Environmental Assessment

Town Farm Road Solar Project
141 Town Farm Road, Enfield, Connecticut

PREPARED FOR

LSE Bootes LLC and LSE Scutum LLC
40 Tower Lane, Suite 201
Avon, Connecticut 06001

PREPARED BY

vhb

100 Great Meadow Road
Wethersfield, CT 06108

FEBRUARY 2024

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1

Introduction

VHB prepared this Environmental Assessment ("EA") on behalf of LSE Bootes LLC & LSE Scutum LLC (the "Petitioner") for the proposed installation and utility interconnection of a solar-based electric generating facility (collectively the "Project"), with an output of approximately 1.93 megawatts[1] ("MW") located in the Town of Enfield Connecticut ("Town"). This EA has been completed to support the Petitioner's submission to the Connecticut Siting Council ("Council") of a petition for declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the construction, maintenance, and operation of the electric generating facility.

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

The Project will be located at 141 Town Farm Road in Enfield, Connecticut (referred to herein as the "Site"), as shown in Figure 1. The Site consists of three parcels: a 9.04-acre property at 141 Town Farm Road (assessor ID number 86-321), and two 3.39-acre parcels off of Abbe Road, (assessor ID numbers 86-164 and 86-326); see Figure 2 for the Tax Parcel Map and Figure 3 for the Town Zoning Map.

2

Proposed Project

2.1 Project Setting

The project will occupy approximately 12.1 acres across the three parcels and will include two solar arrays. The Site interconnection and access to Array 1 (LSE Scutum LLC) will extend north from Town Farm Road. The Site interconnection and access to Array 2 (LSE Bootes LLC) will extend east of Abbe Road. Appendix A contains the proposed Project site plans.

Existing topography at the Site ranges from approximately 126 feet above mean sea level (AMSL) to 157 feet AMSL. Grades within the Site generally slope north to south, with ground elevations ranging from 126 feet AMSL to 153 feet AMSL. The surrounding area is a mix of agricultural fields and residential development. Figure 4 shows the site survey map of the Project area.

2.2 Project Development

2.2.1 Access

The Facility will be accessed via two proposed access roads, one that enters from Town Farm Road at the southeast side of the property, and one that enters from Abbe Road on the northwest side of the property. The Abbe Road access will be used to access Array 1 and the Town Farm Road access will lead to Array 2. See Figure 5 for the project aerial proposed plan.

2.2.2 Public Health and Safety

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

The Facility will be enclosed by a seven-foot-tall chain link fence that will surround both array sections. The entrances to the Facility will be gated, limiting access to authorized personnel only.

3

Environmental Conditions

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

Please refer to Figure 5, Project Aerial Proposed Plan, for a depiction of the Project and its relationship with the resources discussed herein.

3.1 Air Quality

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 be mitigated using available measures, including limiting idling times of equipment; proper maintenance of all vehicles and equipment; and watering/spraying to minimize dust and particulate releases. In addition, all on-site and off-road equipment will meet the latest standards for diesel emissions, as prescribed by the United States Environmental Protection Agency.

3.2 Water Resources

3.2.1 Wetlands and Watercourses

A registered soil scientist identified one wetland on the Site during a field investigation in November 2022 and has prepared a separate wetland delineation report (*Wetland Delineation Report: LODESTAR ENERGY LLC, 141 Town Farm Road & Abbe Road*) that is attached as Appendix B. The isolated wetland is located in the northwest portion of the side, along the west property boundary in a small, wooded island of the agricultural field (see Figure 6 for the wetland delineation map). The basin is seasonally flooded and ephemeral in nature, largely lacking vegetation within the basin. Along the perimeter of the wetland is mostly comprised of shrubs, including winterberry (*Ilex verticillata*), northern spicebush (*Lindera benzoin*), and silky dogwood (*Swida amomum*).

3.2.2 Vernal Pools

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

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

A Vernal Pool Report has been prepared and is attached as Appendix C. A vernal pool assessment was conducted by a wetland scientist during the spring of 2023, on April 25th and May 5th, to determine presence or absence of vernal pool habitat. Survey methods included visual surveys to identify adults, larvae, and egg masses, audial surveys to record breeding choruses, and dip-net surveys to identify amphibian larvae.

The vernal pool survey was completed during the appropriate survey window for vernal pool breeding observations. No vernal pool frog breeding choruses were noted, and no amphibian egg masses were observed.

3.2.3 Wetland Impacts

The Project will not result in any impacts to the onsite wetland. All work is proposed to occur outside of a 50-foot buffer of the wetland, and very minor work will occur inside of the 100-foot upland review area, restricted to placement of a few fence posts no more than 15 feet inside of the upland review area. Construction activities are not expected to result in adverse impacts to the State's wetland resources due to the use of sufficient buffers and erosion and sediment control methods that will be deployed.

3.2.4 Floodplain Areas

The Project will not be located within a 100- or 500-year flood zone. VHB reviewed the United States Federal Emergency Management Agency ("FEMA") Flood Insurance Rate Maps ("FIRMs") covering the Property. According to FIRM PANEL 09003C0233F, dated 9/26/2008, the Site is located in an area designated as Zone X, which is defined as an area of minimal flooding, typically above the 500-year flood level.

A drainage report was developed for the site and is included in Appendix D. No special design considerations or precautions relative to flooding are required for the Project, and no impacts are anticipated to floodplain or downstream areas.

3.3 Water Quality

3.3.1 Groundwater

The entire Project site is classified by publicly available DEEP mapping as "GA" (Figure 7). Designated uses include existing private and potential public or private supplies of water suitable for drinking without treatment, and baseflow for hydraulically connected surface water bodies. See Figure 8 for the Public Water Supply Map.

Review of available DEEP mapping indicates that the Site is not located within a mapped DEEP Aquifer Protection Area (Figure 9) The Project will have no adverse environmental effect on groundwater quality.

3.3.2 Surface Water

The Project will have no adverse environmental effect on surface water quality. Based upon DEEP mapping, the Site is located in Major Drainage Basin 4 (Connecticut River), Regional Drainage Basin 42 (Scantic River), Subregional Drainage Basin 4200 (Scantic River) and Subregional Drainage Basin 4205 (Buckhorn Brook), and Local Drainage Basin 4200-00 (Scantic River) and Local Drainage Basin 4200-01 (Buckhorn Brook). See Figure 10 for drainage basin mapping.

DEEP mapping indicates that the nearest mapped waterbody to the Site is the Pierce Brook, which lies approximately 830 feet from the eastern property boundary of the Site. DEEP classifies Pierce Brook as a Class SA surface waterbody.

During construction, erosion and sediment ("E&S") controls will be installed and maintained in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control. Once operative, stormwater will be managed in accordance with the 2004 Connecticut Stormwater Quality Manual. Based on the distance of the Facility from Pierce Brook and use of these measures, the Project will have no effect on this surface waterbody.

3.4 Habitat Types

According to publicly available mapping and observations during field visits, the Site is comprised of three distinct habitat types. The habitat types located onsite include agricultural fields, turf grasses, small deciduously forested patch habitat and developed areas. The majority of the Site is classified as agricultural fields. In the northwest corner of the Site where an access road is proposed, there is turf grass and developed areas, related to the residential development along Abbe Road.

3.5 Rare Species

3.5.1 Natural Diversity Data Base

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

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

A review of the June 2023 NDDB mapping depicted the closest NDDB polygon approximately 0.75 mile to the west of the Site. As the Site is not located within or near a NDDB polygon, a review request was not submitted to DEEP. The most recent NDDB map (June 2023) is included in Figure 11.

3.5.2 USFWS Consultation

The Site does not host hibernacula for Northern Long Eared Bars (NLEB). The closest mapped hibernacula is located in East Granby, approximately 15 miles from the Site. Trees are located within the wooded island that contains the delineated wetland and along the northern boundary. Any removal of trees related to the Project should not conflict with the United States Fish and Wildlife Service (USFWS) recommended NLEB guidelines. Additionally, no federal involvement will occur with the Project, therefore official coordination with USFWS is not required.

3.6 Historic and Archaeological Resources

As previously mentioned, the project parcel is a fallow agricultural parcel that is situated to the north of Town Farm Road and east of Abbe Road. The Scantic River runs to the west of the project parcel, with Pierce Brook, Frog, and Buckhorn Brook running to the east and south of the project area. At the time of the survey, the Facility area was characterized primarily as a fallow agricultural field and surrounded by active agricultural field to the east, a wooded area to the north, and residential areas lining Town Farm Road and Abbe Road to the west and south.

The predominant soil types identified throughout the project parcel and Facility area include Haven and Enfield and Agawam soils. These soil types are well drained soils, and where there is no presence of previous disturbance, they may be correlated with precontact era and post-European Contact period use and occupation. The location within close proximity to the feeder Buckhorn Brook and the Scantic River provides an optimal area for precontact and post-European Contact period occupation and past activities that may result in the formation of archaeological deposits.

A pedestrian survey of the project area was completed on June 18, 2023 (Appendix E). The pedestrian survey revealed that the proposed project parcel and the Facility area consist of gently sloping, fallow agricultural fields. Aside from disturbance to the upper layers of soil due to plowing, these areas appear to have limited disturbance and to possess a moderate/high archaeological sensitivity. A Phase IB cultural resources reconnaissance survey was completed in

November 2023 (Appendix F). A total of 136 shovel test pits were conducted, and twelve of those pits yielded 15 post-European Contact Period cultural materials. Laboratory analysis indicated a general date of the late nineteenth century. The materials were classified as field scatter, and therefore were assessed as not eligible for listing on the National Register of Historic Places. No further cultural studies are required. The Petitioner will submit to the State Historic Preservation Office (SHPO).

3.7 Scenic and Recreational Areas

No state or local designated scenic roads or scenic areas are located near the Site, therefore none will be physically or visually impacted by the Project. The nearest scenic road is a portion of State Route 75, located approximately 5 miles west of the Project Area.

The nearest state park is the Scantic River State Park, located over a mile to the west of the Site. The Project will have no effect on this resource.

3.8 Lighting

There is no exterior lighting installation proposed for the Project.

3.9 FAA Determination

The Petitioner submitted the relevant Project information to the Federal Aviation Administration (FAA) for an aeronautical study to evaluate potential hazards to air navigation. A private airfield (Laurie Field-CT19) is the closest airfield located to the Site, approximately 0.4 miles to the north. A Determination of No Hazard to Air Navigation was returned by the FAA on May 22, 2023 and is included in Appendix G.

4

Conclusion

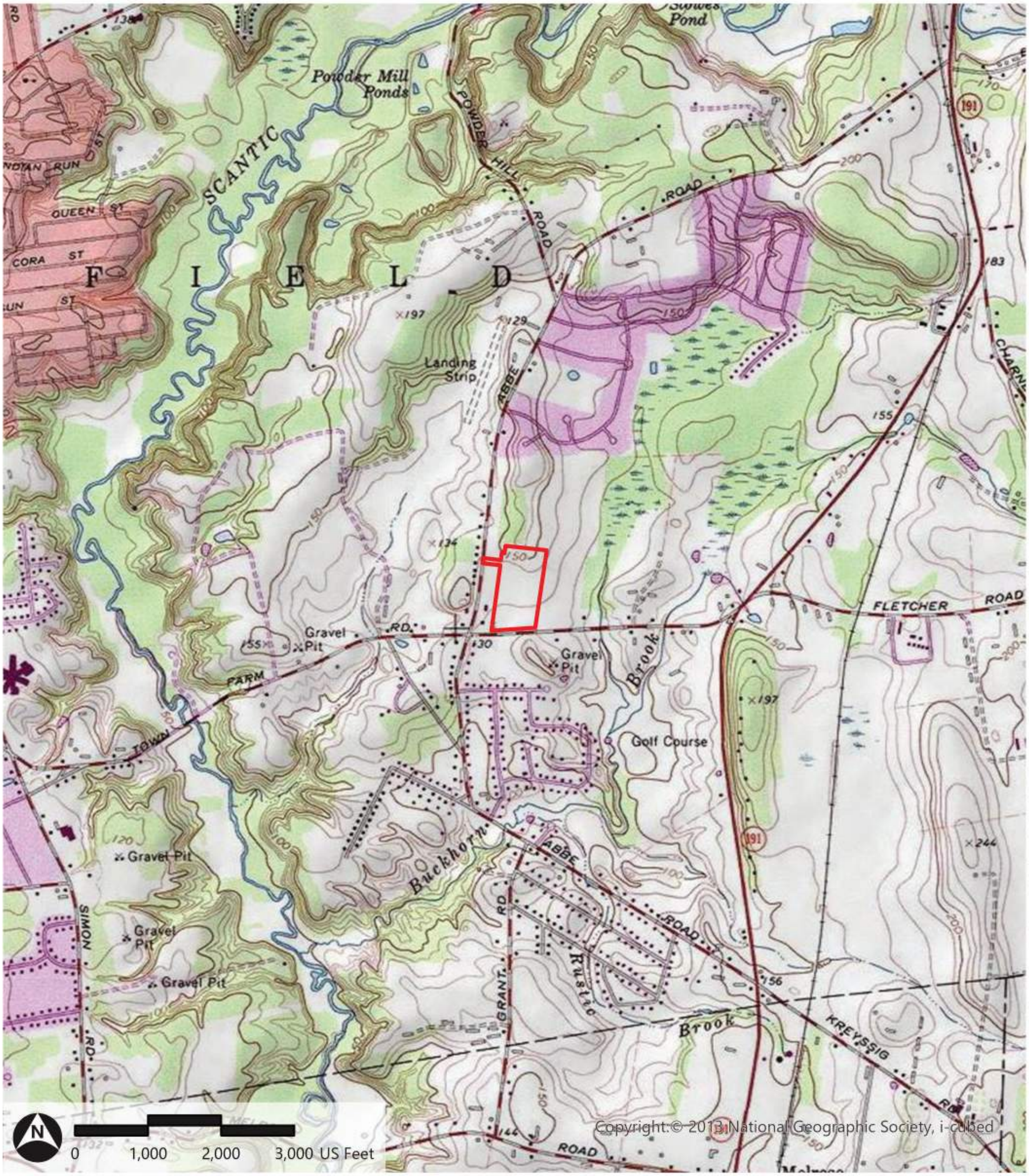
The Project will comply with DEEP air and water quality standards and will not have adverse effects on the existing environment and ecology. Adverse impacts to scenic, historic, and recreational resources in the vicinity of the Project are not anticipated. Once constructed and operating, the Facility will be unstaffed and generate minimal traffic.

