ENVIRONMENTAL ASSESSMENT

PROPOSED

Gaylord Mountain Solar Project 2019, LLC

"Hamden Solar"

360 GAYLORD MOUNTAIN ROAD

HAMDEN, CONNECTICUT

NEW HAVEN COUNTY

Prepared for:

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August 2020

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1 Introduction

All-Points Technology Corporation, P.C. ("APT") prepared this Environmental Assessment ("EA") on behalf of Gaylord Mountain Solar Project 2019, LLC (hereinafter referred to as the "Petitioner") for the proposed installation of a solar-based electric generating facility having an output of ±1.9 megawatts[1] ("Project") located in the Town of Hamden, 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 Project.

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 undue adverse effect on the existing environment and ecology.

The Project will be located at 360 Gaylord Mountain Road, Hamden, Connecticut ("Site"). The Site is an irregularly shaped parcel that consists of approximately 33.64 acres of mostly undeveloped forest land, with an electric transmission corridor bisecting the property north to south. An existing wireless communications facility is located in the northwest corner of the privately-owned Site, which is zoned Residential (R-25) by the Town of Hamden.

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

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

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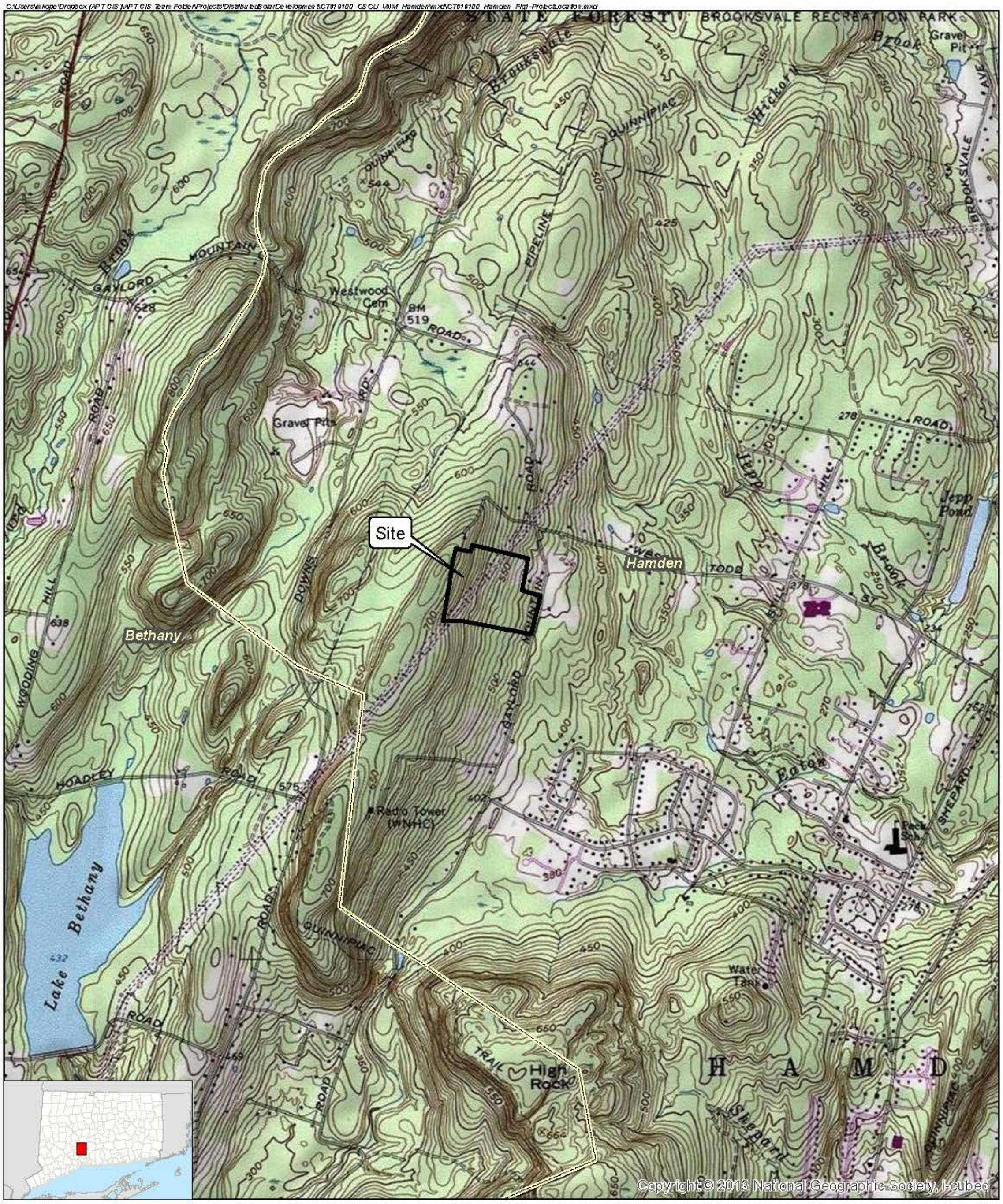

Legend

Site

Municipal Boundary

Map Notes:
Base Map Source: USGS 7.5 Minute Topographic Quadrangle Map, Mount Carmel, CT (1984)
Map Scale:
Map Date: August 2020

2,000 1,000 0 2,000 Feet

Figure 1
Project Location Map
Gaylord Mountain Solar Project 2019, LLC
360 Gaylord Mountain Road
Hamden, Connecticut

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2 Proposed Project

2.1 Project Setting

The Project will be entirely located within areas dominated by mature upland forest in the central and eastern extents of the Site. Five (5) wetlands are located on the Site.

The Site's topography ranges from moderate to steep east to west facing slopes. Ground elevations range from approximately 452 feet AMSL in the west to 716 feet AMSL in the east.

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

The surrounding land use is characterized by residential development to the south, east and north of the Site. Gaylord Mountain Road extends along the eastern Site boundary. Undeveloped land lies to the west of the Site.

Figure 2
Existing Conditions Map
Gaylord Mountain Solar Project 2019, LLC
360 Gaylord Mountain Road
Hamden, Connecticut

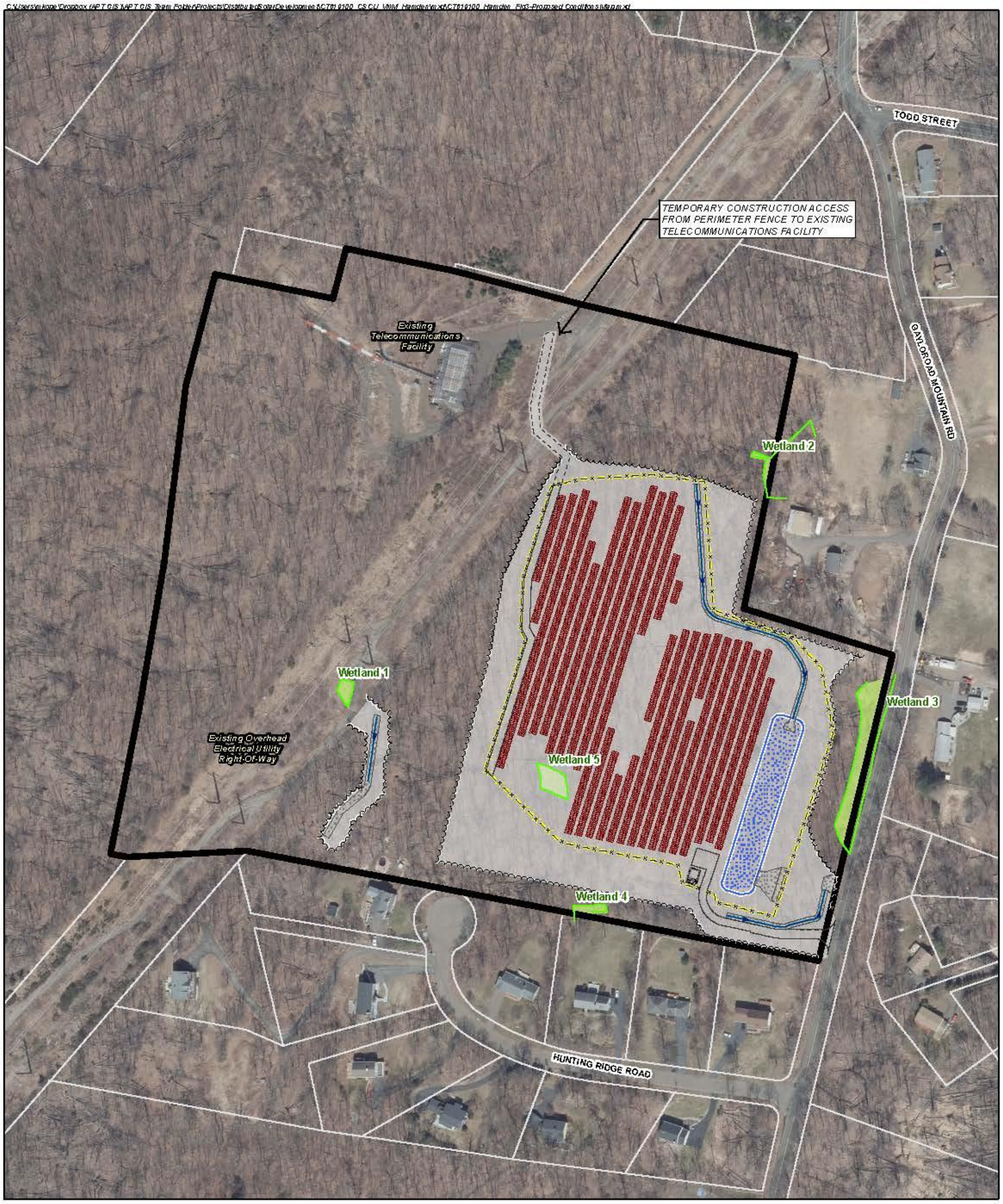
2.2 Project Development and Operation

Upon its completion, the solar energy generating facility ("Facility") will consist of approximately 2,292 Q Peak Duo L-G5.3 400W photovoltaic modules ("panels"); 16 SMA Sunny High Power Peak3 inverters; one (1) 3200A Eaton Pow-R-Line switchboard; one (1) 2000KVA Power Series Envirotran Solar transformer, and one (1) service interconnection point. A ground screw mounted racking system is proposed to secure the panel arrays. The Facility will be surrounded by a six (6)-foot tall chain-link security fence. A permanent gravel access is proposed off Gaylord Mountain Road at the far southeast Site corner extending west into the Project Area. The proposed electrical interconnection will tie into an existing distribution pole along the right-of-way near the permanent Site entrance off Gaylord Mountain Road. A temporary construction access road is proposed to the northwest of the Facility to limit construction traffic through the main access. This proposed construction access will generally follow existing topography cross-slope until connecting with the existing gravel access road currently servicing the telecommunications facility off Gaylord Mountain Road to the north. This temporary access road shall be decommissioned post construction. The Facility will occupy approximately 8.6 acres of the Site with an additional ±3.7 acres of disturbance beyond the fenced Facility limits, for a total of ±12.3 acres ("Project Area"). See Figure 3, *Proposed Conditions Map.*

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

The leading edge of the panels will be approximately thirty-six (36) inches 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 within the Project Area will include tree clearing, installing stormwater control measures, vegetated earthen berm construction, racking and module installation, electrical trenching, and new and temporary access road development. Tree clearing beyond the fenced area will be required to facilitate construction. Existing grades in the proposed solar array area will remain to the extent feasible. Construction of the stormwater management features, the vegetated earthen berm, and temporary/permanent access roads will require cuts/fills and regrading.



Legend

- Site
- Limit of Disturbance
- Approximate Parcel Boundary
- Delineated Wetland Boundary
- Wetland Area
- Solar Modules
- Stormwater Swale
- Perimeter Fence
- Temporary Construction Access
- Gravel Access Road
- Treeline
- Concrete Equipment Pad
- Stormwater Basin
- Gravel Level Spreader

Map Notes:
Base Map Source: CTECO 2019 Aerial Photograph
Map Scale: 1 inch = 250 feet
Map Date: August 2020

250 125 0 250 Feet

N E S W

Figure 3
Proposed Conditions Map

Gaylord Mountain Solar Project 2019, LLC
360 Gaylord Mountain Road
Hamden, Connecticut

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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 mowing and 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.

2.2.1 Access

Permanent access to the Facility will be from the east off of Gaylord Mountain Road over a new gravel road. A temporary construction access is proposed from the north initially following an existing access road servicing the wireless communications facility and then crossing beneath the transmission corridor and into the Project Area to minimize disruption along Gaylord Mountain Road and Hunting Ridge Road.

2.2.2 Public Health and Safety

The Project will meet or exceed 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. The Facility will be enclosed by a six (6)-foot tall chain-link fence. The main entrance to the Facility will be gated, limiting access to authorized personnel only. All Town emergency response personnel will be provided access via a Knox Pad lock.

2.2.3 Land Use

The Project is consistent with state and federal policies and will support the state's energy goals by developing a renewable energy resource while not having a substantial adverse environmental effect. Although local land use requirements do not apply to this Project, it has been designed to meet the intent of the Town's land use regulations, to the extent practicable.

Additionally, while energy generated by the Project will not directly benefit the Town, the Facility meets the goal of the Town's Zoning Regulations, Section 120.2 - Environmental and Natural Resources, to "[e]ncourage the use of solar and other renewable forms of energy and energy conservation and encourage the development of housing opportunities for all citizens of the municipality."

The Project will benefit Southern Connecticut State University by improving electrical service for existing and future development in the area through the availability of enhanced local generating capacity that does not rely on the congested regional electrical transmission networks. In addition, the off-taker for the energy generated by the Project is Central Connecticut State University, further benefiting a local institution.

3 Environmental Conditions

This section provides an overview of the current environmental 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 Connecticut Department of Energy and Environmental Protection's ("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 Map* for a depiction of the Project and its compatibility with the Site resources discussed herein.

3.1 Habitat and Wildlife

Three (3) habitat types (vegetative communities) have been identified on the Site, with all three (3) located within and proximate to the Project Area. Transitional ecotones separate these distinct habitat types. Wetland inclusions occur within the larger Forested habitat on the Site and as peripheral wetland features located in proximity to the Project Area. Detailed descriptions of the wetland habitats can be found in Section 3.2 Water Resources. Habitats located on the Site include:

- Forested;
- Early Successional; and
- Developed.

Figure 2, *Existing Conditions Map*, depicts current conditions on the Site, its access, abutting properties, and several features discussed below.

3.1.1 Habitat Types

Forested

Forested habitat dominates a majority of the Site and generally consists of a complex of upland and smaller isolated pockets of forested wetland habitats. Collectively, this habitat type occupies 26.7 acres of the Site. A description of the wetland forested habitat variant located within this area is included within the wetland discussion presented in Section 3.3.

Upland forest on the Site generally consists of mature mesic hardwoods dominated by red oak (*Quercus rubra*), white oak (*Quercus alba*), pignut hickory (*Carya glabra*), shagbark hickory (*Carya ovata*) with a suppressed component of American beech (*Fagus grandifolia*) and black birch (*Betula lenta*). This habitat largely consists of even-aged forest with diameters[2] ranging from 10 to 16 inches and heights ranging from 80 to 90 feet tall. The canopy is generally closed, with pockets of openings resulting from windthrows consisting of a denser scrub/shrub understory. Understory vegetation is dominated by highbush blueberry (*Vaccinium corymbosum*), witch hazel (*Hamamelis virginiana*), and mountain laurel (*Kalmia latifolia*).

Early Successional

This habitat encompasses approximately 4.6 acres within the west-central portion of the Site. It is a transitional ecotone associated with the electrical transmission corridor, and has been allowed to naturally revegetate in between routine vegetation clearing/management activities with dense herbaceous, young scrub/shrub vegetation and sporadic saplings. Dominant plant species in vegetated areas include typical colonizers of disturbed habitat: the invasive non-native multiflora rose (*Rosa multilfora*), autumn olive (*Elaeagnus umbellata*), and honeysuckle (*Lonicera sp.*); sparse native shrub species such as grey dogwood (*Carunus racemosa*); and species typical of open fields such as cool and warm season grasses (depending on slope position and curvature) and goldenrod (*Solidago spp.*).

Project-related activities within this habitat are limited to construction of the temporary access road. As a result, Early Successional habitat will not be significantly impacted. While some minor impact to this habitat is unavoidable to establish a construction access, similar 'edge' and transitional habitats will be created in other areas of the Site where forest/woodland clearing is proposed.

Developed Areas

The Project would have no substantive adverse impacts to developed areas of the Site, which consist of the impervious and gravel surfaces/infrastructure associated with a wireless telecommunication facility to the northwest of the Project Area.

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[2] Diameters at breast height or DBH.

Table 1, *Habitat Summary Table* provides a summary of the existing on-Site acreage of each habitat types and the area proposed to be occupied by the Project.

Table 1: Habitat Summary Table

Table 1: Habitat Summary Table		
Habitat Type	Total Area On-Site (+/- ac.)	Area Occupied by Project (+/- ac.)
Forested	2.6	2.4
Early Successional	26.9	12.1
Developed	4.6	0.1

3.1.2 Wildlife

In general, the sizes of the Site habitats and surrounding development create a limiting factor for wildlife utilization. Habitat specialists, including mammals and birds, that require large contiguous habitat blocks are not supported by the environment present on the Site. While the forest block associated with the Project is approximately 24 acres, due to its geometry and proximity to surrounding development, much of this intact forest experiences varying degrees of 'edge' effects that diminish its wildlife value. The Site's forested habitat, in particular, is fragmented from larger forested blocks to the west that may support wildlife species that require larger habitat patch sizes.

Despite their relatively small sizes, Site habitats do provide higher quality habitat for those species that are more tolerant of human disturbance, habitat fragmentation and 'edge' effects. Generalist wildlife species would be expected to use areas of the Site, including several song birds and mammals such as raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), grey squirrel (*Sciurus carolinensis*), Virginia opossum (*Didelphus virginiana*), and eastern chipmunk (*Tamias striatus*).

The habitat blocks associated with the Site are small and isolated. Habitat areas being converted as a result of the Project occur elsewhere either on or adjacent to the Site. As a result, the Project will not likely result in a significant impact to those wildlife species utilizing them. Those habitat areas being converted as a result of the Project occur elsewhere either on or adjacent to the Site.

3.1.3 Habitat Enhancement Area

Once the perimeter fence has been installed, a strip of land between the fence and the proposed forest edge will need to remain clear of mature trees to prevent shading of the solar arrays. This Habitat Enhancement Area can be managed for wildlife use by restricting mowing on a rotation basis every four (4) to seven (7) years. This mowing plan will allow the area to revert to late old field habitat and create a soft ecotone that can provide cover and a suitable environment for forest-dwelling wildlife and edge nesting birds. In addition, this area will provide important connectivity between wetland resources and larger forested areas. Should soils within this zone become disturbed during construction activities, a pollinator-friendly seed mix will be used to revegetate those areas.

3.1.4 Core Forest Determination

APT evaluated the size and extent of the contiguous interior forest block (or "core forest") present within and adjacent to the Site 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 2016 leaf-off aerial photography, field observations and professional experience). The first dataset, the Department's *Forestland Habitat Impact Mapping* [3], does not include the Site within an area mapped as core forest. The second dataset, UConn's Center for Land Use Education and Research's ("CLEAR") Forest Fragmentation Analysis ("FFA")[4] 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 ("edge effect"). The FFA study identifies three categories of core forest: small (< 250 acres); medium (250-500 acres); and large (>500 acres).

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[3] Source: http://ctdeep.maps.arcgis.com/apps/webappviewer/index.html?id=7b81844bab634281b544c20bf2d7bfb8: This spatial screening layer identifies prime continuous and connected core forestland blocks. It is intended to identify areas of potential forestland habitat impacts relative to solar installation applications made to the Connecticut Siting Council. If the project intersects with the Forestland Habitat Impact Map there is a potential for material effects to core forest.

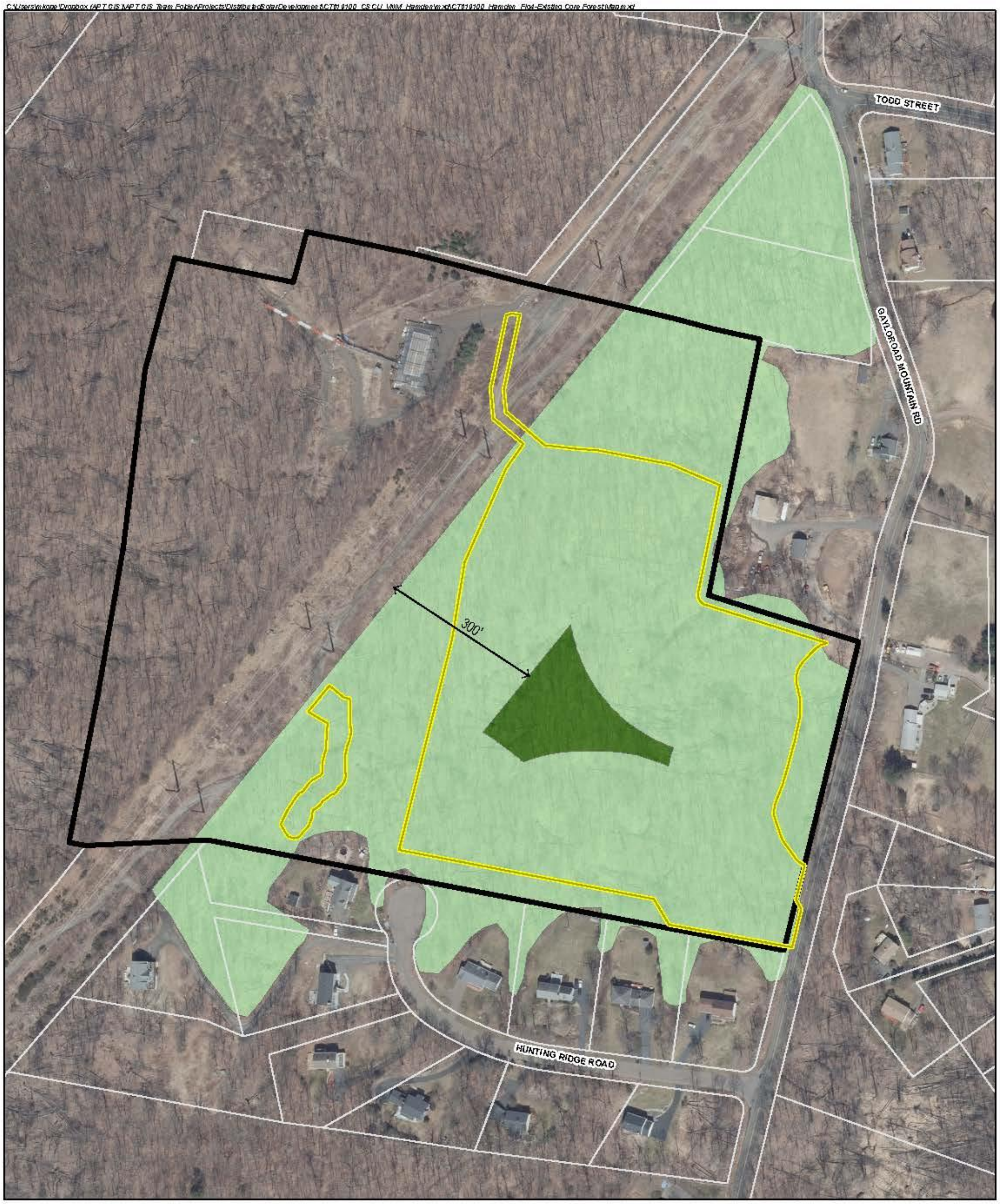
[4] CLEAR's FFA: http://clear.uconn.edu/projects/landscape/forestfrag/forestfrag_public%20summary.pdf

Based on the FFA criteria and APT's independent analysis, the central portion of the Project Area technically lies within a small core forest block totaling ±one (1) acre. The Project will result in a loss of this isolated small core forest block (See Figure 4, Existing Core Forest Map and Figure 5, Proposed Core Forest Map). This size forest block is insufficient to support core forest dependent species. The vast majority of forested habitat on the Site is considered edge forest due to fragmentation from larger forested blocks to the west caused by the presence of the electrical transmission corridor and telecommunications facility. The Project will not likely result in a significant negative impact to core forest habitat.

Table 2, *Core Forest Assessment Table* provides a summary of the existing and proposed on-Site acreage of core forest.

Table 2: Core Forest Assessment Table

Table 2: Core Forest Assessment	
Habitat Type	Total Area On-Site (+/- ac.)
Existing Contiguous Forested Area	25.1
Existing Core Forest Area	0.9
Project Impact's to Core Forest Area	0.9
Proposed Core Forest Area	0



Legend

- Site
- Project Area
- Approximate Parcel Boundary

Existing Forest Block (+/- 25 Acres)

Type:

- Edge Forest (+/- 24 Acres)
- Core Forest (+/- 1 Acre)

**Existing Forest within the Project Area:*
+/- 1 Acre of Core Forest
+/- 11 Acres of Edge Forest

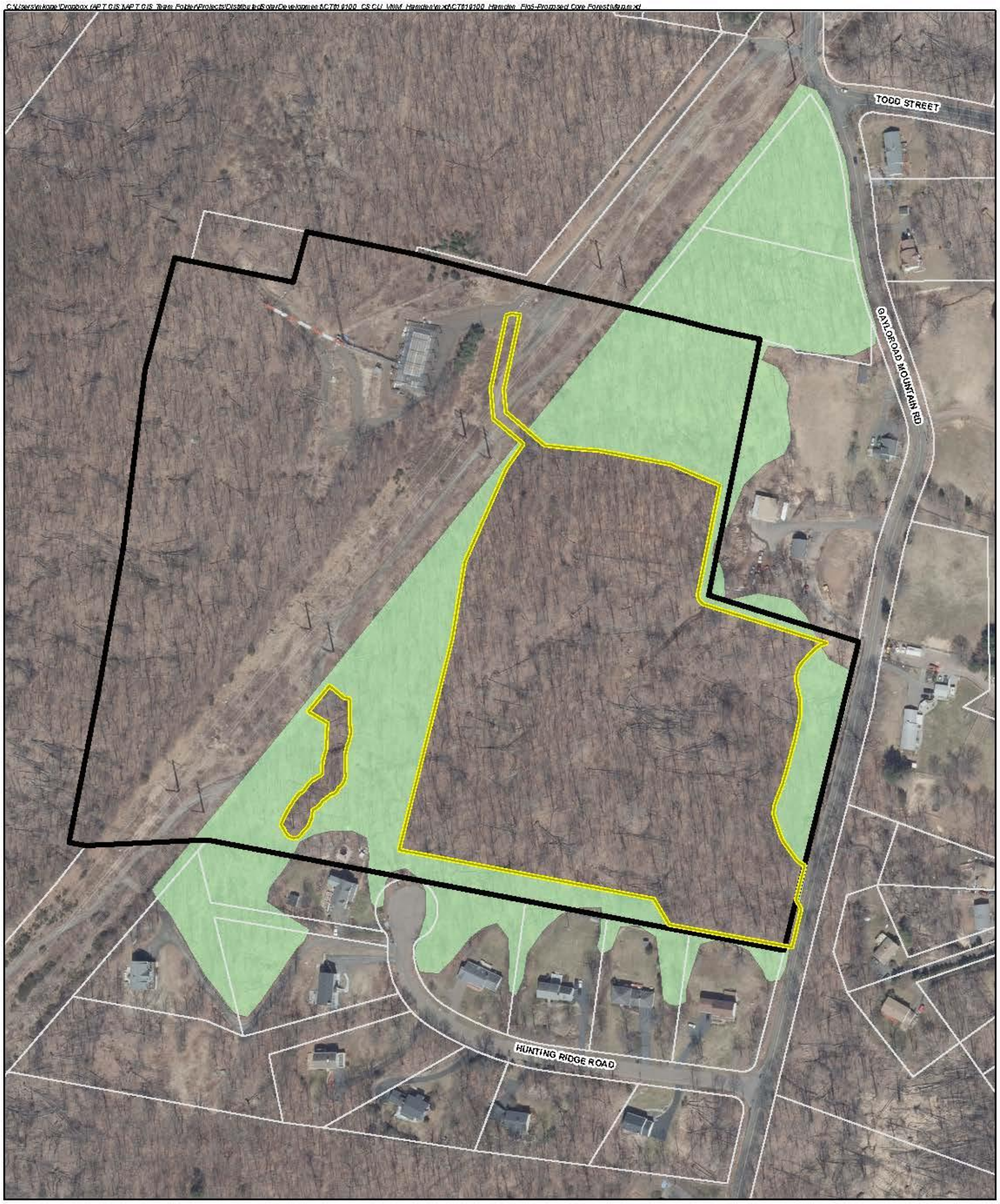
Map Notes:
Base Map Source: CTECO 2019 Aerial Photograph
Map Scale: 1 inch = 250 feet
Map Date: August 2020

250 125 0 250 Feet

Figure 4
Existing Core Forest Map

Gaylord Mountain Solar Project 2019, LLC
360 Gaylord Mountain Road
Hamden, Connecticut

All-Points Technology Corporation



Legend

Site

Project Area

Approximate Parcel Boundary

Proposed Conditions

Total Forest Block (+/- 13 Acres)

Type:

Edge Forest (+/- 13 Acres)

**Proposed Forest remaining within the Project Area:*
+/- 0 Acres of Core Forest
+/- 0 Acres of Edge Forest

Map Notes:
Base Map Source: CTECO 2019 Aerial Photograph
Map Scale: 1 inch = 250 feet
Map Date: August 2020

250 125 0 250 Feet

Figure 5
Proposed Core Forest Map

Gaylord Mountain Solar Project 2019, LLC
360 Gaylord Mountain Road
Hamden, Connecticut

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3.2 Rare Species

3.2.1 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 applicants determine if there is the potential 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) areas 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 (June 2020) to determine if any such species or habitats occur on or within 0.25-mile of the Site. The NDDB mapping reveals the Site is NOT located within an area potentially containing Threatened, Endangered, or Special Concern species and/or critical habitats. The nearest known NDDB location is located approximately 0.52 miles to the south/southeast. As such, formal consultation with CT DEEP NDDB is not required.

3.2.2 USFWS Consultation

The northern long-eared bat ("NLEB"; *Myotis septentrionalis*) is a federally-listed[5] threatened species also known to occur in the vicinity of the Site. 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.

5 Listing under the federal Endangered Species Act

The *Northern long-eared bat areas of concern in Connecticut to assist with Federal Endangered Species Act Compliance map* (February 1, 2016) was reviewed 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 in Connecticut. The nearest NLEB habitat resource to the Site is located in North Branford, approximately 8.9 miles to the southeast.

The Project will result in the removal of a number of trees with greater than three (3) inches DBH.[6] Since tree removal activities can potentially impact NLEB habitat, APT completed a determination of compliance with Section 7 of the Endangered Species Act of 1973 for the Project.

In compliance with the US Fish and Wildlife Service ("USFWS") criteria for assessing NLEB, the Project will not likely result in an adverse effect or incidental take[7] of NLEB and does not require a permit from USFWS. A letter confirming compliance was received by USFWS on April 15, 2020 thus no further consultation with USFWS is required for the proposed activity.

A full review of the *Endangered Species Act (ESA) Compliance Determination* is provided in Appendix D, *USFWS Compliance Statement*.

3.3 Water Resources

3.3.1 Wetlands and Watercourses

An APT Registered Soil Scientist identified portions of five (5) wetlands on the Site during a field inspection and wetland delineation completed on March 16, 2020. Collectively the wetlands comprise approximately 0.44 acre. The locations of these resources are depicted on Figure 2, *Existing Conditions Map*.

Wetland 1 consists of an isolated wetland pocket within the adjacent electrical transmission corridor. This wetland generally drains east to a collapsed/buried culvert associated with a gravel access utility maintenance road that forms the eastern boundary of the wetland and impounds some flows (although neither inundation nor flooding was observed at the time of inspection). This wetland is dominated by emergent and scrub-shrub vegetation resulting from routine

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[6] Suitable NLEB roost habitat includes trees (live, dying, dead, or snag) with a diameter a DBH of three (3) inches or greater.

[7] "Incidental take" is defined by the Endangered Species Act as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." For example, harvesting trees can kill bats that are roosting in the trees, but the purpose of the activity is not to kill bats.

vegetation maintenance activities. There is no regulated resource located east of the maintenance road or beyond the cleared limits of the electrical transmission corridor due to steeper topography east of the culvert.

Wetland 2 consists of a hillside seep system that has experienced varying degrees of historic and more recent disturbances. Hydrology for this resource is derived from hillside seepage to the west and drains east off the Site. The headwaters to this system have been altered through the historic construction of a well and stone wall feature. As Wetland 2 drains to the east, it intercepts areas associated with an active pasture and a garage on the adjacent property. In those areas, vegetation management has resulted in a complex of habitats ranging from unimpacted edge forest to transitional scrub/shrub, and cleared/maintained emergent and disturbed areas.

Wetland 3 consists of a narrow wetland seep system located at the base of a broad till slope confined to the east by Gaylord Mountain Road. This feature is generally formed in a long linear depression with interior surface flows to the south that eventually drain to a culverted crossing east under Gaylord Mountain Road. A diffuse interior flow path was identified as an intermittent watercourse with a width of 1- to 3-feet and flows 1- to 2-inches deep within a sand and gravel channel. It appears flows within this feature are highly ephemeral. Due to the proximity to a public road, this feature has experienced varying degrees of historic impacts including vegetation management and high amounts of debris/trash accumulation.

Wetland 4 consists of an isolated depressional wetland at the transition between maintained backyard open lawn on an adjacent residential property to the south and edge forest on the Site. This wetland generally consists of a shallow depression that receives seepage from the north and west, as well as drainage from lawn areas directed via a shallow swale. Vegetation within Wetland 4 is limited, with much of the resource consisting of deep leaf mulch apparently from maintenance of the adjacent residential property.

Wetland 5 consists of an isolated wetland pocket formed at the base of a hillside seep outbreak within the Project Area. As topography changes/steepens to the east, this feature loses the hydrology supporting the wetland feature as it discharges into the surrounding slope. In addition, a woods road forms the eastern boundary of the feature further conveying surface flows away from this small wetland feature. Dominant vegetation consists of mature, closed canopy hardwood forest.

3.3.2 Wetland Impacts

One wetland will be directly impacted by the Project. Wetland 5 is located within the fenced limits of the Facility. Proposed impacts to Wetland 5 include tree clearing to prevent shading of the Project. No ground disturbances are proposed within Wetland 5 as stumps will be left in place and no grading, panels, fencing, access, stormwater controls, or other Facility appurtenances are proposed within its limits. As such, no direct permanent impacts are proposed to Wetland 5 and therefore the Project will not result in a significant negative impact to on-Site wetlands.

Portions of the Project Area will require minimal grading proximate to wetland resources, including access road improvements and installation of stormwater features. All clearing and grading limits for the Facility's infrastructure (solar arrays, associated equipment and fencing), would maintain a minimum setback of approximately ±20 feet to wetlands, with the exception of Wetland 5. The majority of these proximate impacts would result from peripheral clearing activities. The nearest point of Project activities to Wetland 3, the highest quality wetland resource located on-Site, is a distance of 47 feet. Proposed clearing activities in proximity to these wetlands would not significantly impact any of their functions or values. Table 2, *Wetlands Summary Table* provided below details all direct impacts to wetlands, and distances to wetland resources.

Table 3: Wetlands Summary Table

Table 2: Wetlands Summary		
Direct Permanent Impacts to Wetland 1 (ac.)	0	
Direct Permanent Impacts to Wetland 2 (ac.)	0	
Direct Permanent Impacts to Wetland 3 (ac.)	0	
Direct Permanent Impacts to Wetland 4 (ac.)	0	
Direct Permanent Impacts to Wetland 5 (ac.)	0	
Total Direct Permanent Impacts to Wetlands (ac.)	0	
Project Proximity to Wetlands (from limit of disturbance)	Distance (ft.)	Direction (of wetland from LOD)
Project Proximity to Wetland 1	22	Northwest
Project Proximity to Wetland 2	25	Northeast
Project Proximity to Wetland 3	47	East
Project Proximity to Wetland 4	21	North
Project Proximity to Wetland 5	0	East

To promote protection of wetlands and watercourses during construction, safeguards have been developed to avoid unintentional impacts to these resources, including a Project-specific Resources Protection Plan and the installation and maintenance of E&S controls in accordance with the 2002 *Connecticut Guidelines for Soil Erosion and Sediment Control*. See Appendix B, *Resources Protection Plan*. By implementing these management techniques throughout the duration of construction, potential adverse impacts to wetland resources will be mitigated.

Potential long-term secondary impacts to wetland resources associated with the operation of this Facility are minimized by several factors. The development will be unstaffed (generating negligible traffic), use an existing gravel/dirt access drive (reducing the creation of impervious surfaces), and will treat the majority of the ground beneath the solar arrays with native grass/vegetation (providing ample opportunity for surface water to infiltrate or slow prior to discharge to surrounding resources). As such, the Project will not have a likely adverse impact to wetland resources.

3.3.3 Vernal Pools

During its field inspection, APT assessed all five (5) wetland resource areas for indications of vernal pool resources. Based on a lack of evidence of seasonally flooded areas observed on the date of inspection, it does not appear that any potential vernal pool breeding habitat exists on the Site. Therefore, the Project will not result in any impacts to vernal pool resources.

3.3.4 Floodplain Areas

APT reviewed the United States Federal Emergency Management Agency ("FEMA") Flood Insurance Rate Maps ("FIRM") for 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 #09009C0290H, dated December 27, 2010. Based upon the reviewed mapping, the Site is classified as an unshaded Zone X, which is defined as areas of minimal flooding, typically above the 500-year flood level.

The Project is outside the influence of 100- and 500-year floodplains and will have no effect on these resources. In addition, no special considerations or precautions relative to flooding are required for the Project.

3.4 Water Quality

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. Once operative, the stormwater generated by the proposed development will be properly handled and treated in accordance with the 2004 *Connecticut Stormwater Quality Manual*.

3.4.1 Groundwater

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

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

3.4.2 Surface Water

Based upon a review of DEEP mapping, the Site is located in Major Drainage Basin 5 (South Central Coast), Regional Basin 53 (South Central Western Complex), and Sub Regional Drainage Basin 5302 (Mill River).

Based upon DEEP mapping, there are no surface waterbodies located in proximity to the Site.

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

3.4.3 Stormwater Management

The Project has also been designed to meet the current draft of DEEP's *Appendix I, Stormwater Management at Solar Array Construction Projects*. The proposed post-development drainage characteristics of the Site will change minimally. As a result of the proposed tree clearing, combined with DEEP's requirements to comply with *Appendix I*, specifically the required drop in Hydrologic Soil Group in areas subject to heavy machinery, there will be an increase in stormwater

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[8] Designated uses in GAA classified as existing or potential public supply of water suitable for drinking without treatment; baseflow for hydraulically connected surface water bodies.

runoff within the Project Area. To manage the expected increase in stormwater runoff, a stormwater management basin with associated swales and level spreaders are proposed. The basin is designed to treat the water quality volume as defined by *Appendix I*, which assumes that the solar panels, roadways, gravel surfaces, and transformer pads are effective impervious cover, through the implementation of two (2) outlet control devices and overflow weir.

Due to the nature of the existing slopes on-site, additional design practices have been incorporated into this project as a means of both stormwater management as well as erosion control. The proposed array has been rotated so that the panel azimuth parallels the existing slope to the extent practicable, which follows best design practices per *Appendix I*. Additionally, a series of filter socks are proposed along contour at a maximum distance of 75 feet along the slope to prevent the formation of shallow concentrated flow paths to the extent practicable. To further ensure site stability, the area to be cleared will have the stumps left in place to be ground/sheered instead of removed to preserve the existing soils stability. Once clearing is complete, any disturbed portion of the site will be hydroseeded and the construction schedule/phasing allows for a minimum of one (1) month time for stabilization prior to continued site work.

For technical details regarding stormwater, please refer to the Stormwater Management Report submitted under separate cover.

The Project Area that will be cleared and grubbed during construction will be stabilized via hydroseeding with a low growth seed mix, New England semi-shade grass and forbs mix or equal. To safeguard water resources from potential impacts during construction, the Petitioner is committed to implementing protective measures in the form of a Stormwater Pollution Control Plan ("SWPCP") to be finalized and submitted to the Council, pending approval by DEEP Stormwater Management. The SWPCP will include monitoring of established E&S controls that will be installed and maintained in accordance with the 2002 *Connecticut Guidelines for Soil Erosion and Sediment Control*. The Petitioner will also apply for a *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities* from DEEP. Therefore, with the incorporation of adequate protective measures, stormwater runoff from Project development will not result in an adverse impact to water quality associated with nearby surface water bodies.

3.5 Air Quality

The Site is currently undeveloped and as such, no air emissions are generated.

Due to the nature of a solar energy generating facility, no air emissions will be generated during operations and, 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, nonetheless, be mitigated using available measures, including, inter alia, 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.

3.6 Soils and Geology

Surficial materials on and within the vicinity of the Site are comprised of glacial till. Soils located on and within the vicinity of the Site are identified as Holyoke-Rock outcrop complex, Wethersfield Loam, Cheshire-Holyoke complex, Cheshire fine sandy loam, Ludlow silt loam, and Ridgebury, Leicester, and Whitman soils. Holyoke soils consist of shallow, well drained and somewhat excessively drained soils formed in a thin mantle of till derived mainly from basalt and red sandstone, conglomerate, and shale. They are nearly level to very steep soils on bedrock-controlled ridges and hills. Cheshire soils consist of very deep, well drained loamy soils formed in supraglacial till on uplands. They are nearly level through very steep soils on till plains and hills. Wethersfield soils consist of very deep, well drained loamy soils formed in dense glacial till on uplands. The soils are moderately deep to dense basal till. They are nearly level to steep soils on till plains, low ridges, and drumlins. Ludlow soils consist of moderately well drained soils formed in loamy lodgment till. They are very deep to bedrock and moderately deep to a densic contact. They are nearly level to strongly sloping soils on till plains, hills, and drumlins. Ridgebury, Leicester, and Whitman soils consist of very deep, somewhat poorly and poorly drained soils formed in lodgment till derived mainly from granite, gneiss and/or schist. They are commonly shallow to a densic contact. They are nearly level to gently sloping soils in depressions in uplands.

They also occur in drainageways in uplands, in toeslope positions of hills, drumlins, and ground moraines, and in till plains.

Bedrock geology beneath the Site is identified as West Rock Dolerite (western extents of Site) and New Haven Arkose (eastern extents of Site). West Rock Dolerite generally consists of Dark-gray to greenish-gray (weathers bright orange to brown), medium- to fine-grained, grading from basalt. New Haven Arkose generally consists of Red, pink, and gray coarse-grained, locally conglomeratic, poorly sorted and indurated arkose. The Petitioner does not anticipate encountering bedrock during Project development as ground disturbance will be minimized through ground-screw solar racking systems.

Once vegetative clearing activities are completed, grading for the proposed stormwater management basins/swales will occur. The construction of the stormwater management basin will generate excess material that will be either re-used on-Site or trucked off-Site. The reuse of material will minimize the need for importing fill to the Site and reduce the amount of truck traffic leaving the Site to dispose of that material. Approximately 1,458 CY of material will need to be removed off-Site. A vegetated earthen berm is proposed along the southern Site boundary to aide in providing a natural visibility barrier, helping to soften views of the Facility to nearby properties to the south. Small amounts of fill will be required to construct this vegetated berm. For the locations of the proposed berm and stormwater basin/features please see *Appendix A, Project Plans.*

Once the proposed stormwater management features are installed, minimal grading is required for construction of the remainder of the Project. Some minor grading may be required to establish the gravel access road and install concrete equipment pads. See *Appendix A, Project Plans.*

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*.

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,[9] no Prime Farmland Soils are located on the Site. As such, the Project will not materially affect Prime Farmland Soils. (See Figure 2, *Existing Conditions Map).*

The entirety of the Project Area has remained undeveloped and consists of mature hardwood forest that is largely unmanaged or disturbed. This lack of management activities has allowed the entirety of the Project Area to remain forested and therefore plowing or crop rotation has not occurred for several decades. Historically, a small cleared field was maintained in the extreme northeast corner of the Site prior to reforestation starting in the 1970s.

Recognizing that the Project has a useful life and could be considered temporary in nature, the Petitioner has proposed using minimally intrusive methods for construction of the Facility. The use of ground-screw mounts for installation of the solar panels minimizes the need for substantial grading or surface disturbance. These stormwater management controls allow the Project to be in compliance with the requirement of DEEP's *Appendix I*. Topsoil removed from the Project Area will be segregated from underlying horizons and used as top dressing for reestablishing vegetation.

Table 4: Farmland Soils Assessment and Impacts Table

Table 4: Farmland Soils Assessment and Impacts Table		
Farmland Soil Classification	Total Area On-Site (+/- ac.)	Area within Project Limits (+/- ac.)
Prime Farmland Soil Area	54.3	0.0
Unique Farmland Soil Area	n/a	n/a
Statewide Important Farmland Soils Area	160624.6	94582.02

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

3.7 Historic and Archaeological Resources

Heritage Consultants LLC ("Heritage Consultants") of Newington, Connecticut, reviewed relevant historic and archaeological information to determine whether the Site holds potential 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 properties or historic standing structures listed on the National Register of Historic Places ("NRHP") are located on or proximate to the Site. One nearby property deemed eligible for listing on the NHRP (the Caleb Doolittle Jr. House on the abutting property to the north of the Site) was identified. This information is documented in Heritage Consultant's Phase 1A Cultural Resources Assessment Survey.

In terms of archaeological potential, western extents of the Site are characterized by slopes, wet soils, and/or obvious signs of major disturbances and as such no intact archeological deposits are expected. In contrast, northern portions of the Site are characterized by low slopes and well-drained soils apparently free of large numbers of stones. As a result, it was determined that this portion of the Project Area has the potential to contain intact archaeological deposits in the subsoil and, at the request of the Petitioner, Heritage Consultants performed a Phase 1B Cultural Resources Reconnaissance Survey in June of 2020.

Fieldwork for this assessment included a pedestrian survey, photo-documentation, and the excavation of 12 shovel tests across the northern Project Area. This effort did not identify any artifacts, features, or cultural resources loci. As such, no additional examination of the Project Area is recommended prior to construction.

On behalf of APT, Heritage Consultants submitted Project and Site historic/cultural information, including copies of the Phase 1A and 1B Surveys, to the SHPO for agency review and comment in June of 2020. A response from SHPO is pending.

Copies of the Phase 1A/1B Survey reports are included in Appendix D, *Cultural Resources Survey Reports.*

3.8 Scenic and Recreational Areas

No state designated scenic roads or scenic areas are located near the Site. No local scenic roads are located near the Site. The nearest local scenic road, Hillfield Road, is located approximately 1 mile east of the Site. The nearest recreational area is the Quinnipiac Trail located approximately 0.12 miles to the west. See Figure 6, *Surrounding Features Map,* for other resources located within one-mile of the Site.

No state designated scenic roads or recreational areas will be physically or visually impacted by development of the Project.

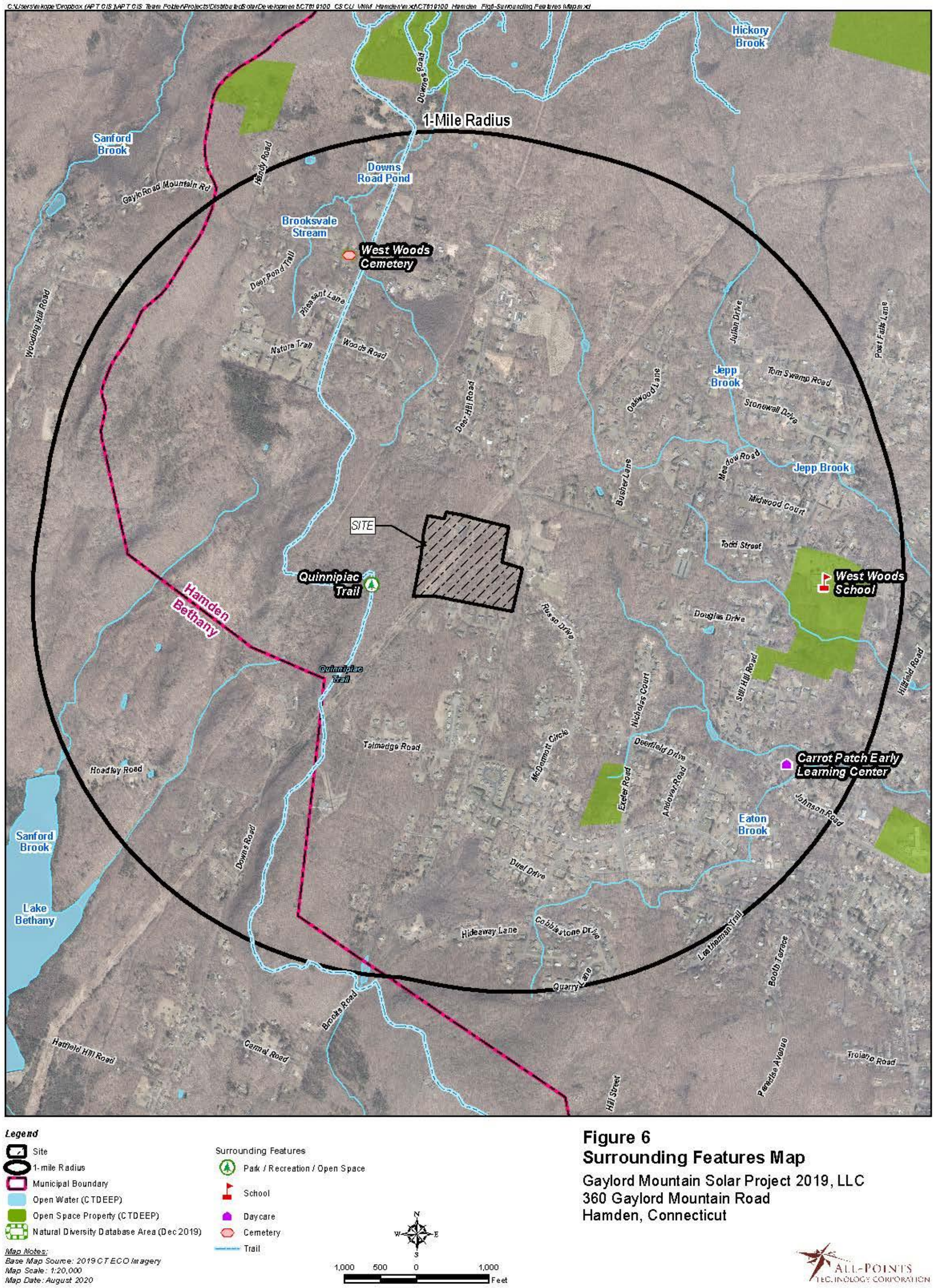

Figure 6
Surrounding Features Map
Gaylord Mountain Solar Project 2019, LLC
360 Gaylord Mountain Road
Hamden, Connecticut

All-Points Technology Corporation

3.9 Noise

With the exception of the existing wireless telecommunications tower and electrical transmission corridor, the majority of the Site is undeveloped; no unusual noise sources presently exist.

The Town has enacted a noise ordinance[10] that is generally consistent with State of Connecticut noise regulations. Construction noise is exempted during daytime hours (7a.m. to 9 p.m.). During construction of the Facility, the temporary increase in noise would likely raise localized ambient sound levels immediately surrounding the Project Area limited to daytime hours. 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.

Once operational, noise from the Project will be minimal and meet applicable State and Town noise standards for a Residential Daytime/Nighttime Zones.[11] The Site is located within a Residential Zone and is abutted by residential areas. Conservatively, the Facility would be an Industrial noise emitter to Residential receptors. As such, it is subject to noise standards of 61 dBA during the daytime and 51 dBA at night.

The only noise generating equipment planned at the Facility are the inverters and transformers. Based on the most conservative information provided by specified equipment manufacturers, the anticipated inverters and transformers for the proposed Facility will typically generate sound levels at or below 56 dBA and 68 dBA, respectively, at a distance of 3 meters (less than 10 feet).

The closest residence relative to the nearest inverter/transformer is approximately 217 feet to the south, off Hunting Ridge Road. The nearest residential parcel boundary is with 18 Hunting Ridge Road, approximately 96 feet to the southeast of the Project Area. Sound reduces with distance and the inverters and transformers are inactive at night. Due to the proposed separation distance it is anticipated that noise levels from the Project-related equipment during operation will be below 61/51 dBA at surrounding property lines.

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[10] Town of Hamden Legislative Council, An Ordinance Providing for the Reduction or Elimination of Excessive Noise and the Administration Thereof.

[11]

Please refer to the inverter and transformer specification sheet provided in Appendix E, *Product Information Sheets*.

3.10 Lighting

The Site is undeveloped where no light sources currently exist.

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

3.11 FAA Determination

APT submitted relevant Project information to the Federal Aviation Administration ("FAA") for an aeronautical study to evaluate potential hazards to air navigation. The FAA provided a Determination of No Hazard to Air Navigation on May 11, 2020. See Appendix F, *FAA Determination*. Based on this determination, there is no need to conduct a glare analysis.

3.12 Visibility

The Facility will consist of 11,492 non-reflective solar panels measuring approximately 10 feet above final grade surrounded by a six (6) foot tall security fence. The proposed electrical interconnection to the existing electrical distribution line located on Gaylord Mountain Road may require the installation of new utility poles.

Year-round visibility of the proposed Facility will be confined to areas within the immediate vicinity of the Site, primarily from portions of some abutting properties to the south along Hunting Ridge Road and east across Gaylord Mountain Road. Views from select locations along Hunting Ridge Road will be minimized by the combination of maintaining a 50-foot non-clearing buffer to the property line and the construction of a vegetated earthen berm along the southern portion of the Project Area. Limited seasonal views, when the leaves are off of the deciduous trees, could extend as far as approximately 800 to 1,000 feet in all directions. No visual receptors (e.g. residences, roadways) are located to the north or west of the Site. In general, views beyond the immediate area would be minimized by a combination of the Facility's low height and the presence of intervening vegetation and topography.

The solar modules are designed to absorb incoming solar radiation and minimize reflectivity, such that only a small percentage of incidental light will be reflected off the panels. This incidental light is significantly less reflective than common building materials, such as steel, or the surface of smooth water. The panels will be tilted up toward the southern sky at a fixed angle of 30 degrees, thereby further reducing reflectivity. Please see Appendix G, *Photo-simulations and Viewshed Map* for visual simulations and a viewshed analysis of the proposed Project.

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. Once operative, the Facility will be unstaffed and generate minimal traffic.

Core forest will not be materially affected by the Project. Tree removal activities will occur primarily within existing 'edge' upland forest, habitat that occurs elsewhere on and adjacent to the Site. The Project is not expected to result in a significant negative impact to this habitat or to wildlife.

No Prime Farmland Soils exist at the Site. Regardless, the Petitioner has designed the Project to minimize disturbances to Site soils by proposing minimally intrusive methods for construction and installation of Facility components, limiting the amounts of cuts/fills and grading to the extent feasible, and ensuring that limited soil will be exported from the Site. Once the Facility has reached the end of its projected useful life, the panels and equipment can be removed and the Project Area restored.

No wetlands or watercourses will be permanently directly impacted by the Project. To promote protection of nearby wetlands and watercourses during construction, safeguards have been developed to avoid unintentional impacts to these resources in the form of a Resources Protection Plan. In addition, E&S controls will be installed and maintained throughout construction in accordance with the 2002 *Connecticut Guidelines for Soil Erosion and Sediment Control*. Implementing these management techniques will mitigate the potential for adverse impacts to wetland resources.

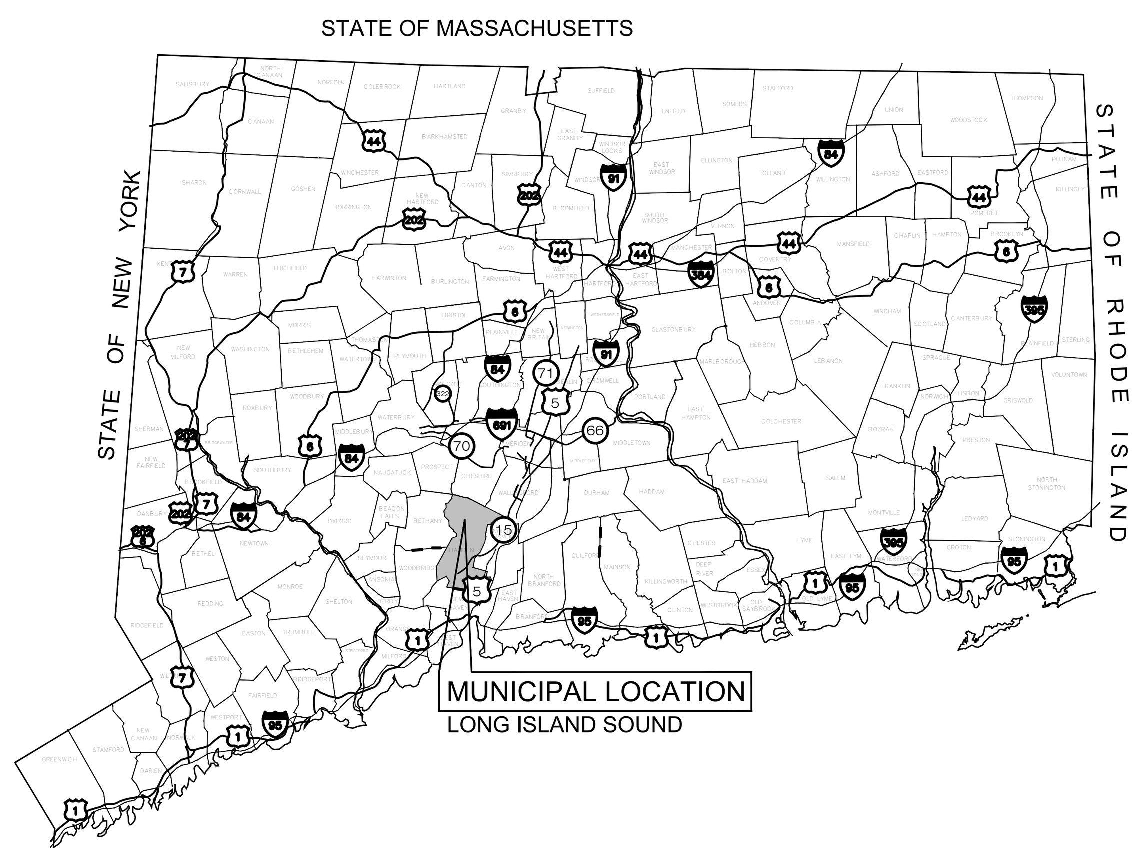
No State-listed species have been identified as potentially occurring within the vicinity of the Site. One federally-listed species (Northern Long-Eared Bat) has been identified as potentially occurring within the vicinity of the Site. In compliance with the USFWS criteria for assessing NLEB, the Project will not likely result in an adverse effect or incidental take of NLEB and does not require a permit from USFWS.

Portions of the Facility will likely be seen from surrounding areas, including adjoining residential properties and Gaylord Mountain Road. The construction of a vegetated earthen berm along the southern edge of the Project Area will help minimize views from the south. The majority of views of the Facility would occur from locations within less than 1,000 feet of the Site.

Overall, the Project's design minimizes the creation of impervious surfaces. The Project has been designed to adequately handle stormwater runoff through the creation of stormwater basins, drainage swales, and a level spreader proposed at peripheral locations of the Facility. Excavations and regrading will be required to allow for the installation of the stormwater management features, construction of the vegetated earthen berm and temporary/permanent access roads, but the majority of the Project Area will maintain existing grades for the installation of the solar arrays. The Project has been designed in accordance with the DEEP's *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities*. The Petitioner will implement a SWPCP, in accordance with the 2002 *Connecticut Guidelines for Soil Erosion and Sediment Control*, that will include provisions for monitoring of development activities and the establishment of E&S controls to be installed and maintained throughout construction.

APPENDIX A

PROJECT PLANS



DISTRIBUTED SOLAR OPERATIONS, LLC

"HAMDEN SOLAR"

360 GAYLORD MOUNTAIN RD HAMDEN, CT

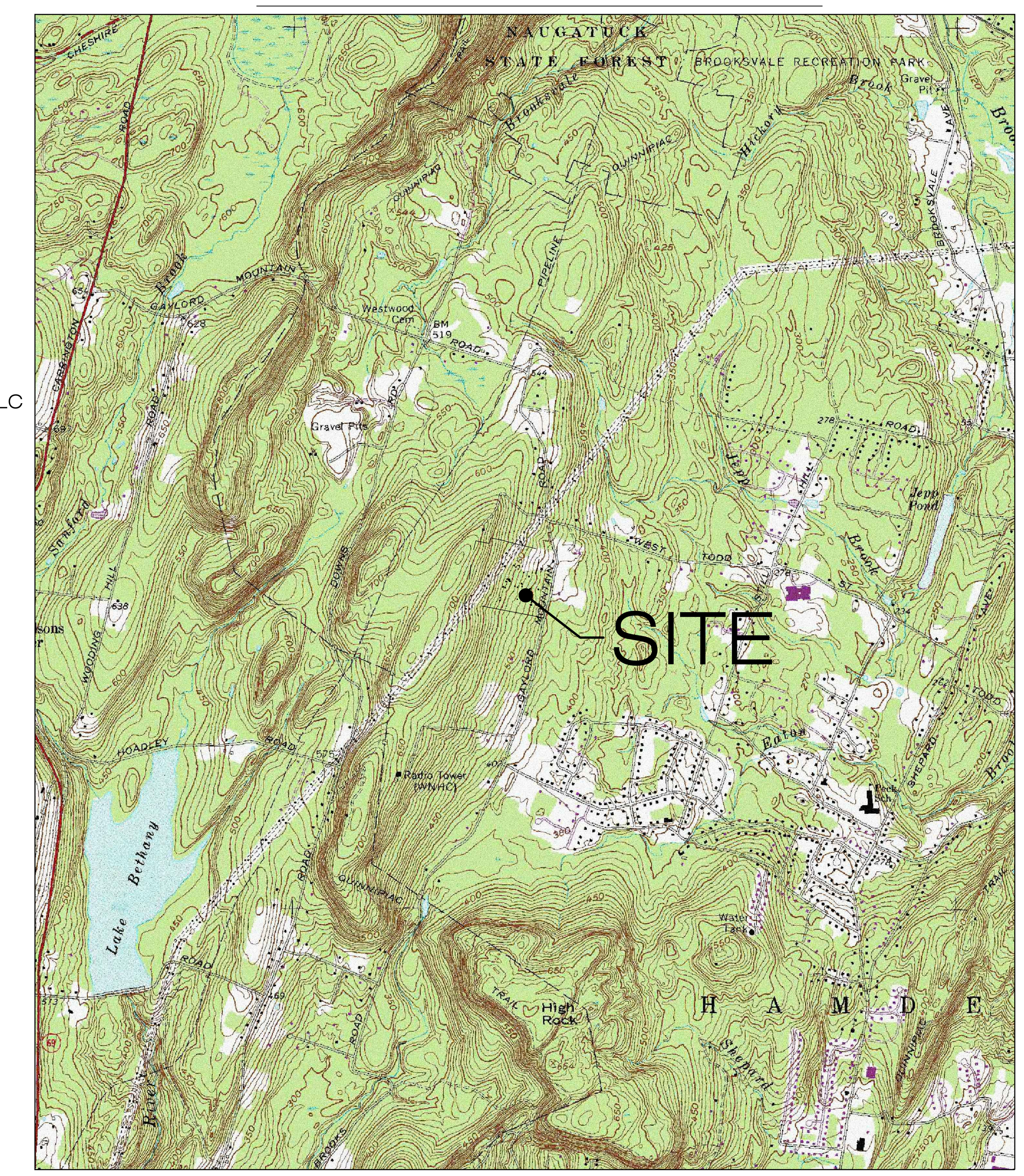
PERMITTING PLAN SET
AUGUST 7, 2020

LIST OF DRAWINGS

SITE INFORMATION

SITE NAME:	"HAMDEN SOLAR"
LOCATION:	360 GAYLORD MOUNTAIN RD HAMDEN, CT
SITE TYPE/DESCRIPTION:	ADD (1) GROUND MOUNTED SOLAR PANEL ARRAY W/ ASSOCIATED EQUIPMENT.
PROPERTY OWNER:	VERTICAL BRIDGE LANCO LLC 750 PARK OF COMMERCE DR S200 BOCA RATON, FL 33487
APPLICANT:	GAYLORD MOUNTAIN SOLAR PROJECT 2019, LLC 200 HARBORSIDE DRIVE, SUITE 200 SCHENECTADY, NY 12305
ENGINEER CONTACT:	BRADLEY J. PARSONS, P.E. (860) 663-1697 x208
LATITUDE:	41°25'53.99" N
LONGITUDE:	72°56'36.37" W
ELEVATION:	581'± AMSL
MBLU:	3224-025-01
ZONE:	R-2
EXISTING LAND USE:	RAD/TV TR M96, EXISTING WOODS
PROPOSED LAND USE:	COMMUNICATIONS, TRANSPORTATION AND PUBLIC UTILITY USES - LARGE SCALE GROUND MOUNTED SOLAR PHOTOVOLTAIC INSTALLATIONS
TOTAL SITE ACERAGE:	33.88± AC.
TOTAL DISTURBED AREA:	12.31± AC.
APPROX. VOLUME OF CUT:	5,639± CY
APPROX. VOLUME OF FILL:	4,181± CY
APPROX. NET VOLUME:	1,458± CY OF CUT

USGS TOPOGRAPHIC MAP



SCALE : 1" = 2000'± SOURCE: USGS 7.5 MOUNT CARMEL QUADRANGLE, CT 2012

GAYLORD MOUNTAIN SOLAR PROJECT 2019, LLC
200 HARBORSIDE DRIVE
SUITE 200
SCHENECTADY, NY 12305

ALL-POINTS TECHNOLOGY CORPORATION
567 VAUXHAUL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-663-1697
WWW.ALLPOINTSTECH.COM FAX: (860)-663-0935

CSC PERMIT SET

NO	DATE	REVISION
0	08/07/20	ISSUED FOR PERMIT: BJP
1		
2		
3		
4		
5		
6		

DESIGN PROFESSIONAL OF RECORD

PROF: BRADLEY J. PARSONS P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION
ADD: 567 VAUXHAUL STREET EXTENSION - SUITE 311 WATERFORD, CT 06385

OWNER: VERTICAL BRIDGE LANCO LLC
ADDRESS: 750 PARK OF COMMERCE DR S200 BOCA RATON, FL 33487

HAMDEN SOLAR

SITE ADDRESS: 360 GAYLORD MOUNTAIN RD HAMDEN, CT

APT FILING NUMBER: CT619100

	DRAWN BY: JT
DATE: 08/07/20	CHECKED BY: BJP

SHEET TITLE:

TITLE SHEET & INDEX

SHEET NUMBER:

T-1

STATE OF CONNECTICUT · LICENSED PROFESSIONAL ENGINEER · No. 28026

1
OP-1

OVERALL DEVELOPMENT MAP

SCALE : 1" = 80'-0"

80 0 40 80 160
(IN FEET) 1 inch = 80 ft.

GAYLORD MOUNTAIN SOLAR PROJECT 2019, LLC

200 HARBORSIDE DRIVE
SUITE 200
SCHENECTADY, NY 12305

ALL-POINTS
TECHNOLOGY CORPORATION

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WATERFORD, CT 06385 PHONE: (860)-663-1697
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CSC PERMIT SET

NO	DATE	REVISION
0	08/07/20	ISSUED FOR PERMIT: BJP
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DESIGN PROFESSIONAL OF RECORD

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HAMDEN SOLAR

SITE ADDRESS: 360 GAYLORD MOUNTAIN RD HAMDEN, CT

APT FILING NUMBER: CT619100

DRAWN BY: JT

DATE: 08/07/20 CHECKED BY: BJP

SHEET TITLE:

OVERALL DEVELOPMENT MAP

SHEET NUMBER:

OP-1

STATE OF CONNECTICUT
BRADLEY J. PARSONS
No. 28025
LICENSED
PROFESSIONAL ENGINEER

EROSION CONTROL NOTES

EROSION AND SEDIMENT CONTROL PLAN NOTES

1. THE CONTRACTOR SHALL CONSTRUCT ALL SEDIMENT AND EROSION CONTROLS IN ACCORDANCE WITH THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL, LATEST EDITION, IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, AND AS DIRECTED BY THE TOWN OF PERMITTEE AND/OR SWPCP MONITOR. ALL PERIMETER SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE START OF CLEARING AND GRUBBING AND DEMOLITION OPERATIONS.

2. THESE DRAWINGS ARE ONLY INTENDED TO DESCRIBE THE SEDIMENT AND EROSION CONTROL MEASURES FOR THIS SITE. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHOWN ON THE EROSION & SEDIMENT CONTROL PLAN ARE SHOWN IN A GENERAL SIZE AND LOCATION ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ALL EROSION CONTROL MEASURES ARE CONFIGURED AND CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION OF SOILS AND PREVENT THE TRANSPORT OF SEDIMENTS AND OTHER POLLUTANTS TO STORM DRAINAGE SYSTEMS AND/OR WATERCOURSES. ACTUAL SITE CONDITIONS OR SEASONAL AND CLIMATIC CONDITIONS MAY WARRANT ADDITIONAL CONTROLS OR CONFIGURATIONS, AS REQUIRED, AND AS DIRECTED BY THE PERMITTEE AND/OR SWPCP MONITOR. SEE SEDIMENT AND EROSION CONTROL DETAILS AND SUGGESTED CONSTRUCTION SEQUENCE FOR MORE INFORMATION. REFER TO SITE PLAN FOR GENERAL INFORMATION AND OTHER CONTRACT PLANS FOR APPROPRIATE INFORMATION.

3. A BOND OR LETTER OF CREDIT MAY BE REQUIRED TO BE POSTED WITH THE GOVERNING AUTHORITY FOR THE EROSION CONTROL INSTALLATION AND MAINTENANCE.

4. THE CONTRACTOR SHALL APPLY THE MINIMUM EROSION & SEDIMENT CONTROL MEASURES SHOWN ON THE PLAN IN CONJUNCTION WITH CONSTRUCTION SEQUENCING, SUCH THAT ALL ACTIVE WORK ZONES ARE PROTECTED. ADDITIONAL AND/OR ALTERNATIVE SEDIMENT AND EROSION CONTROL MEASURES MAY BE INSTALLED DURING THE CONSTRUCTION PERIOD IF FOUND NECESSARY BY THE CONTRACTOR, OWNER, SITE ENGINEER, MUNICIPAL OFFICIALS, OR ANY GOVERNING AGENCY. THE CONTRACTOR SHALL CONTACT THE OWNER AND APPROPRIATE GOVERNING AGENCIES FOR APPROVAL IF ALTERNATIVE CONTROLS OTHER THAN THOSE SHOWN ON THE PLANS ARE PROPOSED BY THE CONTRACTOR.

5. THE CONTRACTOR SHALL TAKE EXTREME CARE DURING CONSTRUCTION SO AS NOT TO DISTURB UNPROTECTED WETLAND AREAS OR INSTALLED SEDIMENTATION AND EROSION CONTROL MEASURES. THE CONTRACTOR SHALL INSPECT ALL SEDIMENT AND EROSION CONTROLS WEEKLY AND WITHIN 24 HOURS OF A STORM WITH A RAINFALL AMOUNT OF 0.25 INCHES OR GREATER TO VERIFY THAT THE CONTROLS ARE OPERATING PROPERLY AND MAKE REPAIRS AS NECESSARY IN A TIMELY MANOR.

6. THE CONTRACTOR SHALL KEEP A SUPPLY OF EROSION CONTROL MATERIAL (SILT FENCE, COMPOST FILTER SOCK, EROSION CONTROL BLANKET, ETC.) ON-SITE FOR PERIODIC MAINTENANCE AND EMERGENCY REPAIRS.

7. ALL FILL MATERIAL PLACED ADJACENT TO ANY WETLAND AREA SHALL BE GOOD QUALITY, WITH LESS THAN 5% FINES PASSING THROUGH A #200 SIEVE (BANK RUN), SHALL BE PLACED IN MAXIMUM ONE FOOT LIFTS, AND SHALL BE COMPACTED TO 95% MAX. DRY DENSITY MODIFIED PROCTOR OR AS SPECIFIED IN THE CONTRACT SPECIFICATIONS.

8. PROTECT EXISTING TREES THAT ARE TO BE SAVED BY FENCING, ORANGE SAFETY FENCE, CONSTRUCTION TAPE, OR EQUIVALENT FENCING/TAPE. ANY LIMB TRIMMING SHOULD BE DONE AFTER CONSULTATION WITH AN ARBORIST AND BEFORE CONSTRUCTION BEGINS IN THAT AREA; FENCING SHALL BE MAINTAINED AND REPAIRED DURING CONSTRUCTION.

9. CONSTRUCTION ENTRANCES (ANTI-TRACKING PADS) SHALL BE INSTALLED PRIOR TO ANY SITE EXCAVATION OR CONSTRUCTION ACTIVITY AND SHALL BE MAINTAINED THROUGHOUT THE DURATION OF ALL CONSTRUCTION IF REQUIRED. THE LOCATION OF THE TRACKING PADS MAY CHANGE AS VARIOUS PHASES OF CONSTRUCTION ARE COMPLETED. CONTRACTOR SHALL ENSURE THAT ALL VEHICLES EXITING THE SITE ARE PASSING OVER THE ANTI-TRACKING PADS PRIOR TO EXISTING.

10. ALL CONSTRUCTION SHALL BE CONTAINED WITHIN THE LIMIT OF DISTURBANCE, WHICH SHALL BE MARKED WITH SILT FENCE, SAFETY FENCE, HAY BALES, RIBBONS, OR OTHER MEANS PRIOR TO CLEARING. CONSTRUCTION ACTIVITY SHALL REMAIN ON THE UPHILL SIDE OF THE SEDIMENT BARRIER UNLESS WORK IS SPECIFICALLY CALLED FOR ON THE DOWNHILL SIDE OF THE BARRIER.

11. NO CUT OR FILL SLOPES SHALL EXCEED 2:1 EXCEPT WHERE STABILIZED BY ROCK FACED EMBANKMENTS OR EROSION CONTROL BLANKETS. ALL SLOPES SHALL BE SEEDED AND BANKS WILL BE STABILIZED IMMEDIATELY UPON COMPLETION OF FINAL GRADING UNTIL TURF IS ESTABLISHED.

12. DIRECT ALL DEWATERING PUMP DISCHARGE TO A SEDIMENT CONTROL DEVICE THE GUIDELINES WITHIN THE APPROVED LIMIT OF DISTURBANCE IF REQUIRED. DISCHARGE TO STORM DRAINS OR SURFACE WATERS FROM SEDIMENT CONTROLS SHALL BE CLEAR AND APPROVED BY THE PERMITTEE OR MUNICIPALITY.

13. THE CONTRACTOR SHALL MAINTAIN A CLEAN CONSTRUCTION SITE AND SHALL NOT ALLOW THE ACCUMULATION OF RUBBISH OR CONSTRUCTION DEBRIS ON THE SITE. PROPER SANITARY DEVICES SHALL BE MAINTAINED ON-SITE AT ALL TIMES AND SECURED APPROPRIATELY. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID THE SPILLAGE OF FUEL OR OTHER POLLUTANTS ON THE CONSTRUCTION SITE AND SHALL ADHERE TO ALL APPLICABLE POLICIES AND REGULATIONS RELATED TO SPILL PREVENTION AND RESPONSE/CONTAINMENT.

14. MINIMIZE LAND DISTURBANCES. SEED AND MULCH DISTURBED AREAS WITH TEMPORARY MIX AS SOON AS PRACTICABLE (2 WEEK MAXIMUM UNSTABILIZED PERIOD) USING PERENNIAL RYEGRASS AT 40 LBS PER ACRE. MULCH ALL CUT AND FILL SLOPES AND SWALES WITH LOOSE HAY AT A RATE OF 2 TONS PER ACRE. IF NECESSARY, REPLACE LOOSE HAY ON SLOPES WITH EROSION CONTROL BLANKETS OR JUTE CLOTH. MODERATELY GRADED AREAS, ISLANDS, AND TEMPORARY CONSTRUCTION STAGING AREAS MAY BE HYDROSEEDED WITH TACKIFIER.

15. SWEEP AFFECTED PORTIONS OF OFF SITE ROADS ONE OR MORE TIMES A DAY (OR LESS FREQUENTLY IF TRACKING IS NOT A PROBLEM) DURING CONSTRUCTION. FOR DUST CONTROL, PERIODICALLY MOISTEN EXPOSED SOIL SURFACES WITH WATER ON UNPAVED TRAVELWAYS TO KEEP THE TRAVELWAYS DAMP. CALCIUM CHLORIDE MAY ALSO BE APPLIED TO ACCESS ROADS. DUMP TRUCK LOADS EXITING THE SITE SHALL BE COVERED.

16. TURF ESTABLISHMENT SHALL BE PERFORMED OVER ALL DISTURBED SOIL, UNLESS THE AREA IS UNDER ACTIVE CONSTRUCTION, IT IS COVERED IN STONE OR SCHEDULED FOR PAVING WITHIN 30 DAYS. TEMPORARY SEEDING OR NON-LIVING SOIL PROTECTION OF ALL EXPOSED SOILS AND SLOPES SHALL BE INITIATED WITHIN THE FIRST 7 DAYS OF SUSPENDING WORK IN AREAS TO BE LEFT LONGER THAN 30 DAYS.

17. MAINTAIN ALL PERMANENT AND TEMPORARY SEDIMENT CONTROL DEVICES IN EFFECTIVE CONDITION THROUGHOUT THE CONSTRUCTION PERIOD. UPON COMPLETION OF WORK SWEEP CONCRETE PADS, CLEAN THE STORMWATER MANAGEMENT SYSTEMS AND REMOVE ALL TEMPORARY SEDIMENT CONTROLS ONCE THE SITE IS FULLY STABILIZED AND APPROVAL HAS BEEN RECEIVED FROM PERMITTEE OR THE MUNICIPALITY.

18. SEEDING MIXTURES SHALL BE NEW ENGLAND SEMI-SHADE GRASS AND FORBS MIX (SEE SITE DETIALS SHEET DN-1), OR APPROVED EQUAL BY OWNER.

SEDIMENT & EROSION CONTROL NARRATIVE

1. THE PROJECT INVOLVES THE CONSTRUCTION OF A GROUND MOUNTED SOLAR PANEL FACILITY WITH ASSOCIATED EQUIPMENT, INCLUDING THE CLEARING, GRUBBING AND GRADING OF APPROXIMATELY 12.31± ACRES OF EXISTING LOT.

THE PROPOSED PROJECT INVOLVES THE FOLLOWING CONSTRUCTION:

A. CLEARING, GRUBBING, AND GRADING OF EXISTING LOT.
B. CONSTRUCTION OF 6,292 GROUND MOUNTED SOLAR PANELS AND ASSOCIATED EQUIPMENT.
B. THE STABILIZATION OF DISTURBED AREAS WITH PERMANENT GRASS TREATMENTS.

2. FOR THIS PROJECT, THERE ARE APPROXIMATELY 12.31± ACRE OF THE SITE BEING DISTURBED WITH NEGLIGIBLE INCREASE IN THE IMPERVIOUS AREA OF THE SITE, AS ALL ACCESS THOUGH THE SITE WILL BE GRAVEL. IMPERVIOUS AREAS ARE LIMITED TO THE CONCRETE PADS FOR ELECTRICAL EQUIPMENT.

3. THE PROJECT SITE, AS MAPPED IN THE SOIL SURVEY OF STATE OF CONNECTICUT (NRCS, VERSION 19, SEP 13, 2019), CONTAINS TYPE 64C, 77D (HYDROLOGIC SOIL GROUP B) AND 87C, 87D, 89C (HYDROLOGIC SOIL GROUP C) SOILS. A GEOTECHNICAL ENGINEERING REPORT HAS BEEN COMPLETED BY DOWN TO EARTH CONSULTING, LLC DATED MAY 2020..

4. IT IS ANTICIPATED THAT CONSTRUCTION WILL BE COMPLETED IN APPROXIMATELY 5-6 MONTHS.

5. REFER TO THE CONSTRUCTION SEQUENCING AND EROSION AND SEDIMENTATION NOTES FOR INFORMATION REGARDING SEQUENCING OF MAJOR OPERATIONS IN THE ON-SITE CONSTRUCTION PHASES.

6. STORMWATER MANAGEMENT DESIGN CRITERIA UTILIZES THE APPLICABLE SECTIONS OF THE 2004 CONNECTICUT STORMWATER QUALITY MANUAL AND THE TOWN OF HAMDEN STANDARDS, TO THE EXTENT POSSIBLE AND PRACTICABLE FOR THIS PROJECT ON THIS SITE. EROSION AND SEDIMENTATION MEASURES ARE BASED UPON ENGINEERING PRACTICE, JUDGEMENT AND THE APPLICABLE SECTIONS OF THE CONNECTICUT EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS, LATEST EDITION.

7. DETAILS FOR THE TYPICAL STORMWATER MANAGEMENT AND EROSION AND SEDIMENTATION MEASURES ARE SHOWN ON THE PLAN SHEETS OR PROVIDED AS SEPARATE SUPPORT DOCUMENTATION FOR REVIEW IN THIS PLAN.

8. CONSERVATION PRACTICES TO BE USED DURING CONSTRUCTION AREA:
A. STAGED CONSTRUCTION;
B. MINIMIZE THE DISTURBED AREAS TO THE EXTENT PRACTICABLE DURING CONSTRUCTION;
C. STABILIZE DISTURBED AREAS AS SOON AS POSSIBLE WITH TEMPORARY OR PERMANENT MEASURES;
D. MINIMIZE IMPERVIOUS AREAS;
E. UTILIZE APPROPRIATE CONSTRUCTION EROSION AND SEDIMENTATION MEASURES.

