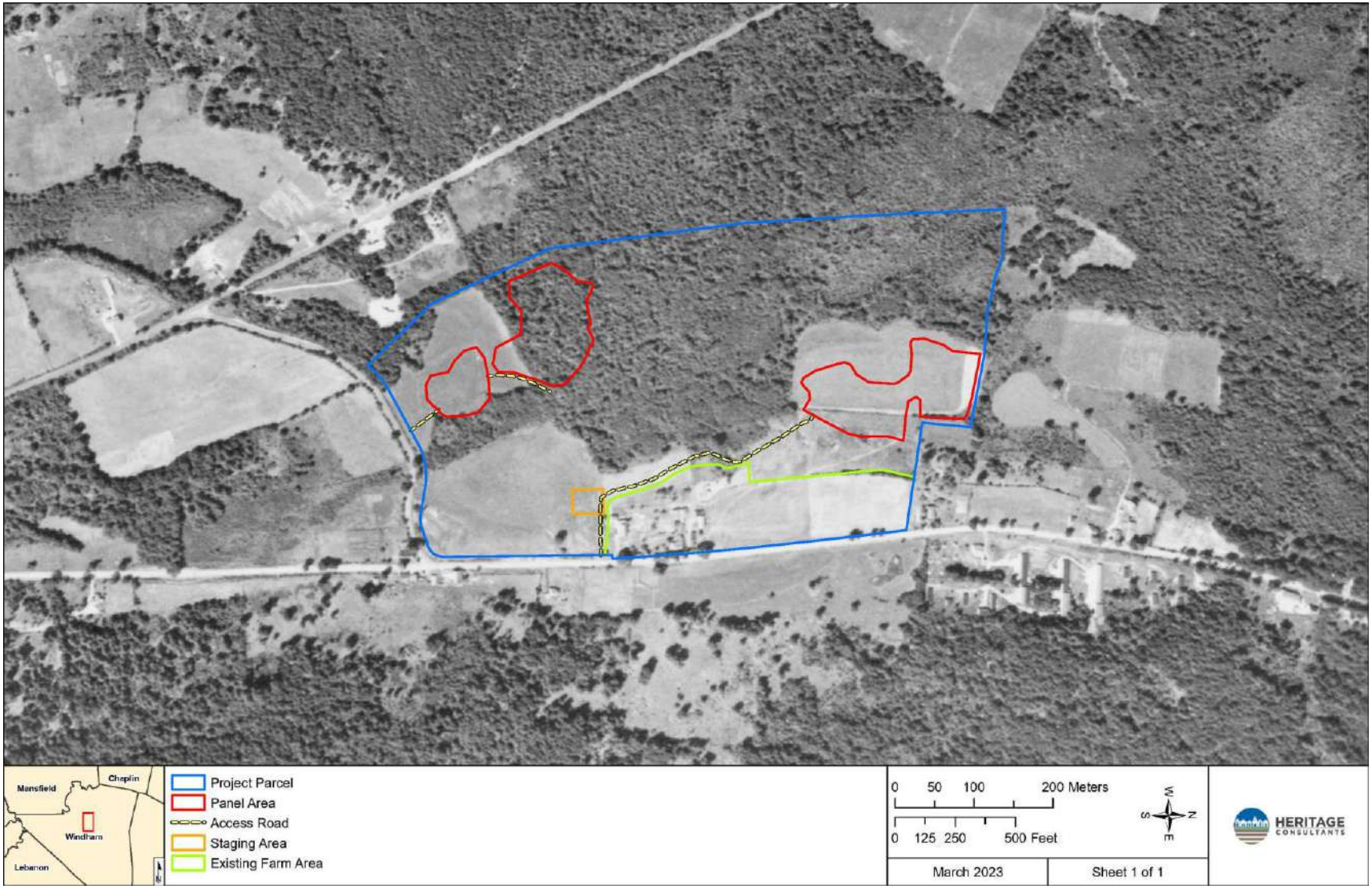

Figure 6. Excerpt from a 1951 aerial photography showing the location of the project parcel in Windham, Connecticut.

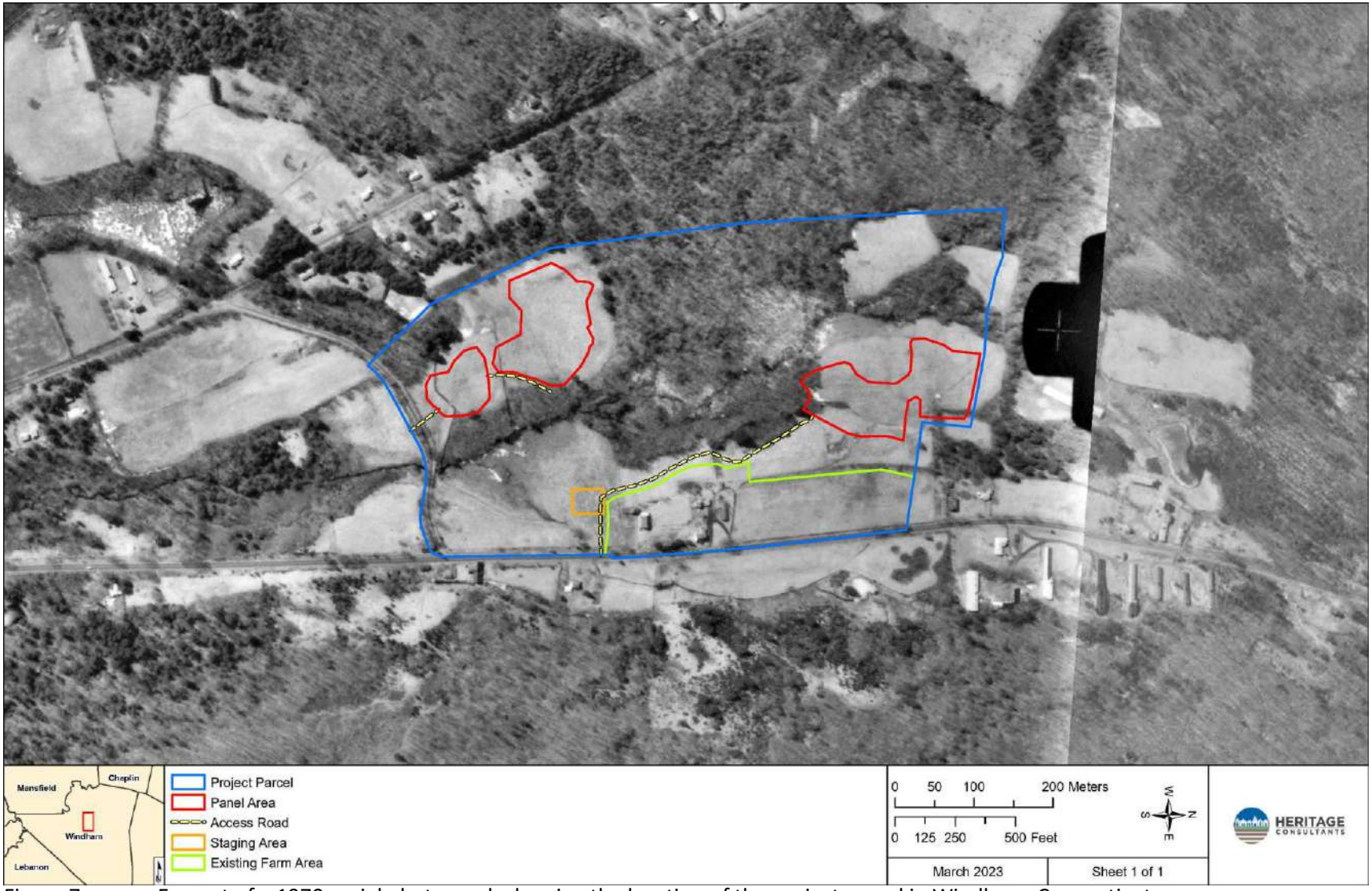

Figure 7. Excerpt of a 1970 aerial photograph showing the location of the project parcel in Windham, Connecticut.