There are no expected impacts to the delineated wetland onsite, there are no vernal pool resources affected and all work will occur outside of the 50-foot buffer area surrounding the wetland. Very minimal work will occur within the 100-foot upland review area, restricted to the placement of a few fence posts no more than 15-feet inside of the upland review area. Proper erosion and sediment controls are proposed to be installed and maintained throughout construction. Areas of ground disturbance to soils from construction and fallow areas will be seeded with a pollinator-friendly seed mix to establish vegetated cover and will be maintained as meadow following construction completion.

FIGURE 1 USGS Site Location Map

Figure 1: USGS Site Location Map

LSE Scutum LLC & LSE Bootes LLC | Enfield, Connecticut

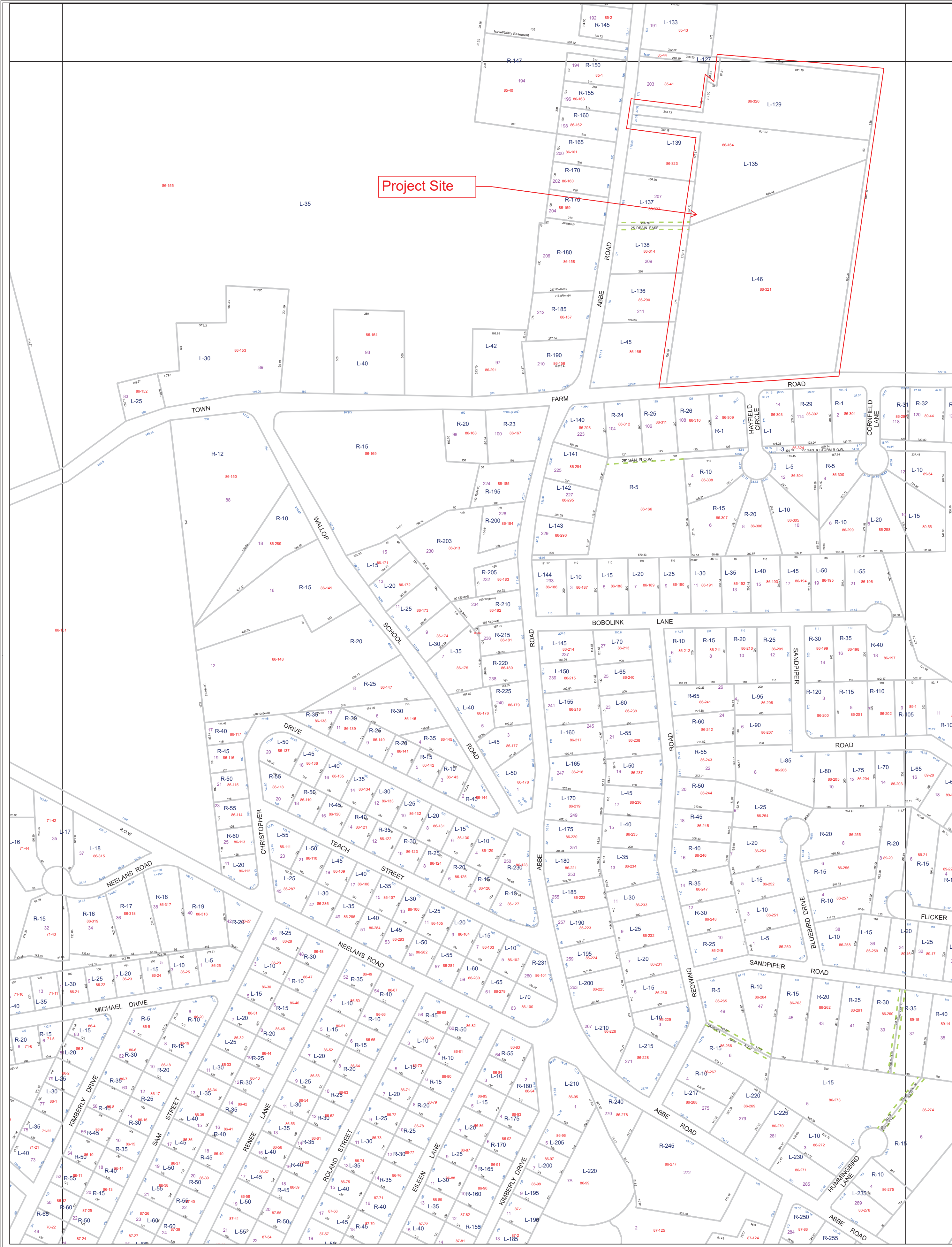


Path: \\vhb.com\gis\proj\Wethersfield\43266.00 Hawkins Town Farm Rd Sol\Project\Hawkins_TownFarmRd_Solar.aprx (sberryman, 11/19/2023)

Project Area

Source: USGS

Figure 2 Tax Parcel Map



THESE MAPS ARE NOT LEGAL DOCUMENTS

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Legend

- Property Line
- Water Body
- Easements
- 67-9 Map-Lot Number
- L-25 Parcel ID

Town of Enfield

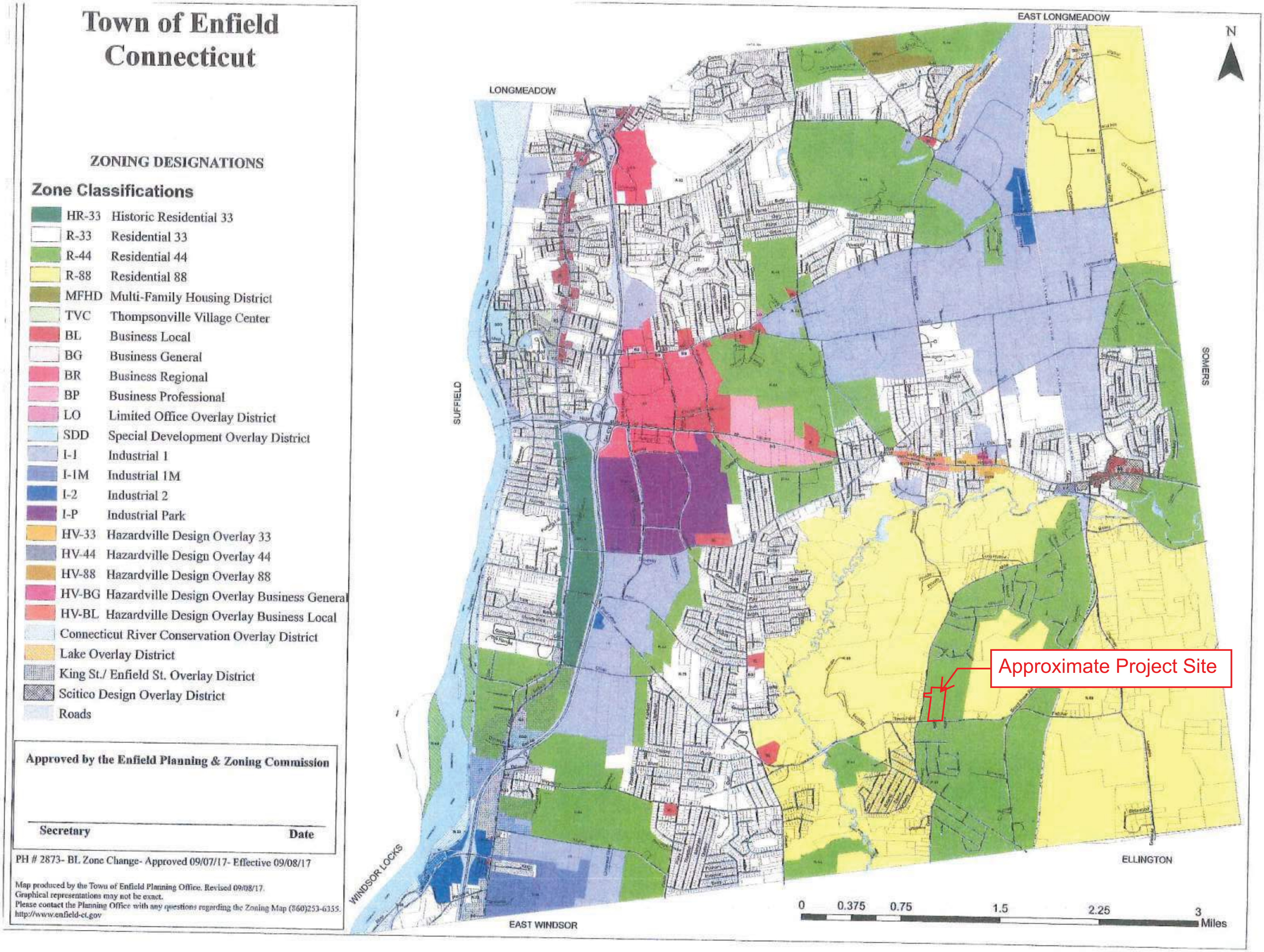
Property Map Atlas

0 100 200 400

Scale: 1 " = 200 '

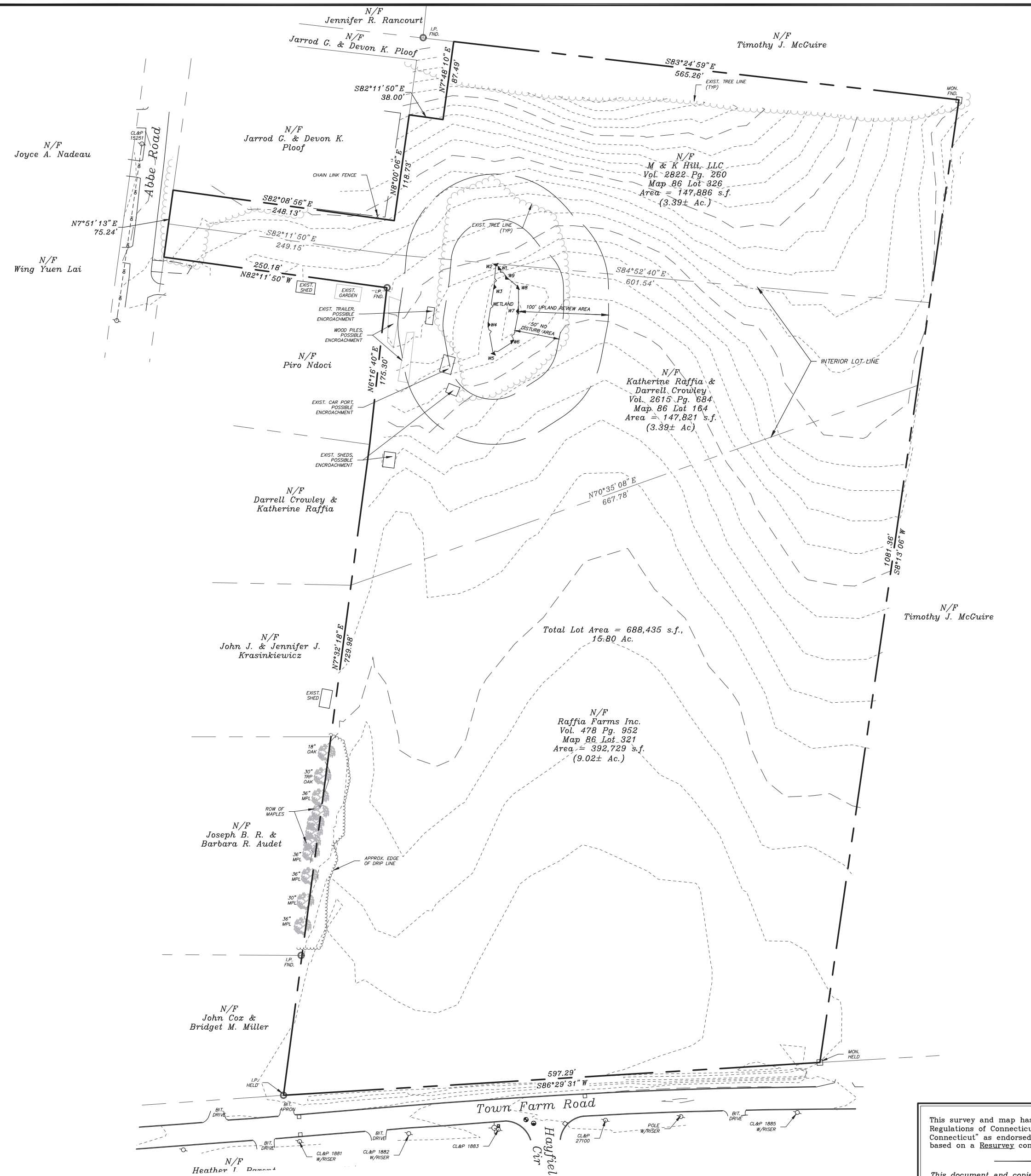
72	85	90
71	86	89
70	87	88

Figure 3 Zoning Map



Town of Enfield
Connecticut
ZONING DESIGNATIONS
Zone Classifications
HR-33 Historic Residential 33
R-33 Residential 33
R-44 Residential 44
R-88 Residential 88
MFHD Multi-Family Housing District
TVC Thompsonville Village Center
BL Business Local
BG Business General
BR Business Regional
BP Business Professional
LO Limited Office Overlay District
SDD Special Development Overlay District
I-1 Industrial 1
I-1M Industrial 1M
I-2 Industrial 2
I-P Industrial Park
HV-33 Hazardville Design Overlay 33
HV-44 Hazardville Design Overlay 44
HV-88 Hazardville Design Overlay 88
HV-BG Hazardville Design Overlay Business General
HV-BL Hazardville Design Overlay Business Local
Connecticut River Conservation Overlay District
Lake Overlay District
King St./ Enfield St. Overlay District
Scitico Design Overlay District
Roads
Approved by the Enfield Planning & Zoning Commission
Secretary
Date
PH # 2873- BL Zone Change- Approved 09/07/17- Effective 09/08/17
Map produced by the Town of Enfield Planning Office. Revised 09/08/17.
Graphical representations may not be exact.
Please contact the Planning Office with any questions regarding the Zoning Map (860)253-6355.
http://www.enfield-ct.gov
EAST LONGMEADOW
LONGMEADOW
SUFFIELD
SOMERS
WINDSOR LOCKS
EAST WINDSOR
ELLINGTON
N
Approximate Project Site
0
0.375
0.75
1.5
2.25
3
Miles