9. THE FOLLOWING SEPARATE DOCUMENTS ARE TO BE CONSIDERED A PART OF THE EROSION AND SEDIMENTATION PLAN:
A. STORMWATER MANAGEMENT REPORT DATED JULY 2020.
B. SWPCP DATED JULY 2020

CONSTRUCTION OPERATION AND MAINTENANCE PLAN - BY CONTRACTOR

E&S MEASURE	INSPECTION SCHEDULE	MAINTENANCE REQUIRED
CONSTRUCTION ENTRANCE	DAILY	PLACE ADDITIONAL STONE, EXTEND THE LENGTH OR REMOVE AND REPLACE THE STONE. CLEAN PAVED SURFACES OF TRACKED SEDIMENT.
COMPOST FILTER SOCK	WEEKLY & WITHIN 24 HOURS OF RAINFALL > 0.25"	REPAIR/REPLACE WHEN FAILURE OR DETERIORATION IS OBSERVED.
SILT FENCE	WEEKLY & WITHIN 24 HOURS OF RAINFALL > 0.25"	REPAIR/REPLACE WHEN FAILURE OR DETERIORATION IS OBSERVED. REMOVE SILT WHEN IT REACHES 1/2 THE HEIGHT OF THE FENCE.
TOPSOIL/BORROW STOCKPILES	DAILY	REPAIR/REPLACE SEDIMENT BARRIERS AS NECESSARY.
TEMPORARY SEDIMENT BASIN (W/ BAFFLES)	WEEKLY & WITHIN 24 HOURS OF RAINFALL > 0.5"	REMOVE SEDIMENT ONCE IT HAS ACCUMULATED TO ONE HALF OF MINIMUM REQUIRED VOLUME OF THE WET STORAGE, DEWATERING AS NEEDED. RESTORE TRAP TO ORIGINAL DIMENSIONS. REPAIR/REPLACE BAFFLES WHEN FAILURE OR DETERIORATION IS OBSERVED.
TEMPORARY SOIL PROTECTION	WEEKLY & WITHIN 24 HOURS OF RAINFALL > 0.25"	REPAIR ERODED OR BARE AREAS IMMEDIATELY. RESEED AND MULCH.

SUGGESTED CONSTRUCTION SEQUENCE

THE FOLLOWING SUGGESTED SEQUENCE OF CONSTRUCTION ACTIVITIES IS PROJECTED BASED UPON ENGINEERING JUDGEMENT AND BEST MANAGEMENT PRACTICES. THE CONTRACTOR MAY ELECT TO ALTER THE SEQUENCING TO BEST MEET THE CONSTRUCTION SCHEDULE, THE EXISTING SITE ACTIVITIES AND WEATHER CONDITIONS. SHOULD THE CONTRACTOR ALTER THE CONSTRUCTION SEQUENCE OR ANY EROSION AND SEDIMENTATION CONTROL MEASURES THEY SHALL MODIFY THE STORMWATER POLLUTION CONTROL PLAN ("SWPCP") AS REQUIRED BY THE GENERAL PERMIT. MAJOR CHANGES IN SEQUENCING AND/OR METHODS MAY REQUIRE REGULATORY APPROVAL PRIOR TO IMPLEMENTATION.

1. THE CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING. PHYSICALLY FLAG THE LIMITS OF DISTURBANCE IN THE FIELD AS NECESSARY TO FACILITATE THE PRE-CONSTRUCTION MEETING.

2. CONDUCT A PRE-CONSTRUCTION MEETING TO DISCUSS THE PROPOSED WORK AND EROSION AND SEDIMENTATION CONTROL MEASURES. THE MEETING SHOULD BE ATTENDED BY THE OWNER, THE OWNER'S REPRESENTATIVE(S), THE GENERAL CONTRACTOR, DESIGNATED SUB-CONTRACTORS AND THE PERSON, OR PERSONS, RESPONSIBLE FOR THE IMPLEMENTATION, OPERATION, MONITORING AND MAINTENANCE OF THE EROSION AND SEDIMENTATION MEASURES. THE CONSTRUCTION PROCEDURES FOR THE ENTIRE PROJECT SHALL BE REVIEWED AT THIS MEETING.

3. NOTIFY CALL BEFORE YOU DIG AT 1-800-922-4455, AS REQUIRED, PRIOR TO THE START OF CONSTRUCTION.

PHASE 1

4. REMOVE EXISTING IMPEDIMENTS AS NECESSARY AND PROVIDE MINIMAL CLEARING AND GRUBBING TO INSTALL THE REQUIRED CONSTRUCTION ENTRANCE/S.

5. CLEAR ONLY AS NEEDED TO INSTALL THE PERIMETER EROSION AND SEDIMENTATION CONTROL MEASURES AND, IF APPLICABLE, TREE PROTECTION. ALL WETLAND AREAS SHALL BE PROTECTED BEFORE MAJOR CONSTRUCTION BEGINS, UNLESS OTHERWISE NOTED.

6. INSTALL PERIMETER EROSION CONTROL.

7. CLEAR REMAINING AREA AND GRUB AS NECESSARY TO INSTALL ACCESS ROADS AND SEDIMENT BASIN/STORMWATER MANAGEMENT BASIN AND SWALES. INSTALL FILTER SOCK ALONG CONTOURS AS INDICATED ON EC-3 AND EC-4.

8. INSTALL TEMPORARY SEDIMENT BASIN 1 AND ASSOCIATED SWALES. UPON COMPLETION OF THE INSTALLATION AND STABILIZATION OF THE BASIN AND SWALES, WORK UP GRADIENT CAN PROCEED.

PHASE 2

9. UPON COMPLETION OF THE INSTALLATION OF THE TEMPORARY SEDIMENT BASIN; THE AREA ABOVE THE BASIN CAN HAVE THE REMAINING ARRAY AREA GRUBBING COMPLETED AS REQUIRED. REMOVE CUT WOOD AND STOCKPILE FOR FUTURE USE OR REMOVE OFF-SITE. REMOVE AND DISPOSE OF DEMOLITION DEBRIS OFF-SITE IN ACCORDANCE WITH APPLICABLE LAWS.

10. TEMPORARILY SEED/HYDROSEED ALL DISTURBED AREAS AND ALLOW STABILIZATION FOR A MINIMUM OF THIRTY (30) DAYS.

PHASE 3

11. UPON THE STABILIZATION OF THE SITE, INSTALL CONCRETE EQUIPMENT PAD.

12. INSTALL ELECTRICAL CONDUIT.

13. INSTALL RACKING POSTS FOR GROUND MOUNTED SOLAR PANELS.

14. INSTALL GROUND MOUNTED SOLAR PANELS AND COMPLETE ELECTRICAL INSTALLATION.

15. AFTER SUBSTANTIAL COMPLETION OF THE INSTALLATION OF THE SOLAR PANELS, COMPLETE REMAINING SITE WORK, INCLUDING ANY REQUIRED LANDSCAPE SCREENING, AND STABILIZE ALL DISTURBED AREAS.

16. FINE GRADE, RAKE, SEED AND MULCH ALL REMAINING DISTURBED AREAS.

17. AFTER THE SITE IS STABILIZED AND WITH THE APPROVAL OF THE PERMITTEE AND TOWN OF HAMDEN AGENT, REMOVE PERIMETER EROSION AND SEDIMENTATION CONTROLS.

GAYLORD MOUNTAIN SOLAR PROJECT 2019, LLC

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SCHENECTADY, NY 12305

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567 VAUXHAUL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-663-1697
WWW.ALLPOINTSTECH.COM FAX: (860)-663-0935

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DESIGN PROFESSIONAL OF RECORD

PROF: BRADLEY J. PARSONS P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION
ADD: 567 VAUXHAUL STREET EXTENSION - SUITE 311 WATERFORD, CT 06385

OWNER: VERTICAL BRIDGE LANCO LLC
ADDRESS: 750 PARK OF COMMERCE DR S200 BOCA RATON, FL 33487

HAMDEN SOLAR

SITE ADDRESS: 360 GAYLORD MOUNTAIN RD HAMDEN, CT

APT FILING NUMBER: CT619100

DRAWN BY: JT

DATE: 08/07/20 CHECKED BY: BJP

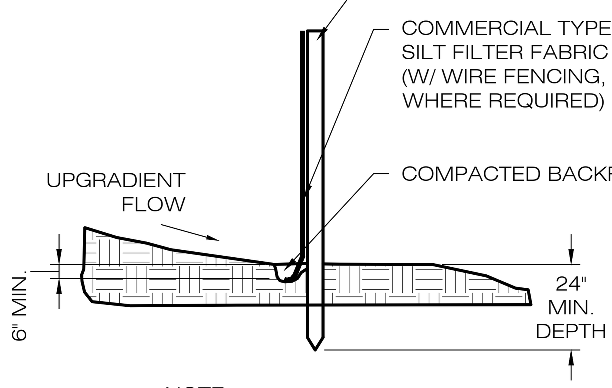
SHEET TITLE:

SEDIMENTATION & EROSION CONTROL NOTES

SHEET NUMBER:

EC-1

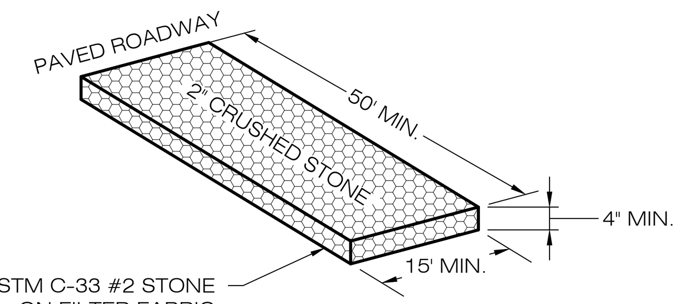
STATE OF CONNECTICUT
BRADLEY J. PARSONS
No. 28025
LICENSED
PROFESSIONAL ENGINEER



NOTE:
SILT FENCE SHALL BE LAPPED ONLY WHEN NECESSARY PER THE MANUFACTURER RECOMMENDATIONS.

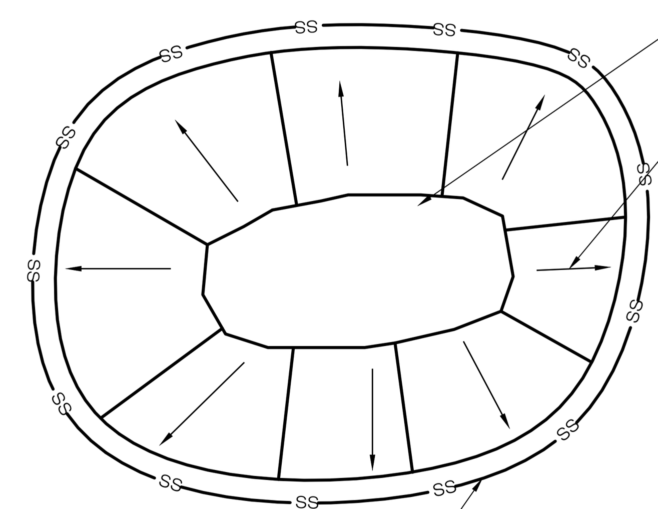
1 EC-4 SILT FENCE DETAIL

SCALE : N.T.S.



2 EC-4 CONSTRUCTION ENTRANCE DETAIL

SCALE : N.T.S.



NOTES:
1. ALL EXISTING EXCAVATED MATERIAL THAT IS NOT TO BE REUSED IN THE WORK IS TO BE IMMEDIATELY REMOVED FROM THE SITE AND PROPERLY DISPOSED OF.

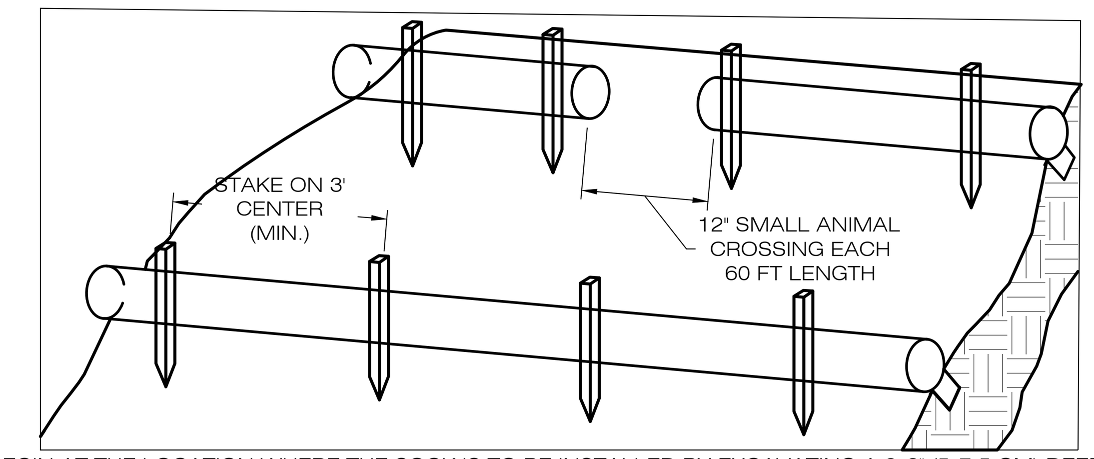
2. SOIL/AGGREGATE STOCKPILE SITES TO BE WHERE SHOWN ON THE DRAWINGS.

3. RESTORE STOCKPILE SITES TO PRE-EXISTING PROJECT CONDITION AND RESEED AS REQUIRED.

4. STOCKPILE HEIGHTS MUST NOT EXCEED 35'. STOCKPILE SLOPES MUST BE 2:1 OR FLATTER.

3 EC-4 MATERIALS STOCKPILE DETAIL

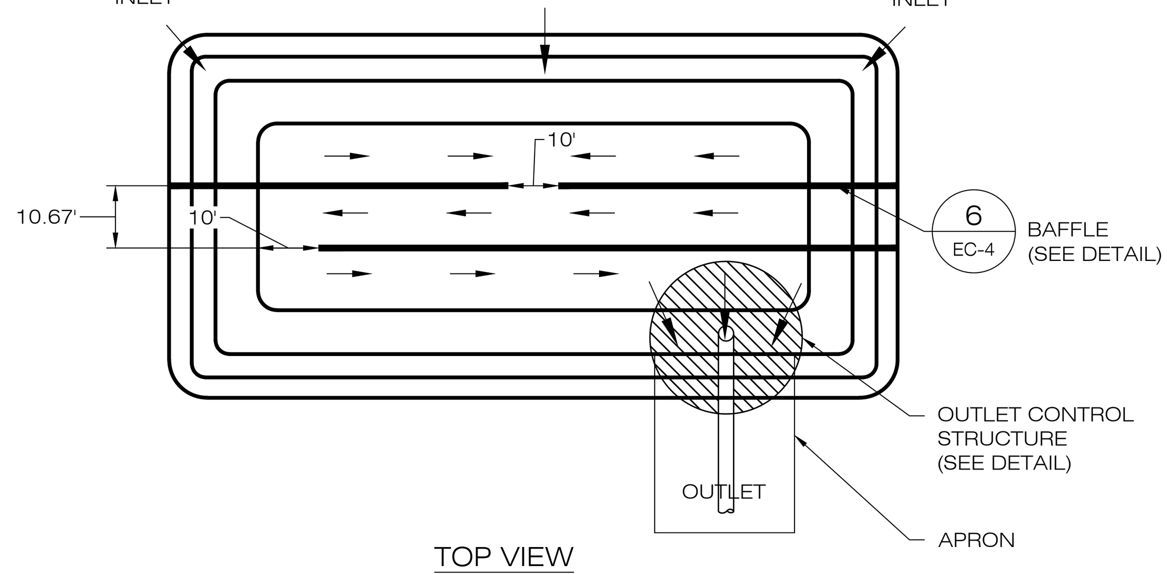
SCALE : N.T.S.



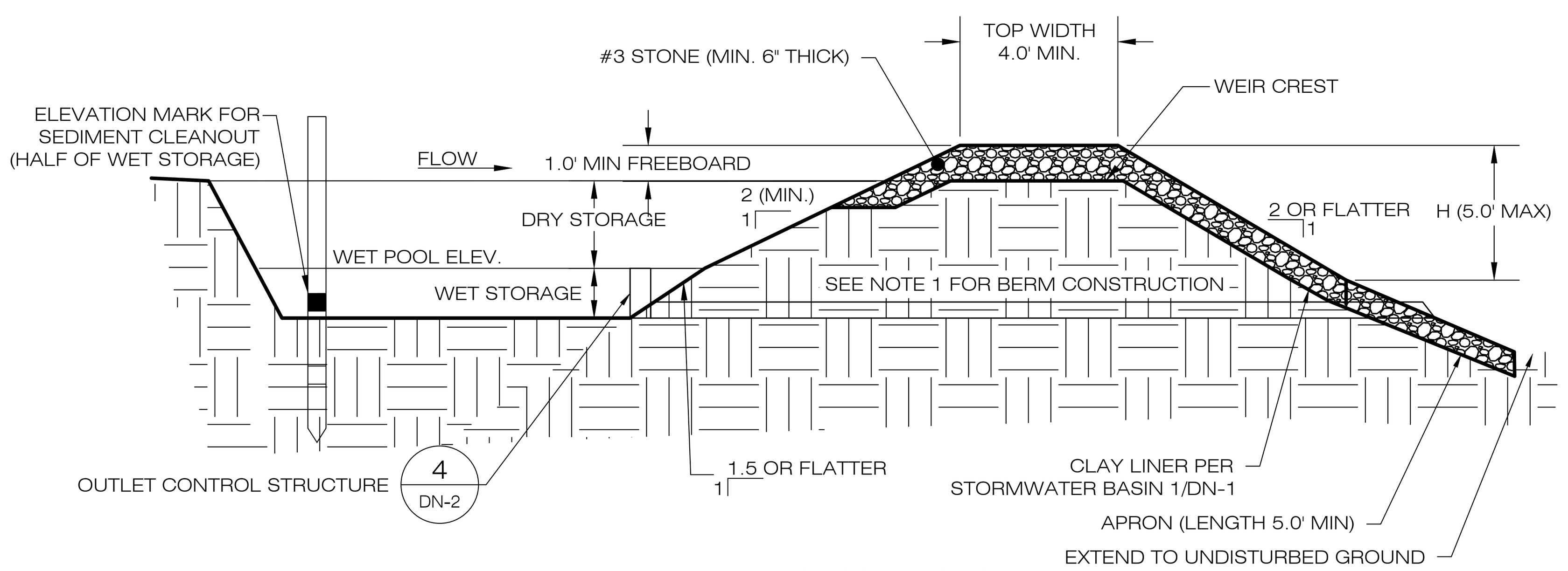
1. BEGIN AT THE LOCATION WHERE THE SOCK IS TO BE INSTALLED BY EXCAVATING A 2-3" (5-7.5 CM) DEEP X 9" (22.9 CM) WIDE TRENCH ALONG THE CONTOUR OF THE SLOPE. EXCAVATED SOIL SHOULD BE PLACED UPSLOPE FROM THE ANCHOR TRENCH.
2. PLACE THE SOCK IN THE TRENCH SO THAT IT CONTOURS TO THE SOIL SURFACE. COMPACT SOIL FROM THE EXCAVATED TRENCH AGAINST THE SOCK ON THE UPHILL SIDE. SOCKS SHALL BE INSTALLED IN 60 FT CONTINUOUS LENGTHS WITH ADJACENT SOCKS TIGHTLY ABUT. EVERY 60 FT THE SOCK ROW SHALL BE SPACED 12 INCHES CLEAR, END TO END, FOR AMPHIBIAN AND REPTILE TRAVEL. THE OPEN SPACES SHALL BE STAGGERED MID LENGTH OF THE NEXT DOWN GRADIENT SOCK.
3. SECURE THE SOCK WITH 18-24" (45.7-61 CM) STAKES EVERY 3-4' (0.9 -1.2 M) AND WITH A STAKE ON EACH END. STAKES SHOULD BE DRIVEN THROUGH THE MIDDLE OF THE SOCK LEAVING AT LEAST 2-3" (5-7.5 CM) OF STAKE EXTENDING ABOVE THE SOCK. STAKES SHOULD BE DRIVEN PERPENDICULAR TO THE SLOPE FACE.

4 EC-4 COMPOST FILTER SOCK SEDIMENTATION CONTROL BARRIER

SCALE : N.T.S.



TOP VIEW



CROSS SECTION

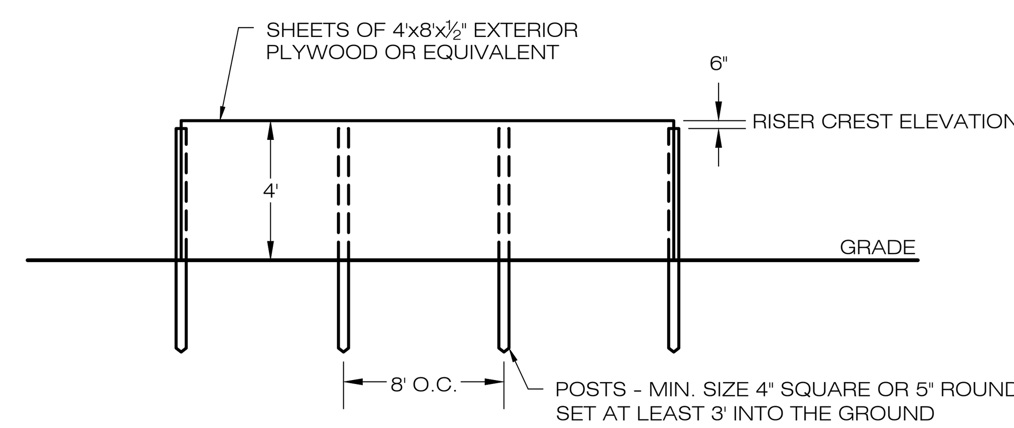
NOTES:
1. CONSTRUCT TEMPORARY SEDIMENT BASIN BERMS AND SIDEWALLS PER THE GRASS LINED BASIN DETAIL.
2. SEDIMENT BAFFLES SHALL BE INSTALLED AS SHOWN ON EC-1.
3. SEE TSB SIZING TABLE FOR WET AND DRY STORAGE VOLUMES.

5 EC-2 TEMPORARY SEDIMENT BASIN

SCALE : N.T.S.

TEMPORARY SEDIMENT BASIN SIZING TABLE

NAME	DRAINAGE AREA (AC)	REQ. WET VOLUME (CYD)	REQ. DRY VOLUME (CYD)	PROP. BTM. ELEV. (FT)	PROP. OUTLET LOW FLOW ORIFICE ELEV. (FT)	PROP. OUTLET RIM ELEV. (FT)	PROP. WEIR CREST ELEV. (FT)	PROP. TOP ELEV. (FT)	WET VOL. PROVIDED (CYD)	DRY VOL. PROVIDED (CYD)	TOTAL VOL. PROVIDED (CYD)
TSB-1	20.49	653	326	482.00	483.50	484.50	486.50	487.00	659	536	1,195



6 EC-4 SEDIMENT BAFFLE

SCALE : N.T.S.

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HAMDEN SOLAR

SITE ADDRESS: 360 GAYLORD MOUNTAIN RD HAMDEN, CT

APT FILING NUMBER: CT619100

DRAWN BY: JT

DATE: 08/07/20 CHECKED BY: BJP

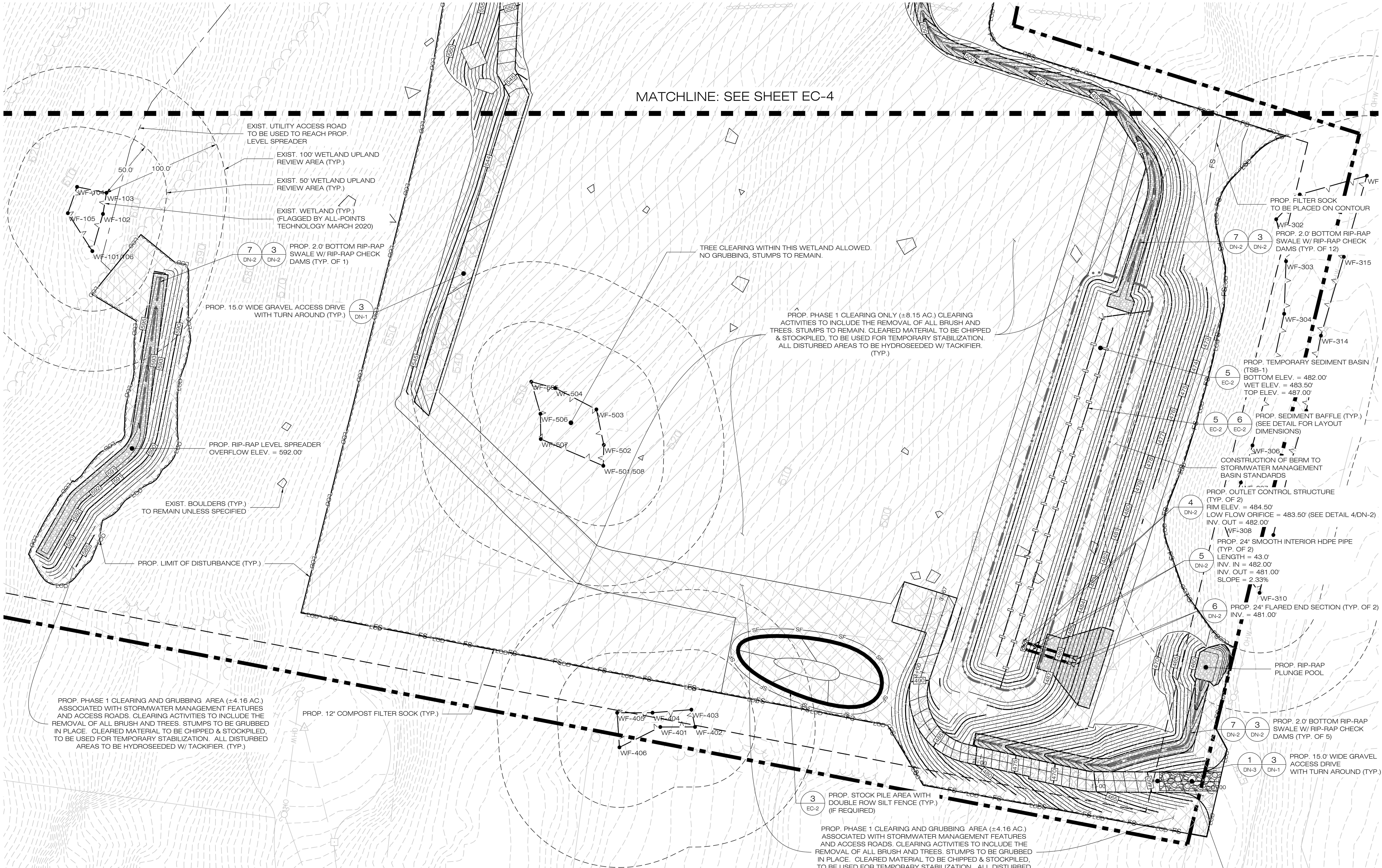
SHEET TITLE:

SEDIMENTATION & EROSION CONTROL DETAILS

SHEET NUMBER:

EC-2

STATE OF CONNECTICUT
No. 28026
LICENSED
PROFESSIONAL ENGINEER



1 EC-3 **PHASE 1 - SEDIMENTATION & EROSION CONTROL PLAN**
SCALE : 1" = 40'-0"

40 0 20 40 80
(IN FEET) 1 inch = 40 ft.

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DRAWN BY: JT

DATE: 08/07/20 CHECKED BY: BJP

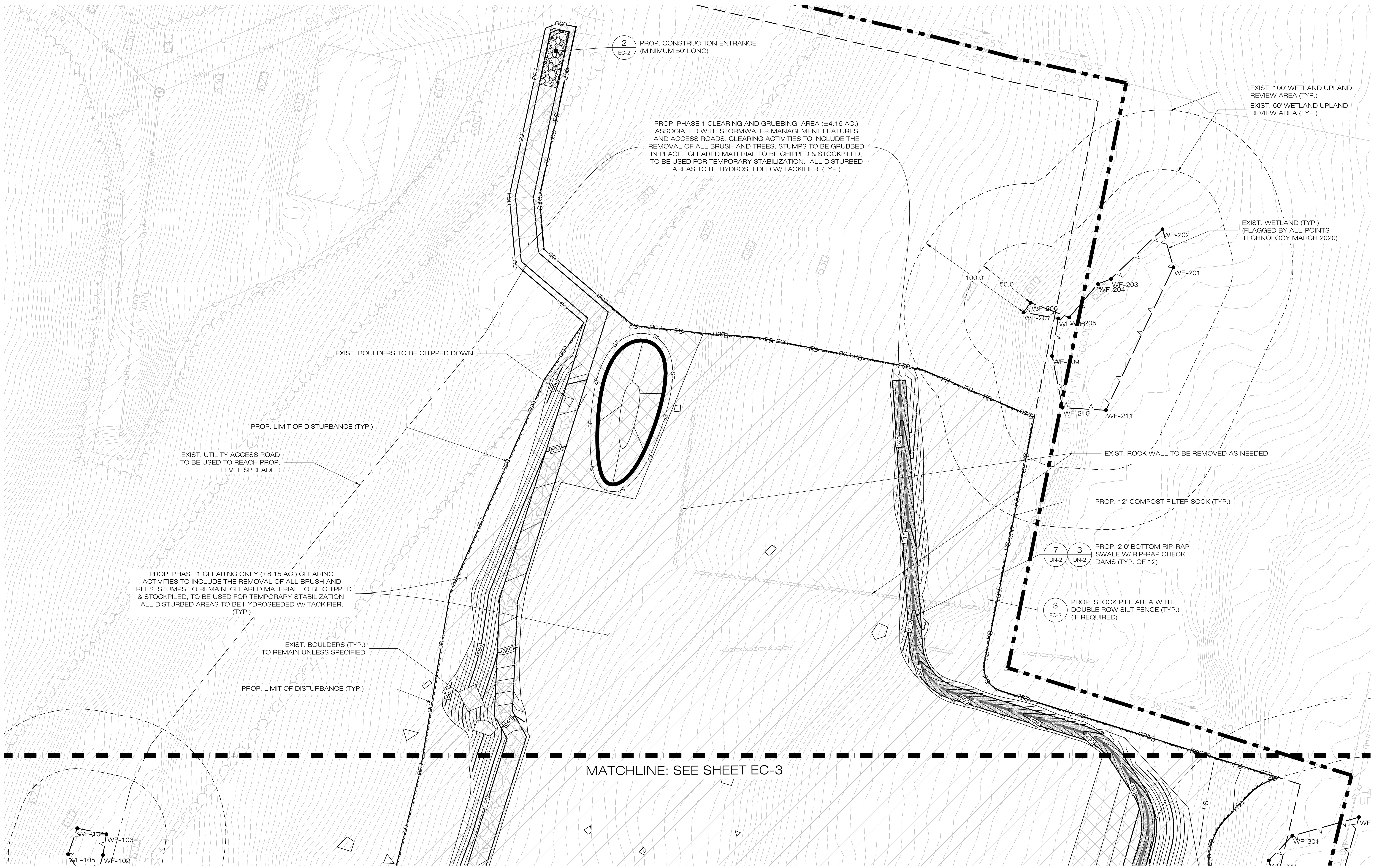
SHEET TITLE:

PHASE 1 SEDIMENTATION & EROSION CONTROL PLAN

SHEET NUMBER:

EC-3

STATE OF CONNECTICUT LICENSED PROFESSIONAL ENGINEER No. 28025



1 EC-4 PHASE 1 - SEDIMENTATION & EROSION CONTROL PLAN

SCALE : 1" = 40'-0"

40 0 20 40 80

(IN FEET) 1 inch = 40 ft.

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HAMDEN SOLAR

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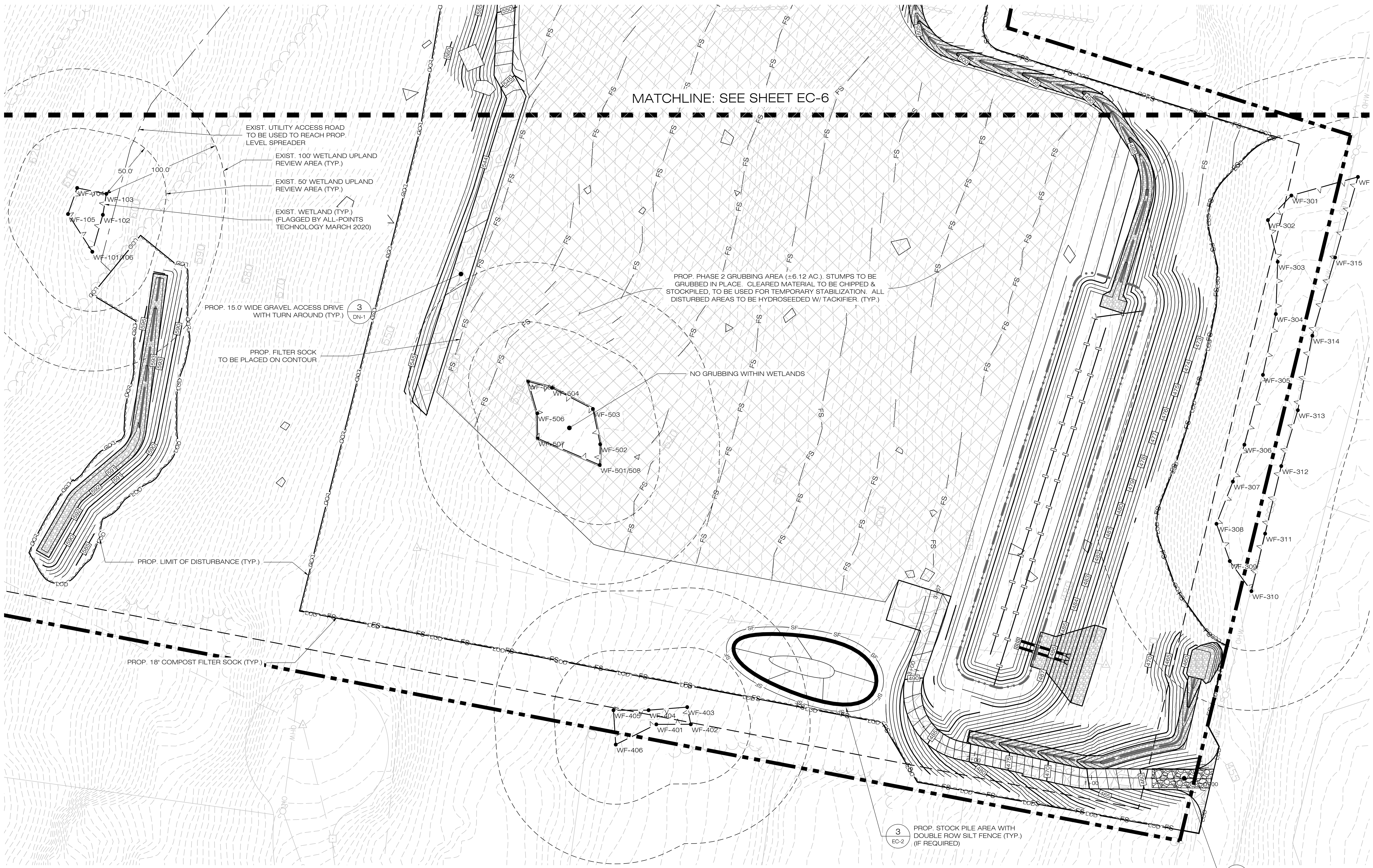
SHEET TITLE:

PHASE 1 SEDIMENTATION & EROSION CONTROL PLAN

SHEET NUMBER:

EC-4



PHASE 2 - SEDIMENTATION & EROSION CONTROL PLAN

1 EC-5

SCALE : 1" = 40'-0"

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HAMDEN SOLAR

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DRAWN BY: JT

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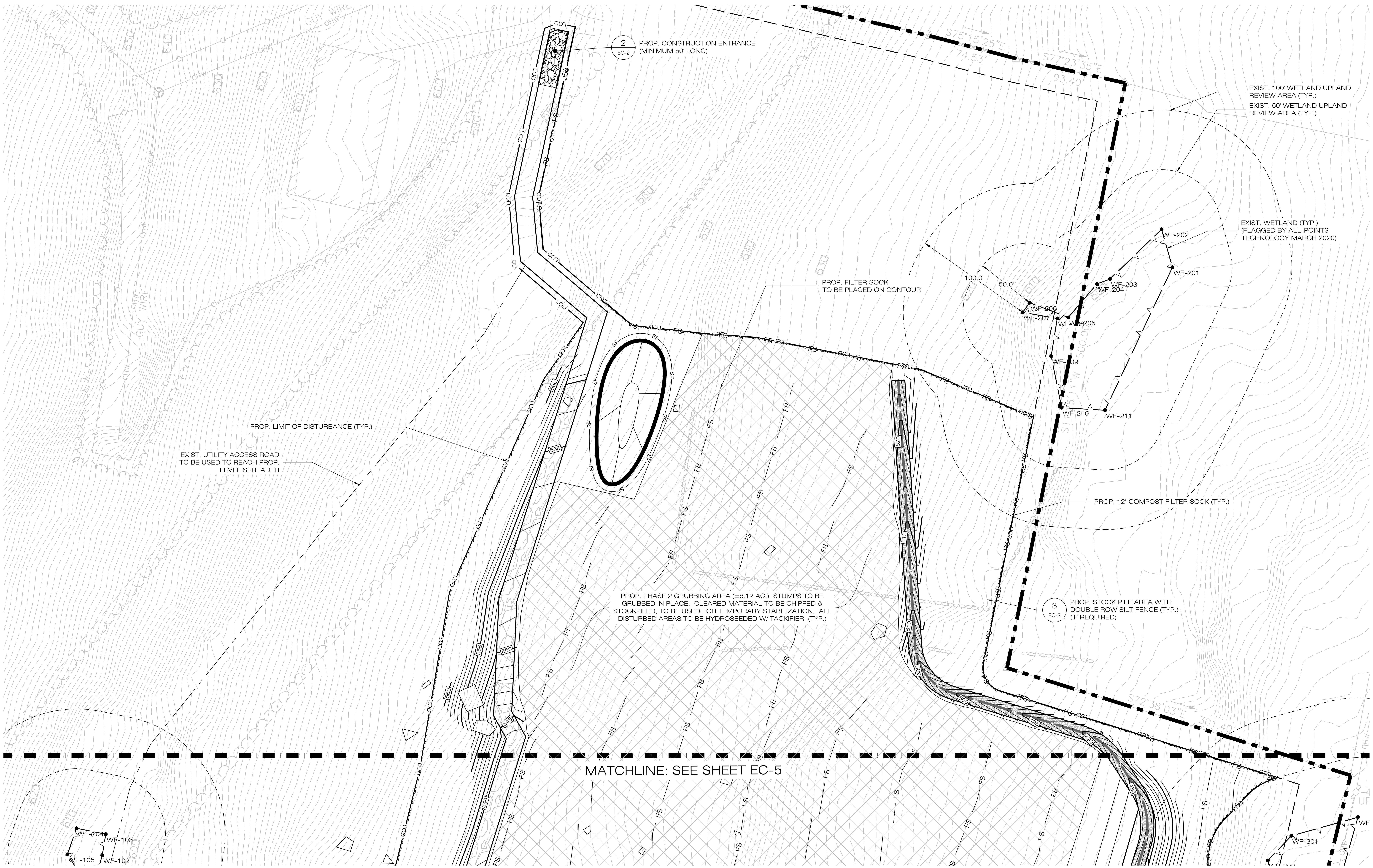
SHEET TITLE:

PHASE 2 SEDIMENTATION & EROSION CONTROL PLAN

SHEET NUMBER:

EC-5

STATE OF CONNECTICUT PROFESSIONAL ENGINEER No. 28025 LICENSED



PHASE 2 - SEDIMENTATION & EROSION CONTROL PLAN

1 / EC-5

SCALE : 1" = 40'-0"

(IN FEET) 1 inch = 40 ft.

GAYLORD MOUNTAIN SOLAR PROJECT 2019, LLC

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HAMDEN SOLAR

SITE ADDRESS: 360 GAYLORD MOUNTAIN RD HAMDEN, CT

APT FILING NUMBER: CT619100

DRAWN BY: JT

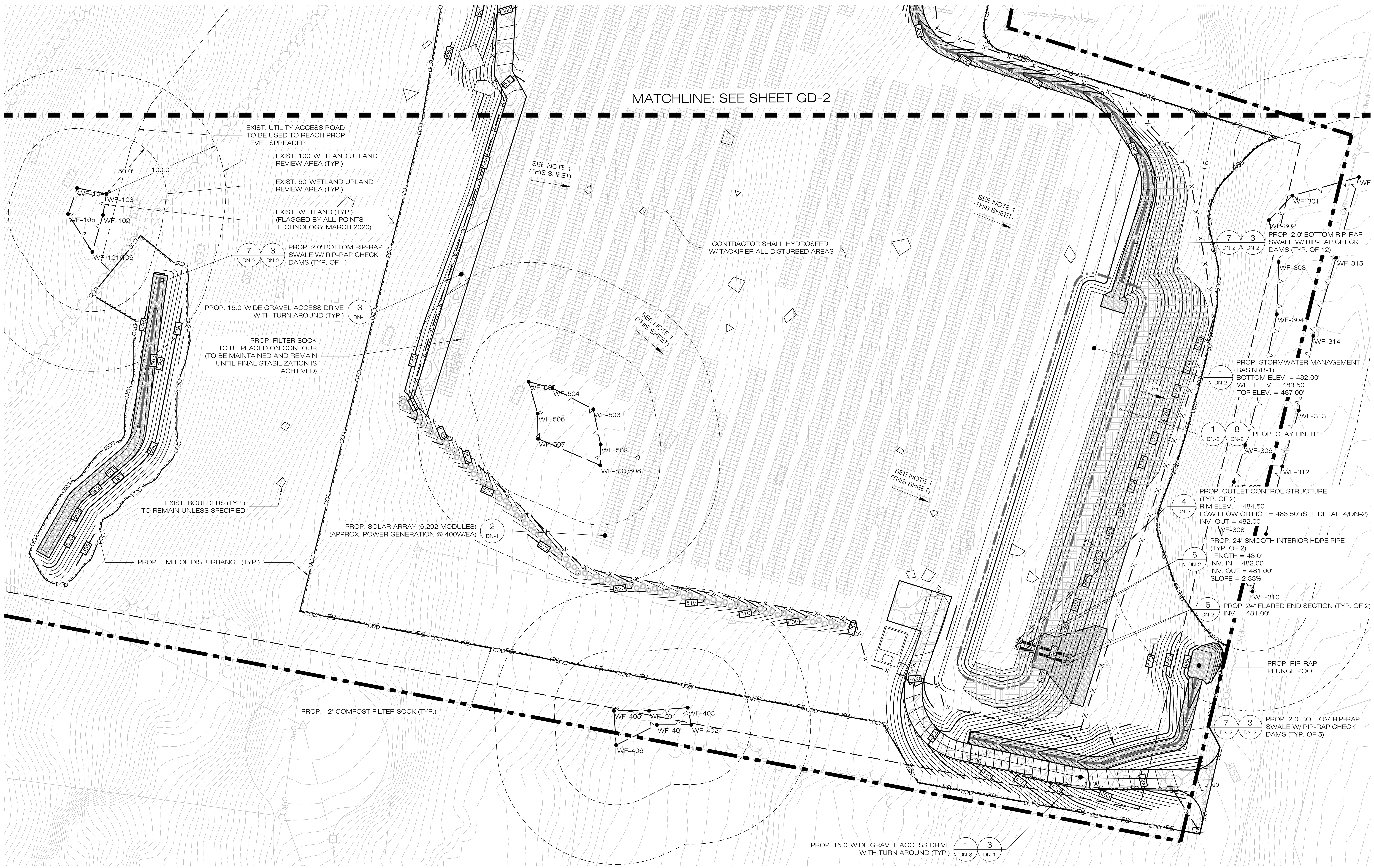
DATE: 08/07/20 CHECKED BY: BJP

SHEET TITLE:

PHASE 2 SEDIMENTATION & EROSION CONTROL PLAN

SHEET NUMBER:

EC-6



NOTES:
1. GRADE/SHAPE AREA TO MAINTAIN EXIST. DRAINAGE PATTERNS.
2. CONTRACTOR SHALL REMOVE ALL BAFFLES.
3. CONTRACTOR SHALL REMOVE ALL SEDIMENT FROM TEMPORARY SEDIMENT BASIN.

1 GD-1 **FINAL GRADING & DRAINAGE PLAN**
SCALE : 1" = 40'-0"

40 0 20 40 80
(IN FEET) 1 inch = 40 ft.

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OWNER: VERTICAL BRIDGE LANCO LLC
ADDRESS: 750 PARK OF COMMERCE DR S200 BOCA RATON, FL 33487

HAMDEN SOLAR

SITE ADDRESS: 360 GAYLORD MOUNTAIN RD HAMDEN, CT

APT FILING NUMBER: CT619100

DRAWN BY: JT

DATE: 08/07/20 CHECKED BY: BJP

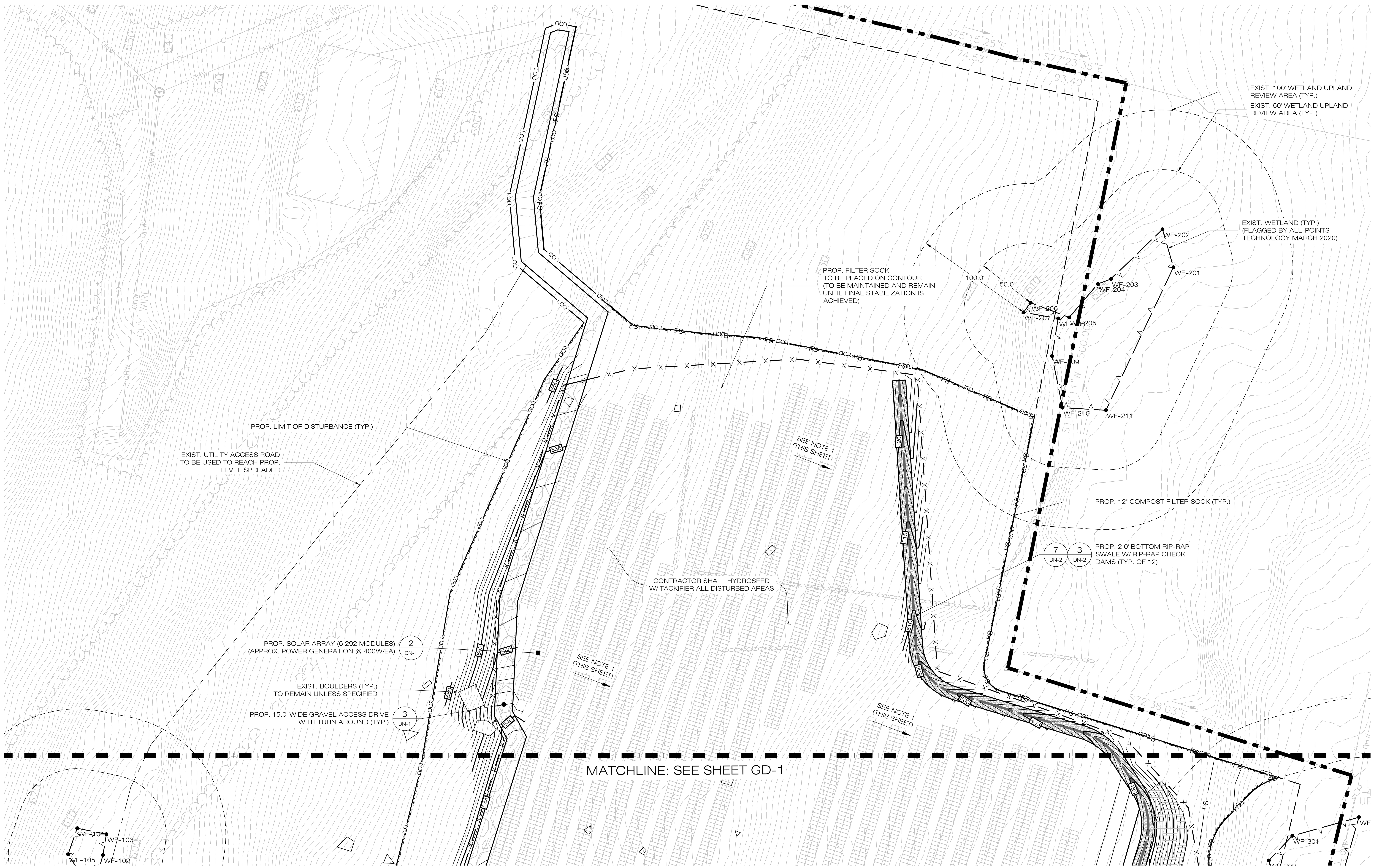
SHEET TITLE:

FINAL GRADING & DRAINAGE PLAN

SHEET NUMBER:

GD-1

STATE OF CONNECTICUT No. 28025 LICENSED PROFESSIONAL ENGINEER



NOTES:
1. GRADE/SHAPE AREA TO MAINTAIN EXIST. DRAINAGE PATTERNS.
2. CONTRACTOR SHALL REMOVE ALL BAFFLES.
3. CONTRACTOR SHALL REMOVE ALL SEDIMENT FROM TEMPORARY SEDIMENT BASIN.

1 GD-2 **FINAL GRADING & DRAINAGE PLAN**
SCALE : 1" = 40'-0"

40 0 20 40 80
(IN FEET) 1 inch = 40 ft.

GAYLORD MOUNTAIN SOLAR PROJECT 2019, LLC

200 HARBORSIDE DRIVE SUITE 200 SCHENECTADY, NY 12305

ALL-POINTS TECHNOLOGY CORPORATION
567 VAUXHAUL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-663-1697
WWW.ALLPOINTSTECH.COM FAX: (860)-663-0935

CSC PERMIT SET

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DESIGN PROFESSIONAL OF RECORD

PROF: BRADLEY J. PARSONS P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION
ADD: 567 VAUXHAUL STREET EXTENSION - SUITE 311 WATERFORD, CT 06385

OWNER: VERTICAL BRIDGE LANCO LLC
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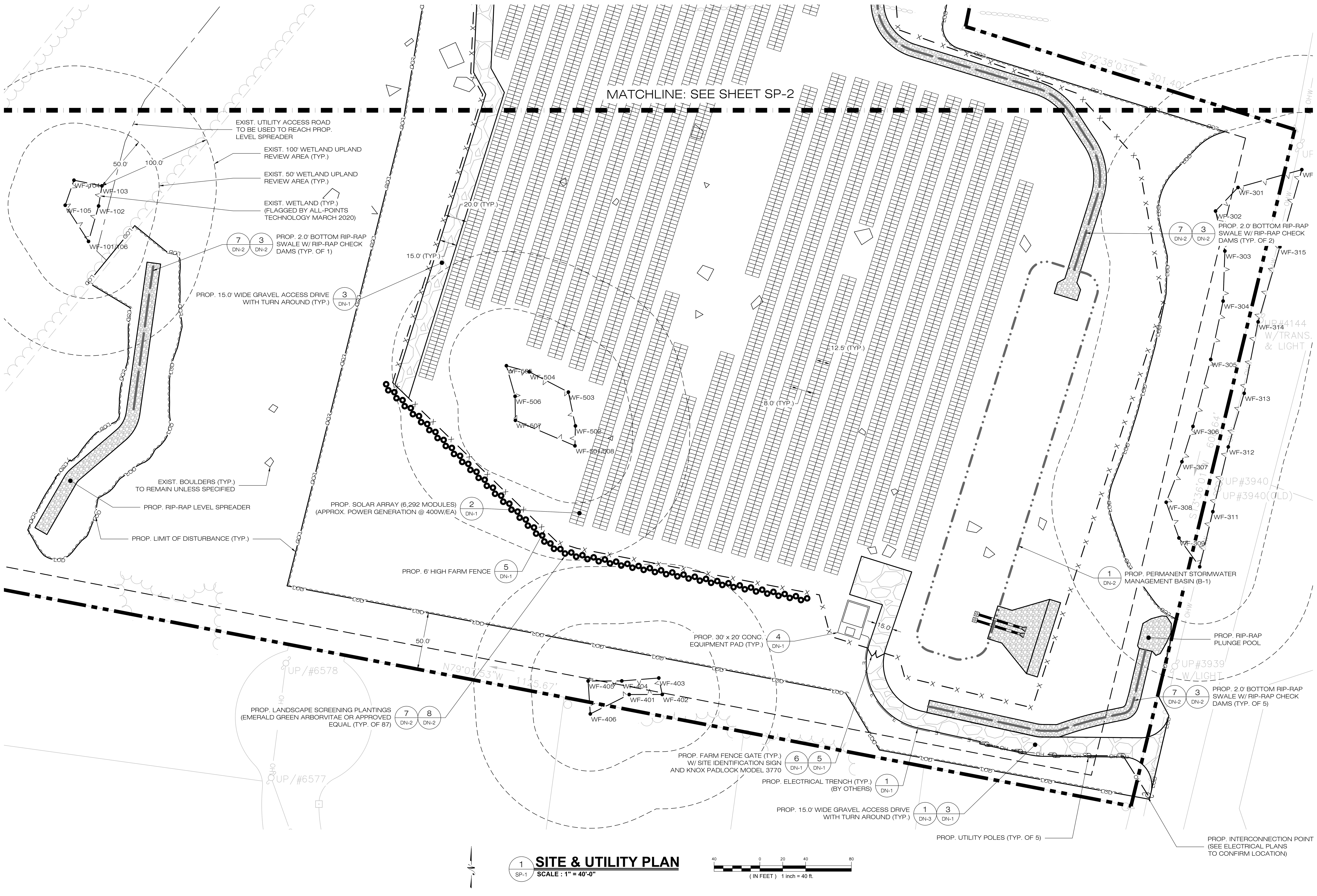
SHEET NUMBER:

GD-2



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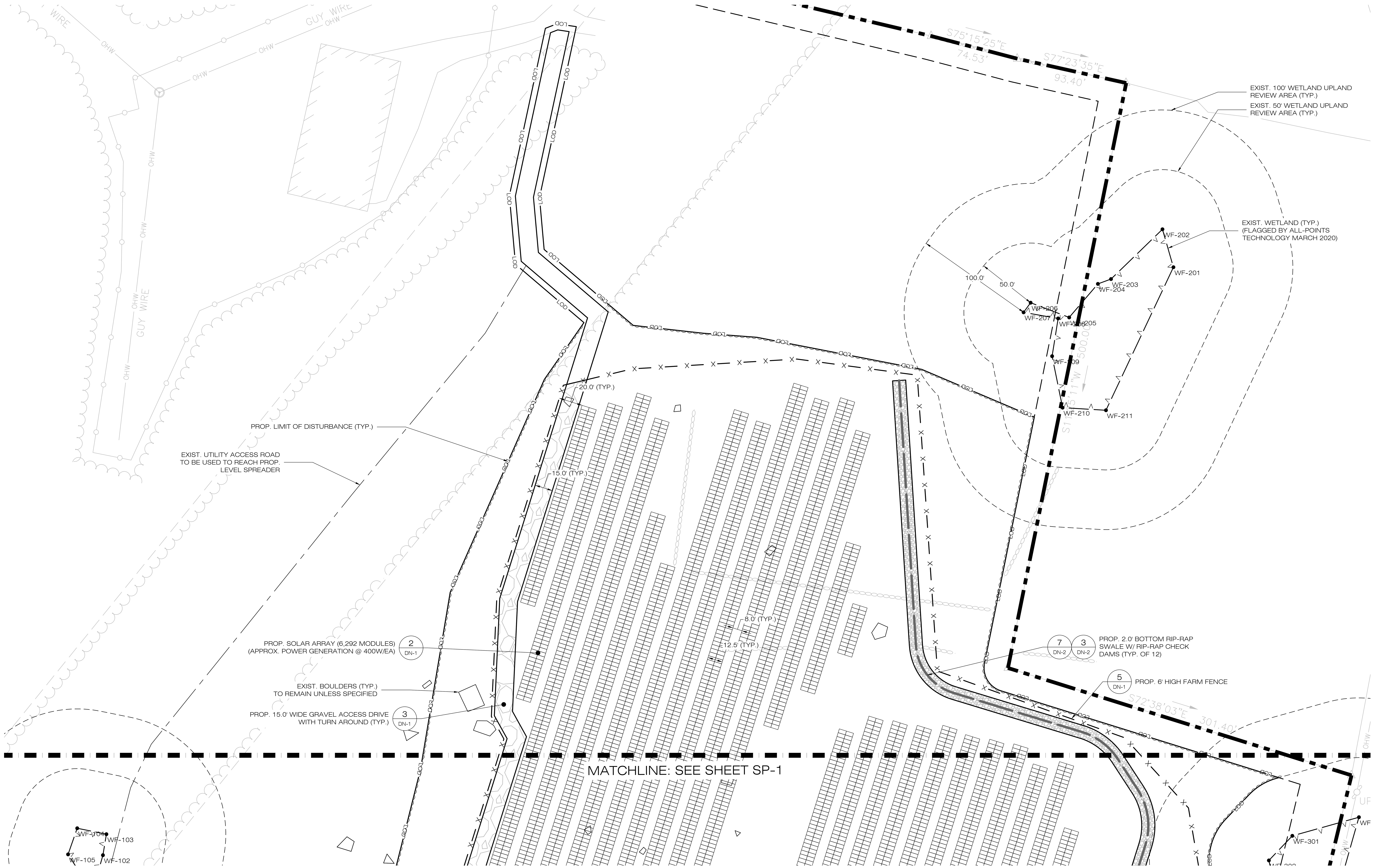
SHEET TITLE:

SITE & UTILITY PLAN

SHEET NUMBER:

SP-1

STATE OF CONNECTICUT BRADLEY J. PARSONS No. 28025 LICENSED PROFESSIONAL ENGINEER



1 SP-2 **SITE & UTILITY PLAN**
SCALE : 1" = 40'-0"

40 0 20 40 80
(IN FEET) 1 inch = 40 ft.

GAYLORD MOUNTAIN SOLAR PROJECT 2019, LLC

**200 HARBORSIDE DRIVE
SUITE 200
SCHENECTADY, NY 12305**

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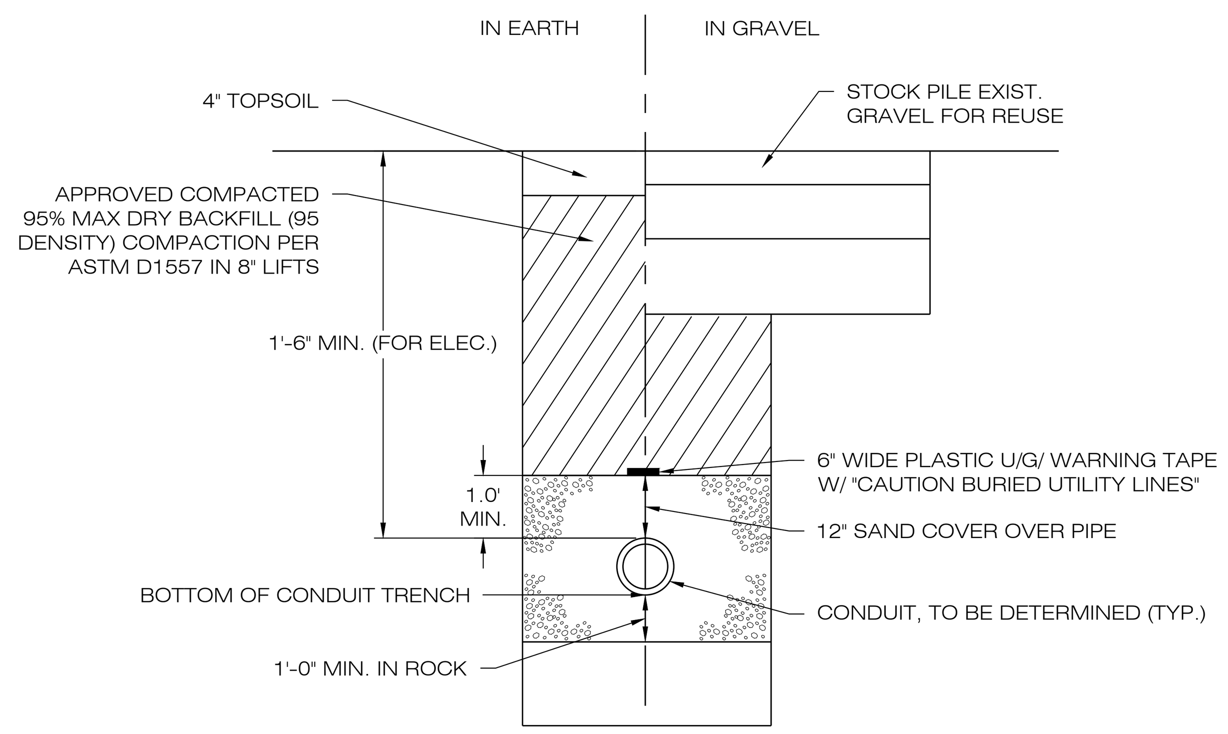
SITE & UTILITY PLAN

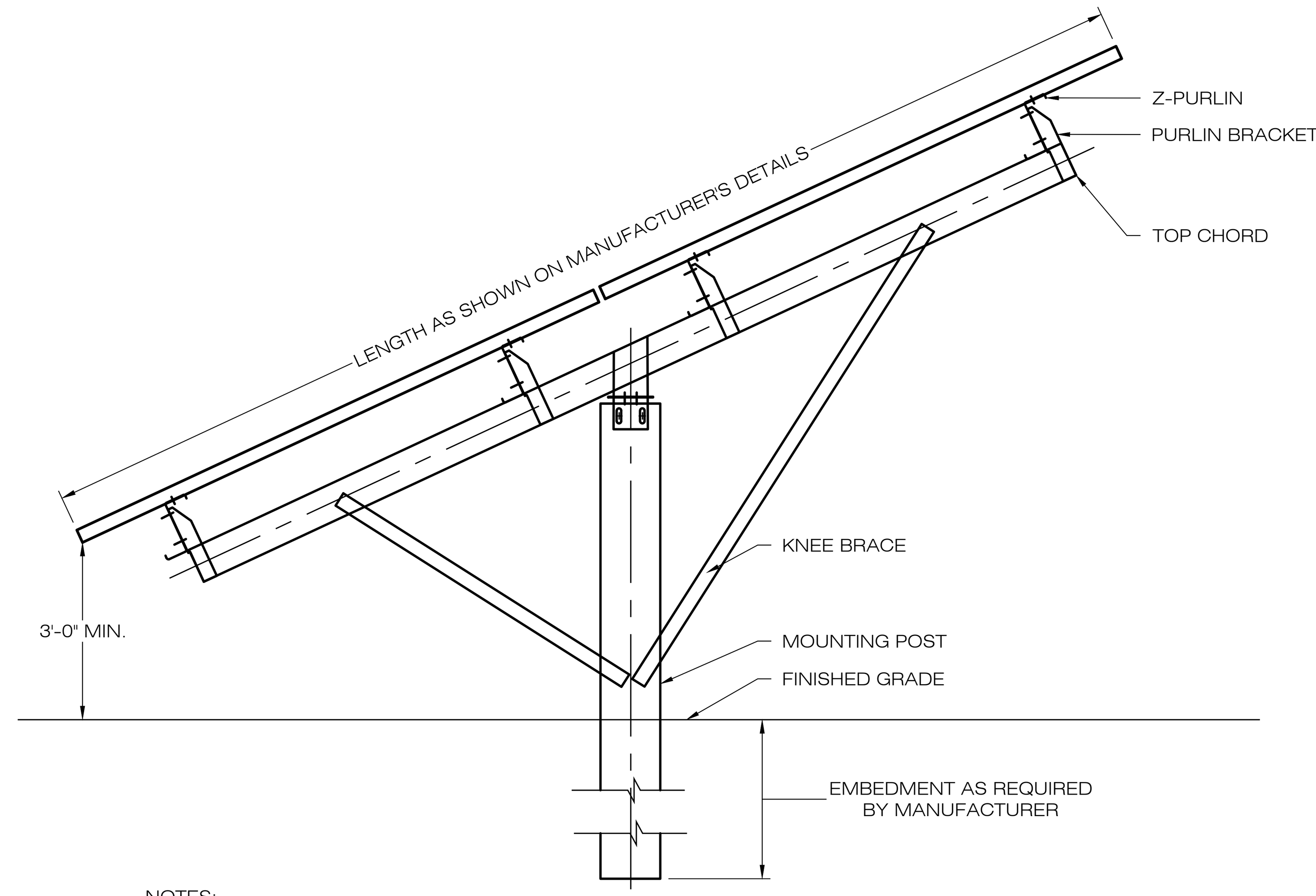
SHEET NUMBER:

SP-2

STATE OF CONNECTICUT PROFESSIONAL ENGINEER

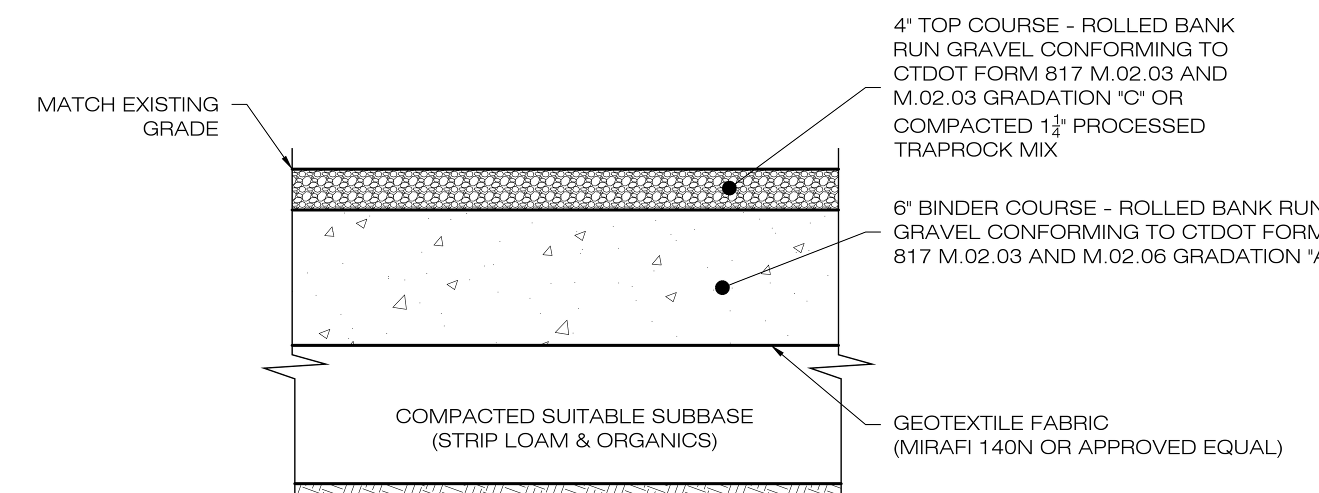


1 DN-1 **ELECTRICAL TRENCH DETAIL**
SCALE : N.T.S.



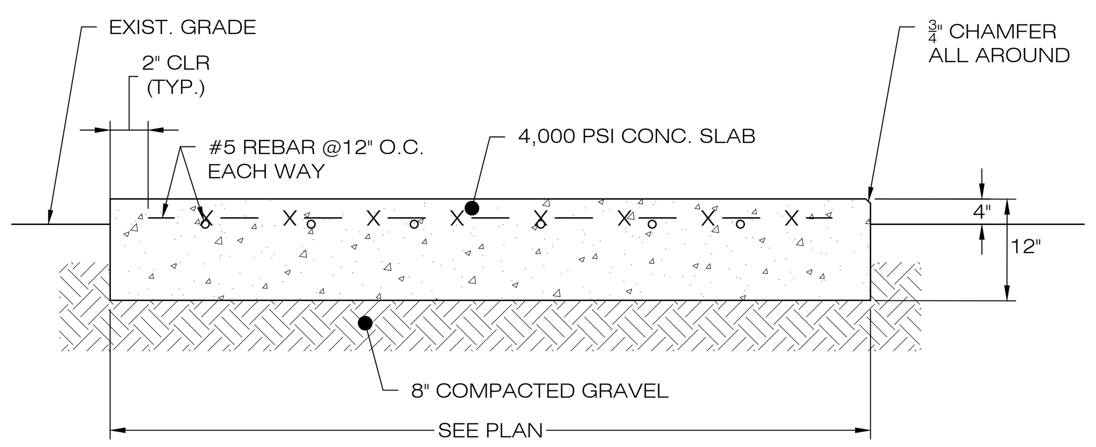
NOTES:
SEE MANUFACTURER'S DETAIL SHEETS FOR ADDITIONAL INFORMATION REGARDING RACKING SYSTEM REQUIREMENTS AND INSTALLATION PROCEDURES. RACKING SYSTEM TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

2 DN-1 **TYPICAL POST MOUNTED RACKING SYSTEM**
SCALE : N.T.S.

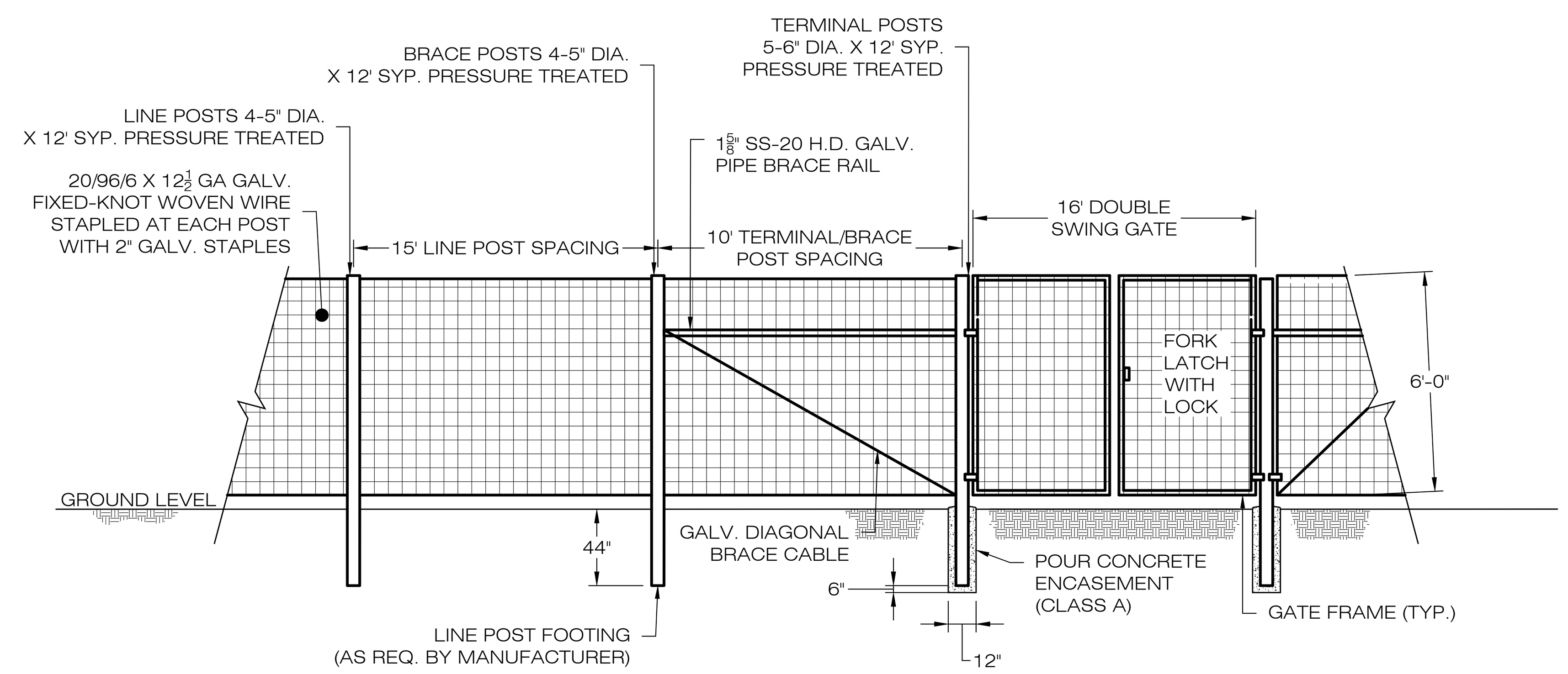


NOTES:
1. SUBBASE MAY CONSIST OF NATIVE MATERIALS IF FOUND ACCEPTABLE BY THE ENGINEER. SUBBASE TO BE COMPACTED TO 95% MAX DRY DENSITY.
2. SUBBASE IS TO BE FREE FROM DEBRIS AND UNSUITABLE MATERIALS.

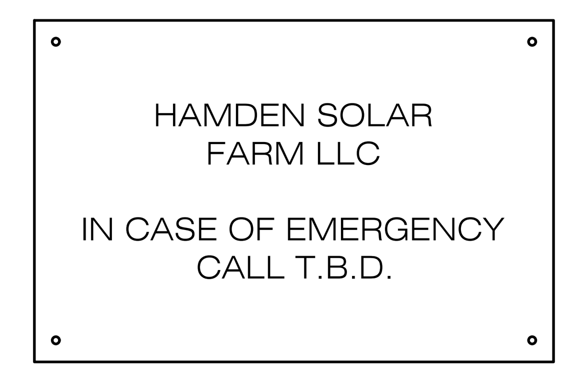
3 DN-1 **GRAVEL ACCESS DRIVE SECTION**
SCALE : N.T.S.



4 DN-1 **CONCRETE EQUIPMENT PAD**
SCALE : N.T.S.

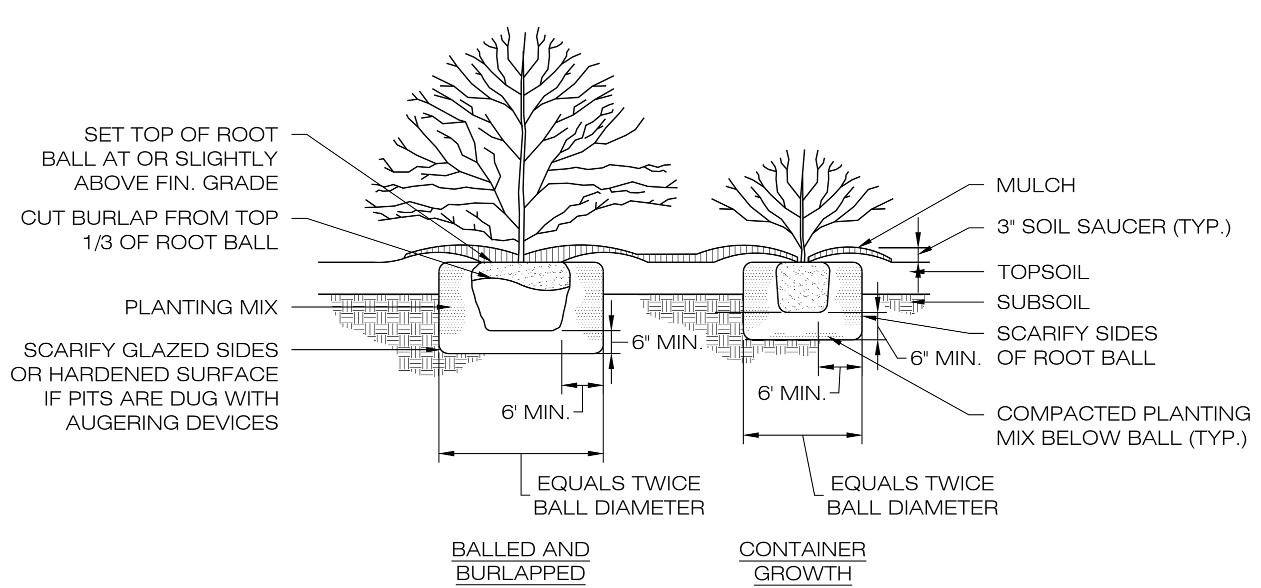


5 DN-1 **FARM FENCE & GATE DETAIL**
SCALE : N.T.S.



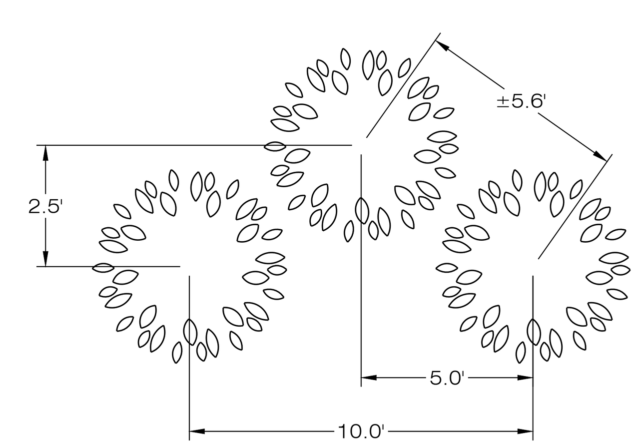
NOTES:
EMERGENCY CALL NUMBER TO BE PROVIDED ONCE DETERMINED.

6 DN-1 **NOTIFICATION SIGN DETAIL**
SCALE : N.T.S.



NOTES:
IN AREAS OF MASS PLANTINGS, CONTINUOUSLY EXCAVATE AND MULCH ENTIRE BED..

7 DN-1 **TYPICAL PLANTING DETAIL**
SCALE : N.T.S.



8 DN-1 **SCREENING TREE SPACING**
SCALE : N.T.S.

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HAMDEN SOLAR

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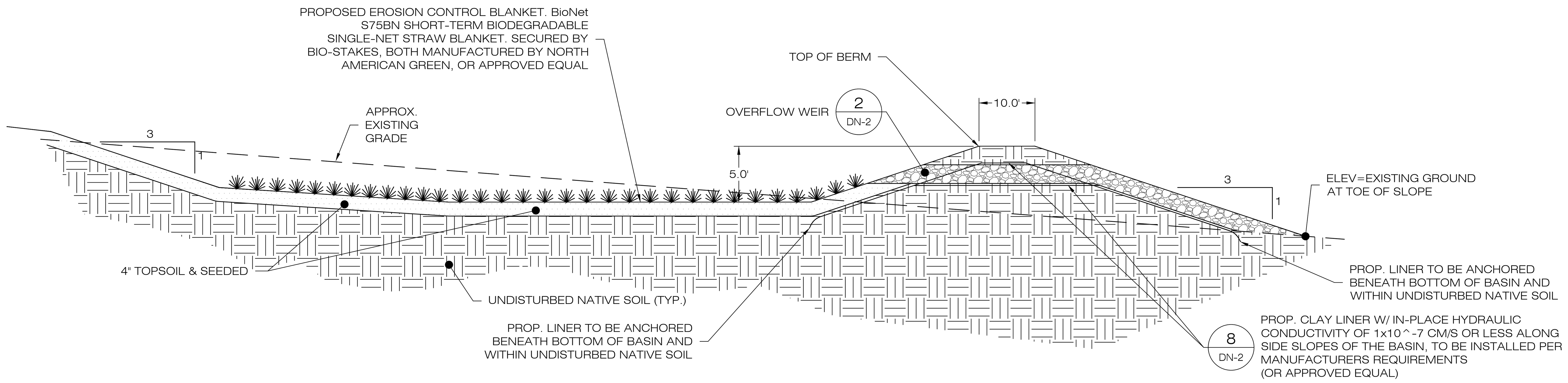
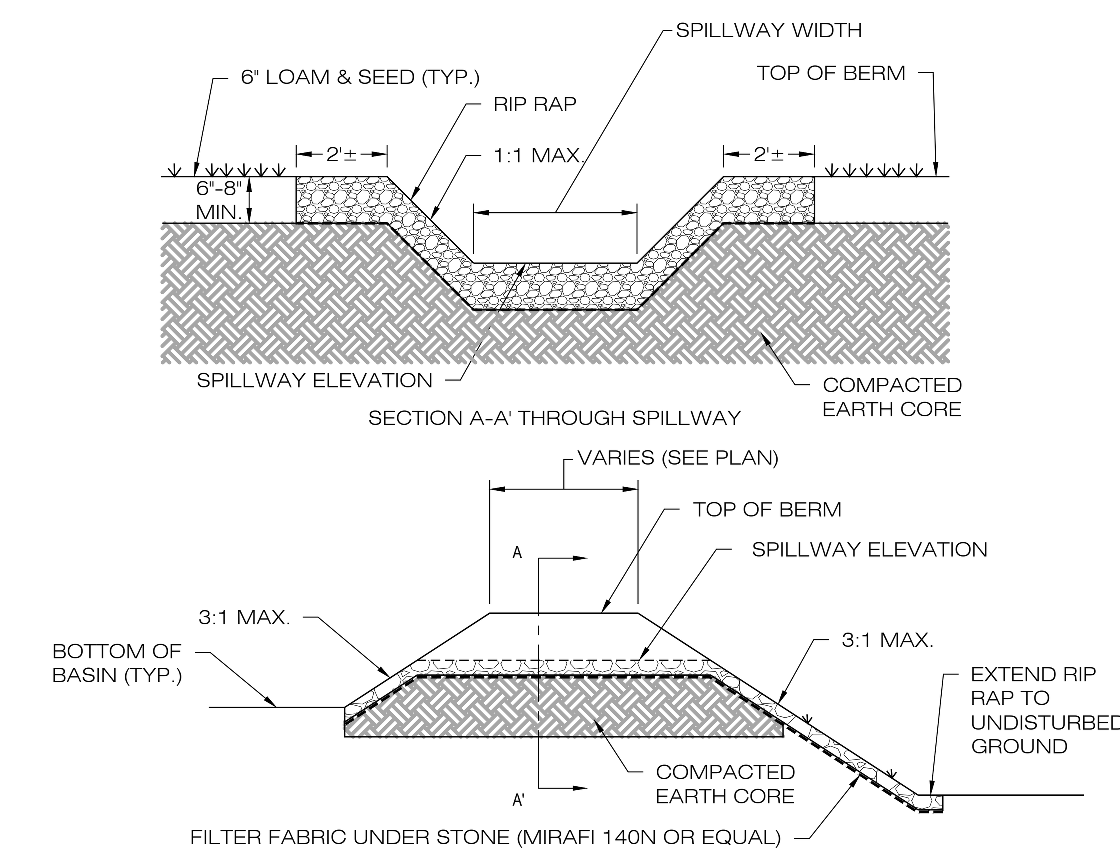
DN-1



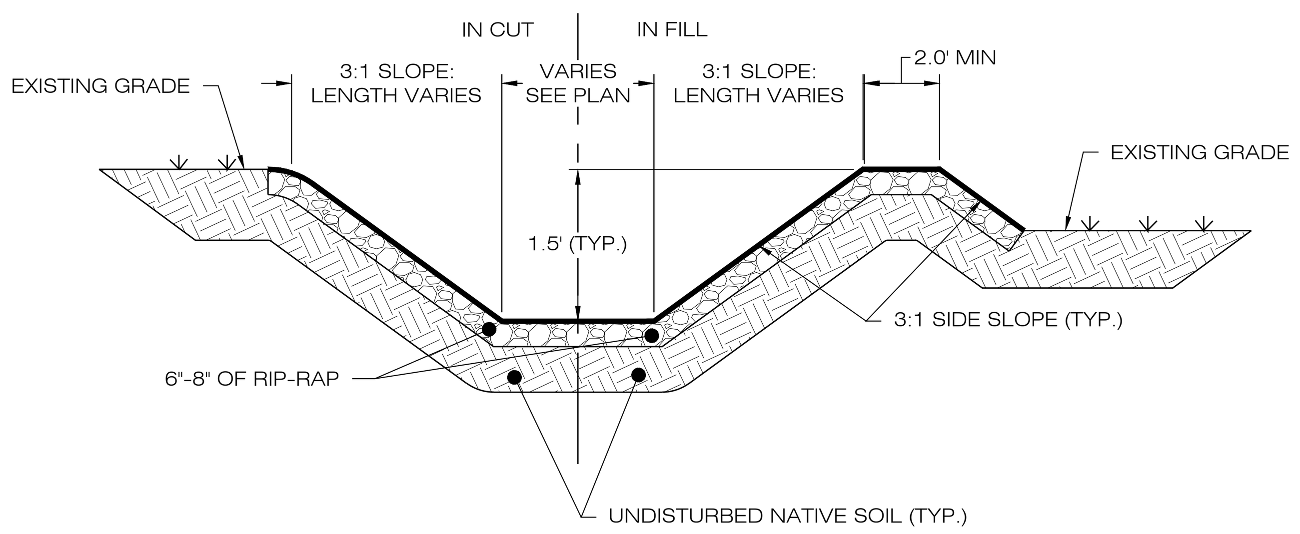
NOTES:

- SEED MIX TO BE NEW ENGLAND EROSION CONTROL/ RESTORATION MIX FOR MOIST SITES ON THE BOTTOM OF THE BASIN AND NEW ENGLAND EROSION/RESTORATION MIX FOR DRY SITES ON THE SIDE SLOPES.
- FOR CONVERTING TSB TO INFILTRATION BASIN, REMOVE BAFFLES, CLEAN OUT SEDIMENT, RESHAPE AS REQUIRED, RECONSTRUCT OUTLET WEIR INCLUDING ADDITIONAL IMPERVIOUS CORE, AND RESEEDING.
- INSPECT AND CLEAN PIPES PRIOR TO INSTALLING PERMANENT OUTLET.