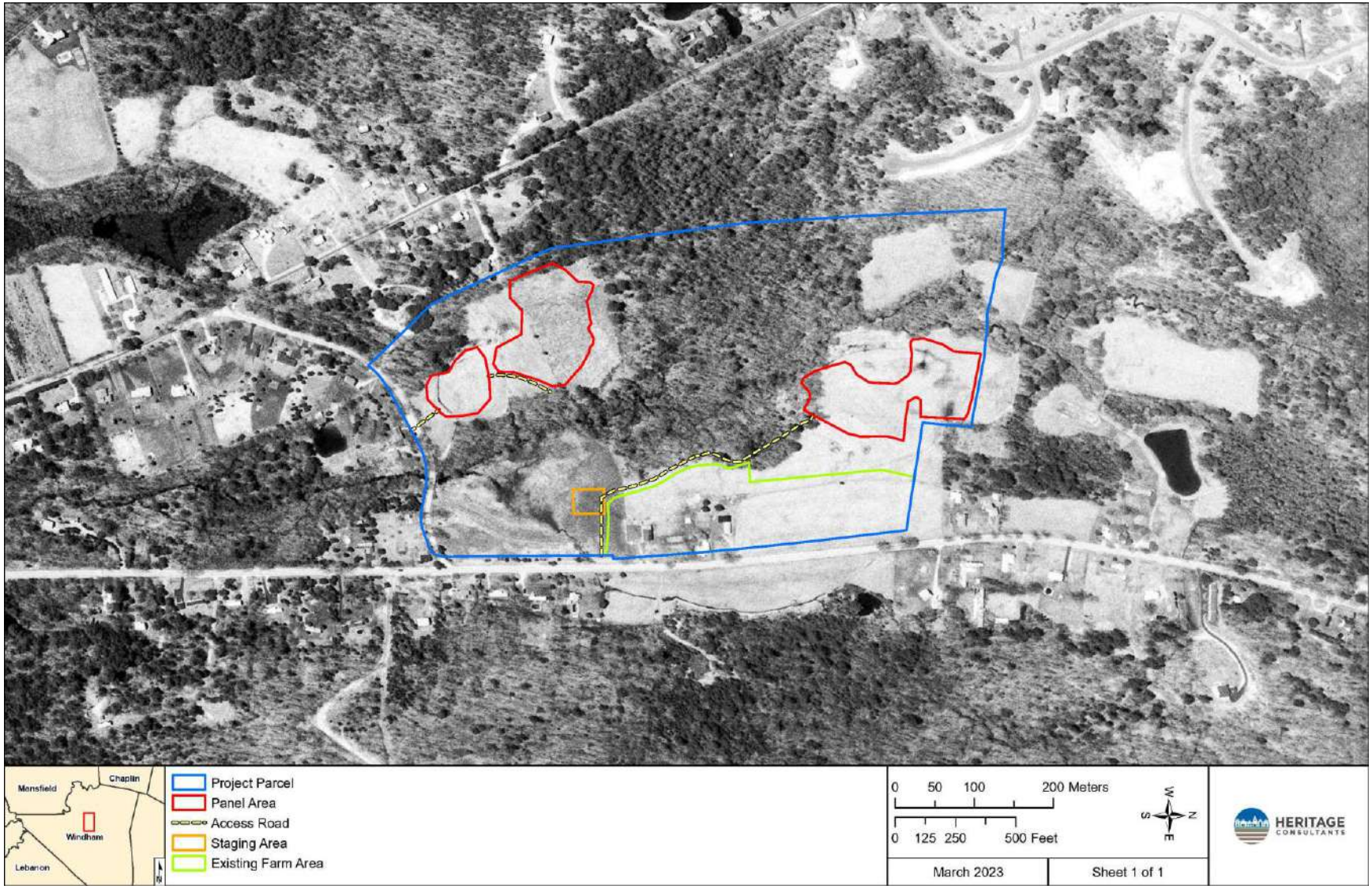

Figure 8. Excerpt of a 1991 aerial photograph showing the location of the project parcel in Windham, Connecticut.

Figure 9. Excerpt of a 2004 aerial photograph showing the location of the project parcel in Windham, Connecticut.

Figure 10. Excerpt of a 2019 aerial photograph showing the location of the project parcel in Windham, Connecticut.

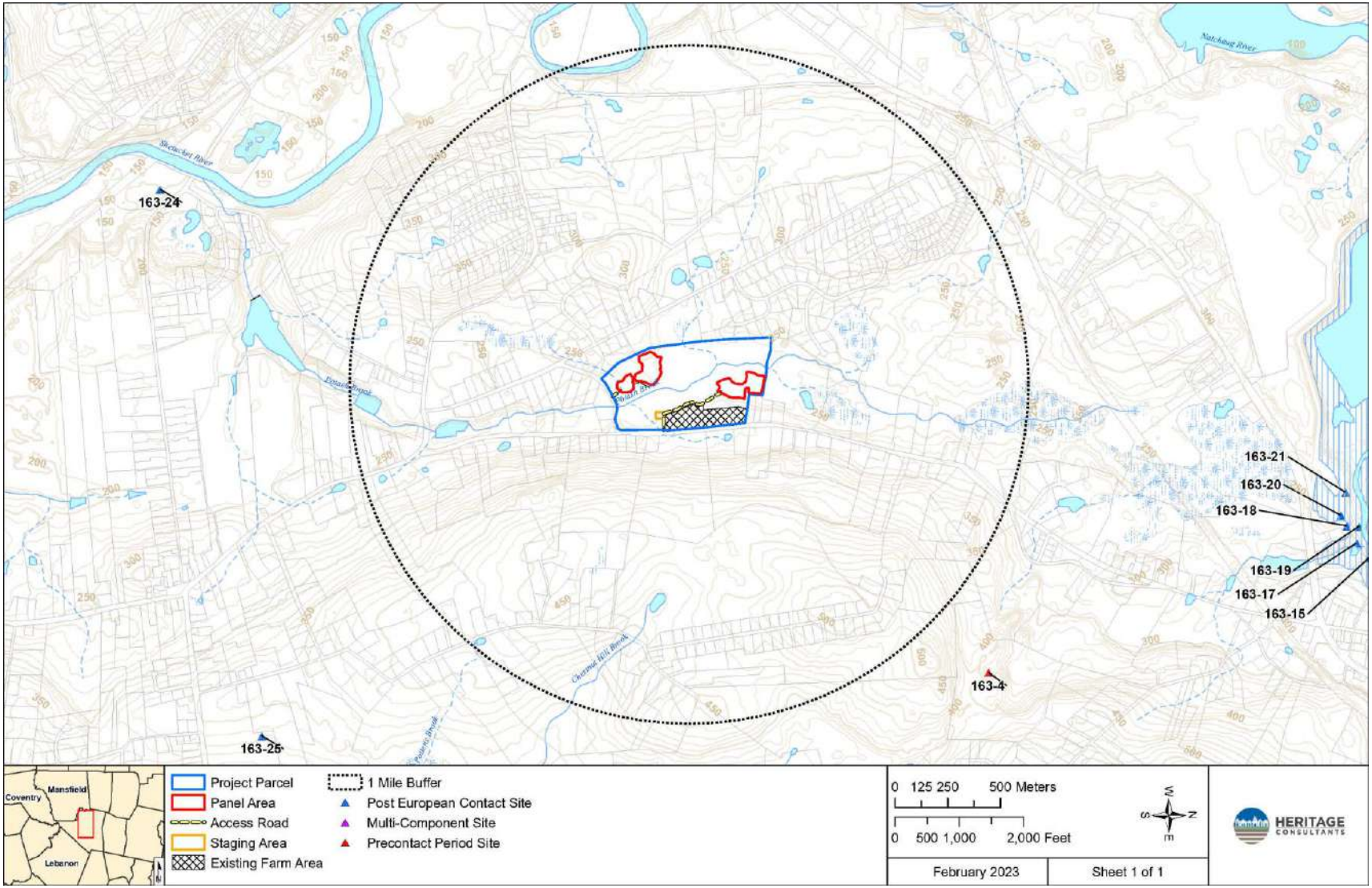

Figure 11. Digital map depicting the locations of the previously identified archaeological sites in the vicinity of the project parcel in Windham, Connecticut.

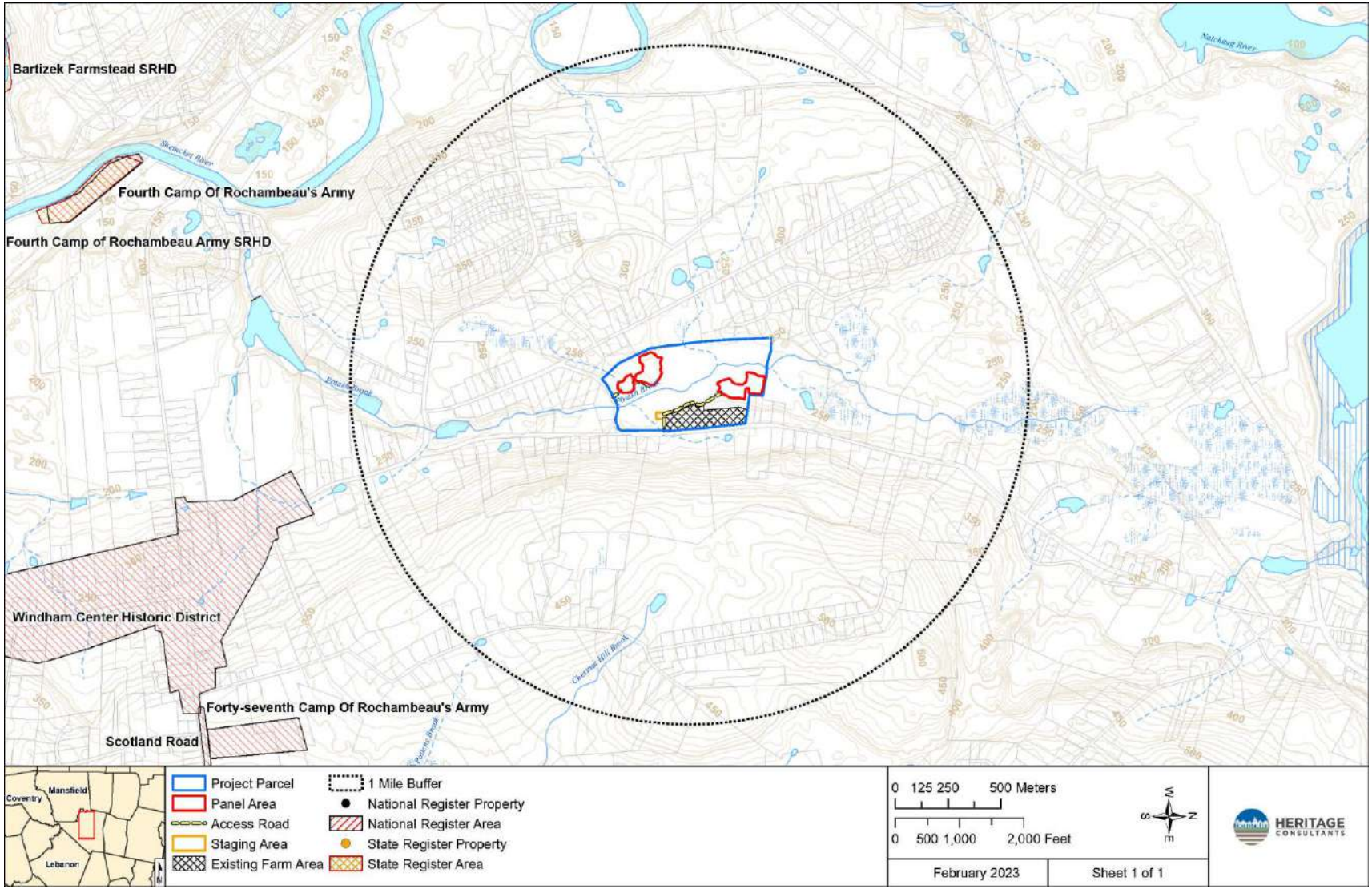

Figure 12. Digital map depicting the locations of the previously identified National Register of Historic Places and State Register of Historic Places properties in the vicinity of the project parcel in Windham, Connecticut.