Figure 4 Site Survey Map



Reference Maps:

1. "Monumented Property Survey Plan Prepared For State of Connecticut Department of Agriculture Farmland Preservation Program Map of Property of Lois P. Osier, Trustee Enfield, Connecticut Total Area = 63.43 Acres Scale: 1"=100' Date: 1-25-02 Rev. 9-06-02" by Schindler Surveys
2. "PH #2276 Resubdivision Map Prepared For: Eli Raffia #207 Abbe Road Enfield, Connecticut Scale: 1"=50' Date: Sept. 12, 2001 Rev. 10-24-01" by Dennis G. Rehmer, L.S.
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4. "Property Survey Prepared For Lois P. Osier Showing Property At Abbe Road & Town Farm Road Enfield, Connecticut Lot Area = 62,997 s.f., 1.45 Ac. Scale: 1"=40' Date: Oct. 2, 1998" by Martin J. Post, L.S.

Notes:

1. Portion of the parcel is located in inland wetlands as delineated by All Points Technology Corporation.
2. Parcel is not located in a flood hazard zone, Firm Insurance Rate Map Number 09003C0233F, Effective Date: September 26, 2008.
3. Horizontal datum based on N.A.D. 1983. Elevations based on N.A.V.D. 1988 Datum.
4. All underground utility locations on this plan are approximate and may not be complete. Anyone using this information without verifying the locations does so at their own risk. No construction will be done on this site prior to utility mark out. "Call Before You Dig 1-800-922-4455".

DATA BLOCK (ZONE R-44)

	REQUIREMENT
MIN. FRONTAGE:	175'
MIN. AREA:	44,000 S.F.
FRONT YARD:	50'
SIDE YARD:	35'
REAR YARD:	60'
MAX. BLDG COVERAGE:	15%

LEGEND

- EXISTING UTILITY HANDHOLE
- EXISTING UTILITY POLE
- EXISTING WATER GATE
- EXISTING HYDRANT
- EXISTING GAS GATE
- EXISTING CATCH BASIN
- EXISTING IRON PIN (FOUND)
- EXISTING MONUMENT (FOUND)
- EXISTING TREELINE
- LIMIT OF WETLANDS
- PROPERTY LINE
- BUILDING LINE

GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 60 ft.

This survey and map has been prepared in accordance with Sections 20-300b-1 thru 20-300b-20 of the Regulations of Connecticut State Agencies - "Minimum Standards for Surveys and Maps in the State of Connecticut" as endorsed by the Connecticut Association of Land Surveyors, Inc. It is a Property Survey based on a Resurvey conforming to Horizontal Class A-2 & a Topographic Survey conforming to Class T-2.

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TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

RUSSO SURVEYORS-ENGINEERS

LODESTAR ENERGY

REVISIONS

BY: LF/TAC CHK: JEU

Town Farm Solar

141 Town Farm Road & Abbe Road
Enfield, Connecticut
Map 086 Lots 321, 164, & 326 Zone: R-44

Boundary Survey

DATE: 10-27-2023
SCALE: 1"=60'
JOB NUMBER: 2022-083
SHEET: 2 of 7

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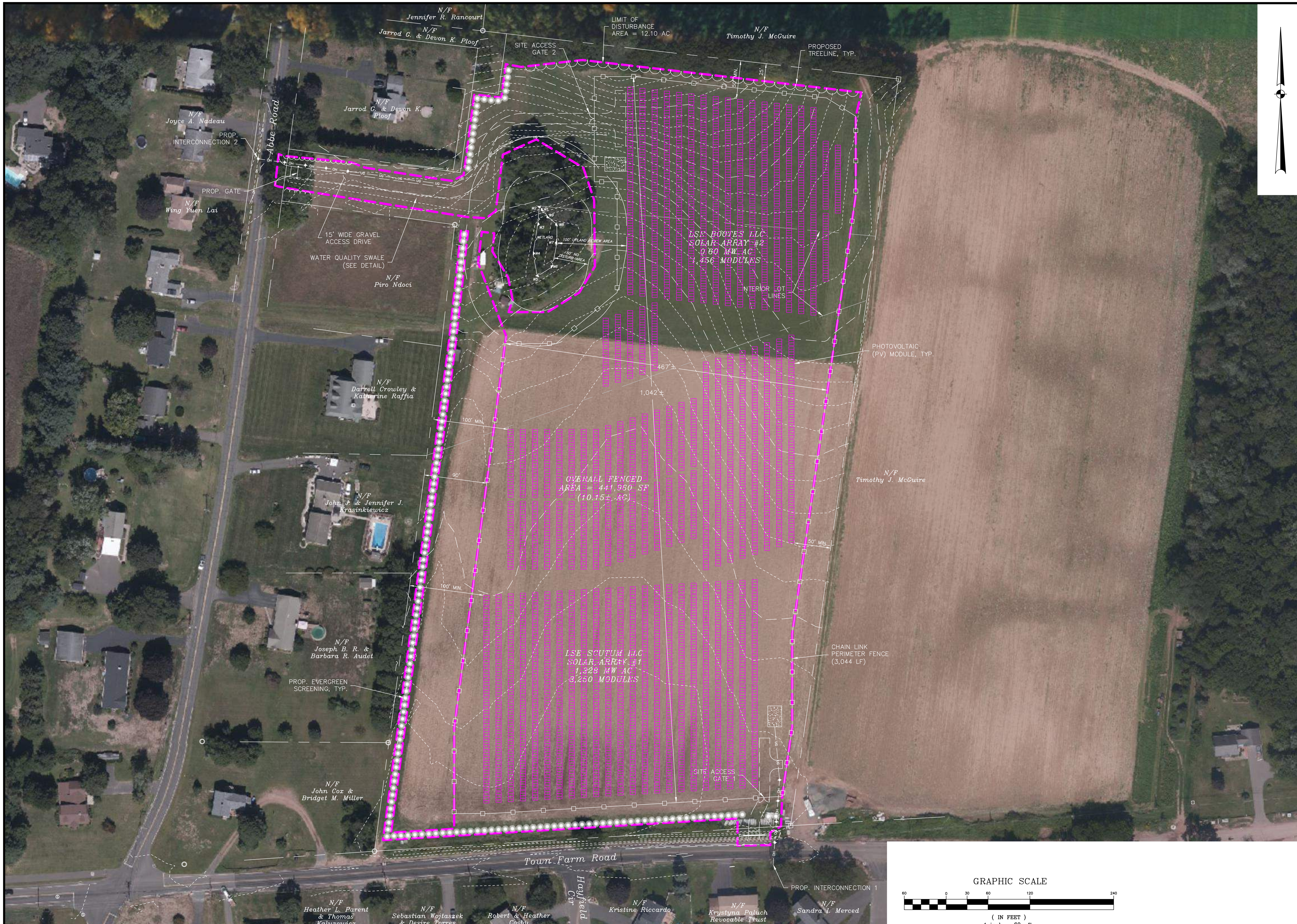
Figure 5 Aerial Proposed Plan



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LODESTAR ENERGY

REVISIONS

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Overall Aerial Plan

DATE	1-30-24
SCALE	1"=60'
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SHEET	3 of 7

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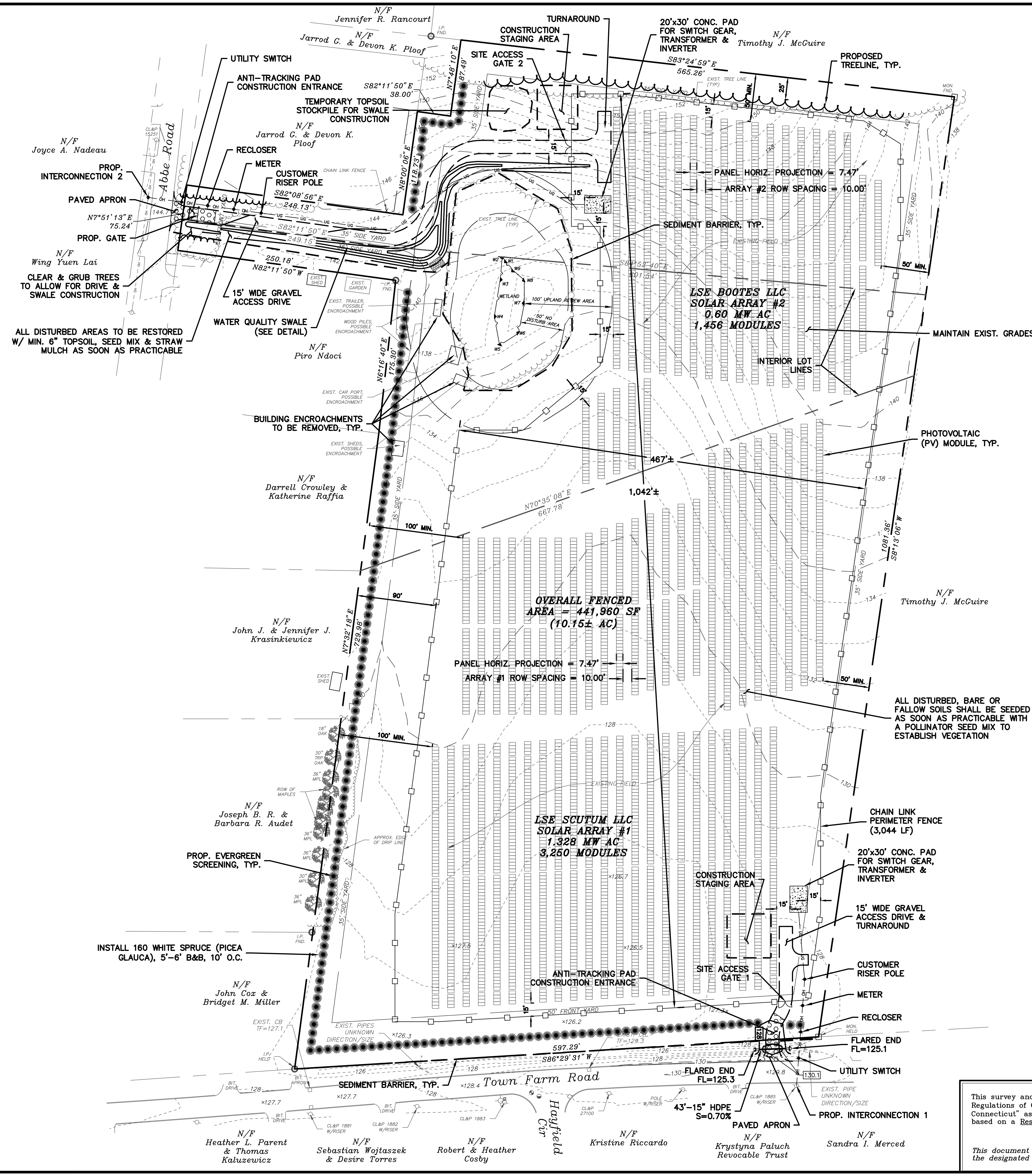

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- UG — PROPOSED UNDERGROUND UTILITIES
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- EXISTING HYDRANT
- EXISTING GAS GATE
- EXISTING CATCH BASIN
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- EXISTING IRON PIN (FOUND)
- EXISTING MONUMENT (FOUND)
- 135x5 EXISTING SPOT GRADE
- 135.5 PROPOSED SPOT GRADE
- 136 EXISTING CONTOUR
- 136 PROPOSED CONTOUR
- EXISTING TREELINE
- PROPOSED TREELINE
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- PROPERTY LINE
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SURVEYORS•ENGINEERS
SERVING CT & MA
J.R. Russo & Associates, LLC