1 DN-2 **STORMWATER MANAGEMENT BASIN**
SCALE : N.T.S.



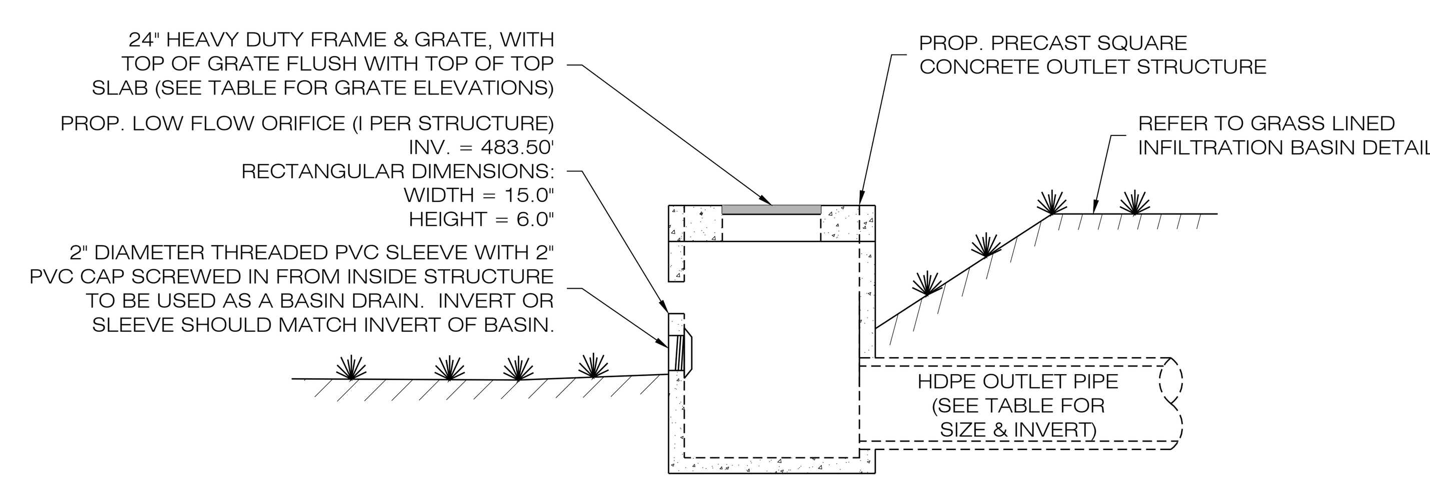
2 DN-2 **OVERFLOW WEIR DETAIL**
SCALE : N.T.S.



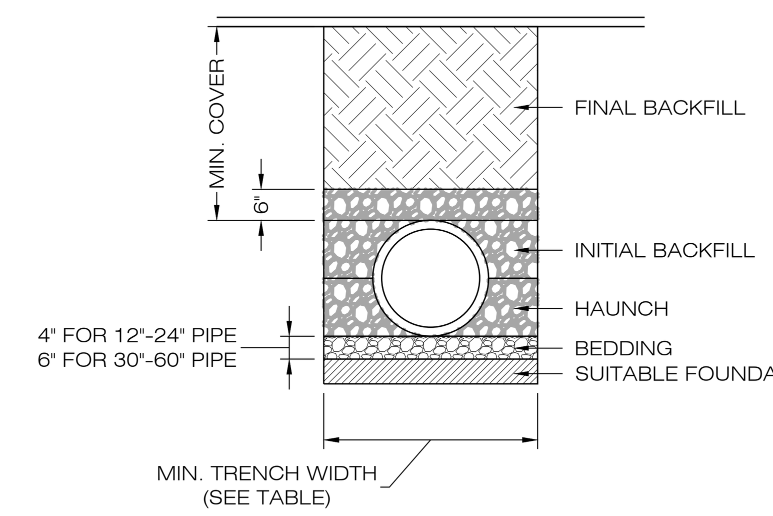
NOTES:
1. IF DEPTH VARIES FROM 1.5', SEE PLAN CALLOUTS.

3 DN-2 **RIP-RAP SWALE**
SCALE : N.T.S.

HDPE OUTLET PIPE SIZING TABLE							
BASIN	LOW FLOW ORIFICE ELEV. (FT)	GRATE ELEV. (FT)	OUTLET PIPE SIZE (IN.)	OUTLET PIPE LENGTH (FT)	OUTLET PIPE SLOPE (%)	OUTLET PIPE INV. ELEV. AT STRUCTURE (FT)	OUTLET PIPE INV. AT OUTFALL (FT)
B-1	483.50	484.50'	24"	43.0'	2.33%	482.00'	481.00'



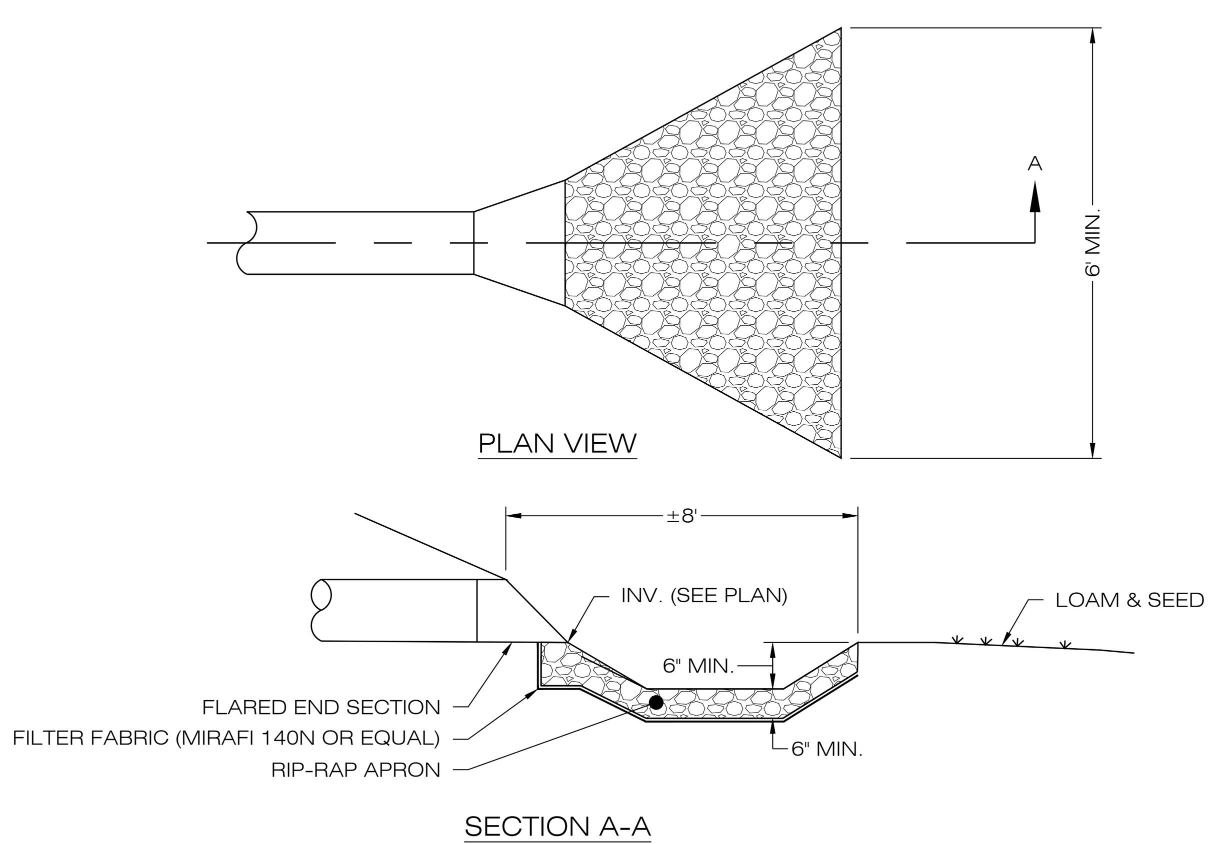
4 DN-2 **OUTLET CONTROL STRUCTURE**
SCALE : N.T.S.



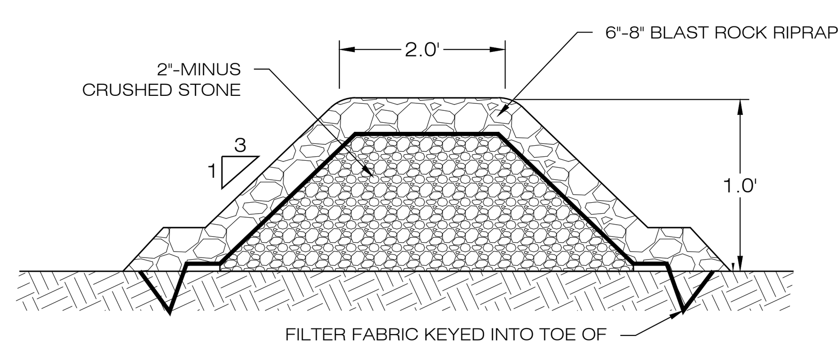
RECOMMENDED MIN. TRENCH WIDTH	
PIPE DIA.	MIN. TRENCH WIDTH
6"	23"
8"	26"
10"	28"
12"	30"
15"	34"
18"	39"
24"	48"
30"	56"
36"	64"
48"	80"
60"	96"

NOTES:
1. ALL PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321 , "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST ADDITION.
2. MEASURES SHOULD BE TAKEN TO PREVENT MIGRATION OF NATIVE FINES INTO BACKFILL MATERIAL, WHEN REQUIRED.
3. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.
4. BEDDING: SUITABLE MATERIAL SHALL BE CLASS I, II OR III. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" (100mm) FOR 4"-24" (100mm-600mm); 6" (150mm) FOR 30"-60" (750mm-900mm).
5. INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I, II OR III IN THE PIPE ZONE EXTENDING NOT LESS THAN 6" ABOVE CROWN OF PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.
6. MINIMUM COVER: MINIMUM COVER, H, IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" FROM THE TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOATION. FOR TRAFFIC APPLICATIONS, MINIMUM COVER, H, IS 12" UP TO 48" DIAMETER PIPE AND 24" OF COVER FOR 54"-60" DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT.

5 DN-2 **HDPE STORM DRAINAGE TRENCH DETAIL**
SCALE : N.T.S.

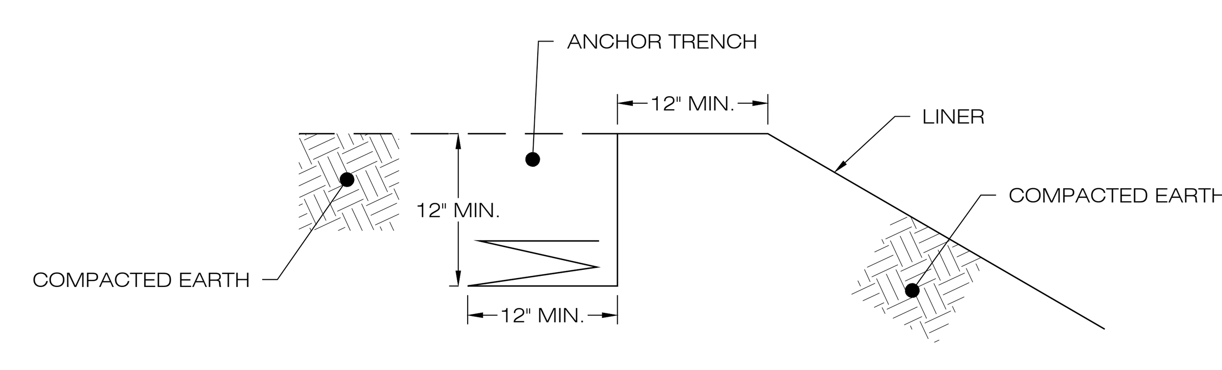


6 DN-2 **FLARED END SECTION**
SCALE : N.T.S.



NOTES:
1. STONE SHALL BE PLACED MECHANICALLY OR BY HAND. STONE SHALL NOT BE DUMPED DIRECTLY INTO SWALE.
2. SEE GRADING AND DRAINAGE PLAN.

7 DN-2 **STONE CHECK DAM**
SCALE : N.T.S.



8 DN-2 **LINER ANCHOR DETAIL**
SCALE : N.T.S.

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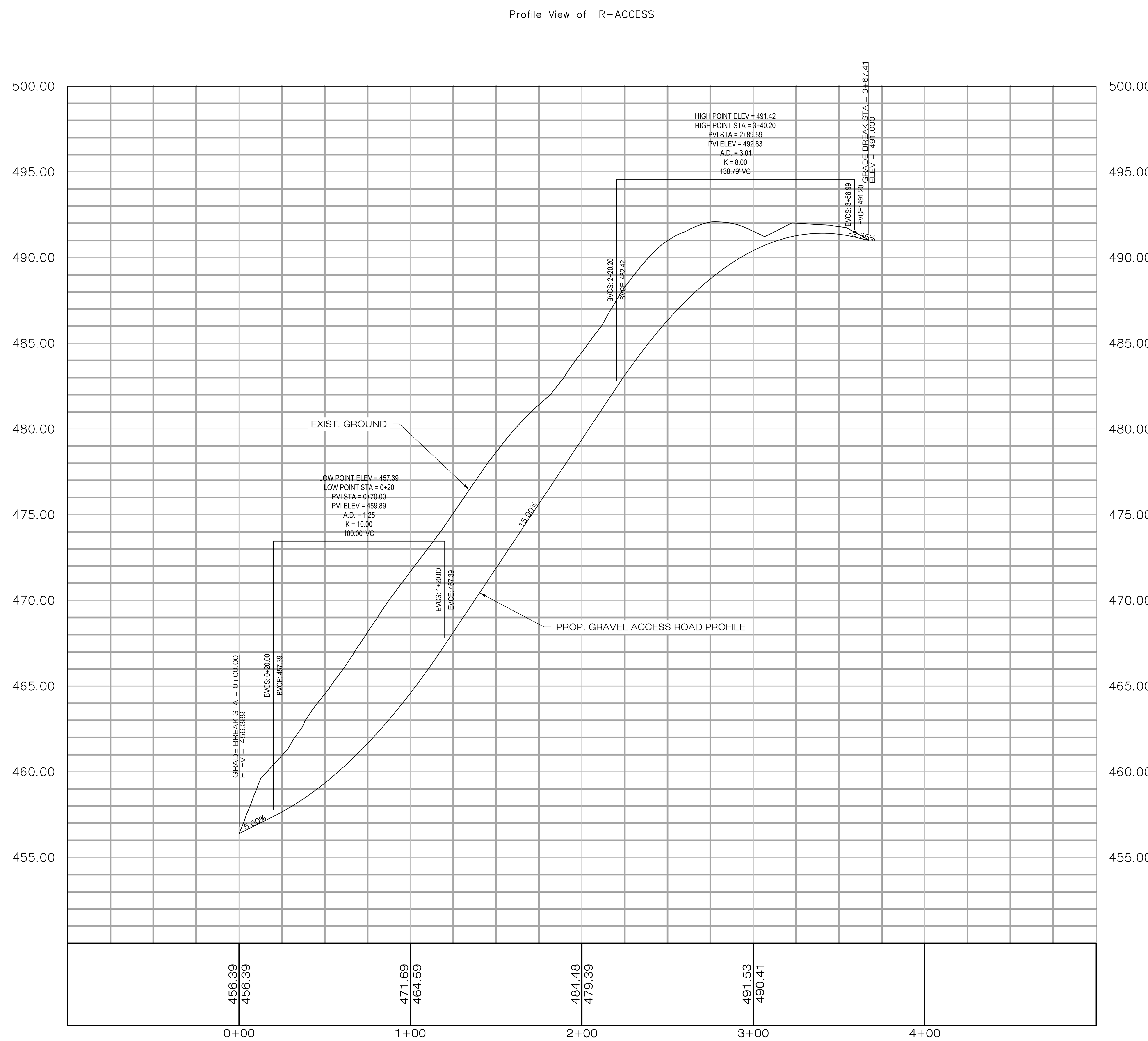
DN-2



1 DN-3 **ACCESS ROAD PROFILE**
SCALE: HORIZONTAL 1" = 40'; VERTICAL 1" = 4'

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SHEET TITLE:

ACCESS ROAD PROFILE

SHEET NUMBER:

DN-3

STATE OF CONNECTICUT BRADLEY J. PARSONS No. 28025 LICENSED PROFESSIONAL ENGINEER

GENERAL NOTES

1. ALL CONSTRUCTION SHALL COMPLY WITH PROJECT DEVELOPER STANDARDS, TOWN OF HAMDEN STANDARDS, CONNECTICUT DEPARTMENT OF TRANSPORTATION STANDARDS AND SPECIFICATIONS IN THE ABOVE REFERENCED INCREASING HIERARCHY. IF SPECIFICATIONS ARE IN CONFLICT, THE MORE STRINGENT SPECIFICATION SHALL APPLY.

2. IF NO PROJECT CONSTRUCTION SPECIFICATION PACKAGE IS PROVIDED BY THE PROJECT DEVELOPER OR THEIR REPRESENTATIVE, THE CONTRACTOR SHALL COMPLY WITH THE MANUFACTURE, TOWN OF HAMDEN, OR CONNECTICUT DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, AND BE IN ACCORDANCE WITH ALL APPLICABLE OSHA, FEDERAL, STATE AND LOCAL REGULATIONS.

3. THE PROJECT DEVELOPER IS RESPONSIBLE FOR OBTAINING ALL NECESSARY ZONING AND STORMWATER PERMITS REQUIRED BY GOVERNMENT AGENCIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL OBTAIN ALL TOWN OF HAMDEN CONSTRUCTION PERMITS. THE CONTRACTOR SHALL POST ALL BONDS, PAY ALL FEES, PROVIDE PROOF OF INSURANCE AND PROVIDE TRAFFIC CONTROL NECESSARY FOR THIS WORK.

4. REFER TO PLANS, DETAILS AND REPORTS PREPARED BY ALL-POINTS TECHNOLOGY CORPORATION FOR ADDITIONAL INFORMATION. THE CONTRACTOR SHALL VERIFY ALL SITE CONDITIONS IN THE FIELD AND CONTACT THE PROJECT DEVELOPER IF THERE ARE ANY QUESTIONS OR CONFLICTS REGARDING THE CONSTRUCTION DOCUMENTS AND/OR FIELD CONDITIONS SO THAT APPROPRIATE REVISIONS CAN BE MADE PRIOR TO BIDDING/CONSTRUCTION. ANY CONFLICT BETWEEN THE DRAWINGS AND SPECIFICATIONS SHALL BE CONFIRMED WITH THE PROJECT DEVELOPERS CONSTRUCTION MANAGER PRIOR TO CONSTRUCTION.

5. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OF ALL PRODUCTS, MATERIALS PER PLANS AND SPECIFICATIONS TO THE PROJECT DEVELOPER FOR REVIEW AND APPROVAL PRIOR TO FABRICATION OR DELIVERY TO THE SITE. ALLOW A MINIMUM OF 14 WORKING DAYS FOR REVIEW.

6. SHOULD ANY UNKNOWN OR INCORRECTLY LOCATED EXISTING PIPING OR OTHER UTILITY BE UNCOVERED DURING EXCAVATION, CONSULT THE PROJECT DEVELOPER IMMEDIATELY FOR DIRECTIONS BEFORE PROCEEDING FURTHER WITH WORK IN THIS AREA.

7. DO NOT INTERRUPT EXISTING UTILITIES SERVICING FACILITIES OCCUPIED AND USED BY THE PROJECT DEVELOPER OR OTHERS DURING OCCUPIED HOURS, EXCEPT WHEN SUCH INTERRUPTIONS HAVE BEEN AUTHORIZED IN WRITING BY THE PROJECT DEVELOPER AND THE LOCAL MUNICIPALITY. INTERRUPTIONS SHALL ONLY OCCUR AFTER ACCEPTABLE TEMPORARY SERVICE HAS BEEN PROVIDED.

8. THE CONTRACT LIMIT IS THE PROPERTY LINE UNLESS OTHERWISE SPECIFIED OR SHOWN ON THE CONTRACT DRAWINGS.

9. THE CONTRACTOR SHALL ABIDE BY ALL OSHA, FEDERAL, STATE AND LOCAL REGULATIONS WHEN OPERATING CRANES, BOOMS, HOISTS, ETC. IN CLOSE PROXIMITY TO OVERHEAD ELECTRIC LINES. IF CONTRACTOR MUST OPERATE EQUIPMENT CLOSE TO ELECTRIC LINES, CONTACT POWER COMPANY TO MAKE ARRANGEMENTS FOR PROPER SAFEGUARDS. ANY UTILITY COMPANY FEES SHALL BE PAID FOR BY THE CONTRACTOR.

10. THE CONTRACTOR SHALL COMPLY WITH OSHA CFR 29 PART 1926 FOR EXCAVATION TRENCHING AND TRENCH PROTECTION REQUIREMENTS.

11. THE ENGINEER IS NOT RESPONSIBLE FOR SITE SAFETY MEASURES TO BE EMPLOYED DURING CONSTRUCTION. THE ENGINEER HAS NO CONTRACTUAL DUTY TO CONTROL THE SAFEST METHODS OR MEANS OF THE WORK, JOB SITE RESPONSIBILITIES, SUPERVISION OF PERSONNEL OR TO SUPERVISE SAFETY AND DO NOT VOLUNTARILY ASSUME ANY SUCH DUTY OR RESPONSIBILITY.

12. THE CONTRACTOR SHALL RESTORE ANY DRAINAGE STRUCTURE, PIPE, CONDUIT, PAVEMENT, CURBING, SIDEWALKS, LANDSCAPED AREAS OR SIGNAGE DISTURBED DURING CONSTRUCTION TO THEIR ORIGINAL CONDITION OR BETTER, AS APPROVED BY THE PROJECT DEVELOPER OR TOWN OF HAMDEN.

13. THE CONTRACTOR SHALL PROVIDE AS-BUILT RECORDS OF ALL CONSTRUCTION (INCLUDING UNDERGROUND UTILITIES) TO THE PROJECT DEVELOPER AT THE END OF CONSTRUCTION.

14. ALTERNATIVE METHODS AND PRODUCTS, OTHER THAN THOSE SPECIFIED, MAY BE USED IF REVIEWED AND APPROVED BY THE PROJECT DEVELOPER, ENGINEER, AND APPROPRIATE REGULATORY AGENCY PRIOR TO INSTALLATION DURING THE BIDDING/CONSTRUCTION PROCESS.

15. INFORMATION ON EXISTING UTILITIES AND STORM DRAINAGE SYSTEMS HAS BEEN COMPILED FROM AVAILABLE INFORMATION INCLUDING UTILITY PROVIDER AND MUNICIPAL RECORD MAPS AND/OR FIELD SURVEY AND IS NOT GUARANTEED CORRECT OR COMPLETE. UTILITIES AND STORM DRAINAGE SYSTEMS ARE SHOWN TO ALERT THE CONTRACTOR TO THEIR PRESENCE AND THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ACTUAL LOCATIONS AND ELEVATIONS OF ALL UTILITIES AND STORM DRAINAGE SYSTEMS INCLUDING SERVICES. PRIOR TO DEMOLITION OR CONSTRUCTION, THE CONTRACTOR SHALL CONTACT "DIG SAFE" 72 HOURS BEFORE COMMENCEMENT OF WORK AT "811" AND VERIFY ALL UTILITY AND STORM DRAINAGE SYSTEM LOCATIONS.

16. NO CONSTRUCTION OR DEMOLITION SHALL BEGIN UNTIL APPROVAL OF THE FINAL PLANS IS GRANTED BY ALL GOVERNING AND REGULATORY AGENCIES.

SITE PLAN NOTES

1. THE SURVEY WAS PROVIDED BY NORTHEAST SURVEY CONSULTANTS, DATED APRIL 16, 2019.

2. THERE ARE BVWS LOCATED ON THE SITE AS INDICATED ON THE PLANS. BVW BOUNDARIES WERE FLAGGED AND LOCATED BY ALL-POINTS TECHNOLOGY, IN MARCH 2020.

3. THERE WILL BE MINIMAL GRADING ON SITE IN THE AREAS OF THE MINOR CLEARING, TO ENSURE THAT PROPER DRAINAGE IS MAINTAINED.

4. THE CONTRACTOR SHALL FOLLOW THE RECOMMENDED SEQUENCE OF CONSTRUCTION NOTES PROVIDED ON THE EROSION CONTROL PLAN OR SUBMIT AN ALTERNATE PLAN FOR APPROVAL BY THE ENGINEER AND/OR PERMITTING AGENCIES PRIOR TO THE START CONSTRUCTION. ALLOW A MINIMUM OF 14 WORKING DAYS FOR REVIEW.

5. PROPER CONSTRUCTION PROCEDURES SHALL BE FOLLOWED ON ALL IMPROVEMENTS WITHIN THIS PARCEL SO AS TO PREVENT THE SILTING OF ANY WATERCOURSE OR BVWS IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS. IN ADDITION, THE CONTRACTOR SHALL ADHERE TO "EROSION CONTROL PLAN" CONTAINED HEREIN. THE CONTRACTOR SHALL BE RESPONSIBLE TO POST ALL BONDS AS REQUIRED BY GOVERNMENT AGENCIES WHICH WOULD GUARANTEE THE PROPER IMPLEMENTATION OF THE PLAN.

6. ALL SITE WORK, MATERIALS OF CONSTRUCTION, AND CONSTRUCTION METHODS FOR EARTHWORK AND STORM DRAINAGE WORK, SHALL CONFORM TO THE SPECIFICATIONS AND DETAILS AND APPLICABLE SECTIONS OF THE PROJECT SPECIFICATIONS MANUAL. OTHERWISE THIS WORK SHALL CONFORM TO THE STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION AND PROJECT GEOTECHNICAL REPORT IF THERE IS NO PROJECT SPECIFICATIONS MANUAL. ALL FILL MATERIAL UNDER STRUCTURES AND PAVED AREAS SHALL BE PER THE ABOVE STATED APPLICABLE SPECIFICATIONS, AND/OR PROJECT GEOTECHNICAL REPORT, AND SHALL BE PLACED IN ACCORDANCE WITH THE APPLICABLE SPECIFICATIONS UNDER THE SUPERVISION OF A QUALIFIED PROFESSIONAL ENGINEER. MATERIAL SHALL BE COMPACTED IN 8" LIFTS TO 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D 1557 AT 95% PERCENT OF OPTIMUM MOISTURE CONTENT.

7. ALL DISTURBANCE INCURRED TO PUBLIC, MUNICIPAL, COUNTY, STATE PROPERTY DUE TO CONSTRUCTION SHALL BE RESTORED TO ITS PREVIOUS CONDITION OR BETTER, TO THE SATISFACTION OF THE TOWN OF HAMDEN AND STATE OF CONNECTICUT.

8. IF IMPACTED OR CONTAMINATED SOIL IS ENCOUNTERED BY THE CONTRACTOR, THE CONTRACTOR SHALL SUSPEND EXCAVATION WORK OF IMPACTED SOIL AND NOTIFY THE PROJECT DEVELOPER AND/OR PROJECT DEVELOPER'S ENVIRONMENTAL CONSULTANT PRIOR TO PROCEEDING WITH FURTHER WORK IN THE IMPACTED SOIL LOCATION UNTIL FURTHER INSTRUCTED BY THE PROJECT DEVELOPER AND/OR PROJECT DEVELOPER'S ENVIRONMENTAL CONSULTANT.

UTILITY NOTES

1. CONTRACTOR IS RESPONSIBLE FOR CONTACTING THE TOWN OF HAMDEN TO SECURE CONSTRUCTION PERMITS AND FOR PAYMENT OF FEES FOR STREET CUTS AND CONNECTIONS TO EXISTING UTILITIES.
2. REFER TO DRAWINGS BY PROJECT DEVELOPER FOR THE ONSITE ELECTRICAL DRAWINGS AND INTERCONNECTION TO EXISTING ELECTRICAL GRID. SITE CONTRACTOR SHALL SUPPLY AND INSTALL PIPE ADAPTERS AS NECESSARY AT BUILDING CONNECTION POINT OR AT EXISTING UTILITY OR PIPE CONNECTION POINT. THESE DETAILS ARE NOT INCLUDED IN THESE PLANS.
3. UTILITY LOCATIONS AND PENETRATIONS ARE SHOWN FOR THE CONTRACTOR'S INFORMATION AND SHALL BE VERIFIED WITH THE ELECTRICAL ENGINEER AND THE PROJECT DEVELOPER'S CONSTRUCTION MANAGER PRIOR TO THE START OF CONSTRUCTION.
4. THE CONTRACTOR SHALL VISIT THE SITE AND VERIFY THE ELEVATION AND LOCATION OF ALL UTILITIES BY VARIOUS MEANS PRIOR TO BEGINNING ANY EXCAVATION. TEST PITS SHALL BE DUG AT ALL LOCATIONS WHERE PROP. SANITARY SEWERS AND WHERE PROP. STORM PIPING WILL CROSS EXISTING UTILITIES, AND THE HORIZONTAL AND VERTICAL LOCATIONS OF THE UTILITIES SHALL BE DETERMINED. THE CONTRACTOR SHALL CONTACT THE PROJECT DEVELOPER IN THE EVENT OF ANY DISCOVERED OR UNFORESEEN CONFLICTS BETWEEN EXISTING AND PROPOSED SANITARY SEWERS, STORM PIPING AND UTILITIES SO THAT AN APPROPRIATE MODIFICATION MAY BE MADE.
5. UTILITY CONNECTION DESIGN AS REFLECTED ON THE PLAN MAY CHANGE SUBJECT TO UTILITY PROVIDER AND GOVERNING AUTHORITY STAFF REVIEW.
6. THE CONTRACTOR SHALL ENSURE THAT ALL UTILITY PROVIDERS AND GOVERNING AUTHORITY STANDARDS FOR MATERIALS AND CONSTRUCTION METHODS ARE MET. THE CONTRACTOR SHALL PERFORM PROPER COORDINATION WITH THE RESPECTIVE UTILITY PROVIDER.
7. THE CONTRACTOR SHALL ARRANGE FOR AND COORDINATE WITH THE RESPECTIVE UTILITY PROVIDERS FOR SERVICE INSTALLATIONS AND CONNECTIONS. THE CONTRACTOR SHALL COORDINATE WORK TO BE PERFORMED BY THE VARIOUS UTILITY PROVIDERS AND SHALL PAY ALL FEES FOR CONNECTIONS, DISCONNECTIONS, RELOCATIONS, INSPECTIONS, AND DEMOLITION UNLESS OTHERWISE STATED IN THE PROJECT SPECIFICATIONS MANUAL AND/OR GENERAL CONDITIONS OF THE CONTRACT.
8. ALL EXISTING PAVEMENT WHERE UTILITY PIPING IS TO BE INSTALLED SHALL BE SAW CUT. AFTER UTILITY INSTALLATION IS COMPLETED, THE CONTRACTOR SHALL INSTALL TEMPORARY AND/OR PERMANENT PAVEMENT REPAIR AS DETAILED ON THE DRAWINGS OR AS REQUIRED BY THE TOWN OF HAMDEN.
9. ALL PIPES SHALL BE LAID ON STRAIGHT ALIGNMENTS AND EVEN GRADES USING A PIPE LASER OR OTHER ACCURATE METHOD.
10. RELOCATION OF UTILITY PROVIDER FACILITIES, SUCH AS POLES, SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THE UTILITY PROVIDER.
11. THE CONTRACTOR SHALL COMPACT PIPE BACKFILL IN 8" LIFTS ACCORDING TO THE PIPE BEDDING DETAILS. TRENCH BOTTOM SHALL BE STABLE IN HIGH GROUNDWATER AREAS. A PIPE FOUNDATION SHALL BE USED PER THE TRENCH DETAILS AND IN AREAS OF ROCK EXCAVATION.
12. CONTRACTOR TO PROVIDE STEEL SLEEVES AND ANNULAR SPACE SAND FILL FOR UTILITY PIPE AND CONDUIT CONNECTIONS UNDER FOOTINGS.
13. ALL UTILITY CONSTRUCTION IS SUBJECT TO INSPECTION FOR APPROVAL PRIOR TO BACKFILLING, IN ACCORDANCE WITH THE APPROPRIATE UTILITY PROVIDER REQUIREMENTS.
14. A ONE-FOOT MINIMUM VERTICAL CLEARANCE BETWEEN WATER, GAS, ELECTRICAL, AND TELEPHONE LINES AND STORM PIPING SHALL BE PROVIDED. A SIX-INCH MINIMUM CLEARANCE SHALL BE MAINTAINED BETWEEN STORM PIPING AND SANITARY SEWER. A 6-INCH TO 18-INCH VERTICAL CLEARANCE BETWEEN SANITARY SEWER PIPING AND STORM PIPING SHALL REQUIRE CONCRETE ENCASEMENT OF THE PROP. SANITARY PIPING.
15. THE CONTRACTOR SHALL RESTORE ANY UTILITY STRUCTURE, PIPE, CONDUIT, PAVEMENT, CURBING, SIDEWALKS, DRAINAGE STRUCTURE, SWALE OR LANDSCAPED AREAS DISTURBED DURING CONSTRUCTION, TO THEIR ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE PROJECT DEVELOPER AND TOWN OF HAMDEN.
16. INFORMATION ON EXISTING UTILITIES AND STORM DRAINAGE HAS BEEN COMPILED FROM AVAILABLE INFORMATION INCLUDING UTILITY PROVIDER AND MUNICIPAL RECORD MAPS AND/OR FIELD SURVEY, AND IS NOT GUARANTEED CORRECT OR COMPLETE. UTILITIES AND STORM DRAINAGE ARE SHOWN TO ALERT THE CONTRACTOR TO THEIR PRESENCE. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ACTUAL LOCATIONS AND ELEVATIONS OF ALL UTILITIES AND STORM DRAINAGE INCLUDING SERVICES. CONTACT "DIG SAFE" AT 811 72 HOURS PRIOR TO CONSTRUCTION AND VERIFY ALL UNDERGROUND AND OVERHEAD UTILITY AND STORM DRAINAGE LOCATIONS. THE CONTRACTOR SHALL EMPLOY THE USE OF A UTILITY LOCATING COMPANY TO PROVIDE SUBSURFACE UTILITY ENGINEERING CONSISTING OF DESIGNATING UTILITIES AND STORM PIPING ON PRIVATE PROPERTY WITHIN THE CONTRACT LIMIT AND CONSISTING OF DESIGNATING AND LOCATING WHERE PROP. UTILITIES AND STORM PIPING CROSS EXISTING UTILITIES AND STORM PIPING WITHIN THE CONTRACT LIMITS.
17. THE CONTRACTOR SHALL ARRANGE AND COORDINATE WITH UTILITY PROVIDERS FOR WORK TO BE PERFORMED BY UTILITY PROVIDERS. THE CONTRACTOR SHALL PAY ALL UTILITY FEES UNLESS OTHERWISE STATED IN THE PROJECT SPECIFICATION MANUAL AND GENERAL CONDITIONS, AND REPAIR PAVEMENTS AS NECESSARY.
18. ELECTRIC DRAWINGS AND REQUIREMENTS ARE NOT INCLUDED AS PART OF THIS DRAWING SET AND SHOULD BE OBTAINED FROM THE PROJECT DEVELOPER.
19. ALTERNATIVE METHODS AND PRODUCTS OTHER THAN THOSE SPECIFIED MAY BE USED IF REVIEWED AND APPROVED BY THE PROJECT DEVELOPER, ENGINEER, AND APPROPRIATE REGULATORY AGENCIES PRIOR TO INSTALLATION.
20. THE CONTRACTOR SHALL MAINTAIN ALL FLOWS AND UTILITY CONNECTIONS TO EXISTING BUILDINGS WITHOUT INTERRUPTION UNLESS/UNTIL AUTHORIZED TO DISCONNECT BY THE PROJECT DEVELOPER, TOWN OF HAMDEN, UTILITY PROVIDERS AND GOVERNING AUTHORITIES.

GAYLORD MOUNTAIN SOLAR PROJECT 2019, LLC

200 HARBORSIDE DRIVE
SUITE 200
SCHENECTADY, NY 12305

ALL-POINTS
TECHNOLOGY CORPORATION

567 VAUXHAUL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-663-1697
WWW.ALLPOINTSTECH.COM FAX: (860)-663-0935

CSC PERMIT SET

NO	DATE	REVISION
0	08/07/20	ISSUED FOR PERMIT: BJP
1		
2		
3		
4		
5		
6		

DESIGN PROFESSIONAL OF RECORD

PROF: BRADLEY J. PARSONS P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION
ADD: 567 VAUXHAUL STREET EXTENSION - SUITE 311 WATERFORD, CT 06385

OWNER: VERTICAL BRIDGE LANCO LLC
ADDRESS: 750 PARK OF COMMERCE DR S200 BOCA RATON, FL 33487

HAMDEN SOLAR

SITE ADDRESS: 360 GAYLORD MOUNTAIN RD HAMDEN, CT

APT FILING NUMBER: CT619100

	DRAWN BY: JT
DATE: 08/07/20	CHECKED BY: BJP

SHEET TITLE:

SITE NOTES

SHEET NUMBER:

DN-4

STATE OF CONNECTICUT
BRADLEY J. PARSONS
No. 28025
LICENSED
PROFESSIONAL ENGINEER

APPENDIX B

RESOURCES PROTECTION PLAN

ENVIRONMENTAL NOTES

Wetland Protection Plan

As a result of the proposed development's location in the vicinity of wetlands, the following Best Management Practices ("BMPs") are recommended to avoid unintentional impact to wetland habitats during construction activities. This plan includes elements that will protect wetlands regardless of the time of year. Complete details of the recommended BMPs are provided below, which will be incorporated into the construction drawings to ensure the Contractor is fully aware of the project's environmentally sensitive setting.

A wetland scientist from All-Points Technology Corp. ("APT") experienced in compliance monitoring of construction activities will serve as the Environmental Monitor for this project to ensure that the following BMPs are implemented properly. The proposed wetland protection program consists of several components including: proper maintenance of erosion and sedimentation controls; periodic inspection of erosion controls; education of all contractors and sub-contractors prior to initiation of work on the site; awareness signage; protective measures; and, reporting.

1. **Erosion and Sedimentation Controls**

   a. Plastic netting with large mesh openings (> ¼") 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 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 with a mesh size <¼" such as that typically used in compost filter socks to avoid/minimize wildlife entanglement.

   b. Installation of erosion and sedimentation controls, required for erosion control compliance, shall be performed by the Contractor following clearing activities and prior to any earthwork. The Environmental Monitor will inspect the work zone area prior to and following erosion control barrier installation to ensure these controls are satisfactorily installed.

   c. If a staging area for equipment, vehicles or construction materials is required for this project, such area(s) shall be located outside of any wetland resource Buffer Zone.

   d. All erosion control measures shall be removed within 30 days of completion of work and permanent stabilization of site soils so that herpetofauna movements between uplands and wetlands are not restricted.

2. 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 the Environmental Monitor. This orientation and educational session will consist of information such as, but not limited to: the location and extents of sensitive wetland resources, proper protection measures and the importance of maintaining these controls, and how to avoid unintentional impacts to these resources. The Contractor will designate one of its workers as the “Project Monitor”, who will be responsible for daily monitoring of these protective measures.

b. The Environmental Monitor will also post caution signs throughout the project site and maintain them for the duration of construction to provide notice of the environmentally sensitive nature of the work area.

c. The Contractor will be provided with the Environmental Monitor’s cell phone and email contact information to immediately report any encounters with herpetofauna.

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 sensitive 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. 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 take place on an impervious pad with secondary containment designed to contain fuels.
      2. Any refueling drums/tanks 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 or watercourses.

   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 waterways or wetlands.
      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.
    4. Contact the appropriate local, state and/or federal agencies, as necessary.
    5. Contact a disposal company to properly dispose of contaminated materials.

iv. Reporting
    1. Complete an incident report.
    2. Submit a completed incident report to local, state and federal agencies, as required.

4. Reporting

a. Inspection reports (brief narrative and applicable photos) will be prepared by the Environmental Monitor documenting each inspection and submitted to the Permittee for compliance verification. 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.

b. Any incidents of release of sediment or other materials into wetland resource areas shall be reported by the Permittee within 24 hours to the Town of Canton Wetland Enforcement Officer and the Connecticut Siting Council.

c. Following completion of the project, a summary report will be prepared by the Environmental Monitor documenting compliance with the Wetland Protection Plan and submitted to the Permittee, who shall submit a copy to the Connecticut Siting Council.

APPENDIX C

USFWS COMPLIANCE STATEMENT

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
http://www.fws.gov/newengland

IPaC Record Locator: 765-21279317 April 15, 2020

Subject: Consistency letter for the 'Distributed Solar Hamden Solar Energy Facility' project indicating that any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o).

Dear Deborah Gustafson:

The U.S. Fish and Wildlife Service (Service) received on April 15, 2020 your effects determination for the 'Distributed Solar Hamden Solar Energy Facility' (the Action) using the northern long-eared bat (*Myotis septentrionalis*) key within the Information for Planning and Consultation (IPaC) system. You indicated that no Federal agencies are involved in funding or authorizing this Action. This IPaC key assists users in determining whether a non-Federal action may cause "take"[1] of the northern long-eared bat that is prohibited under the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.).

Based upon your IPaC submission, any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o). Unless the Service advises you within 30 days of the date of this letter that your IPaC-assisted determination was incorrect, this letter verifies that the Action is not likely to result in unauthorized take of the northern long-eared bat.

Please report to our office any changes to the information about the Action that you entered into IPaC, the results of any bat surveys conducted in the Action area, and any dead, injured, or sick northern long-eared bats that are found during Action implementation.

If your Action proceeds as described and no additional information about the Action's effects on species protected under the ESA becomes available, no further coordination with the Service is required with respect to the northern long-eared bat.

[1]Take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct [ESA Section 3(19)].

Action Description

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

1. Name

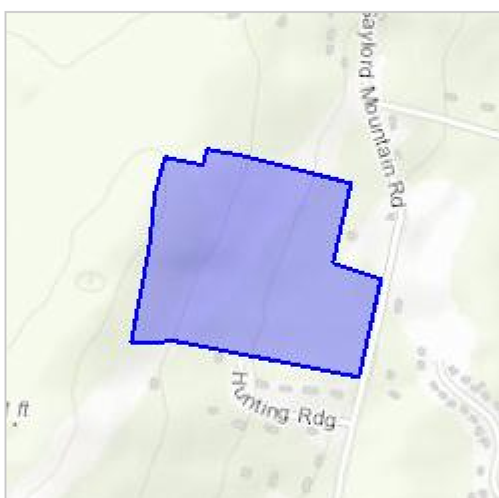
Distributed Solar Hamden Solar Energy Facility

2. Description

The following description was provided for the project 'Distributed Solar Hamden Solar Energy Facility':

> Distributed Solar Operations, LLC ("Distributed Solar" or the "Client") proposes a solar facility at a ±33.64-acre property located at 360 Gaylord Mountain Road in Hamden, New Haven County, Connecticut (the "Host Property"). The DC Output is +/- 3.43 MW with a total of 8,580 modules (26 modules per string with 20 degree tilt) with a paved driveway which extends southwestward from Gaylord Mountain Road to provide access to the solar facility. An Eversource electrical transmission corridor crosses Gaylord Mountain Road and traverses the Host Property in roughly a northeast to southwest direction. Remaining portions of the Host Property are lightly wooded and undeveloped. The Host Property is located in the northwestern portion of Hamden and abutting properties generally consist of residentially-developed properties and wooded, undeveloped land.

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/41.43241434715347N72.94471145523693W



Determination Key Result

This non-Federal Action may affect the northern long-eared bat; however, any take of this species that may occur incidental to this Action is not prohibited under the final 4(d) rule at 50 CFR §17.40(o).

Determination Key Description: Northern Long-eared Bat 4(d) Rule
This key was last updated in IPaC on **May 15, 2017**. Keys are subject to periodic revision.

This key is intended for actions that may affect the threatened northern long-eared bat.

The purpose of the key for non-Federal actions is to assist determinations as to whether proposed actions are excepted from take prohibitions under the northern long-eared bat 4(d) rule.

If a non-Federal action may cause prohibited take of northern long-eared bats or other ESA-listed animal species, we recommend that you coordinate with the Service.

Determination Key Result

Based upon your IPaC submission, any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o).

Qualification Interview

1. Is the action authorized, funded, or being carried out by a Federal agency?

   No

2. Will your activity purposefully **Take** northern long-eared bats?

   No

3. Is the project action area located wholly outside the White-nose Syndrome Zone?

   Automatically answered
   No

4. Have you contacted the appropriate agency to determine if your project is near a known hibernaculum or maternity roost tree?

   Location information for northern long-eared bat hibernacula is generally kept in state Natural Heritage Inventory databases – the availability of this data varies state-by-state. Many states provide online access to their data, either directly by providing maps or by providing the opportunity to make a data request. In some cases, to protect those resources, access to the information may be limited. A web page with links to state Natural Heritage Inventory databases and other sources of information on the locations of northern long-eared bat roost trees and hibernacula is available at www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html.

   Yes

5. Will the action affect a cave or mine where northern long-eared bats are known to hibernate (i.e., hibernaculum) or could it alter the entrance or the environment (physical or other alteration) of a hibernaculum?

   No

6. Will the action involve Tree Removal?

   Yes

7. Will the action only remove hazardous trees for the protection of human life or property?

   No

8. Will the action remove trees within 0.25 miles of a known northern long-eared bat hibernaculum at any time of year?

   No

9. Will the action remove a known occupied northern long-eared bat maternity roost tree or any trees within 150 feet of a known occupied maternity roost tree from June 1 through July 31?

   No

Project Questionnaire

If the project includes forest conversion, report the appropriate acreages below. Otherwise, type ‘0’ in questions 1-3.

1. Estimated total acres of forest conversion:

17.6

2. If known, estimated acres of forest conversion from April 1 to October 31

17.6

3. If known, estimated acres of forest conversion from June 1 to July 31

17.6

If the project includes timber harvest, report the appropriate acreages below. Otherwise, type ‘0’ in questions 4-6.

4. Estimated total acres of timber harvest

0

5. If known, estimated acres of timber harvest from April 1 to October 31

0

6. If known, estimated acres of timber harvest from June 1 to July 31

0

If the project includes prescribed fire, report the appropriate acreages below. Otherwise, type ‘0’ in questions 7-9.

7. Estimated total acres of prescribed fire

0

8. If known, estimated acres of prescribed fire from April 1 to October 31

0

9. If known, estimated acres of prescribed fire from June 1 to July 31

0

If the project includes new wind turbines, report the megawatts of wind capacity below. Otherwise, type ‘0’ in question 10.

10. What is the estimated wind capacity (in megawatts) of the new turbine(s)?

0

APPENDIX D

PHASE 1A/1B CULTURAL RESOURCES
RECONNAISSANCE SURVEY REPORT

MAY 2020

PHASE IA CULTURAL RESOURCES ASSESSMENT SURVEY OF THE PROPOSED HAMDEN SOLAR CENTER PROJECT IN HAMDEN, CONNECTICUT

PREPARED FOR:

ALL-POINTS TECHNOLOGY CORPORATION

567 VAUXHALL STREET EXTENSION, SUITE 311
WATERFORD, CT 06385

PREPARED BY:

HERITAGE CONSULTANTS

P.O. BOX 310249
NEWINGTON, CONNECTICUT 06131

ABSTRACT

This report presents the results of a Phase IA cultural resources assessment survey for a proposed solar center in Hamden, Connecticut. The project area associated with the solar center will occupy approximately 10.2 ac of land and will be accessed via a road that will extend from an existing cellular communications compound to the northwest, across an Eversource Energy electrical transmission right-of-way, and to the project parcel. The current investigation consisted of: 1) preparation of an overview of the region's prehistory, history, and natural setting); 2) a literature search to identify and discuss previously recorded cultural resources in the region; 3) a review of readily available historic maps and aerial imagery depicting the project area to identify potential historic resources and/or areas of past disturbance; and 4) pedestrian survey and photo-documentation of the project area to determine their archaeological sensitivity. The results of the survey indicate that the western, southern, eastern, and central portions of the project area, which encompasses 9.7 ac of land, are characterized by slopes, wet soils, and/or obvious signs of major disturbance. No intact archaeological deposits are expected there, and no additional examination of these areas is recommended. Alternatively, the northern portion of the project area, which contains 0.5 ac of land, contains low slopes and well-drained soils. This area was deemed to possess a moderate/high archaeological sensitivity, and it is recommended that it be subjected to Phase IB cultural resources survey prior to the construction of the proposed solar center. Finally, the historic Caleb Doolittle Jr., House, which was identified to the north of and outside of the project parcel, will likely be visible from the proposed solar center. This residence may be eligible for listing on the National Register of Historic Places applying the criteria for evaluation (36 CFR 60.4 [a-d]). It is recommended that impacts to the viewshed of this house be avoided to the extent feasible. This can be accomplished by leaving the existing tree line to the rear of south and west of the Caleb Doolittle Jr., House in place, as well as installing privacy slats in the perimeter fence line around the solar array.

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CHAPTER I
INTRODUCTION

This report presents the results of a Phase IA cultural resources assessment survey for a proposed solar center in Hamden, Connecticut (Figure 1). All-Points Technology Corporation (All-Points) requested that Heritage Consultants, LLC (Heritage) complete the assessment survey as part of the planning process for the proposed Hamden Solar Center, which will occupy approximately 10.2 of land within a larger 34.3 ac (13.9 ha) parcel of land to the west of Gaylord Mountain Road. The proposed development area is hereafter referred to as the project area. The project area is situated at the southeastern corner of a larger parcel of land recorded in the Hamden Assessor's Office as 360 Gaylord Mountain Road. Currently owned by Vertical Bridge Landco, LLC, this parcel is bordered to the north by a forested area, to the east by Gaylord Mountain Road, to the south by a residential subdivision, and to the west by an Eversource Energy electrical transmission corridor. The parcel was wooded and contained no structures at the time of survey. Heritage completed this investigation on behalf of All-Points in April of 2020. 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 and Methods Overview
The proposed project will include the installation of rows of solar panels spaced approximately 10 ft (3 m) apart across the majority of the proposed project area. The development also will include an access road that will extend from an existing cellular communications compound to the west, across an Eversource Energy electrical transmission right-of-way, and to the project parcel. In addition, the proposed project plans depict a stormwater basin in the eastern portion of the project area along Gaylord Mountain Road, as well as a concrete equipment pad and pole mounted meter, recloser, and digital controller in the southeastern corner of the project area. The solar array will interconnect with powerlines along Gaylord Mountain Road (Figure 2). At the time of survey, the project area was covered with a mixed deciduous forest and it ranged in elevation from 137.2 to 182.9 m (450 to 600 ft) NGVD, with elevations sloping up from east to west. With the exception of a stone wall, no manmade objects, including residences, barns, wells, etc., were noted on the property at the time of survey. Soils recorded throughout the area were generally rocky in nature and prone to large amounts of surface runoff due to the presence of slopes. Finally, pedestrian survey of the project area resulted in the identification of a large number of tree-throws and recently downed trees. These resulted from a documented tornado microburst that affected the Hamden area in May of 2018.

This Phase IA cultural resources assessment survey consisted of the completion of the following tasks: 1) a contextual overview of the region's prehistory, history, and natural setting (e.g., soils, ecology, hydrology, etc.); 2) a literature search to identify and discuss previously completed cultural resources surveys and previously recorded cultural resources in the region encompassing the project area; 3) a review of readily available historic maps and aerial imagery depicting the project area in order to identify potential historic resources and/or areas of past disturbance; 4) pedestrian survey and photo-documentation of the project in order to determine their archaeological sensitivity; and 5) preparation of the current Phase IA cultural resources assessment survey report.

Project Results and Management Recommendations Overview
The review of historic maps and aerial images depicting the project area and files maintained by the CT-SHPO resulted in the identification of two previously identified archaeological sites (Sites 8-5 and 8-15) and five historic standing structures in the vicinity of the project area. Site 8-5 consisted of a prehistoric camp that has been destroyed by previous construction activities, and Site 8-15 has been described as a prehistoric occupation dating from the Late Archaic period that has not been assessed for its significance. The historic standing structures located in the vicinity of the project area consist of four historic residences and a single school. They represent the Colonial, Federal, and Greek Revival styles, and none of them have been assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). The presence of these resources, which are discussed in detail in Chapter V, demonstrates that archaeological sites and historic standing structures have been noted in the vicinity of the project area.

In addition to the cultural resources discussed above, Heritage combined data from the historic map and aerial image analysis, and the pedestrian survey to stratify the project area into zones of no/low and/or moderate/high archaeological sensitivity. The results of the investigation indicated that 9.7 ac of land in the western, southern, eastern, and central portions of the project area contained steep slopes, large amounts of rocks and boulders on the surface, numerous tree-throws that resulted from a tornado that occurred in May of 2018, and significant amounts of surface water runoff. These areas were assessed as having a no/low archaeological sensitivity, and no additional archaeological examination of them is recommended prior to construction of the Hamden Solar Center.

In contrast, the northern 0.5 ac of the project area contains level slopes and are free of rock, boulders, and tree-throws. This area was deemed to retain a moderate/high archaeological sensitivity. It is recommended that Phase IB archaeological survey of this area be undertaken prior to construction of the proposed solar center. Finally, pedestrian survey revealed that the solar center will be visible from a nearby residence to the north and outside of the project parcel; it is an eighteenth century Cape Style home that belonged to Caleb Doolittle Jr. It is likely eligible for listing to the National Register of Historic Places applying the criteria for evaluation (36 CFR 60.4 [a-d]). It is recommended that impacts to the viewshed of this house be avoided to the extent feasible. This can be accomplished by leaving the existing tree line to the rear of south and west of the Caleb Doolittle Jr., as well as the installation of privacy slats in the perimeter fence line around the solar array.

Project Personnel
Key personnel for this project included Mr. David R. George, M.A., R.P.A, who served as Principal Investigator for this effort and completed the field work portion of the project. He was assisted by Mr. William Keegan, B.A., support services and project mapping. Ms. Christina Volpe, B.A., completed this historic background research of the project and contributed to the final report, while Mr. Stephen Anderson, B.A., completed all GIS tasks associated with the project and Ms. Elizabeth Correia, M.A., assisted in the compilation of this report.

Organization of the Report
The natural setting of the region encompassing the project area is presented in Chapter II; it includes a brief overview of the geology, hydrology, and soils, of the project region. The prehistory of the project region is outlined briefly in Chapter III. The history of the region encompassing the project area is chronicled in Chapter IV, while a discussion of previous archaeological investigations in the vicinity of the project area is presented in Chapter V. The methods used to complete this investigation are discussed in

Chapter VI. Finally, the results of this investigation and management recommendations for the project area and the identified cultural resources are presented in Chapter VII.

CHAPTER II
NATURAL SETTING

Introduction

This chapter provides a brief overview of the natural setting of the region containing the project area. Previous archaeological research has documented that a few specific environmental factors can be associated with both prehistoric and historic period site selection. These include general ecological conditions, as well as types of fresh water sources and soils present. The remainder of this section 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 quite 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: South-Central Lowlands ecoregion. A brief summary of this ecoregion is presented below. It is followed by a discussion of the hydrology and soils found in and adjacent to the study area.

<u>South-Central Lowlands Ecoregion</u>

The South-Central Lowlands ecoregion consists of "a rolling area of low average elevation, crossed by several north-trending ridge systems; streams and river systems with broad, well developed flood plains, from which the land surface generally rises to the bases of the ridges" (Dowhan and Craig 1976). Elevations average less than 60 m (200 ft) but can reach approximately 300 m (1,000 ft) in height. The region's bedrock is sedimentary, consisting of sandstones, basalt, and traprock. Soils vary from "clayey glacial till in the uplands of the region, to sand, gravel, silt, and clay in the lowlands."

Hydrology in the Vicinity of the Project Area

The project area is situated within a region that contains to multiple sources of freshwater, including Jepps Brook, Jepp Pond, Eaton Brook, West River, Lake Bethany, and Sanford Brook, as well as numerous unnamed streams, ponds, and wetlands. These freshwater sources may have served as resource extraction areas for Native American and historic populations. Previously completed archaeological investigations in Connecticut have demonstrated that streams, rivers, and wetlands were focal points for prehistoric occupations because they provided access to transportation routes, sources of freshwater, and abundant faunal and floral resources.

Soils Comprising the Project Area

Soil formation is the direct result of the interaction of many variables, including climate, vegetation, parent material, time, and organisms present (Gerrard 1981). Once archaeological deposits are buried within the soil, they are subject to various taphonomic and 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 in within the current study area. In contrast, acidic soils enhance the preservation of charred plant remains.

A review of the soils within the study area is presented below. The study area is characterized by the presence of eight major soil types. The most ubiquitous soil types found within the region and which cover the majority of the study area include Cheshire, Holyoke, and Wethersfield (Figure 2). A review of these soils shows that they consist of well-drained loams; they are the types of soils that are typically correlated with prehistoric and historic use and occupation. Descriptive profiles for each soil type are presented below; they were gathered from the National Resources Conservation Service.

<u>Cheshire Soils (Soil Code 77):</u>

The Cheshire series consists of deep, well drained loamy soils that have formed in supraglacial till on uplands. They are nearly level through very steep soils on till plains and hills and slope ranges from 0 through 60 percent. A typical profile of Cheshire series soils is as follows: **Ap--**0 to 8 inches; dark brown (7.5YR 3/2) fine sandy loam, pinkish gray (7.5YR 6/2) dry; weak medium granular structure; friable; common fine roots; 5 percent gravel; strongly acid; clear wavy boundary; **Bw1--**8 to 16 inches; reddish brown (5YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; few fine roots; 10 percent gravel; strongly acid; gradual wavy boundary; **Bw2--**16 to 26 inches; reddish brown (5YR 5/4) fine sandy loam; weak medium subangular blocky structure; very friable; few fine roots; 10 percent gravel; strongly acid; clear wavy boundary; and **C--**26 to 65 inches; reddish brown (2.5YR 4/4) gravelly sandy loam; massive; very friable with firm lenses; 20 percent gravel and cobbles; strongly acid.

<u>Holyoke Soils (Soil Code 78):</u>

The Holyoke series consists of shallow, well drained and somewhat excessively drained soils that have formed in a thin mantle of till derived mainly from basalt and red sandstone, conglomerate, and shale. They are nearly level to very steep soils on bedrock controlled ridges and hills with slopes that range from 0 to 60 percent. A typical profile of Holyoke series soils is as follows: **Oe**--0 to 1 cm; black (10YR 2/1) moderately decomposed plant material; **A**--1 to 8 cm; dark brown (10YR 3/3) silt loam; weak medium granular structure; very friable; many fine roots; 10 percent angular gravel; very strongly acid; abrupt wavy boundary; **Bw1**--8 to 20 cm; brown (7.5YR 4/4) silt loam; weak coarse granular structure; very friable; many fine roots; 10 percent gravel; very strongly acid; clear wavy boundary; **Bw2**--20 to 46 cm; yellowish red (5YR 4/6) gravelly silt loam; weak medium subangular blocky structure; friable; common fine roots; 15 percent gravel; very strongly acid; abrupt wavy boundary; and **2R**--46 cm; basalt bedrock.

Wethersfield Soils (Soil Code 87):

The Wethersfield series consists of very deep, well drained loamy soils that have formed in dense glacial till on uplands. The soils are moderately deep to dense basal till. They are nearly level to steep soils on till plains, low ridges, and drumlins. A typical profile of Wethersfield series soils is as follows: **Oe**--0 to 3 cm; black (10YR 2/1) moderately decomposed plant material; **A**--3 to 8 cm; dark brown (7.5YR 3/2) loam; moderate medium granular structure; friable; many fine and medium roots; 10 percent gravel; strongly acid; clear wavy boundary; **Bw1**--8 to 22 cm; reddish brown (5YR 4/4) loam; weak medium subangular blocky structure; friable; common fine and medium roots; 10 percent gravel; strongly acid; clear wavy boundary; **Bw2**--22 to 69 cm; dark reddish brown (5YR 3/3) gravelly loam; weak medium subangular blocky structure; friable; few medium roots; 15 percent gravel and cobbles; strongly acid; clear wavy boundary; and **Cd**--69 to 165 cm; reddish brown (2.5YR 4/4) gravelly loam; weak thick platy structure; very firm, brittle; few silt films and black coatings on some plates; 20 percent gravel and cobbles; strongly acid.

Summary

The natural setting of the area containing the proposed Hamden Solar Center is common throughout the South-Central Lowlands ecoregion. Streams and rivers of this area drain into the Long Island Sound. Further, the landscape in general is dominated by well-drained loamy soil types that contain large amounts of stone and that have formed on glacial substrates, including bedrock and till. Though steep slopes dominate a large amount of the region, the project region might have been well suited to Native American occupation throughout the prehistoric era. This portion of Hamden was also used throughout the historic era as evidenced by the presence of historic residences and agricultural fields throughout the region. Thus, archaeological deposits dating from the last 350 years or so may also be expected near or within the proposed impact areas.

CHAPTER III
PREHISTORIC SETTING

Introduction

Prior to the late 1970s and early 1980s, few systematic archaeological surveys of large portions of the state of Connecticut had been undertaken. Rather, the prehistory of the region was studied at the site level. Sites chosen for excavation were highly visible and were located in areas such as the coastal zone, e.g., shell middens, and Connecticut River Valley. As a result, a skewed interpretation of the prehistory 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 prehistoric 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 prehistoric 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 prehistory of Connecticut. The remainder of this chapter provides an overview of the prehistoric 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., 12,000 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 numerous surface finds of Paleo-Indian projectile points throughout the State of Connecticut, only two sites, the Templeton Site (6-LF-21) in Washington, Connecticut and the Hidden Creek Site (72-163) in Ledyard, Connecticut, have been studied in detail and dated using the radiocarbon method (Jones 1997; Moeller 1980). The Templeton Site (6-LF-21) is located 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.

The only other Paleo-Indian site studied in detail in Connecticut is the Hidden Creek Site (72-163) (Jones 1997). The Hidden Creek Site is situated on the southeastern margin of the Great Cedar Swamp on the Mashantucket Pequot Reservation in Ledyard, Connecticut. 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.

While archaeological evidence for Paleo-Indian occupation is scarce in Connecticut, it, combined with data from the West Athens Road and King's Road Site in the Hudson drainage and the Davis and Potts Sites in northern New York, supports the hypothesis that there was human occupation of the area not long after ca. 12,000 B.P. (Snow 1980). Further, site types currently known suggest that the Paleo-Indian settlement pattern was characterized by a high degree of mobility, with groups moving from region to region in search of seasonally abundant food resources, as well as for the procurement of high-quality raw materials from which to fashion stone tools.

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).

<u>Early Archaic Period (10,000 to 8,000 B.P.)</u>

To date, 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 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.

<u>Middle Archaic Period (8,000 to 6,000 B.P.)</u>

By the onset of the Middle Archaic Period, essentially modern deciduous forests had developed in the region (Davis 1969). It is at this time that increased numbers and types of sites are noted in Connecticut (McBride 1984). The most well-known Middle Archaic site in New England is the Neville Site, which is located in Manchester, New Hampshire and studied by Dincauze (1976). Careful analysis of the Neville Site indicated that the Middle Archaic occupation dated from between ca., 7,700 and 6,000 years ago. In fact, Dincauze (1976) obtained several radiocarbon dates from the Middle Archaic component of the Neville Site. The dates, associated with the then-newly named Neville type projectile point, ranged from 7,740±280 and 7,015±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 Period, 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 prehistory. 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 Period 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 the use of Orient Fishtail projectile points (McBride 1984:119; Ritchie 1971).

In addition, it was during the late Terminal Archaic Period 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 of 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 has been 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.

Careful archaeological investigations of Early Woodland sites in southern New England have 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 indicative of the Middle Woodland Period include 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 diverse stylistically 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 Prehistory

In sum, the prehistory of Connecticut spans from ca., 12,000 to 350 B.P., and it is characterized by numerous changes in tool types, subsistence patterns, and land use strategies. For the majority of the prehistoric era, local Native American groups practiced a subsistence pattern based on a mixed economy of hunting and gathering wild 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 prehistoric era 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 containing the proposed project area, a variety of prehistoric site types may be expected. These range from seasonal camps utilized by Archaic populations to temporary and task-specific sites of the Woodland era.

CHAPTER IV
HISTORIC OVERVIEW

Introduction

The project area is located in the north western part of the town of Hamden, which was formed in the eighteenth-century and is adjacent to (and formerly part of) New Haven. Hamden began seeing rapid population growth at the beginning of the twentieth century and is now a thickly settled suburban community. The project area, however, is situated at the base of Gaylord Mountain and within a tract of undeveloped woodland amidst preserved agricultural parcels and contemporary housing subdivisions.

Native American History

At the time of the English colonists' arrival, the territory of the future New Haven and Hamden was held by Native Americans who were known as the Quinnipiacs. Like other Algonquian-speaking people of the region, the Quinnipiacs lived in agricultural villages located on the best available river valley land, and also used the rest of their territory (including the Hamden area) for hunting, fishing, and temporary winter-season camps. The key leaders of two villages near New Haven harbor at the time of contact were Momaugin and Montowese. In 1638, these leaders were persuaded to give the colonists deeds to their territory, reserving only limited areas for their communities' farming activity; the terms of the transactions reflect the colonists' expectations that the Native Americans should and would conform to English legal and social structures, including the idea that the individual leaders really were English-style sovereigns who could transfer absolute ownership of territory. The disruption of the Native American economy and society that resulted, which included constant encroachments of colonists on their reserved farming lands and reduction of crucial hunting and fishing activities elsewhere, gradually caused the Quinnipiacs to relocate to places that these disruptions had not yet reached. By 1749, only 15 to 20 Quinnipiac families were still living in the New Haven area, and only 11 individuals in 1774 (Atwater 1902, De Forest 1852, Townshend 1900). The historic sources mention finds of Native American artifacts in Hamden, but no details about specific locations or areas where camps or villages might have been located. Nonetheless, the possibility of such sites cannot be discounted.

Hamden's Colonial History

Hamden remained as part of New Haven until 1786. The 1638 colony of New Haven, and several others in the area, were founded by Reverend John Davenport and Theophilus Eaton, who formed a common government called the New Haven Jurisdiction in 1643. The royal charter acquired by the separate Connecticut Colony in the 1660s, however, forced New Haven to become part of the single government called Connecticut (Cunningham 1995). Colonization of the Hamden area began well before this event and the town's separation from its parent town. In the 1640s, New Haven began granting tracts of land to its citizens in areas known as the Great Plains (later Hamden Plains), Beaver Meadows, and Pine Rock Meadows, all in the southern part of the future Hamden. By the 1680s, the town was granting the land in the northern sections (Hartley 1959). By 1716, the population of the northern parts of New Haven was large enough that the residents sought permission to set up the North Haven ecclesiastical society, which enabled them to tax themselves to support a Congregational church separate from the one in distant New Haven (Rockey 1892). The northern part of the future town of Hamden followed suit in 1757 with the Mount Carmel Society. The creation of such separate sub-entities led, in time, to the establishment of separate towns, but Hamden did not do so until near the end of the Revolutionary

War, in 1781, and was not successful in doing so until 1786 (Hartley 1959). Thus, colonial-era structures and sites are expected in Hamden, despite the significant population growth of later eras.

Hamden's History from 1790 to 1900

Hamden's population remained at less than 5,000 residents throughout the nineteenth century. It began at a reported 1,422 people in 1790, had reached only 2,164 citizens by 1850, and finally leaped to 4,662 residents in 1900 (Keegan 2012). An 1819 gazetteer reported that the town's physical geography was framed by hills to the east and west, which contained good building stone and some supposed copper deposits, and soil supported stands of hardwoods and substantial grain production. The gazetteer mentions Eli Whitney's gun factory in the southeast part of town, as well as a paper mill and one or two grain mills, tanneries, stores, and so forth; four churches (only two of them Congregational); and 260 houses for its population of 1,716 residents as of 1810 (Pease and Niles 1819). Except for Whitney's factory, this was a typical small Connecticut town of the period.

The Farmington Canal was built through Hamden and Cheshire between 1825 and 1826. By 1838, it carried some traffic as far as Northampton, Massachusetts (Crofut 1937). The venture turned out to be a failure, however, and in 1845 the New Haven and Northampton Railroad took its place. This railroad was completed between New Haven and Plainville by 1848 (Roth et al. 1981). In 1856, reorganized as the Canal Railroad, it reached Northampton, and then further north. It was prosperous and successful by 1874, and the New York, New Haven & Hartford Railroad purchased all of its stock in 1887, taking it over completely (Turner et al. 1989). As of the 1830s, probably encouraged by the canal, there were two Congregational churches in Hamden, in addition to one Methodist and one Episcopal. The town's businesses included the Carmel Works, which made "coach and elliptic springs, steps, and axletrees," as well as a carriage factory, a brass factory, a paper mill, and a few other manufacturing enterprises. In 1836, over 100 acres in the south part of town was planted in mulberry trees as part of the widespread, though temporary, craze for starting silk production in the state (Barber 1837). It is likely that various parts of Hamden contain nineteenth-century residential and industrial structures, the latter concentrated near the railroad and water-power sites, the former near the industry and on the many scattered farms.

Hamden's History from 1900 to Present

After 1900 Hamden's population grew rapidly; by 1930 it had quadrupled to 19,020 residents (Keegan 2012). This trend was driven in part by industrial activity that expanded out from New Haven. In the 1930s, Hamden had "[i]nnumerable manufacturing interests … includ[ing] radiators, carriage hardware, brass foundry goods, terra cotta, dyeing, smelting, bricks, etc." (Crofut 1937: 550). Some of these early twentieth-century industrial sites, and associated housing, are likely to be present in the town. Nevertheless, much of Hamden's growth after 1930, which saw the population more than double to 49,357 residents in 1970, can also be attributed to suburban residential expansion from New Haven. The construction of the limited-access Wilbur Cross Parkway through town in the late 1940s facilitated this trend. As of 2004, Hamden had 1,400 business firms employing 20,000 people, 23,000 housing units, and had been acquiring land for open space since the 1980s (Hamden 2004). As of 2014, the town had 70 manufacturing firms yielding 1,180 jobs (5.8 percent of the 20,455 jobs in town); 183 retail firms with 2,665 jobs; and 203 health care/social assistance firms with 4,198 jobs. All five of the town's largest property owners in 2014 were housing management or development companies, while the largest employers were in education, medical care, travel, and transportation. Twice as many Hamden residents commuted to New Haven as worked in Hamden itself (CERC 2016). This is typical of the modern service-sector orientation of Connecticut's economy, in which manufacturing is only a small part of employment and economic activity.

Historical Overview of the Project Area

Historical records indicate that the project area is located outside of the historic industrial and residential zones of Hamden. The project area is located in the northwestern area of Hamden, near Hamden's western border with the Town of Bethany. An 1852 historic map shows the project area situated along the then existing, and present-day Gaylord Mountain Road (Figure 4). The road is named for Alling Gaylord who, in 1804, established West Wood Cemetery to the northwest of the project area along Gaylord Mountain Road.

> "Know ye that Alling Gaylord of Hamden, for the consideration of twelve ($12) received to my full satisfaction….hereby grant a certain piece for the only purpose of a burying place, containing one quarter of an acre, beginning at a heap of stones on the brow of the hill & to extend north six rods, and west of east end so far as to make one quarter of an acre, and is bounded East, West & North on my own land, South on Highway."

Gaylord established the cemetery for the budding community of approximately five agricultural families that migrated to the area from New Haven, Wallingford, and Cheshire in the late eighteenth/early nineteenth centuries, when the area was then referred to as West Wood for its richly forested hills. The few gravestones in the small cemetery "bear the predominant names of Doolittle, Handy, and Warner, and Gaylord" (Hartley 1959). In 1729, Daniel Bradley built a sawmill on West Todd Road to grind flour (West Todd Street, as it now referred to, is to the northeast of the project area and would have abutted the Doolittle property). Soon after the sawmill was constructed several other mills were established along the Mill River, encouraging settlers to move northward away from New Haven and into the hills of Hamden (Lehman 2010). In 1740, the Ives and Dickerman Families cleared land to the south of the project area and remained in the vicinity through their descendants well into the late nineteenth century (Figure 4). In 1743, Samuel Bellany opened a tavern in the area, marking the West Wood community a growing village. Seven years later, in 1747, Waite Chatterton took over operations of the sawmill near West Todd Street and later sold it to his cousin Horace Doolittle, who in turn later sold it to his nephew Oswin Doolittle. Oswin replaced the up and down reciprocating saw with a circular one in 1879 and built a new structure to house it (Lehman 2010).

The Doolittle Family played a significant role in establishing the West Wood community in Hamden. On the 1852, 1856, and 1868 historic maps of the project area the nearest structure is labeled R. Doolittle and later in 1868 Mrs. L.A. Doolittle (Figure 4 through 6). The structure labeled on the historic maps was the homestead of Reuben Doolittle (1809-1862). Reuben is a fourth generation descendent of early New Haven settler and the large landholder, Abraham Doolittle, who served as the sheriff of New Haven in 1644. Later, in 1669, Abraham served on the settlement committee for the town of Wallingford (Davis 1979). Abraham's son Ebenezer, who was born in 1672, was one of the first settlers of the New Haven colony to migrate to the Cheshire area where he had inherited and acquired a significant amount of property. Ebenezer's son Caleb Doolittle left his father's lands, plus his own, to his children when he died in 1781. The land was subsequently split amongst his nine children. Reuben Doolittle, who lived near the project area, was the son of Caleb Jr., who in the nine-way split with his siblings in 1781 received a humble farm "in the north west part of Hamden called Westwood" (Davis 1979). Of Caleb Jr.'s four children, Reuben, the eldest, and Caleb the III, were popular local figures in their youth who were known for putting on entertaining displays of muscle and strength. This excerpt from the 2010 book by Eric D. Lehman *Hamden: Tales from the Sleeping Giant* recounts the Doolittle brother's popularity:

> "For entertainment, men tried to beat the brawny Doolittle family at trials of strength, which included lifting four-hundred-pound beams and full cider barrels. Some of the wittier citizens banded together in an

> early lampoon society called Dog Lane Court, a group of young men who would meet at the home of Horace Bradley. Located in the West Woods section of Hamden, Reuben and his brother Caleb became famous when once challenged by Yale students to life a full barrel of cider, which Caleb obliged showing off by drinking from the bunghole."

This structure is likely the former home of Reuben's father Caleb Doolittle Jr., and was built circa 1780. In the 1820 United States Federal Census, the property is occupied by Caleb Doolittle, Jesse Doolittle, and Reuben Doolittle. Reuben married Ann Grace Thomas (1814-1846) in June of 1835. They had two children together, Mary E. Doolittle (1838-1910) and Hobart Bennet Doolittle (1838-1917). Following his first wife's death in 1846, Reuben waited two years before remarrying to Laura Adelia Horton (1812-1893) of Naugatuck in October of 1848. In 1850, Reuben is listed as living on the property, then 41 years old, and working as a farmer. He lived with his wife Laura A., age 37, his daughter Mary E., age 13, and his son Hobert, age 11. Reuben died on October 30, 1862 in Hamden and is buried in the Centerville Cemetery. On the 1868 historic map Mrs. L.A. Doolittle is listed as the property owner (Figure 6). According to the June 1880 Agricultural Census for the town of Hamden, Laura A. Doolittle, then age 67, was operating a modest farm on the property. Her property included six acres of tilled meadow land, six acres of meadows, and 20 surrounding acres of forested, unfarmed land. The value as recorded for her land and buildings was $800.00 and the value of her farm production as of 1879 was $150.00. Laura noted four acres of mown lawn for hay, two not mown acres, one acre of potatoes and four troths of hay, one cow, one calf, 20 chickens and a 125 pounds of butter. Laura died in 1893 at the age of 80 years and is buried in her family plot in Hillside Cemetery in Naugatuck.

Following the death of Laura Doolittle, it appears the property continued to operate as a farm. The 1934 aerial photograph displays several groomed farming parcels east of the project area and opposite Gaylord Mountain Road (Figure 7). The project area itself abuts the cleared electrical corridor and shows a small area reserved for agricultural use. Interestingly the farm parcels to the west and north of the project area retain their boundaries but show significant reforestation as of 1934. Reforestation thickened in much of the periphery of the project area by 1951 with the exception for the former Doolittle property, which appeared to sustain the use of the property for farming operations (Figure 8). Visible in the 1951 aerial photograph also is the addition of a small structure outside of the northwest boundary of the project parcel. This appears to be the 1949 WNHC-FM transmitter site for air and later television broadcast communications, the first in the state and the still present location of the WPLR (better known as 99.1 PLR rock radio).

In 1946, six men started the Elm City Broadcasting company and began broadcasting a morning station called WHNC-AM that played Italian music and news on Sunday mornings for New Haven area residents and was broadcast from a former funeral home on Chapel Street in New Haven. The owners of Elm City Broadcasting applied for and were granted their own FM radio channel and television Channel 6 for broadcast to greater New Haven County. Later that year, the six owners of Elm City Broadcasting invested some $30,000 to purchase television equipment and a tract of land on Gaylord Mountain in Hamden. By the summer of 1947, they had roads laid and had initiated construction of the transmitter building atop Gaylord Mountain. In the middle of the night on June 2, 1948, the first television picture transmitted from Connecticut took place at the top of Gaylord Mountain, broadcasting for approximately two hours and capturing the transmitter itself, the station, and the scenic surroundings of Hamden (Murray 1997).

The station's road is further defined in the 2004 aerial image. There also appears the addition of several suburban outlets along Gaylord Mountain Road: Hunting Ridge and Russo Drive. By this time, the former

Doolittle property appears to retain use of the land for agricultural purposes (Figure 9). Little change appears to have occurred between the 2004 aerial and the 2016 aerial photographs, the only change being the addition of several residential properties along Gaylord Mountain Road (Figure 10). Most recently, the 2019 aerial image displays the continued preservation of the former Doolittle farmland. The project area is unaffected by the suburban development to its south and remains within a densely reforested area (Figure 11).