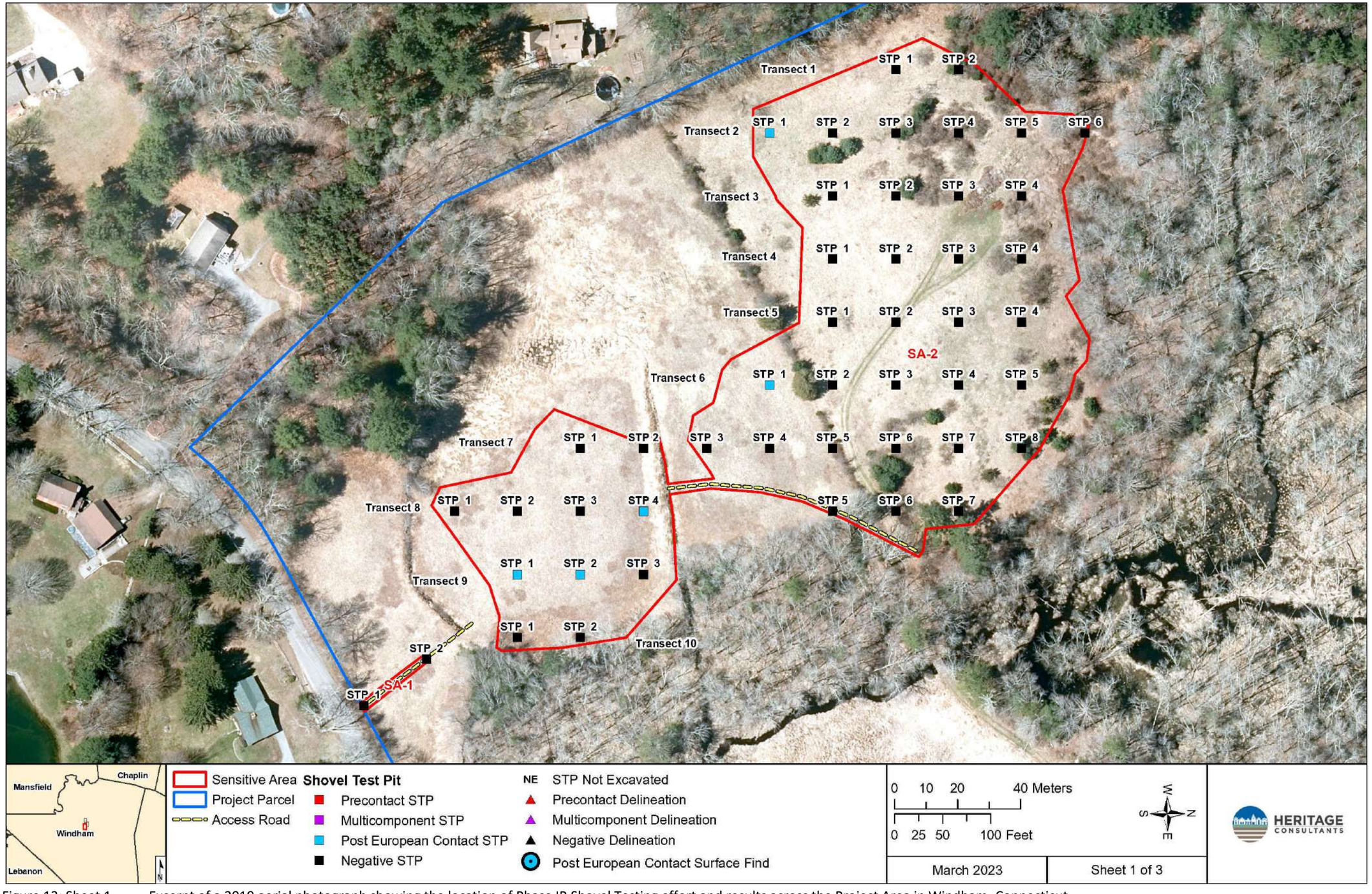

Figure 13; Sheet 1. Excerpt of a 2019 aerial photograph showing the location of Phase IB Shovel Testing effort and results across the Project Area in Windham, Connecticut.

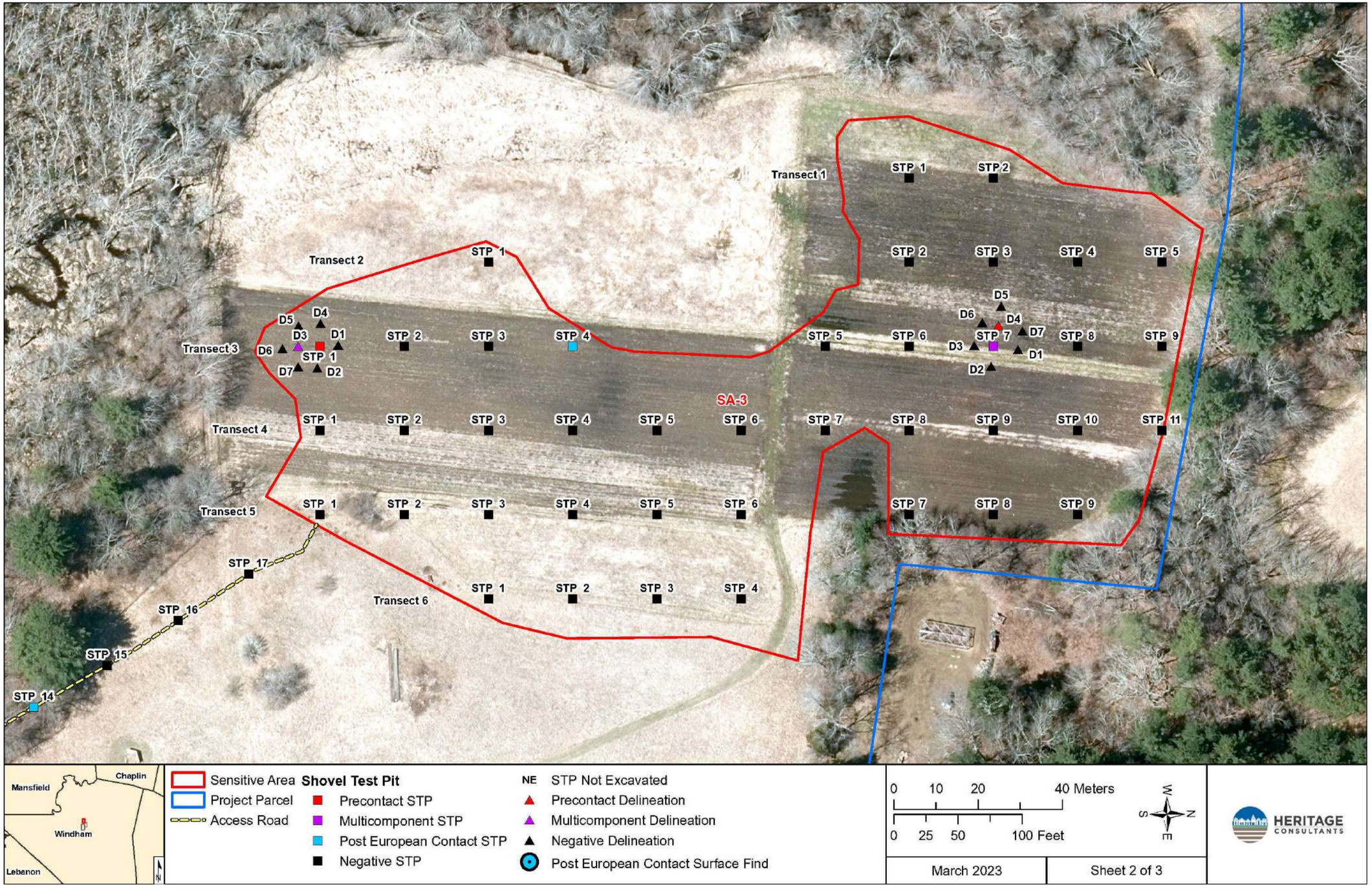

Figure 13; Sheet 2. Excerpt of a 2019 aerial photograph showing the location of Phase IB Shovel Testing effort and results across the Project Area in Windham, Connecticut.