LODESTAR ENERGY

REVISIONS

BY: LF/TAC CHK: JEU

Town Farm Solar

141 Town Farm Road & Abbe Road
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Map 086 Lots 321, 164, & 326 Zone: R-44

Array Site Plan

DATE 1-30-24

SCALE 1"=60'

JOB NUMBER 2022-083

S:\Acad\2022 Civil 3D\2022-083 Lodestar - 141 Town Farm Rd\Russo Drawings\2022-083.dwg

Figure 6 Wetland Delineation Figure

WETLAND SKETCH: 141 TOWN FARM ROAD – ENFIELD, CT

LODESTAR ENERGY

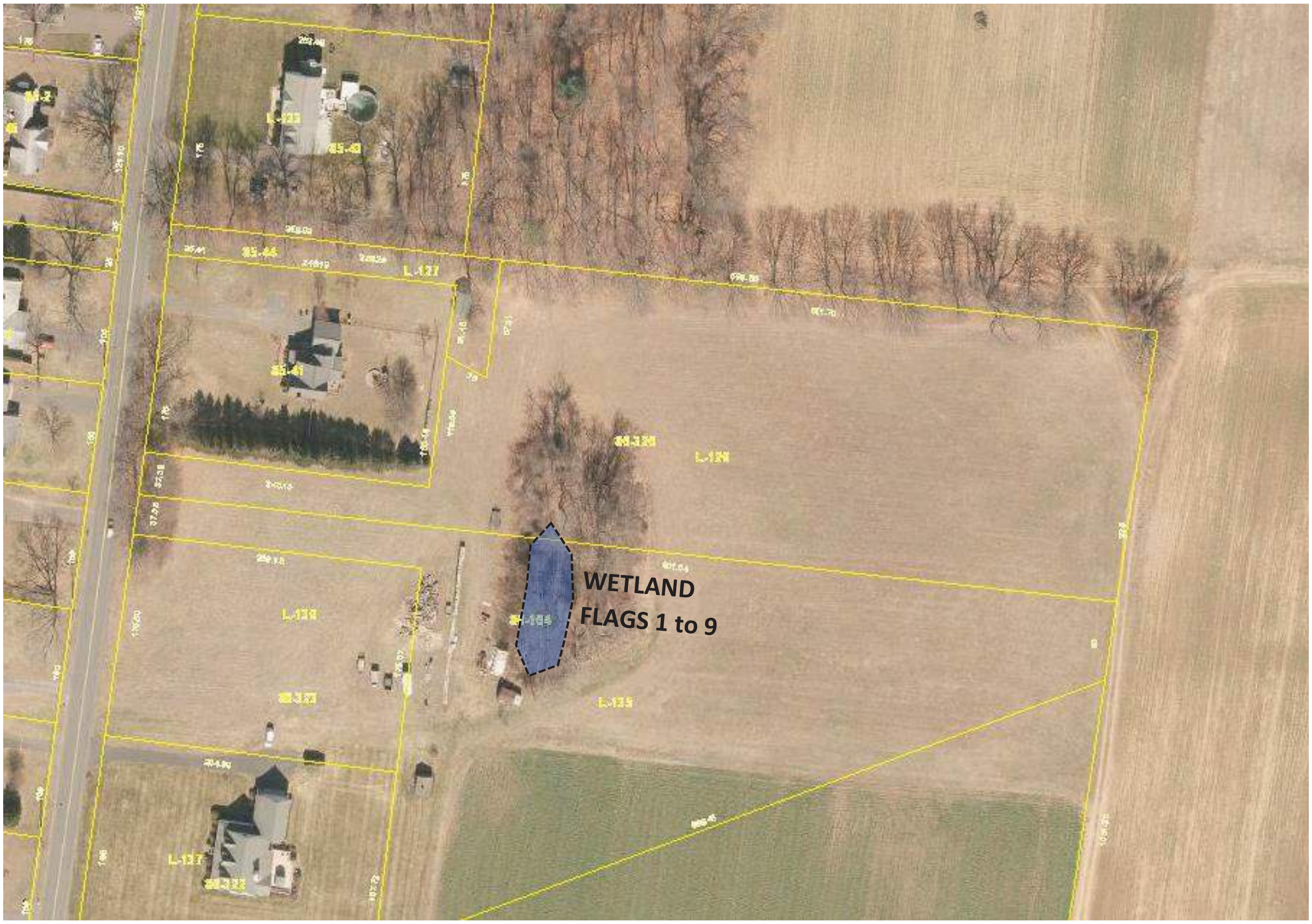


Figure 7 Groundwater Classification Map

WATER QUALITY CLASSIFICATIONS
ENFIELD, CT

SURFACE WATER QUALITY CLASSES

Area	Line
A	A
AA	AA
B, B*	B, B*
SA	SA
SB	SB

NOTES:
Surface Water Classifications beginning with S refer to Coastal and Marine Surface Water.
B* is a subset of Class B where no direct wastewater discharges are allowed other than those consistent with Class AA, A and SA surface waters.

GROUND WATER QUALITY CLASSES

- GA (white background)
- GAA, GAAs
- GA, GAA may not meet current standards
- GB
- GC
- Area of Contribution to Public Supply Well
- Final Aquifer Protection Area (Level A)
- Major Basin Boundary

EXPLANATION

WATER QUALITY CLASSIFICATIONS (WQC) MAPS are one of the elements of the Water Quality Standards (WQS) for the State of Connecticut. The WQS are a part of Connecticut's clean water program and are essential for protecting and improving water quality. The WQS follow the principles of Connecticut's Clean Water Act which is in Chapter 446K of the Connecticut General Statutes. The WQS provide policy guidance in many areas, for example decisions on acceptable discharges to water resources, siting of landfills, remediation or prioritization of municipal sewerage system projects. The first two elements of the WQS are the Standards, which set an overall policy for management of water quality, and the Criteria, which are descriptive and numerical standards that describe the allowable parameters and goals for various water quality classifications. A discussion of these two elements is found in the Water Quality Standards document available on the CT DEEP website. The third element is the Classifications and the Water Quality Classification Maps which show the Classification assigned to each surface and groundwater resource throughout the State. The WQS are adopted using a public participation process. The WQC maps are also adopted using a public participation process but go through hearings separately from the Standards and Criteria hearings. Revision and adoption of the WQC data occurs in accordance with the public participation procedures contained in Section 22a-426 of the Connecticut General Statutes. Ground WQC is subject to Connecticut regulation and changes must be reviewed and adopted. All changes to the Surface WQC require an adoption process which is subject to federal review and approval in addition to CT regulation. The adoption dates for the WQC by major drainage basin are: Housatonic River, Hudson River and Southwest Coastal Basins - March 1999; Connecticut River and South Central Coastal Basins - February 1993; Thames River, Pawcatuck River and Southeast Coastal Basins - December 1986. Surface Water Classifications do not change after the adoption date until the next major revision. Ground Water Classifications may change after the adoption date under specific circumstances. The map may have more than one WQC adoption date because a town may be in more than one major drainage basin.

SURFACE WATERS in Connecticut are divided into freshwater classified as AA, A, B or B* and saline waters classified as SA or SB. Class AA designated uses are existing or proposed drinking water supplies; habitat for fish and other aquatic life and wildlife; recreation; and water supply for industry and agriculture. Class A designated uses are habitat for fish and other aquatic life and wildlife; potential drinking water supplies; recreation; navigation; and water supply for industry and agriculture. Class SA designated uses are habitat for marine fish, other aquatic life and wildlife; shellfish harvesting for direct human consumption; recreation; industrial water supply; and navigation. Class B designated uses are habitat for fish and aquatic life and wildlife; recreation; navigation; and industrial and agricultural water supply. Class B*, applicable to Candlewood Lake, is a subset of Class B and is identical in all ways to the designated uses, criteria and standards for Class B waters except for the restriction on direct discharges. Class SB designated uses are habitat for marine fish and aquatic life and wildlife; commercial shellfish harvesting; recreation; industrial water supply; and navigation.

Surface waters which are not specifically classified shall be considered as Class A or Class AA. Surface waters in GA ground water areas are assumed Class A or Class SA unless otherwise indicated. Surface waters in GAA ground water areas are assumed Class AA unless otherwise indicated.

On the WQC map a surface water quality goal of A is represented by blue colored water bodies. Surface water quality goal of AA is represented by purple colored water bodies. Surface water quality goal of B is represented by gold colored water bodies.

GROUND WATERS in Connecticut are classified as GAA, GA, GB and GC. Class GAA designated uses are existing or potential public supply of water suitable for drinking without treatment and baseflow for hydraulically-connected surface water bodies. The Class GAAs is a subclass of GAA for ground water that is tributary to a public water supply reservoir. The area of contribution to a public water supply well is represented by a 500-foot radius around the well and is assumed to be Class GAA unless otherwise classified. Class GA designated uses are existing private and potential public or private supplies of water suitable for drinking without treatment and baseflow for hydraulically-connected surface water bodies. All ground waters not specifically classified are considered as Class GA. Class GB designated uses are industrial process water and cooling waters and baseflow for hydraulically-connected water bodies and is presumed not suitable for human consumption without treatment. Class GC designated uses are assimilation of discharges authorized by the Commissioner pursuant to Section 22a-430 of the General Statutes.

On the WQC map GA is represented by white colored land areas. Class GAA and class GAAs are represented by blue colored land areas. The area of contribution to a public water supply well is shown by a blue cross-hatch overprint. A notation of GAA followed by a state abbreviation indicates a watershed that contributes to the public water supply for a state other than Connecticut. Class GA or Class GAA areas that currently may not be meeting the GA or GAA standards are represented on the WQC maps by tan colored land areas. Class GB is represented by green colored land areas. Class GC is represented by magenta colored land areas.

FINAL AQUIFER PROTECTION AREAS (Level A) are included on the WQC maps for informational purposes. These areas are anticipated to be reclassified GAA during the next major basin updates, subject to public participation. The Aquifer Protection Program helps protect Connecticut's public drinking water resources by delineating aquifer protection areas (also called wellhead protection areas) for public supply wells and establishing land use regulations within these areas. These areas represent the land area contributing ground water to active public water supply wells or well fields that serve more than 1000 people and are set in sand and gravel aquifers (stratified drift deposits).

DATA SOURCES

WATER QUALITY CLASSIFICATIONS DATA – Water quality classifications shown on this map are based on information from the following digital spatial datasets that are typically shown together – Ground Water Quality Classifications Poly, Surface Water Quality Classifications Line, and Surface Water Quality Classifications Poly. The map legend above reflects the content of these three data sources. These WQC data were initially compiled on 1:24,000-scale 7.5 minute USGS topographic quadrangle maps and later digitized at 1:24,000 scale. For example, the Surface Water Quality Classifications Line and Surface Water Quality Classifications Poly digital data assigns surface water quality classifications to water bodies such as rivers, streams, reservoirs, lakes, ponds and coves found in 1:24,000-scale hydrography data available from CT DEEP. The hydrography may not include all the waterbodies in Connecticut. The Ground Water Quality Classifications Poly data assigns ground water quality classifications, at 1:24,000 scale, to the remaining land areas in Connecticut.

AQUIFER PROTECTION AREA DATA – Aquifer Protection Areas shown on this map are from the Aquifer Protection Area digital dataset which contains polygon data intended to be used at 1:24,000 scale. The dataset contains regulated areas classified as Level A Aquifer Protection Area (Final) and Level B Aquifer Protection Area (Preliminary). The Level B areas are not shown on the WQC maps. The data was collected from 1991 to the present and is actively updated as Final area mapping replaces earlier Preliminary areas. The Aquifer Protection Areas are delineated by the individual water companies owning the well fields and submitted to the CT DEEP for approval. Preliminary mapping provides a general estimate of the area contributing ground water to the well field. Final mapping is based on extensive, site-specific, detailed modeling of the ground water flow system. CT DEEP may adjust Final area boundaries to be consistent with 1:24,000 scale topography and base map data where appropriate during the approval process.

MAJOR DRAINAGE BASIN DATA – Major drainage basins shown on this map are from Major Basin Line data developed by CT DEEP and intended to be used at 1:24,000 scale.

BASE MAP DATA - Based on data originally from 1:24,000-scale USGS 7.5 minute topographic quadrangle maps published between 1969 and 1992. It includes political boundaries, railroads, airports, hydrography, geographic names and geographic places. Streets and street names are from Tele Atlas® copyrighted data. Base map information is neither current nor complete.

RELATED INFORMATION
This map is intended to be printed at its original dimensions in order to maintain the 1:24,000 scale (1 inch = 2000 feet).
WATER QUALITY STANDARDS - Go to the CT DEEP website for a summary and the full text of the "Water Quality Standards" and for other information on water quality.
AQUIFER PROTECTION AREAS - Go to the CT DEEP website for more information.