Conclusions

Historical data indicates that the project area sits between two contrasting moments on the timeline of Connecticut's history. The first being the eighteenth-century settlement and nineteenth century evolution of a remote agricultural and industrial community at the base of Gaylord Mountain. The Caleb Doolittle Jr., House, which is located to the north and outside of the project parcel, was recommended for further historical investigation and analysis in a 1985 "Town-wide Historic & Architectural Survey" carried out by Historic Resource Consultants Bruce Clouette and Matthew Roth. The recommendation came as the house is of the American vernacular style and is relevant to local history. Consideration should be taken to ensure that the house and property continue to be preserved, with a possible nomination to the Connecticut State Register of Historic Places. Second, the WPLR transmitter tower retains its own significance for pioneering television broadcasting in the state in the 1950s. While certainly a more contemporary piece of state history, the transmitter is nonetheless significant for its continued contribution to Connecticut's digital media.

CHAPTER V
PREVIOUS INVESTIGATIONS

Introduction
This chapter presents an overview of previous cultural resources research completed within the vicinity of the project area in Hamden, Connecticut. This discussion provides the comparative data necessary for assessing the results of the current Phase IA cultural resources assessment survey, and it ensures that the potential impacts to all previously recorded cultural resources located within and adjacent to the project area are taken into consideration. Specifically, this chapter reviews previously identified archaeological sites, National/State Register of Historic Places properties, and inventoried historic standing structures over 50 years old situated in the project region (Figures 12 and 13). The discussions presented below are based on information currently on file at the CT-SHPO in Hartford, Connecticut. In addition, the electronic site files maintained by Heritage also were examined during this investigation. Both the quantity and quality of the information contained in the original cultural resources survey reports and State of Connecticut archaeological site forms are reflected below.

Previously Recorded Archaeological Sites, National/State Register of Historic Places Properties/District, and Inventoried Historic Standing Structure in the Vicinity of the Project Area
A review of data currently on file at the Connecticut State Historic Preservation Office, as well as the electronic site files maintained by Heritage failed to identify any National/State Register of Historic Places Properties within 1.6 km (1 mi) of the project area (Figures 11 and 12). However, this review did indicate that two previously identified archaeological sites have been identified within 1.6 km (1 mi) of the project area (Sites 8-5 and 8-15); both are located to the far southwest of the project area in Bethany (Figure 12). They include Sites 8-5 and 8-15 and they are described below. In addition, five inventoried historic standing structures were identified within 1.6 km (1 mi) of the project area (Figure 13). They include the Caleb Doolittle Jr., the Lambert Talmadge House, the Elihu Dickerman House, the West Woods School, and the Doolittle House. The identified cultural resources are described below.

Site 8-5
Site 8-5, which is also known as the Downs Road Site, is situated along Downs Road in Bethany, Connecticut. It is located 250 m (820.2 ft) to the north of the intersection with Hoadley Road. It is an Archaic Period prehistoric occupation that was recorded by the Connecticut Archaeological Society in June 1979. The Dowers Road Site was surface collected by Thomas Hammond, who recovered Orient Fishtail projectile points, Brewerton Eared Triangle points, and Brewerton side-notched projectile points within an approximately 1 ac area. Hammond concluded that the site represented a hunting camp and interpreted the site as important because Archaic settlement subsistence strategies had been little studied at the time. The Downs Road Site has not been assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). It will not be impacted by the proposed Hamden Solar Center Project.

Site 8-15
Site 8-15, which is also known as the Barnett Garden Site, was identified at 400 Downs Road in Bethany, Connecticut. The site is named after the property owners at the time the site was recorded. It was recorded by D. Thompson in March of 1988. According to the submitted site form, a Vosburg projectile point, a stone plummet, and a whale vertebra were recovered from the site by Joni and Jerry Barnett. No

other information regarding the artifacts, or the site, is recorded on the official State of Connecticut site form for the Barnett Garden Site. Site 8-15 has not been assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). It will not be impacted by the proposed Hamden Solar Center Project.

Caleb Doolittle Jr., House

The Caleb Doolittle Jr., House is located on a small residential lot the north of the project parcel; it fronts on Gaylord Mountain Road. According to the Hamden Assessor's website, this residence has the same street address as the project parcel; however, as seen in Figure 13, this building is clearly located on a separate parcel to the north of the current project area; it will not be directly impacted by construction. It was built in the late eighteenth century and is a one-and-a-half story Colonial Cape style house that is characterized by five bays and a gable roof. There is a one-story, shed roof addition on the south side of the residence that extends past the rear of the house. The exterior walls of the residence are clad in clapboards and the roof is covered by asphalt shingles. A raised stone patio with stone steps lead up to the central front entrance of the home. The two windows on each side are a six-over-six sash type, and a modern brick chimney abuts the south side. As discussed in Chapter V, the Doolittle Family was characterized as some of the earliest settlers in New Haven before moving to Hamden. While Bruce Clouette and Matthew Roth recommended additional study of the residence in 1985, the Doolittle House has not been assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). This house is located in close proximity to the proposed project area. Thus, visual impacts to it should be avoided to the extent possible, possibly using vegetative screening.

Lambert Talmadge House

The building recorded at 100 Gaylord Mountain Road in Hamden is known as the Lambert Talmadge House. This residence was built in 1805 in the Greek Revival style and now has an L-shaped plan. The front façade of the house has three, two-and-a-half story bays situated under a gable end and a two story shed roof projection on the south side. The front entrance of the house has a wide entablature and a window in the second story. Clapboards cover the exterior walls of the buildings and asphalt shingles cover the roof. The windows are of the six-over-six sash type. The Lambert Talmadge House has not been assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). Due to intervening topography and vegetation, the proposed Hamden Solar Center will not be seen from the Lambert Talmadge House. Thus, no indirect impacts to this property will be made and no additional architectural recordation is required.

Elihu Dickerman House

The building at 1275 West Woods Road is known as the Elihu Dickerman House. It is a Federal style, one-and-half story residence covered by a gabled roof. The elevation facing West Woods Road has three bays on the first story with a door at the far left, and four windows on the upper story. The south elevation contains four bays and another entrance. Both doors are topped with wide entablatures and have pilasters to either side. The Elihu Dickerman House has clapboard siding and an asphalt shingled roof, as well as a stone foundation. In addition, there is a wide brick chimney protruding from the center of the roof. A one-story addition extends from the southwest corner of the residence, the construction date of which is unknown. The house was built ca. 1820 for Elihu Dickerman, who bought the land from his father Enos Dickerman. Dickerman farmed the property for 20 years before the property passed to his nephew Wales C. Dickerman. The house has not been assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). Due to intervening topography and vegetation, the proposed Hamden Solar Center will not be seen from the

Elihu Dickerman House. Thus, no indirect impacts to this property will be made and no additional architectural recordation is required.

West Woods School

The property ay 295 Johnson Road contains the District #2 School, also known as the West Woods School. It is situated behind a modern fire station. The school building was constructed in 1909 and is currently being used as office space. It is one story in height and is topped by a steep gable roof that has a molded cornice and cornice returns. In addition, there is a decorative bracket at the peak of the roof. There is a central entrance under a bracketed portico on the façade, which is characterized by six-over-six sash type windows to each side. A one-story, flat roof addition extends from the north side of the building; it is not known when this addition was constructed. The exterior walls of the school are clad in wooden clapboards and the roof is covered in asphalt shingles. The West Woods School has not been assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). Due to intervening topography and vegetation, the proposed Hamden Solar Center will not be seen from the District #2 School. Thus, no indirect impacts to this property will be made and no additional architectural recordation is required.

Doolittle House

The Doolittle House at 353 West Todd Street is a Greek Revival residence that was built in ca., 1845 by a descendent to the Doolittle Family that lived at 360 Gaylord Mountain Road beginning in the eighteenth century. The house at 353 West Todd Street has two stories, a projecting gable roof with asphalt shingles, and clapboards on its exterior walls. The doors and windows have wide trims. The facade has three bays, with a door at the right side of the first story. The windows are of the six-over-six sash type. Doolittle ancestors were some of the earliest settlers in New Haven before moving to Hamden. The Doolittle House at 353 West Todd Street has not been assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). Due to intervening topography and vegetation, the proposed Hamden Solar Center will not be seen from the District #2 School. Thus, no indirect impacts to this property will be made and no additional architectural recordation is required.

Summary and Interpretations

The review of previously completed research in the vicinity of the project area and the analysis of cultural resources recorded nearby, indicates that the larger project region contains prehistoric Native American deposits. Archaeological sites occupied within the study region date from as early as the Late Archaic Period (ca., 4,500 years ago), suggesting that additional archaeological sites may situated within the vicinity of the project area. In addition, historic residences from the Colonial Period and later also exist in the project region, as well as to the north of the project area. Therefore, additional historic cultural resources may be located in the project area.

CHAPTER VI
METHODS

Introduction

This chapter describes the research design and field methodology used to complete the Phase IA cultural resources assessment survey of the project area in Hamden, Connecticut. The following tasks were completed during this investigation: 1) study of the region's prehistory, history, and natural setting, as presented in Chapters II through IV; 2) a literature search to identify and discuss previously recorded cultural resources in project region; 3) a review of historic maps, topographic quadrangles, and aerial imagery depicting the project area in order to identify potential historic resources and/or areas of past disturbance; and 4) pedestrian survey and photo-documentation of the project area in order to determine its archaeological sensitivity. These methods are in keeping with those required by the Connecticut State Historic Preservation Office in the document entitled: *Environmental Review Primer for Connecticut's Archaeological Resources* (Poirier 1987)

Research Framework

The current Phase IA cultural resources assessment survey was designed to identify and assess the archaeological sensitivity of the project areas, as well as to visually examine the project items and record any previously unidentified cultural resources during pedestrian survey. The undertaking was comprehensive in nature, and project planning took into consideration the distribution of previously recorded cultural resources located within the project region, as well as the visual assessment of the project area. The methods used to complete this investigation were designed to provide coverage of all portions of the project area. The fieldwork portion of this undertaking entailed pedestrian survey, photo-documentation, and mapping (see below).

Archival Research & Literature Review

Background research for this project included a review of a variety of historic maps depicting the proposed project area; an examination of USGS 7.5' series topographic quadrangles; an examination of aerial images dating from 1934 through 2019; and a review of all archaeological sites, National and State Register of Historic Places, and inventoried historic standing structures on file with the CT-SHPO, as well as electronic cultural resources data maintained by Heritage. The intent of this review was to identify all previously recorded cultural resources situated within and immediately adjacent to the project area and to provide a natural and cultural context for the project region. This information was used to develop the archaeological context of the project area and to assess its sensitivity with respect to the potential for producing intact cultural resources.

Field Methodology and Data Synthesis

Heritage performed fieldwork for the Phase IA cultural resources assessment survey of the project area with the proposed solar project in Hamden, Connecticut. This included pedestrian survey, photo-documentation, and mapping. During the completion of the pedestrian survey, representatives from Heritage photo-documented all potential areas of impact using digital media.

CHAPTER VII
RESULTS OF THE INVESTIGATION & MANAGEMENT RECOMMENDATIONS

Introduction

This chapter presents the results of the Phase IA cultural resources assessment survey of the project area in Hamden, Connecticut, as well as management recommendations for treatment of the proposed impacted areas associated with the Hamden Solar Project. As stated in the introductory section of this report, the investigation involved the following tasks: 1) a contextual overview of the region's prehistory, history, and natural setting (e.g., soils, ecology, hydrology, etc.); 2) a literature search to identify and discuss previously recorded archaeological and cultural resources in the project region; 3) a review of readily available historic maps and aerial imagery depicting the project area in order to identify potential historic resources and/or areas of past disturbance; 4) pedestrian survey and photo-documentation of the project area to determine its archaeological sensitivity; and 5) preparation of the current Phase IA cultural resources assessment survey report.

Results of Phase IA survey

As seen in Figures 1 and 2, the proposed project area is situated to the west of Gaylord Mountain Road and to the east of an Eversource Energy electrical transmission corridor. According to current design plans, the proposed project will include the installation of rows of solar panels spaced approximately 10 ft (3 m) apart across the project area. The project area will be accessed via a road that will extend from an existing cellular communications compound to the west, across an Eversource Energy electrical transmission right-of-way, and to the project parcel. A single stormwater basin, as well as an equipment pad, a pole mounted meter, a pole mounted recloser, and a pole mounted digital controller, will be located in the eastern part of the project area. The solar array will be interconnected to the existing powerlines along Gaylord Mountain Road (Figure 2). At the time of survey, the project area was covered with a mixed deciduous forest and elevations in the project area ranged from 137.2 to 182.9 m (450 to 600 ft) NGVD, with slopes rising from Gaylord Mountain Road to the Eversource Energy electrical transmission corridor (see Figures 14 through 28).

Pedestrian survey of the western, southern, central and eastern portions of the project area revealed a landscape largely characterized by rocky soils (Figures 14 through 20). Most of these portions of the project area also contained small stones and medium to large boulders on the surface, as well as widespread areas prone to surface runoff. A large number of tree-throws and recently downed trees also were noted in the western, southern, central and eastern portions of the project area. They resulted from a documented tornado microburst that affected the Hamden area in May of 2018. The central portion of the project area also contained an east to west-trending logging road incised into the landscape (Figure 20). The northern edge of the road was delineated by a stone wall that resulted from farm field clearing the historic era. The former cleared area can be seen in Figures 7 and 8 and was farmed by the Doolittle Family historically.

The area to the north of the above-referenced stone wall will be the location of a portion of the solar array (Figure 2). Pedestrian survey of this area showed that it was level and free of large boulders on the surface (Figures 21 through 24). This area was also prone to less runoff than the remainder of the project parcel due to the low slopes. Finally, the pedestrian survey revealed that the historic Caleb Doolittle Jr., House, a late eighteenth century residence fronting Gaylord Mountain Road, is located to the northeast and within sight of the proposed solar center. As mentioned in Chapter IV, the Doolittle Family was among the early settlers of this part of Hamden, having moved there from New Haven. As discussed in Chapter V, the Caleb Doolittle Jr., House is Colonial Cape style house with five bays and a gable roof. The house was first recorded in 1985 by Bruce Clouette and Matthew Roth, both of whom recommended that the house may be eligible for listing to the National Register of Historic Places. However, the additional research was never completed (see Figure 29).

Overall Sensitivity of the Proposed Study Area

The field data associated with soils, slopes, aspect, distance to water, and previous disturbance collected during the pedestrian survey was used in conjunction with the analysis of historic maps, aerial images, and data regarding previously identified archaeological sites, National and State Register of Historic Places properties, and inventoried historic standing structure to stratify the project items into zones of no/low and/or moderate/high archaeological sensitivity. In general, historic period archeological sites are relatively easy to identify on the current landscape because the features associated with them tend to be relatively permanent constructions that extend above the ground surface (i.e., stone foundations, pens, wells privies, etc.). In contrast, archaeological sites dating from the prehistoric era are less often identified during pedestrian survey because they are buried, and predicting their locations relies more on the analysis and interpretation environmental factors that would have informed Native American site choices.

With respect to the potential for identifying prehistoric archaeological sites, the project parcel was divided into areas of no/low and/or moderate/high archaeological potential by analyzing the landform types, slope, aspect, soils contained within them, and their distance to water. In general, areas located less than 300 m (1,000 ft) from a freshwater source and that contain slopes of less than 8 percent and well-drained soils possess a high potential for producing prehistoric archaeological deposits. Those areas located between 300 and 600 m (1,000 and 2,000 ft) from a freshwater source and well drained soils are considered moderate probability areas. This is in keeping with broadly based interpretations of prehistoric settlement and subsistence models that are supported by decades of previous archaeological research throughout the region. It is also expected that there may be variability of prehistoric site types found in the moderate/high sensitivity zones. For example, large Woodland period village sites and Archaic period seasonal camps may be expected along large river floodplains and near stream/river confluences, while smaller temporary or task specific sites may be expected on level areas with well-drained soils that are situated more than 300 m (1,000 ft) but less than 600 m (2,000 ft) from a water source. Finally, steeply sloping areas, poorly drained soils, or areas of previous disturbance are generally deemed to retain a no/low archaeological sensitivity with respect to their potential to contain prehistoric archaeological sites.

In addition, the potential for a given area to yield evidence of historic period archaeological deposits is based not only the above-defined landscape features but also on the presence or absence of previously identified historic period archaeological resources as identified during previous archaeological surveys, recorded on historic period maps, or captured in aerial images of the region under study. In this case, proposed project items that are situated within 100 m (328 ft) of a previously identified historic period archaeological site, a National or State Register of Historic Places district/individually listed property, or an area that contains known historic period buildings also may be deemed to retain a moderate/high archaeological sensitivity. In contrast, those areas situated over 100 m (328 ft) from any of the above-referenced properties would be considered to retain a no/low historic period archaeological sensitivity.

The combined review of historic maps, aerial images, land deeds, and pedestrian survey indicates that the much of the project area contains steep slopes, stony soils, large amounts of tree throws resulting from a tornado, and significant areas prone to surface runoff. These conditions were identified in the western, southern, eastern, and central portion of the project area and encompasses 9.7 ac of land (Figure 30). These landscape types and conditions are not conducive to producing or preserving intact archaeological deposit or cultural resources. Thus, the were assessed as no/low sensitivity areas, and no additional archaeological examination of them is recommended.

The northern portion of the proposed project parcel, in contrast, is characterized by a level area that contains few tree-throws and few examples of stones or large boulders on the surface. This area is also located in proximity to the historic Caleb Doolittle Jr., House. Due to its landscape characteristics, soils, and proximity to a historic resource, it is possible that this portion of the project area may contain intact archaeological deposits either from the prehistoric or historic era. As a result, this 0.5 ac portion of the project area was classified as a moderate/high archaeologically sensitive area (Figure 30).

Management Recommendations

Since the western, southern, eastern, and central 9.7 ac of the project area are characterized by slopes, wet soils, and/or obvious signs of major disturbance due to a previous tornado, no intact archaeological deposits are expected there; thus, no additional examination of these areas is recommended prior to construction of the proposed solar center. Alternatively, the northern portion of the project area, which contains 0.5 ac of land, is characterized by low slopes and well-drained soils that are apparently free of large numbers of stones. This area, which will contain a portion of the solar array, was deemed to possess a moderate/high archaeological sensitivity; it is recommended that this area be subjected to Phase IB cultural resources survey prior to the construction of the proposed solar center. Finally, the historic Caleb Doolittle Jr., House, while not located on the project parcel, will be visible from the proposed solar center. This house was built in the eighteenth century and possesses relatively good integrity. It may be eligible for listing on the National Register of Historic Places applying the criteria for evaluation (36 CFR 60.4 [a-d]). It is recommended that impacts to the viewshed of this house be avoided to the extent feasible. This can be accomplished by leaving the existing tree line to the rear of south and west of the Caleb Doolittle Jr., House in place, as well as installing privacy slats in the perimeter fence line around the solar array.

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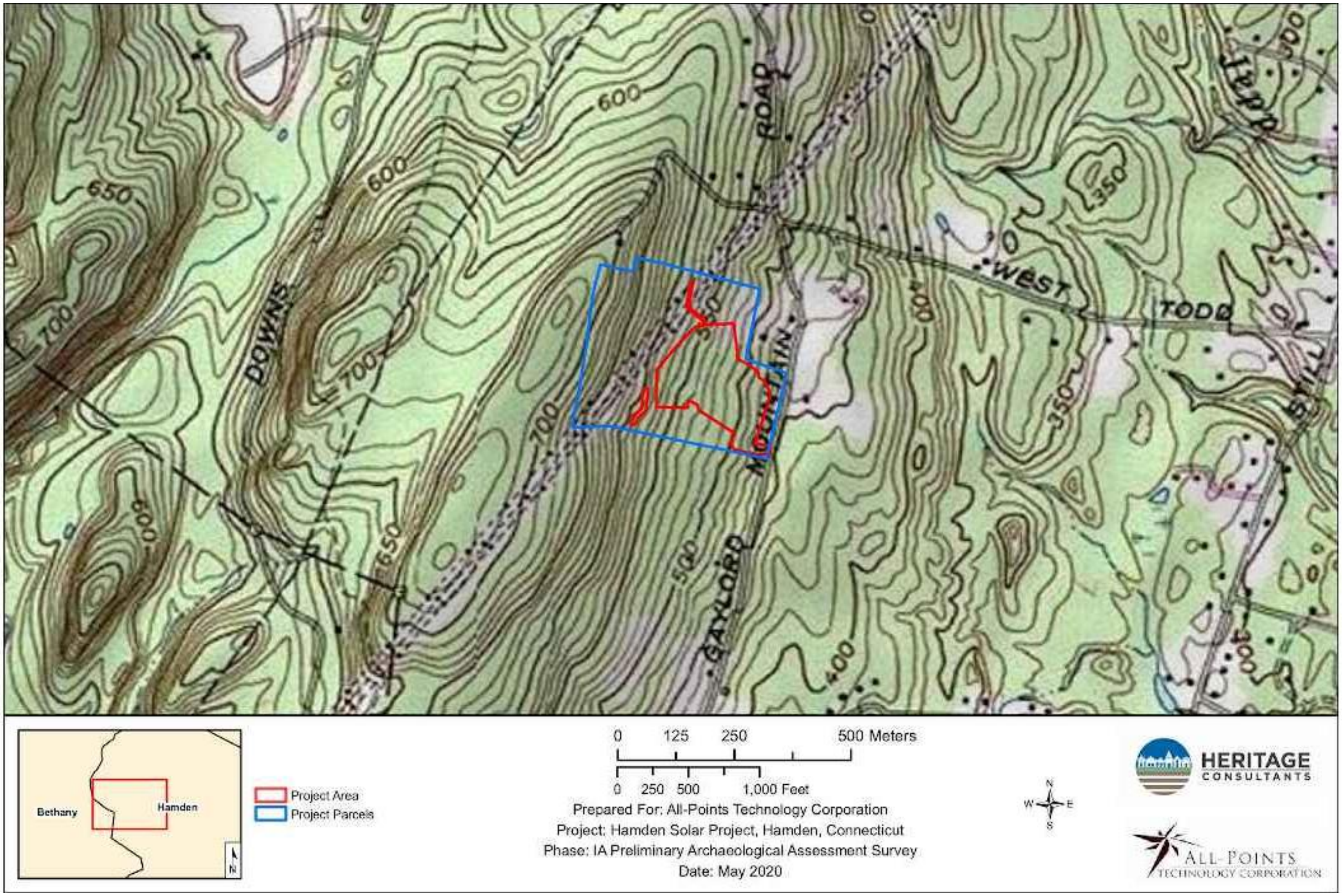


Figure 1. Excerpt from a USGS 7.5' series topographic quadrangle image showing the location of the project area in Hamden, Connecticut.

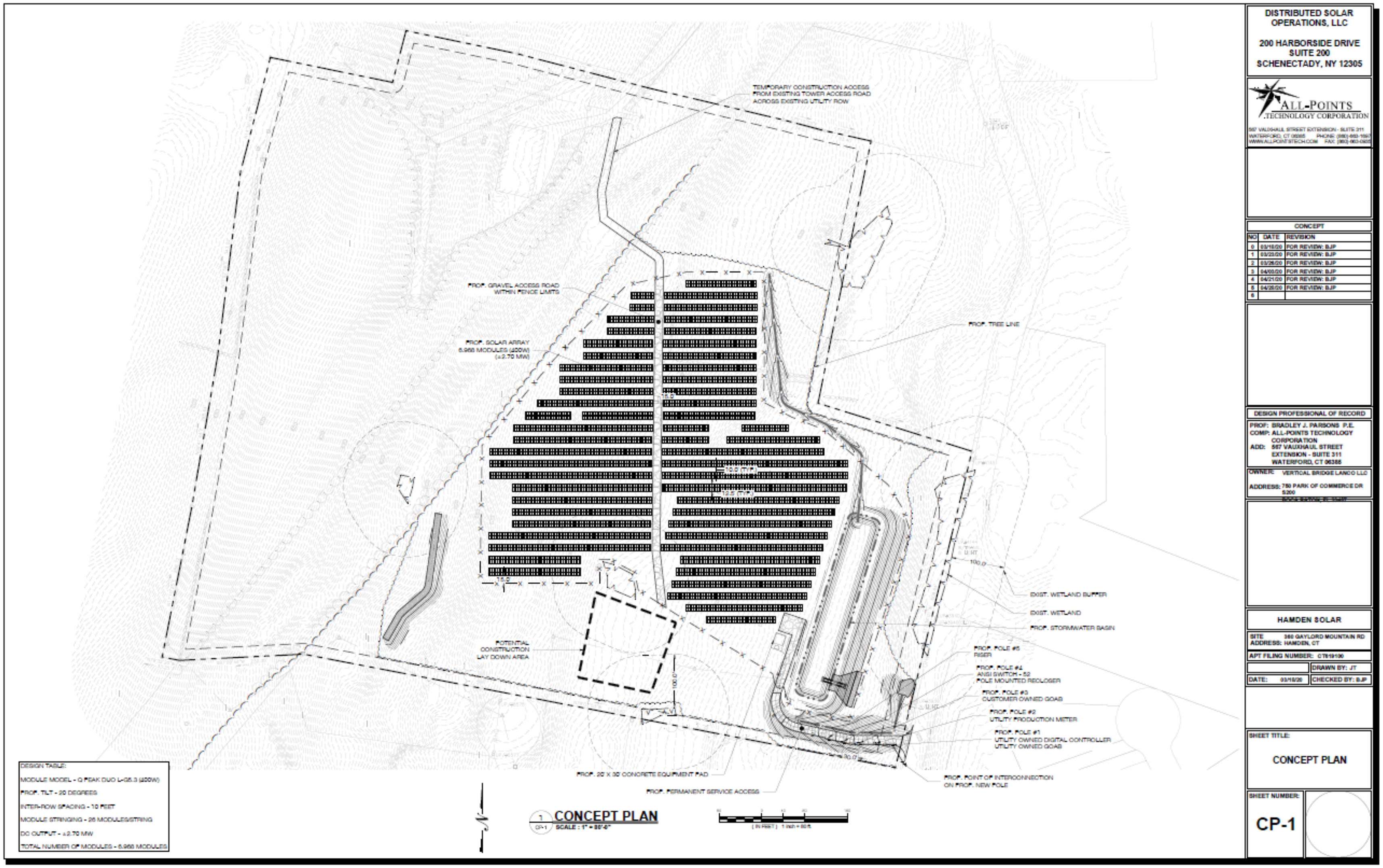


Figure 2. Project plans showing the proposed solar center in Hamden, Connecticut.

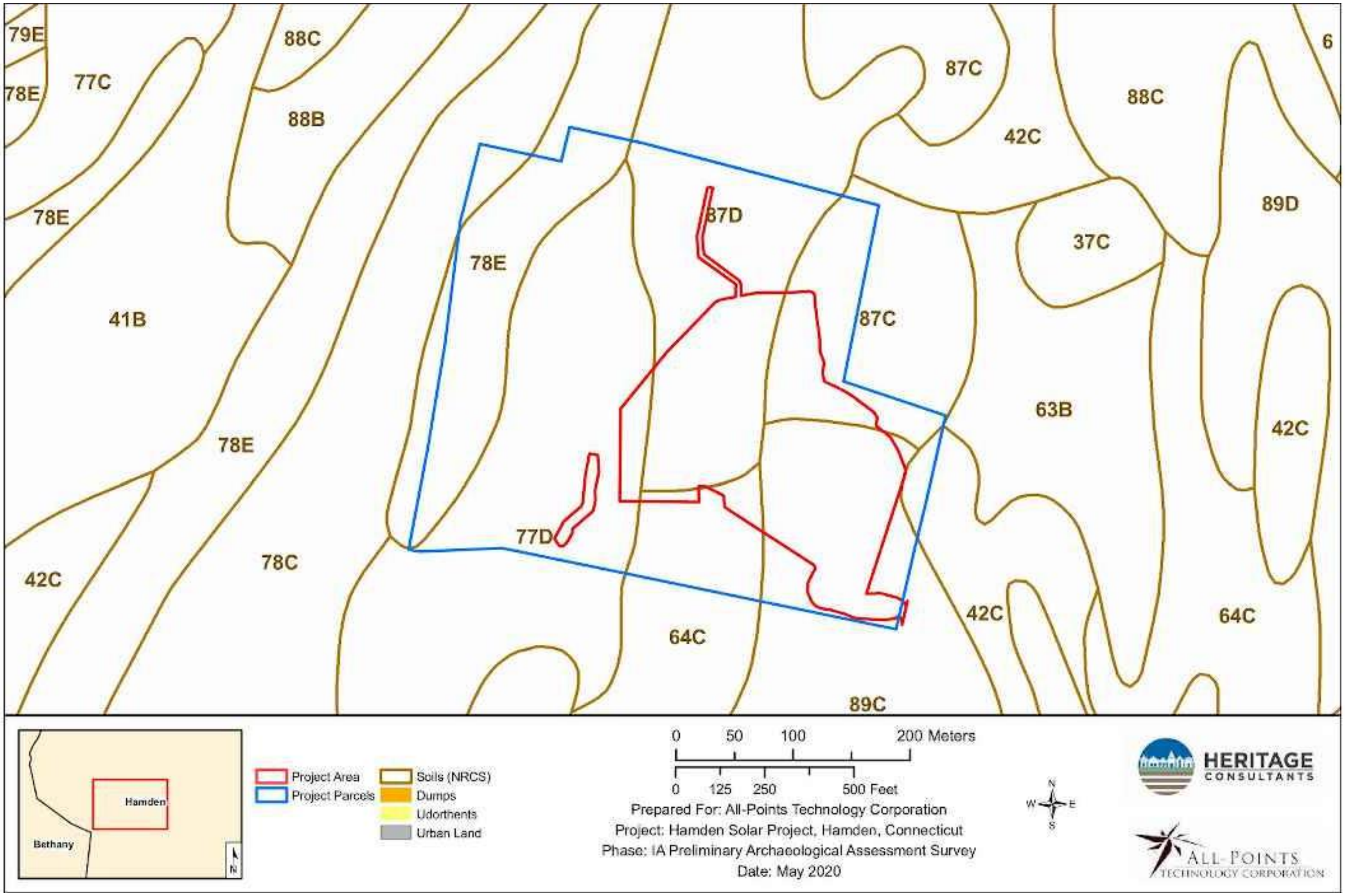


Figure 3. Map of soil located in the vicinity of the project area in Hamden, Connecticut.

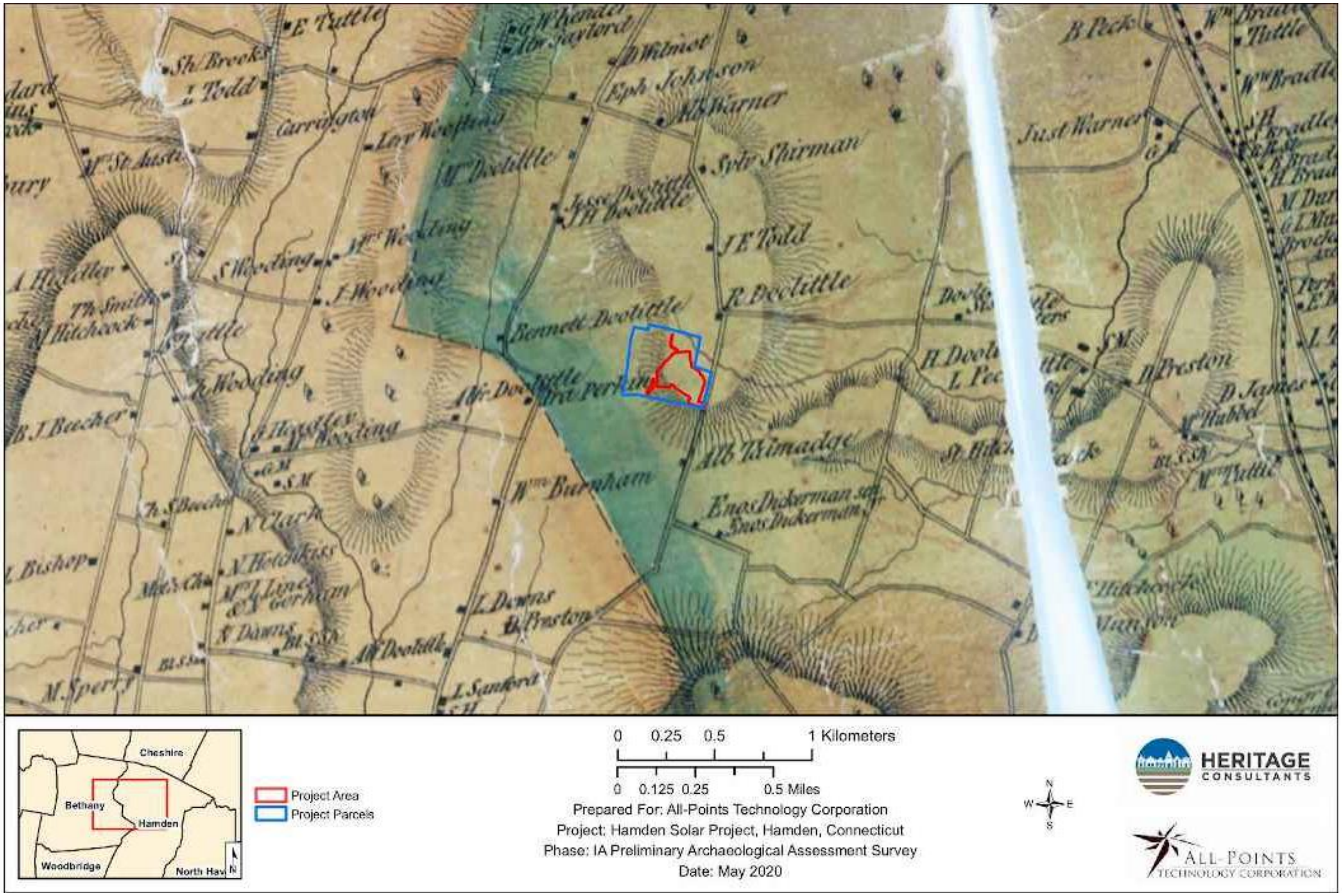


Figure 4. Excerpt from an 1852 historic map showing the location of the project area in Hamden, Connecticut.

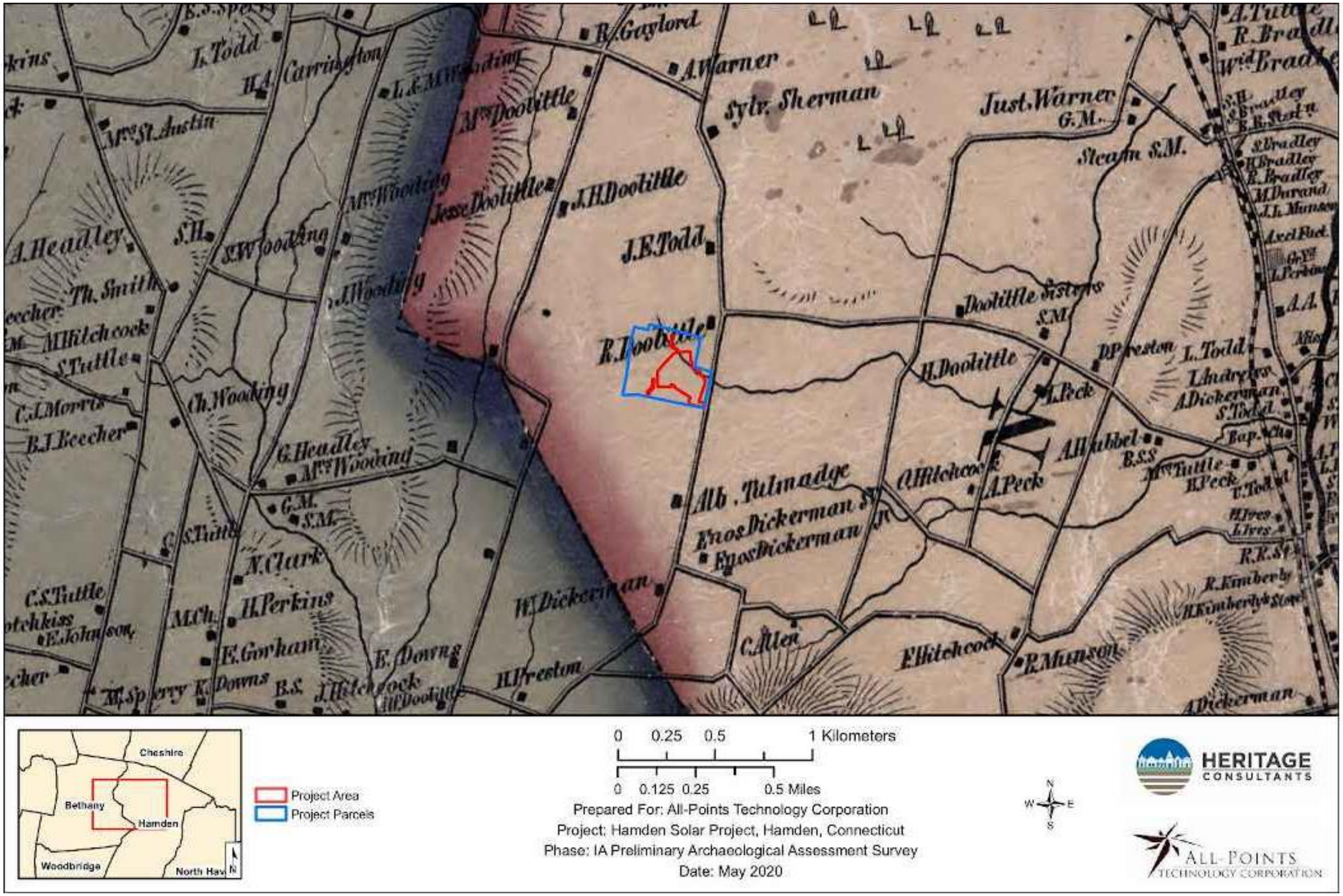


Figure 5. Excerpt from an 1856 historic map showing the location of the project area in Hamden, Connecticut.

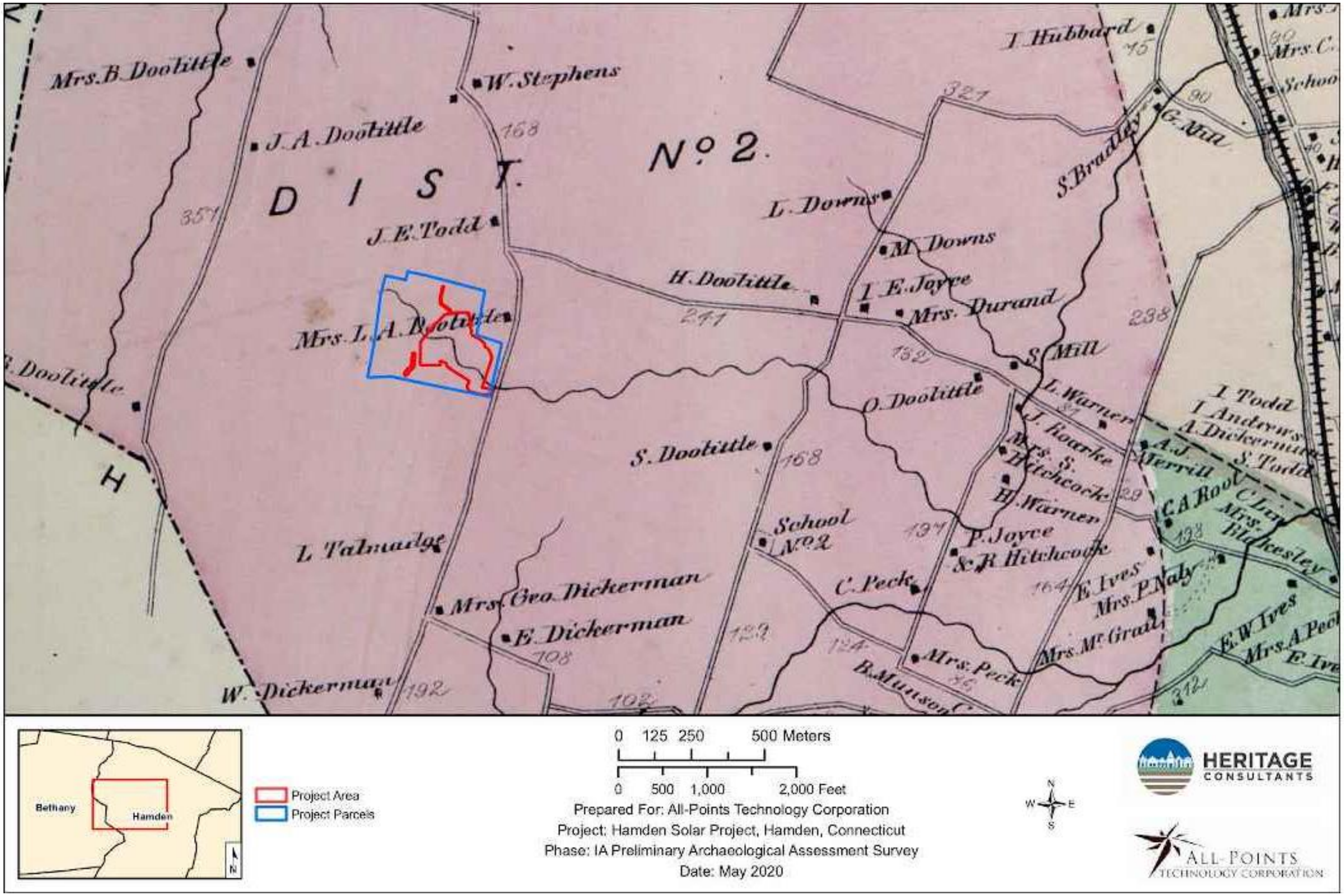


Figure 6. Excerpt from an 1868 historic map showing the location of the project area in Hamden, Connecticut.

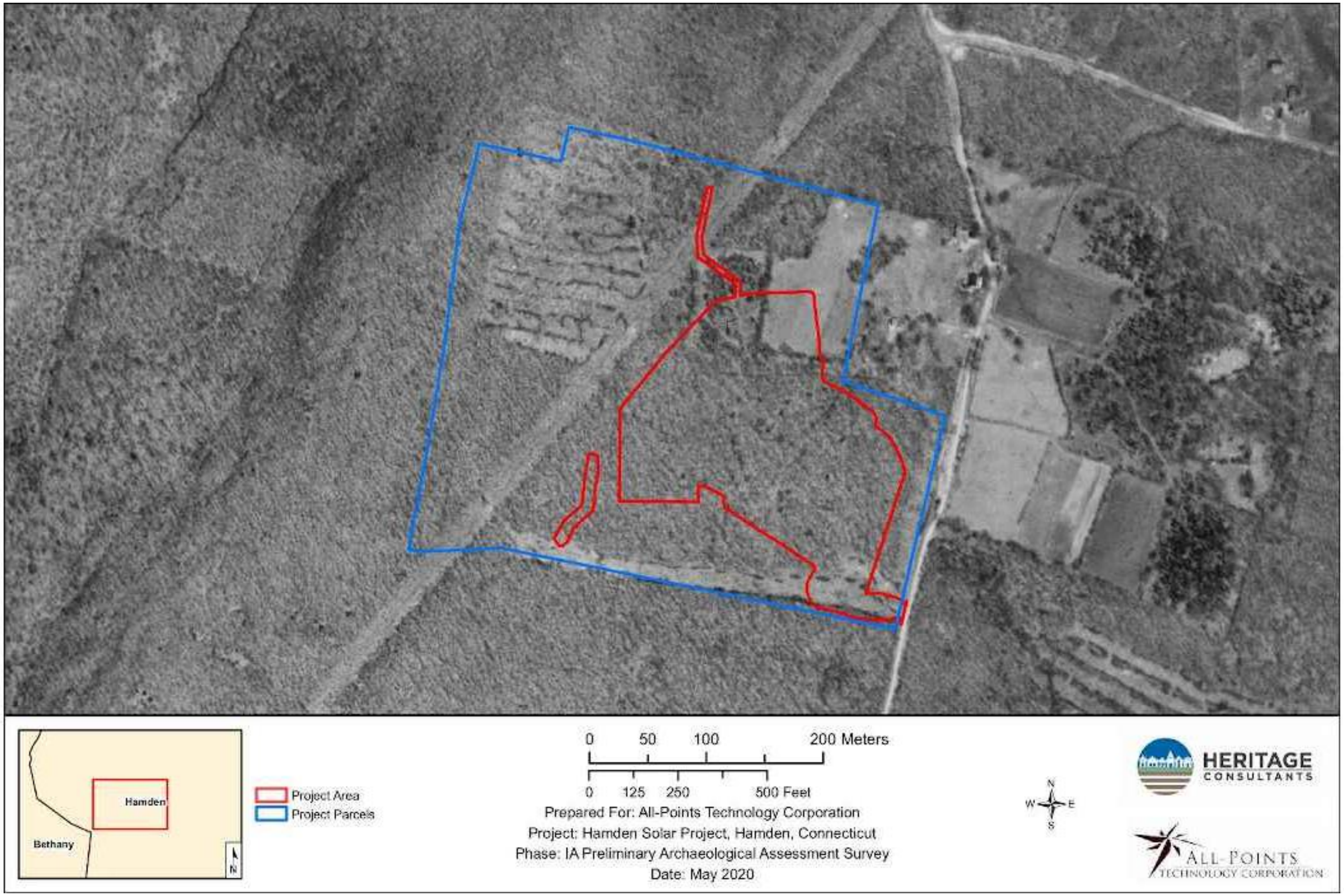


Figure 7. Excerpt from a 1934 aerial photograph showing the location of the project area in Hamden, Connecticut.

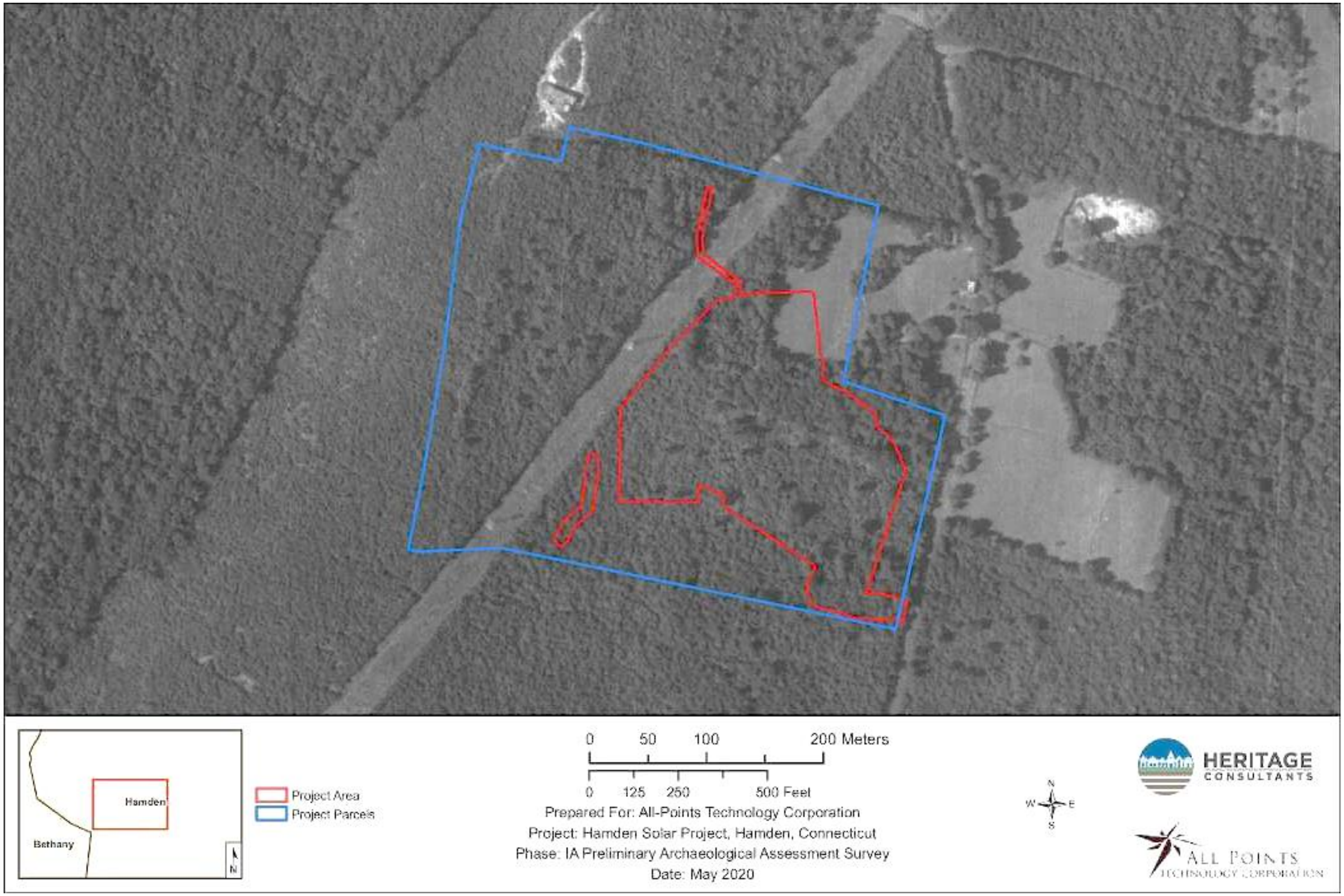


Figure 8. Excerpt from a 1951 aerial photograph showing the location of the project area in Hamden, Connecticut.

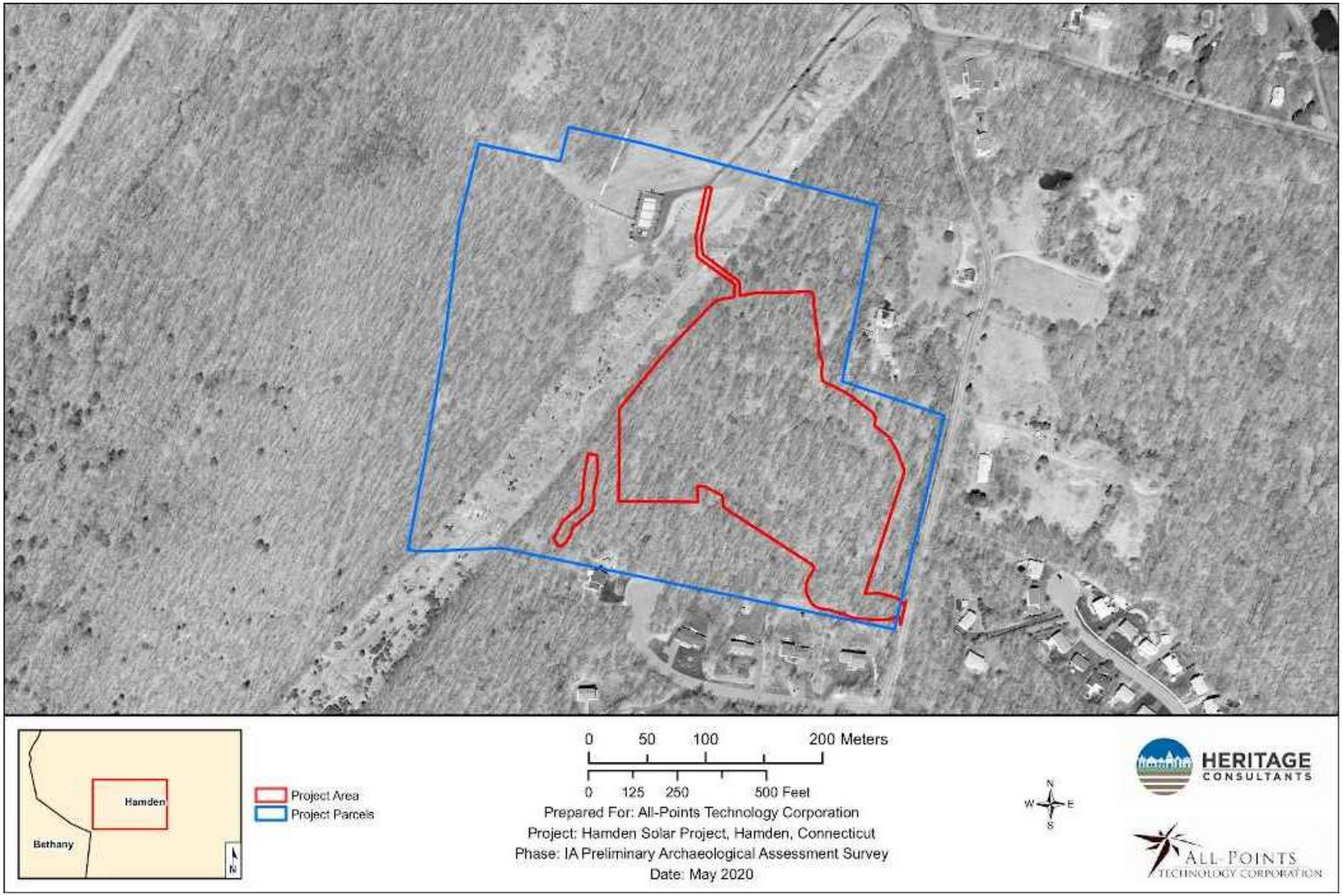


Figure 9. Excerpt from a 2004 aerial photograph showing the location of the project area in Hamden, Connecticut.

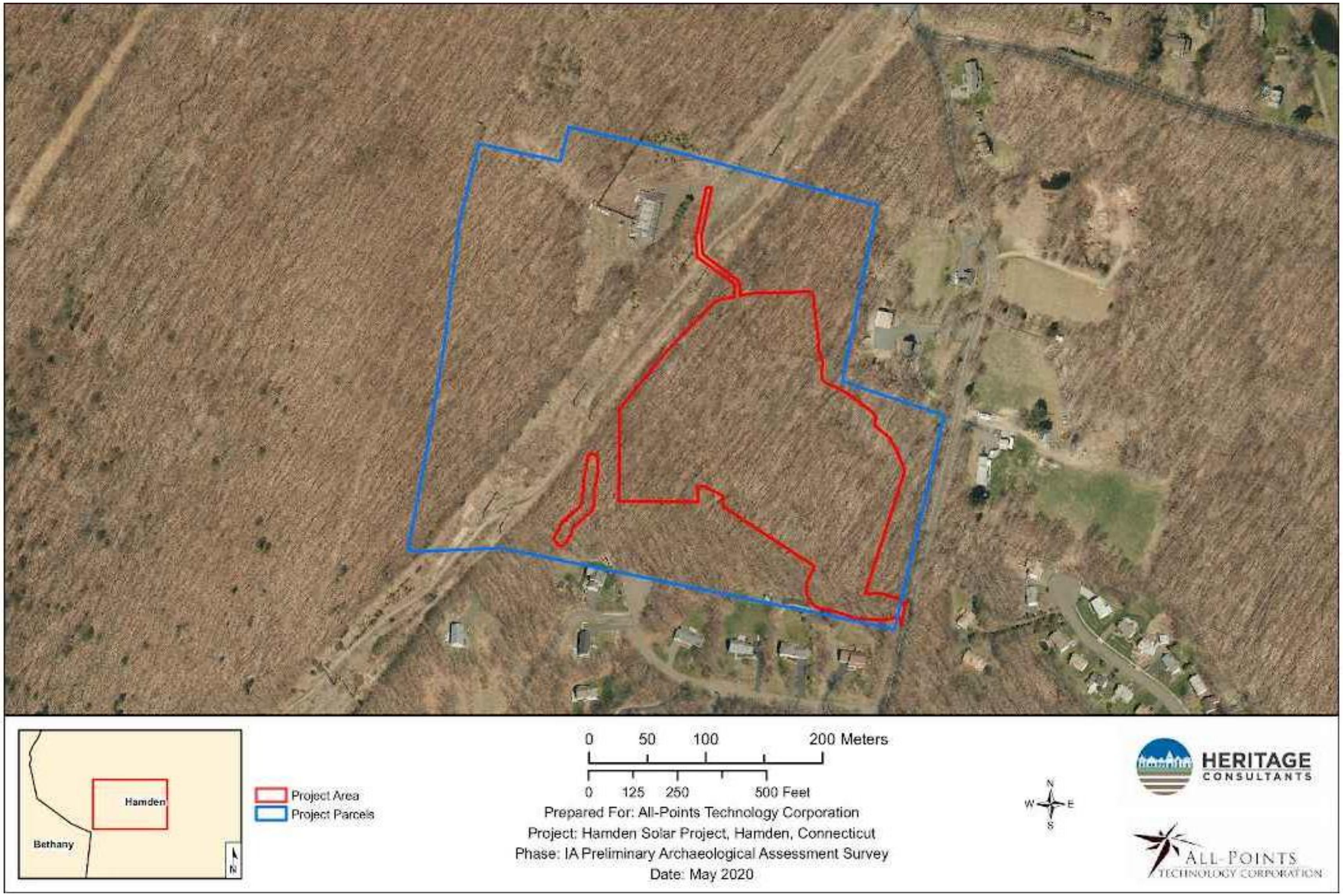


Figure 10. Excerpt from a 2016 aerial photograph showing the location of the project area in Hamden, Connecticut.

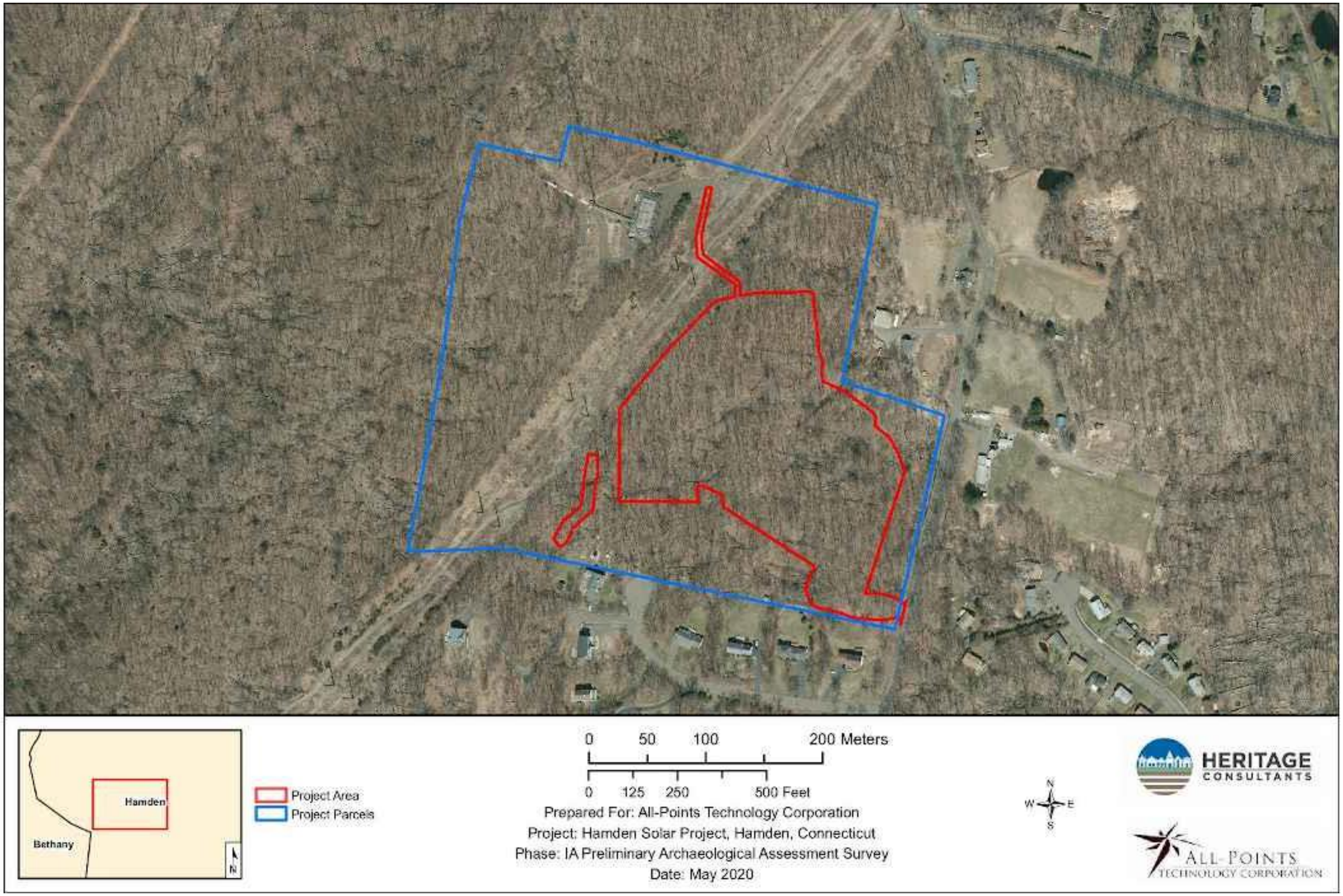


Figure 11. Excerpt from a 2019 aerial photograph showing the location of the project area in Hamden, Connecticut.

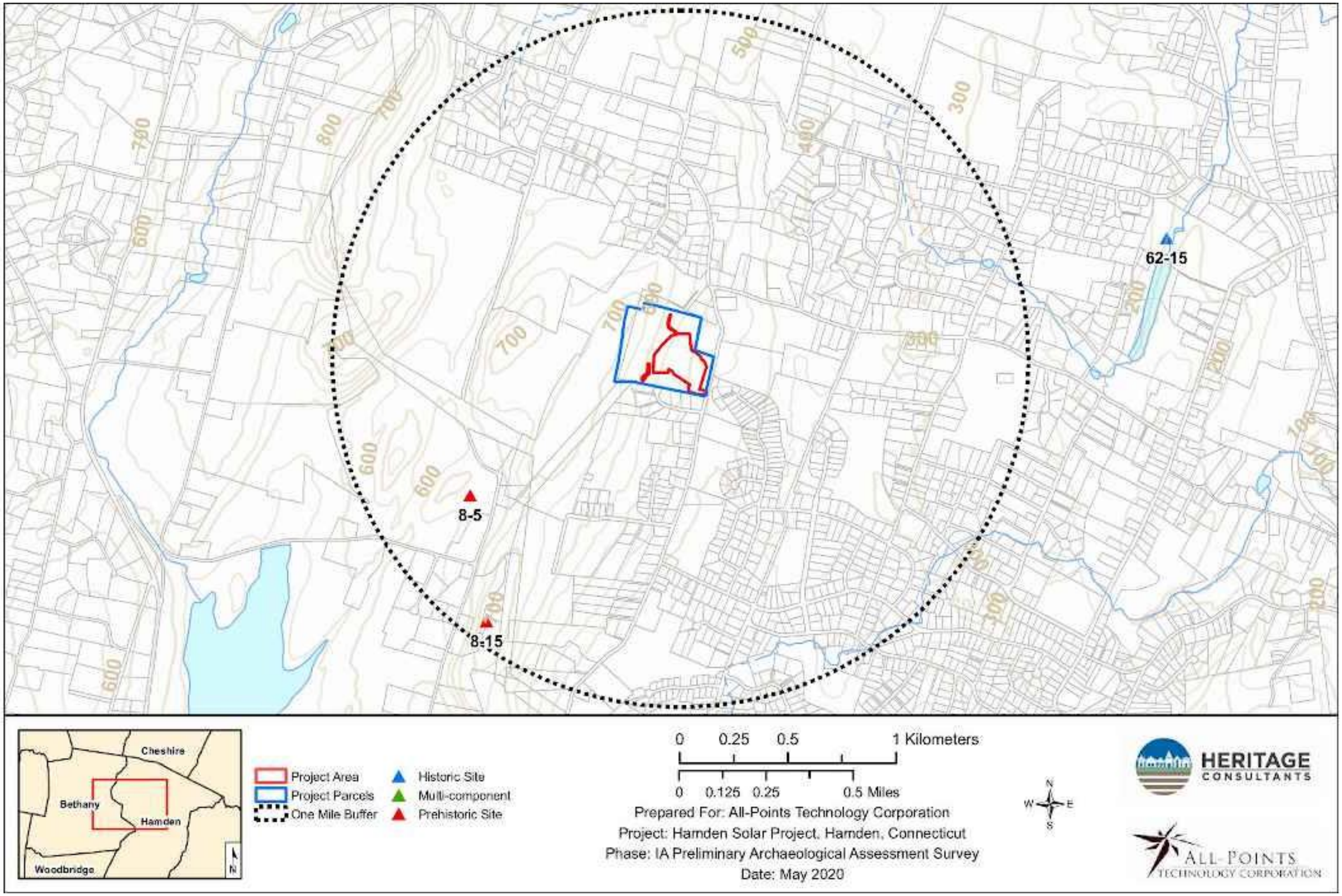


Figure 12. Digital map showing the location of previously identified archaeological sites in the vicinity of the project area in Hamden, Connecticut.

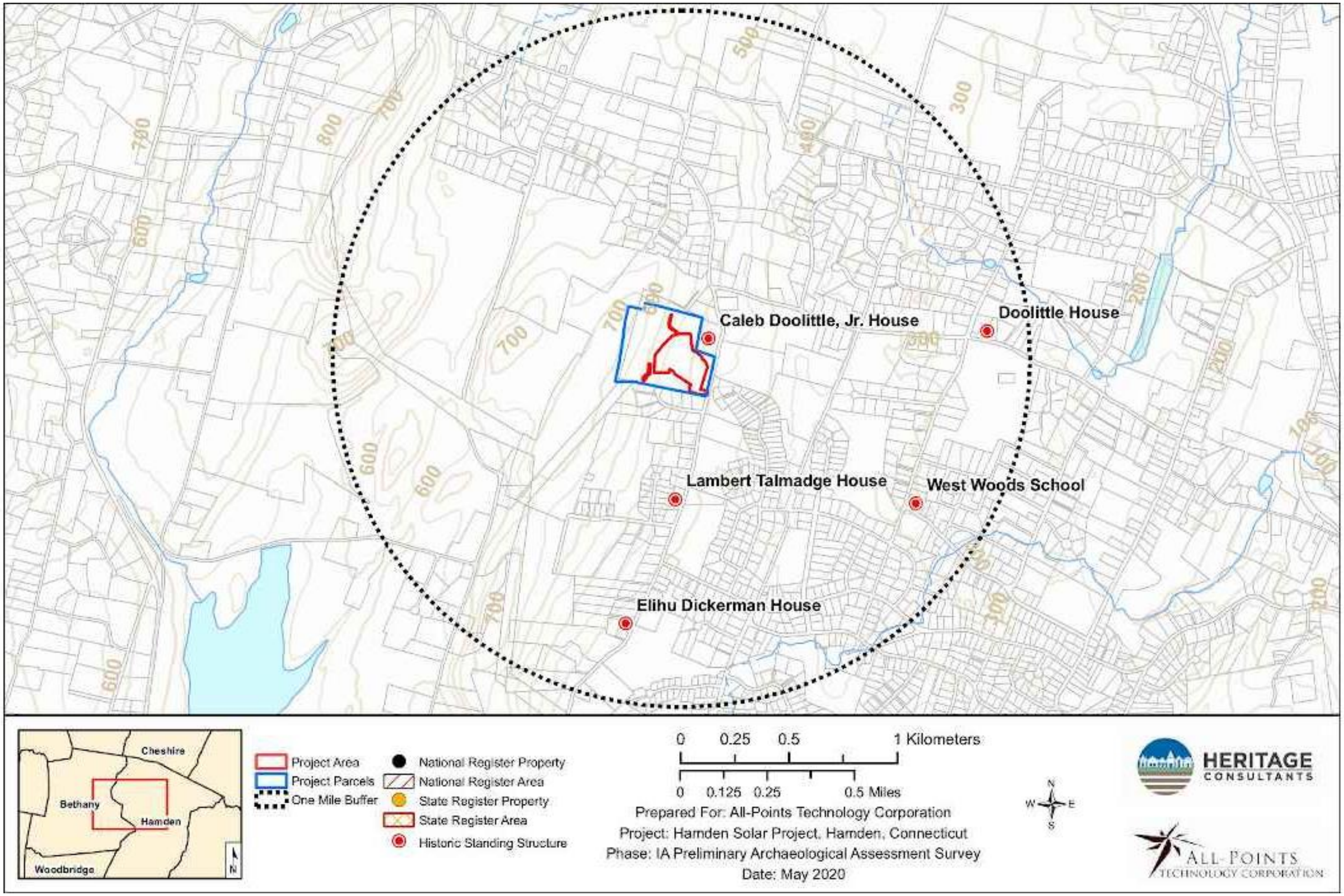


Figure 13. Digital map depicting the locations of previously identified National/State Register of Historic Places properties and inventoried Historic Standing Structures in the vicinity of the project area in Hamden, Connecticut.

Figure 14. Overview photo of the west-central portion of the project area facing northeast (note large boulders and tree throws throughout this area).

Figure 15. Overview photo of the southwestern portion of the project area facing south (note steep slopes throughout this area).

Figure 16. Overview photo of the southwestern portion of the project area facing north (note this are contained wet soils and tree throws).

Figure 17. Overview photo of the southeastern portion of the project area facing north (note surface water in this area).

Figure 18. Overview photo of the east-central portion of the project area facing north (this area contains stony soils, boulders, and tree throws).

Figure 19. Overview photo of the east-central portion of the project area facing west (note surface expressions of large stone and boulders in this area).

Figure 20. Overview photo of the northeastern portion of the project area facing west (note presence of logging rod in this area).

Figure 21. Overview photo of the northeastern portion of the project area facing northeast.

Figure 22. Overview photo of the northern portion of the project area facing north.

Figure 23. Overview photo of the northern portion of the project area facing southwest.

Figure 24. Overview photo of the proposed project area facing south.

Figure 25. Overview photo of the northwestern portion of the project area facing south (note steep slopes and past timbering in this area).

Figure 26. Overview photo of the eastern portion of the project area near Gaylord Mountain Road facing southwest (note slopes and large amount of stones and boulders in this area).

Figure 27. Overview photo of the southeastern portion of the project area near Gaylord Mountain Road facing southwest (note slopes and large amount of stones and boulders in this area).

Figure 28. Overview photo of the eastern portion of the project area near Gaylord Mountain Road facing southwest (note slopes and large amount of stones and boulders in this area).

Figure 29. Overview photo of the Doolittle House at 363 Gaylord Farms Road (note this image is from Google streetscape, as the landowner did not want the house photographed at the time of survey).

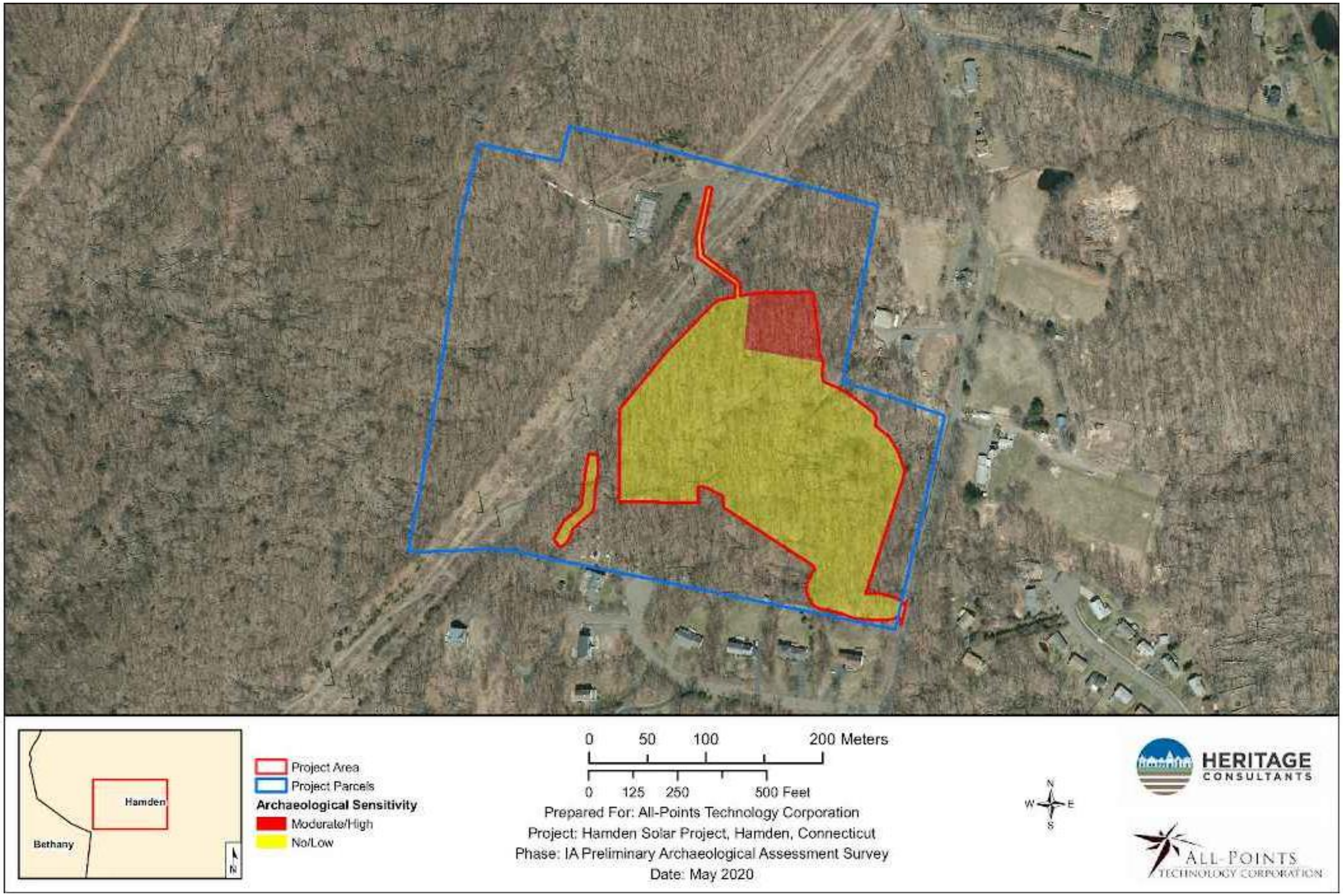
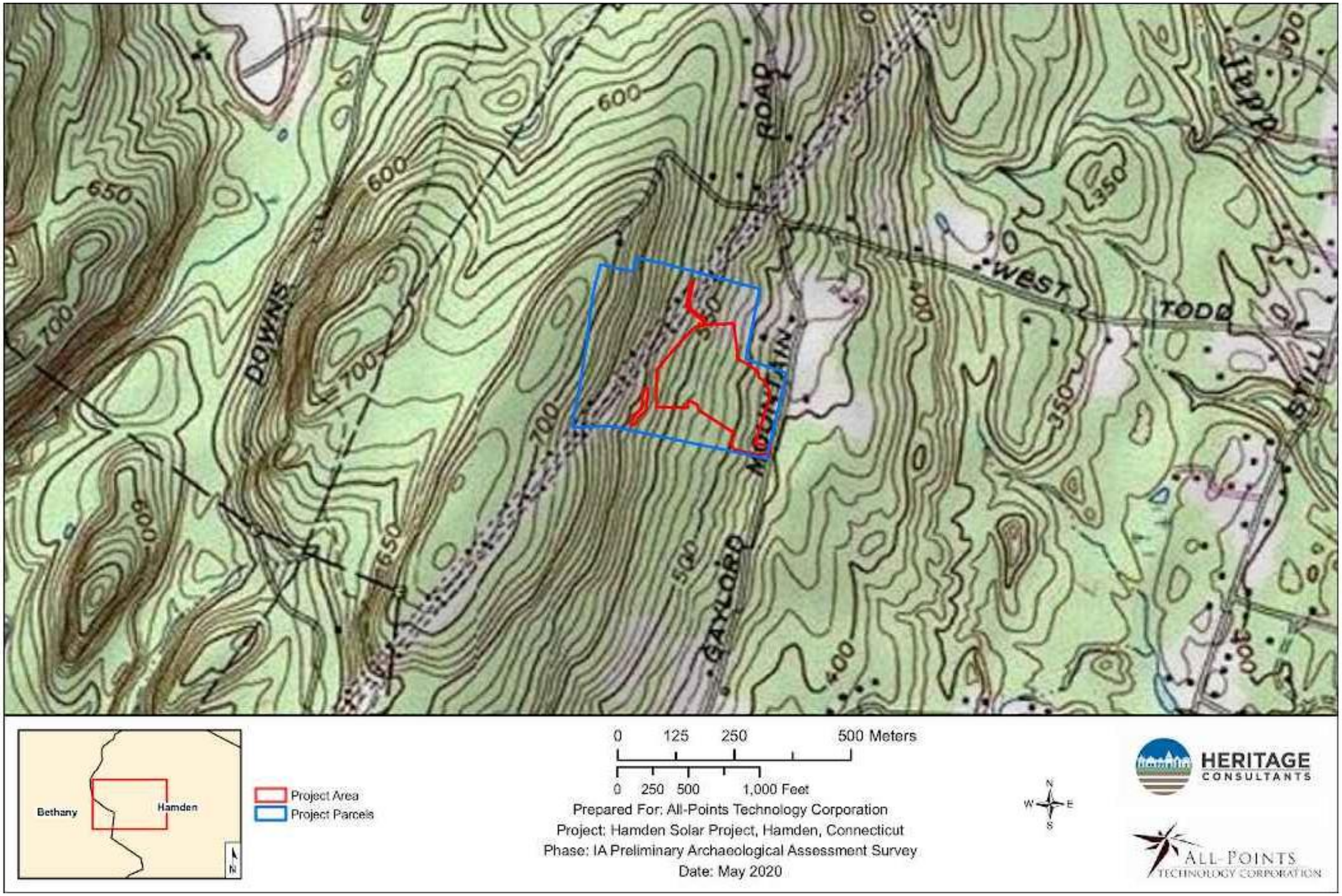


Figure 30. Excerpt from a 2019 aerial image showing the location of the project area in Hamden, Connecticut, as well as areas of no/low and moderate/high archaeological sensitivity.