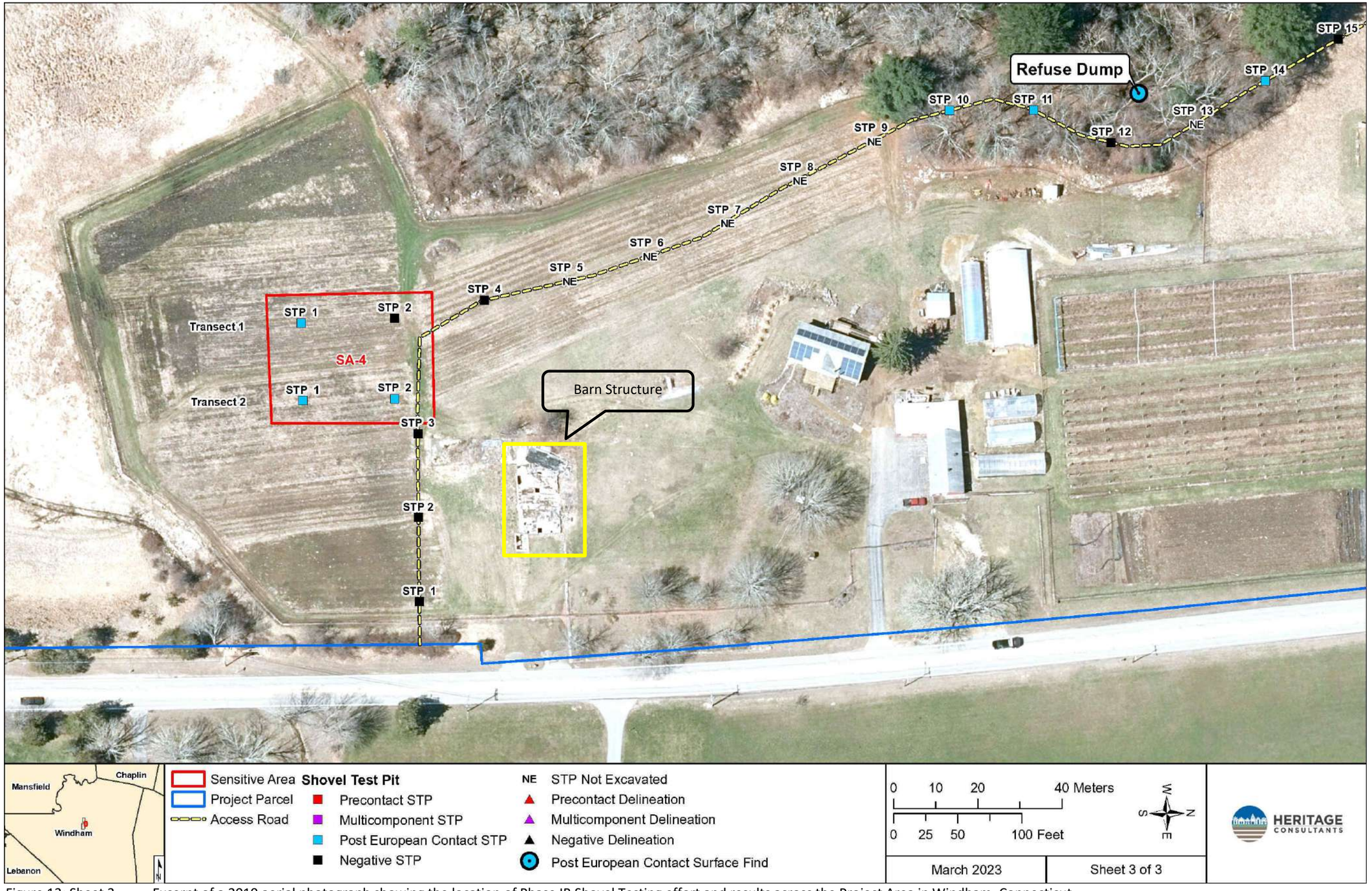

Figure 13; Sheet 3. Excerpt of a 2019 aerial photograph showing the location of Phase IB Shovel Testing effort and results across the Project Area in Windham, Connecticut.

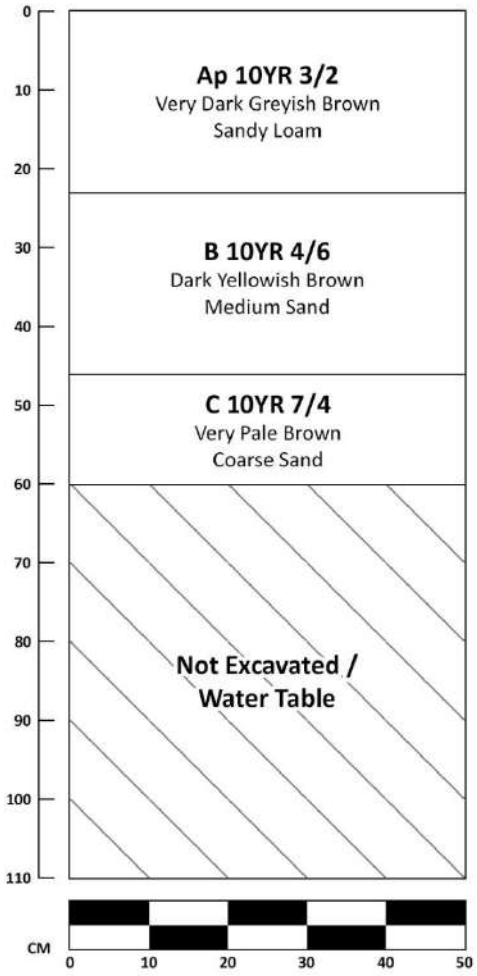

Figure 14. Digital soil profile of Sensitivity Area, SA-1: Transect 1, STP2.

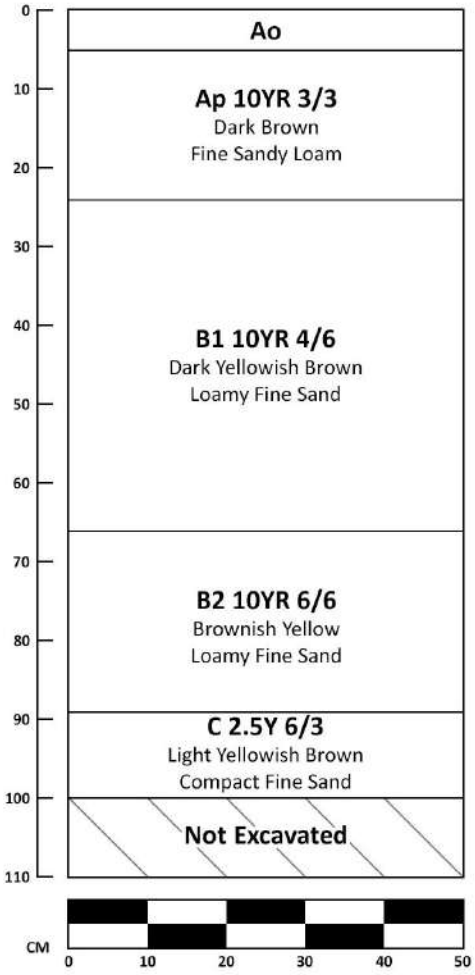

Figure 15. Digital soil profile of Sensitivity Area, SA-2: Transect 2, STP6.

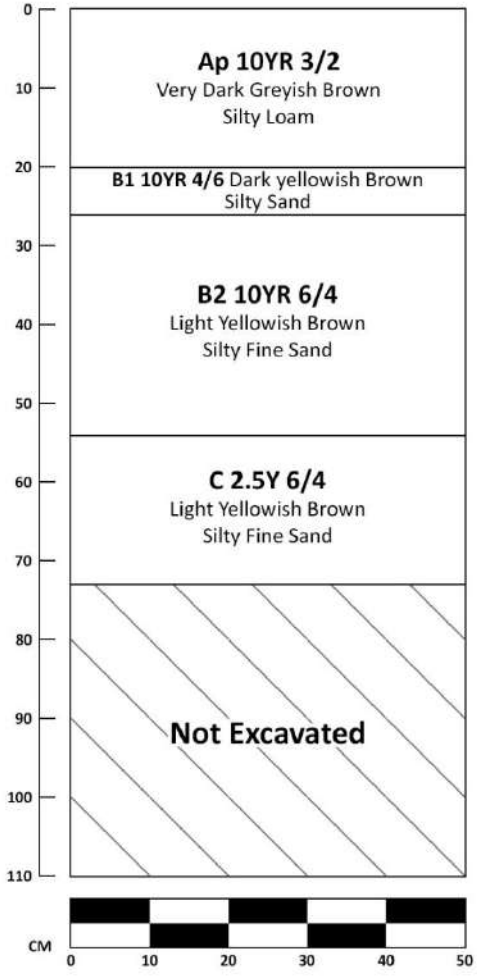

Figure 16. Digital soil profile of Access Road, AR-1: Transect 1, STP4.

Photo 1. Overview photo of the project parcel taken from Brick Top Lane facing northwest towards SA-1.

Photo 2. Overview photo of excavation within SA-2. Photo facing to the East.

Photo 3. Overview photo of excavations within SA-2. Photo facing to the northwest.

Photo 4. Overview of excavations within SA-2. Photo facing to the west.

Photo 5. Overview of excavations within SA-3. Photo facing to the east.

Photo 6. Overview of excavations within SA-3. Photo facing to the south.

Photo 7. Overview of excavations within SA-3. Photo facing to the west.

Photo 8. Overview of excavations within SA-3. Photo facing to the south.

Photo 9. Side A of recovered precontact cultural material. A) Chalcedony Projectile Point; B) Crystal quartz flake; C) quartz flake; D) Quartz biface reduction flake.

Photo 10. Side B of recovered precontact cultural material. A) Chalcedony Projectile Point; B) Crystal quartz flake; C) quartz flake; D) Quartz biface reduction flake.

Photo 11. Overview of excavations along AR-1. Photo facing to the north.

Photo 12. Overview photo of historic refuse dump surface find. Photo facing to the east.