ADOPTED DATES

Water Quality Standards
February 25, 2011

Thames River, Pawcatuck River and Southeast Coastal Basins: December 1986

Connecticut River and South Central Coastal Basins: February 1993

Housatonic River, Hudson River and Southwest Coastal Basins: March 1999

MAP LOCATION

MAJOR BASINS

1 Pawcatuck
2 Southeast Coast
3 Thames
4 Connecticut
5 South Central Coast
6 Housatonic
7 Southwest Coast
8 Hudson

State Plane Coordinate System of 1983, Zone 3526
Lambert Conformal Conic Projection
North American Datum of 1983

1 0.5 0 1 Miles
1000 0 1000 2000 3000 4000 5000 6000 7000 Feet
1 0.5 0 1 Kilometers

SCALE 1:24,000 (1 inch = 2000 feet) when map is printed at original size

STATE OF CONNECTICUT
DEPARTMENT OF
ENERGY & ENVIRONMENTAL PROTECTION
79 Elm Street
Hartford, CT 06106-5127

Map created by CT DEEP
October 2018

Map is not colorfast
Protect from light and moisture

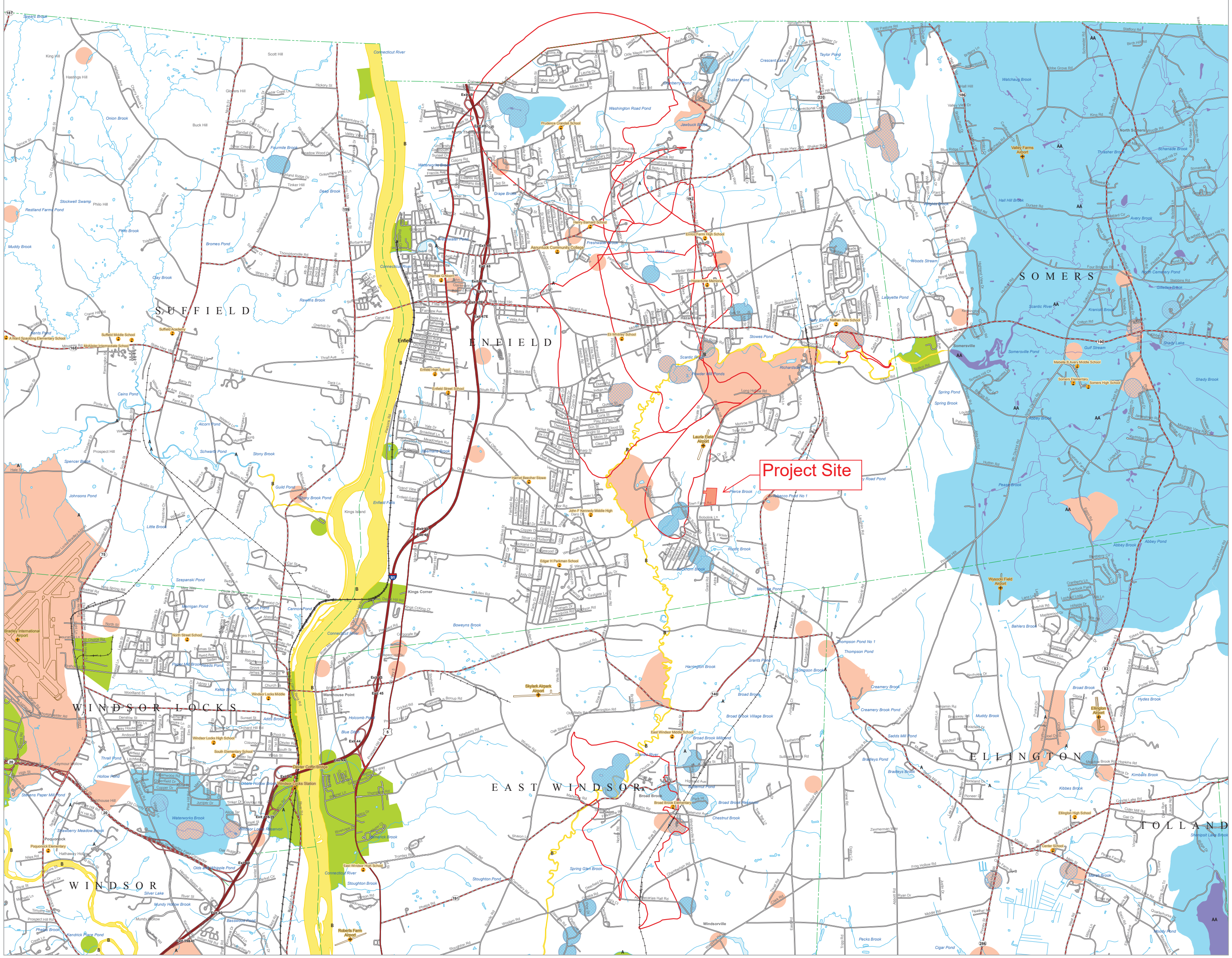


Figure 8 Public Water Supply Map

Public Water Supply Map

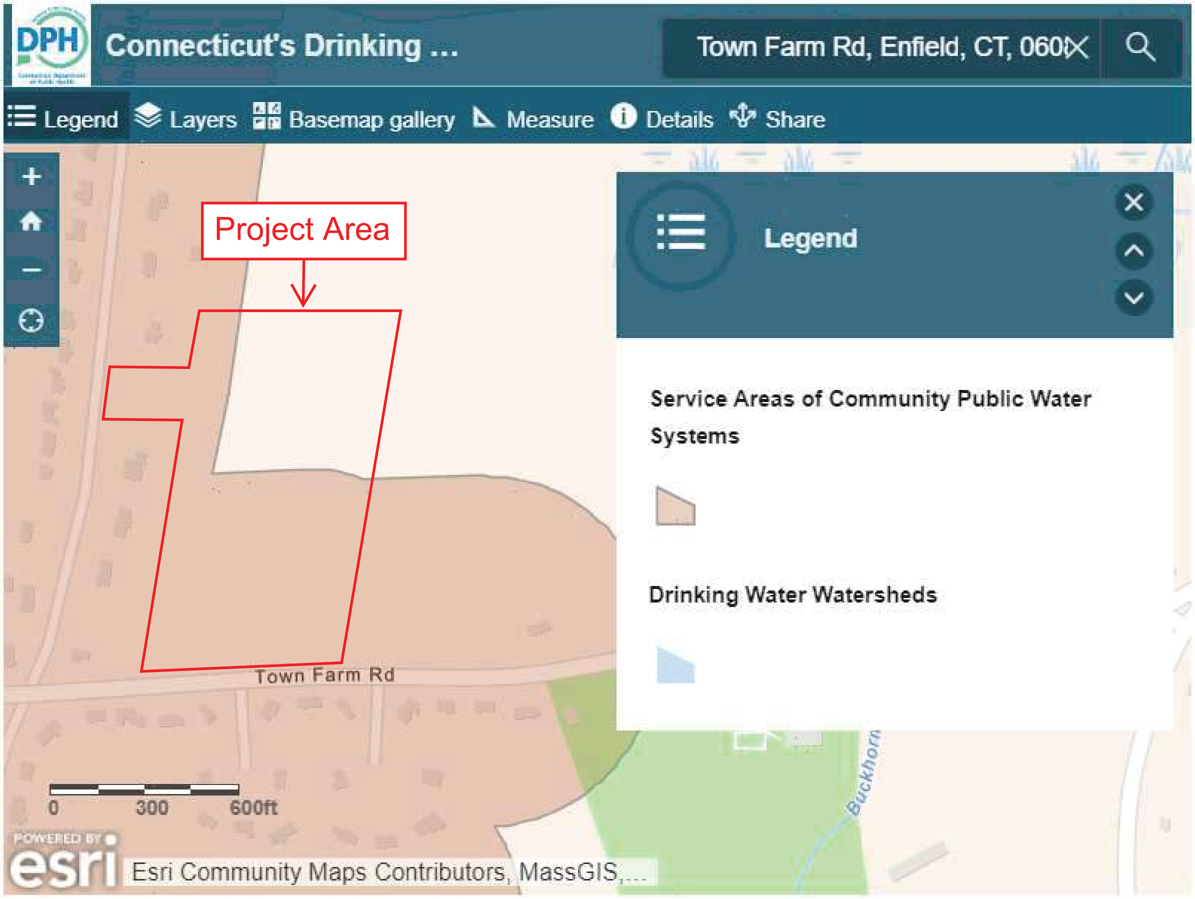


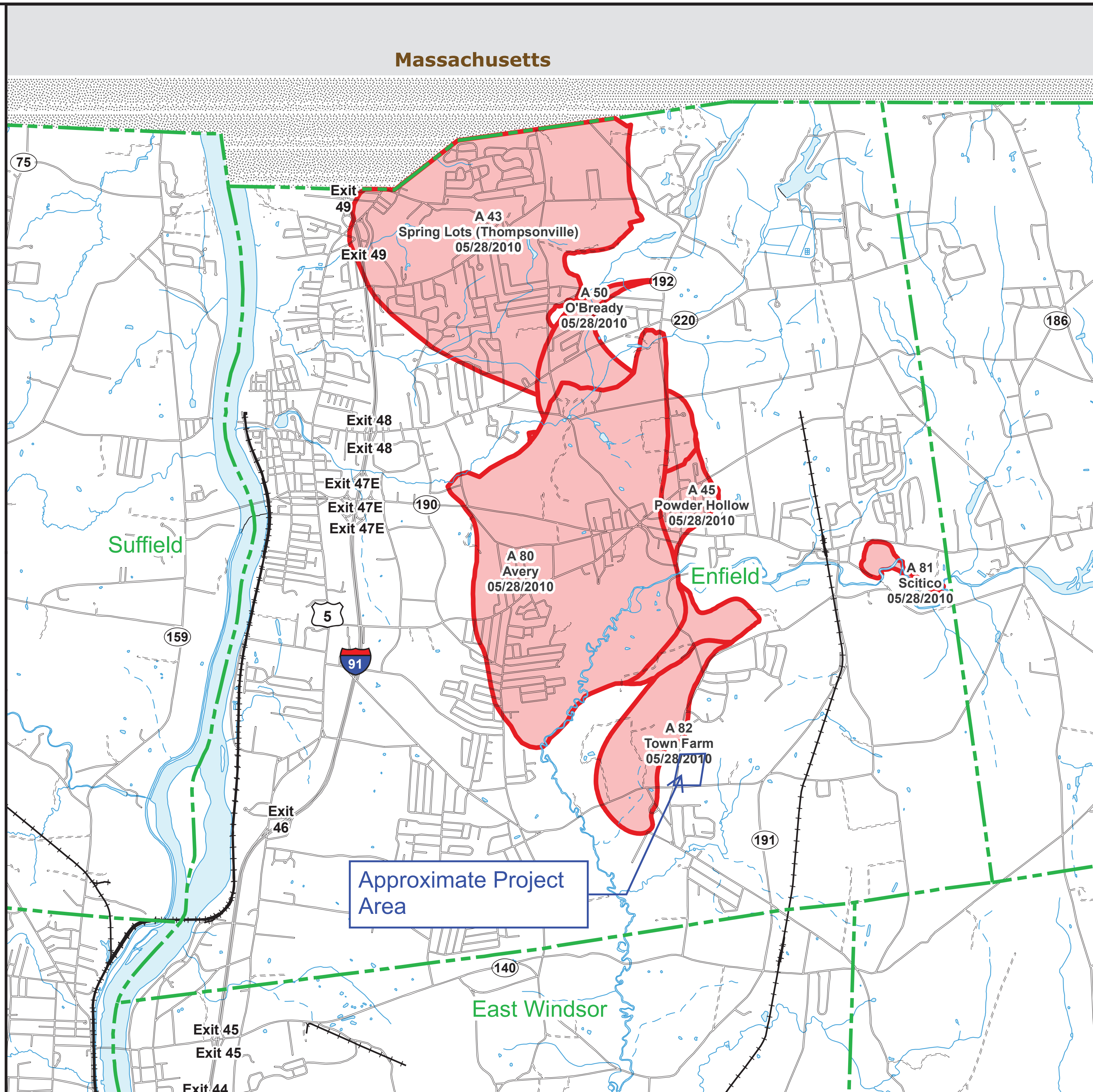
Figure 9 Aquifer Protection Area Map

AQUIFER PROTECTION AREAS

Enfield, CT

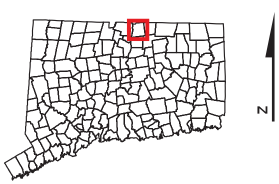
December 23, 2021

- Level A APA (Final Adopted)
- Level A APA (Final)
- Level B APA (Preliminary)
- Town Boundary



NOTE: The Aquifer Protection Areas were delineated through Connecitcut's Level A and Level B Mapping Processes. Aquifer Protection Areas are delineated for active public water supply wells in stratified drift that serve more than 1000 people, in accordance with Sections 22a-354c and 22a-354z of the Connecticut General Statutes. Level B Mapping delineates a preliminary aquifer protection area, providing an estimate of the land area from which the well draws its water. Level A Mapping delineates the final Aquifer Protection Area, which becomes the regulatory boundary for land use controls designed to protect the well from contamination. As Level A Mapping is completed for each well field and approved by DEEP, it replaces the Level B Mapping. Final Adopted Level A Areas are those where towns have land use regulations for them. Masschusetts and Rhode Island Wellhead Protection Areas may be shown for informational purposes.