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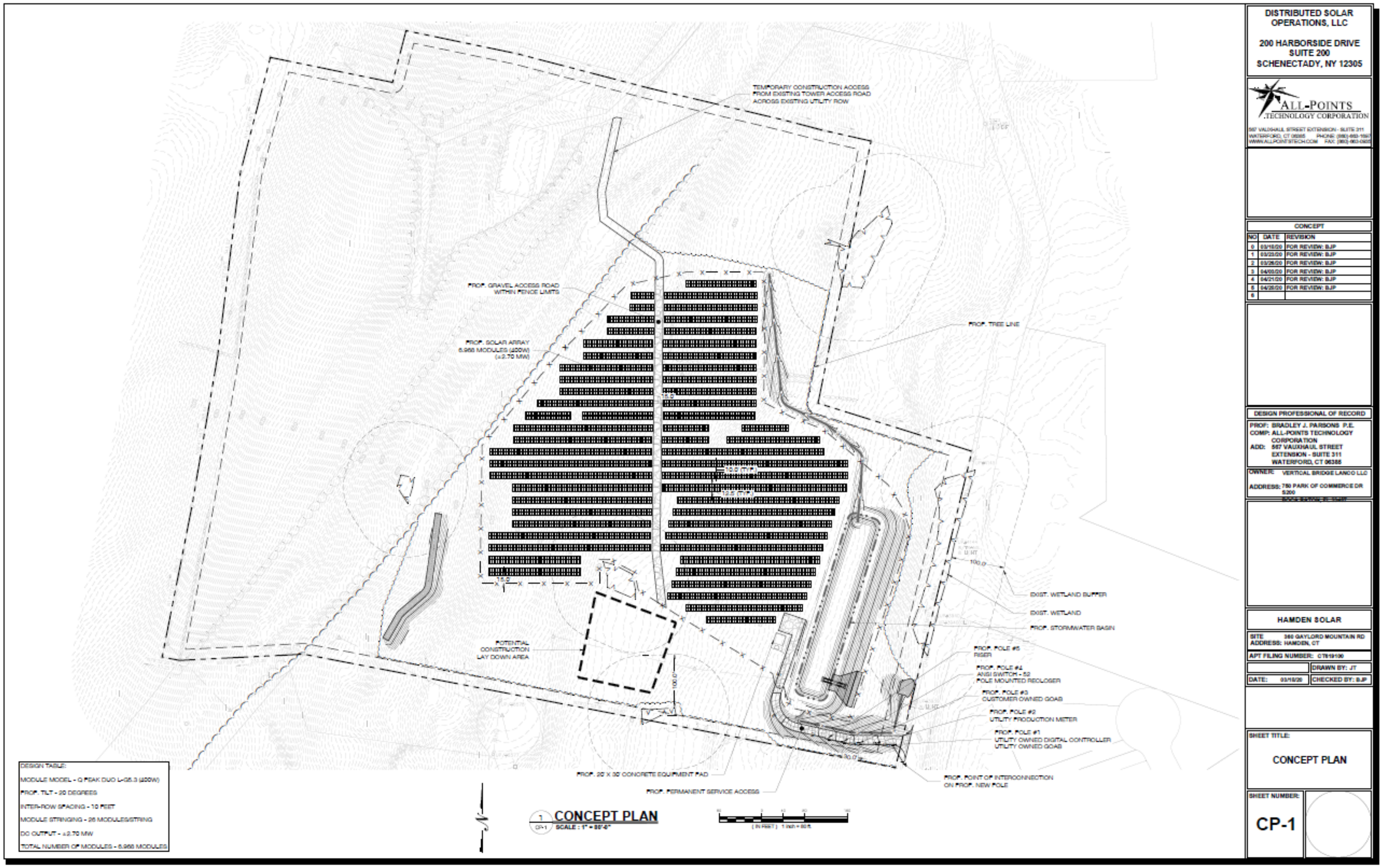

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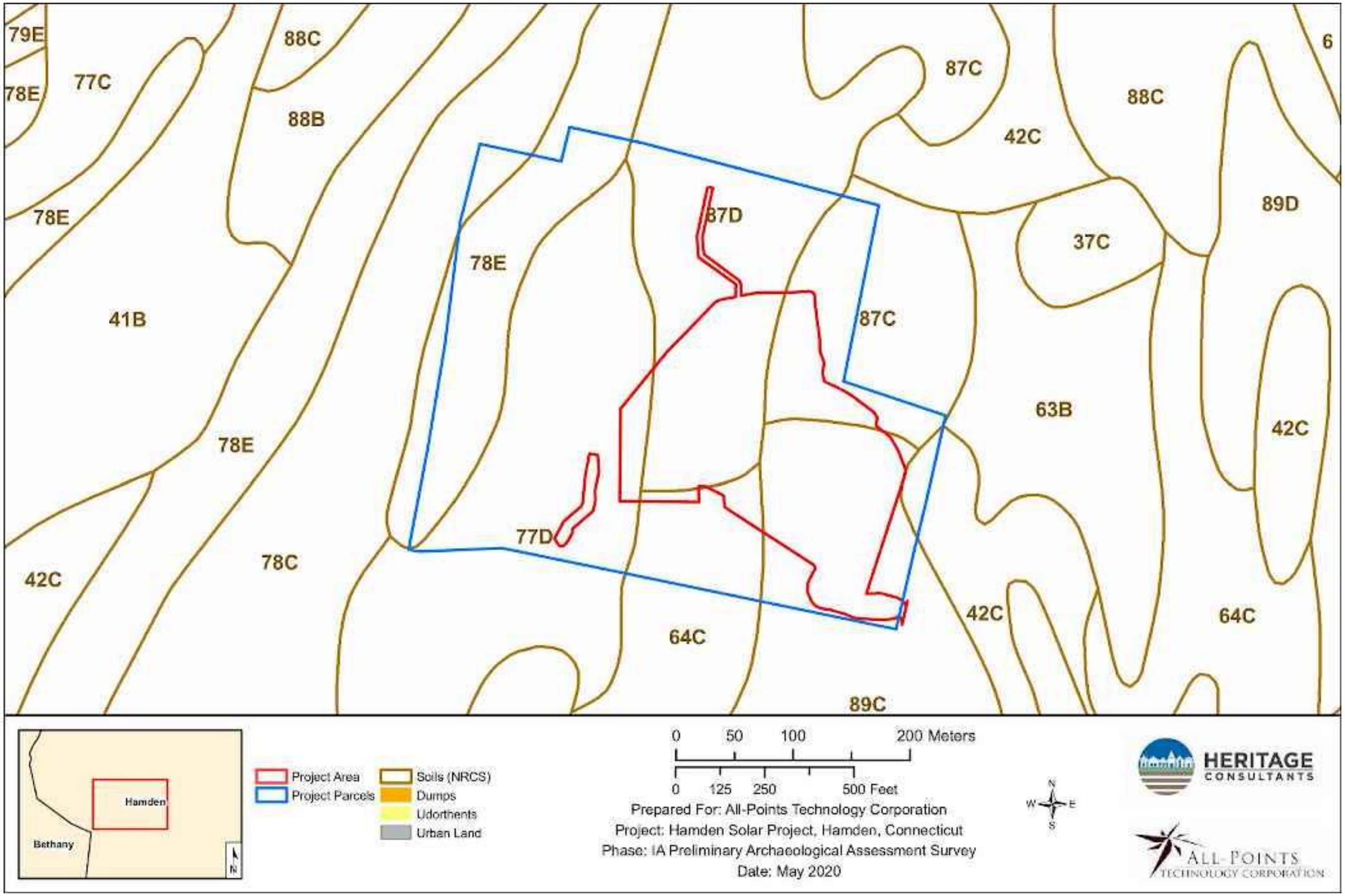

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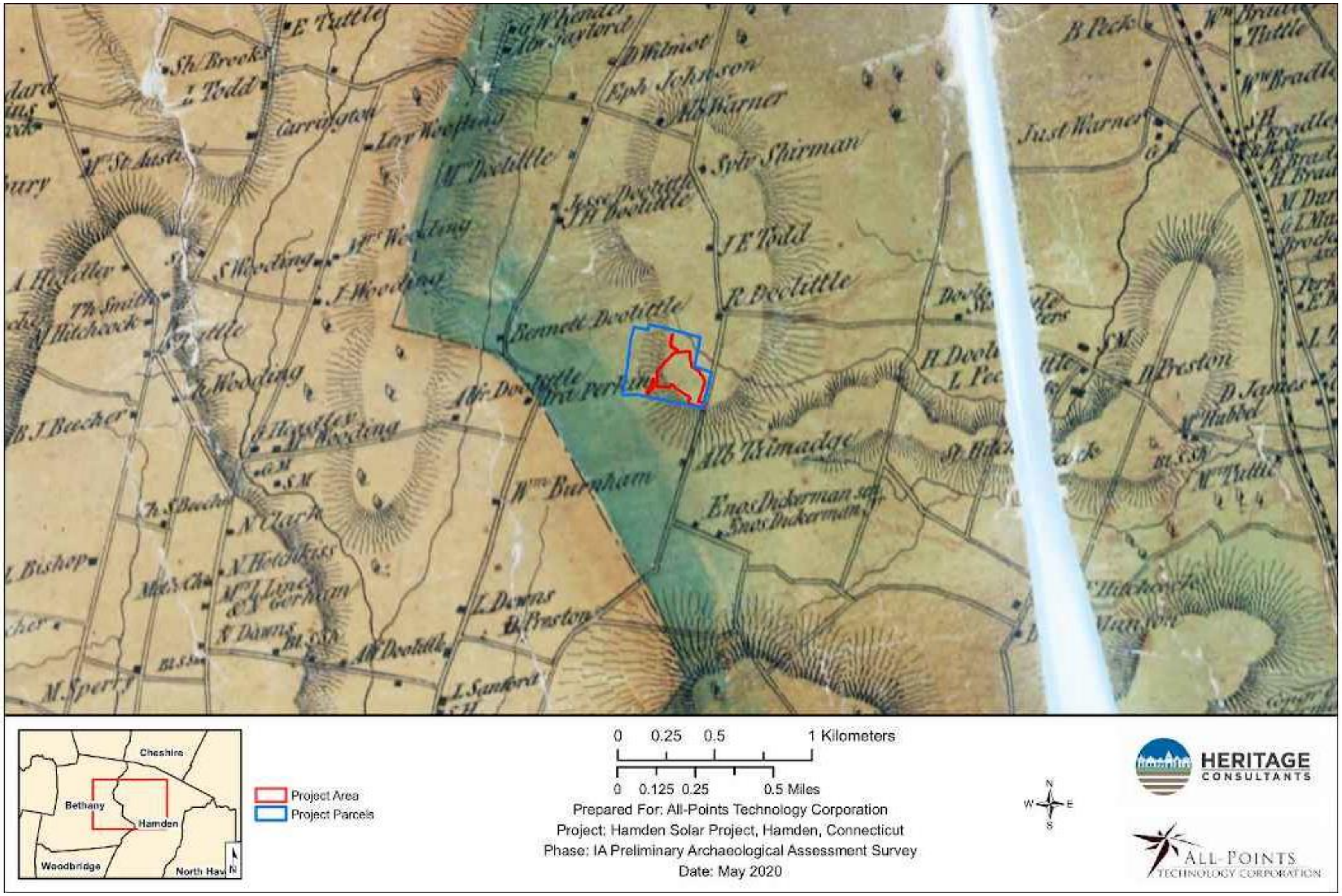

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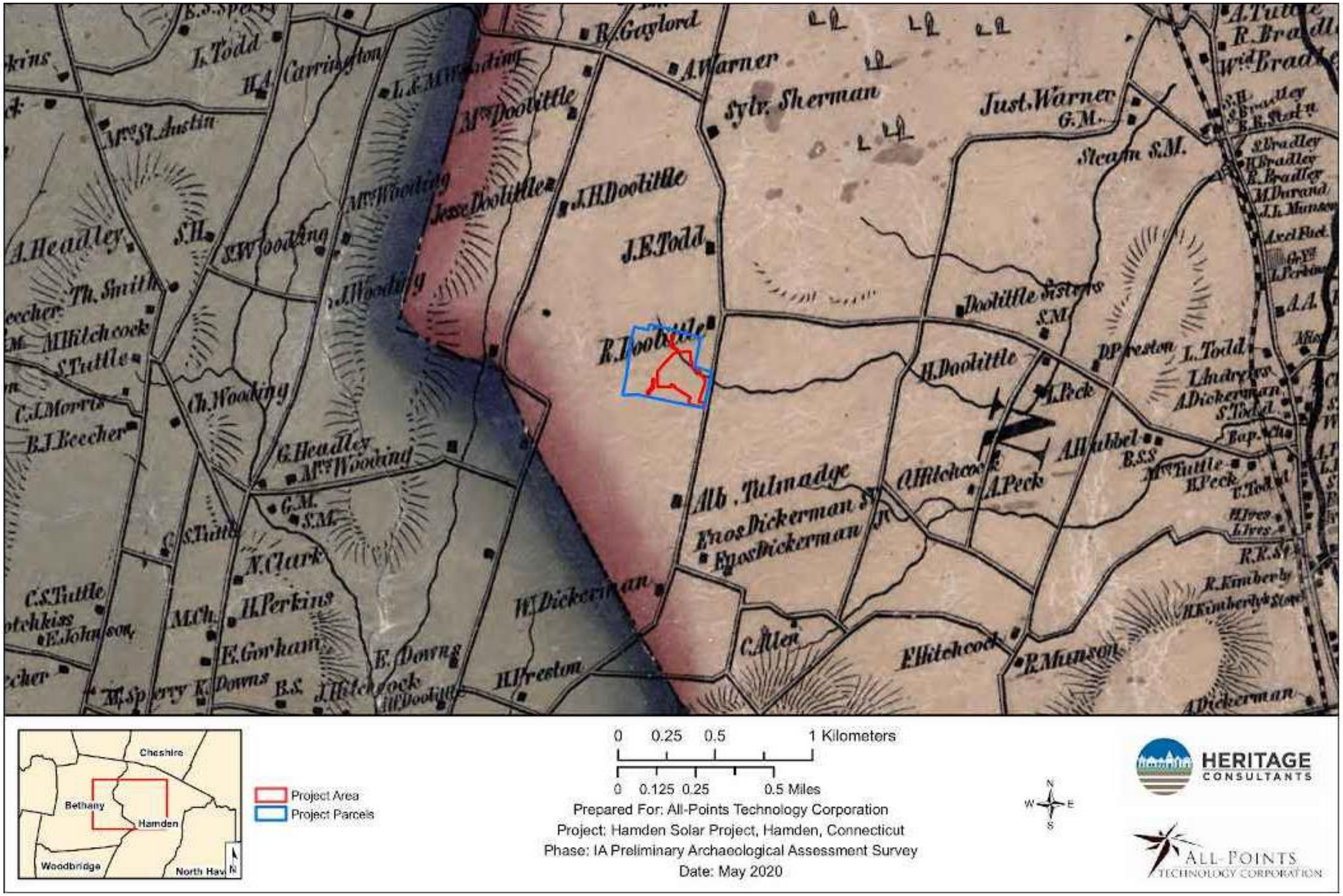

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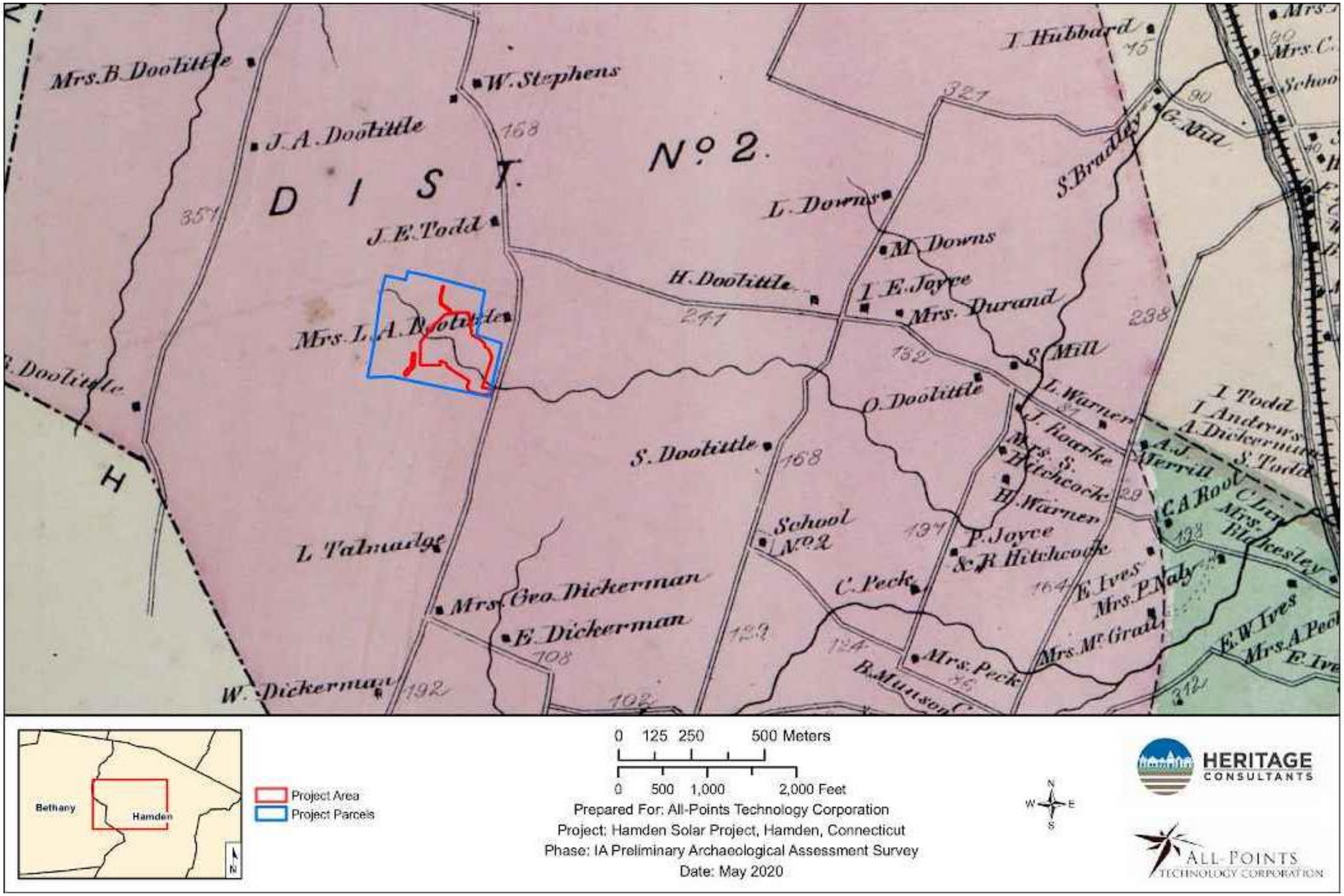
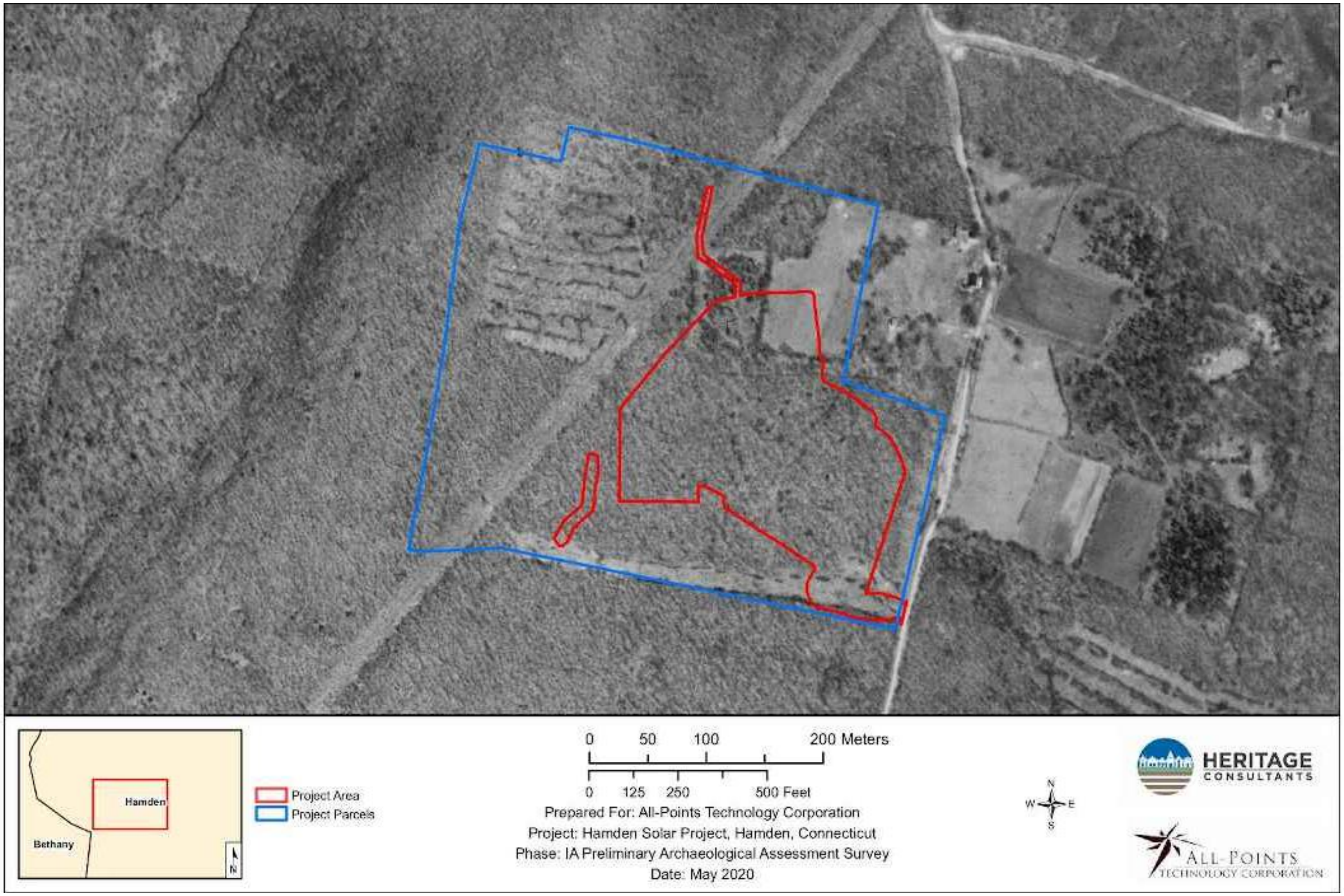


Figure 6. Excerpt from an 1868 historic map showing the location of the project area in Hamden, Connecticut.



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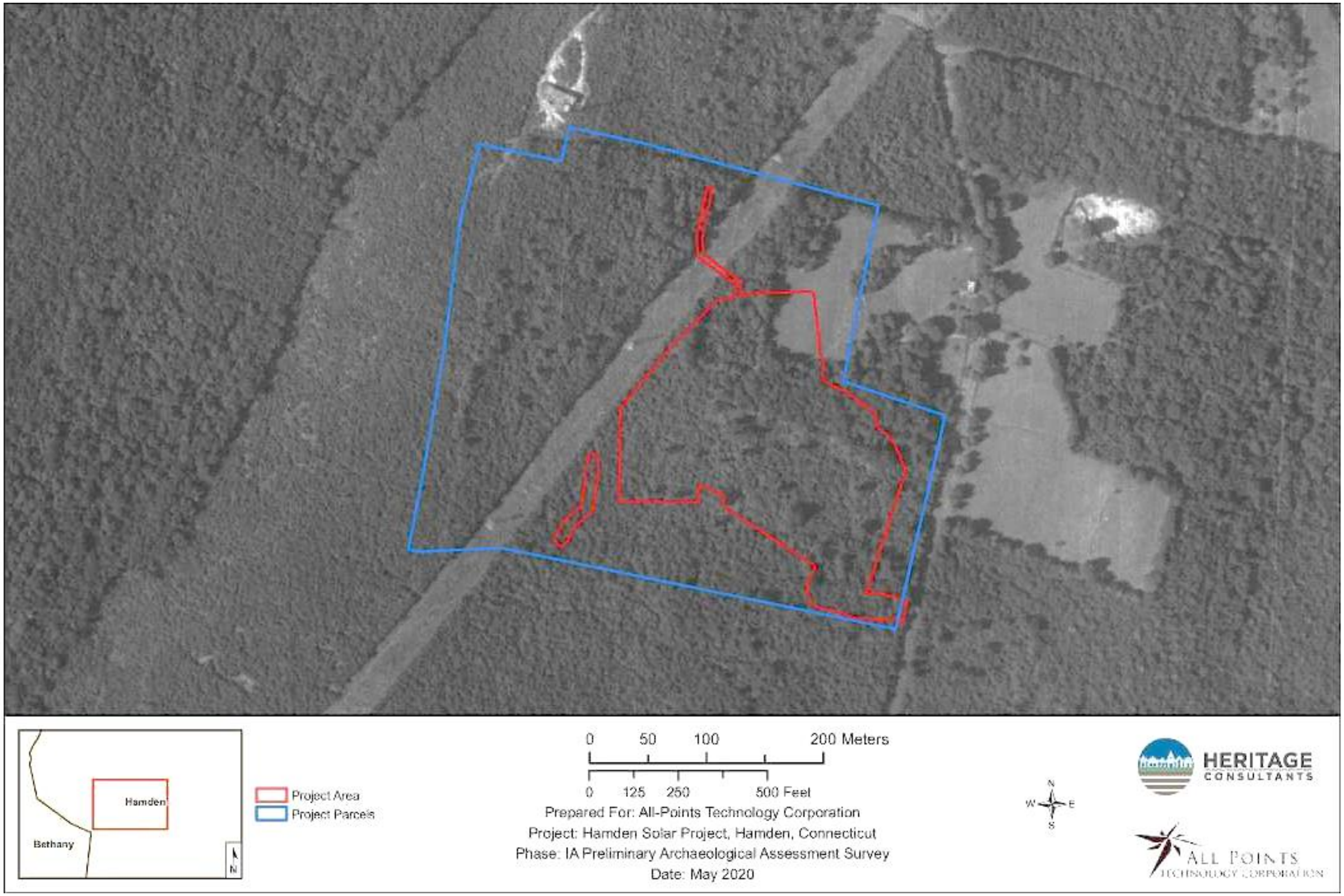

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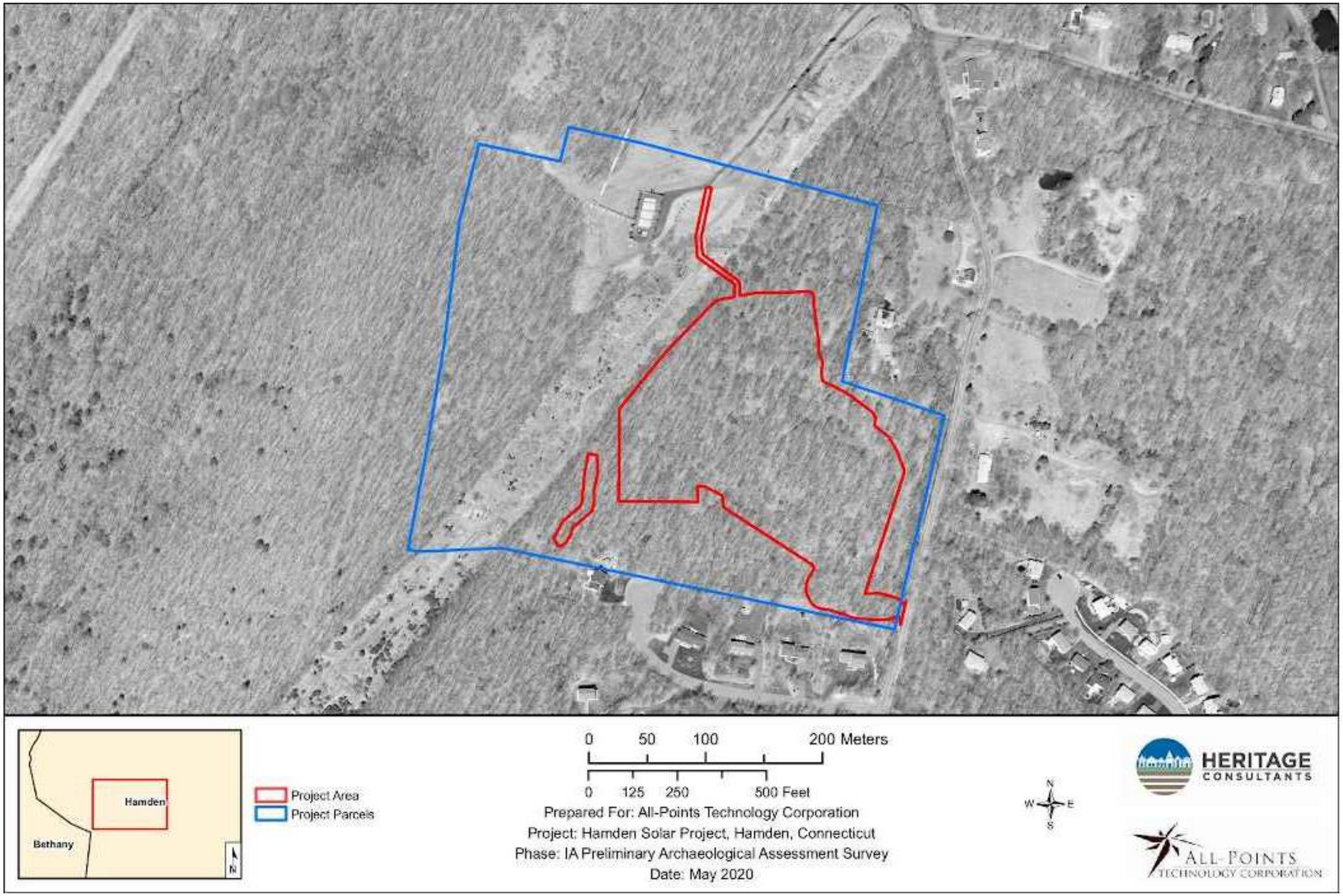

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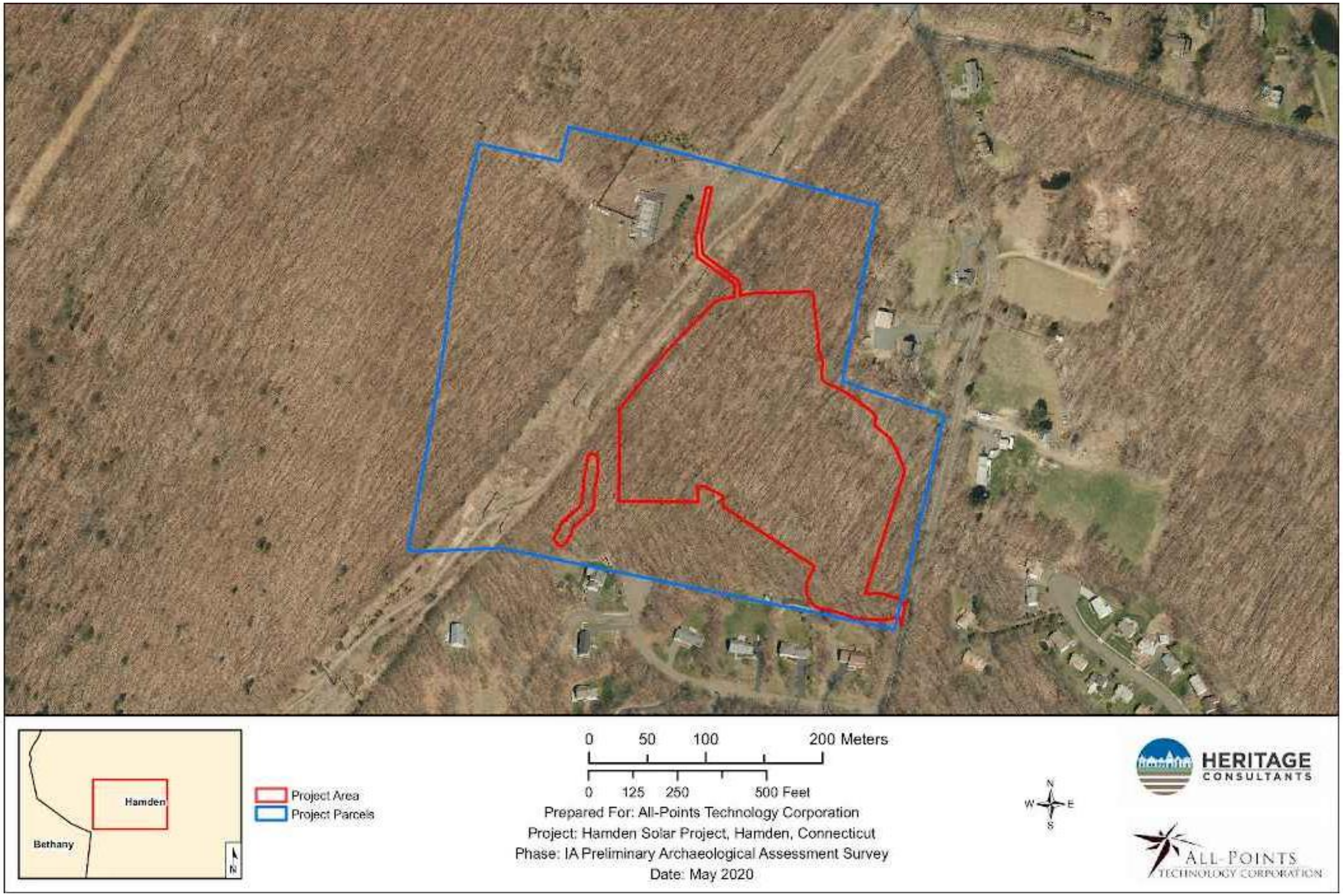

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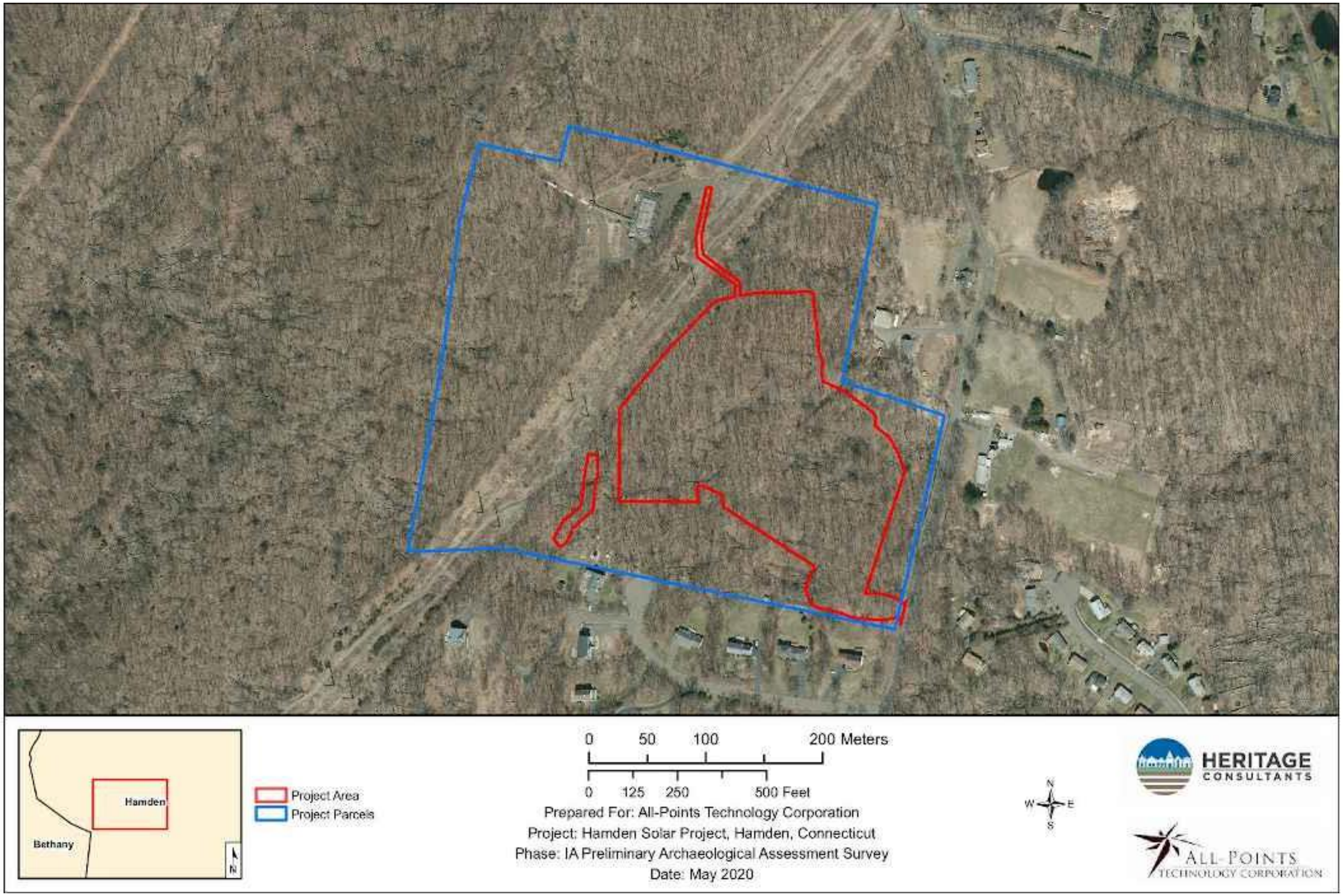

Figure 11. Excerpt from a 2019 aerial photograph showing the location of the project area in Hamden, Connecticut.

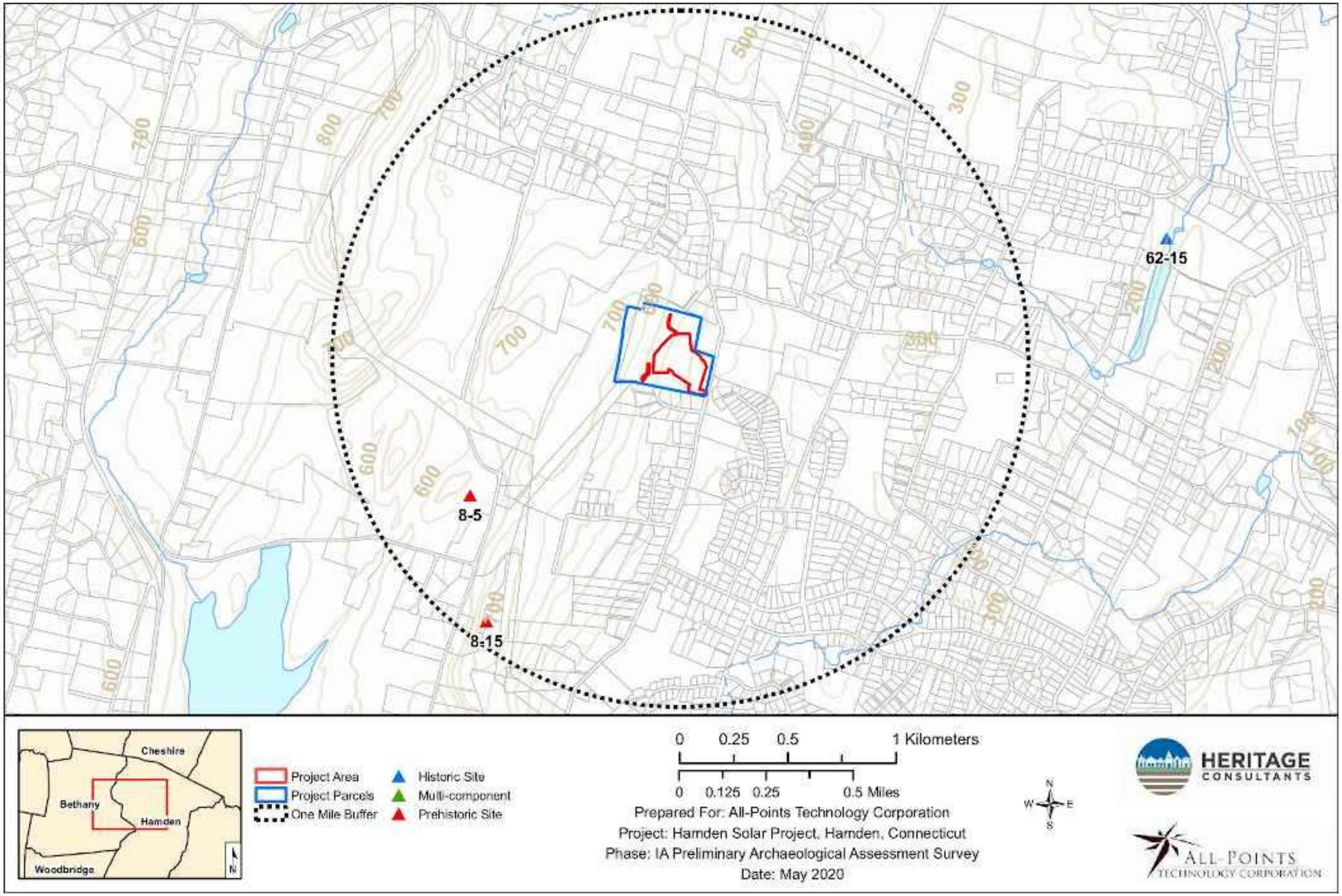

Figure 12. Digital map showing the location of previously identified archaeological sites in the vicinity of the project area in Hamden, Connecticut.

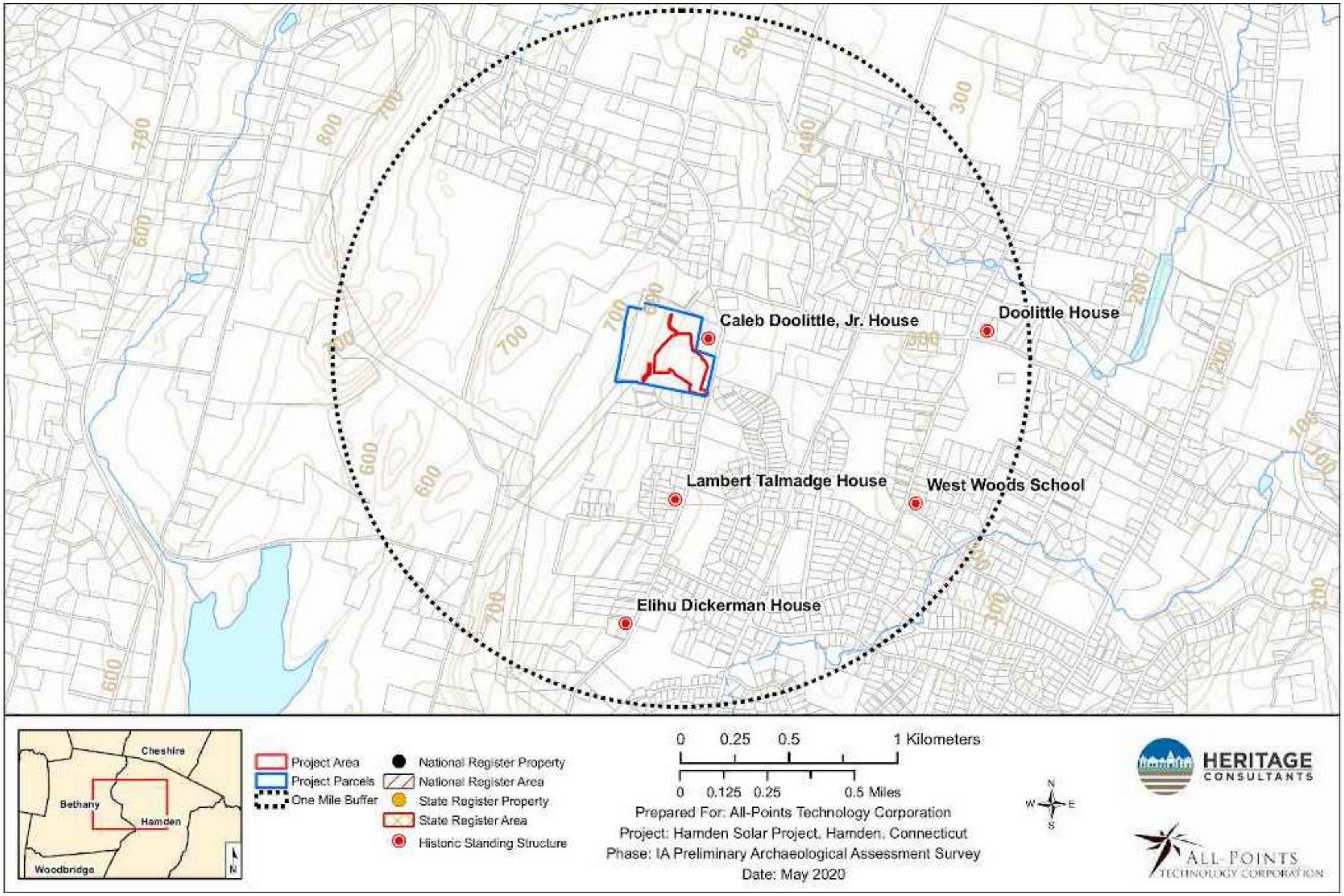

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Figure 14. Overview photo of the west-central portion of the project area facing northeast (note large boulders and tree throws throughout this area).

Figure 15. Overview photo of the southwestern portion of the project area facing south (note steep slopes throughout this area).

Figure 16. Overview photo of the southwestern portion of the project area facing north (note this are contained wet soils and tree throws).

Figure 17. Overview photo of the southeastern portion of the project area facing north (note surface water in this area).

Figure 18. Overview photo of the east-central portion of the project area facing north (this area contains stony soils, boulders, and tree throws).

Figure 19. Overview photo of the east-central portion of the project area facing west (note surface expressions of large stone and boulders in this area).

Figure 20. Overview photo of the northeastern portion of the project area facing west (note presence of logging rod in this area).

Figure 21. Overview photo of the northeastern portion of the project area facing northeast.

Figure 22. Overview photo of the northern portion of the project area facing north.

Figure 23. Overview photo of the northern portion of the project area facing southwest.

Figure 24. Overview photo of the proposed project area facing south.

Figure 25. Overview photo of the northwestern portion of the project area facing south (note steep slopes and past timbering in this area).

Figure 26. Overview photo of the eastern portion of the project area near Gaylord Mountain Road facing southwest (note slopes and large amount of stones and boulders in this area).

Figure 27. Overview photo of the southeastern portion of the project area near Gaylord Mountain Road facing southwest (note slopes and large amount of stones and boulders in this area).

Figure 28. Overview photo of the eastern portion of the project area near Gaylord Mountain Road facing southwest (note slopes and large amount of stones and boulders in this area).

Figure 29. Overview photo of the Doolittle House at 363 Gaylord Farms Road (note this image is from Google streetscape, as the landowner did not want the house photographed at the time of survey).

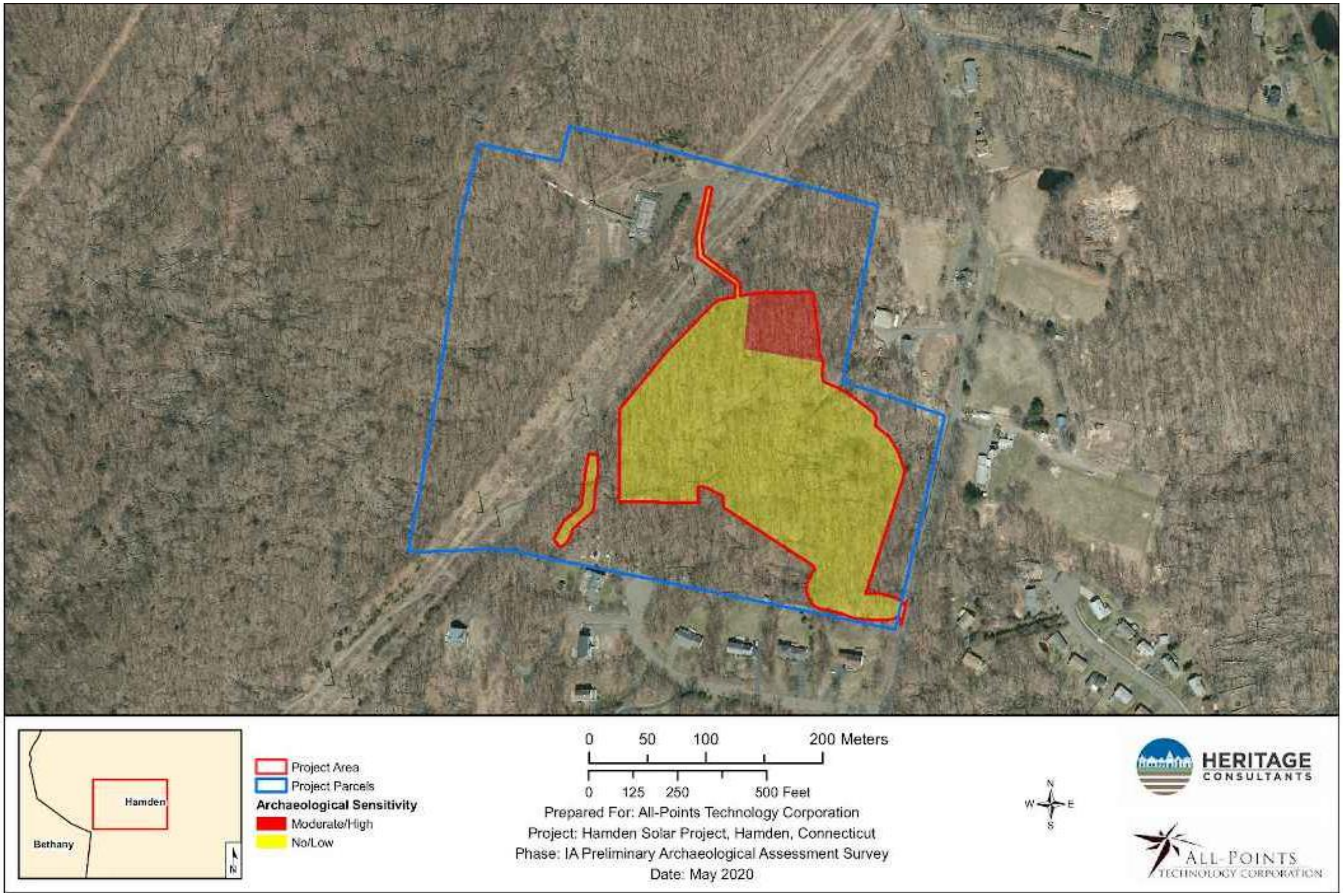

Figure 30. Excerpt from a 2019 aerial image showing the location of the project area in Hamden, Connecticut, as well as areas of no/low and moderate/high archaeological sensitivity.

JUNE 2020

PHASE IB CULTURAL RESOURCES RECONNAISSANCE SURVEY OF THE PROPOSED HAMDEN SOLAR CENTER PROJECT IN HAMDEN, CONNECTICUT

PREPARED FOR:

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ABSTRACT

This report presents the results of a Phase IB cultural reconnaissance survey of the proposed solar center in Hamden, Connecticut. Heritage completed the current Phase IB cultural resources reconnaissance survey on behalf of All-Points Technology Corporation in June of 2020. The survey was completed in the northern portion of the solar center project area in Hamden, Connecticut, which was previously determined to retain a moderate/high sensitivity for archaeological resources. A total of 12 of 12 (100 percent) planned shovel tests were excavated throughout the moderate/high sensitivity area. This effort failed to identify any artifacts, features, or cultural resources loci. No additional examination of the project area is recommended prior to construction.

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CHAPTER I
INTRODUCTION

This report presents the results of a Phase IB cultural resources reconnaissance survey for a proposed solar center in Hamden, Connecticut (Figure 1). All-Points Technology Corporation (All-Points) requested that Heritage Consultants, LLC (Heritage) complete the reconnaissance survey as part of the planning process for the proposed residential development. Heritage completed this investigation in June of 2020. All work associated with this investigation was performed in accordance the *Environmental Review Primer for Connecticut's Archaeological Resources* (Poirier 1987) promulgated by the Connecticut State Historic Preservation Office (CT-SHPO).

Project Description and Methods Overview

The proposed project will include the installation of rows of solar panels spaced approximately 10 ft (3 m) apart. The development also will include an access road that will extend from an existing cellular communications compound to the west, across an Eversource Energy electrical transmission right-of-way, and to the project parcel. In addition, the proposed project plans depict a stormwater basin in the eastern portion of the project area along Gaylord Mountain Road, as well as a concrete equipment pad and pole mounted meter, recloser, and digital controller in the southeastern corner of the project area. The solar array will interconnect with powerlines along Gaylord Mountain Road (Figure 2). In May of 2020, Heritage conducted a Phase IA pedestrian survey of the proposed development parcel to assess current field conditions and soil integrity. This also included photo-documentation of property. The pedestrian survey revealed that the majority of the project area was disturbed and/or contained steep slopes or wet soils. The northern portion of the project area, however, which contains approximately 0.5 ac of land, contained low slopes and well-drained soils. This area was deemed to possess a moderate/high sensitivity for archaeological resources, and it is recommended that it be subjected to Phase IB cultural resources survey prior to the construction of the solar center.

The current Phase IB cultural resources reconnaissance survey consisted of the completion of the following tasks: 1) a contextual overview of the area's prehistory, history, and natural setting (e.g., soils, ecology, hydrology, etc.); 2) a literature search to identify and discuss previously completed cultural resources surveys and previously recorded cultural resources in the region encompassing the study area; 3) a review of readily available historic maps and aerial imagery depicting the study area in order to identify potential historic resources and/or areas of past disturbance; 4) subsurface testing of the identified moderate/high sensitivity area; and 5) preparation of the current Phase IB cultural resources assessment survey report.

Project Results and Management Recommendations Overview

During the Phase IB cultural resources survey, a total of 12 of 12 (100 percent) planned shovel tests were excavated throughout the identified moderate/high sensitivity area (Figure 2). This effort failed to identify any artifacts, features, or cultural resources loci. Thus, no additional archaeological examination of the project area is recommended prior to construction.

Project Personnel

Key personnel for this project included Mr. David R. George, M.A., R.P.A., (Principal Investigator), Ms. Kelsey Tuller, M.A. (Field Director); Mr. Stephen Anderson, B.A., (GIS Specialist); Ms. Christina Volpe, B.A., (Historian); and Ms. Elizabeth Correia, M.A., (Laboratory Specialist).

Organization of the Report

The natural setting of the region encompassing the study area is presented in Chapter II; it includes a brief overview of the geology, hydrology, and soils, of the project region. The prehistory of the project region is outlined briefly in Chapter III. The history of the region encompassing the project region and study area is chronicled in Chapter IV, while a discussion of previous archaeological investigations near the study area is presented in Chapter V. The methods used to complete this investigation are discussed in Chapter VI. The results of this investigation and management recommendations for the study area and the identified cultural resources are presented in Chapter VII.

CHAPTER II
NATURAL SETTING

Introduction
This chapter provides a brief overview of the natural setting of the region containing the project area. Previous archaeological research has documented that a few specific environmental factors can be associated with both prehistoric and historic period site selection. These include general ecological conditions, as well as types of fresh water sources and soils present. The remainder of this section 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 quite 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: South-Central Lowlands ecoregion. A brief summary of this ecoregion is presented below. It is followed by a discussion of the hydrology and soils found in and adjacent to the study area.

<u>South-Central Lowlands Ecoregion</u>
The South-Central Lowlands ecoregion consists of "a rolling area of low average elevation, crossed by several north-trending ridge systems; streams and river systems with broad, well developed flood plains, from which the land surface generally rises to the bases of the ridges" (Dowhan and Craig 1976). Elevations average less than 60 m (200 ft) but can reach approximately 300 m (1,000 ft) in height. The region's bedrock is sedimentary, consisting of sandstones, basalt, and traprock. Soils vary from "clayey glacial till in the uplands of the region, to sand, gravel, silt, and clay in the lowlands."

Hydrology in the Vicinity of the Project Area
The project area is situated within a region that contains to multiple sources of freshwater, including Jepps Brook, Jepp Pond, Eaton Brook, West River, Lake Bethany, and Sanford Brook, as well as numerous unnamed streams, ponds, and wetlands. These freshwater sources may have served as resource extraction areas for Native American and historic populations. Previously completed archaeological investigations in

Connecticut have demonstrated that streams, rivers, and wetlands were focal points for prehistoric occupations because they provided access to transportation routes, sources of freshwater, and abundant faunal and floral resources.

Soils Comprising the Project Area

Soil formation is the direct result of the interaction of many variables, including climate, vegetation, parent material, time, and organisms present (Gerrard 1981). Once archaeological deposits are buried within the soil, they are subject to various taphonomic and 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 in within the current study area. In contrast, acidic soils enhance the preservation of charred plant remains.

A review of the soils within the study area is presented below. The study area is characterized by the presence of eight major soil types. The most ubiquitous soil types found within the region and which cover the majority of the study area include Cheshire, Holyoke, and Wethersfield soils (Figure 2). A review of these soils shows that they consist of well-drained loams; they are the types of soils that are typically correlated with prehistoric and historic use and occupation. Descriptive profiles for each soil type are presented below; they were gathered from the National Resources Conservation Service.

<u>Cheshire Soils (Soil Code 77):</u>

The Cheshire series consists of deep, well drained loamy soils that have formed in supraglacial till on uplands. They are nearly level through very steep soils on till plains and hills and slope ranges from 0 through 60 percent. A typical profile of Cheshire series soils is as follows: **Ap--**0 to 8 inches; dark brown (7.5YR 3/2) fine sandy loam, pinkish gray (7.5YR 6/2) dry; weak medium granular structure; friable; common fine roots; 5 percent gravel; strongly acid; clear wavy boundary; **Bw1--**8 to 16 inches; reddish brown (5YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; few fine roots; 10 percent gravel; strongly acid; gradual wavy boundary; **Bw2--**16 to 26 inches; reddish brown (5YR 5/4) fine sandy loam; weak medium subangular blocky structure; very friable; few fine roots; 10 percent gravel; strongly acid; clear wavy boundary; and **C--**26 to 65 inches; reddish brown (2.5YR 4/4) gravelly sandy loam; massive; very friable with firm lenses; 20 percent gravel and cobbles; strongly acid.

<u>Holyoke Soils (Soil Code 78):</u>

The Holyoke series consists of shallow, well drained and somewhat excessively drained soils that have formed in a thin mantle of till derived mainly from basalt and red sandstone, conglomerate, and shale. They are nearly level to very steep soils on bedrock controlled ridges and hills with slopes that range from 0 to 60 percent. A typical profile of Holyoke series soils is as follows: **Oe**--0 to 1 cm; black (10YR 2/1) moderately decomposed plant material; **A**--1 to 8 cm; dark brown (10YR 3/3) silt loam; weak medium granular structure; very friable; many fine roots; 10 percent angular gravel; very strongly acid; abrupt wavy boundary; **Bw1**--8 to 20 cm; brown (7.5YR 4/4) silt loam; weak coarse granular structure; very friable; many fine roots; 10 percent gravel; very strongly acid; clear wavy boundary; **Bw2**--20 to 46 cm; yellowish red (5YR 4/6) gravelly silt loam; weak medium subangular blocky structure; friable; common fine roots; 15 percent gravel; very strongly acid; abrupt wavy boundary; and **2R**--46 cm; basalt bedrock.

Wethersfield Soils (Soil Code 87):

The Wethersfield series consists of very deep, well drained loamy soils that have formed in dense glacial till on uplands. The soils are moderately deep to dense basal till. They are nearly level to steep soils on till plains, low ridges, and drumlins. A typical profile of Wethersfield series soils is as follows: **Oe**--0 to 3 cm; black (10YR 2/1) moderately decomposed plant material; **A**--3 to 8 cm; dark brown (7.5YR 3/2) loam; moderate medium granular structure; friable; many fine and medium roots; 10 percent gravel; strongly acid; clear wavy boundary; **Bw1**--8 to 22 cm; reddish brown (5YR 4/4) loam; weak medium subangular blocky structure; friable; common fine and medium roots; 10 percent gravel; strongly acid; clear wavy boundary; **Bw2**--22 to 69 cm; dark reddish brown (5YR 3/3) gravelly loam; weak medium subangular blocky structure; friable; few medium roots; 15 percent gravel and cobbles; strongly acid; clear wavy boundary; and **Cd**--69 to 165 cm; reddish brown (2.5YR 4/4) gravelly loam; weak thick platy structure; very firm, brittle; few silt films and black coatings on some plates; 20 percent gravel and cobbles; strongly acid.

Summary

The natural setting of the area containing the proposed Hamden Solar Center is common throughout the South-Central Lowlands ecoregion. Streams and rivers of this area drain into the Long Island Sound. Further, the landscape in general is dominated by well-drained loamy soil types that contain large amounts of stone and that have formed on glacial substrates, including bedrock and till. Though steep slopes dominate a large amount of the region, the project region might have been well suited to Native American occupation throughout the prehistoric era. This portion of Hamden was also used throughout the historic era as evidenced by the presence of historic residences and agricultural fields throughout the region. Thus, archaeological deposits dating from the last 350 years or so may also be expected near or within the proposed impact areas.

CHAPTER III
PREHISTORIC SETTING

Introduction
This chapter provides a brief overview of the natural setting of the region containing the Project Site. Previous archaeological research has documented that a few specific environmental factors can be associated with both prehistoric and historic period site selection. These include general ecological conditions, as well as types of fresh water sources and soils present. The remainder of this section provides a brief overview of the ecology, hydrological resources, and soils present within the Project Site 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 quite 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: North-Central Lowlands ecoregion. A brief summary of this ecoregion is presented below. It is followed by a discussion of the hydrology and soils found in and adjacent to the Project Site.

North-Central Lowlands Ecoregion
The North-Central Lowlands ecoregion consists of a broad valley located between 40.2 and 80.5 km (25 and 50 mi) to the north of Long Island Sound (Dowhan and Craig 1976). It is characterized by extensive floodplains, backwater swamps, and lowland areas situated near large rivers and tributaries. Physiography in this region is composed of a series of north-trending ridge systems, the easternmost of which is referred to as the Bolton Range (Bell 1985:45). These ridge systems comprise portions of the terraces that overlook the larger rivers such as the Connecticut and Farmington Rivers. The bedrock of the region is composed of Triassic sandstone, interspersed with durable basalt or "traprock" (Bell 1985). Soils found in the upland portion of this ecoregion are developed on red, sandy to clayey glacial till, while those soils situated nearest to the rivers are situated on widespread deposits of stratified sand, gravel, silt, and alluvium resulting from the impoundment of glacial Lake Hitchcock.

Hydrology in the Vicinity of the Project Site

The project area is situated within a region that contains to multiple sources of freshwater, including Jepps Brook, Jepp Pond, Eaton Brook, West River, Lake Bethany, and Sanford Brook, as well as numerous unnamed streams, ponds, and wetlands. These freshwater sources may have served as resource extraction areas for Native American and historic populations. Previously completed archaeological investigations in Connecticut have demonstrated that streams, rivers, and wetlands were focal points for prehistoric occupations because they provided access to transportation routes, sources of freshwater, and abundant faunal and floral resources.

Soils Comprising the Project Site

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 several 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 the chemical and mechanical 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 in within the current Project Site. In contrast, acidic soils enhance the preservation of charred plant remains.

A review of the soils within the Project Site is presented below. The Project Site is characterized by the presence of five major soil types: Agawam, Haven, Enfield, Manchester, and Udorthent soils (Figure 3). A review of the first four of these soils shows that they consist of well drained sandy loams; they are the types of soils that are typically correlated with prehistoric and historic use and occupation. Descriptive profiles for each soil type are presented below; they were gathered from the National Resources Conservation Service. The final soil type, Udorthents, are typical of areas that have been largely disturbed in the past and no longer retain archaeological sensitivity.

<u>Agawam Soils (Soil Code 29A):</u>

The Agawam series consists of very deep, well drained soils that have formed in sandy, water deposited materials. They are typically found on outwash plains and high stream terraces where slope ranges from 0 to 15 percent. A typical profile associated with Haven soils is as follows: **Ap**--0 to 11 inches; dark grayish brown (10YR 4/2) fine sandy loam; light brownish gray (10YR 6/2) dry; weak medium and coarse subangular blocky structure; very friable; common fine and medium roots; strongly acid; abrupt smooth boundary; **Bw1**--11 to 16 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium and coarse subangular blocky structure; very friable; common fine and medium roots; strongly acid; abrupt smooth boundary; **Bw2**--16 to 26 inches; light olive brown (2.5Y 5/4) fine sandy loam; weak medium subangular blocky structure; very friable; common fine and medium roots; strongly acid; clear smooth boundary; **2C1**--26 to 45 inches; olive(5Y 5/3) loamy fine sand; massive; very friable; few fine roots; strongly acid; clear smooth boundary; **2C2**--45 to 55 inches; olive brown (2.5Y 4/4) loamy fine sand; massive; very friable; strongly acid; abrupt smooth boundary; and **2C3**--55 to 65 inches; olive (5Y 5/3) loamy sand; single grain; loose; strongly acid.

<u>Haven Soils (Soil Code 32A):</u>

The Haven series consists of very deep, well drained soils that have formed in loamy over sandy and gravelly outwash. They are typically found on outwash plains, valley trains, terraces, and water-sorted moraine deposits where slope ranges from 0 through 15 percent. A typical profile associated with Haven soils is as follows: **Oi**--0 to 2 inches (0 to 5 centimeters); slightly decomposed plant material derived from loose pine needles, leaves and twigs. **Oa**-- 2 to 3 inches (5 to 8 centimeters); black (5YR 2/1) highly decomposed plant material; **A**--3 to 6 inches (8 to 15 centimeters); dark grayish brown (10YR 4/2) loam; weak fine and medium granular structure; friable; many fine and coarse roots; very strongly acid; abrupt smooth boundary; **Bw1**-- 6 to 13 inches (15 to 33 centimeters); brown (7.5YR 4/4) loam; weak fine and medium subangular blocky structure; friable; common fine roots; many fine pores; very strongly acid; clear wavy boundary. **Bw2**-- 13 to 22 inches (33 to 56 centimeters); strong brown (7.5YR 5/6) loam; weak fine and medium subangular blocky structure; friable; common fine roots; many fine pores; 5 percent fine gravel; very strongly acid; gradual wavy boundary; **BC**-- 22 to 31 inches (56 to 79 centimeters); yellowish brown (10YR 5/6) gravelly loam; weak medium and fine subangular blocky structure; friable; few fine roots; common fine pores; 20 percent fine gravel; very strongly acid; clear wavy boundary; and **2C**-- 31 to 65 inches (79 to 165 centimeters); yellowish brown (10YR 5/4) to brownish yellow (10YR 6/6) stratified gravelly sand; single grained; loose; 30 percent fine gravel; very strongly acid.

Enfield Soils (Soil Code 32A):
The Enfield series consists of very deep, well drained loamy soils formed in a silty mantle overlying glacial outwash. They are found on level to sloping areas characterized by outwash plains and terraces. A typical profile associated with Enfield soils is as follows: **Ap**--0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine granular structure; friable; many very fine and fine roots; 5 percent fine gravel; strongly acid; abrupt smooth boundary; **Bw1**--7 to 16 inches; strong brown (7.5YR 5/6) silt loam; weak medium subangular blocky structure; friable; common very fine and many fine roots; 5 percent fine gravel; strongly acid; clear wavy boundary. **Bw2**--16 to 25 inches; light olive brown (2.5Y 5/4) silt loam; weak medium subangular blocky structure; friable, few very fine and common fine roots; 5 percent fine gravel; strongly acid; abrupt wavy boundary; and **2C**--25 to 60 inches; brown (10YR 5/3) very gravelly sand; single grain; loose; stratified; 45 percent gravel and 5 percent cobbles; strongly acid.

Manchester Soils (Soil Code 37E):
The Manchester series consists of very deep, excessively drained soils that have formed in sandy and gravelly glacial outwash and stratified drift. They are found on outwash plains, terraces, kames, deltas, and eskers where slopes ranges from 0 to 45 percent. A typical profile associated with Manchester soils is as follows: **Ap**--0 to 9 inches; dark brown (7.5YR 3/2) gravelly sandy loam; weak medium granular structure; very friable; many fine and common medium roots; 20 percent gravel; strongly acid; clear smooth boundary; **Bw**--9 to 18 inches; reddish brown (5YR 4/3) gravelly loamy sand; very weak fine and medium granular structure; very friable; few fine roots; 25 percent gravel; strongly acid; clear wavy boundary; and **C**--18 to 65 inches; reddish brown (5YR 4/4) very gravelly sand; single grain; loose; 50 percent gravel; very strongly acid.

Udorthent Soils (Soil Code 305):
Udorthent soils occur within cuts (road, railroad, etc.), spoil piles, landfills, and gravel pits. The slope ranges from 0 to 25 percent and the runoff class is medium. The depth to a restrictive feature is greater than 60 inches. The drainage class is moderately well drained. Areas characterized by Udorthent soils are largely disturbed by cutting, smoothing, filling, or large-scale excavations. They do not retain archaeological sensitivity.

Summary
The natural setting of the Project Site is common throughout the North-Central Lowlands ecoregion. Streams and rivers of this area empty into the Connecticut River, which in turn, drains into the Long Island Sound. Further, the landscape in general is dominated by sandy loamy soil types with some

wetland soils intermixed. In addition, low slopes dominate the region. Thus, in general, the project region was well suited to Native American occupation throughout the prehistoric era. This portion of East Windsor was also used throughout the historic era, as evidenced by the presence of numerous historic residences, barns, outbuildings, and agricultural fields throughout the region; thus, archaeological deposits dating from the prehistoric and historic era may be expected near or within the proposed Project Site.

CHAPTER III
PREHISTORIC 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 prehistory 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 prehistory 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 prehistoric 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 prehistoric 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 prehistory of Connecticut. The remainder of this chapter provides an overview of the prehistoric setting of the region encompassing the Project Site.

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 circa (ca.), 12,000 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 numerous surface finds of Paleo-Indian projectile points throughout the State of Connecticut, only two sites, the Templeton Site (6-LF-21) in Washington, Connecticut and the Hidden Creek Site (72-163) in Ledyard, Connecticut, have been studied in detail and dated using the radiocarbon method (Jones 1997; Moeller 1980). The Templeton Site (6-LF-21) 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 quite 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.

The only other Paleo-Indian site studied in detail in Connecticut is the Hidden Creek Site (72-163) (Jones 1997). The Hidden Creek Site is situated on the southeastern margin of the Great Cedar Swamp on the Mashantucket Pequot Reservation in Ledyard, Connecticut. 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.

While archaeological evidence for Paleo-Indian occupation is scarce in Connecticut, it, combined with data from the West Athens Road and King's Road Site in the Hudson drainage and the Davis and Potts Sites in northern New York, supports the hypothesis that there was human occupation of the area not long after ca. 12,000 B.P. (Snow 1980). Further, site types currently known suggest that the Paleo-Indian settlement pattern was characterized by a high degree of mobility, with groups moving from region to region in search of seasonally abundant food resources, as well as for the procurement of high-quality raw materials from which to fashion stone tools.

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 small and produce few artifacts, most of which are not temporally diagnostic. While Early Archaic sites in other portions 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 based on 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, an area 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.

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

By the onset of the Middle Archaic Period, essentially modern deciduous forests had developed in the region (Davis 1969). It is at this time that increased numbers and types of sites are noted in Connecticut (McBride 1984). The most well-known Middle Archaic site in New England is the Neville Site, which is in Manchester, New Hampshire and studied by Dincauze (1976). Careful analysis of the Neville Site indicated that the Middle Archaic occupation dated from between ca., 7,700 and 6,000 years ago. In fact, Dincauze (1976) obtained several radiocarbon dates from the Middle Archaic component of the

Neville Site. The dates, associated with the then-newly named Neville type projectile point, ranged from 7,740±280 and 7,015±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 Period, 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 prehistory. 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 the use 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 has 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.

Careful archaeological investigations of Early Woodland sites in southern New England have 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 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 diverse stylistically 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 Prehistory

In sum, the prehistory of Connecticut spans from ca., 12,000 to 350 B.P., and it is characterized by numerous changes in tool types, subsistence patterns, and land use strategies. For most of the prehistoric era, local Native American groups practiced a subsistence pattern based on a mixed economy of hunting and gathering wild 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 prehistoric era 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 containing the proposed Project Site, a variety of prehistoric site types may be expected. These range from seasonal camps utilized by Archaic populations to temporary and task-specific sites of the Woodland era.

CHAPTER IV
HISTORIC OVERVIEW

Introduction
The project area is located in the north western part of the town of Hamden, which was formed in the eighteenth-century and is adjacent to (and formerly part of) New Haven. Hamden began seeing rapid population growth at the beginning of the twentieth century and is now a thickly settled suburban community. The project area, however, is situated at the base of Gaylord Mountain and within a tract of undeveloped woodland amidst preserved agricultural parcels and contemporary housing subdivisions.

Native American History
At the time of the English colonists' arrival, the territory of the future New Haven and Hamden was held by Native Americans who were known as the Quinnipiacs. Like other Algonquian-speaking people of the region, the Quinnipiacs lived in agricultural villages located on the best available river valley land, and also used the rest of their territory (including the Hamden area) for hunting, fishing, and temporary winter-season camps. The key leaders of two villages near New Haven harbor at the time of contact were Momaugin and Montowese. In 1638, these leaders were persuaded to give the colonists deeds to their territory, reserving only limited areas for their communities' farming activity; the terms of the transactions reflect the colonists' expectations that the Native Americans should and would conform to English legal and social structures, including the idea that the individual leaders really were English-style sovereigns who could transfer absolute ownership of territory. The disruption of the Native American economy and society that resulted, which included constant encroachments of colonists on their reserved farming lands and reduction of crucial hunting and fishing activities elsewhere, gradually caused the Quinnipiacs to relocate to places that these disruptions had not yet reached. By 1749, only 15 to 20 Quinnipiac families were still living in the New Haven area, and only 11 individuals in 1774 (Atwater 1902, De Forest 1852, Townshend 1900). The historic sources mention finds of Native American artifacts in Hamden, but no details about specific locations or areas where camps or villages might have been located. Nonetheless, the possibility of such sites cannot be discounted.

Hamden's Colonial History
Hamden remained as part of New Haven until 1786. The 1638 colony of New Haven, and several others in the area, were founded by Reverend John Davenport and Theophilus Eaton, who formed a common government called the New Haven Jurisdiction in 1643. The royal charter acquired by the separate Connecticut Colony in the 1660s, however, forced New Haven to become part of the single government called Connecticut (Cunningham 1995). Colonization of the Hamden area began well before this event and the town's separation from its parent town. In the 1640s, New Haven began granting tracts of land to its citizens in areas known as the Great Plains (later Hamden Plains), Beaver Meadows, and Pine Rock Meadows, all in the southern part of the future Hamden. By the 1680s, the town was granting the land in the northern sections (Hartley 1959). By 1716, the population of the northern parts of New Haven was large enough that the residents sought permission to set up the North Haven ecclesiastical society, which enabled them to tax themselves to support a Congregational church separate from the one in distant New Haven (Rockey 1892). The northern part of the future town of Hamden followed suit in 1757 with the Mount Carmel Society. The creation of such separate sub-entities led, in time, to the establishment of separate towns, but Hamden did not do so until near the end of the Revolutionary

War, in 1781, and was not successful in doing so until 1786 (Hartley 1959). Thus, colonial-era structures and sites are expected in Hamden, despite the significant population growth of later eras.

Hamden's History from 1790 to 1900

Hamden's population remained at less than 5,000 residents throughout the nineteenth century. It began at a reported 1,422 people in 1790, had reached only 2,164 citizens by 1850, and finally leaped to 4,662 residents in 1900 (Keegan 2012). An 1819 gazetteer reported that the town's physical geography was framed by hills to the east and west, which contained good building stone and some supposed copper deposits, and soil supported stands of hardwoods and substantial grain production. The gazetteer mentions Eli Whitney's gun factory in the southeast part of town, as well as a paper mill and one or two grain mills, tanneries, stores, and so forth; four churches (only two of them Congregational); and 260 houses for its population of 1,716 residents as of 1810 (Pease and Niles 1819). Except for Whitney's factory, this was a typical small Connecticut town of the period.

The Farmington Canal was built through Hamden and Cheshire between 1825 and 1826. By 1838, it carried some traffic as far as Northampton, Massachusetts (Crofut 1937). The venture turned out to be a failure, however, and in 1845 the New Haven and Northampton Railroad took its place. This railroad was completed between New Haven and Plainville by 1848 (Roth et al. 1981). In 1856, reorganized as the Canal Railroad, it reached Northampton, and then further north. It was prosperous and successful by 1874, and the New York, New Haven & Hartford Railroad purchased all of its stock in 1887, taking it over completely (Turner et al. 1989). As of the 1830s, probably encouraged by the canal, there were two Congregational churches in Hamden, in addition to one Methodist and one Episcopal. The town's businesses included the Carmel Works, which made "coach and elliptic springs, steps, and axletrees," as well as a carriage factory, a brass factory, a paper mill, and a few other manufacturing enterprises. In 1836, over 100 acres in the south part of town was planted in mulberry trees as part of the widespread, though temporary, craze for starting silk production in the state (Barber 1837). It is likely that various parts of Hamden contain nineteenth-century residential and industrial structures, the latter concentrated near the railroad and water-power sites, the former near the industry and on the many scattered farms.

Hamden's History from 1900 to Present

After 1900 Hamden's population grew rapidly; by 1930 it had quadrupled to 19,020 residents (Keegan 2012). This trend was driven in part by industrial activity that expanded out from New Haven. In the 1930s, Hamden had "[i]nnumerable manufacturing interests … includ[ing] radiators, carriage hardware, brass foundry goods, terra cotta, dyeing, smelting, bricks, etc." (Crofut 1937: 550). Some of these early twentieth-century industrial sites, and associated housing, are likely to be present in the town. Nevertheless, much of Hamden's growth after 1930, which saw the population more than double to 49,357 residents in 1970, can also be attributed to suburban residential expansion from New Haven. The construction of the limited-access Wilbur Cross Parkway through town in the late 1940s facilitated this trend. As of 2004, Hamden had 1,400 business firms employing 20,000 people, 23,000 housing units, and had been acquiring land for open space since the 1980s (Hamden 2004). As of 2014, the town had 70 manufacturing firms yielding 1,180 jobs (5.8 percent of the 20,455 jobs in town); 183 retail firms with 2,665 jobs; and 203 health care/social assistance firms with 4,198 jobs. All five of the town's largest property owners in 2014 were housing management or development companies, while the largest employers were in education, medical care, travel, and transportation. Twice as many Hamden residents commuted to New Haven as worked in Hamden itself (CERC 2016). This is typical of the modern service-sector orientation of Connecticut's economy, in which manufacturing is only a small part of employment and economic activity.

Historical Overview of the Project Area

Historical records indicate that the project area is located outside of the historic industrial and residential zones of Hamden. The project area is located in the northwestern area of Hamden, near Hamden's western border with the Town of Bethany. An 1852 historic map shows the project area situated along the then existing, and present-day Gaylord Mountain Road (Figure 4). The road is named for Alling Gaylord who, in 1804, established West Wood Cemetery to the northwest of the project area along Gaylord Mountain Road.

> "Know ye that Alling Gaylord of Hamden, for the consideration of twelve ($12) received to my full satisfaction….hereby grant a certain piece for the only purpose of a burying place, containing one quarter of an acre, beginning at a heap of stones on the brow of the hill & to extend north six rods, and west of east end so far as to make one quarter of an acre, and is bounded East, West & North on my own land, South on Highway."

Gaylord established the cemetery for the budding community of approximately five agricultural families that migrated to the area from New Haven, Wallingford, and Cheshire in the late eighteenth/early nineteenth centuries, when the area was then referred to as West Wood for its richly forested hills. The few gravestones in the small cemetery "bear the predominant names of Doolittle, Handy, and Warner, and Gaylord" (Hartley 1959). In 1729, Daniel Bradley built a sawmill on West Todd Road to grind flour (West Todd Street, as it now referred to, is to the northeast of the project area and would have abutted the Doolittle property). Soon after the sawmill was constructed several other mills were established along the Mill River, encouraging settlers to move northward away from New Haven and into the hills of Hamden (Lehman 2010). In 1740, the Ives and Dickerman Families cleared land to the south of the project area and remained in the vicinity through their descendants well into the late nineteenth century (Figure 4). In 1743, Samuel Bellany opened a tavern in the area, marking the West Wood community a growing village. Seven years later, in 1747, Waite Chatterton took over operations of the sawmill near West Todd Street and later sold it to his cousin Horace Doolittle, who in turn later sold it to his nephew Oswin Doolittle. Oswin replaced the up and down reciprocating saw with a circular one in 1879 and built a new structure to house it (Lehman 2010).

The Doolittle Family played a significant role in establishing the West Wood community in Hamden. On the 1852, 1856, and 1868 historic maps of the project area the nearest structure is labeled R. Doolittle and later in 1868 Mrs. L.A. Doolittle (Figure 4 through 6). The structure labeled on the historic maps was the homestead of Reuben Doolittle (1809-1862). Reuben is a fourth generation descendent of early New Haven settler and the large landholder, Abraham Doolittle, who served as the sheriff of New Haven in 1644. Later, in 1669, Abraham served on the settlement committee for the town of Wallingford (Davis 1979). Abraham's son Ebenezer, who was born in 1672, was one of the first settlers of the New Haven colony to migrate to the Cheshire area where he had inherited and acquired a significant amount of property. Ebenezer's son Caleb Doolittle left his father's lands, plus his own, to his children when he died in 1781. The land was subsequently split amongst his nine children. Reuben Doolittle, who lived near the project area, was the son of Caleb Jr., who in the nine-way split with his siblings in 1781 received a humble farm "in the north west part of Hamden called Westwood" (Davis 1979). Of Caleb Jr.'s four children, Reuben, the eldest, and Caleb the III, were popular local figures in their youth who were known for putting on entertaining displays of muscle and strength. This excerpt from the 2010 book by Eric D. Lehman *Hamden: Tales from the Sleeping Giant* recounts the Doolittle brother's popularity:

> "For entertainment, men tried to beat the brawny Doolittle family at trials of strength, which included lifting four-hundred-pound beams and full cider barrels. Some of the wittier citizens banded together in an

> early lampoon society called Dog Lane Court, a group of young men who would meet at the home of Horace Bradley. Located in the West Woods section of Hamden, Reuben and his brother Caleb became famous when once challenged by Yale students to life a full barrel of cider, which Caleb obliged showing off by drinking from the bunghole."

This structure is likely the former home of Reuben's father Caleb Doolittle Jr., and was built circa 1780. In the 1820 United States Federal Census, the property is occupied by Caleb Doolittle, Jesse Doolittle, and Reuben Doolittle. Reuben married Ann Grace Thomas (1814-1846) in June of 1835. They had two children together, Mary E. Doolittle (1838-1910) and Hobart Bennet Doolittle (1838-1917). Following his first wife's death in 1846, Reuben waited two years before remarrying to Laura Adelia Horton (1812-1893) of Naugatuck in October of 1848. In 1850, Reuben is listed as living on the property, then 41 years old, and working as a farmer. He lived with his wife Laura A., age 37, his daughter Mary E., age 13, and his son Hobert, age 11. Reuben died on October 30, 1862 in Hamden and is buried in the Centerville Cemetery. On the 1868 historic map Mrs. L.A. Doolittle is listed as the property owner (Figure 6). According to the June 1880 Agricultural Census for the town of Hamden, Laura A. Doolittle, then age 67, was operating a modest farm on the property. Her property included six acres of tilled meadow land, six acres of meadows, and 20 surrounding acres of forested, unfarmed land. The value as recorded for her land and buildings was $800.00 and the value of her farm production as of 1879 was $150.00. Laura noted four acres of mown lawn for hay, two not mown acres, one acre of potatoes and four troths of hay, one cow, one calf, 20 chickens and a 125 pounds of butter. Laura died in 1893 at the age of 80 years and is buried in her family plot in Hillside Cemetery in Naugatuck.

Following the death of Laura Doolittle, it appears the property continued to operate as a farm. The 1934 aerial photograph displays several groomed farming parcels east of the project area and opposite Gaylord Mountain Road (Figure 7). The project area itself abuts the cleared electrical corridor and shows a small area reserved for agricultural use. Interestingly the farm parcels to the west and north of the project area retain their boundaries but show significant reforestation as of 1934. Reforestation thickened in much of the periphery of the project area by 1951 with the exception for the former Doolittle property, which appeared to sustain the use of the property for farming operations (Figure 8). Visible in the 1951 aerial photograph also is the addition of a small structure outside of the northwest boundary of the project parcel. This appears to be the 1949 WNHC-FM transmitter site for air and later television broadcast communications, the first in the state and the still present location of the WPLR (better known as 99.1 PLR rock radio).

In 1946, six men started the Elm City Broadcasting company and began broadcasting a morning station called WHNC-AM that played Italian music and news on Sunday mornings for New Haven area residents and was broadcast from a former funeral home on Chapel Street in New Haven. The owners of Elm City Broadcasting applied for and were granted their own FM radio channel and television Channel 6 for broadcast to greater New Haven County. Later that year, the six owners of Elm City Broadcasting invested some $30,000 to purchase television equipment and a tract of land on Gaylord Mountain in Hamden. By the summer of 1947, they had roads laid and had initiated construction of the transmitter building atop Gaylord Mountain. In the middle of the night on June 2, 1948, the first television picture transmitted from Connecticut took place at the top of Gaylord Mountain, broadcasting for approximately two hours and capturing the transmitter itself, the station, and the scenic surroundings of Hamden (Murray 1997).