Photo 13. Selection of post-European Contact artifacts recovered during Phase IB testing associated with the Raspberry Knoll Site. Side A: A) Porcelain vessel handle; B) Kaolin pipe stem; C) Colorless medicinal bottle finish; D) Machine-cut iron nail.

Photo 14. Selection of post-European Contact artifacts recovered during Phase IB testing associated with the Raspberry Knoll Site. Side B: A) Porcelain vessel handle; B) Kaolin pipe stem; C) Colorless medicinal bottle finish; D) Machine-cut iron nail.

Photo 15. Overview of Barn foundation. Photo facing to the north.

Photo 16. Overview of barn foundation. Photo facing to the east.

Photo 17. Overview of barn foundation. Photo facing to the south.

Photo 18. Overview of barn foundation. Photo facing to the east.

Photo 19. Overview of barn foundation. Photo facing to the west.

Photo 20. Overview of barn foundation. Photo facing to the northwest.

Photo 21. Overview of barn foundation interior. Photo facing to the north.

Photo 22. Overview of barn foundation interior. Photo facing to the northeast.

HERITAGE CONSULTANTS

May 25, 2023

Ms. Jennifer Young Gaudet
Program Manager
All-Points Technology Corporation
567 Vauxhall Street Extension- Suite 311
Waterford, Connecticut 06385

RE: Letter Report for Supplemental Phase IB Cultural Resources Reconnaissance Survey of the Brick Top Lane Solar Project in Windham, Connecticut.

Ms. Young Gaudet,

This letter is in regard to the supplemental Phase IB cultural reconnaissance survey field work associated with the proposed solar development project (the Project) at Brick Top Lane and 163 North Windham Road in Windham, Connecticut. All-Points Technology Corporation (All-Points) informed Heritage Consultants, LLC (Heritage) that a new array and a short access road leading to it was added to the Project after completion of a previous Phase IB survey by Heritage in April of 2023. The additional array area encompasses 0.65 acres of land, and the proposed access road measures 42 meters (137 feet) in length. Both items are situated approximately 24 meters (78 feet) to the east of the southern portion of Sensitivity Area SA-3, which was previously surveyed for archaeological deposits (Figure 1). After reviewing the updated Project plans, it was determined that the additional array and associated access road fell within an area of moderate/high potential for intact archaeological deposits. Therefore, Heritage recommended that these items be subjected to Phase IB subsurface testing. Heritage personnel completed the additional Phase IB subsurface testing in May of 2023. The results of the supplemental survey are presented below.

Phase IB Methods

The field strategy for the supplemental survey was designed such that the entirety of the additional array and the associated access road were examined visually and photographed. The subsurface testing portion of the field effort was completed through the excavation of shovel tests at 15 meter (49 foot) intervals along survey transects positioned 15 meters (49 feet) apart throughout the array and at 15 meter (49 foot) intervals along the access road centerline. Each shovel test measured 50 x 50 centimeters (19.7 x 19.7 inches) in size, and each was excavated until glacially derived C-Horizon or immovable objects (e.g., boulders, large tree roots) were encountered. Each shovel test was excavated in 10 centimeter (3.9 inch) arbitrary levels within natural soil horizons, and the fill from each level was screened separately. All shovel test fill was screened through 0.635 centimeter (0.25 in) hardware cloth. Soil characteristics were recorded in the field using Munsell Soil Color Charts and standard soils nomenclature. Each shovel test was backfilled after it was fully documented.

Phase IB Testing Results

The additional array, which encompassed a total of 0.65 acres of land, as well as the access road, were situated approximately 24 meters (78 feet) to the east of previously surveyed Sensitivity Area SA-3. The array and access road areas were characterized by an open meadow with a gentle west facing slope; this area was situated at an elevation of 79 meters (260 feet) NVGD (Photos 1 and 2). A total of 7 of 7 (100 percent) planned shovel tests were excavated along two survey transects throughout the new array area.

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Phone (860) 299-6328
Email: dgeorge@heritage-consultants.com

The access road was investigated through the excavation of 1 of 1 (100 percent) planned shovel tests (Figure 2).

A typical shovel test excavated within the array and along the access road extended to a depth of 30 to 75 centimeters below surface (9 to 23 inches) and exhibited three soil horizons in profile. The Ap (plowzone) horizon extended from 0 to 27 centimeters below surface (0 to 8 inches below surface) and was characterized as a deposit of dark brown (10YR 3/3) medium sandy loam mixed with gravel inclusions. The underlaying B horizon was defined as a layer of dark yellowish brown (10YR 3/6) silty loam mixed with gravel and cobble inclusions; it extended from 27 to 49 centimeters below surface (8 to 15 inches below surface). Finally, the glacially-derived C horizon was classified as a deposit brownish yellow (10YR 6/6) fine sandy silt that extended from 49 to 70 centimeters below surface (15 to 21 inches below surface) or the bottom of the test pit.

The Phase IB subsurface testing of the additional array and the access road resulted in the recovery of two post-European Contact period artifacts. A single plain creamware sherd was recovered from the Ap horizon of Shovel Test 4 and Transect 2 within the array area; it originated from 0 to 10 cmbs (0 to 3 inbs). In addition, a single iron lynch pin was collected from the interface of the Ap and B horizon of Shovel Test 1 along Transect 2 in the array areas at a depth of 20 to 30 cmbs (6 to 9 inbs) (Photo 3 and 4). While these two artifacts cannot be dated to a specific year or decade, they retain a general date range of the late nineteenth through twentieth century. Since they were not identified in association with any architectural debris or features, they were classified as agricultural field scatter related to the post-European Contact period use of the Raspberry Knolls Farm Site, which was identified and reported on during the previous Phase IB survey. As determined in the initial report, while the Raspberry Knoll Farm Site is clearly indicative of the agrarian activity that has occurred on the parcel throughout the nineteenth and twentieth centuries, the lack of significant concentrations of artifacts and diagnostic materials recovered from stratified soils indicated that the site is not eligible for listing on the National Register of Historic Places applying the criteria for evaluation (36 CFR 60.4 [a-d]). Thus, no further archaeological investigation of the additional array, the associated access road, or the Raspberry Knolls Farm Site is recommended prior to construction.

If you have any questions regarding the information provided above, or if we may be of additional assistance with this or any other projects you may have, please do not hesitate to contact me at the number listed below.

Sincerely,

David R. George

David R. George, M.A., R.P.A.
Heritage Consultants, LLC

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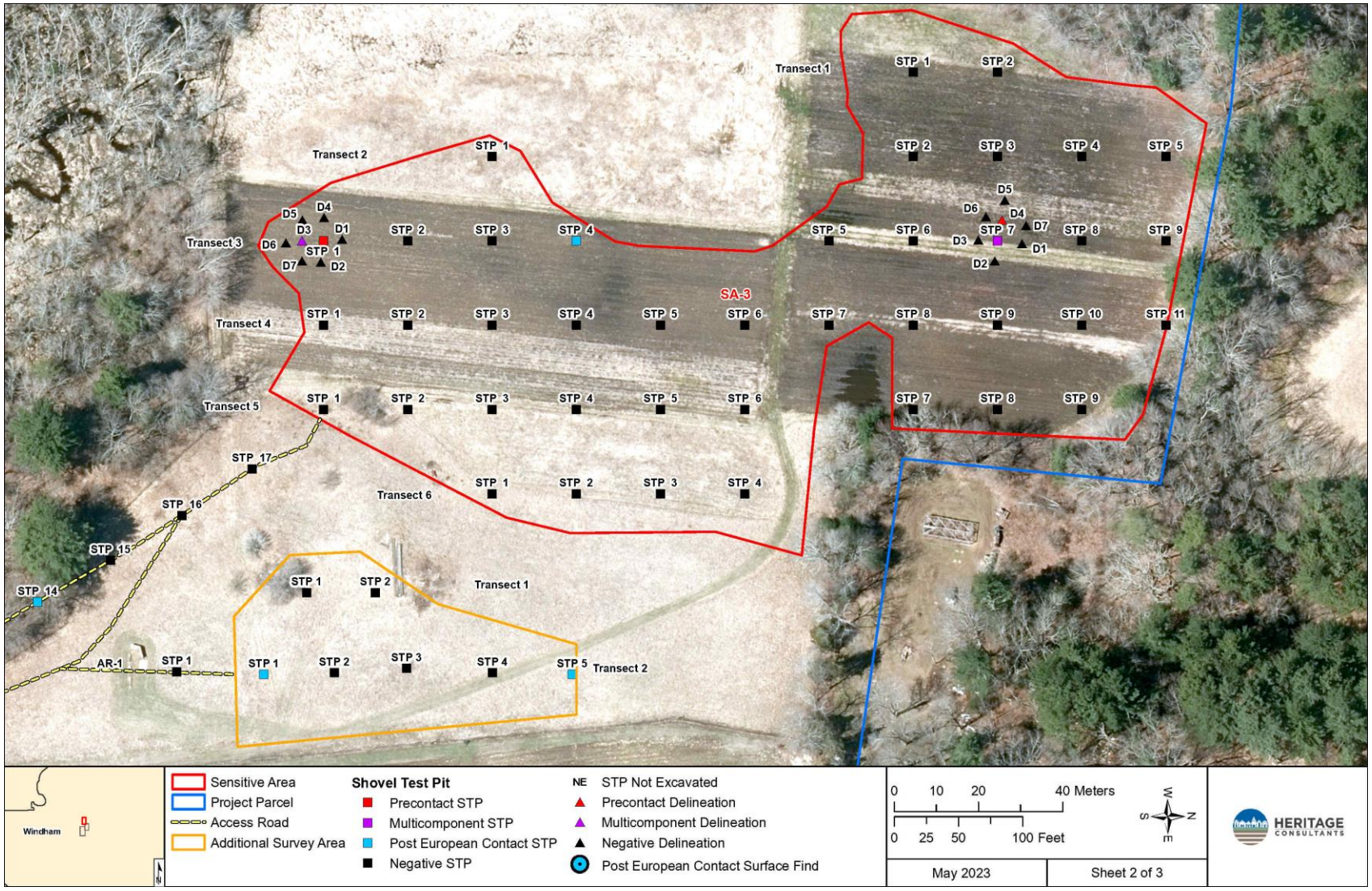