QUESTIONS:
Bureau of Water Protection and Land Reuse
Planning and Standards Division
Phone: (860) 424-3020
www.ct.gov/deep/aquiferprotection



STATE OF CONNECTICUT
DEPARTMENT OF
ENERGY & ENVIRONMENTAL PROTECTION
79 Elm Street
Hartford, CT 06106-5127

Figure 10 Drainage Basin Map

CTDEEP Drainage Basin Map

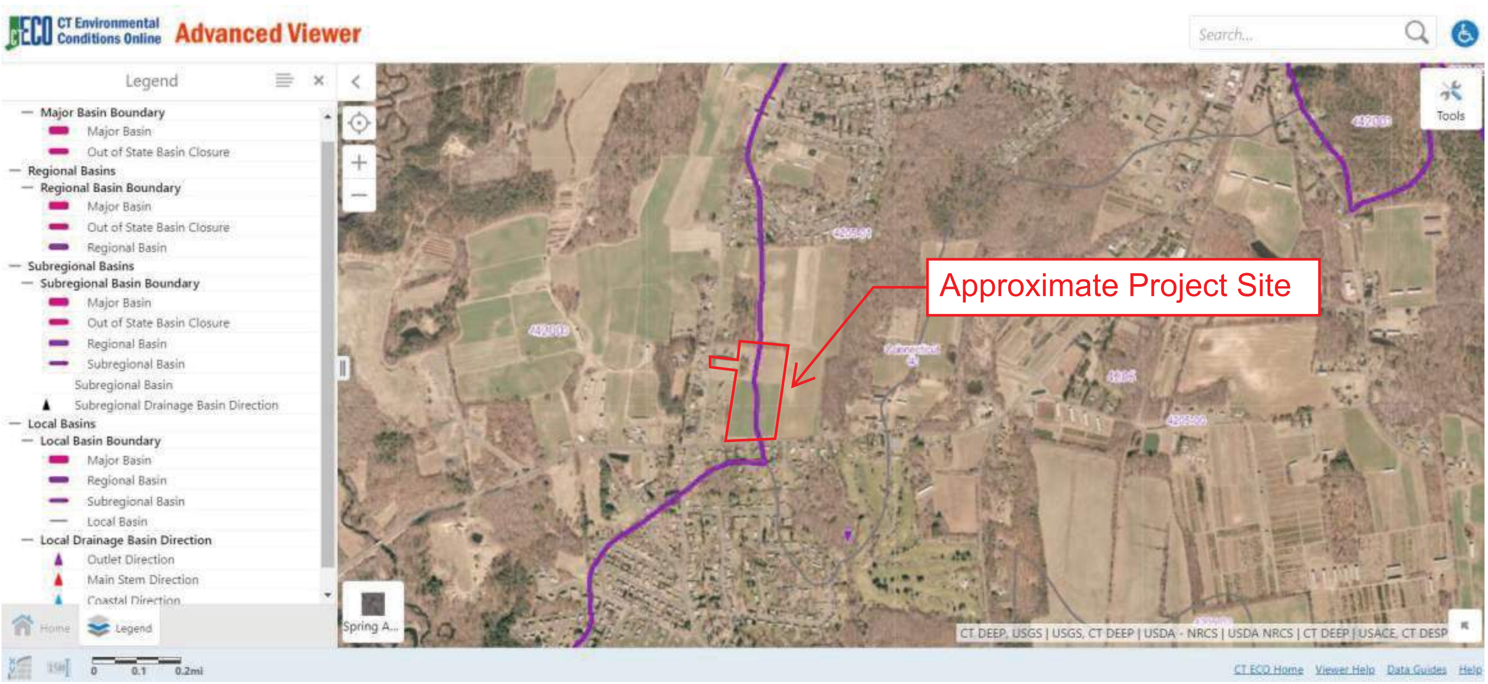


Figure 11 NDDB Figure

Natural Diversity Data Base Areas

ENFIELD, CT

June 2023

- State and Federal Listed Species
- Critical Habitat
- Town Boundary

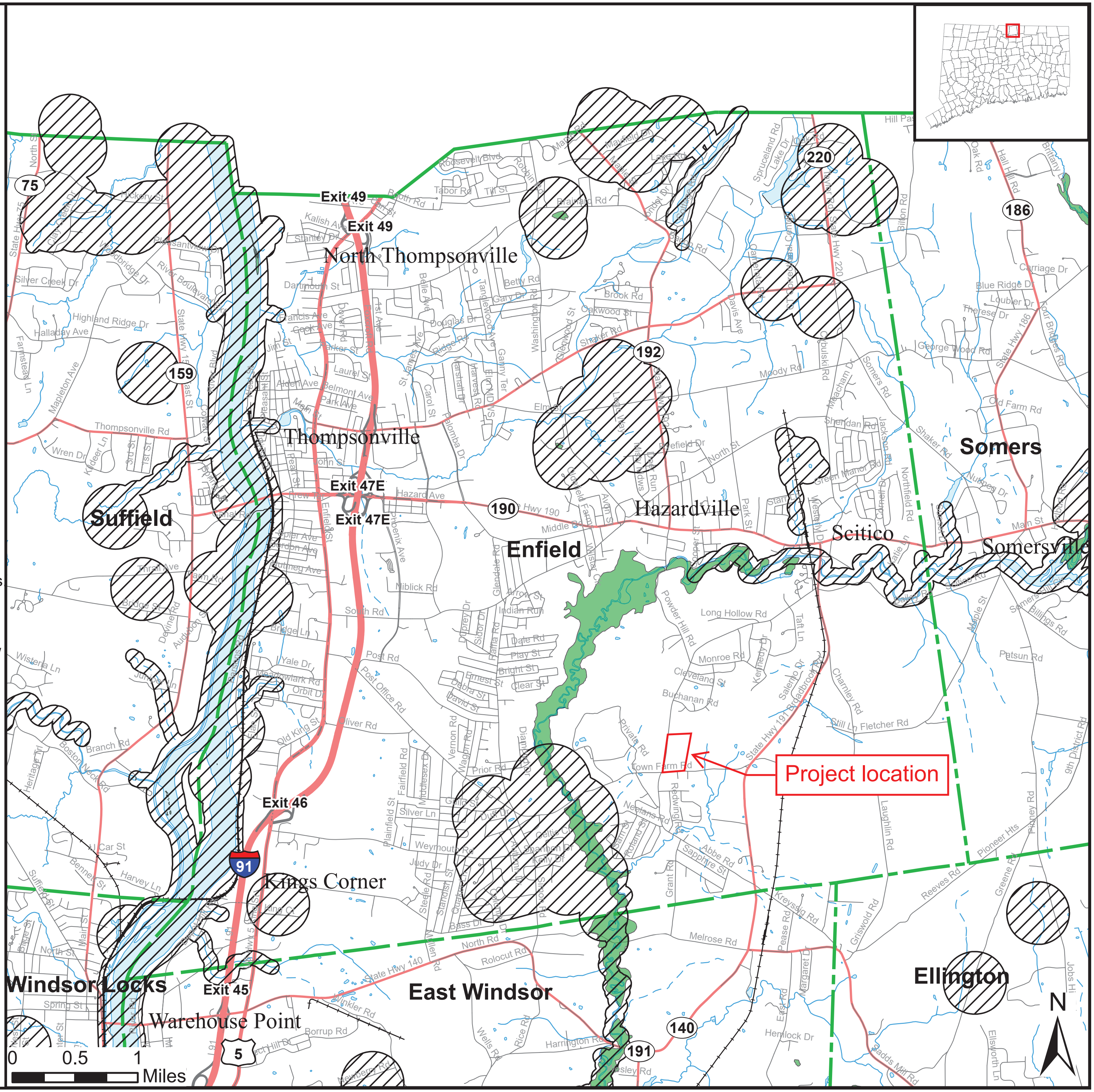
NOTE: This map shows known locations of State and Federal Listed Species and Critical Habitats. Information on listed species is collected and compiled by the Natural Diversity Data Base (NDDB) from a variety of data sources . Exact locations of species have been buffered to produce the generalized locations.

This map is intended for use as a preliminary screening tool for conducting a Natural Diversity Data Base Review Request. To use the map, locate the project boundaries and any additional affected areas. If the project is within a hatched area there may be a potential conflict with a listed species. For more information, use DEEP ezFile https://filings.deep.ct.gov/DEEPPortal/ to submit a Request for Natural Diversity Data Base State Listed Species Review or Site Assessment. More detailed instructions are provided along with the request form on our website.
https://portal.ct.gov/deep-nddbrequest

Use the CTECO Interactive Map Viewers at http://cteco.uconn.edu to more precisely search for and locate a site and to view aerial imagery with NDDB Areas.

QUESTIONS: Department of Energy and Environmental Protection (DEEP)
79 Elm St, Hartford, CT 06106
email: deep.nddbrequest@ct.gov
Phone: (860) 424-3011

Connecticut Department of Energy & Environmental Protection

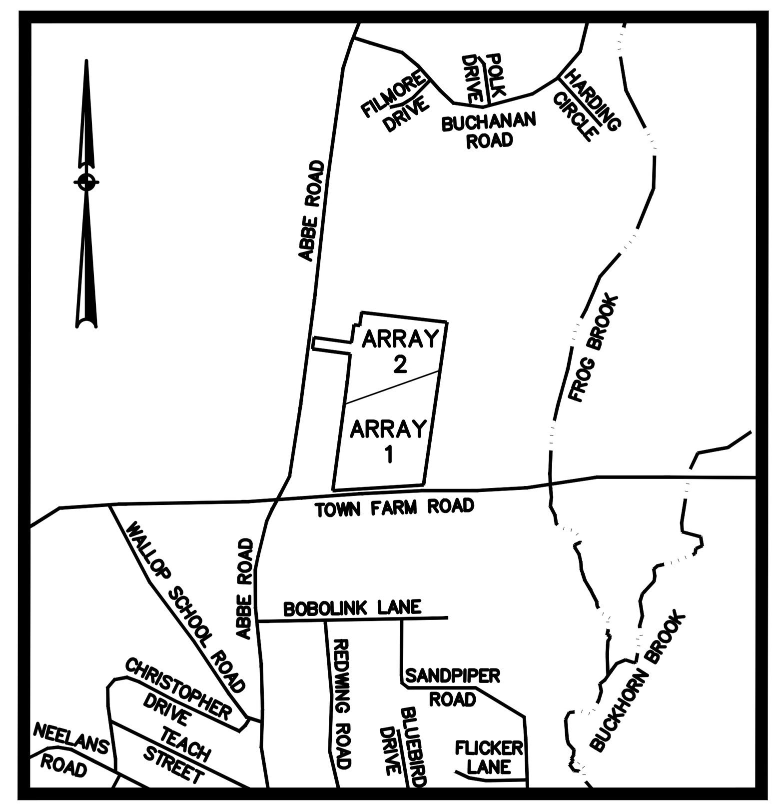


Appendix A Site Plan

Town Farm Solar

141 Town Farm Road & Abbe Road
Enfield, CT 06082

Map 086 Lots 164, 321, & 326 Zone: R-44



LOCATION MAP
1"=1000'

Applicants

LSE Scutum LLC (Array 1)
& LSE Bootes LLC (Array 2)
40 Tower Lane, Suite 201
Avon, CT 06001

Owners

M&K Hill, LLC
212 Abbe Road
Enfield, CT 06082

Katherine Raffia
& Darrell Crowley
207 Abbe Road
Enfield, CT 06082

Raffia Farms, Inc.
113 Raffia Road
Enfield, CT 06082

Prepared By

RUSSO
SURVEYORS·ENGINEERS
SERVING CT & MA

J.R. Russo & Associates, LLC
P.O. Box 938, 1 Shoham Rd East Windsor, CT 06088
www.jrrusso.com · CT 860.623.0569 · MA 413.785.1158

DRAWING INDEX

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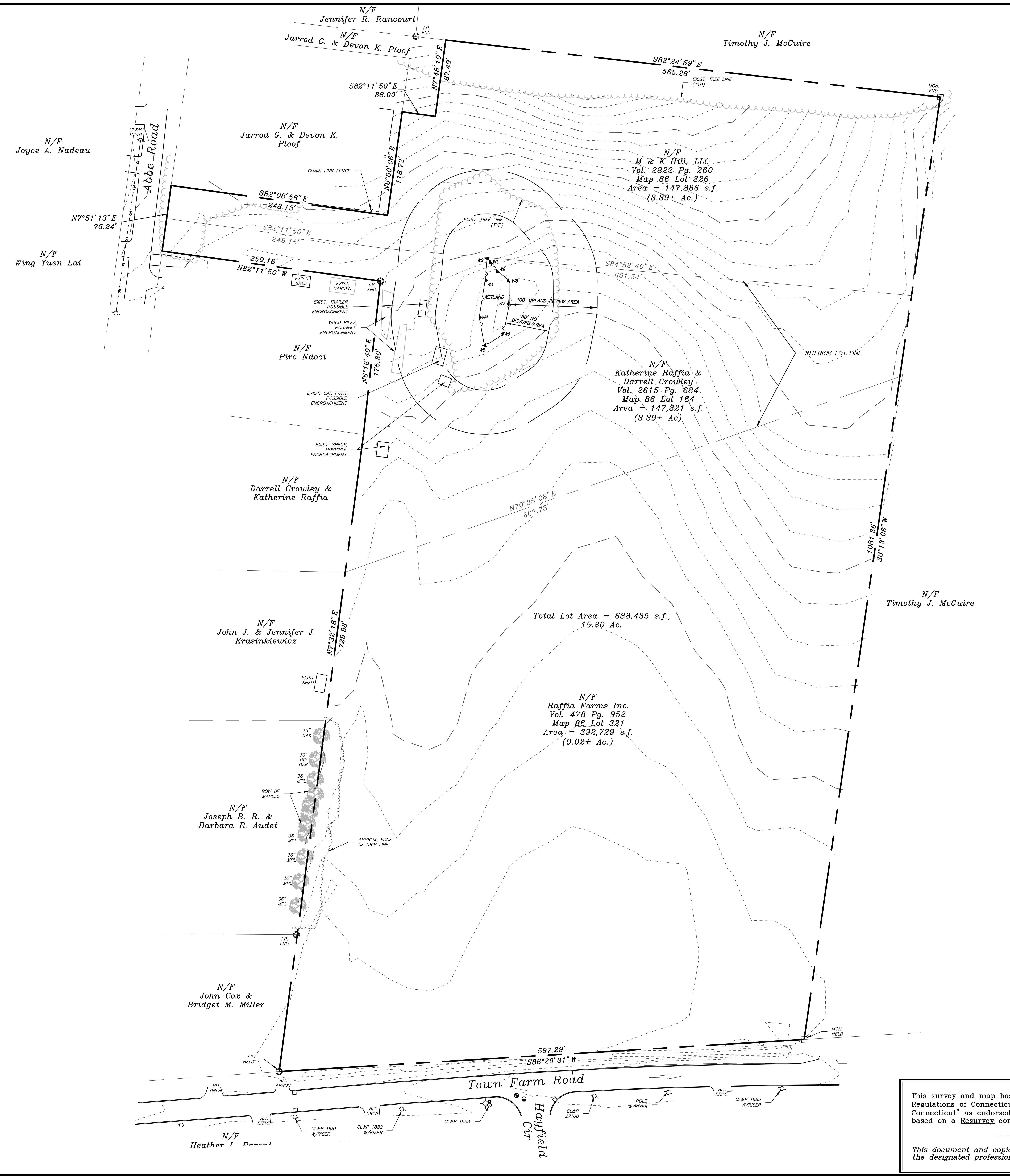

GRAPHIC SCALE

(IN FEET)
1 inch = 60 ft.