The station's road is further defined in the 2004 aerial image. There also appears the addition of several suburban outlets along Gaylord Mountain Road: Hunting Ridge and Russo Drive. By this time, the former

Doolittle property appears to retain use of the land for agricultural purposes (Figure 9). Little change appears to have occurred between the 2004 aerial and the 2016 aerial photographs, the only change being the addition of several residential properties along Gaylord Mountain Road (Figure 10). Most recently, the 2019 aerial image displays the continued preservation of the former Doolittle farmland. The project area is unaffected by the suburban development to its south and remains within a densely reforested area (Figure 11).

Conclusions

Historical data indicates that the project area sits between two contrasting moments on the timeline of Connecticut's history. The first being the eighteenth-century settlement and nineteenth century evolution of a remote agricultural and industrial community at the base of Gaylord Mountain. The Caleb Doolittle Jr., House, which is located to the north and outside of the project parcel, was recommended for further historical investigation and analysis in a 1985 "Town-wide Historic & Architectural Survey" carried out by Historic Resource Consultants Bruce Clouette and Matthew Roth. The recommendation came as the house is of the American vernacular style and is relevant to local history. Second, the WPLR transmitter tower retains its own significance for pioneering television broadcasting in the state in the 1950s. While certainly a more contemporary piece of state history, the transmitter is nonetheless significant for its continued contribution to Connecticut's digital media.

CHAPTER V
PREVIOUS INVESTIGATIONS

Introduction

This chapter presents an overview of previous cultural resources research completed within the vicinity of the project area in Hamden, Connecticut. This discussion provides the comparative data necessary for assessing the results of the current Phase IB cultural resources reconnaissance survey, and it ensures that the potential impacts to all previously recorded cultural resources located within and adjacent to the project area are taken into consideration. Specifically, this chapter reviews previously identified archaeological sites, National/State Register of Historic Places properties, and inventoried historic standing structures over 50 years old situated in the project region (Figures 12 and 13). The discussions presented below are based on information currently on file at the CT-SHPO in Hartford, Connecticut. In addition, the electronic site files maintained by Heritage also were examined during this investigation. Both the quantity and quality of the information contained in the original cultural resources survey reports and State of Connecticut archaeological site forms are reflected below.

Previously Recorded Archaeological Sites, National/State Register of Historic Places Properties/District, and Historic Standing Structures in the Vicinity of the Project Area

A review of data currently on file at the Connecticut State Historic Preservation Office, as well as the electronic site files maintained by Heritage failed to identify any National/State Register of Historic Places Properties within 1.6 km (1 mi) of the project area (Figures 11 and 12). However, this review did indicate that two previously identified archaeological sites have been identified within 1.6 km (1 mi) of the project area (Sites 8-5 and 8-15); both are located to the far southwest of the project area in Bethany (Figure 12). They include Sites 8-5 and 8-15 and they are described below. In addition, five inventoried historic standing structures were identified within 1.6 km (1 mi) of the project area (Figure 13). They include the Caleb Doolittle Jr., the Lambert Talmadge House, the Elihu Dickerman House, the West Woods School, and the Doolittle House. The identified cultural resources are described below.

<u>Site 8-5</u>

Site 8-5, which is also known as the Downs Road Site, is situated along Downs Road in Bethany, Connecticut. It is located 250 m (820.2 ft) to the north of the intersection with Hoadley Road. It is an Archaic Period prehistoric occupation that was recorded by the Connecticut Archaeological Society in June 1979. The Dowers Road Site was surface collected by Thomas Hammond, who recovered Orient Fishtail projectile points, Brewerton Eared Triangle points, and Brewerton side-notched projectile points within an approximately 1 ac area. Hammond concluded that the site represented a hunting camp and interpreted the site as important because Archaic settlement subsistence strategies had been little studied at the time. The Downs Road Site has not been assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). It will not be impacted by the proposed Hamden Solar Center Project.

<u>Site 8-15</u>

Site 8-15, which is also known as the Barnett Garden Site, was identified at 400 Downs Road in Bethany, Connecticut. The site is named after the property owners at the time the site was recorded. It was recorded by D. Thompson in March of 1988. According to the submitted site form, a Vosburg projectile point, a stone plummet, and a whale vertebra were recovered from the site by Joni and Jerry Barnett. No other information regarding the artifacts, or the site, is recorded on the official State of Connecticut site form for the Barnett Garden Site. Site 8-15 has not been assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). It will not be impacted by the proposed Hamden Solar Center Project.

Caleb Doolittle Jr., House

The Caleb Doolittle Jr., House is located on a small residential lot the north of the project parcel; it fronts on Gaylord Mountain Road. According to the Hamden Assessor's website, this residence has the same street address as the project parcel; however, as seen in Figure 13, this building is clearly located on a separate parcel to the north of the current project area; it will not be directly impacted by construction. It was built in the late eighteenth century and is a one-and-a-half story Colonial Cape style house that is characterized by five bays and a gable roof. There is a one-story, shed roof addition on the south side of the residence that extends past the rear of the house. The exterior walls of the residence are clad in clapboards and the roof is covered by asphalt shingles. A raised stone patio with stone steps lead up to the central front entrance of the home. The two windows on each side are a six-over-six sash type, and a modern brick chimney abuts the south side. As discussed in Chapter V, the Doolittle Family was characterized as some of the earliest settlers in New Haven before moving to Hamden. While Bruce Clouette and Matthew Roth recommended additional study of the residence in 1985, the Doolittle House has not been assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). This house is located in close proximity to the proposed project area.

Lambert Talmadge House

The building recorded at 100 Gaylord Mountain Road in Hamden is known as the Lambert Talmadge House. This residence was built in 1805 in the Greek Revival style and now has an L-shaped plan. The front façade of the house has three, two-and-a-half story bays situated under a gable end and a two story shed roof projection on the south side. The front entrance of the house has a wide entablature and a window in the second story. Clapboards cover the exterior walls of the buildings and asphalt shingles cover the roof. The windows are of the six-over-six sash type. The Lambert Talmadge House has not been assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). Due to intervening topography and vegetation, the proposed Hamden Solar Center will not be seen from the Lambert Talmadge House. Thus, no indirect impacts to this property will be made and no additional architectural recordation is required.

Elihu Dickerman House

The building at 1275 West Woods Road is known as the Elihu Dickerman House. It is a Federal style, one-and-half story residence covered by a gabled roof. The elevation facing West Woods Road has three bays on the first story with a door at the far left, and four windows on the upper story. The south elevation contains four bays and another entrance. Both doors are topped with wide entablatures and have pilasters to either side. The Elihu Dickerman House has clapboard siding and an asphalt shingled roof, as well as a stone foundation. In addition, there is a wide brick chimney protruding from the center of the roof. A one-story addition extends from the southwest corner of the residence, the construction date of which is unknown. The house was built ca. 1820 for Elihu Dickerman, who bought the land from his father Enos Dickerman. Dickerman farmed the property for 20 years before the property passed to his nephew Wales C. Dickerman. The house has not been assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). Due to intervening topography and vegetation, the proposed Hamden Solar Center will not be seen from the

Elihu Dickerman House. Thus, no indirect impacts to this property will be made and no additional architectural recordation is required.

West Woods School

The property ay 295 Johnson Road contains the District #2 School, also known as the West Woods School. It is situated behind a modern fire station. The school building was constructed in 1909 and is currently being used as office space. It is one story in height and is topped by a steep gable roof that has a molded cornice and cornice returns. In addition, there is a decorative bracket at the peak of the roof. There is a central entrance under a bracketed portico on the façade, which is characterized by six-over-six sash type windows to each side. A one-story, flat roof addition extends from the north side of the building; it is not known when this addition was constructed. The exterior walls of the school are clad in wooden clapboards and the roof is covered in asphalt shingles. The West Woods School has not been assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). Due to intervening topography and vegetation, the proposed Hamden Solar Center will not be seen from the District #2 School. Thus, no indirect impacts to this property will be made and no additional architectural recordation is required.

Doolittle House

The Doolittle House at 353 West Todd Street is a Greek Revival residence that was built in ca., 1845 by a descendent to the Doolittle Family that lived at 360 Gaylord Mountain Road beginning in the eighteenth century. The house at 353 West Todd Street has two stories, a projecting gable roof with asphalt shingles, and clapboards on its exterior walls. The doors and windows have wide trims. The facade has three bays, with a door at the right side of the first story. The windows are of the six-over-six sash type. Doolittle ancestors were some of the earliest settlers in New Haven before moving to Hamden. The Doolittle House at 353 West Todd Street has not been assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). Due to intervening topography and vegetation, the proposed Hamden Solar Center will not be seen from the District #2 School. Thus, no indirect impacts to this property will be made and no additional architectural recordation is required.

Summary and Interpretations

The review of previously completed research in the vicinity of the project area and the analysis of cultural resources recorded nearby, indicates that the larger project region contains prehistoric Native American deposits. Archaeological sites occupied within the study region date from as early as the Late Archaic Period (ca., 4,500 years ago), suggesting that additional archaeological sites may situated within the vicinity of the project area. In addition, historic residences from the Colonial Period and later also exist in the project region, as well as to the north of the project area. Therefore, additional historic cultural resources may be located in the project area.

CHAPTER VI
METHODS

Introduction
This chapter describes the research design and field methods used to complete the Phase IB cultural resources reconnaissance survey of the project area in Hamden, Connecticut. It also includes the location and point-of-contact for the final facility at which all drawings, maps, photographs, and field notes generated during survey will be curated is provided below.

Research Design
The current Phase IB cultural resources reconnaissance survey was designed to identify all prehistoric and historic cultural resources located within the moderate/high sensitivity portion of the study area. Fieldwork for the project was comprehensive in nature; planning considered the results of each previously completed archaeological survey within the project general area, the distribution of previously recorded archaeological sites located near the proposed project area, and a geological assessment of the study area. The methods used to complete this investigation were designed to provide complete and thorough coverage of all portions of the study area. This undertaking entailed pedestrian survey, systematic subsurface testing, detailed mapping, and photo-documentation throughout the limits of the study area.

Field Methodology
Following the completion of all background research, the moderate/high sensitivity portion of the study area was subjected to a Phase IB cultural resources reconnaissance survey utilizing pedestrian survey, photo-documentation, mapping, and systematic shovel testing. The pedestrian survey portion of this investigation included visual reconnaissance of all areas scheduled for impacts within the moderate/high sensitivity area. The field methods also included subsurface testing of the Hamden solar center project area, during which shovel test were placed within the northern area of the solar center development area ,which was determined to have moderate/high archaeological sensitivity in a previous cultural resources assessment survey completed by Heritage in May of 2020.

During survey, each shovel test measured 50 x 50 cm (19.7 x 19.7 in) in size and each was excavated until the glacially derived C-Horizon was encountered or until large buried objects (e.g., boulders) prevented further excavation. Each shovel test was excavated in 10 cm (3.9 in) arbitrary levels within natural strata, and the fill from each level was screened separately. All shovel test fill was screened through 0.635 cm (0.25 in) hardware cloth and examined visually for cultural material. Soil characteristics were recorded in the field using Munsell Soil Color Charts and standard soils nomenclature. Finally, each shovel test was backfilled immediately upon completion of the archaeological recordation process.

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

Introduction
This chapter presents the results of a Phase IB cultural resources reconnaissance survey of the proposed Hamden solar center (Figures 1 and 2). The Phase IB investigation was completed on behalf of All-Points in June of 2020 by personnel representing Heritage. All fieldwork was performed in accordance with the *Environmental Review Primer for Connecticut's Archaeological Resources* (Poirier 1987) promulgated by the CT-SHPO. The Phase IB cultural resources reconnaissance survey results are presented below.

Results of the Phase IB Cultural Resources Reconnaissance Survey of the Moderate/High Area
As discussed in Chapter I, the proposed project will include the installation of rows of solar panels spaced approximately 10 ft (3 m) apart. The development also will include an access road that will extend from an existing cellular communications compound to the west, across an Eversource Energy electrical transmission right-of-way, and to the project parcel. In addition, the proposed project plans depict a stormwater basin in the eastern portion of the project area along Gaylord Mountain Road, as well as a concrete equipment pad and pole mounted meter, recloser, and digital controller in the southeastern corner of the project area. The solar array will interconnect with powerlines along Gaylord Mountain Road (Figure 2).

The Phase IB survey effort of the previously identified moderate/high sensitivity zone in the northern portion of the project parcel consisted of pedestrian survey, subsurface testing, and mapping of the (Figures 14 through 16). The subsurface testing regime associated with the Phase IB cultural resources reconnaissance survey resulted in the excavation of 12 of 12 (100 percent) planned shovel tests measuring 50 x 50 cm (19.7 x 19.7 in) in size throughout archaeologically sensitive portions of the solar center project area, which measured approximately 0.5 acres in size (Figure 14). Despite the field effort, no artifacts, features, or cultural resources loci were identified. No additional examination of the moderate/high sensitivity zone or the remainder of the project area is recommended prior to construction.

CHAPTER VIII
SUMMARY AND MANAGEMENT RECOMMENDATIONS

Heritage completed the current Phase IB cultural resources reconnaissance survey on behalf of All-Points Technology Corporation in June of 2020. The survey was completed in the northern portion of the solar center project area in Hamden, Connecticut, which was previously determined to have moderate/high sensitivity for archaeological resources. A total of 12 of 12 (100 percent) planned shovel tests were excavated throughout this 0.5 acre zone. This effort failed to identify any artifacts, features, or cultural resources loci. No additional examination of the moderate/high sensitivity zone or the remainder of the project area is recommended prior to construction.

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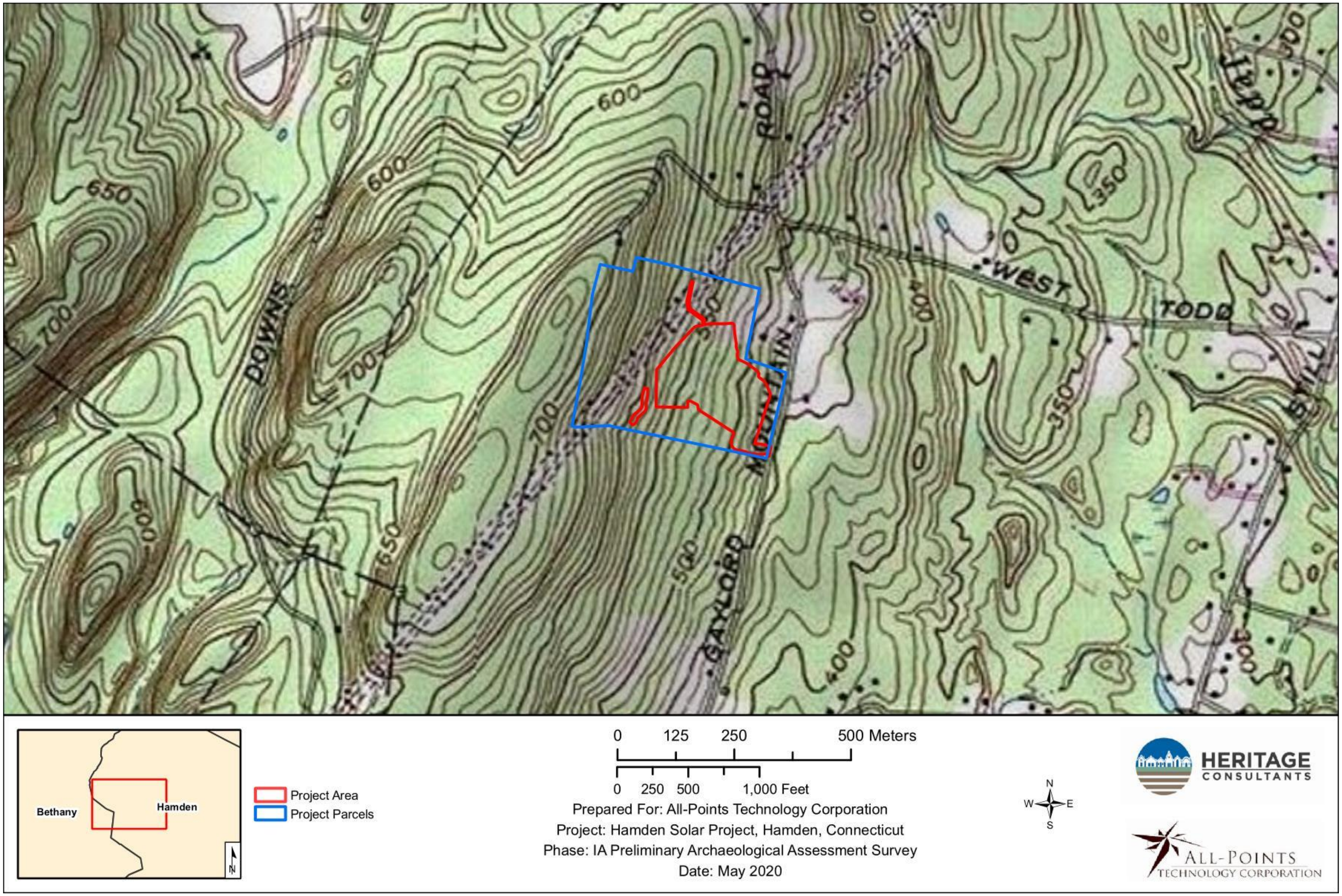


Figure 1. Excerpt from a USGS 7.5' series topographic quadrangle image showing the location of the project area in Hamden, Connecticut.

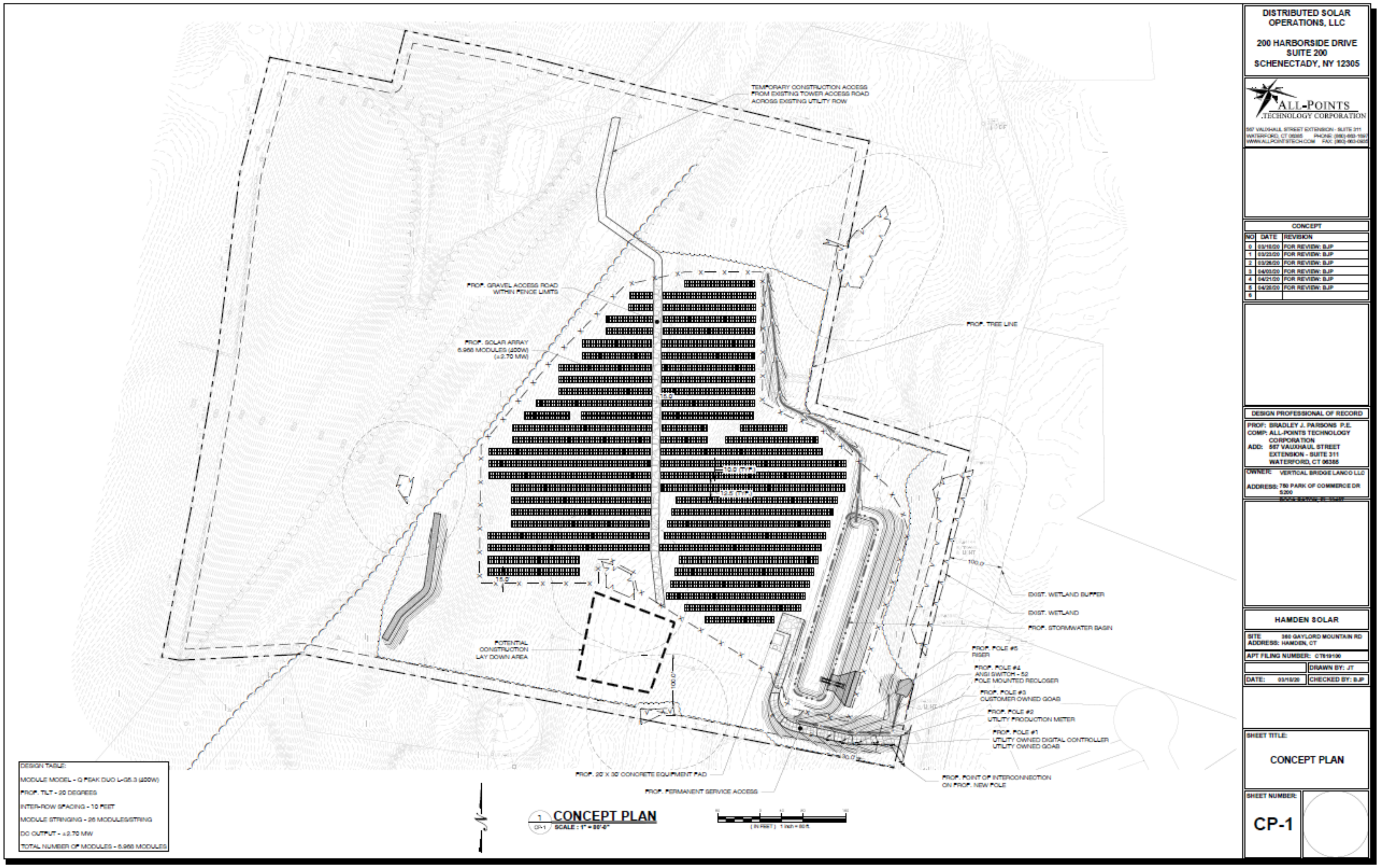


Figure 2. Project plans showing the proposed solar center in Hamden, Connecticut.

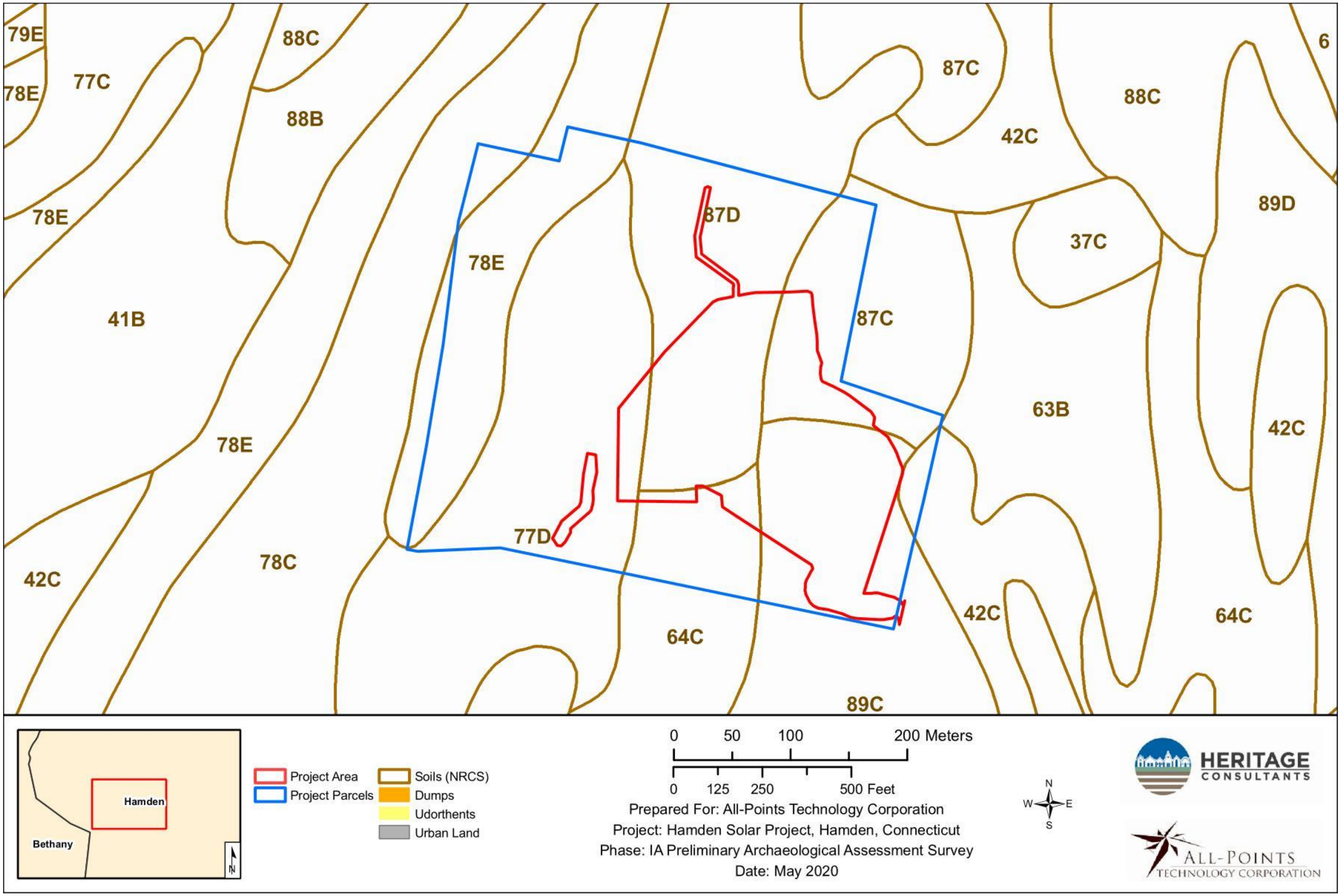


Figure 3. Map of soil located in the vicinity of the project area in Hamden, Connecticut.

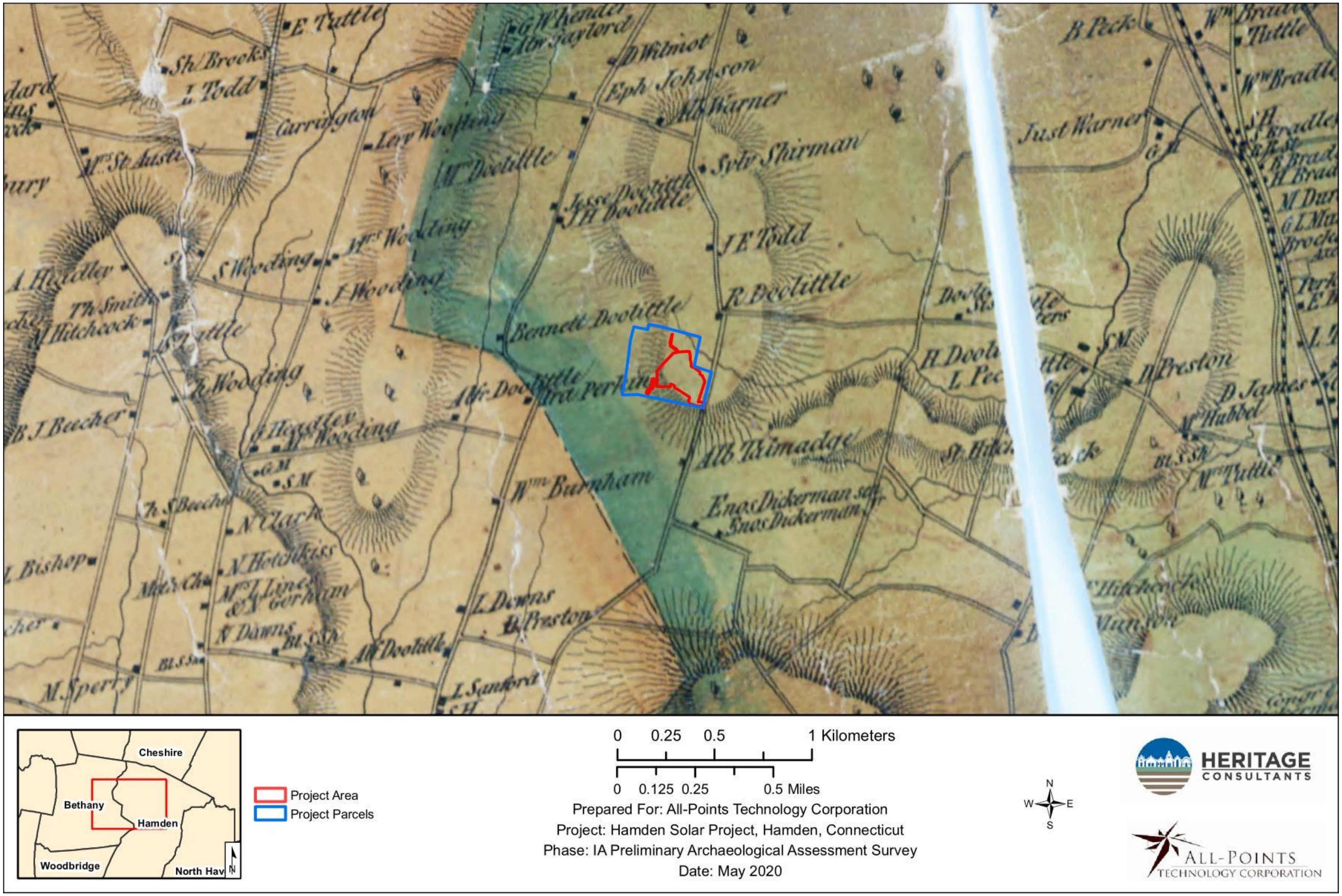


Figure 4. Excerpt from an 1852 historic map showing the location of the project area in Hamden, Connecticut.

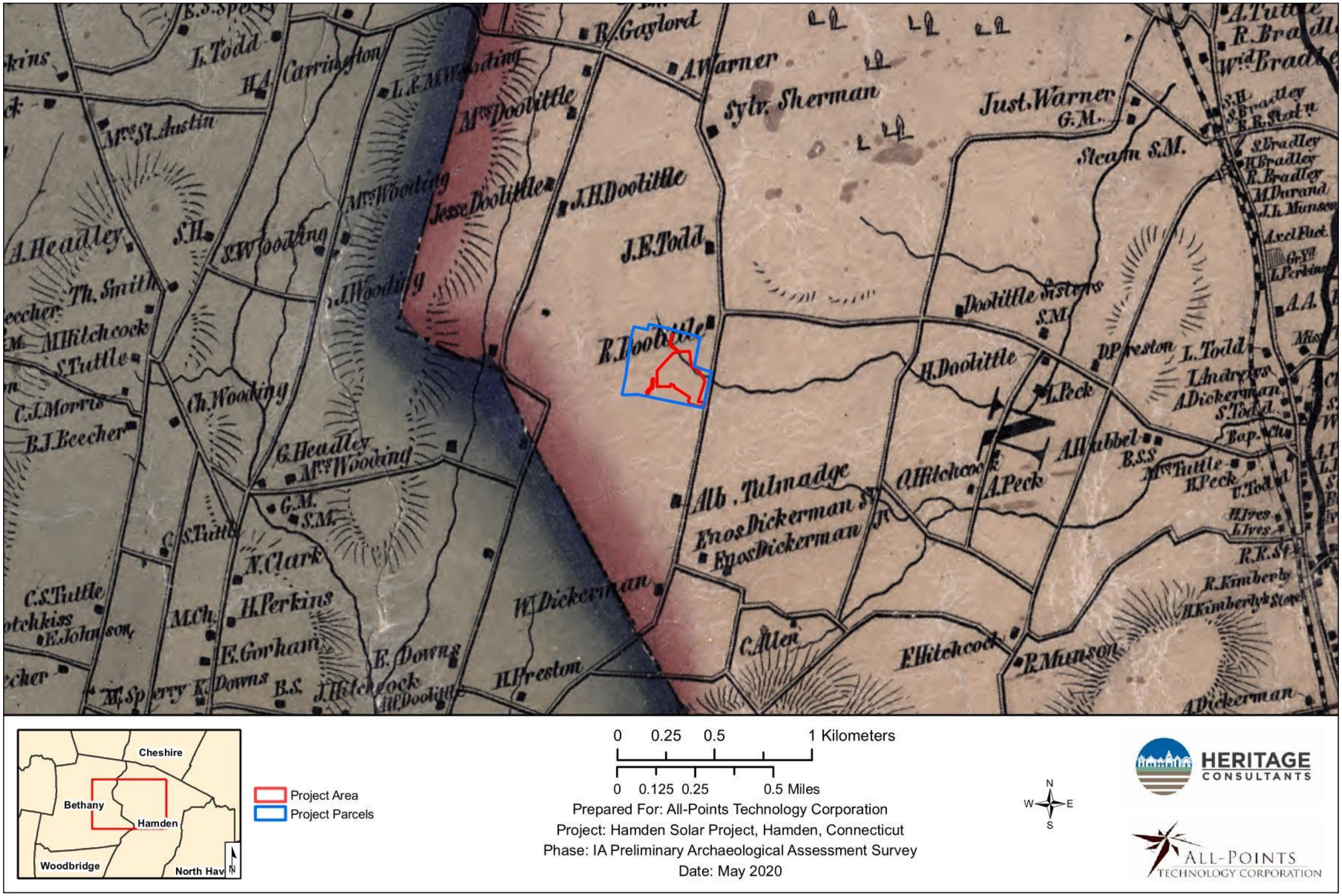


Figure 5. Excerpt from an 1856 historic map showing the location of the project area in Hamden, Connecticut.

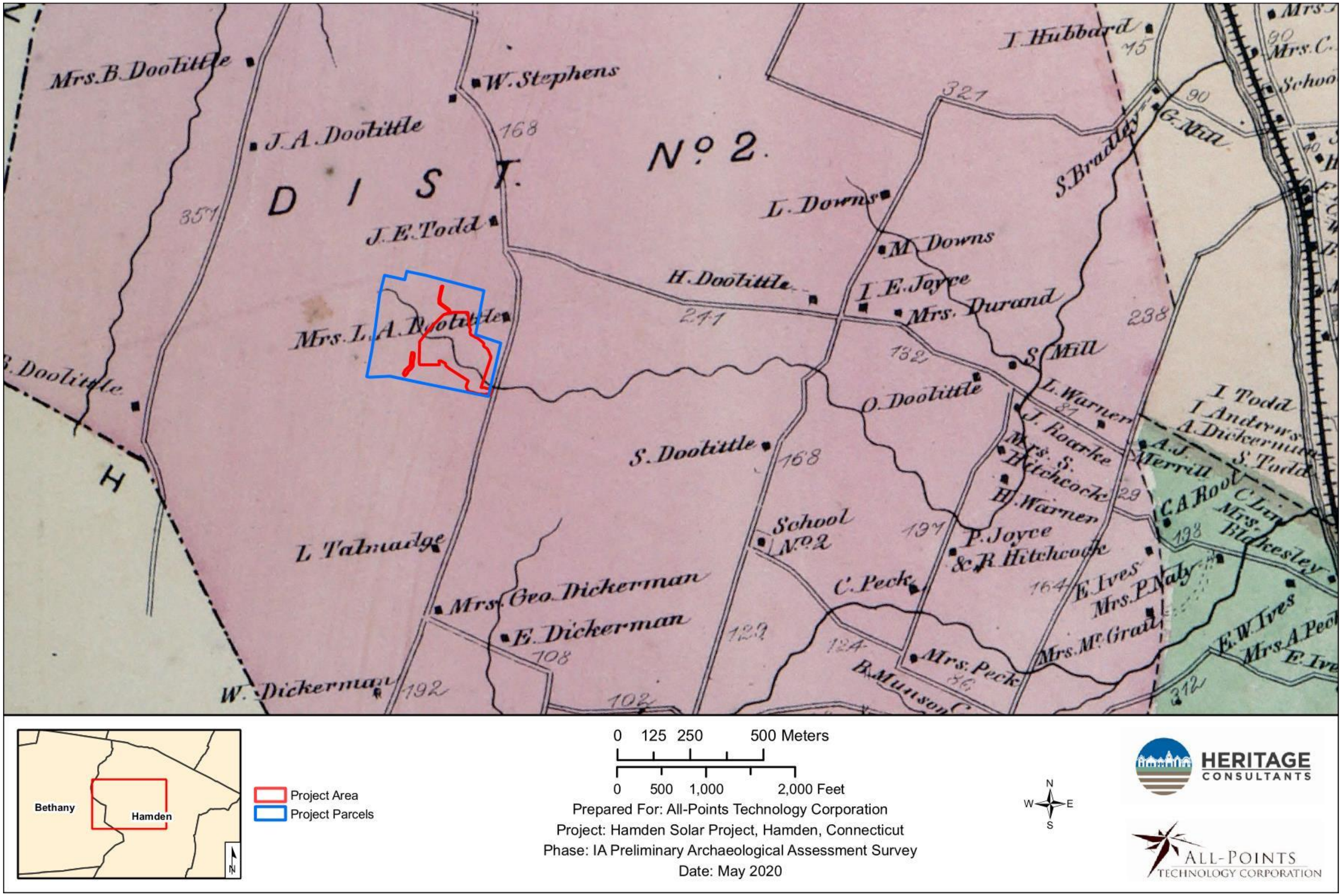


Figure 6. Excerpt from an 1868 historic map showing the location of the project area in Hamden, Connecticut.

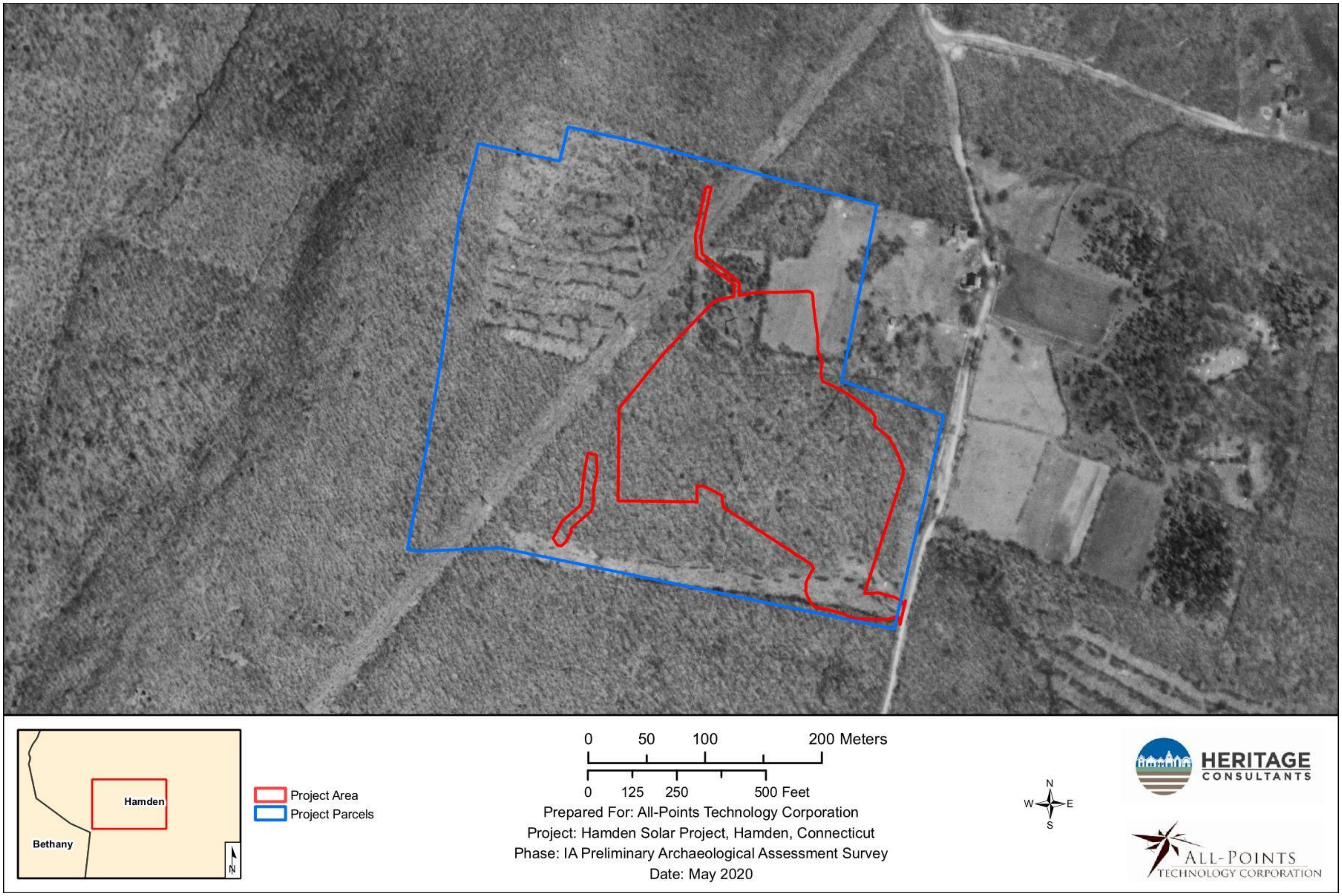


Figure 7. Excerpt from a 1934 aerial photograph showing the location of the project area in Hamden, Connecticut.

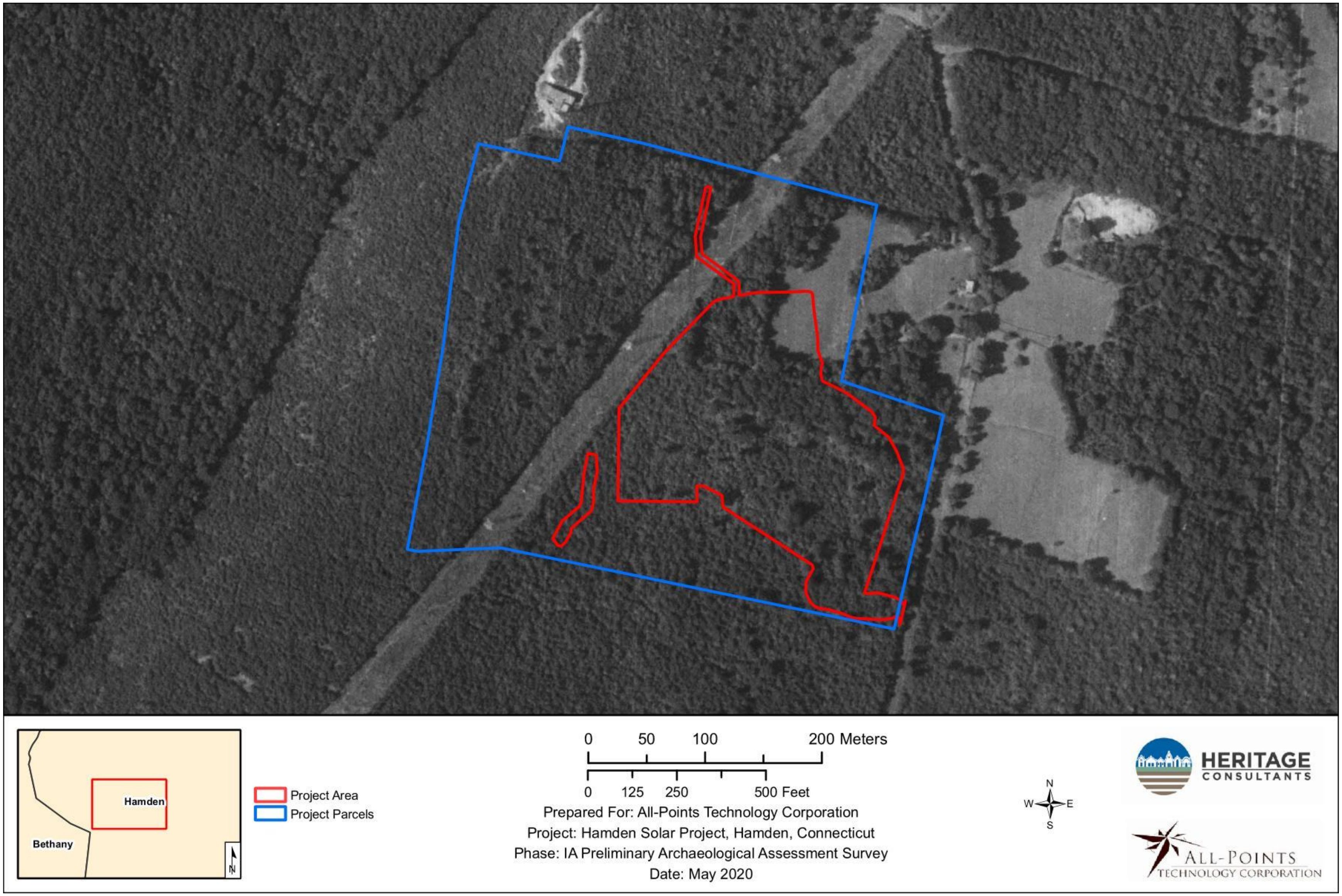


Figure 8. Excerpt from a 1951 aerial photograph showing the location of the project area in Hamden, Connecticut.

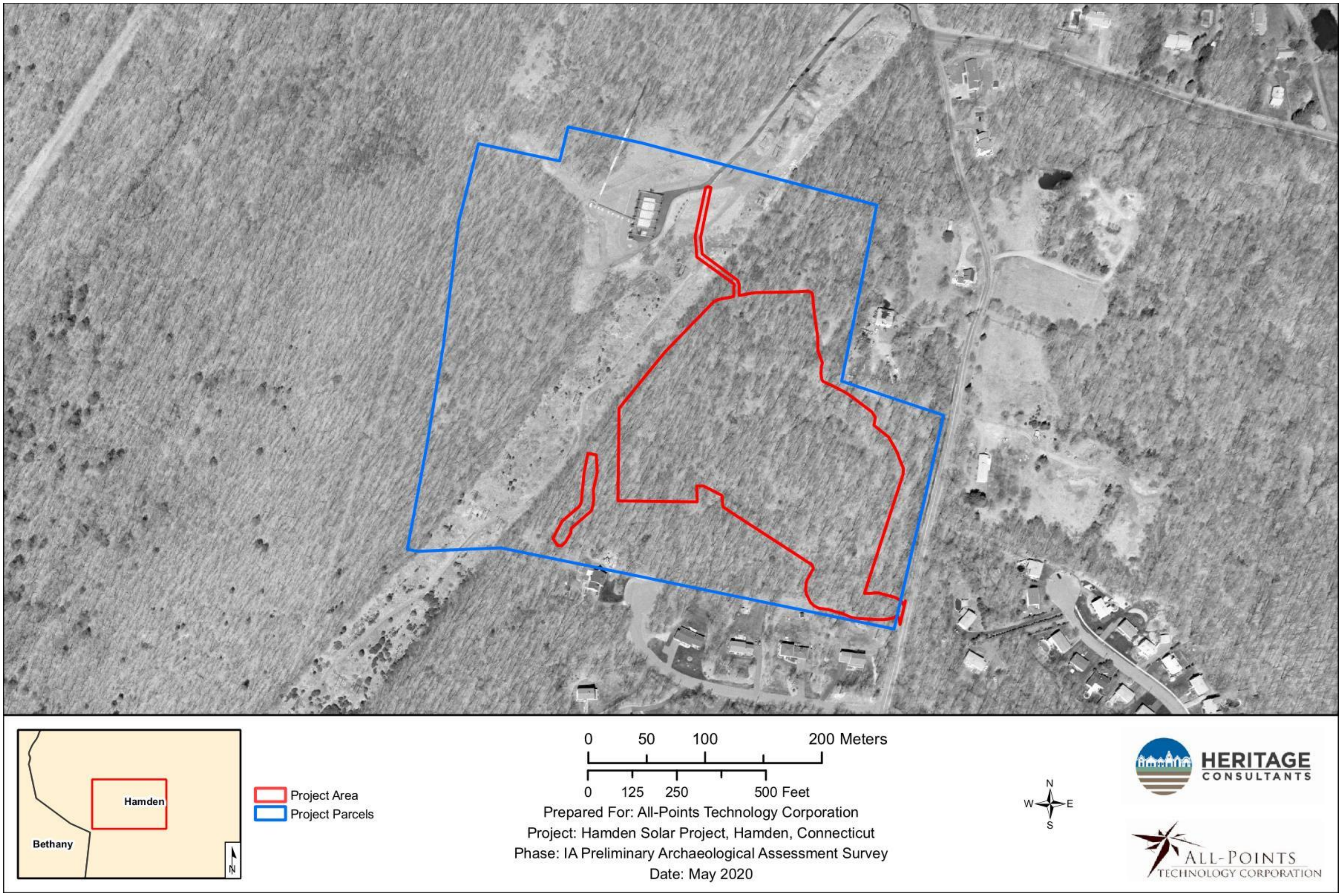


Figure 9. Excerpt from a 2004 aerial photograph showing the location of the project area in Hamden, Connecticut.

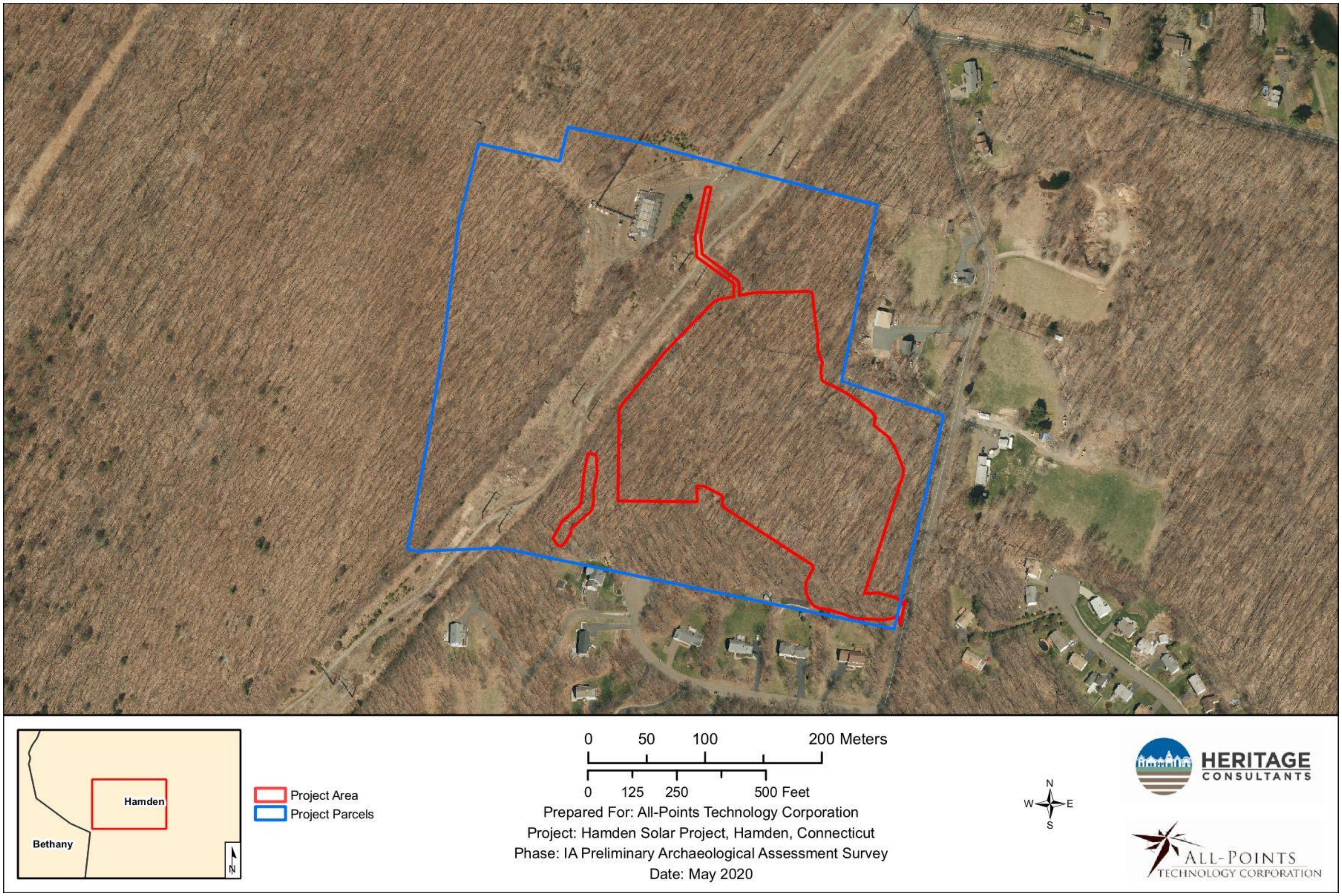


Figure 10. Excerpt from a 2016 aerial photograph showing the location of the project area in Hamden, Connecticut.

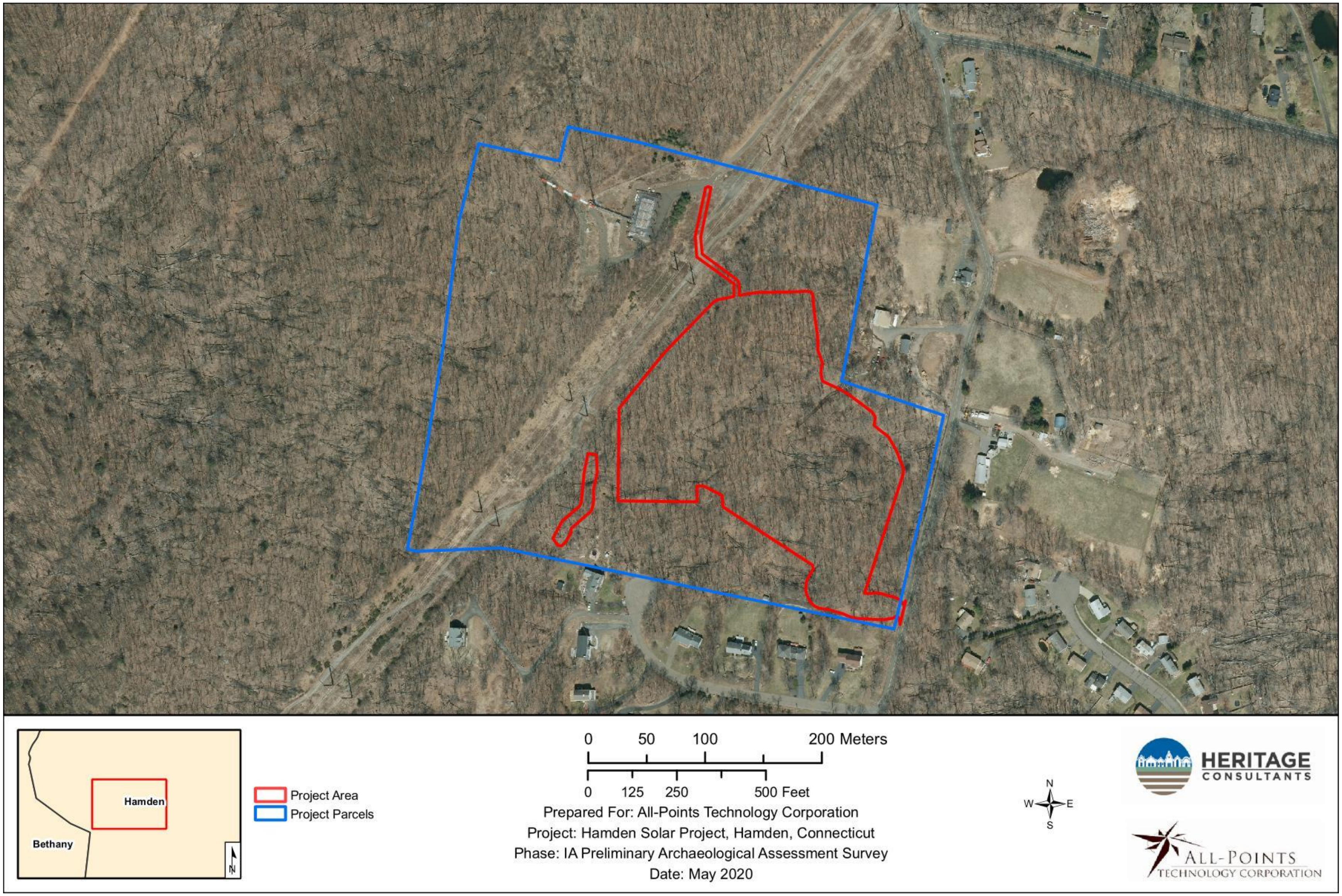


Figure 11. Excerpt from a 2019 aerial photograph showing the location of the project area in Hamden, Connecticut.

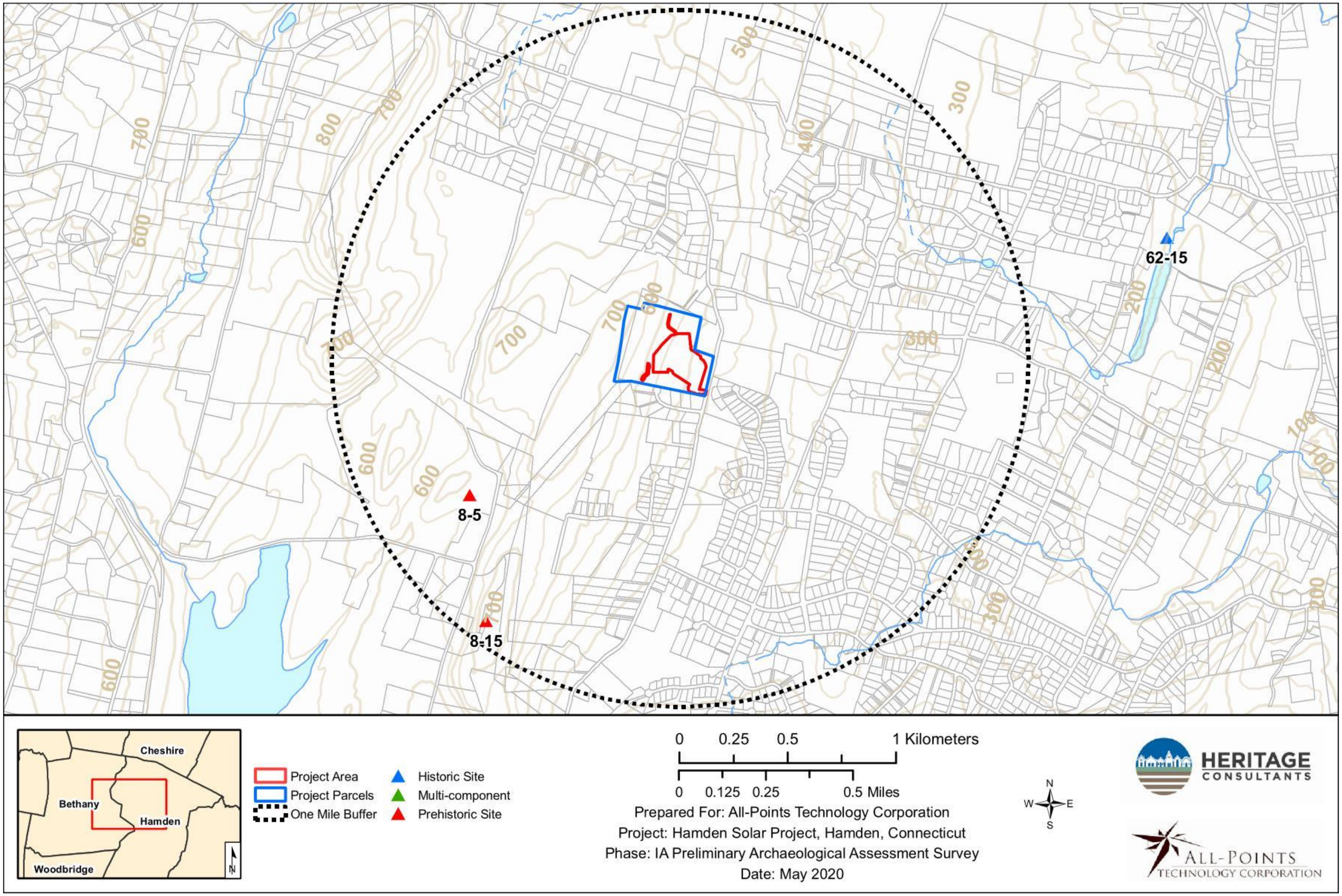


Figure 12. Digital map showing the location of previously identified archaeological sites in the vicinity of the project area in Hamden, Connecticut.

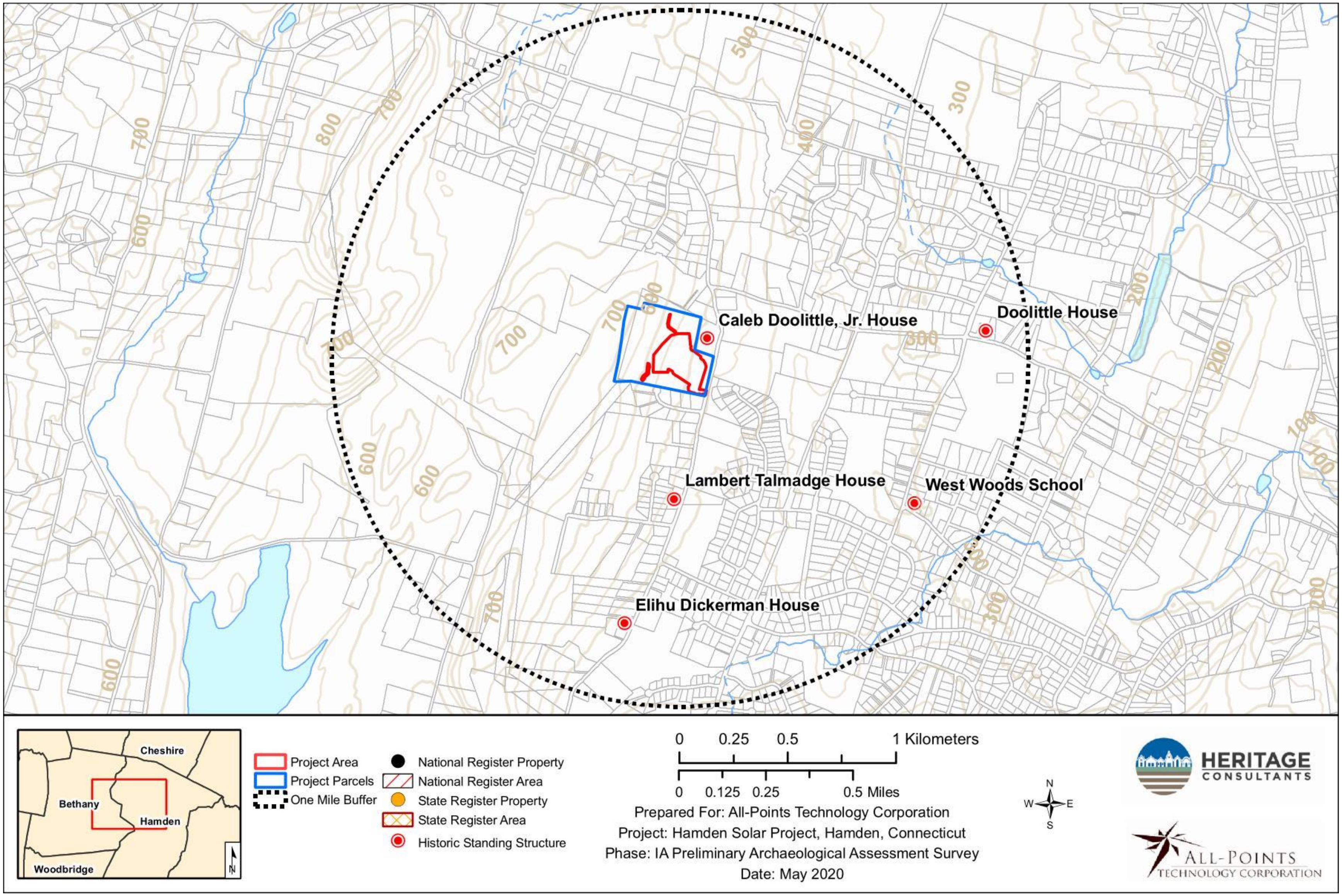


Figure 13. Digital map depicting the locations of previously identified National/State Register of Historic Places properties and inventoried Historic Standing Structures in the vicinity of the project area in Hamden, Connecticut.

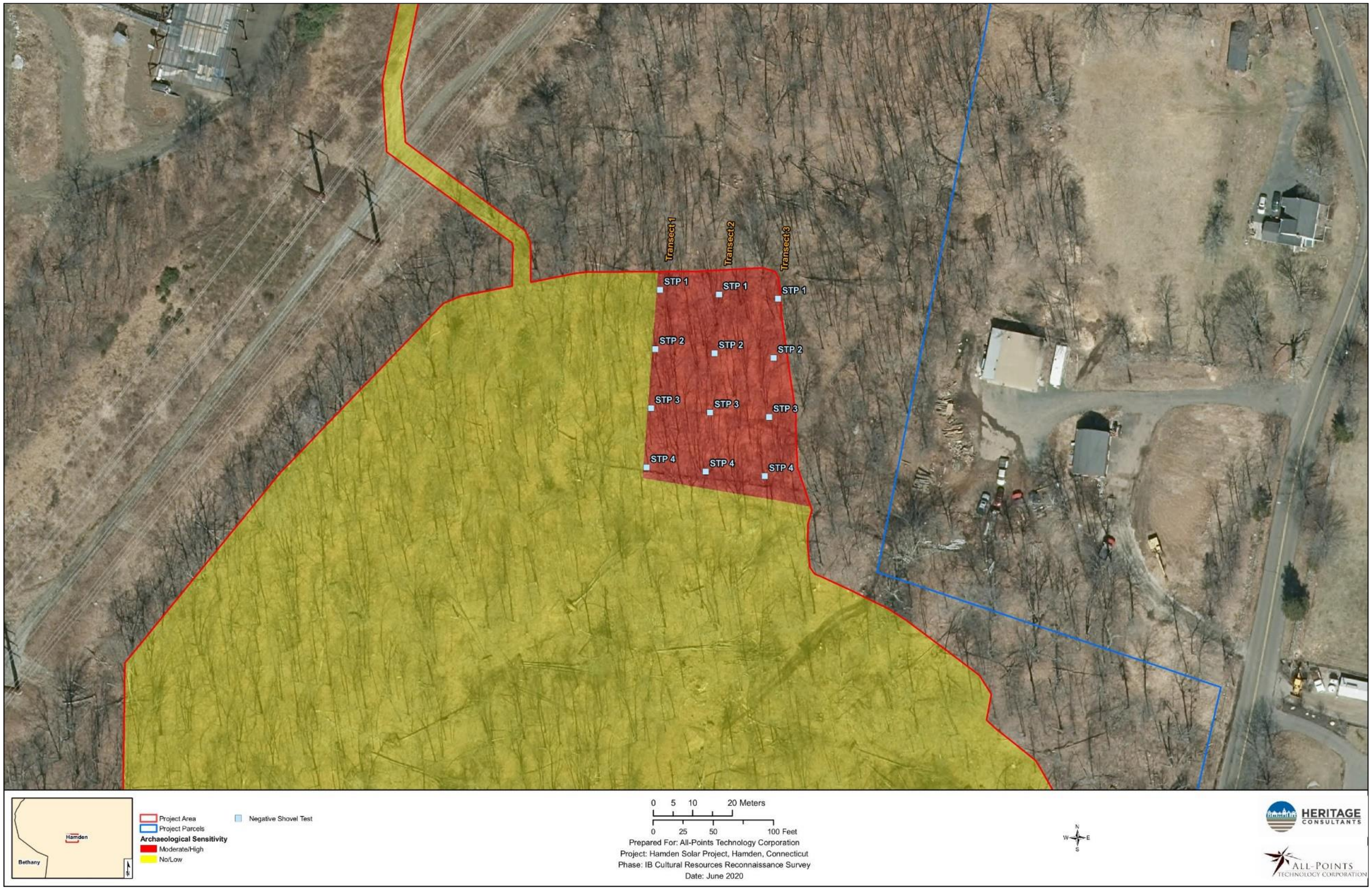


Figure 14. Digital map depicting the locations of excavated shovel test pits within the project area in Hamden, Connecticut.

Figure 15. Overview photo of project area facing southwest from the northeastern corner.

Figure 16. Overview photo of the project area facing northwest from the southeastern corner.

APPENDIX E

PRODUCT INFORMATION SHEETS

powered by Q.ANTUM DUO

Q.PEAK DUO L-G5.3
380-400

ENDURING HIGH PERFORMANCE

Q.ANTUM TECHNOLOGY: LOW LEVELISED COST OF ELECTRICITY
Higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 20.1%.

INNOVATIVE ALL-WEATHER TECHNOLOGY
Optimal yields, whatever the weather with excellent low-light and temperature behaviour.

ENDURING HIGH PERFORMANCE
Long-term yield security with Anti LID Technology, Anti PID Technology[1], Hot-Spot Protect and Traceable Quality Tra.Q™.

EXTREME WEATHER RATING
High-tech aluminium alloy frame, certified for high snow (5400 Pa) and wind loads (2400 Pa).

A RELIABLE INVESTMENT
Inclusive 12-year product warranty and 25-year linear performance warranty[2].

STATE OF THE ART MODULE TECHNOLOGY
Q.ANTUM DUO combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology.

[1] APT test conditions according to IEC/TS 62804-1:2015, method B (−1500 V, 168 h)
[2] See data sheet on rear for further information.

THE IDEAL SOLUTION FOR:

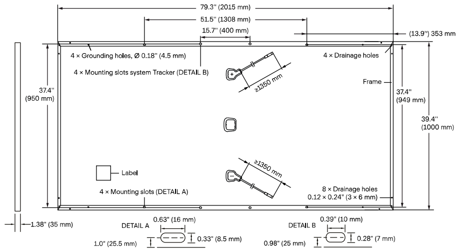
- Rooftop arrays on commercial / industrial buildings
- Ground-mounted solar power plants

Engineered in Germany

Q CELLS

MECHANICAL SPECIFICATION

Format	79.3 in × 39.4 in × 1.38 in (including frame) (2015 mm × 1000 mm × 35 mm)
Weight	50.7 lbs (23 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Anodized aluminum
Cell	6 × 24 monocrystalline Q.ANTUM solar half cells
Junction Box	2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), IP67, with bypass diodes
Cable	4 mm² Solar cable; (+) ≥53.1 in (1350 mm), (−) ≥53.1 in (1350 mm)
Connector	Stäubli MC4-Evo2, Amphenol UTX, Renhe 05-8, Tonglin TL-Cable01S-F; IP68 or Friends PV2e; IP67

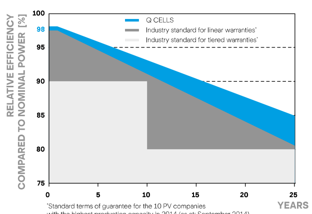


ELECTRICAL CHARACTERISTICS

POWER CLASS				380	385	390	395	400
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / −0 W)								
Minimum	Power at MPP[1]	P_{MPP}	[W]	380	385	390	395	400
	Short Circuit Current[1]	I_{SC}	[A]	10.05	10.10	10.14	10.19	10.24
	Open Circuit Voltage[1]	V_{OC}	[V]	47.95	48.21	48.48	48.74	49.00
	Current at MPP	I_{MPP}	[A]	9.57	9.61	9.66	9.70	9.75
	Voltage at MPP	V_{MPP}	[V]	39.71	40.05	40.38	40.71	41.04
	Efficiency[1]	η	[%]	≥18.9	≥19.1	≥19.4	≥19.6	≥19.9
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT[2]								
Minimum	Power at MPP	P_{MPP}	[W]	284.4	288.2	291.9	295.6	299.4
	Short Circuit Current	I_{SC}	[A]	8.10	8.14	8.17	8.21	8.25
	Open Circuit Voltage	V_{OC}	[V]	45.21	45.46	45.71	45.96	46.21
	Current at MPP	I_{MPP}	[A]	7.53	7.57	7.60	7.64	7.67
	Voltage at MPP	V_{MPP}	[V]	37.77	38.08	38.40	38.71	39.02

[1]Measurement tolerances P_{MPP} ±3%; I_{SC}; V_{OC} ±5% at STC: 1000 W/m², 25±2 °C, AM 1.5 G according to IEC 60904-3 • [2]800 W/m², NMOT, spectrum AM 1.5 G

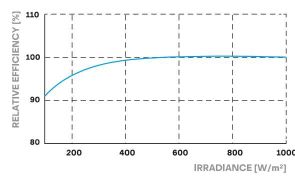
Q CELLS PERFORMANCE WARRANTY



At least 98% of nominal power during first year. Thereafter max. 0.54% degradation per year. At least 93.1% of nominal power up to 10 years. At least 85% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²)

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I_{SC}	α	[% / K]	+0.04	Temperature Coefficient of V_{OC}	β	[% / K]	−0.27
Temperature Coefficient of P_{MPP}	γ	[% / K]	−0.36	Normal Module Operating Temperature	NMOT	[°F]	109±5.4 (43±3 °C)

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V_{SYS}	[V]	1500 (IEC) / 1500 (UL)	Safety Class	II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating	C / TYPE 1
Max. Design Load, Push / Pull[3]	[lbs / ft²]	75 (3600 Pa) / 33 (1600 Pa)	Permitted Module Temperature on Continuous Duty	−40 °F up to +185 °F (−40 °C up to +85 °C)
Max. Test Load, Push / Pull[3]	[lbs / ft²]	113 (5400 Pa) / 50 (2400 Pa)		

[3] See Installation Manual

QUALIFICATIONS AND CERTIFICATES

UL 1703, CE-compliant, IEC 61215:2016, IEC 61730:2016, Application Class II, U.S. Patent No. 9,893,215 (solar cells)

C Certified US UL 1703 (254141)

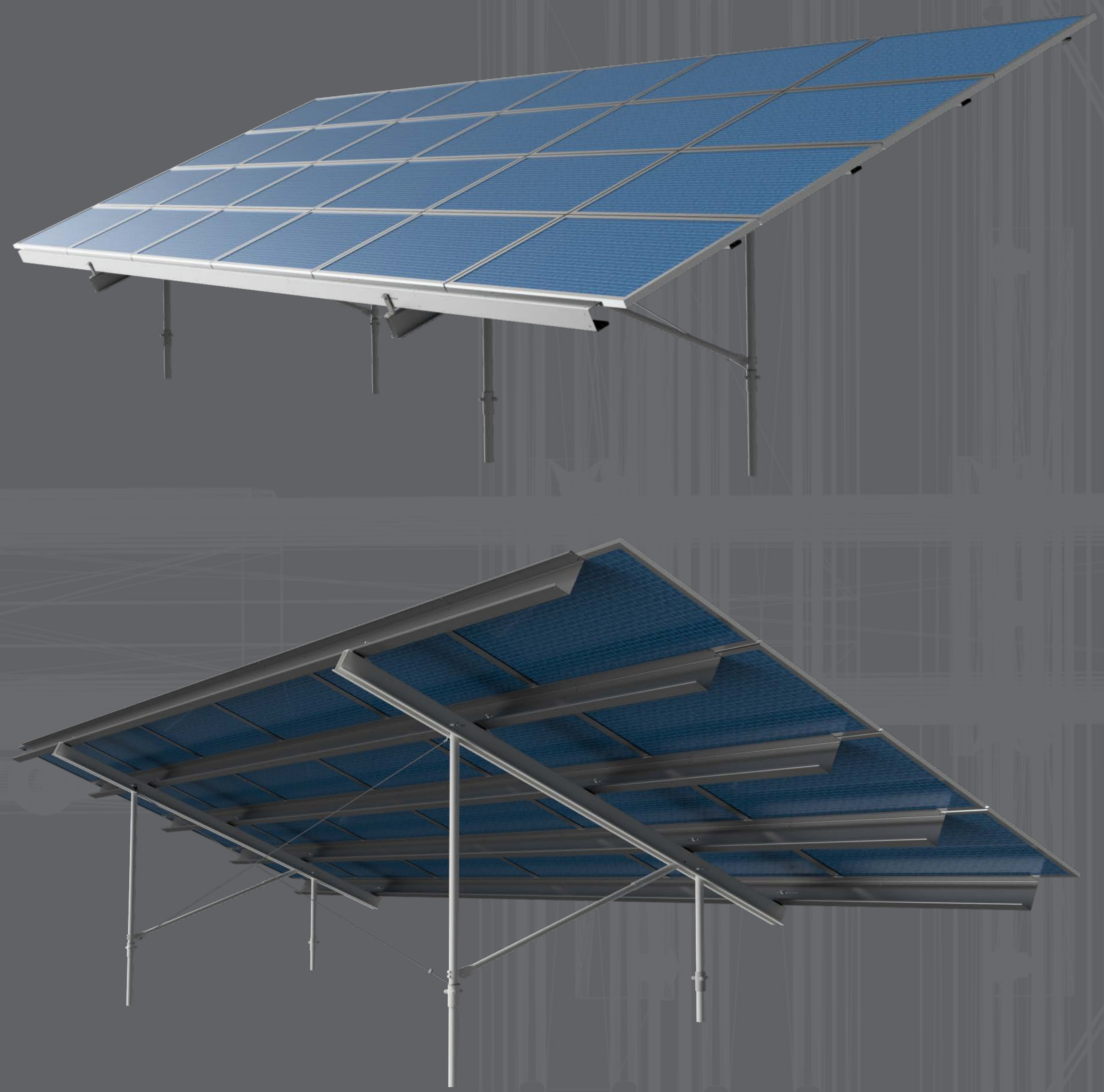
PACKAGING INFORMATION

Number of Modules per Pallet	29
Number of Pallets per 53' Trailer	27
Number of Pallets per 40' HC-Container	22
Pallet Dimensions (L × W × H)	81.9 × 45.3 × 46.9 in (2080 × 1150 × 1190 mm)
Pallet Weight	1603 lbs (727 kg)

Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS America Inc.
400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | **TEL** +1 949 748-5996 | **EMAIL** inquiry@us.q-cells.com | **WEB** www.q-cells.com/na

TERRASMART



GLIDE - TGL
Fixed-Tilt Ground Mount

OVERVIEW

GLIDE is TerraSmart's front line fixed-tilt ground mount racking solution that offers complete bifacial module compatibility. TGL is the culmination of ten years and over 3 gigawatts of installed-capacity experience in engineering, manufacturing and construction. As a result, GLIDE is currently the most economical racking system in TerraSmart's fixed-tilt ground mount racking portfolio.

Leveraging the benefits of TerraSmart's widely deployed proprietary ground screw foundation, TGL is designed to work in any soil condition ultimately offering customers increased install efficiency, reduced labor hours and a significant savings in material costs.

(239) 362-0211 | WWW.TERRASMART.COM

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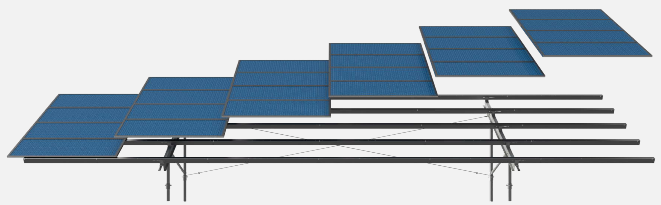
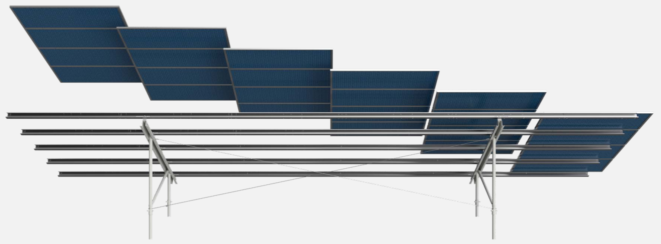
START SMART. BUILD SMART.

SPECS

Structural Material Specifications	Cold Rolled Steel Galvanized to ASTM A653 (G90 min) ASTM A 500 Hollow Structural Steel, Hot Dip Galvanized to ASTM A123 (3.0 mils min)
Hardware Material	316 Stainless Steel for Module Mounting Hardware Carbon Steel Alloy, Magni Coated to ASTM F2833 for all Structural Hardware
Foundation Options	Ground Screws
Module Orientation	Landscape
Module Mounting	Bottom Mount Bifacial Compatibility (Shadow Free Backside) Integrated Electrical Bonding
Tilt Angle	5 to 40 degrees
Wire Management	Incorporated in Structure – NEC Compliant
Configuration	Landscape Module Orientation up to 4 high x 6 wide
Slopes	East or West facing, up to 30%, north or south facing, up to 36%
Load Capacities	Project Specific; Up to 170 MPH wind speed and 100 PSF Ground Snow Load
Certifications	UL 2703, Edition 1; CPP Wind Tunnel Tested
Warranty	20 - year limited warranty





FAST

- Exponentially Less Hardware
- Integrated Electrical Bonding
- Included Wire Managment

COMPLIANT

- UL 2703, Edition 1 Listed
- NEC Compliant
- Wind Tunnel Tested

VERSATILE

- Numerous Configurations
- Adapts to Steep Slopes
- Accommodates Arduous Soils

LIGHT

- Lighter / Stiffer Components
- Less Freight Costs

SUNNY HIGHPOWER PEAK3

Efficient

- High power density with 150 kW thanks to its compact structure
- Max. yield due to possible DC/AC ratio of up to 150%

Reliable

- Superior PV system availability with 150 kW units
- Innovative digital features aligned with the energy management platform ennexOS

Flexible

- For DC input voltages up to 1500 V
- Flexible DC solutions with customer-specific PV array junction boxes

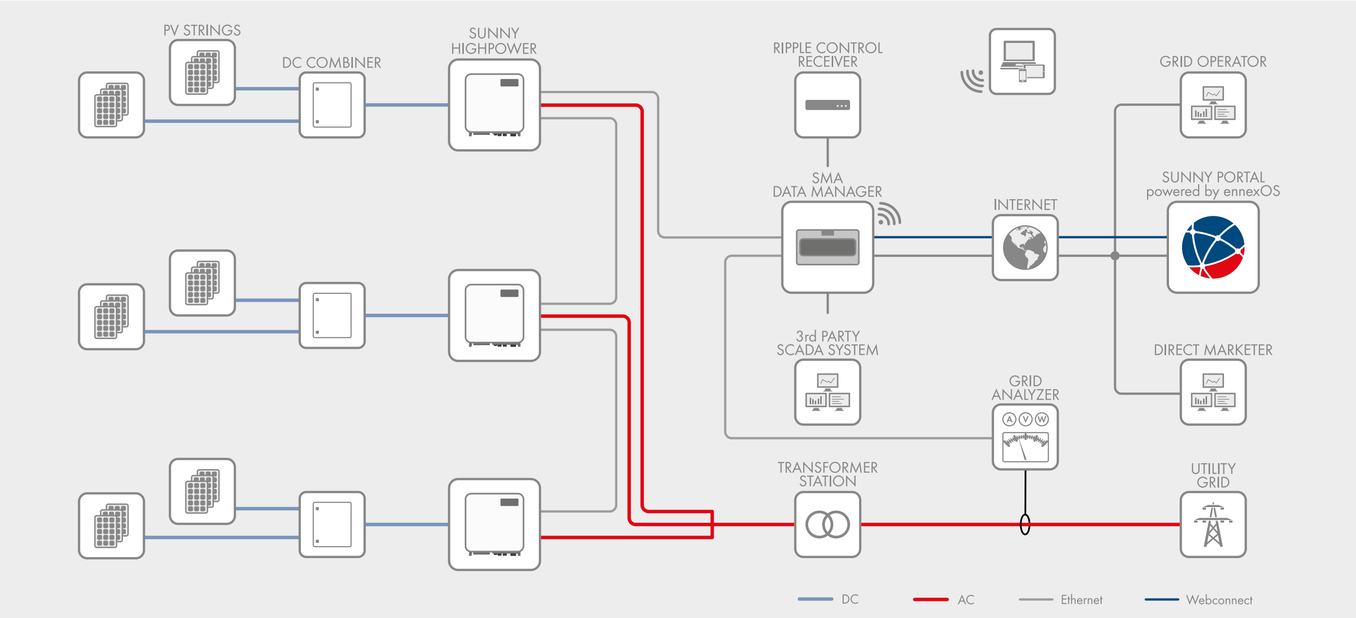
Easy to install

- Ergonomic handling and simple connection for quick installation
- Centralized commissioning and control of the PV power plant via SMA Data Manager

SUNNY HIGHPOWER PEAK3

Customized for tomorrow today

The Sunny Highpower PEAK3 is the central component of the SMA solution for PV power plants with a decentralized architecture and system voltages of 1500 V DC. This compact string inverter enables cost-optimized solutions for industrial PV applications thanks to its high power density. It also provides a simple way of transport and allows for quick installation and commissioning. This string inverter with 150 kW of power is equipped with the automatic SMA Smart Connected service for proactive servicing that facilitates operation and maintenance and reduces service costs throughout the entire project lifetime.