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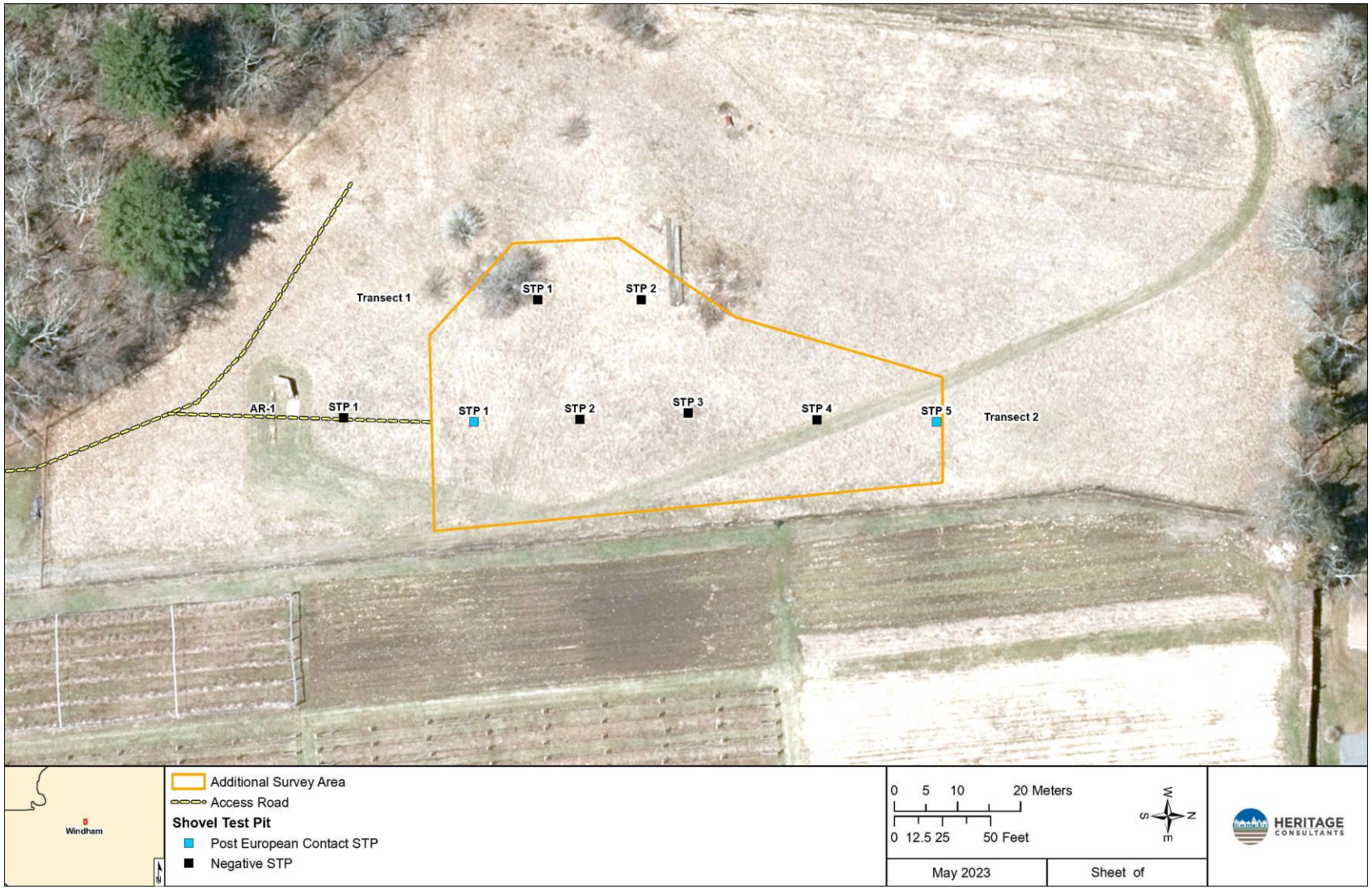

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Photo 1. Overview of the additional array area. Photo facing to the south.

Photo 2. Overview photo of proposed access road. Photo facing to the North.

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Photo 3. Photo of artifacts recovered during additional Phase IB testing, Side A. A) Iron lynch pin; B) Undecorated creamware sherd.

Photo 4. Photo of artifacts recovered during additional Phase IB testing, Side B. A) Iron lynch pin; B) Undecorated creamware sherd.

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APPENDIX D

NOISE ANALYSIS

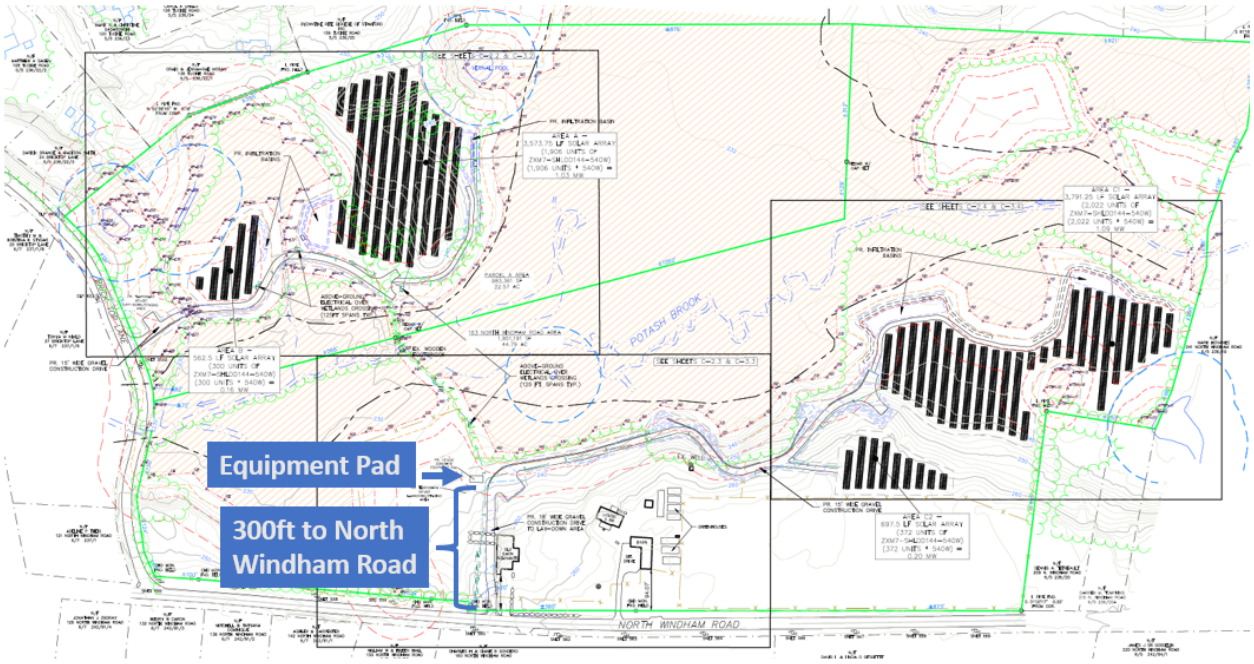
LODESTAR ENERGY

Brick Top Solar – Noise Analysis

Introduction

Noise generated by this Project will derive from the operation of (12) Solectria XGI 1500-166/166kW inverters and (1) Maddox 2250kVA transformer. All proposed inverters and transformers are designed to be installed on a single equipment pad at the location illustrated in Figure 1 below. According to the Solectria equipment specifications, a single inverter has an acoustic noise output of 73dBA at 1 meter (3.28 ft) from the unit; meanwhile, a single Maddox transformer has an output of 62 dBA at 1 meter (3.28ft). The equipment pad's proximity to the closest property line and abutting properties on North Windham Road is 300ft.

Figure 1: Equipment Pad Location



As stated in Regulations of Connecticut State Agencies Sec. 22a-69-3.5, noise received within residential zones (Class A Receptors) shall not exceed 51dBA at night and 61dBA during the daytime in order to minimize disturbance to abutting and adjacent property owners.

Methods/Analysis Sound Intensity of All Equipment at a Common Point

To quantify the noise output of all inverters, a logarithmic formula is required to accurately determine amplification of sound. This formula and the processes related to calculating a result are illustrated below.