Reference Maps:

1. "Monumented Property Survey Plan Prepared For State of Connecticut Department of Agriculture Farmland Preservation Program Map of Property of Lois P. Osier, Trustee Enfield, Connecticut Total Area = 63.43 Acres Scale: 1"=100' Date: 1-25-02 Rev. 9-06-02" by Schindler Surveys
2. "PH #2276 Resubdivision Map Prepared For: Eli Raffia #207 Abbe Road Enfield, Connecticut Scale: 1"=50' Date: Sept. 12, 2001 Rev. 10-24-01" by Dennis G. Rehmer, L.S.
3. "PH #2703 Resubdivision Map Prepared For: Eli Raffia #205 Abbe Road Enfield, Connecticut Scale: 1"=50' Date: August 18, 2010 Rev. 9-17-10" by Dennis G. Rehmer, L.S.
4. "Property Survey Prepared For Lois P. Osier Showing Property At Abbe Road & Town Farm Road Enfield, Connecticut Lot Area = 62,997 s.f., 1.45 Ac. Scale: 1"=40' Date: Oct. 2, 1998" by Martin J. Post, L.S.

Notes:

1. Portion of the parcel is located in inland wetlands as delineated by All Points Technology Corporation.
2. Parcel is not located in a flood hazard zone, Firm Insurance Rate Map Number 09003C0233F, Effective Date: September 26, 2008.
3. Horizontal datum based on N.A.D. 1983. Elevations based on N.A.V.D. 1988 Datum.
4. All underground utility locations on this plan are approximate and may not be complete. Anyone using this information without verifying the locations does so at their own risk. No construction will be done on this site prior to utility mark out. "Call Before You Dig 1-800-922-4455".

DATA BLOCK (ZONE R-44)

	REQUIREMENT
MIN. FRONTAGE:	175'
MIN. AREA:	44,000 S.F.
FRONT YARD:	50'
SIDE YARD:	35'
REAR YARD:	60'
MAX. BLDG COVERAGE:	15%

LEGEND

- EXISTING UTILITY HANDHOLE
- EXISTING UTILITY POLE
- EXISTING WATER GATE
- EXISTING HYDRANT
- EXISTING GAS GATE
- EXISTING CATCH BASIN
- EXISTING IRON PIN (FOUND)
- EXISTING MONUMENT (FOUND)
- EXISTING TREELINE
- LIMIT OF WETLANDS
- PROPERTY LINE
- BUILDING LINE

This survey and map has been prepared in accordance with Sections 20-300b-1 thru 20-300b-20 of the Regulations of Connecticut State Agencies – "Minimum Standards for Surveys and Maps in the State of Connecticut" as endorsed by the Connecticut Association of Land Surveyors, Inc. It is a Property Survey based on a Resurvey conforming to Horizontal Class A-2 & a Topographic Survey conforming to Class T-2.

This document and copies thereof are valid only if they bear the live signature and embossed seal of the designated professional. Unauthorized alterations render any declaration hereon null and void.

TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

RUSSO SURVEYORS • ENGINEERS SERVING CT & MA
J.R. Russo & Associates, LLC
P.O. Box 938, 1 Shoham Rd East Windsor, CT 06088
www.jrrusso.com • CT 860.623.0569 • MA 413.785.1158

LODESTAR ENERGY

REVISIONS

BY: LF/TAC CHK: JEU

Town Farm Solar
141 Town Farm Road & Abbe Road
Enfield, Connecticut
Map 086 Lots 321, 164, & 326 Zone: R-44

Boundary Survey

DATE 1-30-24
SCALE 1"=60'
JOB NUMBER 2022-083
SHEET 2 of 7

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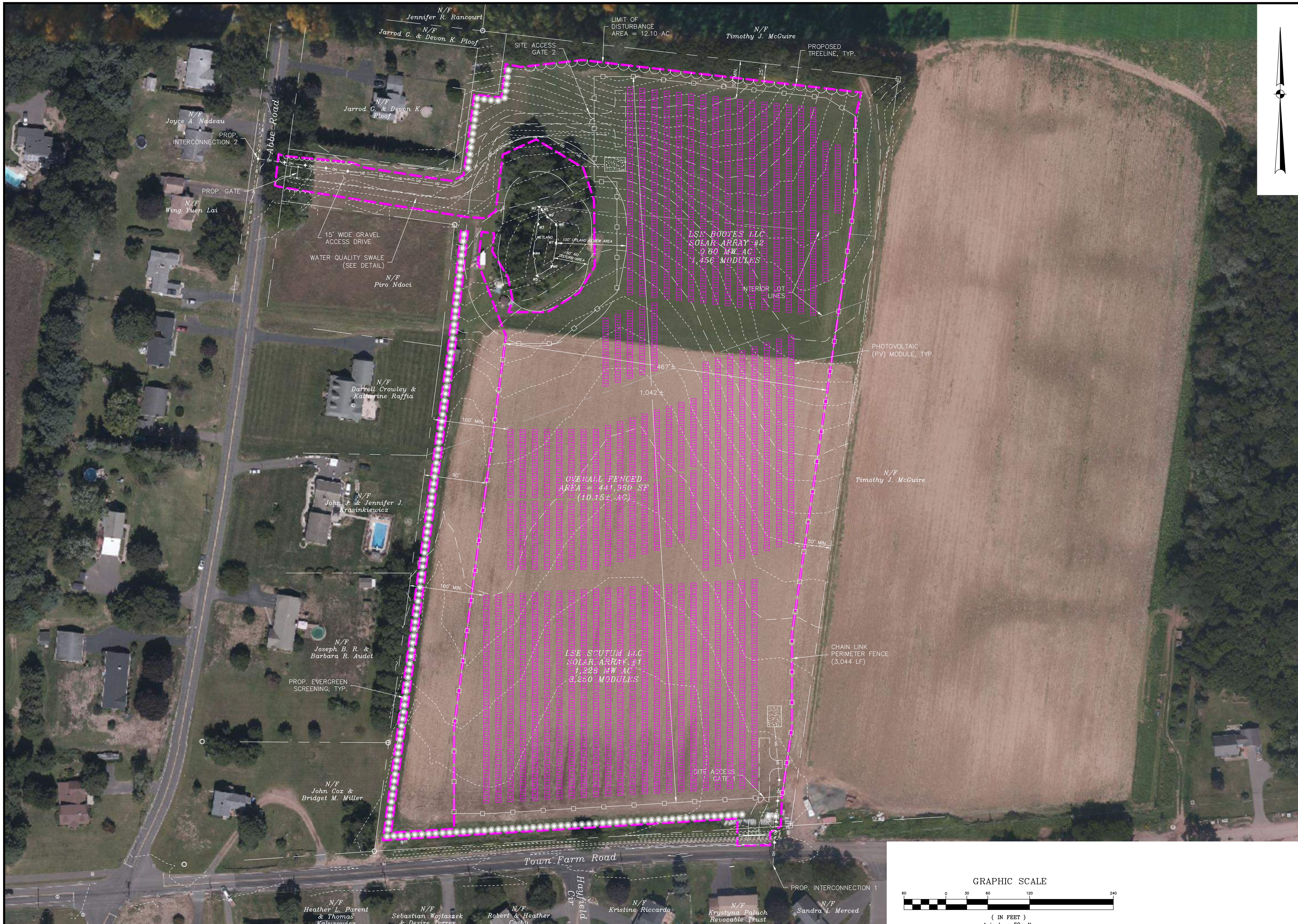

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LODESTAR ENERGY

REVISIONS

BY: LF/TAC	CHK: JEU

Town Farm Solar

141 Town Farm Road & Abbe Road
Enfield, Connecticut
Map 086 Lots 321, 164, & 326 Zone: R-44

Overall Aerial Plan

DATE	1-30-24
SCALE	1"=60'
JOB NUMBER	2022-083
SHEET	3 of 7

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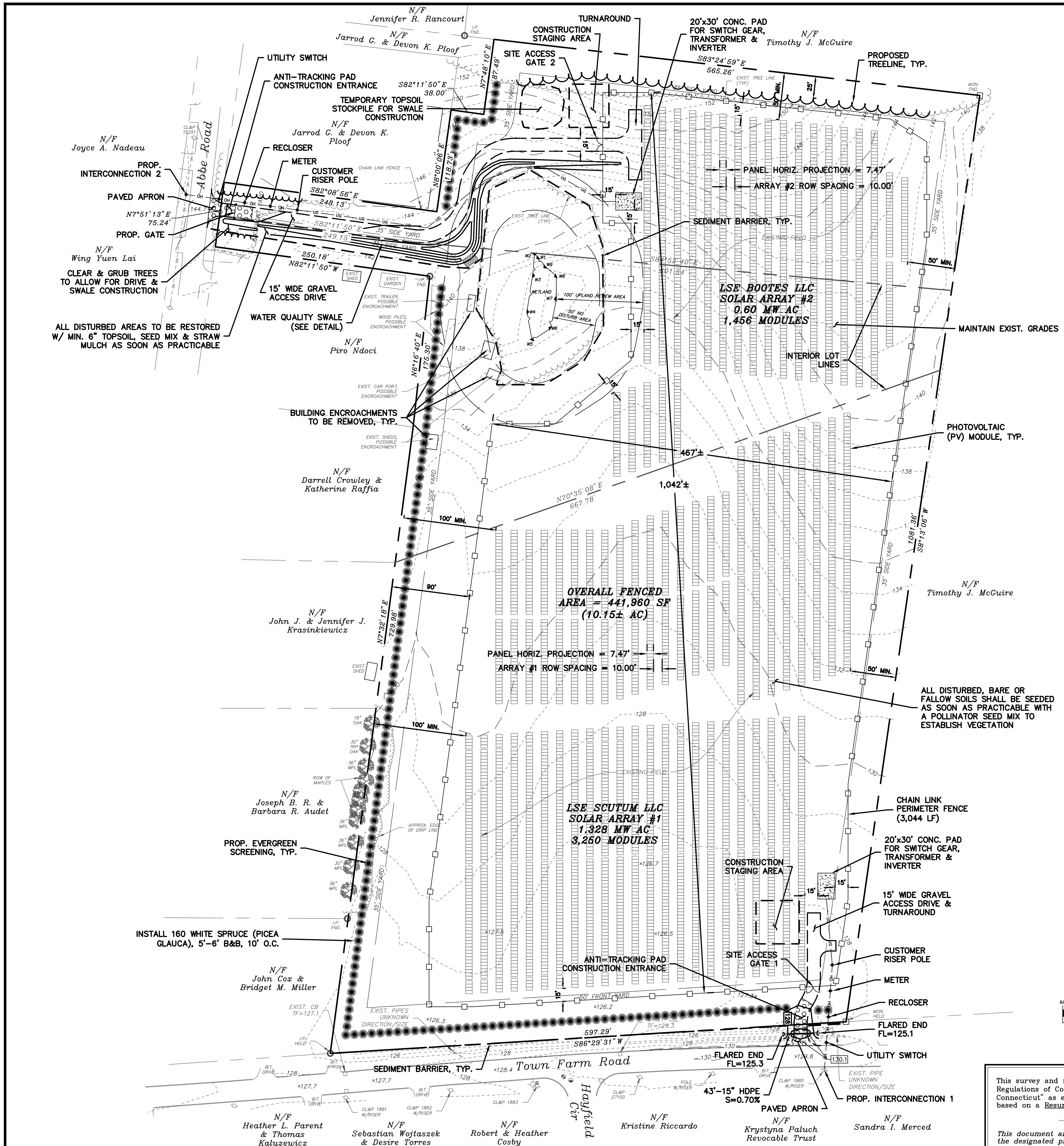

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- PROPOSED UTILITY POLE
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- PROPOSED UNDERGROUND UTILITIES
- EXISTING WATER GATE
- EXISTING HYDRANT
- EXISTING GAS GATE
- EXISTING CATCH BASIN
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- EXISTING IRON PIN (FOUND)
- EXISTING MONUMENT (FOUND)
- EXISTING SPOT GRADE
- PROPOSED SPOT GRADE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- EXISTING TREELINE
- PROPOSED TREELINE
- LIMIT OF WETLANDS
- PROPERTY LINE
- BUILDING LINE
- STAKED HAYBALES OR SILT FENCE

This survey and map has been prepared in accordance with Sections 20-300b-1 thru 20-300b-20 of the Regulations of Connecticut State Agencies - "Minimum Standards for Surveys and Maps in the State of Connecticut" as endorsed by the Connecticut Association of Land Surveyors, Inc. It is a Property Survey based on a Resurvey conforming to Horizontal Class A-2 & a Topographic Survey conforming to Class T-2.