Technical Data	Sunny Highpower 100-20	Sunny Highpower 150-20
Input (DC)		
Max. PV array power	150000 Wp	225000 Wp
Max. input voltage	1000 V	1500 V
MPP voltage range / rated input voltage	590 V to 1000 V / 590 V	880 V to 1450 V / 880 V
Max. input current / max. short-circuit current	180 A / 325 A	180 A / 325 A
Number of independent MPP trackers	1	1
Number of inputs	1 or 2 (optional) for external PV array junction boxes	
Output (AC)		
Rated power at nominal voltage	100000 W	150000 W
Max. apparent power	100000 VA	150000 VA
Nominal AC voltage / AC voltage range	400 V / 304 V to 477 V	600 V / 480 V to 690 V
AC grid frequency / range	50 Hz / 44 Hz to 55 Hz 60 Hz / 54 Hz to 66 Hz	50 Hz / 44 Hz to 55 Hz 60 Hz / 54 Hz to 66 Hz
Rated grid frequency	50 Hz	50 Hz
Max. output current	151 A	151 A
Power factor at rated power / displacement power factor adjustable	1 / 0 overexcited to 0 underexcited	
Harmonic (THD)	< 3%	< 3%
Feed-in phases / AC connection	3 / 3-PE	3 / 3-PE
Efficiency		
Max. efficiency / European efficiency	98.8% / 98.6%	99.1% / 98.8%
Protective devices		
Ground fault monitoring / grid monitoring / DC reverse polarity protection	● / ● / ●	● / ● / ●
AC short-circuit current capability / galvanically isolated	● / –	● / –
All-pole-sensitive residual-current monitoring unit	●	●
Monitored surge arrester (type II) AC / DC	● / ●	● / ●
Protection class (according to IEC 62109-1) / overvoltage category (as per IEC 62109-1)	I / AC: III; DC: II	I / AC: III; DC: II
General Data		
Dimensions (W / H / D)	770 mm / 830 mm / 444 mm (30.3 in / 32.7 in / 17.5 in)	
Weight	98 kg (216 lbs)	
Operating temperature range	−25°C to +60°C (−13°F to +140°F)	
Noise emission (typical)	< 65 dB(A)	
Self-consumption (at night)	< 5 W	
Topology	transformerless	
Cooling method	OptiCool, active cooling, speed-controlled fan	
Degree of protection (according to IEC 60529)	IP65	
Max. permissible value for relative humidity (non-condensing)	100%	
Features / function / accessories		
DC connection / AC connection	Terminal lug (up to 300 mm²) / Screw terminal (up to 150 mm²)	
LED display (Status / Fault / Communication)	●	
Ethernet interface	● (2 ports)	
Data interface: SMA Modbus / SunSpec Modbus / Speedwire, Webconnect	● / ● / ●	
Mounting type	Rack mounting	
OptiTrac Global Peak / Integrated Plant Control / Q on Demand 24/7	● / ● / ●	
Off-grid capable / SMA Fuel Save Controller compatible	● / ●	
Warranty: 5 / 10 / 15 / 20 years	● / ○ / ○ / ○	
Certificates and approvals (planned)	IEC 62109-1/-2, AR N-4110, AR N-4120, CEI 0-16, C10/11:2012, EN 50549, PEA 2017, DEWA	
● Standard features ○ Optional features – Not available Data at nominal conditions Status: 12/ 2018		
Type designation	SHP 100-20	SHP 150-20

Three-phase pad-mounted compartmental type transformer

General

At Eaton's Cooper Power Systems, we are constantly striving to introduce new innovations to the transformer industry, bringing you the highest quality, most reliable transformers. Eaton's Cooper Power Systems Transformer Products are ISO 9001 compliant, emphasizing process improvement in all phases of design, manufacture, and testing. In order to drive this innovation, we have invested both time and money in the Thomas A. Edison Technical Center, our premier research facility in Franksville, Wisconsin. Headquarters for the Systems Engineering Group of Eaton's Cooper Power Systems, such revolutionary products as distribution-class UltraSIL™ Polymer-Housed Evolution™ surge arresters and Envirotemp™ FR3™ fluid have been developed at our Franksville lab.

With transformer sizes ranging from 45 kVA to 12 MVA and high voltages ranging from 2400 V to 46 kV, Eaton's Cooper Power Systems has you covered. From fabrication of the tanks and cabinets to winding of the cores and coils, to production of arresters, switches, tap changers, expulsion fuses, current limit fuses, bushings (live and dead) and molded rubber goods, Eaton's Cooper Power Systems does it all. Eaton's Cooper Power Systems transformers are available with electrical grade mineral oil or Envirotemp™ FR3™ fluid, a less-flammable and bio-degradable fluid. Electrical codes recognize the advantages of using Envirotemp™ FR3™ fluid both indoors and outdoors for fire sensitive applications. The bio-based fluid meets Occupational Safety and Health Administration (OSHA) and Section 450.23 NEC Requirements.

Cooper
Power Systems
by EATON

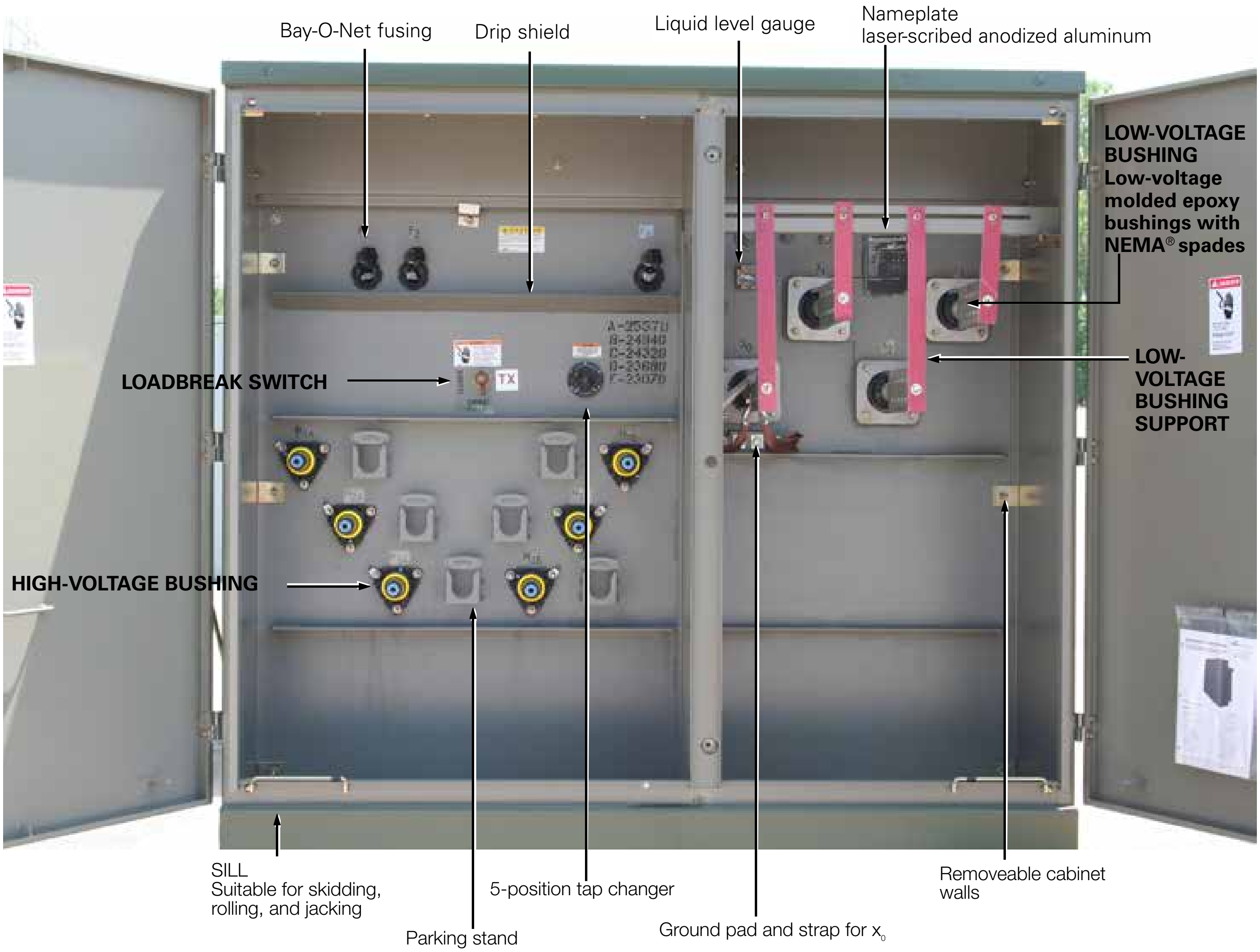


Figure 1. Three-phase pad-mounted compartmental type transformer.

Table 1. Product Scope

Type	Three Phase, 50 or 60 Hz, 65 °C Rise (55 °C, 55/65 °C), 65/75 °C, 75 °C
Fluid Type	Mineral oil or Envirotemp™ FR3™ fluid
Coil Configuration	2-winding or 4-winding or 3-winding (Low-High-Low), 3-winding (Low-Low-High)
Size	45 – 12,000 kVA
Primary Voltage	2,400 – 46,000 V
Secondary Voltage	208Y/120 V to 14,400 V
Specialty Designs	Inverter/Rectifier Bridge
	K-Factor (up to K-19)
	Vacuum Fault Interrupter (VFI)
	UL® Listed & Labeled and Classified
	Factory Mutual (FM) Approved®
	Solar/Wind Designs
	Differential Protection
	Seismic Applications (including OSHPD)
	Hardened Data Center

Table 2. Three-Phase Ratings

Three-Phase 50 or 60 Hz
kVA Available[1] 45, 75, 112.5, 150, 225, 300, 500, 750, 1000, 1500, 2000, 2500, 3000, 3750, 5000, 7500, 10000, 12000

[1]Transformers are available in the standard ratings and configurations shown or can be customized to meet specific needs.

Table 3. Audible Sound Levels

Self-Cooled, Two Winding kVA Rating	NEMA® TR-1 Average Decibels (dB)
45-500	56
501-700	57
701-1000	58
1001-1500	60
1501-2000	61
2001-2500	62
2501-3000	63
3001-4000	64
4001-5000	65
5001-6000	66
6001-7500	67
7501-12000	68

Table 4. Insulation Test Levels

KV Class	Induced Test 180 or 400 Hz 7200 Cycle	kV BIL Distribution	Applied Test 60 Hz (kV)
1.2	TWICE RATED VOLTAGE	30	10
2.5		45	15
5		60	19
8.7		75	26
15		95	34
25 (grd Y Only)		125	40
25		150	50
34.5 (grd Y Only)		125	40
34.5		150	70
46		200	95

Table 5. Temperature Rise Ratings 0-3300 Feet (0-1000 meters)

	Standard	Optional
Unit Rating (Temperature Rise Winding)	65 °C	55 °C, 55/65 °C, 75 °C
Ambient Temperature Max	40 °C	50 °C
Ambient Temperature 24 Hour Average	30 °C	40 °C
Temperature Rise Hotspot	80 °C	65 °C

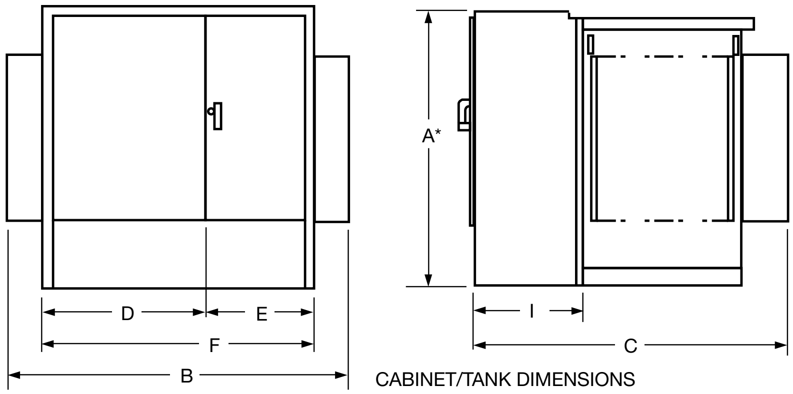


Figure 2. Transformer and pad dimensions.

* Add 9" for Bay-O-Net fusing.

Table 6. Fluid-filled—aluminum windings 55/65 °C Rise[1]

65° Rise	DEAD-FRONT—LOOP OR RADIAL FEED—BAY-O-NET FUSING OIL FILLED—ALUMINUM WINDINGS									
	OUTLINE DIMENSIONS (in.)									
kVA Rating	A*	B	C	D	E	F	G	H	I	Gallons of Fluid	Approx. Total Weight (lbs.)
45	50	68	39	42	26	68	72	43	20	110	2,100
75	50	68	39	42	26	68	72	43	20	115	2,250
112.5	50	68	49	42	26	68	72	53	20	120	2,350
150	50	68	49	42	26	68	72	53	20	125	2,700
225	50	72	51	42	30	72	76	55	20	140	3,150
300	50	72	51	42	30	72	76	55	20	160	3,650
500	50	89	53	42	30	72	93	57	20	190	4,650
750	64	89	57	42	30	72	93	61	20	270	6,500
1000	64	89	59	42	30	72	93	63	20	350	8,200
1500	73	89	86	42	30	72	93	90	24	410	10,300
2000	73	72	87	42	30	72	76	91	24	490	12,500
2500	73	72	99	42	30	72	76	103	24	530	14,500
3000	73	84	99	46	37	84	88	103	24	620	16,700
3750	84	85	108	47	38	85	88	112	24	660	19,300
5000	84	96	108	48	48	96	100	112	24	930	25,000
7500	94	102	122	54	48	102	100	126	24	1,580	41,900

1 Weights, gallons of fluid, and dimensions are for reference only and not for construction. Please contact Eaton's Cooper Power Systems for exact dimensions.

* Add 9" for Bay-O-Net fusing.

Table 7. Fluid-Filled—Copper Windings 55/65 °C Rise[1]

65° Rise	DEAD-FRONT—LOOP OR RADIAL FEED—BAY-O-NET FUSING OIL FILLED—COPPER WINDINGS										
	OUTLINE DIMENSIONS (in.)										
kVA Rating	A*	B	C	D	E	F	G	H	I	Gallons of Fluid	Approx. Total Weight (lbs.)
45	50	64	39	34	30	64	69	43	20	110	2,100
75	50	64	39	34	30	64	69	43	20	115	2,350
112.5	50	64	49	34	30	64	69	53	20	115	2,500
150	50	64	49	34	30	64	69	53	20	120	2,700
225	50	64	51	34	30	64	73	55	20	140	3,250
300	50	64	51	34	30	64	75	55	20	160	3,800
500	50	81	53	34	30	64	85	57	20	200	4,800
750	64	89	57	42	30	72	93	61	20	255	6,500
1000	64	89	59	42	30	72	93	63	20	300	7,800
1500	73	89	86	42	30	72	93	90	24	410	10,300
2000	73	72	87	42	30	72	76	91	24	420	11,600
2500	73	72	99	42	30	72	76	103	24	500	14,000
3000	73	84	99	46	37	84	88	103	24	720	18,700
3750	84	85	108	47	38	85	88	112	24	800	20,500
5000	84	96	108	48	48	96	100	112	24	850	25,000
7500	94	102	122	54	48	102	100	126	24	1,620	46,900

1 Weights, gallons of fluid, and dimensions are for reference only and not for construction. Please contact Eaton's Cooper Power Systems for exact dimensions.

* Add 9" for Bay-O-Net fusing.

Standard features

Connections and neutral configurations

- Delta - Wye: Low voltage neutral shall be a fully insulated X0 bushing with removable ground strap.
- Grounded Wye-Wye: High voltage neutral shall be internally tied to the low voltage neutral and brought out as the H0X0 bushing in the secondary compartment with a removable ground strap.
- Delta-Delta: Transformer shall be provided without a neutral bushing.
- Wye-Wye: High voltage neutral shall be brought out as the H0 bushing in the primary compartment and the low voltage neutral shall be brought as the X0- bushing in the secondary compartment.
- Wye-Delta: High voltage neutral shall be brought out as the H0 bushing in the primary compartment. No ground strap shall be provided (line to line rated fusing is required).

High and low voltage bushings

- 200 A bushing wells (15, 25, and 35 kV)
- 200 A, 35 kV Large Interface
- 600 A (15, 25, and 35 kV) Integral bushings (dead-front)
- Electrical-grade wet-process porcelain bushings (live-front)

Tank/cabinet features

- Bolted cover for tank access (45-1750 kVA)
- Welded cover with hand hole (2000-12,000 kVA)
- Three-point latching door for security
- Removable sill for easy installation
- Lifting lugs (4)
- Stainless steel cabinet hinges and mounting studs
- Steel divider between HV and LV compartment
- 20” Deep cabinet (45-1000 kVA)
- 24” Deep cabinet (1500-7500 kVA)
- 30” Deep cabinet (34.5/19.92 kV)
- Pentahead captive bolt
- Stainless steel 1-hole ground pads (45-500 kVA)
- Stainless steel 2-hole ground pads (750-10,000 kVA)
- Parking Stands

Valves/plugs

- One-inch upper filling plug
- One-inch drain plug (45-500 kVA)
- One-inch combination drain valve with sampling device in low voltage compartment (750-12,000 kVA)
- Automatic pressure relief valve

Nameplate

- Laser-scribed anodized aluminum nameplate

Figure 3. Drain valve with sampler.

Figure 4. Automatic Pressure relief valve.

Figure 5. Liquid level gauge.

Figure 6. External Gauges.

Figure 7. External visible break with gauges.

Optional features

High and low voltage bushings

- 200 A (15, 25 kV) bushing inserts
- 200 A (15, 25 kV) feed thru inserts
- 200 A (15, 25 kV) (HTN) bushing wells with removable studs
- High-voltage 600 A (15, 25, 35 kV) deadbreak one-piece bushings
- Low voltage 6-, 8-holes spade
- Low voltage 12-, 16-, 20-holes spade (750-2500 kVA)
- Low voltage bushing supports

Tank/cabinet features

- Stainless steel tank base and cabinet
- Stainless steel tank base, cabinet sides and sill
- 100% stainless steel unit
- Service entrance (2 inch) in sill or cabinet side
- Touch-up paint (domestic)
- Copper ground bus bar
- Kirk-Key provisions
- Nitrogen blanket
- Bus duct cutout

Special designs

- Factory Mutual (FM)
- UL® Classified
- Triplex
- High altitude
- K-Factors
- Step-up
- Critical application
- Modulation transformers
- Seismic applications (including OSHPD)

Switches

- One, two, or three On/Off loadbreak switches
- 4-position loadbreak V-blade switch or T-blade switch
- Delta-wye switch
- 3-position V-Blade selector switch
- 100 A, 150 A, 300 A tap changers
- Dual voltage switch
- Visible break with VFI interrupter interlock
- External visible break (15, 25, and 35 kV, up to 3 MVA)
- External visible break with gauges (15, 25, and 35 kV, up to 3 MVA)

Gauges and devices

- Liquid level gauge (optional contacts)
- Pressure vacuum gauge (optional contacts and bleeder)
- Dial-type thermometer (optional alarm contacts)
- Cover mounted pressure relief device
- Ground connectors
- Hexhead captive bolt
- Breaker mounting provisions
- External gauges in padlockable box

Overcurrent protection

- Bay-O-Net fusing (Current sensing, dual sensing, dual element, high amperage overload)
- Bay-O-Net expulsion fuse in series with a partial range under-oil ELSP current limiting fuse (below 23 kV)
- Cartridge fusing in series with a partial range under-oil ELSP current limiting fuse (above 23 kV)
- MagneX™ interrupter with ELSP current-limiting fuse
- Vacuum Fault Interrupter (VFI)
- Visible break window
- Fuse/switch interlock

Valves/plugs

- Drain/sampling valve in high-voltage compartment
- Globe type upper fill valve

Overvoltage protection

- Distribution-, intermediate-, or station-class surge arresters
- Elbow arresters (for dead-front connections)

Metering/fan/control

- Full metering package
- Current Transformers (CTs)
- Metering Socket
- NEMA® 4 control box (optional stainless steel)
- NEMA® 7 control box (explosion proof)
- Fan Packages

Testing

- Customer test witness
- Customer final inspection
- Zero Sequence Impedance Test
- Heat Run Test
- ANSI® Impulse Test
- Audible Sound Level Test
- RIV (Corona) Test
- Dissolved Gas Analysis (DGA) Test
- 8- or 24-Hour Leak Test

Coatings (paint)

- ANSI® Bell Green
- ANSI® #61 Light Gray
- ANSI® #70 Sky Gray
- Special paint available per request

Nameplate

- Stainless steel nameplate

Decals and labels

- High voltage warning signs
- Mr. Ouch
- Bi-lingual warning
- DOE compliant
- Customer stock code
- Customer stenciling
- Shock and arc flash warning decal
- Non-PCB decal

Construction

Core

The three-legged, step-lap mitered core construction is manufactured using a high-quality cutting machine. For maximum efficiency, cores are precisely stacked, virtually eliminating gaps in the corner joints.

Five-legged wound core or shell-type triplex designs are used for wye-wye connected transformers, and other special transformer designs.

Cores are manufactured with precision cut, burr-free, grain-oriented silicon steel. Many grades of core steel are available for optimizing core loss efficiency.

Coils

Pad-mounted transformers feature a rectangular coil configuration with wire-wound, high-voltage primaries and sheet-wound secondaries. The design minimizes axial stress developed by short circuits and provides for magnetic balancing of tap connections.

Coils are wound using the highest quality winding machines providing exacting tension control and conductor placement for superior short-circuit strength and maximum efficiency.

Extra mechanical strength is provided by diamond pattern, epoxy-coated paper insulation, used throughout the coil, with additional epoxy at heavy stress points. The diamond pattern distribution of the epoxy and carefully arranged ducts, provide a network of passages through which cooling fluid can freely circulate.

Coil assemblies are heat-cured under calculated hydraulic pressure to ensure performance against short-circuit forces.

Core and coil assemblies

Pad-mounted transformer core and coil assemblies are braced with heavy steel ends to prevent the rectangular coil from distorting under short-circuit conditions. Plates are clamped in place using presses, and welded or bolted to form a solid core and coil assembly. Core and coil assemblies exceed ANSI® and IEEE® requirements for short-circuit performance. Due to the rigidity of the design, impedance shift after short-circuit is comparable to that of circular wound assemblies.

Tanks

Transformer tanks are designed for high strength and ease of handling, installation, and maintenance. Tanks are welded using precision-cut, hot rolled, pickled and oiled steel. They are sealed to protect the insulating fluid and other internal components.

Transformer tanks are pressure-tested to withstand 7 psig without permanent distortion and 15 psig without rupture.

Tank finish

An advanced multi-stage finishing process exceeds IEEE Std C57.12.28™-2005 standards. The eight-stage pre-treatment process assures coating adhesion and retards corrosion. It converts tank surfaces to a nonmetallic, water insoluble iron phosphate coating.

The paint method consists of two distinct layers of paint. The first is an epoxy primer (E-coat) layer which provides a barrier against moisture, salt and corrosives. The two-component urethane final coat seals and adds ultraviolet protection.

Vacuum processing

Transformers are dried and filled with filtered insulating fluid under vacuum, while secondary windings are energized. Coils are heated to drive out moisture, ensuring maximum penetration of fluid into the coil insulation system.

Insulating fluid

Transformers from Eaton's Cooper Power Systems are available with electrical-grade mineral insulating oil or Envirotemp™ FR3™ fluid. The highly refined fluids are tested and degassed to assure a chemically inert product with minimal acid ions. Special additives minimize oxygen absorption and inhibit oxidation. To ensure high dielectric strength, the fluid is re-tested for dryness and dielectric strength, refiltered, heated, dried, and stored under vacuum before being added to the completed transformer.

Eaton's Cooper Power Systems transformers filled with Envirotemp™ FR3™ fluid enjoy unique fire safety, environmental, electrical, and chemical advantages, including insulation life extending properties.

A bio-based, sustainable, natural ester dielectric coolant, Envirotemp™ FR3™ fluid quickly and thoroughly biodegrades in the environment and is non-toxic per acute aquatic and oral toxicity tests.

Building for Environmental and Economic Sustainability (BEES) total life cycle assessment software, utilized by the US Dept. of Commerce, reports its overall environmental performance impact score at 1/4th that reported for mineral oil. Envirotemp™ FR3™ fluid has also earned the EPA Environmental Technology Verification of transformer materials.

With a fire point of 360 °C, Envirotemp™ FR3™ fluid is FM Approved® and Underwriters Laboratories (UL®) Classified "Less-Flammable" per NEC® Article 450-23, fitting the definition of a Listed Product per NEC®.

Figure 8. VFI transformer with visible break.

Pad-mounted VFI transformer

The VFI transformer combines a conventional distribution transformer from Eaton's Cooper Power Systems with the proven Vacuum Fault Interrupter (VFI). This combination provides both voltage transformation and transformer over current protection in one space saving and money saving package. The pad-mounted VFI transformer protects the transformer and provides proper coordination with upstream protective devices. When a transformer fault or overload condition occurs, the VFI breaker trips and isolates the transformer.

The three-phase VFI breaker has independent single-phase initiation, but is three-phase mechanically gang-tripped. A trip signal on any phase will open all three phases. This feature eliminates single-phasing of three phase loads. It also enables the VFI breaker to be used as a three-phase load break switch.

Due to the resettable characteristics of the VFI breaker, restoring three-phase service is faster and easier.

The sealed visible break window and switch is an option that can be installed to provide visible break contact. This feature provides enhanced safety and allows an operator to see if the loadbreak switch contacts are in an open or closed position before performing maintenance.

Envirotran™ FM Approved special protection transformer

The Envirotran™ transformer from Eaton's Cooper Power Systems is FM Approved and suitable for indoor locations. Factory Mutual Research Corporation's (FMRC) approval of the Envirotran transformer line makes it easy to comply with and verify compliance with Section 450.23, 2008 NEC, Less-Flammable Liquid-Filled Transformer Requirements for both indoor and outdoor locations.

Envirotran FM Approved transformers offer the user the benefit of a transformer that can be easily specified to comply with NEC, and makes FM Safety Data Sheet compliance simpler, while also providing maximum safety and flexibility for both indoor and outdoor installations.

Because the "FM Approved" logo is readily visible on the transformer and its nameplate, NEC compliance is now easily verifiable by the inspector.

Envirotran FM Approved transformers are manufactured under strict compliance with FMRC Standard 3990 and are filled with FM Approved Envirotemp™ FR3™ fluid, a fire-resistant dielectric coolant.

Special application transformers

Data Center transformer

With focus rapidly shifting from simply maximizing uptime and supporting demand to improving energy utilization, the data center industry is continually looking for methods to increase its energy efficiency and reliability. Utilizing cutting edge technology, Eaton's Cooper Power Systems Hardened Data Center (HDC) transformers are the solution. Designed with special attention given to surge protection, HDC liquid-filled transformers provide superior performance under the harshest electrical environments. Contrary to traditional dry-type units, HDC transformers provide unsurpassed reliability, overloadability, operational life, efficiency, thermal loading and installed footprint. These Eaton's Cooper Power Systems units have reliably served more than 100 MW of critical data center capacity for a total of more than 6,000,000 hours without any reported downtime caused by a thermal or short-circuit coil failure.

The top priority in data center operations is uninterrupted service. Envirotran HDC transformers from Eaton's Cooper Power Systems, having substantially higher levels of insulation, are less susceptible to voltage surges. Eaton's Cooper Power Systems has experienced zero failures due to switching transients. The ANSI® and IEEE® standard impulse withstand ratings are higher for liquid-filled transformers, making them less susceptible to insulation failure. The Envirotran HDC transformer provides ultimate protection by increasing the BIL rating one level higher than standard liquid-filled transformer ratings. The cooling system of liquid-filled transformers provides better protection from severe overloads—overloads that can lead to significant loss of life or failure.

Data center design typically includes multiple layers of redundancy, ensuring maximum uptime for the critical IT load. When best in class transformer manufacturing lead times are typically weeks, not days, an unexpected transformer failure will adversely affect the facility's reliability and profitability. Therefore, the ability to determine the electrical and mechanical health of a transformer can reduce the probability of costly, unplanned downtime. Routine diagnostic tests, including key fluid properties and dissolved gas analysis (DGA), can help determine the health of a liquid-filled transformer. Although sampling is not required for safe operation, it will provide the user with valuable information, leading to scheduled repair or replacement, and minimizing the duration and expense of an outage. With a dry-type transformer, there is no reliable way to measure the health or likelihood of an impending failure.

Solar transformer

As a result of the increasing number of states that are adopting aggressive Renewable & Alternative Energy Portfolio Standards, the solar energy market is growing—nearly doubling year over year. Eaton's Cooper Power Systems, a key innovator and supplier in this expanding market, is proud to offer Envirotran transformers specifically designed for Solar Photovoltaic medium-voltage applications. Eaton's Cooper Power Systems is working with top solar photovoltaic developers, integrators and inverter manufacturers to evolve the industry and change the way we distribute power.

In accordance with this progressive stance, every Eaton's Cooper Power Systems Envirotran Solar transformer is filled with non-toxic, biodegradable Envirotemp™ FR3™ dielectric fluid, made from renewable seed oils. On top of its biodegradability, Envirotemp™ FR3™ fluid substantially extends the life of the transformer insulation, saving valuable resources. What better way to distribute green power than to use a green transformer. In fact, delaying conversion to Envirotran transformers places the burden of today's environmental issues onto tomorrow's generations. Eaton's Cooper Power Systems can help you create a customized transformer, based on site specific characteristics including: temperature profile, site altitude, solar profile and required system life. Some of the benefits gained from this custom rating include:

- Reduction in core losses
- Improved payback on investment
- Reduction in footprint
- Improved fire safety
- Reduced environmental impact

For the solar photovoltaic industry, Eaton's Cooper Power Systems is offering standard step up transformers and dual secondary designs, including 4-winding, 3-winding (Low-High-Low) and 3-winding (Low-Low-High) designs.

Wind transformer

Eaton's Cooper Power Systems is offering custom designs for renewable energy power generation. Eaton's Cooper Power Systems manufactures Generator Step-Up (GSU) transformers for installation at the base of every wind turbine. Additionally, grounding transformers are available for wind power generation.

DOE efficiency

The United States Department of Energy (DOE) has mandated efficiency values for most liquid type, medium voltage transformers. As a result, all applicable Eaton's Cooper Power Systems transformers are designed to meet or exceed the standard efficiency values per DOE 2010; Final Ruling, 10 CFR Part 431.

Underwriters Laboratories® (UL®) Listed and Labeled/ Classified

The Envirotran transformer from Eaton's Cooper Power Systems can be specified as UL® Listed & Labeled, and/or UL® Classified. Underwriters Laboratories (UL®) listing is a verification of the design and construction of the transformer to the ANSI® and IEEE® standards. UL® listing generally is the most efficient, cost-effective solution for complying with relevant state and local electrical codes. UL® Combination Classification/Listing is another way in which to comply with Section 450.23, 2008 NEC® requirements. This combines the UL® listed transformer with a UL® Classified Less-Flammable Liquid and complies with the use restrictions found within the liquid Classification.

K-Factor transformer

With a drastic increase in the use of ferromagnetic devices, arcing devices, and electric power converters, higher frequency loads have increased significantly. This harmonic loading has the potential to generate higher heat levels within a transformer's windings and leads by as much as 300%. Harmonic loading has the potential to induce premature failure in standard-design distribution transformers.

In addition to standard UL® "K-Factor" ratings, transformers can be designed to customer-provided specifications detailing precise loading scenarios. Onsite measurements of magnitude and frequency, alongside harmonic analysis of the connected load can be performed by Eaton's Cooper Power Systems engineers or a third party consultant. These field measurements are used to determine exact customer needs and outline the transformer specifications.

Eaton's Cooper Power Systems will design harmonic-resistant transformers that will be subjected to the unique harmonic loads. These units are designed to maintain normal temperature rise under harmonic, full-load conditions. Standard UL® "K-Factor" designs can result in unnecessary costs when the "next-highest" K-Factor must be selected for a calculated design factor. To save the customer these unnecessary costs, Eaton's Cooper Power Systems can design the transformer to the specific harmonic spectrum used in the application. K-factor transformers from Eaton's Cooper Power Systems are filled with mineral oil or Envirotemp™ FR3™ fluid and enjoy the added benefits of dielectric cooling such as higher efficiencies than dry-type transformers.

Modulation transformer

Bundled with an Outboard Modulation Unit (OMU) and a Control and Receiving Unit (CRU), a Modulation Transformer Unit (MTU) is designed to remotely achieve two way communication.

The use of an MTU reduces travel time and expense versus traditional meter reading performed by high voltage electricians. Additionally, with MTU it is possible to manage and evaluate energy consumption data, providing reduced metering costs and fewer tenant complaints.

An MTU utilizes existing utility infrastructure, therefore eliminating the need to engineer and construct a dedicated communication network.

Figure 9. Modular transformer.

Inverter/rectifier bridge

Eaton's Cooper Power Systems complements its range of applications for transformers by offering dual winding designs. These designs are intended for connection to 12-pulse rectifier bridges.

Product attributes

To set us apart from other transformer manufactures, Eaton's Cooper Power Systems includes the following guarantees with every three-phase pad-mounted transformer.

Engineered to order (ETO)

Providing the customer with a well developed, cost-effective solution is the number one priority at Eaton's Cooper Power Systems. Using customer specifications, Eaton's Cooper Power Systems will work with the customer from the beginning to the end to develop a solution to fit their needs. Whether it is application specific, site specific, or a uniquely specified unit, Eaton's Cooper Power Systems will provide transformers with the best in class value and performance, saving the customer time and money.

Made in the U.S.A.

Eaton's Cooper Power Systems three-phase pad-mounted transformers are produced right here in the United States of America. Our manufacturing facilities are positioned strategically for rapid shipment of products. Furthermore, should the need arise, Eaton's Cooper Power Systems has a broad network of authorized service repair shops throughout the United States.

Superior paint performance

Protecting transformers from nature's elements worldwide, Eaton's Cooper Power Systems E-coat system provides unrivaled transformer paint life, and exceeds IEEE Std C57.12.28™-2005 and IEEE Std C57.12.29™-2005 standards. In addition to the outside of the unit, each transformer receives a gray E-coat covering in the interior of the tank and cabinet, providing superior rust resistance and greater visibility during service.

If the wide range of standard paint selections does not suit the customer's needs, Eaton's Cooper Power Systems will customize the paint color to meet their requirements.

Rectangular coil design

Eaton's Cooper Power Systems utilizes a rectangular coil design. This winding technique results in a smaller overall unit footprint as well as reducing the transformer weight. The smaller unit size does not hinder the transformer performance in the least. Units have proven short circuit withstand capabilities up to 12 MVA.

Testing

Eaton's Cooper Power Systems performs routing testing on each transformer manufactured including the following tests:

- Insulation Power Factor: This test verifies that vacuum processing has thoroughly dried the insulation system to required limits.
- Ratio, Polarity, and Phase Relation: Assures correct winding ratios and tap voltages; checks insulation of HV and LV circuits. Checks entire insulation system to verify all live-to-ground clearances.
- Resistance: This test verifies the integrity of internal high-voltage and low-voltage connections; provides data for loss upgrade calculations.
- Applied Potential: Applied to both high-voltage and low-voltage windings, this test stresses the entire insulation system to verify all live-to-ground clearances.
- Induced Potential: 3.46 times normal plus 1000 volts for reduced neutral designs.
- Loss Test: These design verification tests are conducted to assure that guaranteed loss values are met and that test values are within design tolerances. Tests include no-load loss and excitation

current along with impedance voltage and load loss.

- Leak Test: Pressurizing the tank to 7 psig assures a complete seal, with no weld or gasket leaks, to eliminate the possibility of moisture infiltration or fluid oxidation.

Design performance tests

The design performance tests include the following:

- Temperature Rise: Our automated heat run facility ensures that any design changes meet ANSI® and IEEE® temperature rise criteria.
- Audible Sound Level: Ensures compliance with NEMA® requirements.
- Lightning Impulse: To assure superior dielectric performance, this test consists of one reduced wave, two chopped waves and one full wave in sequence, precisely simulating the harshest conditions.

Thomas A Edison Research and Test Facility

We are constantly striving to introduce new innovations to the transformer industry, bringing you the highest quality transformer for the lowest cost. Eaton's Cooper Power Systems Transformer Products are ISO 9001 compliant, emphasizing process improvement in all phases of design, manufacture, and testing. We have invested millions of dollars in the Thomas A. Edison Technical Center, our premier research facility in Franksville, Wisconsin affirming our dedication to introducing new innovations and technologies to the transformer industry. Headquarters for the Systems Engineering group of Eaton's Cooper Power Systems, this research facility is fully available for use by our customers to utilize our advanced electrical and chemical testing labs.

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Powering Business Worldwide

APPENDIX F

FAA DETERMINATION

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

Aeronautical Study No.
2020-ANE-2454-OE

Issued Date: 05/11/2020

Bradley J. Parsons, PE, PMP
All-Points Technology Corporation - Engineering
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Killingworth, CT 06419

****DETERMINATION OF NO HAZARD TO AIR NAVIGATION FOR TEMPORARY STRUCTURE****

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:	Crane Point 1
Location:	Hamden, CT
Latitude:	41-25-58.90N NAD 83
Longitude:	72-56-35.04W
Heights:	525 feet site elevation (SE)
	22 feet above ground level (AGL)
	547 feet above mean sea level (AMSL)

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

SEE ATTACHMENT FOR ADDITIONAL CONDITION(S) OR INFORMATION

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.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of a 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 temporary 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.

A copy of this determination will be forwarded to the Federal Aviation Administration Flight Procedures Office if the structure is subject to the issuance of a Notice To Airman (NOTAM).

If you have any questions, please contact our office at (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2454-OE

Signature Control No: 437282155-439462057 (TMP)
David Maddox
Specialist

Additional Condition(s) or Information for ASN 2020-ANE-2454-OE

Proposal: To construct and/or operate a(n) Crane to a height of 22 feet above ground level, 547 feet above mean sea level.

Location: The structure will be located 6.84 nautical miles southwest of MMK Airport reference point.

Case Description for ASN 2020-ANE-2454-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Part 77 Obstruction Standard(s) Exceeded and Aeronautical Impacts, if any:

Preliminary FAA study indicates that the above mentioned structure would:
have no effect on any existing or proposed arrival, departure, or en route instrument flight rules (IFR) operations or procedures.
have no effect on any existing or proposed arrival, departure, or en route visual flight rules (VFR) operations.
have no effect on any existing or proposed arrival, departure, or en route instrument/visual flight rules (IFR/VFR) minimum flight altitudes.
not exceed traffic pattern airspace
have no physical or electromagnetic effect on the operation of air navigation and communications facilities.
have no effect on any airspace and routes used by the military.

Based on this aeronautical study, the structure would not constitute a substantial adverse effect on aeronautical operations or procedures because it will be temporary. The temporary structure would not be considered a hazard to air navigation provided all of the conditions specified in this determination are strictly met.

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 L Change 2, Obstruction Marking and Lighting, flag marker - Chapters 3(Marked)&12.

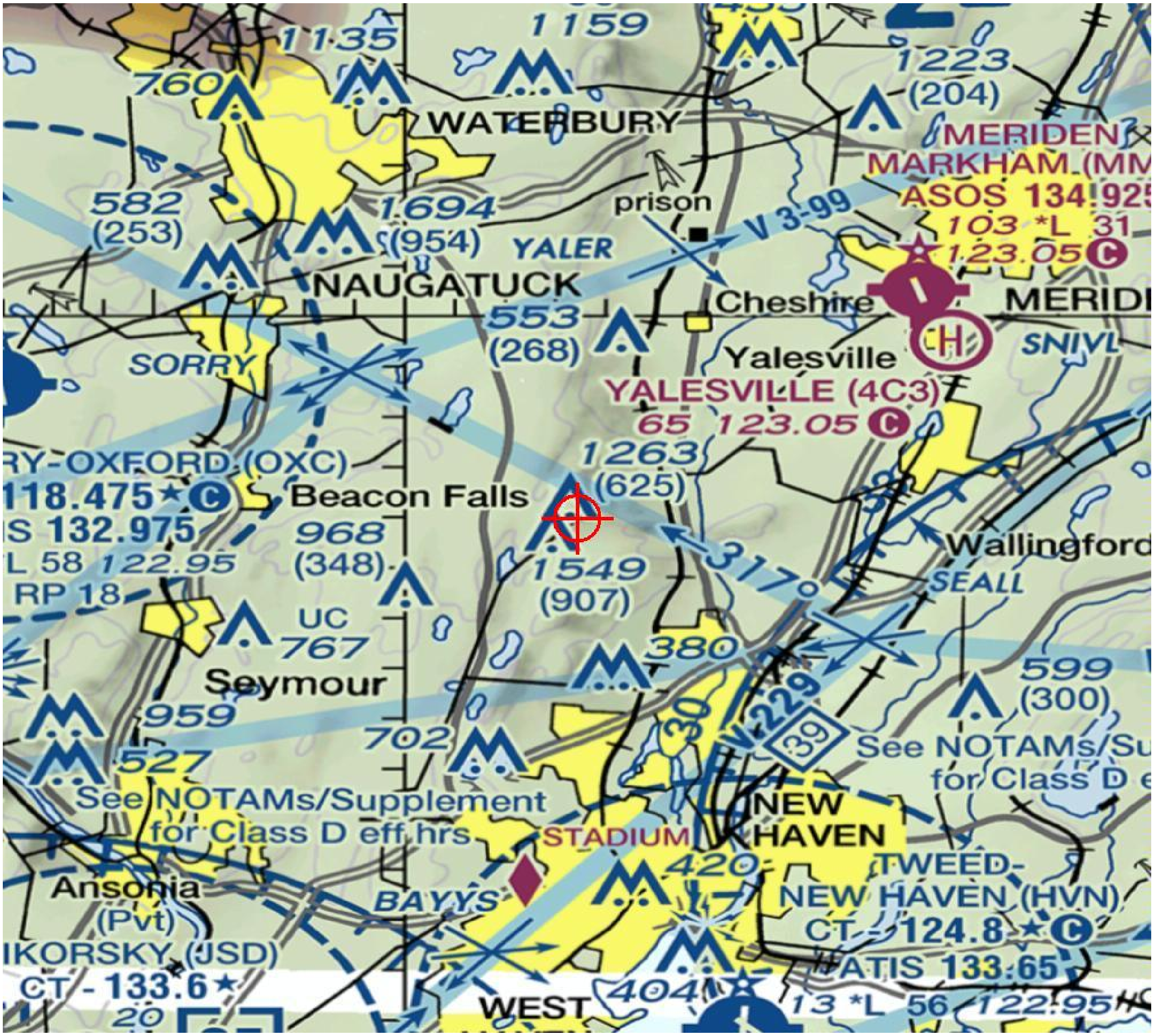
Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

This determination expires on 11/11/2021 unless extended, revised, or terminated by the issuing office.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed within 5 days after the temporary structure is dismantled.

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.

Sectional Map for ASN 2020-ANE-2454-OE



Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
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2020-ANE-2455-OE

Issued Date: 05/11/2020

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DETERMINATION OF NO HAZARD TO AIR NAVIGATION FOR TEMPORARY STRUCTURE

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:	Crane Point 2
Location:	Hamden, CT
Latitude:	41-25-55.57N NAD 83
Longitude:	72-56-32.75W
Heights:	490 feet site elevation (SE)
	22 feet above ground level (AGL)
	512 feet above mean sea level (AMSL)

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

SEE ATTACHMENT FOR ADDITIONAL CONDITION(S) OR INFORMATION

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.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of a 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 temporary 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.

A copy of this determination will be forwarded to the Federal Aviation Administration Flight Procedures Office if the structure is subject to the issuance of a Notice To Airman (NOTAM).

If you have any questions, please contact our office at (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2455-OE

Signature Control No: 437282156-439462065 (TMP)

David Maddox
Specialist

Additional Condition(s) or Information for ASN 2020-ANE-2455-OE

Proposal: To construct and/or operate a(n) Crane to a height of 22 feet above ground level, 547 feet above mean sea level.

Location: The structure will be located 6.84 nautical miles southwest of MMK Airport reference point.

Case Description for ASN 2020-ANE-2455-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Part 77 Obstruction Standard(s) Exceeded and Aeronautical Impacts, if any:

Preliminary FAA study indicates that the above mentioned structure would:
have no effect on any existing or proposed arrival, departure, or en route instrument flight rules (IFR) operations or procedures.
have no effect on any existing or proposed arrival, departure, or en route visual flight rules (VFR) operations.
have no effect on any existing or proposed arrival, departure, or en route instrument/visual flight rules (IFR/VFR) minimum flight altitudes.
not exceed traffic pattern airspace
have no physical or electromagnetic effect on the operation of air navigation and communications facilities.
have no effect on any airspace and routes used by the military.

Based on this aeronautical study, the structure would not constitute a substantial adverse effect on aeronautical operations or procedures because it will be temporary. The temporary structure would not be considered a hazard to air navigation provided all of the conditions specified in this determination are strictly met.

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 L Change 2, Obstruction Marking and Lighting, flag marker - Chapters 3(Marked)&12.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

This determination expires on 11/11/2021 unless extended, revised, or terminated by the issuing office.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed within 5 days after the temporary structure is dismantled.

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.

Sectional Map for ASN 2020-ANE-2455-OE

Mail Processing Center
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Issued Date: 05/11/2020

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DETERMINATION OF NO HAZARD TO AIR NAVIGATION FOR TEMPORARY STRUCTURE

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:	Crane Point 3
Location:	Hamden, CT
Latitude:	41-25-55.07N NAD 83
Longitude:	72-56-32.78W
Heights:	490 feet site elevation (SE)
	22 feet above ground level (AGL)
	512 feet above mean sea level (AMSL)

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

SEE ATTACHMENT FOR ADDITIONAL CONDITION(S) OR INFORMATION

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.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of a 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 temporary 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.

A copy of this determination will be forwarded to the Federal Aviation Administration Flight Procedures Office if the structure is subject to the issuance of a Notice To Airman (NOTAM).

If you have any questions, please contact our office at (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2456-OE

Signature Control No: 437282157-439462059 (TMP)

David Maddox
Specialist

Additional Condition(s) or Information for ASN 2020-ANE-2456-OE

Proposal: To construct and/or operate a(n) Crane to a height of 22 feet above ground level, 547 feet above mean sea level.

Location: The structure will be located 6.84 nautical miles southwest of MMK Airport reference point.

Case Description for ASN 2020-ANE-2456-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Part 77 Obstruction Standard(s) Exceeded and Aeronautical Impacts, if any:

Preliminary FAA study indicates that the above mentioned structure would:
have no effect on any existing or proposed arrival, departure, or en route instrument flight rules (IFR) operations or procedures.
have no effect on any existing or proposed arrival, departure, or en route visual flight rules (VFR) operations.
have no effect on any existing or proposed arrival, departure, or en route instrument/visual flight rules (IFR/VFR) minimum flight altitudes.
not exceed traffic pattern airspace
have no physical or electromagnetic effect on the operation of air navigation and communications facilities.
have no effect on any airspace and routes used by the military.

Based on this aeronautical study, the structure would not constitute a substantial adverse effect on aeronautical operations or procedures because it will be temporary. The temporary structure would not be considered a hazard to air navigation provided all of the conditions specified in this determination are strictly met.

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 L Change 2, Obstruction Marking and Lighting, flag marker - Chapters 3(Marked)&12.

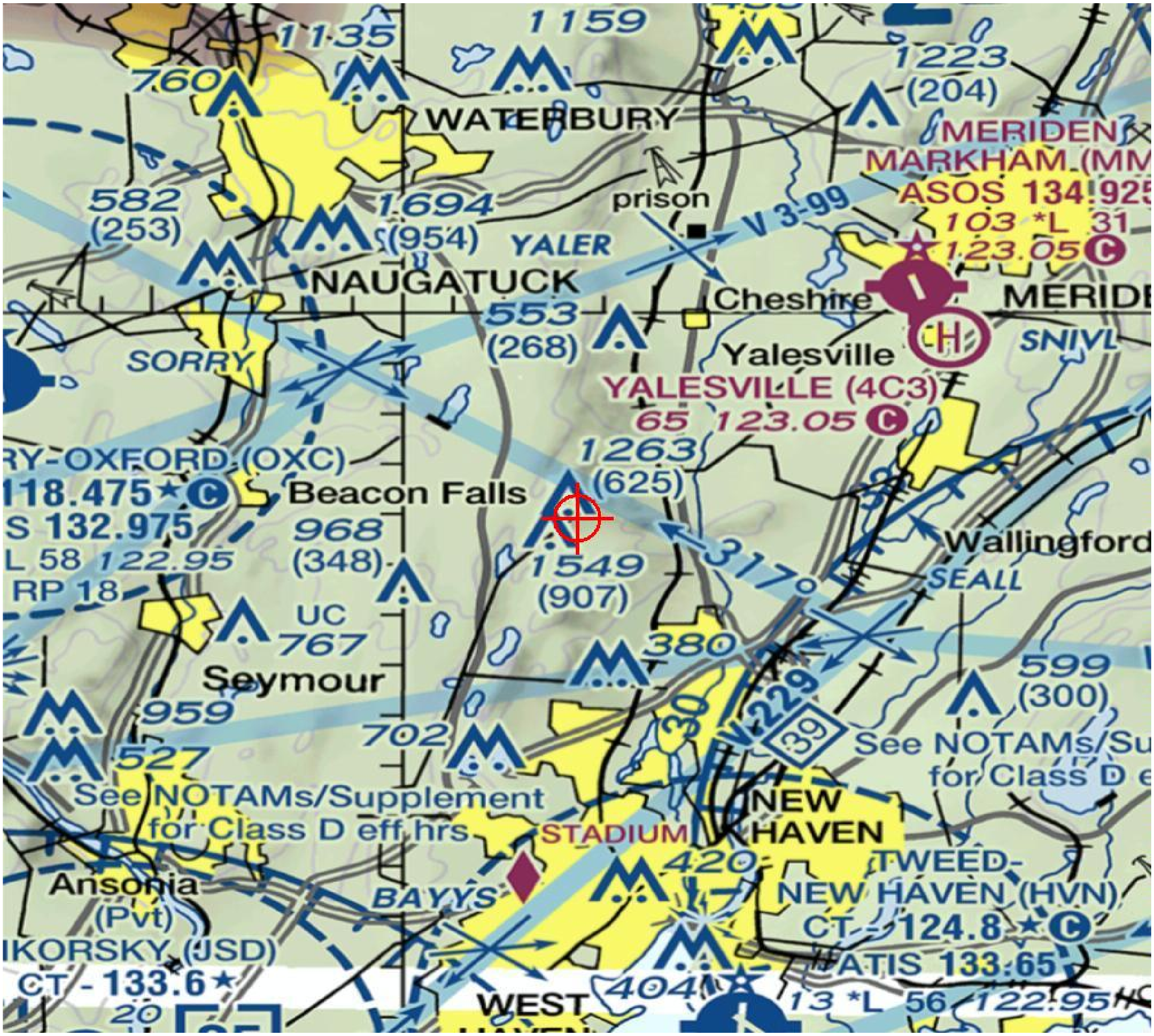
Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

This determination expires on 11/11/2021 unless extended, revised, or terminated by the issuing office.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed within 5 days after the temporary structure is dismantled.

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.

Sectional Map for ASN 2020-ANE-2456-OE



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

Aeronautical Study No.
2020-ANE-2457-OE

Issued Date: 05/11/2020

Bradley J. Parsons, PE, PMP
All-Points Technology Corporation - Engineering
3 Saddlebrook Dr
Killingworth, CT 06419

****DETERMINATION OF NO HAZARD TO AIR NAVIGATION FOR TEMPORARY STRUCTURE****

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:	Crane Point 4
Location:	Hamden, CT
Latitude:	41-25-52.79N NAD 83
Longitude:	72-56-33.90W
Heights:	490 feet site elevation (SE)
	22 feet above ground level (AGL)
	512 feet above mean sea level (AMSL)

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

SEE ATTACHMENT FOR ADDITIONAL CONDITION(S) OR INFORMATION

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.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of a 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 temporary 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.

A copy of this determination will be forwarded to the Federal Aviation Administration Flight Procedures Office if the structure is subject to the issuance of a Notice To Airman (NOTAM).

If you have any questions, please contact our office at (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2457-OE

Signature Control No: 437282158-439462063 (TMP)

David Maddox
Specialist

Additional Condition(s) or Information for ASN 2020-ANE-2457-OE

Proposal: To construct and/or operate a(n) Crane to a height of 22 feet above ground level, 547 feet above mean sea level.

Location: The structure will be located 6.84 nautical miles southwest of MMK Airport reference point.

Case Description for ASN 2020-ANE-2457-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Part 77 Obstruction Standard(s) Exceeded and Aeronautical Impacts, if any:

Preliminary FAA study indicates that the above mentioned structure would:
have no effect on any existing or proposed arrival, departure, or en route instrument flight rules (IFR) operations or procedures.
have no effect on any existing or proposed arrival, departure, or en route visual flight rules (VFR) operations.
have no effect on any existing or proposed arrival, departure, or en route instrument/visual flight rules (IFR/VFR) minimum flight altitudes.
not exceed traffic pattern airspace
have no physical or electromagnetic effect on the operation of air navigation and communications facilities.
have no effect on any airspace and routes used by the military.

Based on this aeronautical study, the structure would not constitute a substantial adverse effect on aeronautical operations or procedures because it will be temporary. The temporary structure would not be considered a hazard to air navigation provided all of the conditions specified in this determination are strictly met.

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 L Change 2, Obstruction Marking and Lighting, flag marker - Chapters 3(Marked)&12.

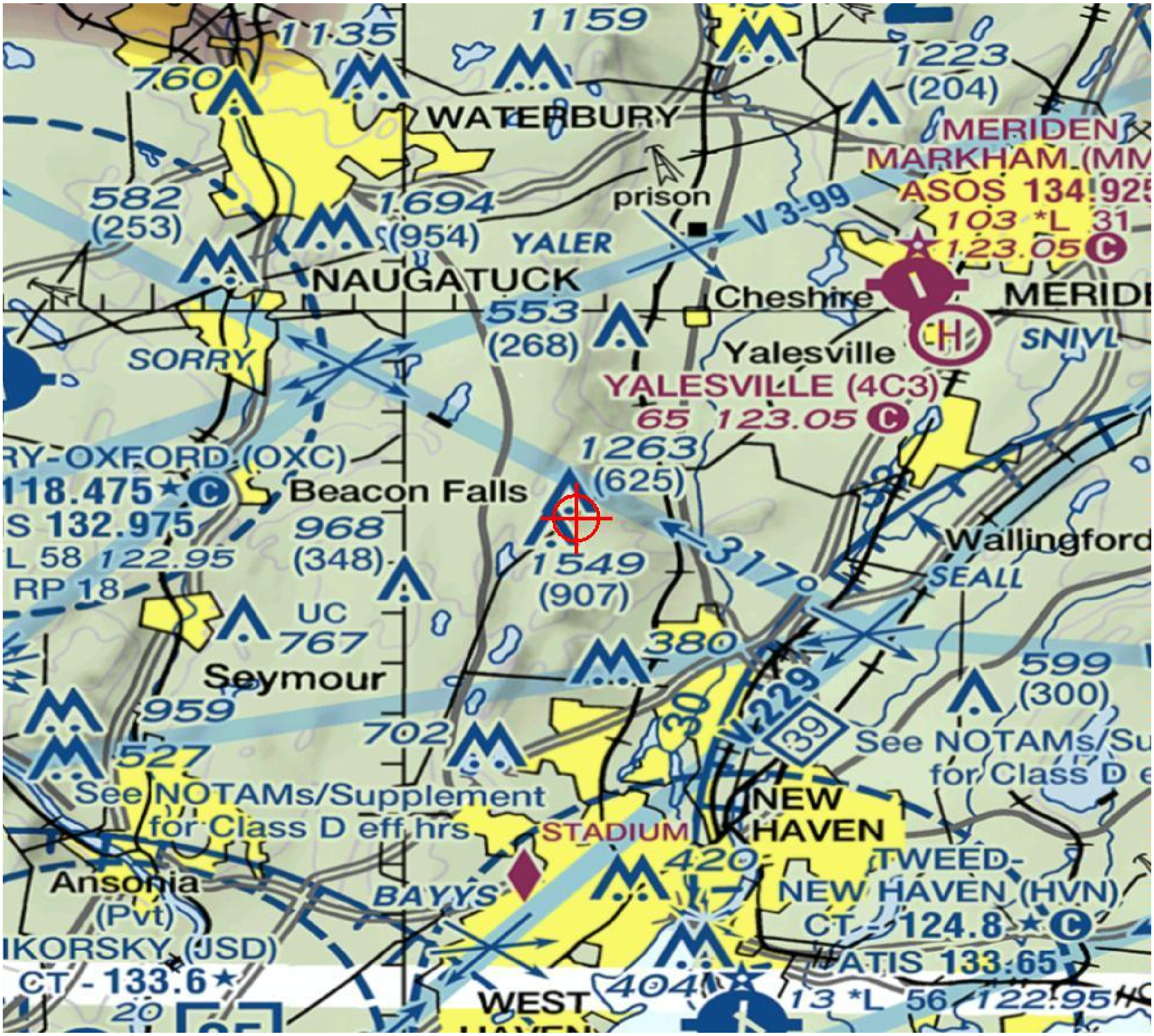
Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

This determination expires on 11/11/2021 unless extended, revised, or terminated by the issuing office.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed within 5 days after the temporary structure is dismantled.

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.

Sectional Map for ASN 2020-ANE-2457-OE



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

Aeronautical Study No.
2020-ANE-2458-OE

Issued Date: 05/11/2020

Bradley J. Parsons, PE, PMP
All-Points Technology Corporation - Engineering
3 Saddlebrook Dr
Killingworth, CT 06419

****DETERMINATION OF NO HAZARD TO AIR NAVIGATION FOR TEMPORARY STRUCTURE****

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:	Crane Point 5
Location:	Hamden, CT
Latitude:	41-25-52.79N NAD 83
Longitude:	72-56-35.03W
Heights:	502 feet site elevation (SE)
	22 feet above ground level (AGL)
	524 feet above mean sea level (AMSL)

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

SEE ATTACHMENT FOR ADDITIONAL CONDITION(S) OR INFORMATION

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.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of a 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 temporary 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.

A copy of this determination will be forwarded to the Federal Aviation Administration Flight Procedures Office if the structure is subject to the issuance of a Notice To Airman (NOTAM).

If you have any questions, please contact our office at (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2458-OE

Signature Control No: 437282159-439462058 (TMP)

David Maddox
Specialist

Additional Condition(s) or Information for ASN 2020-ANE-2458-OE

Proposal: To construct and/or operate a(n) Crane to a height of 22 feet above ground level, 547 feet above mean sea level.

Location: The structure will be located 6.84 nautical miles southwest of MMK Airport reference point.

Case Description for ASN 2020-ANE-2458-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Part 77 Obstruction Standard(s) Exceeded and Aeronautical Impacts, if any:

Preliminary FAA study indicates that the above mentioned structure would:
have no effect on any existing or proposed arrival, departure, or en route instrument flight rules (IFR) operations or procedures.
have no effect on any existing or proposed arrival, departure, or en route visual flight rules (VFR) operations.
have no effect on any existing or proposed arrival, departure, or en route instrument/visual flight rules (IFR/VFR) minimum flight altitudes.
not exceed traffic pattern airspace
have no physical or electromagnetic effect on the operation of air navigation and communications facilities.
have no effect on any airspace and routes used by the military.

Based on this aeronautical study, the structure would not constitute a substantial adverse effect on aeronautical operations or procedures because it will be temporary. The temporary structure would not be considered a hazard to air navigation provided all of the conditions specified in this determination are strictly met.

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 L Change 2, Obstruction Marking and Lighting, flag marker - Chapters 3(Marked)&12.

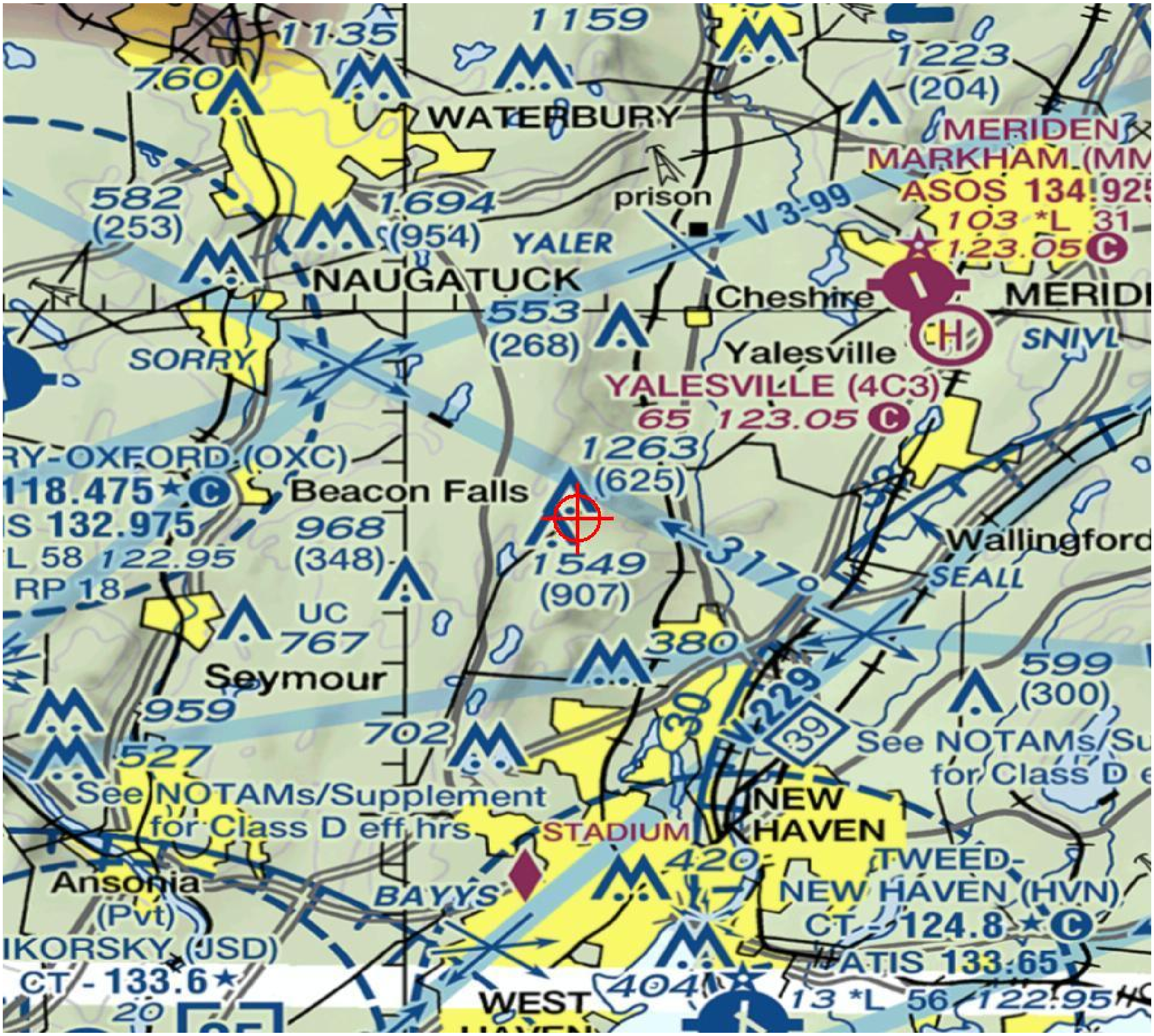
Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

This determination expires on 11/11/2021 unless extended, revised, or terminated by the issuing office.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed within 5 days after the temporary structure is dismantled.

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.

Sectional Map for ASN 2020-ANE-2458-OE



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

Aeronautical Study No.
2020-ANE-2459-OE

Issued Date: 05/11/2020

Bradley J. Parsons, PE, PMP
All-Points Technology Corporation - Engineering
3 Saddlebrook Dr
Killingworth, CT 06419

****DETERMINATION OF NO HAZARD TO AIR NAVIGATION FOR TEMPORARY STRUCTURE****

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:	Crane Point 6
Location:	Hamden, CT
Latitude:	41-25-53.00N NAD 83
Longitude:	72-56-37.20W
Heights:	520 feet site elevation (SE)
	22 feet above ground level (AGL)
	542 feet above mean sea level (AMSL)

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

SEE ATTACHMENT FOR ADDITIONAL CONDITION(S) OR INFORMATION

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.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of a 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 temporary 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.

A copy of this determination will be forwarded to the Federal Aviation Administration Flight Procedures Office if the structure is subject to the issuance of a Notice To Airman (NOTAM).

If you have any questions, please contact our office at (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2459-OE

Signature Control No: 437282160-439462067 (TMP)
David Maddox
Specialist

Additional Condition(s) or Information for ASN 2020-ANE-2459-OE

Proposal: To construct and/or operate a(n) Crane to a height of 22 feet above ground level, 547 feet above mean sea level.

Location: The structure will be located 6.84 nautical miles southwest of MMK Airport reference point.

Case Description for ASN 2020-ANE-2459-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Part 77 Obstruction Standard(s) Exceeded and Aeronautical Impacts, if any:

Preliminary FAA study indicates that the above mentioned structure would:
have no effect on any existing or proposed arrival, departure, or en route instrument flight rules (IFR) operations or procedures.
have no effect on any existing or proposed arrival, departure, or en route visual flight rules (VFR) operations.
have no effect on any existing or proposed arrival, departure, or en route instrument/visual flight rules (IFR/VFR) minimum flight altitudes.
not exceed traffic pattern airspace
have no physical or electromagnetic effect on the operation of air navigation and communications facilities.
have no effect on any airspace and routes used by the military.

Based on this aeronautical study, the structure would not constitute a substantial adverse effect on aeronautical operations or procedures because it will be temporary. The temporary structure would not be considered a hazard to air navigation provided all of the conditions specified in this determination are strictly met.

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 L Change 2, Obstruction Marking and Lighting, flag marker - Chapters 3(Marked)&12.

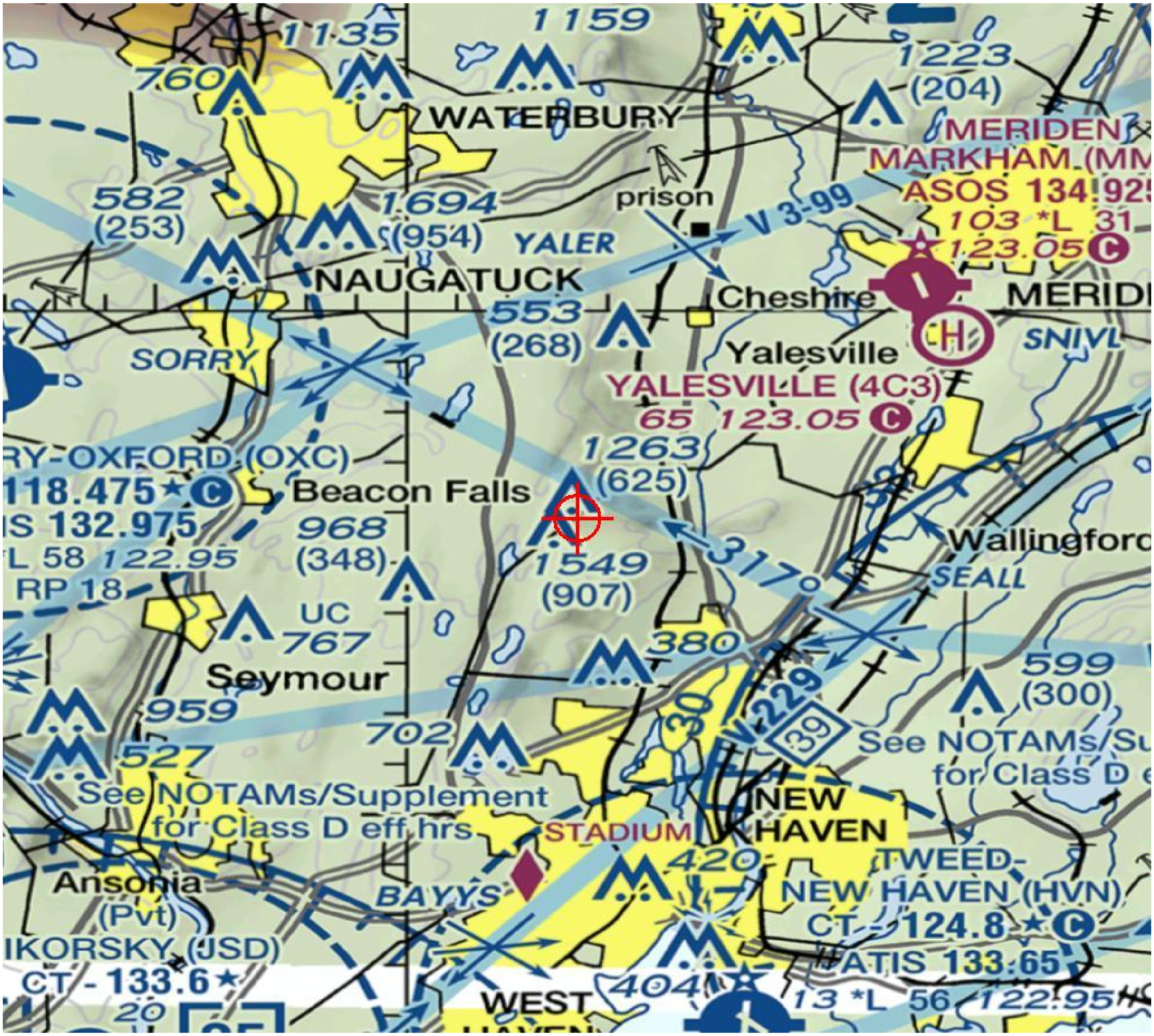
Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

This determination expires on 11/11/2021 unless extended, revised, or terminated by the issuing office.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed within 5 days after the temporary structure is dismantled.

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.

Sectional Map for ASN 2020-ANE-2459-OE



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

Aeronautical Study No.
2020-ANE-2460-OE

Issued Date: 05/11/2020

Bradley J. Parsons, PE, PMP
All-Points Technology Corporation - Engineering
3 Saddlebrook Dr
Killingworth, CT 06419

****DETERMINATION OF NO HAZARD TO AIR NAVIGATION FOR TEMPORARY STRUCTURE****

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:	Crane Point 7
Location:	Hamden, CT
Latitude:	41-25-53.44N NAD 83
Longitude:	72-56-39.32W
Heights:	536 feet site elevation (SE)
	22 feet above ground level (AGL)
	558 feet above mean sea level (AMSL)

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

SEE ATTACHMENT FOR ADDITIONAL CONDITION(S) OR INFORMATION

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.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of a 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 temporary 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.

A copy of this determination will be forwarded to the Federal Aviation Administration Flight Procedures Office if the structure is subject to the issuance of a Notice To Airman (NOTAM).

If you have any questions, please contact our office at (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2460-OE

Signature Control No: 437282161-439462062 (TMP)
David Maddox
Specialist

Additional Condition(s) or Information for ASN 2020-ANE-2460-OE

Proposal: To construct and/or operate a(n) Crane to a height of 22 feet above ground level, 547 feet above mean sea level.

Location: The structure will be located 6.84 nautical miles southwest of MMK Airport reference point.

Case Description for ASN 2020-ANE-2460-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Part 77 Obstruction Standard(s) Exceeded and Aeronautical Impacts, if any:

Preliminary FAA study indicates that the above mentioned structure would:
have no effect on any existing or proposed arrival, departure, or en route instrument flight rules (IFR) operations or procedures.
have no effect on any existing or proposed arrival, departure, or en route visual flight rules (VFR) operations.
have no effect on any existing or proposed arrival, departure, or en route instrument/visual flight rules (IFR/VFR) minimum flight altitudes.
not exceed traffic pattern airspace
have no physical or electromagnetic effect on the operation of air navigation and communications facilities.
have no effect on any airspace and routes used by the military.

Based on this aeronautical study, the structure would not constitute a substantial adverse effect on aeronautical operations or procedures because it will be temporary. The temporary structure would not be considered a hazard to air navigation provided all of the conditions specified in this determination are strictly met.

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 L Change 2, Obstruction Marking and Lighting, flag marker - Chapters 3(Marked)&12.

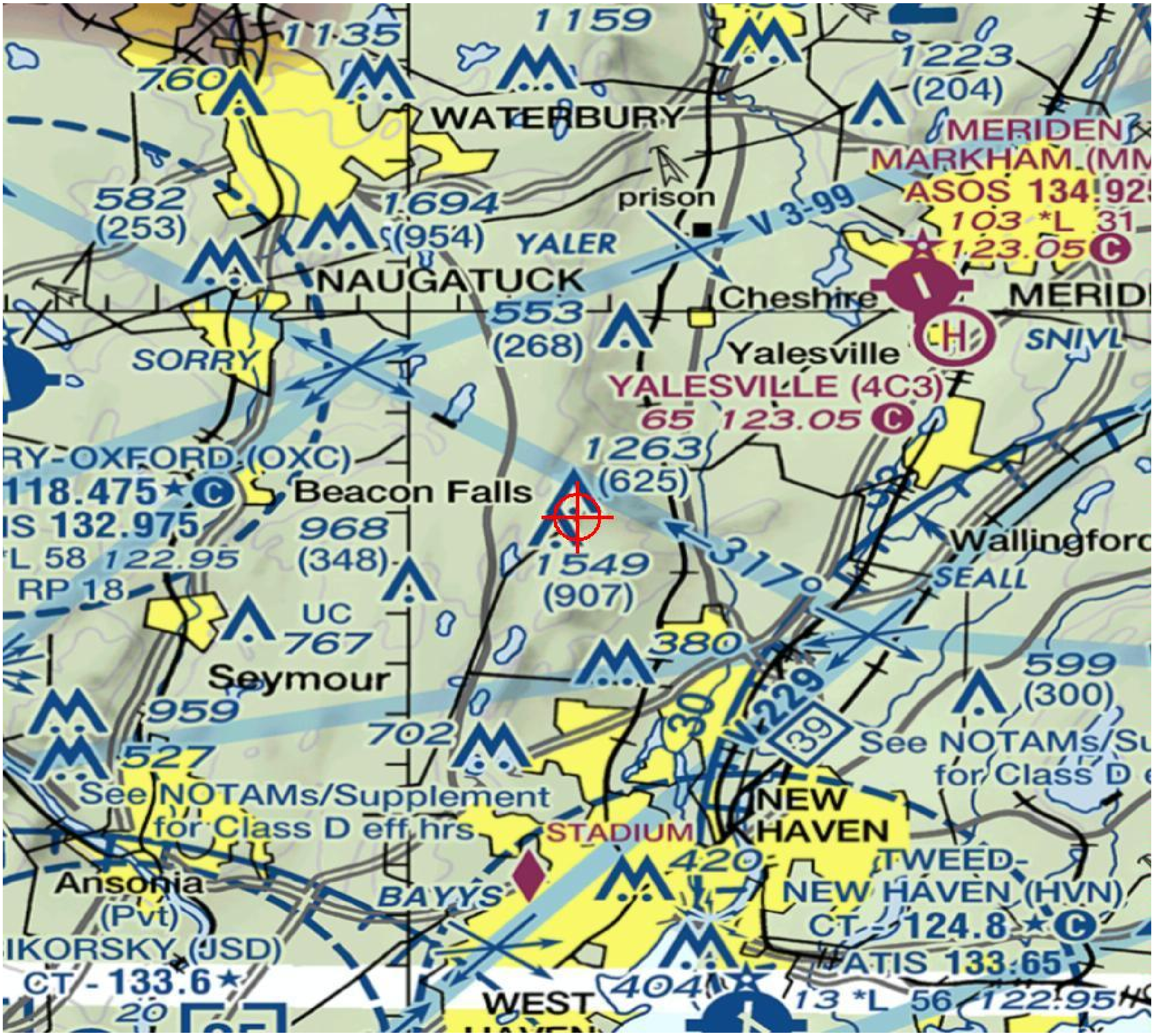
Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

This determination expires on 11/11/2021 unless extended, revised, or terminated by the issuing office.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed within 5 days after the temporary structure is dismantled.

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.

Sectional Map for ASN 2020-ANE-2460-OE



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

Aeronautical Study No.
2020-ANE-2461-OE

Issued Date: 05/11/2020

Bradley J. Parsons, PE, PMP
All-Points Technology Corporation - Engineering
3 Saddlebrook Dr
Killingworth, CT 06419

****DETERMINATION OF NO HAZARD TO AIR NAVIGATION FOR TEMPORARY STRUCTURE****

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:	Crane Point 8
Location:	Hamden, CT
Latitude:	41-25-53.44N NAD 83
Longitude:	72-56-41.59W
Heights:	566 feet site elevation (SE)
	22 feet above ground level (AGL)
	588 feet above mean sea level (AMSL)

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

SEE ATTACHMENT FOR ADDITIONAL CONDITION(S) OR INFORMATION

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.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of a 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 temporary 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.

A copy of this determination will be forwarded to the Federal Aviation Administration Flight Procedures Office if the structure is subject to the issuance of a Notice To Airman (NOTAM).

If you have any questions, please contact our office at (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2461-OE

Signature Control No: 437282162-439462064 (TMP)
David Maddox
Specialist

Additional Condition(s) or Information for ASN 2020-ANE-2461-OE

Proposal: To construct and/or operate a(n) Crane to a height of 22 feet above ground level, 547 feet above mean sea level.

Location: The structure will be located 6.84 nautical miles southwest of MMK Airport reference point.

Case Description for ASN 2020-ANE-2461-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Part 77 Obstruction Standard(s) Exceeded and Aeronautical Impacts, if any:

Preliminary FAA study indicates that the above mentioned structure would:
have no effect on any existing or proposed arrival, departure, or en route instrument flight rules (IFR) operations or procedures.
have no effect on any existing or proposed arrival, departure, or en route visual flight rules (VFR) operations.
have no effect on any existing or proposed arrival, departure, or en route instrument/visual flight rules (IFR/VFR) minimum flight altitudes.
not exceed traffic pattern airspace
have no physical or electromagnetic effect on the operation of air navigation and communications facilities.
have no effect on any airspace and routes used by the military.

Based on this aeronautical study, the structure would not constitute a substantial adverse effect on aeronautical operations or procedures because it will be temporary. The temporary structure would not be considered a hazard to air navigation provided all of the conditions specified in this determination are strictly met.

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 L Change 2, Obstruction Marking and Lighting, flag marker - Chapters 3(Marked)&12.