LODESTAR ENERGY

Equation 1. Decibel Addition

$$L = 10 \log_{10} \left(\sum_{i=1}^{n} 10^{(L_i / 10)} \right)$$

(1) Solectria XGI 1500-166/166kW inverter = 73dBA at 3.28ft
(12) Solectria XGI 1500-166/166kW inverters = **83.9dBA at 3.28ft**
(1) Maddox 2250kVa transformer = 62dBA at 3.28ft
(12) Solectria XGI 1500-166/166kW inverters + (1) Maddox 2250kVa transformers = **83.9dBA at 3.28ft**

Equation 2. Audibility

The proposed Project design includes the installation of inverters. The 12 inverters and 1 transformer combined have an 83.9dBA output. To quantify the reduction in sound from the point of origin to North Windham Road and the closest abutting properties (300ft away), the formula stated in Equation 2 utilizes the inverse square law for sound intensity. This formula states that the reduction in sound pressure is relative to the distance from the source. The formula is set forth below in equation 2 and applied to the instant case in which proposed site conditions are calculated:

$$\textit{Equation 2.}\ DL = L_{P2} - L_{P1}$$

Calculation

$$DL = 10 \log log \left(R_2 / R_1 \right)^2$$

$$DL = 20 log (R_2 / R_1)$$

$$DL = 20\, log(300/3.28)$$

DL= 39.2 dBA

83.9 dBA – 39.2 dBA = 44.7 dBA

Variables:
DL = difference in sound pressure (dBA)
L_{P1} = Sound pressure level at location 1 (1m)
L_{P2} = Sound pressure level at location 2 (North Windham Road)

R_1 = distance from source to location 1

R_2 = distance from source to location 2

Conclusion

In conclusion, the noise levels emitted from the inverters and transformers will be 44.7 dBA at North Windham Road, which is 300ft away from the origin of noise emanation. Noise will be further reduced at farther property lines and buildings. Therefore, the proposed Project and its components comply with the applicable regulations, well below 51dBA at night and 61dBA during the daytime for residential zone receptors.

APPENDIX E

FEDERAL AVIATION ADMINISTRATION
DETERMINATIONS

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2022-ANE-7771-OE

Issued Date: 01/03/2023

Lodestar
Kevin Midei
6 ridgebury Rd
Avon, CT 06001

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Bricktop Ln Solar
Location:	Windham, CT
Latitude:	41-43-06.10N NAD 83
Longitude:	72-10-00.70W
Heights:	250 feet site elevation (SE) 11 feet above ground level (AGL) 261 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 07/03/2024 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, effective 21 Nov 2007, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

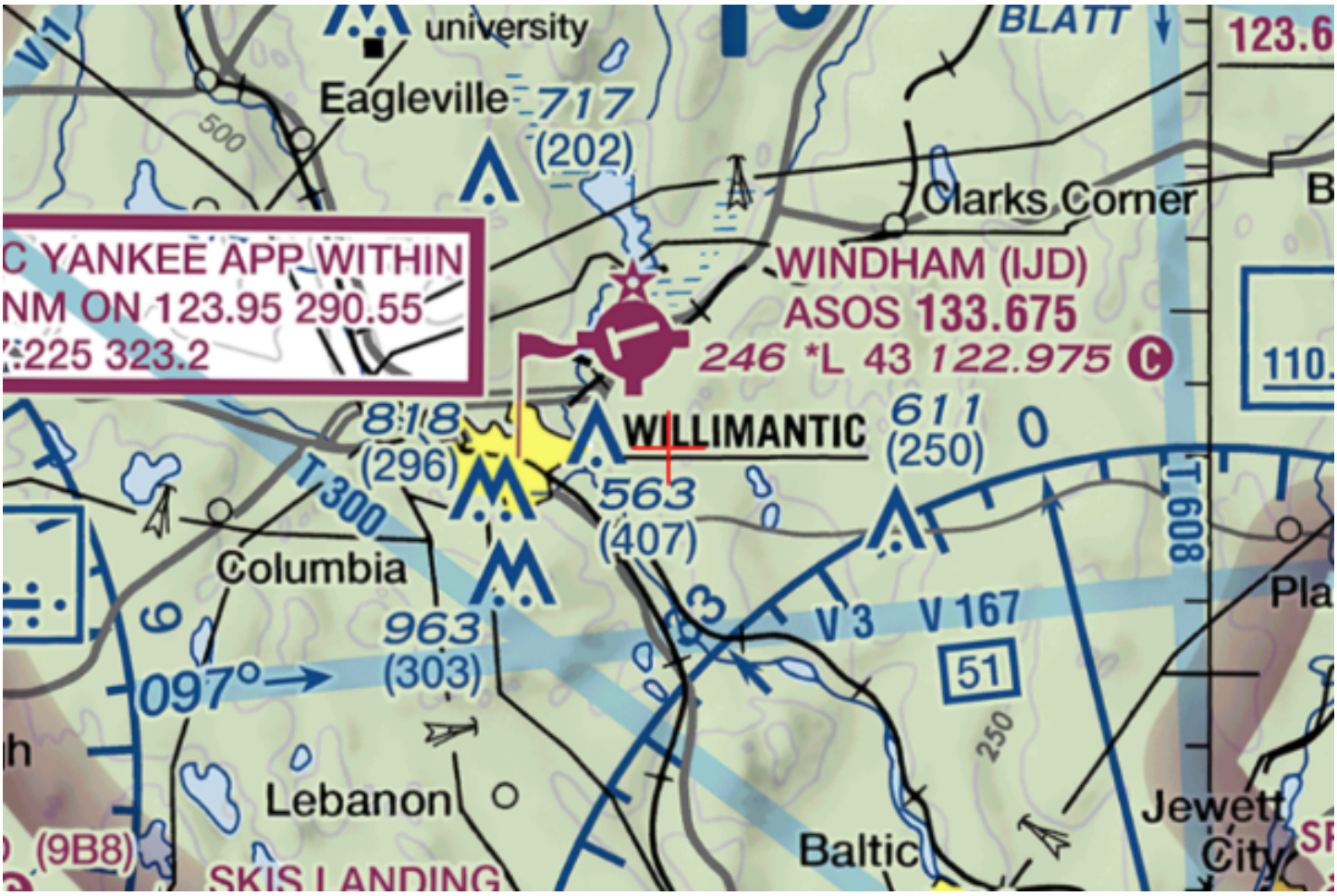
This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (404) 305-6582, or Stephanie.Kimmel@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2022-ANE-7771-OE.

Signature Control No: 565564029-566751093 (DNE)
Stephanie Kimmel
Specialist

Attachment(s)
Map(s)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SKIS LANDING

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2022-ANE-7772-OE

Issued Date: 01/03/2023

Lodestar
Kevin Midei
6 ridgebury Rd
Avon, CT 06001

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Bricktop Ln Solar
Location:	Windham, CT
Latitude:	41-43-03.50N NAD 83
Longitude:	72-10-11.20W
Heights:	240 feet site elevation (SE) 11 feet above ground level (AGL) 251 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

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Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

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(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, effective 21 Nov 2007, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

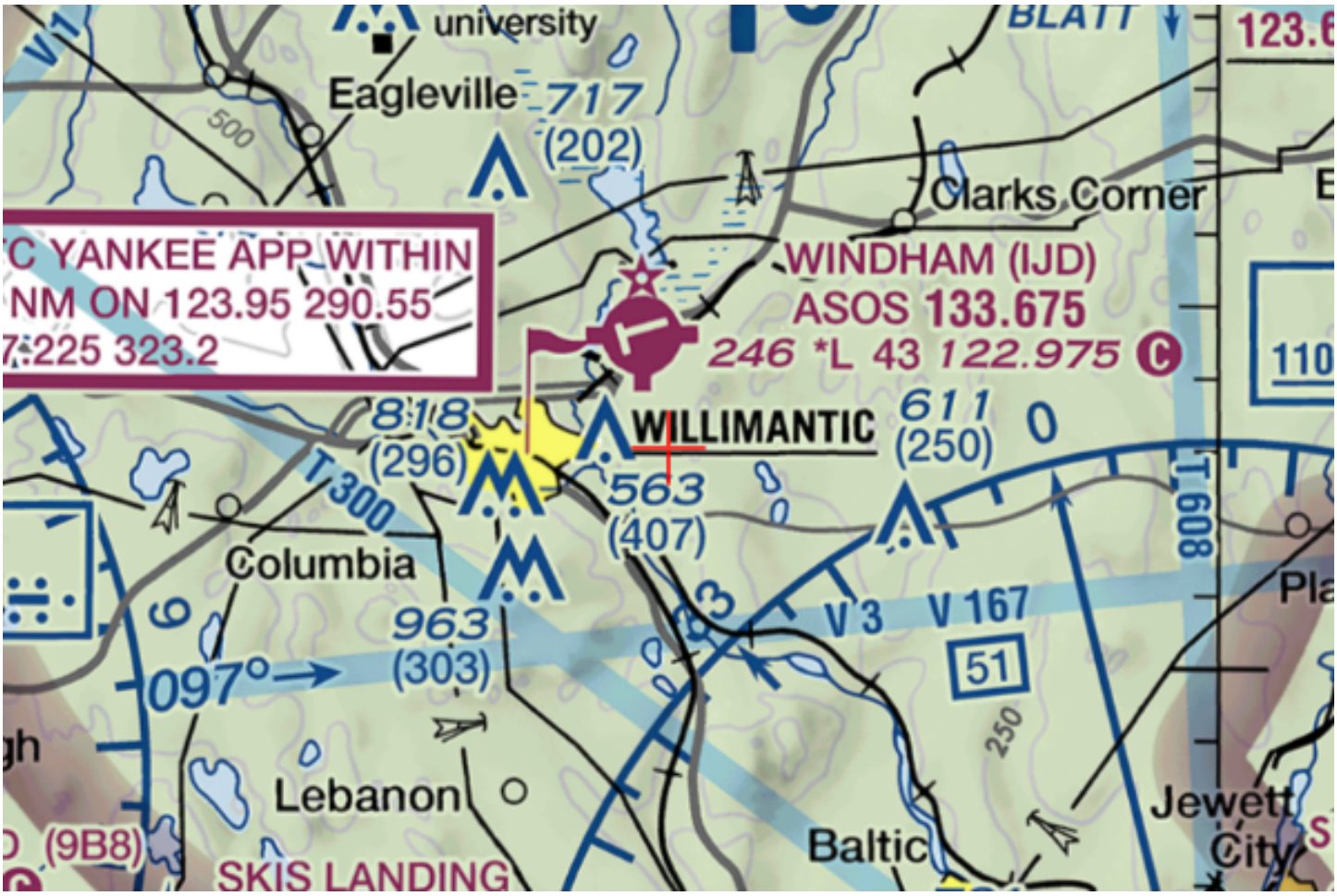
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (404) 305-6582, or Stephanie.Kimmel@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2022-ANE-7772-OE.