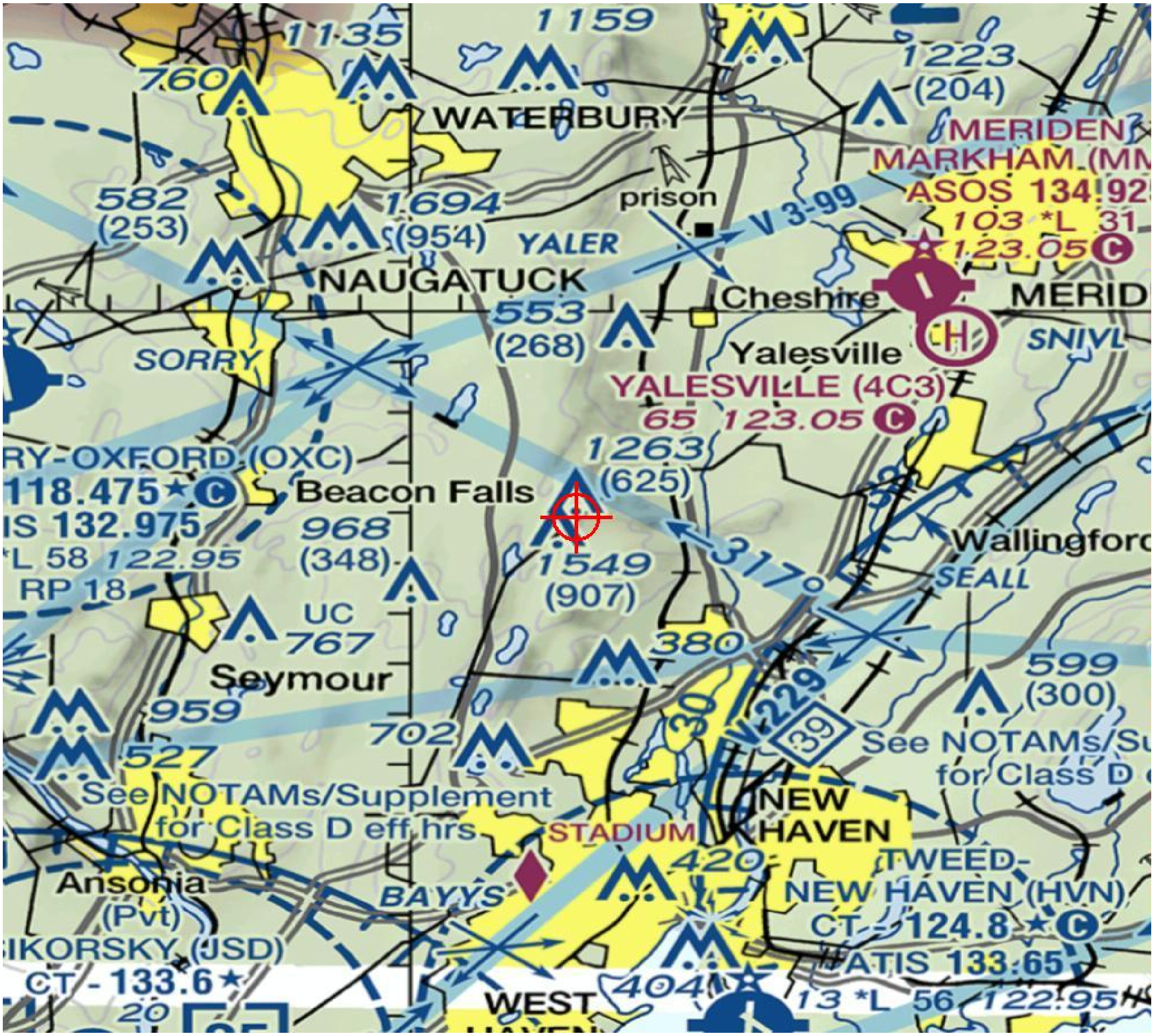
Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

This determination expires on 11/11/2021 unless extended, revised, or terminated by the issuing office.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed within 5 days after the temporary structure is dismantled.

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.

Sectional Map for ASN 2020-ANE-2461-OE



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

Aeronautical Study No.
2020-ANE-2462-OE

Issued Date: 05/11/2020

Bradley J. Parsons, PE, PMP
All-Points Technology Corporation - Engineering
3 Saddlebrook Dr
Killingworth, CT 06419

****DETERMINATION OF NO HAZARD TO AIR NAVIGATION FOR TEMPORARY STRUCTURE****

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:	Crane Point 9 (Also HP)
Location:	Hamden, CT
Latitude:	41-25-55.56N NAD 83
Longitude:	72-56-41.26W
Heights:	574 feet site elevation (SE)
	22 feet above ground level (AGL)
	596 feet above mean sea level (AMSL)

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

SEE ATTACHMENT FOR ADDITIONAL CONDITION(S) OR INFORMATION

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.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of a 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 temporary 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.

A copy of this determination will be forwarded to the Federal Aviation Administration Flight Procedures Office if the structure is subject to the issuance of a Notice To Airman (NOTAM).

If you have any questions, please contact our office at (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2462-OE

Signature Control No: 437282163-439462061 (TMP)

David Maddox
Specialist

Additional Condition(s) or Information for ASN 2020-ANE-2462-OE

Proposal: To construct and/or operate a(n) Crane to a height of 22 feet above ground level, 547 feet above mean sea level.

Location: The structure will be located 6.84 nautical miles southwest of MMK Airport reference point.

Case Description for ASN 2020-ANE-2462-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Part 77 Obstruction Standard(s) Exceeded and Aeronautical Impacts, if any:

Preliminary FAA study indicates that the above mentioned structure would:
have no effect on any existing or proposed arrival, departure, or en route instrument flight rules (IFR) operations or procedures.
have no effect on any existing or proposed arrival, departure, or en route visual flight rules (VFR) operations.
have no effect on any existing or proposed arrival, departure, or en route instrument/visual flight rules (IFR/VFR) minimum flight altitudes.
not exceed traffic pattern airspace
have no physical or electromagnetic effect on the operation of air navigation and communications facilities.
have no effect on any airspace and routes used by the military.

Based on this aeronautical study, the structure would not constitute a substantial adverse effect on aeronautical operations or procedures because it will be temporary. The temporary structure would not be considered a hazard to air navigation provided all of the conditions specified in this determination are strictly met.

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 L Change 2, Obstruction Marking and Lighting, flag marker - Chapters 3(Marked)&12.

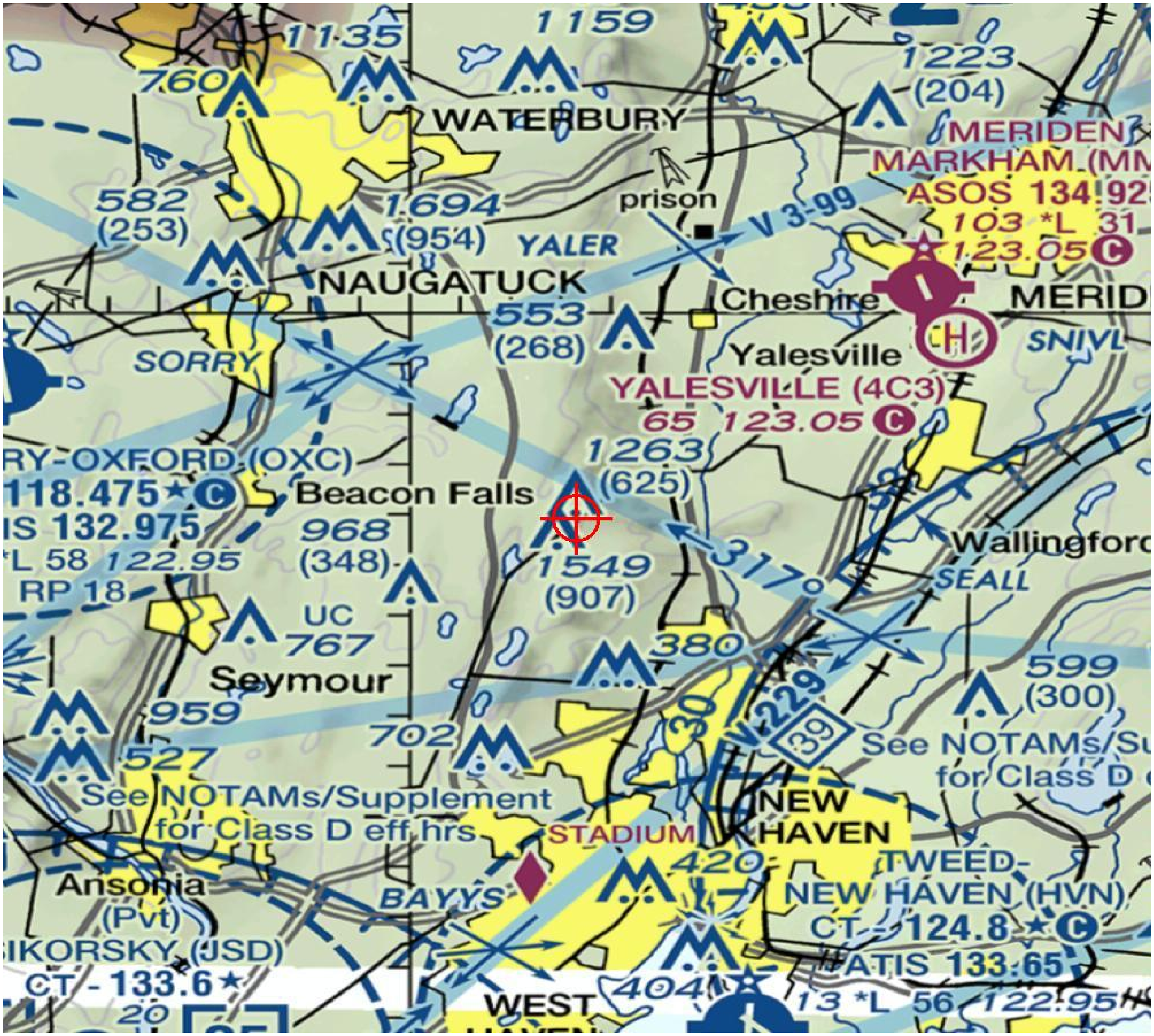
Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

This determination expires on 11/11/2021 unless extended, revised, or terminated by the issuing office.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed within 5 days after the temporary structure is dismantled.

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.

Sectional Map for ASN 2020-ANE-2462-OE



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10101 Hillwood Parkway
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Aeronautical Study No.
2020-ANE-2463-OE

Issued Date: 05/11/2020

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All-Points Technology Corporation - Engineering
3 Saddlebrook Dr
Killingworth, CT 06419

****DETERMINATION OF NO HAZARD TO AIR NAVIGATION FOR TEMPORARY STRUCTURE****

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:	Crane Point 10
Location:	Hamden, CT
Latitude:	41-25-58.67N NAD 83
Longitude:	72-56-37.93W
Heights:	552 feet site elevation (SE)
	22 feet above ground level (AGL)
	574 feet above mean sea level (AMSL)

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

SEE ATTACHMENT FOR ADDITIONAL CONDITION(S) OR INFORMATION

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.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of a 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 temporary 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.

A copy of this determination will be forwarded to the Federal Aviation Administration Flight Procedures Office if the structure is subject to the issuance of a Notice To Airman (NOTAM).

If you have any questions, please contact our office at (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2463-OE

Signature Control No: 437282165-439462066 (TMP)

David Maddox
Specialist

Additional Condition(s) or Information for ASN 2020-ANE-2463-OE

Proposal: To construct and/or operate a(n) Crane to a height of 22 feet above ground level, 547 feet above mean sea level.

Location: The structure will be located 6.84 nautical miles southwest of MMK Airport reference point.

Case Description for ASN 2020-ANE-2463-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Part 77 Obstruction Standard(s) Exceeded and Aeronautical Impacts, if any:

Preliminary FAA study indicates that the above mentioned structure would:
have no effect on any existing or proposed arrival, departure, or en route instrument flight rules (IFR) operations or procedures.
have no effect on any existing or proposed arrival, departure, or en route visual flight rules (VFR) operations.
have no effect on any existing or proposed arrival, departure, or en route instrument/visual flight rules (IFR/VFR) minimum flight altitudes.
not exceed traffic pattern airspace
have no physical or electromagnetic effect on the operation of air navigation and communications facilities.
have no effect on any airspace and routes used by the military.

Based on this aeronautical study, the structure would not constitute a substantial adverse effect on aeronautical operations or procedures because it will be temporary. The temporary structure would not be considered a hazard to air navigation provided all of the conditions specified in this determination are strictly met.

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 L Change 2, Obstruction Marking and Lighting, flag marker - Chapters 3(Marked)&12.

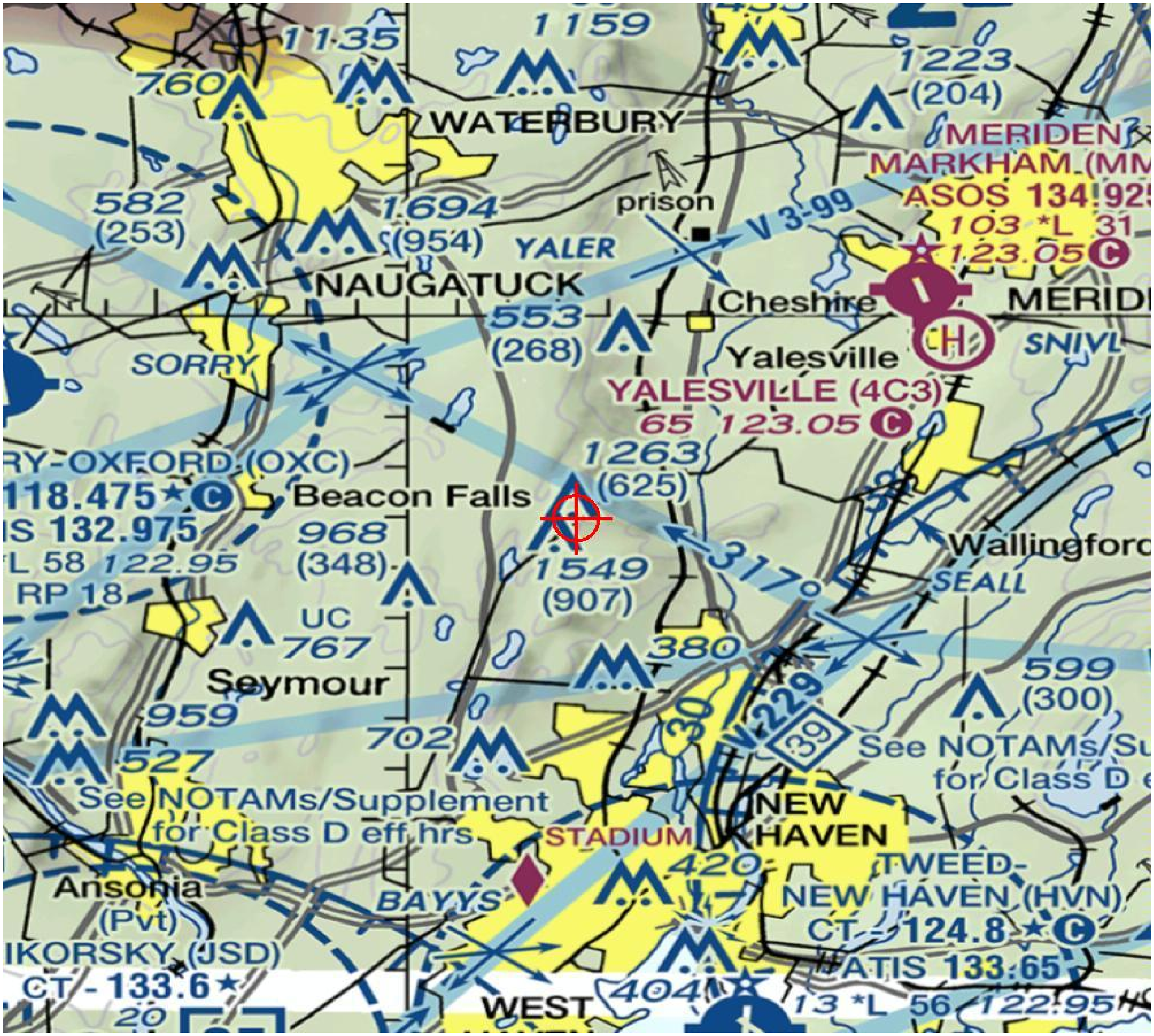
Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

This determination expires on 11/11/2021 unless extended, revised, or terminated by the issuing office.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed within 5 days after the temporary structure is dismantled.

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.

Sectional Map for ASN 2020-ANE-2463-OE



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Aeronautical Study No.
2020-ANE-2464-OE

Issued Date: 05/11/2020

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Killingworth, CT 06419

****DETERMINATION OF NO HAZARD TO AIR NAVIGATION FOR TEMPORARY STRUCTURE****

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:	Crane Point 11
Location:	Hamden, CT
Latitude:	41-25-58.89N NAD 83
Longitude:	72-56-36.75W
Heights:	540 feet site elevation (SE)
	22 feet above ground level (AGL)
	562 feet above mean sea level (AMSL)

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

SEE ATTACHMENT FOR ADDITIONAL CONDITION(S) OR INFORMATION

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.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of a 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 temporary 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.

A copy of this determination will be forwarded to the Federal Aviation Administration Flight Procedures Office if the structure is subject to the issuance of a Notice To Airman (NOTAM).

If you have any questions, please contact our office at (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2464-OE

Signature Control No: 437282166-439462060 (TMP)

David Maddox
Specialist

Additional Condition(s) or Information for ASN 2020-ANE-2464-OE

Proposal: To construct and/or operate a(n) Crane to a height of 22 feet above ground level, 547 feet above mean sea level.

Location: The structure will be located 6.84 nautical miles southwest of MMK Airport reference point.

Case Description for ASN 2020-ANE-2464-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Part 77 Obstruction Standard(s) Exceeded and Aeronautical Impacts, if any:

Preliminary FAA study indicates that the above mentioned structure would:
have no effect on any existing or proposed arrival, departure, or en route instrument flight rules (IFR) operations or procedures.
have no effect on any existing or proposed arrival, departure, or en route visual flight rules (VFR) operations.
have no effect on any existing or proposed arrival, departure, or en route instrument/visual flight rules (IFR/VFR) minimum flight altitudes.
not exceed traffic pattern airspace
have no physical or electromagnetic effect on the operation of air navigation and communications facilities.
have no effect on any airspace and routes used by the military.

Based on this aeronautical study, the structure would not constitute a substantial adverse effect on aeronautical operations or procedures because it will be temporary. The temporary structure would not be considered a hazard to air navigation provided all of the conditions specified in this determination are strictly met.

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 L Change 2, Obstruction Marking and Lighting, flag marker - Chapters 3(Marked)&12.

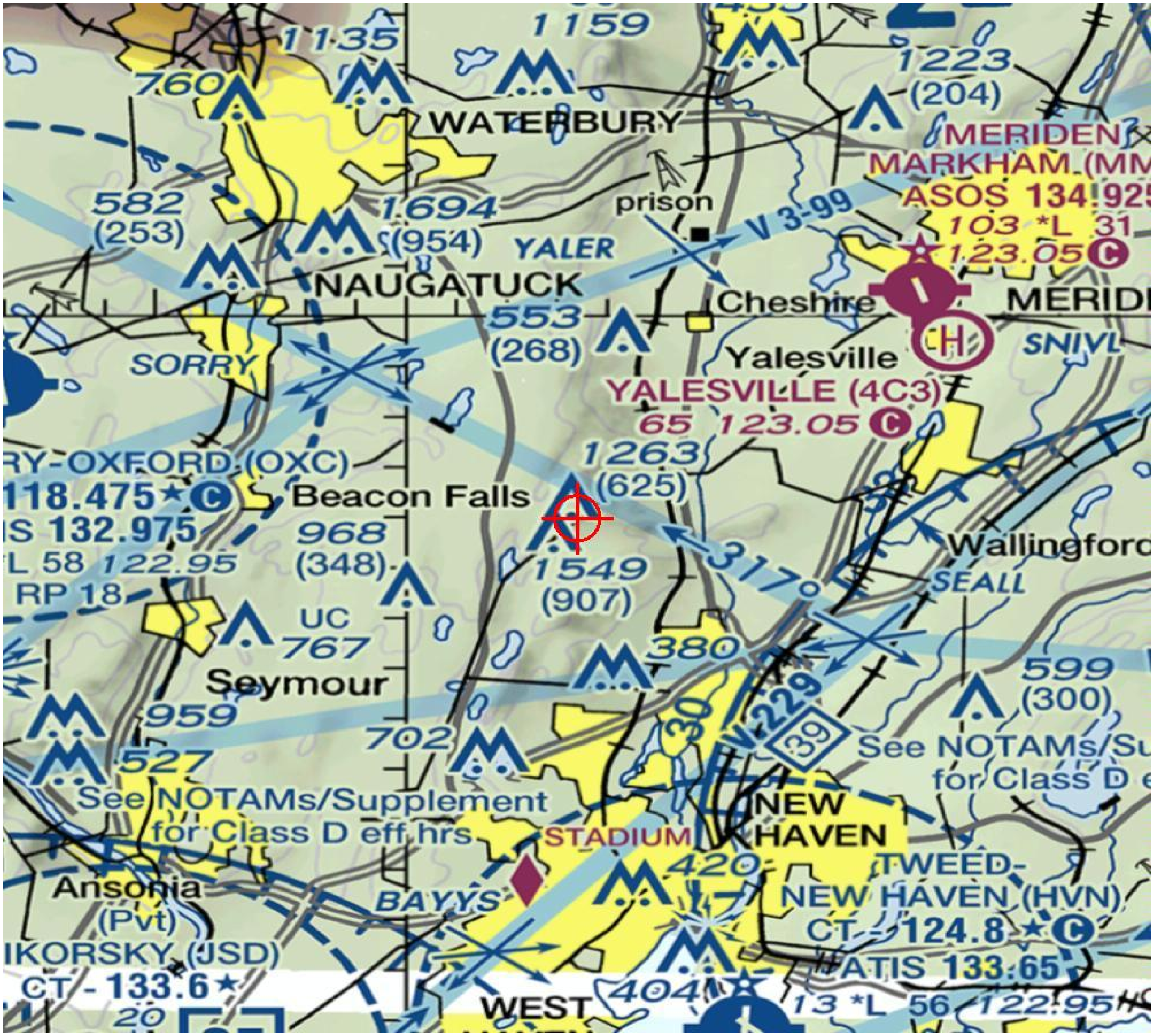
Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

This determination expires on 11/11/2021 unless extended, revised, or terminated by the issuing office.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed within 5 days after the temporary structure is dismantled.

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.

Sectional Map for ASN 2020-ANE-2464-OE



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Aeronautical Study No.
2020-ANE-2465-OE

Issued Date: 05/11/2020

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Killingworth, CT 06419

**** 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 Point 1
Location:	Hamden, CT
Latitude:	41-25-58.90N NAD 83
Longitude:	72-56-35.04W
Heights:	525 feet site elevation (SE)
	10 feet above ground level (AGL)
	535 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:

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 L Change 2.

This determination expires on 11/11/2021 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 (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2465-OE.

Signature Control No: 437297914-439461339 (DNE)

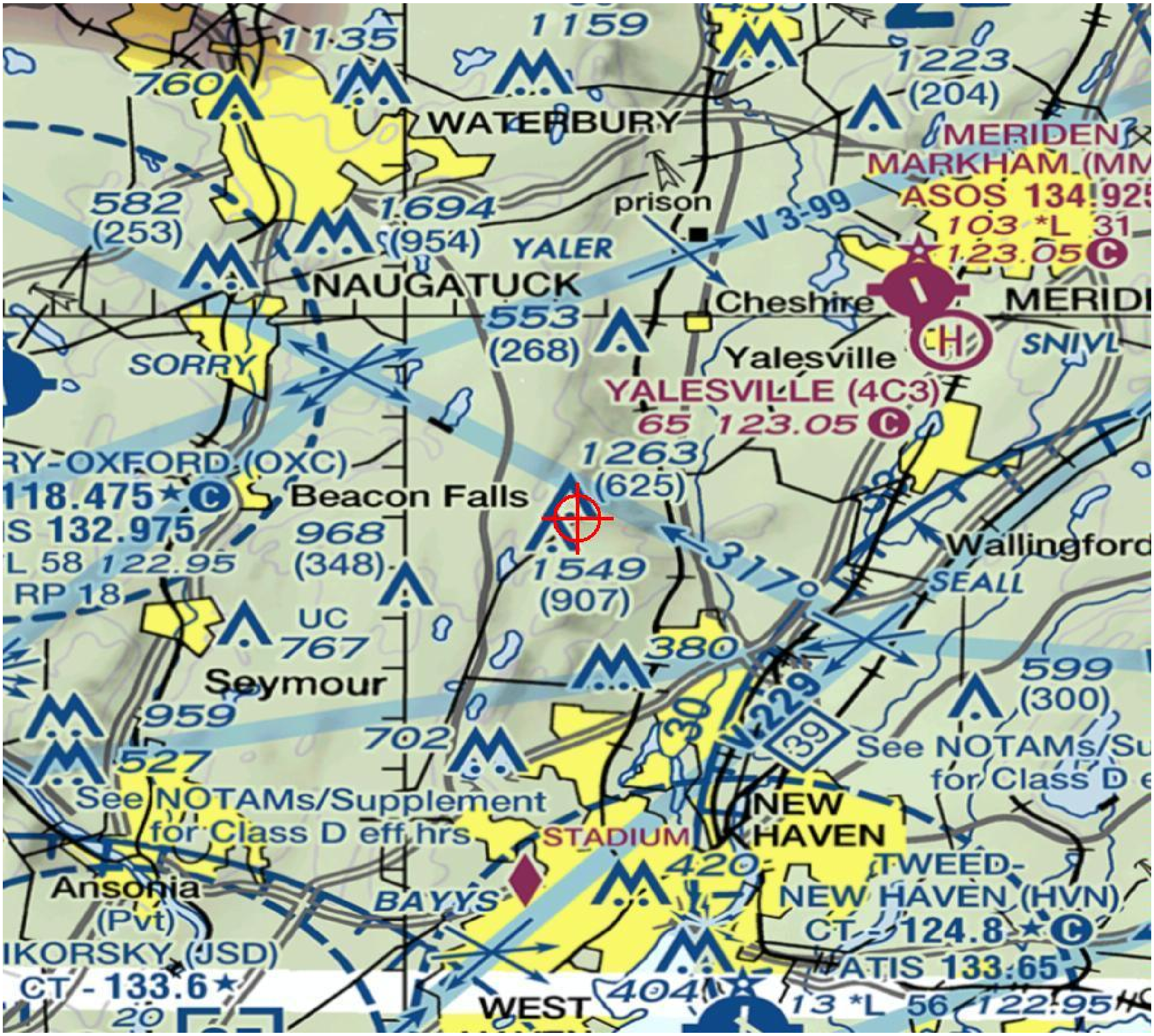
David Maddox
Specialist

Attachment(s)
Case Description
Map(s)

Case Description for ASN 2020-ANE-2465-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Sectional Map for ASN 2020-ANE-2465-OE



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Fort Worth, TX 76177

Aeronautical Study No.
2020-ANE-2466-OE

Issued Date: 05/11/2020

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**** 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 Point 2
Location:	Hamden, CT
Latitude:	41-25-55.57N NAD 83
Longitude:	72-56-32.75W
Heights:	490 feet site elevation (SE) 10 feet above ground level (AGL) 500 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:

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 L Change 2.

This determination expires on 11/11/2021 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 (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2466-OE.

Signature Control No: 437297915-439461341 (DNE)
David Maddox
Specialist

Attachment(s)
Case Description
Map(s)

Case Description for ASN 2020-ANE-2466-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Sectional Map for ASN 2020-ANE-2466-OE

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Aeronautical Study No.
2020-ANE-2467-OE

Issued Date: 05/11/2020

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**** 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 Point 3
Location:	Hamden, CT
Latitude:	41-25-55.07N NAD 83
Longitude:	72-56-32.78W
Heights:	490 feet site elevation (SE) 10 feet above ground level (AGL) 500 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:

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 L Change 2.

This determination expires on 11/11/2021 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 (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2467-OE.

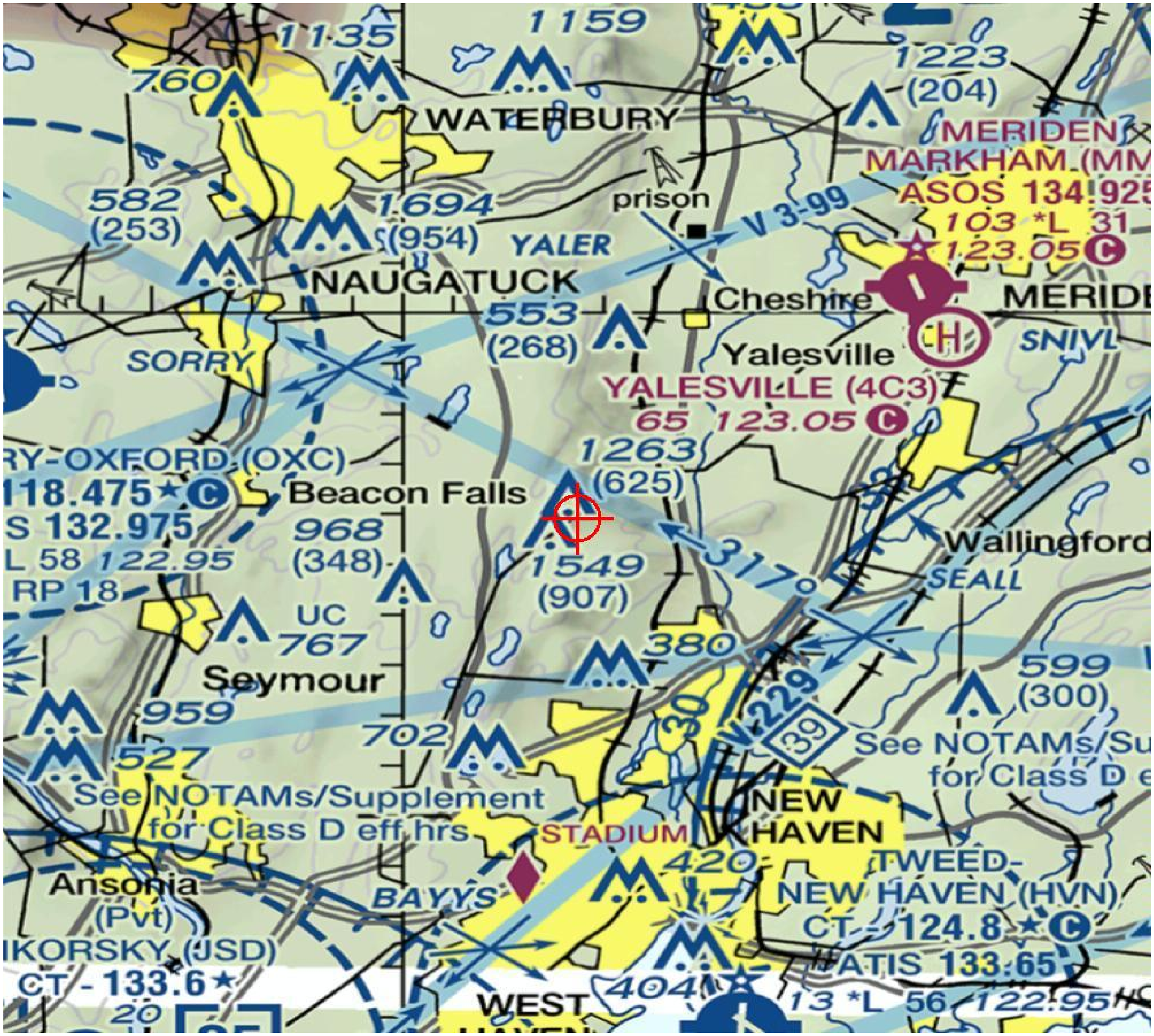
Signature Control No: 437297916-439461343 (DNE)
David Maddox
Specialist

Attachment(s)
Case Description
Map(s)

Case Description for ASN 2020-ANE-2467-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Sectional Map for ASN 2020-ANE-2467-OE



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Aeronautical Study No.
2020-ANE-2468-OE

Issued Date: 05/11/2020

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**** 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 Point 4
Location:	Hamden, CT
Latitude:	41-25-52.79N NAD 83
Longitude:	72-56-33.90W
Heights:	490 feet site elevation (SE)
	10 feet above ground level (AGL)
	500 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:

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 L Change 2.

This determination expires on 11/11/2021 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 (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2468-OE.

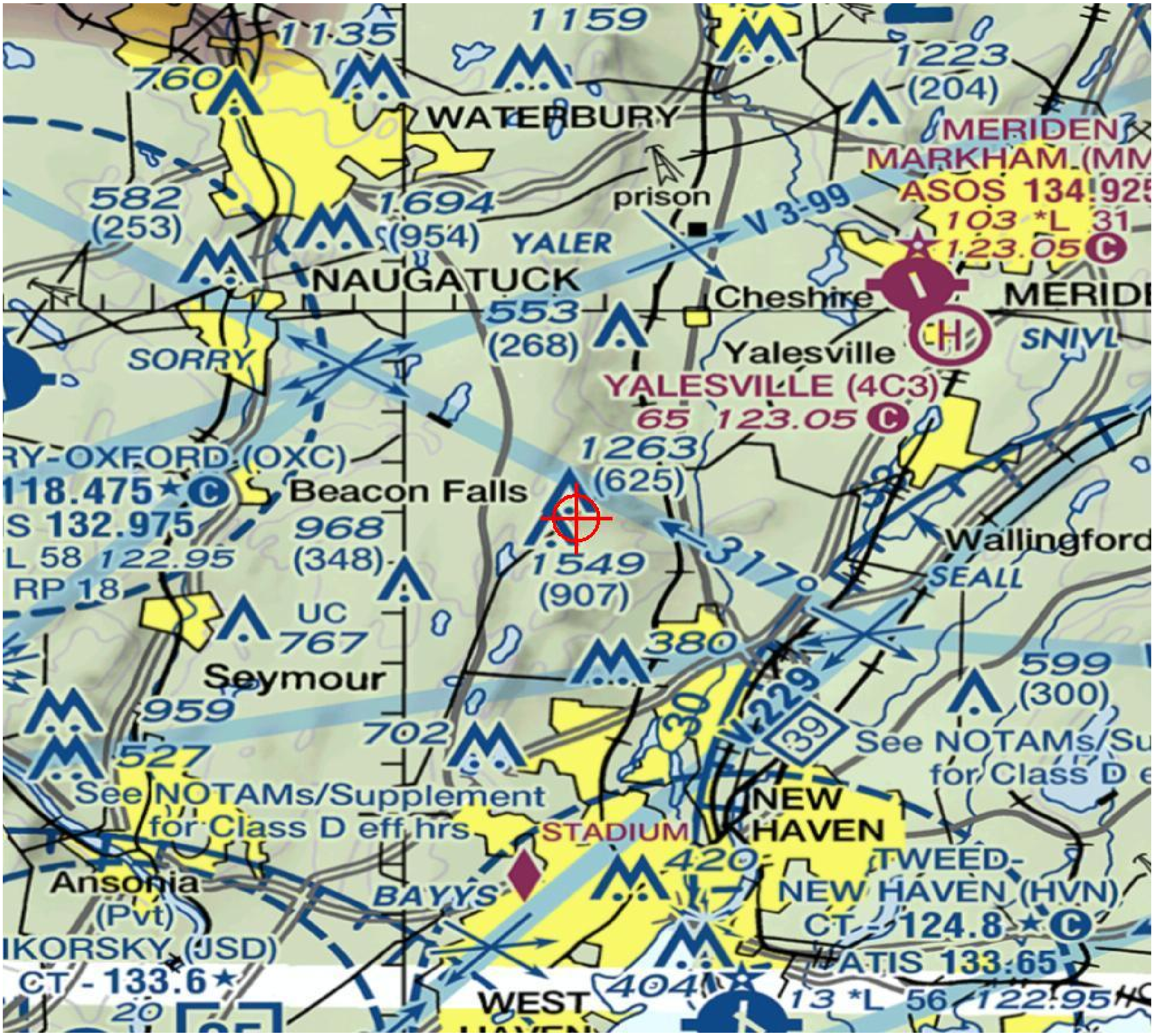
Signature Control No: 437297917-439461340 (DNE)
David Maddox
Specialist

Attachment(s)
Case Description
Map(s)

Case Description for ASN 2020-ANE-2468-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Sectional Map for ASN 2020-ANE-2468-OE



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Federal Aviation Administration
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10101 Hillwood Parkway
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Aeronautical Study No.
2020-ANE-2469-OE

Issued Date: 05/11/2020

Bradley J. Parsons, PE, PMP
All-Points Technology Corporation - Engineering
3 Saddlebrook Dr
Killingworth, CT 06419

**** 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 Point 5
Location:	Hamden, CT
Latitude:	41-25-52.79N NAD 83
Longitude:	72-56-35.03W
Heights:	502 feet site elevation (SE)
	10 feet above ground level (AGL)
	512 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:

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 L Change 2.

This determination expires on 11/11/2021 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 (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2469-OE.

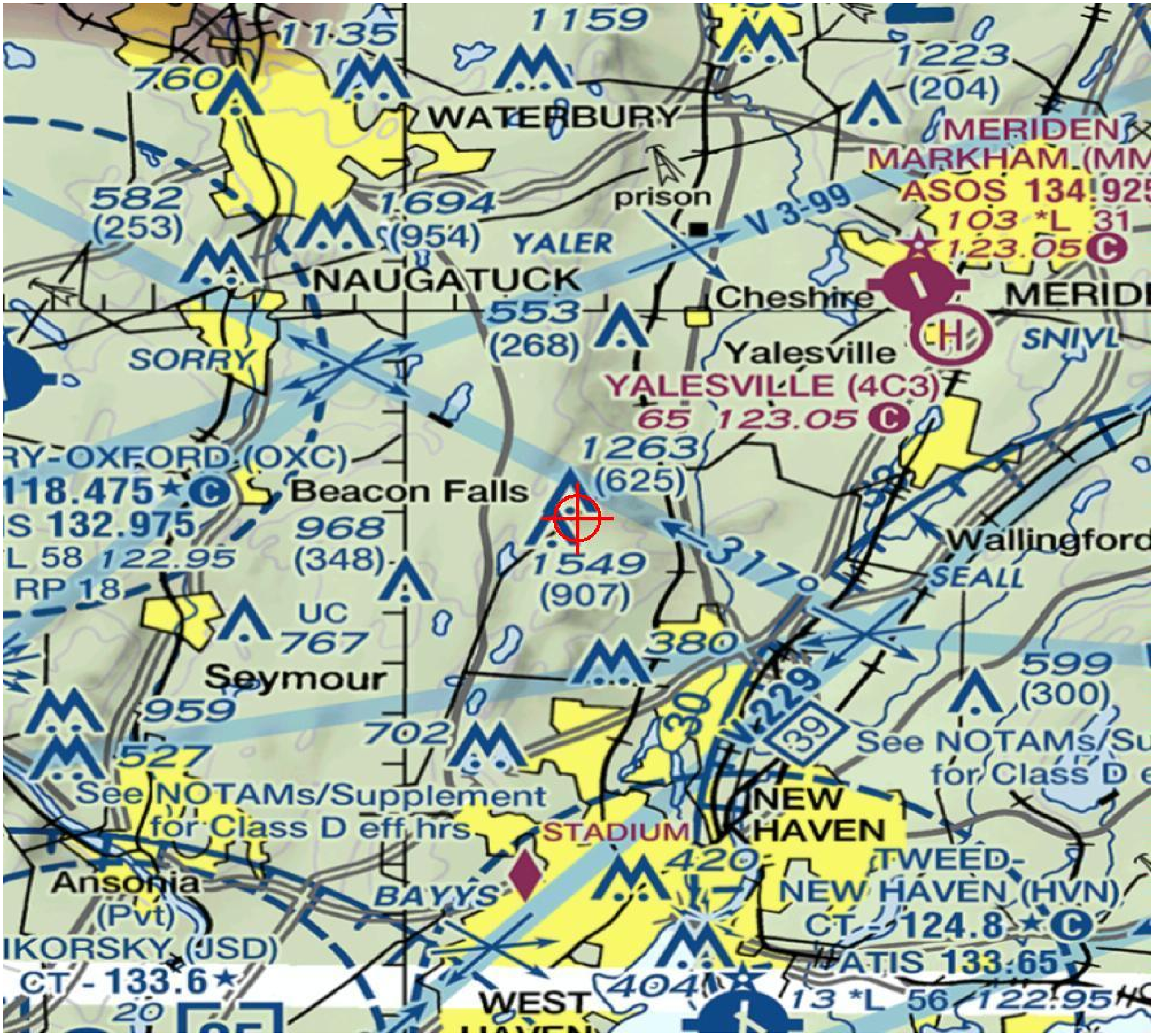
Signature Control No: 437297918-439461342 (DNE)
David Maddox
Specialist

Attachment(s)
Case Description
Map(s)

Case Description for ASN 2020-ANE-2469-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Sectional Map for ASN 2020-ANE-2469-OE



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Aeronautical Study No.
2020-ANE-2470-OE

Issued Date: 06/12/2020

Bradley J. Parsons, PE, PMP
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Killingworth, CT 06419

**** 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 Point 6
Location:	Hamden, CT
Latitude:	41-25-53.00N NAD 83
Longitude:	72-56-37.20W
Heights:	520 feet site elevation (SE)
	10 feet above ground level (AGL)
	530 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:

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 L Change 2.

This determination expires on 12/12/2021 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 (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2470-OE.

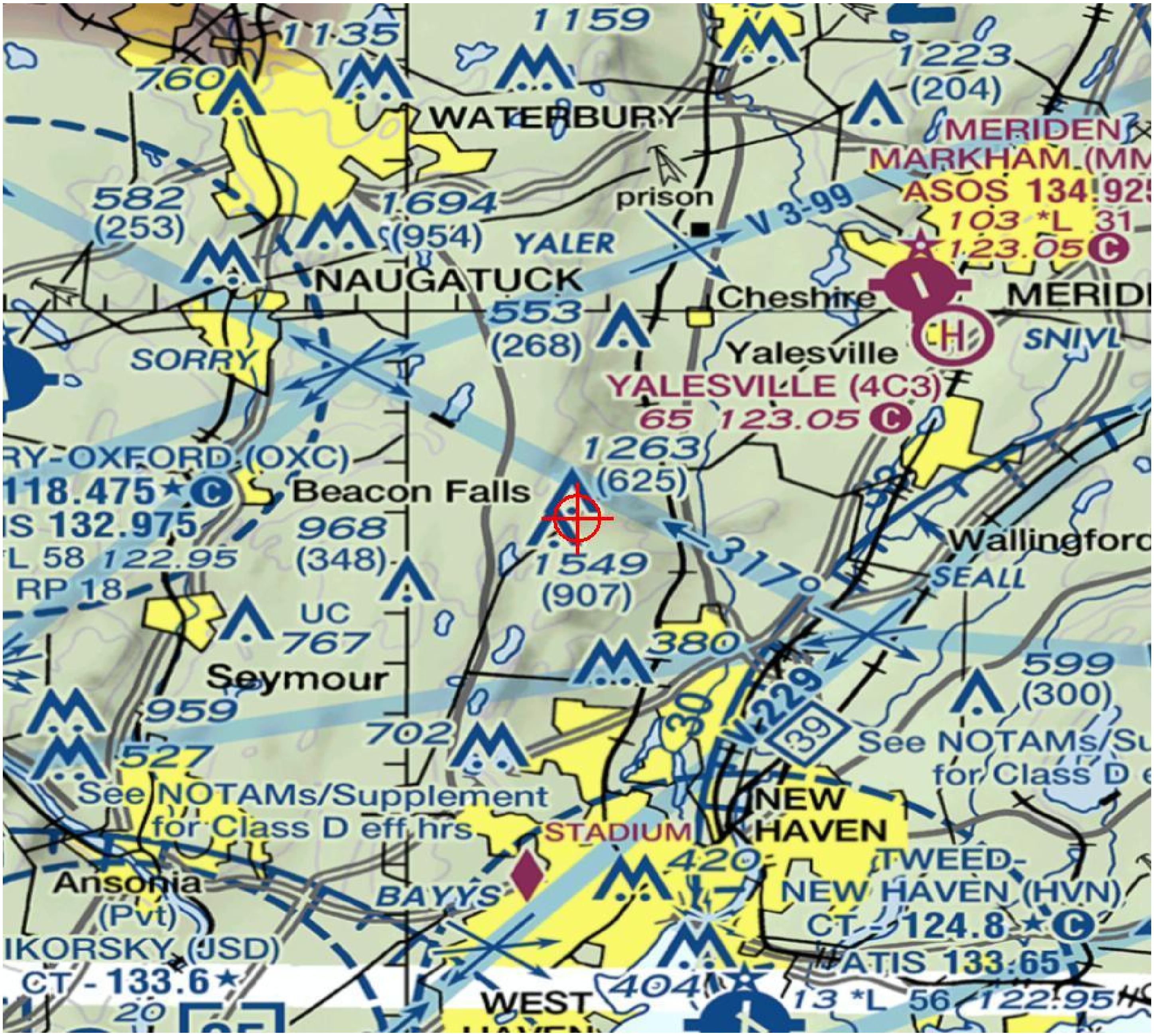
Signature Control No: 437297919-442691932 (DNE)
David Maddox
Specialist

Attachment(s)
Case Description
Map(s)

Case Description for ASN 2020-ANE-2470-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Sectional Map for ASN 2020-ANE-2470-OE



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Aeronautical Study No.
2020-ANE-2471-OE

Issued Date: 06/12/2020

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**** 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 Point 7
Location:	Hamden, CT
Latitude:	41-25-53.44N NAD 83
Longitude:	72-56-39.32W
Heights:	536 feet site elevation (SE)
	10 feet above ground level (AGL)
	546 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:

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 L Change 2.

This determination expires on 12/12/2021 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 (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2471-OE.

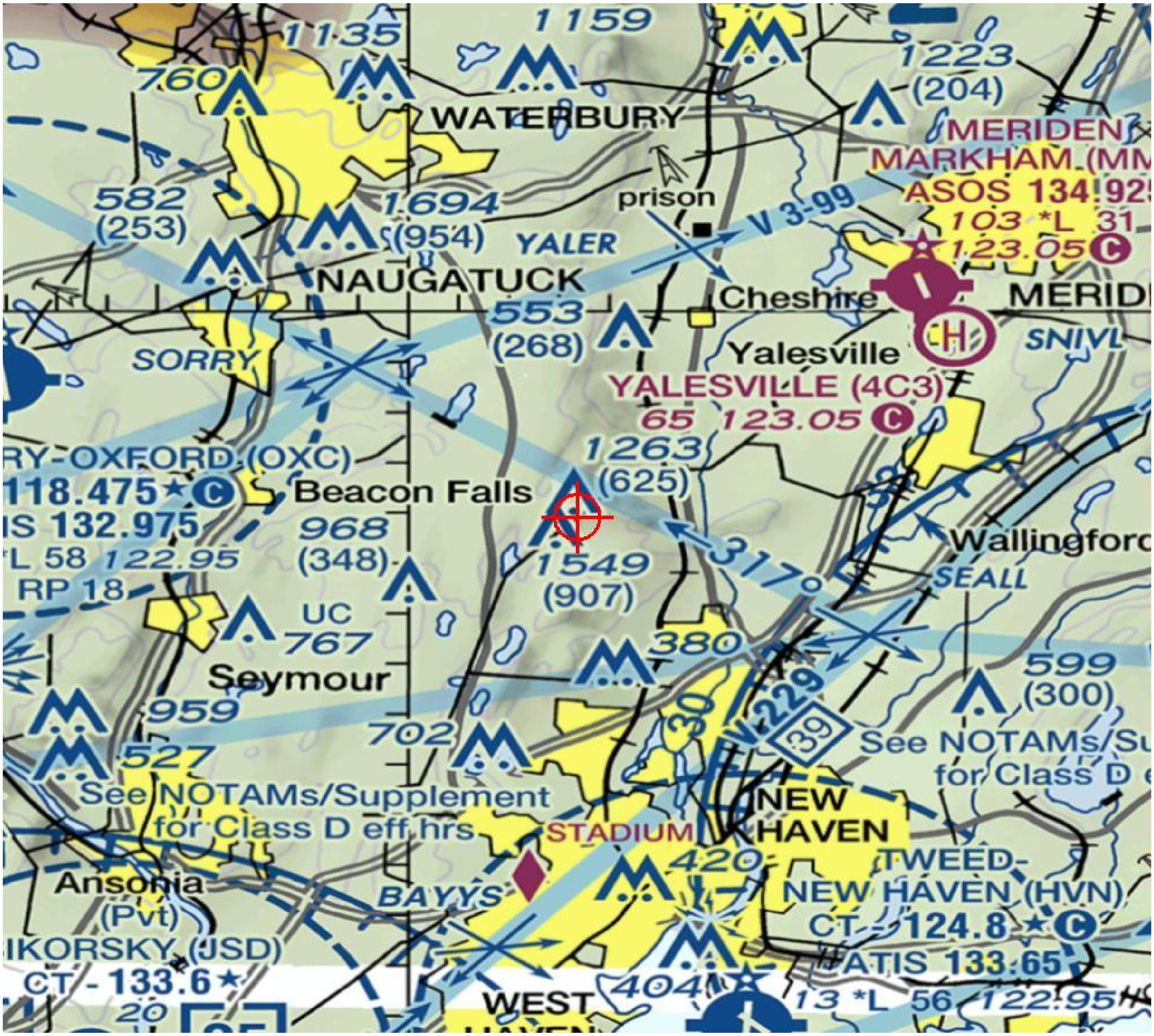
Signature Control No: 437297920-442691930 (DNE)
David Maddox
Specialist

Attachment(s)
Case Description
Map(s)

Case Description for ASN 2020-ANE-2471-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Sectional Map for ASN 2020-ANE-2471-OE



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Aeronautical Study No.
2020-ANE-2472-OE

Issued Date: 06/12/2020

Bradley J. Parsons, PE, PMP
All-Points Technology Corporation - Engineering
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Killingworth, CT 06419

**** 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 Point 8
Location:	Hamden, CT
Latitude:	41-25-53.44N NAD 83
Longitude:	72-56-41.59W
Heights:	566 feet site elevation (SE)
	10 feet above ground level (AGL)
	576 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:

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 L Change 2.

This determination expires on 12/12/2021 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 (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2472-OE.

Signature Control No: 437297921-442691931 (DNE)

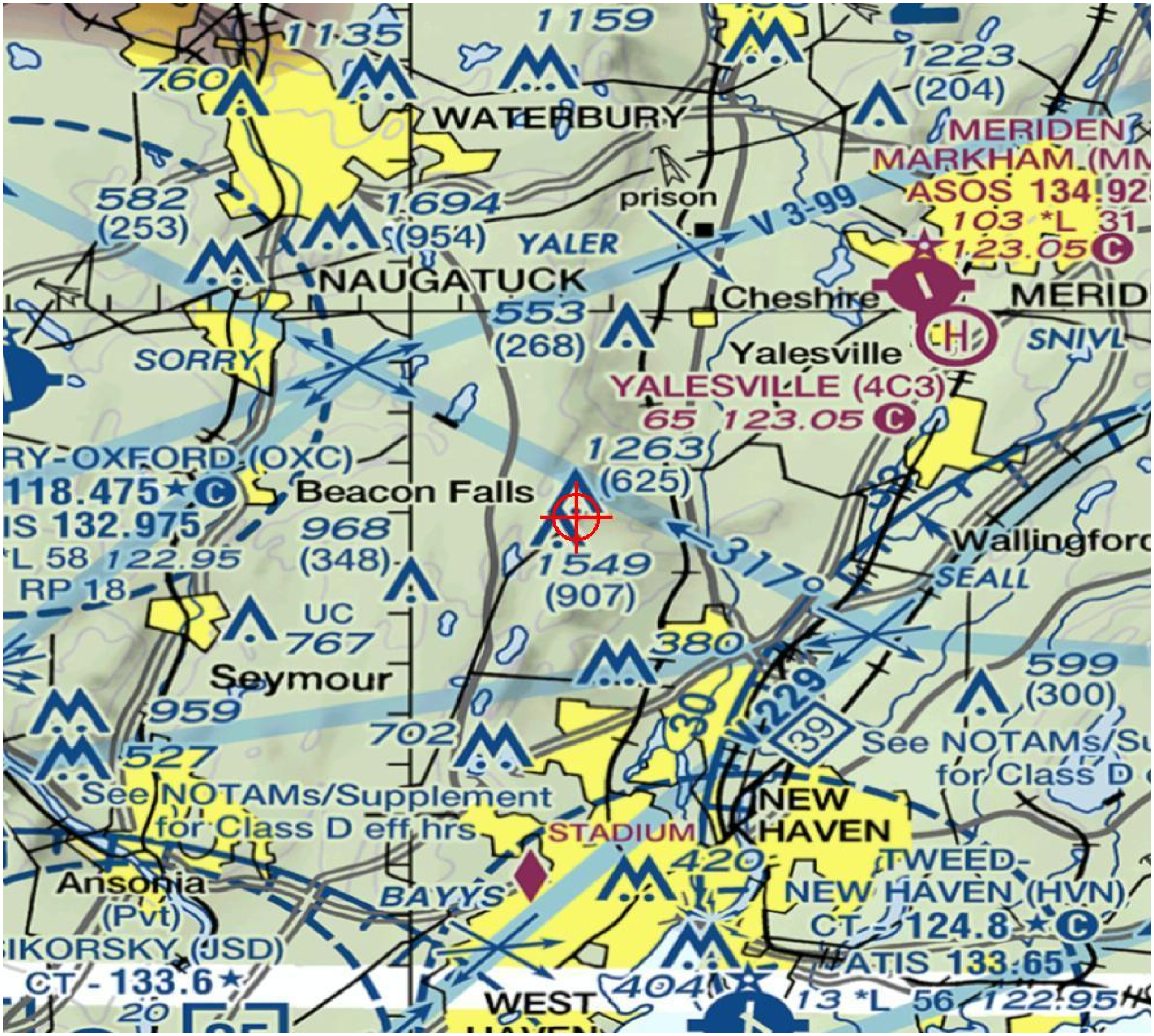
David Maddox
Specialist

Attachment(s)
Case Description
Map(s)

Case Description for ASN 2020-ANE-2472-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Sectional Map for ASN 2020-ANE-2472-OE



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Aeronautical Study No.
2020-ANE-2473-OE

Issued Date: 06/12/2020

Bradley J. Parsons, PE, PMP
All-Points Technology Corporation - Engineering
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Killingworth, CT 06419

**** 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 Point 9 (Also HP)
Location:	Hamden, CT
Latitude:	41-25-55.56N NAD 83
Longitude:	72-56-41.26W
Heights:	574 feet site elevation (SE)
	10 feet above ground level (AGL)
	584 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:

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 L Change 2.

This determination expires on 12/12/2021 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 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 (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2473-OE.

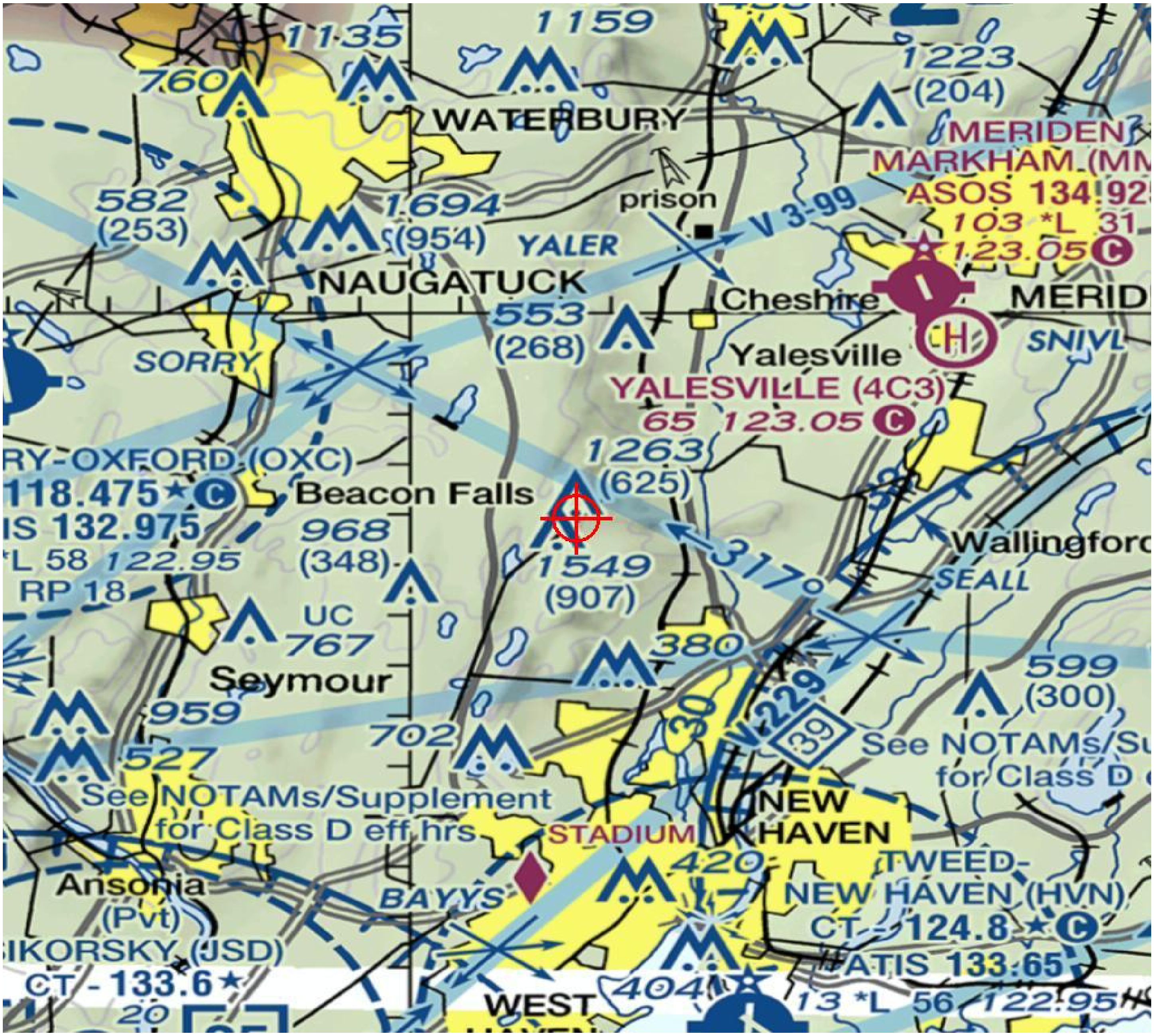
Signature Control No: 437297922-442691933 (DNE)
David Maddox
Specialist

Attachment(s)
Case Description
Map(s)

Case Description for ASN 2020-ANE-2473-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Sectional Map for ASN 2020-ANE-2473-OE



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Fort Worth, TX 76177

Aeronautical Study No.
2020-ANE-2474-OE

Issued Date: 06/12/2020

Bradley J. Parsons, PE, PMP
All-Points Technology Corporation - Engineering
3 Saddlebrook Dr
Killingworth, CT 06419

**** 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 Point 10
Location:	Hamden, CT
Latitude:	41-25-58.67N NAD 83
Longitude:	72-56-37.93W
Heights:	552 feet site elevation (SE)
	10 feet above ground level (AGL)
	562 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:

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 L Change 2.

This determination expires on 12/12/2021 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 (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2474-OE.

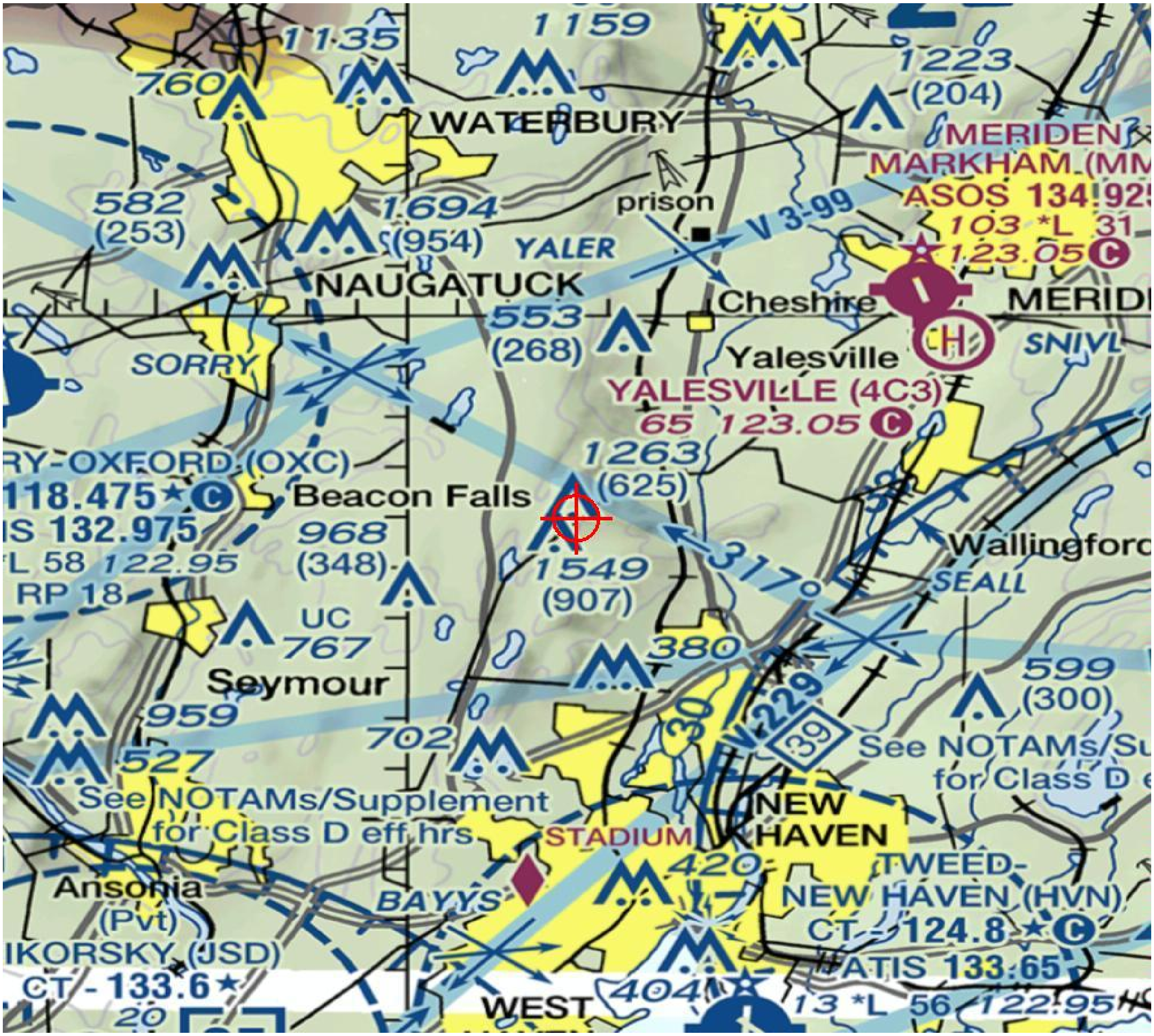
Signature Control No: 437297923-442691934 (DNE)
David Maddox
Specialist

Attachment(s)
Case Description
Map(s)

Case Description for ASN 2020-ANE-2474-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

Sectional Map for ASN 2020-ANE-2474-OE



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Aeronautical Study No.
2020-ANE-2475-OE

Issued Date: 06/12/2020

Bradley J. Parsons, PE, PMP
All-Points Technology Corporation - Engineering
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Killingworth, CT 06419

**** 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 Point 11
Location:	Hamden, CT
Latitude:	41-25-58.89N NAD 83
Longitude:	72-56-36.75W
Heights:	540 feet site elevation (SE)
	10 feet above ground level (AGL)
	550 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:

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 L Change 2.

This determination expires on 12/12/2021 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 (202) 267-4525, or david.maddox@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2020-ANE-2475-OE.

Signature Control No: 437297924-442691935 (DNE)

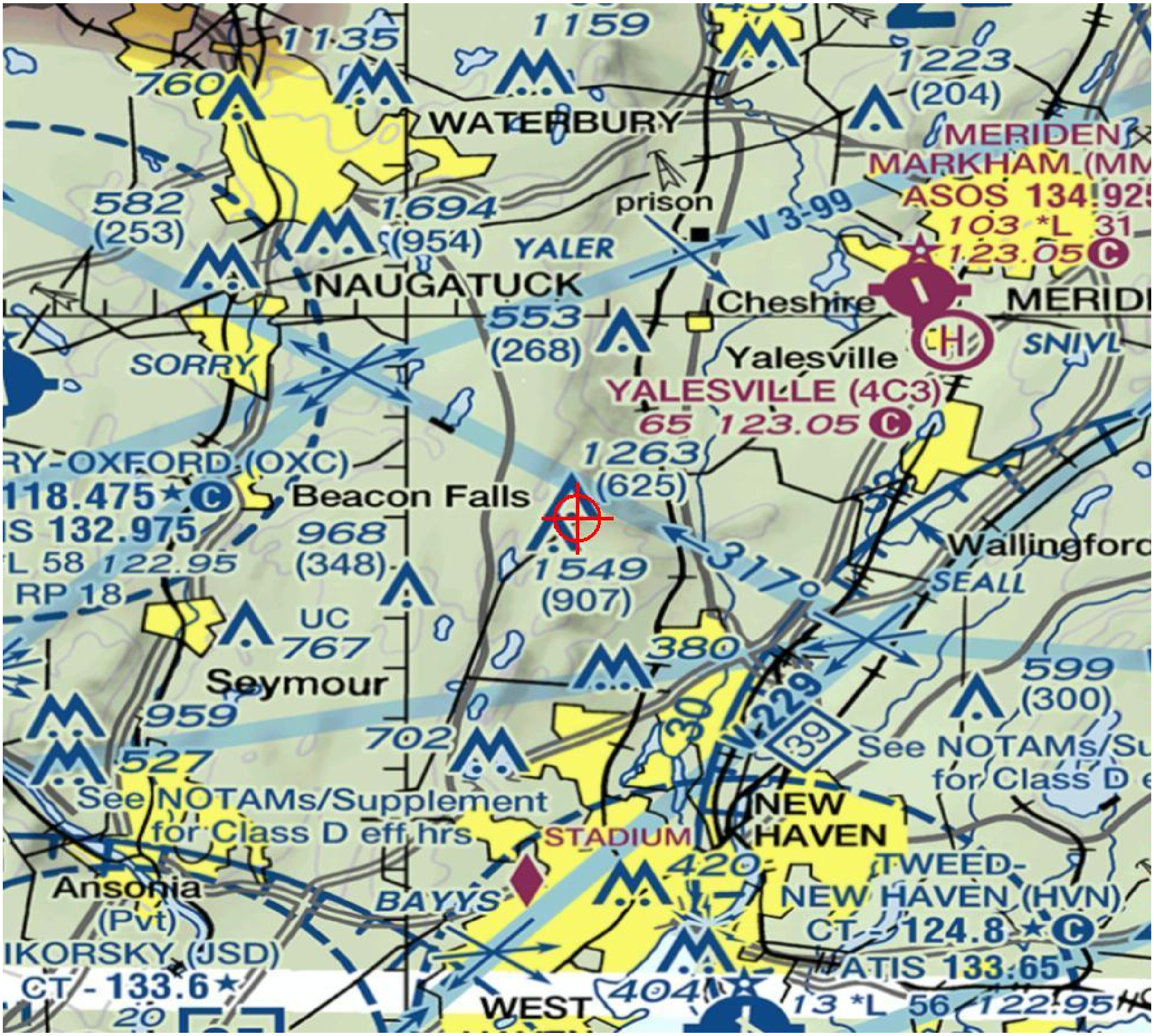
David Maddox
Specialist

Attachment(s)
Case Description
Map(s)

Case Description for ASN 2020-ANE-2475-OE

Study is being requested in connection w/ a proposed solar facility consisting of solar panels and associated ground equipment. Please see uploaded PDF file for site layout and point locations. Point 9 is highest elevation of proposed solar facility.

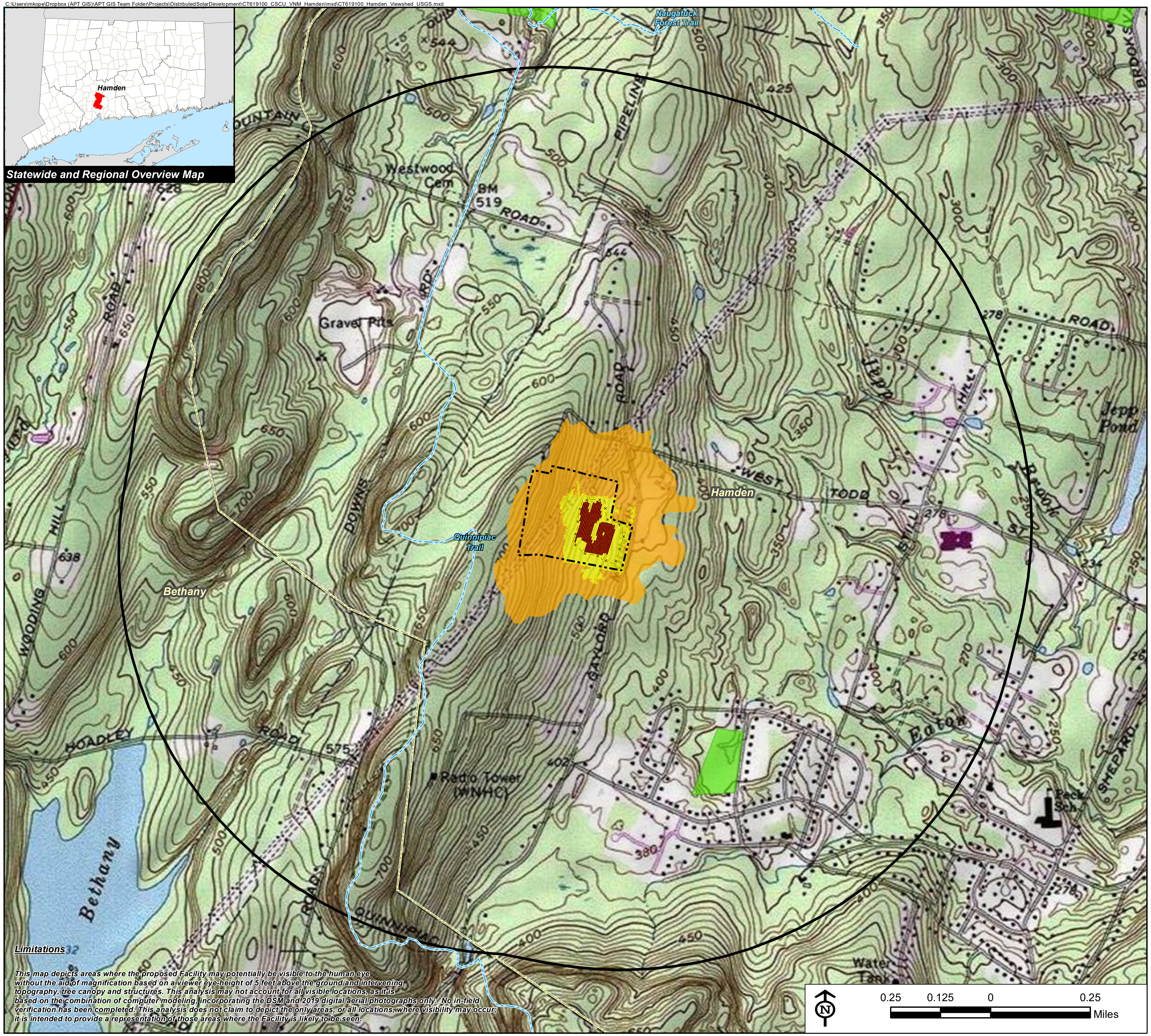
Sectional Map for ASN 2020-ANE-2475-OE



APPENDIX G

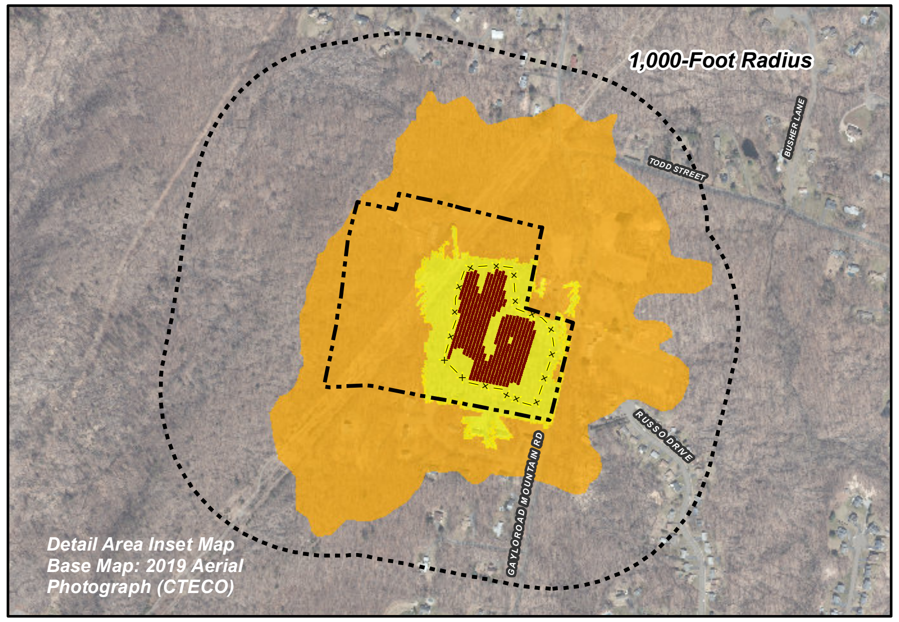
PHOTO SIMULATIONS AND
VIEWSHED MAP

C:\Users\mkope\Dropbox (APT GIS)\APT GIS Team Folder\Projects\DistributedSolarDevelopment\CT619100_CSCU_VNM_Hamden\mxd\CT619100_Hamden_Viewshed_USGS.mxd



Limitations

This map depicts areas where the proposed Facility may potentially be visible to the human eye without the aid of magnification based on a viewer eye-height of 5 feet above the ground and intervening topography, tree canopy and structures. This analysis may not account for all visible locations, as it is based on the combination of computer modeling, incorporating the DSM and 2019 digital aerial photographs only. No in-field verification has been completed. This analysis does not claim to depict the only areas, or all locations, where visibility may occur; it is intended to provide a representation of those areas where the Facility is likely to be seen.



Viewshed Analysis Map

Gaylord Mountain Solar Project 2019, LLC
360 Gaylord Mountain Road
Hamden, Connecticut

Proposed solar panels to be mounted on approximate 10' AGL support structures.
Forest canopy height and topographic contours are derived from LiDAR data.
Study area encompasses a 1-mile radius and includes 2,639 acres.
Base Map Source: USGS 7.5 Minute Topographic Quadrangle Map, Mount Carmel, CT (1984)
Map Date: August 2020

Legend

- Site
- Solar Modules
- Perimeter Fence
- Study Area (1-Mile Radius)
- Predicted Year-Round Visibility (17 Acres)
- Areas of Potential Seasonal Visibility (88 Acres)
- Municipal Boundary
- Trail
- Scenic Highway
- DEEP Boat Launches
- Municipal and Private Open Space Property
- State Forest/Park

Protected Open Space Property

- Federal
- Land Trust
- Municipal
- Private
- State

Data Sources:

Physical Geography / Background Data

A digital surface model (DSM) was created from the State of Connecticut 2016 LiDAR LAS data points. The first return LiDAR LAS values, associated with the highest feature in the landscape (such as a treetop or top of building), were used to capture the natural and built features on the Earth's surface beyond the approximate limits of clearing associated with the proposed solar facility. The "bare-earth" return values were utilized to reflect proposed conditions where vegetative clearing associated with the proposed solar facility would occur.

Municipal Open Space, State Recreation Areas, Trails, County Recreation Areas, and Town Boundary data obtained from CT DEEP.
Scenic Roads: CTDOT State Scenic Highways (2015); Municipal Scenic Roads (compiled by APT)

Dedicated Open Space & Recreation Areas

Connecticut Department of Energy and Environmental Protection (DEEP): DEEP Property (May 2007; Federal Open Space (1997); Municipal and Private Open Space (1997); DEEP Boat Launches (1994)

Connecticut Forest & Parks Association, Connecticut Walk Books East & West

Other

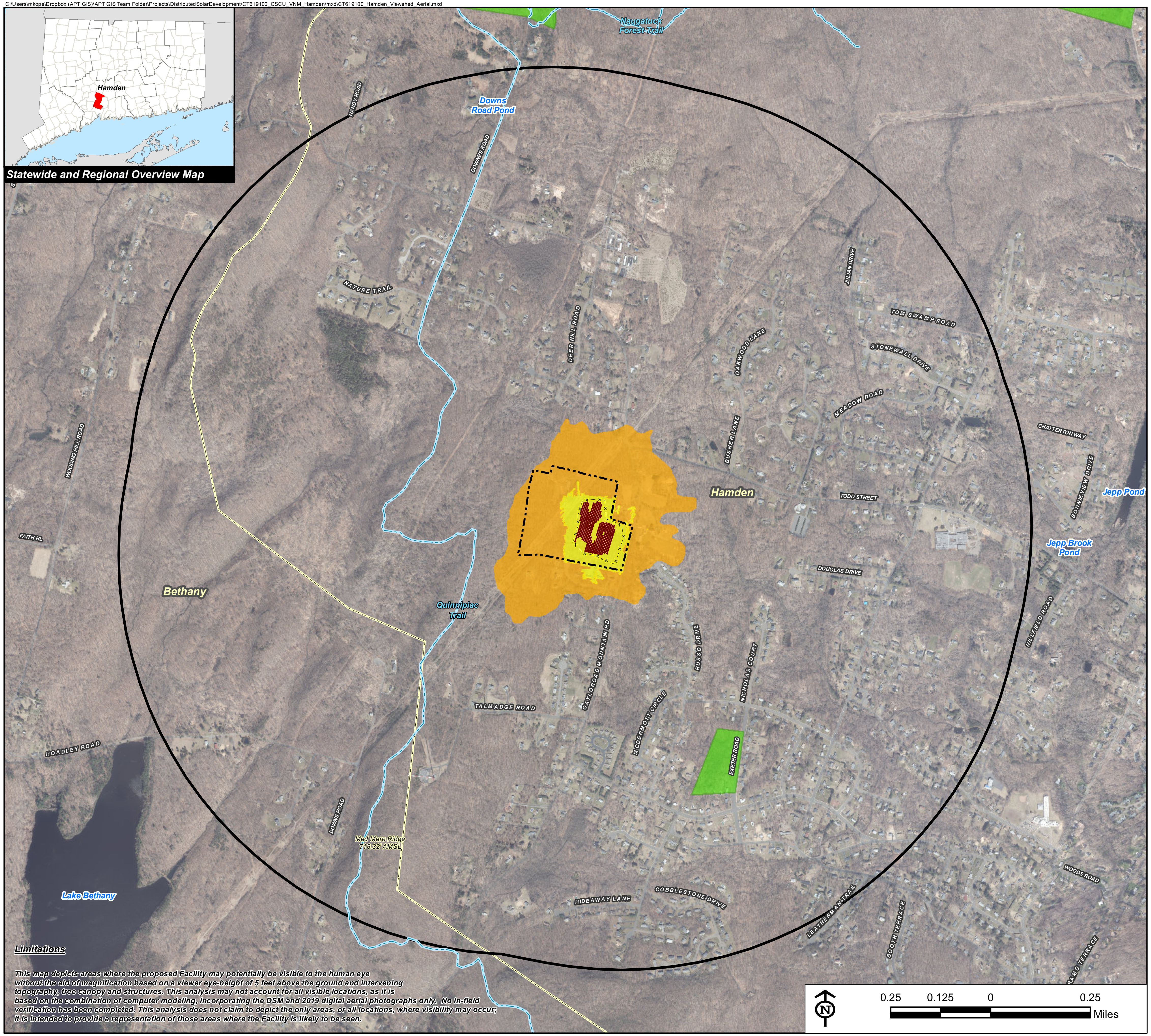
CTDOT Scenic Strips (based on Department of Transportation data)

Notes

***Not all the sources listed above appear on the Viewshed Maps. Only those features within the scale of the graphic are shown.*

ALL-POINTS TECHNOLOGY CORPORATION

C:\Users\mkope\Dropbox (APT GIS)\APT GIS Team Folder\Projects\DistributedSolarDevelopment\CT619100_CSCU_VNM_Hamden\mxd\CT619100_Hamden_Viewshed_Aerial.mxd



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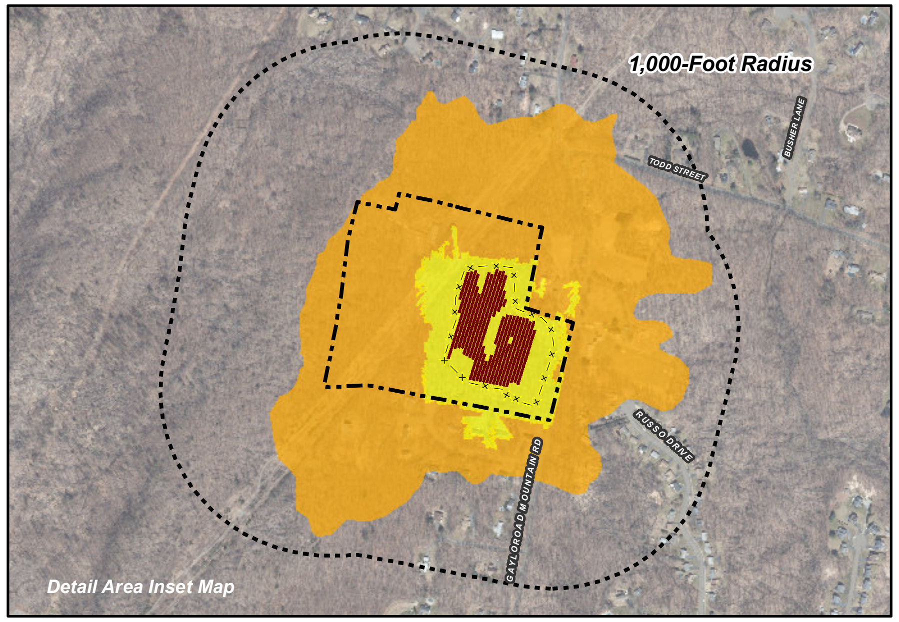

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Base Map Source: 2019 Aerial Photograph (CTECO)
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EXISTING

PICTOMETRY AERIAL IMAGERY - PHOTOGRAPHED AUGUST 24, 2019

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DSD

PROPOSED

PICTOMETRY AERIAL IMAGERY - PHOTOGRAPHED AUGUST 24, 2019

ALL-POINTS TECHNOLOGY CORPORATION

DSD