Signature Control No: 565564031-566751091 (DNE)
Stephanie Kimmel
Specialist

Attachment(s)
Map(s)

Sectional Map for ASN 2022-ANE-7772-OE



Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2022-ANE-7773-OE

Issued Date: 01/03/2023

Lodestar
Kevin Midei
6 ridgebury Rd
Avon, CT 06001

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Bricktop Ln Solar
Location:	Windham, CT
Latitude:	41-43-25.10N NAD 83
Longitude:	72-10-02.20W
Heights:	260 feet site elevation (SE) 11 feet above ground level (AGL) 271 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 07/03/2024 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, effective 21 Nov 2007, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

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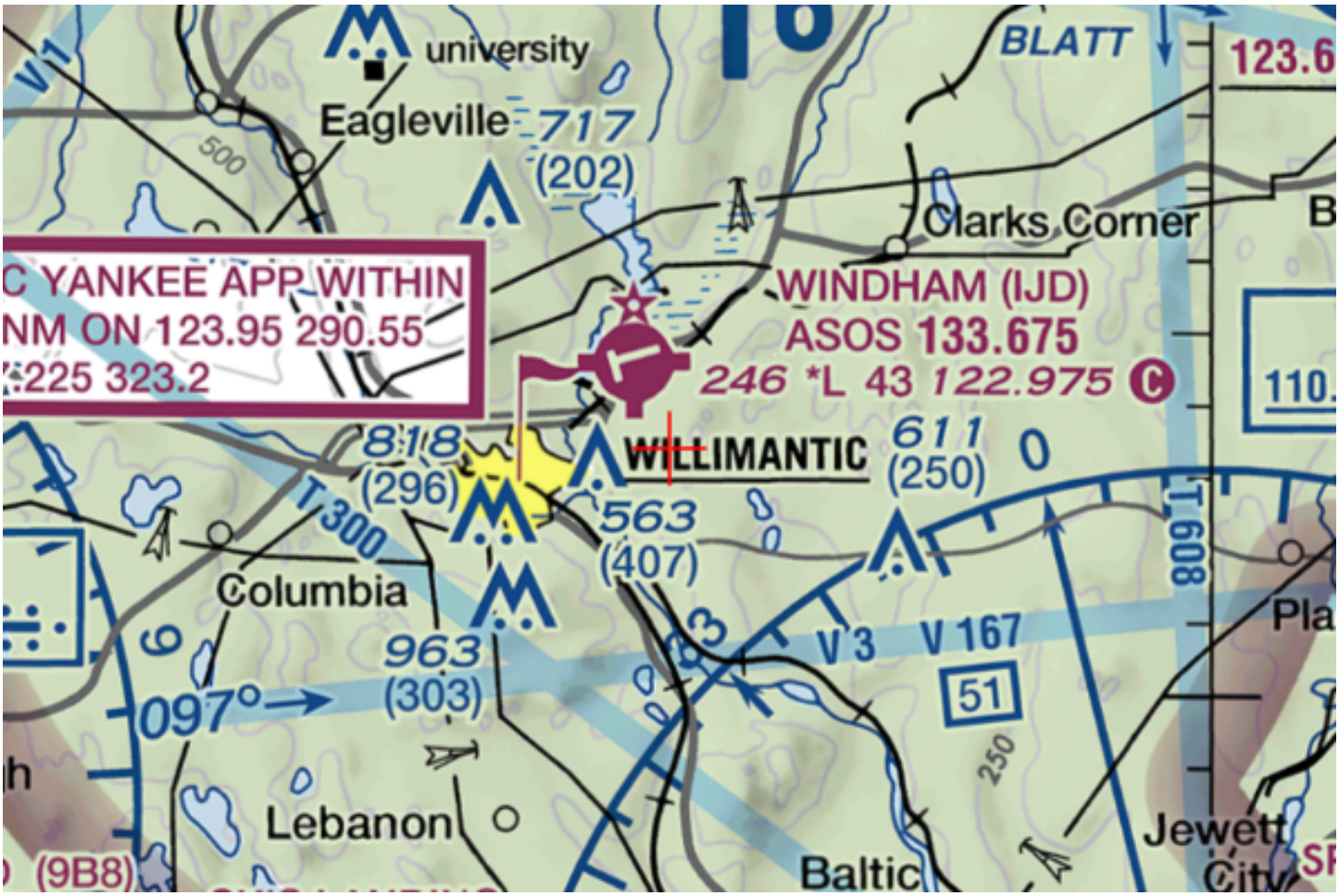
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (404) 305-6582, or Stephanie.Kimmel@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2022-ANE-7773-OE.

Signature Control No: 565564033-566751094 (DNE)
Stephanie Kimmel
Specialist

Attachment(s)
Map(s)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Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2022-ANE-7774-OE

Issued Date: 01/03/2023

Lodestar
Kevin Midei
6 ridgebury Rd
Avon, CT 06001

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Bricktop Ln Solar
Location:	Windham, CT
Latitude:	41-43-29.00N NAD 83
Longitude:	72-10-18.00W
Heights:	240 feet site elevation (SE) 11 feet above ground level (AGL) 251 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 07/03/2024 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

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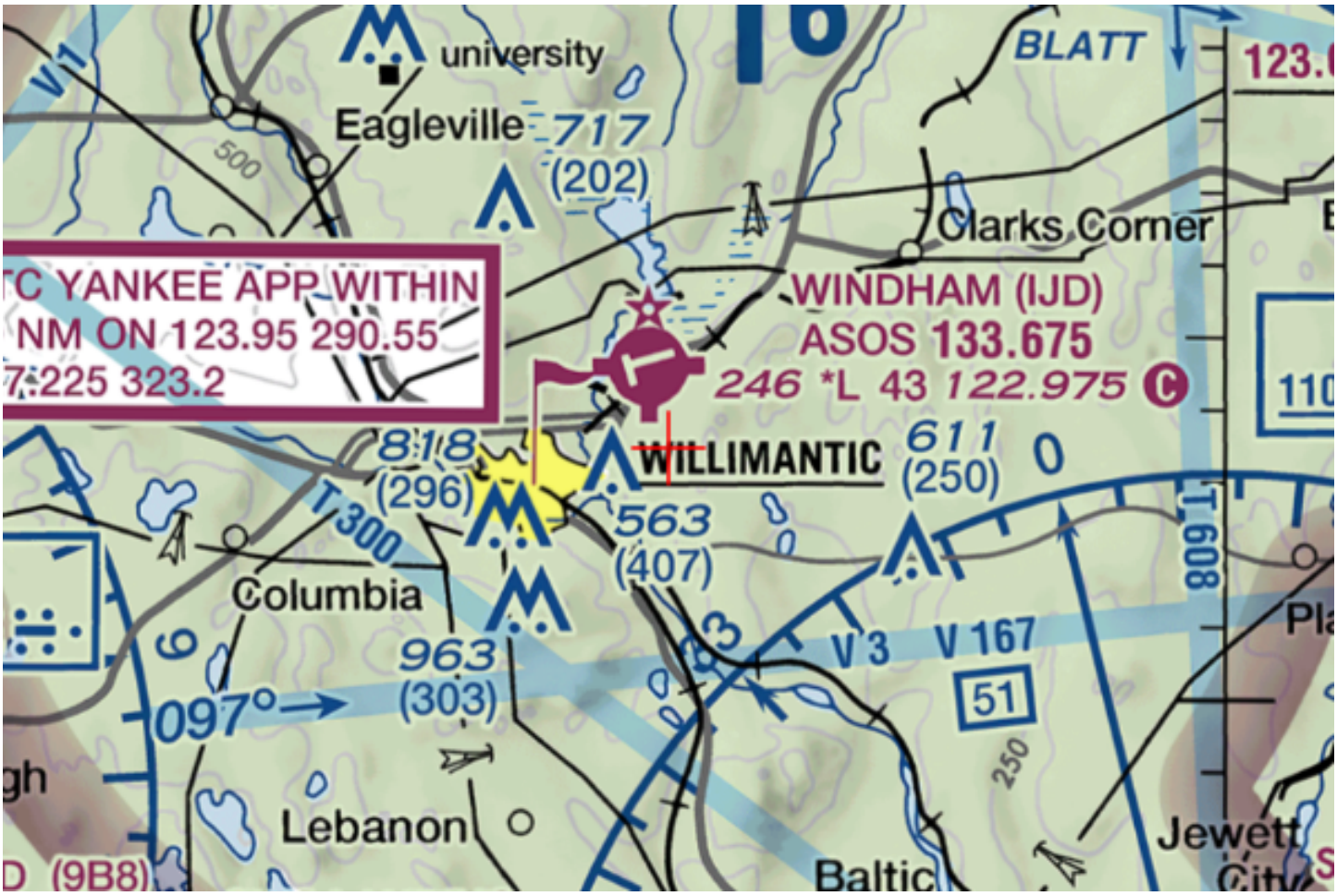
If we can be of further assistance, please contact our office at (404) 305-6582, or Stephanie.Kimmel@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2022-ANE-7774-OE.

Signature Control No: 565564034-566751092 (DNE)
Stephanie Kimmel
Specialist

Attachment(s)
Map(s)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