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LODESTAR ENERGY

REVISIONS

BY: LF/TAC CHK: JEU

Town Farm Solar

141 Town Farm Road & Abbe Road
Enfield, Connecticut
Map 086 Lots 321, 164, & 326 Zone: R-44

Array Site Plan

DATE: 1-30-24
SCALE: 1"=60'
JOB NUMBER: 2022-083

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PERMANENT SEEDING (PS)

SPECIFICATIONS

Time Of Year

Seeding dates in Connecticut are normally April 1 through June 15 and August 15 through October 1. Spring seedings give the best results and spring seedings of all mixes with legumes is recommended. There are two exceptions to the above dates. The first exception is when seedings will be made in the areas of Connecticut known as the Coastal Slope and the Connecticut River Valley. The Coastal Slope includes the coastal towns of New London, Middlesex, New Haven, and Fairfield counties. In these areas, with the exception of crown vetch (when crown vetch is seeded in late summer, at least 35% of the seed should be hard seed (unscarified), the final fall seeding dates can be extended and additional 15 days. The second exception is frost crack or dormant seeding, the seed is applied during the time of year when no germination can be expected, normally November through February. Germination will take place when weather conditions improve, mulching is extremely important to protect the seed from wind and surface erosion and to provide erosion protection until the seeding becomes established.

Site Preparation

Grade in accordance with the Land Grading measure which is in the Connecticut Guidelines For Soil Erosion and Sediment Control latest edition.

Install all necessary surface water controls.

For areas to be mowed remove all surface stones 2 inches or larger. Remove all other debris such as wire, cable tree roots, pieces of concrete, clods, lumps, or other unsuitable material.

Seed Selection

Basins & Disturbed Areas outside of fenced array: New England Erosion Control/Restoration Mix by New England Wetland Plants Inc. or Approved Equal.
Disturbed Areas within fenced area: Northeast Solar Pollinator Buffer Mix – ERNMX-610 by Ernst Conservation Seeds or approved equal.

Seedbed Preparation

Apply topsoil, if necessary, in accordance with the Topsoiling measure which is in the Connecticut Guidelines For Soil Erosion and Sediment Control latest edition.

Apply ground limestone and fertilizer according to soil test recommendations (such as those offered by the University of Connecticut Soil Testing Laboratory or other reliable source).

Where soil testing is not feasible on small or variable sites, or where timing is critical, fertilizer may be applied at the rate of 300 pounds per acre or 7.5 pounds per 1,000 square feet of 10-10-10 or equivalent and limestone at 4 tons per acre or 200 pounds per 1,000 square feet.

Work lime and fertilizer into the soil to a depth of 3 to 4 inches with a disc or other suitable equipment.

Inspect seedbed just before seeding. If the soil is compacted, crusted or hardened, scarify the area prior to seeding.

Seed Application

Apply selected seed at rates per manufacturer's recommendations uniformly by hand, cyclone seeder, drill, cultipacker type seeder or hydroseeder (slurry including seed, fertilizer). Normal seeding depth is from 0.25 to 0.5 inch. Increase seeding rates by 10% when hydroseeding or frost crack seeding. Seed warm season grasses during the spring period only.

Mulching

See guidelines in the Mulch For Seed measures.

MAINTENANCE

Inspect temporary soil protection area at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater during the first growing season.

Where seed has been moved or where soil erosion has occurred, determine [illegible] needed.

TEMPORARY SEEDING (TS)

SPECIFICATIONS

Site Preparation

Install needed erosion control measures such as diversions, grade stabilization structures, sedimentation basins and grassed waterways in accordance with the approved plan.

Grade according to plans and allow for the use of appropriate equipment for seedbed preparation, seeding, mulch application and mulch anchoring.

Seedbed Preparation

Loosen the soil to a depth of 3-4 inches with a slightly roughened surface. If the area has been recently loosened or disturbed, no further roughening is required. Soil preparation can be accomplished by tracking with a bulldozer, discing harrowing, raking or dragging with a section of chain link fence.

Apply ground limestone and fertilizer according to soil test recommendations (such as those offered by the University of Connecticut Soil Testing Laboratory or other reliable source).

If soil testing is not feasible on small or variable sites, or where timing is critical, fertilizer may be applied at the rate of 300 pounds per acre or 7.5 pounds per 1,000 square feet of 10-10-10 or equivalent.

Seeding

Apply seed uniformly by hand, cyclone seeder, drill, cultipacker type seeder or hydroseeder. The temporary seed shall be Rye (grain) applied at a rate of 120 pounds per acre. Increase seeding rates by 10% when hydroseeding.

Mulching

See guidelines in the Mulch For Seed measures.

MAINTENANCE

Inspect temporary seeding area at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater for seed and mulch movement and rill erosion.

Where seed has been moved or where soil erosion has occurred, determine the cause of the failure and repair as needed.

MULCH FOR SEED (MS)

SPECIFICATIONS

Materials

Types of Mulches *within this specification include, but are not limited to:*

1. Hay: *The dried stems and leafy parts of plants cut and harvested, such as alfalfa, clovers, other forage legumes and the finer stemmed, leafy grasses. The average stem length should not be less than 4 inches. Hay that can be windblown should be anchored to hold it in place.*

2. Straw: *Cut and dried stems of herbaceous plants, such as wheat, barley, cereal rye, or brome. The average stem length should not be less than 4 inches. Straw that can be windblown should be anchored to hold it in place.*

3. Cellulose Fiber: *Fiber origin is either virgin wood, post-industrial/pre-consumer wood or post consumer wood complying with materials specification (collectively referred to as "wood fiber"), newspaper, kraft paper, cardboard (collectively referred to as "paper fiber") or a combination of wood and paper fiber. Paper fiber, in particular, shall not contain boron, which inhibits seed germination. The cellulose fiber must be manufactured in such a manner that after the addition to and agitation in slurry tanks with water, the fibers in the slurry become uniformly suspended to form a homogeneous product. Subsequent to hydraulic spraying on the ground, the mulch shall allow for the absorption and percolation of moisture and shall not form a tough crust such that it interferes with seed germination or growth. Generally applied with tackifier and fertilizer. Refer to manufacturer's specifications for application rates needed to attain 80%-95% coverage without interfering with seed germination or plant growth. Not recommended as a mulch for use when seeding occurs outside of the recommended seeding dates.*

Tackifiers *within this specification include, but are not limited to: Water soluble materials that cause mulch particles to adhere to one another, generally consisting of either a natural vegetable gum blended with gelling and hardening agents or a blend of hydrophilic polymers, resins, viscosifiers, sticking aids and gums. Good for areas intended to be mowed. Cellulose fiber mulch may be applied as a tackifier to other mulches, provided the application is sufficient to cause the other mulches to adhere to one another.* ***Emulsified asphalts are specifically prohibited for use as tackifiers due to their potential for causing water pollution following its application.***

Nettings *within this specification include, but are not limited to: Prefabricated openwork fabrics made of cellulose cords, ropes, threads, or biodegradable synthetic material that is woven, knotted or molded in such a manner that it holds mulch in place until vegetation growth is sufficient to stabilize the soil. Generally used in areas where no mowing is planned.*

Site Preparation

Grade according to plans and allow for the use of appropriate equipment for seedbed preparation, seeding, mulch application and mulch anchoring.

Application

Timing: *Applied immediately following seeding. Some cellulose fiber may be applied with seed to assist in marking where seed has been sprayed, but expect to apply a second application of cellulose fiber to meet the requirements of* ***Mulch For Seed*** *in the Connecticut Guidelines For Soil Erosion and Sediment Control latest edition.*

Spreading: *Mulch material shall be spread uniformly by hand or machine resulting in 80%-95% coverage of the disturbed soil when seeding within the recommended seeding dates. Applications that are uneven can result in excessive mulch smothering the germinating seeds. For hay or straw anticipate an application rate of 2 tons per acre. For cellulose fiber follow manufacture's recommended application rates to provided 80%-95% coverage.*

When seeding outside the recommended seeding dates, increase mulch application rate to provide between 95%-100% coverage of the disturbed soil. For hay or straw anticipate an application rate to 2.5 to 3 tons per acre.

When spreading hay mulch by hand, divide the area to be mulched into approximately 1,000 square feet and place 1.5-2 bales of hay in each section to facilitate uniform distribution.

For cellulose fiber mulch, expect several spray passes to attain adequate coverage, to eliminate shadowing, and to avoid slippage.

Anchoring: *Expect the need for mulch anchoring along the shoulders of actively traveled roads, hill tops and long open slopes not protected by wind breaks.*

When using netting, the most critical aspect is to ensure that the netting maintains substantial contact with the underlying mulch and the mulch, in turn, maintains continuous contact with the soil surface. Without such contact, the material is useless and erosion can be expected to occur.

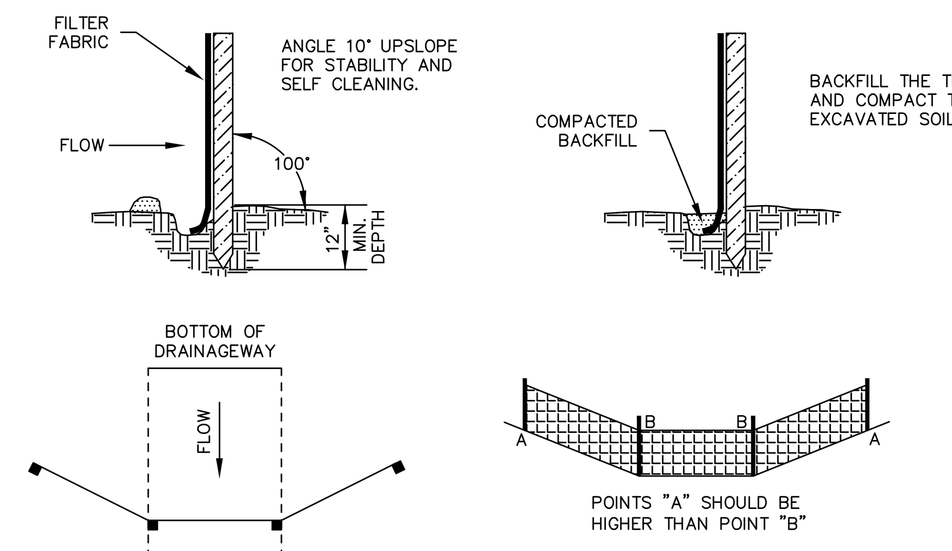
MAINTENANCE

Inspect mulch for seed area at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater until the grass has germinated to determine maintenance needs.

Where mulch has been moved or where soil erosion has occurred, determine the cause of the failure and repair as needed.

SOIL ERSOION & SEDIMENT CONTROL NOTES

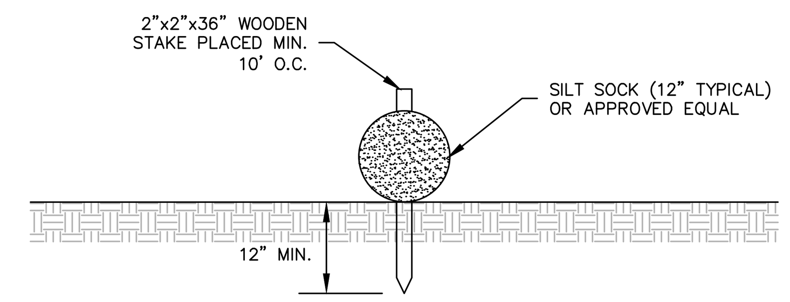
1. *All soil erosion and sediment control work shall be done in strict accordance with the Connecticut Guidelines For Soil Erosion and Sediment Control latest edition.*
2. *Any additional erosion/sediment control deemed necessary by the engineer during construction, shall be installed by the developer. In addition, the developer shall be responsible for the repair/replacement and/or maintenance of all erosion control measures until all disturbed areas are stabilized to the satisfaction of the town staff.*
3. *All soil erosion and sediment control operations shall be in place prior to any grading operations and installation of proposed structures or utilities and shall be left in place until construction is completed and/or area is stabilized.*
4. *In all areas, removal of trees, bushes and other vegetation as well as disturbance of the soil is to be kept to an absolute minimum while allowing proper development of the site. During construction, expose as small an area of soil as possible for as short a time as possible.*
5. *The developer shall practice effective dust control per the soil conservation service handbook during construction and until all areas are stabilized or surface treated. The developer shall be responsible for the cleaning of nearby streets of any debris from these construction activities.*
6. *All fill areas shall be compacted sufficiently for their intended purpose and as required to reduce slipping, erosion or excess saturation. Fill intended to support buildings, structures, conduits, etc., shall be compacted in accordance with local requirements or codes.*
7. *Topsoil is to be stripped and stockpiled in amounts necessary to complete finished grading of all exposed areas requiring topsoil. The stockpiled topsoil is to be located as designated on the plans. Topsoil shall not be placed while in a frozen or muddy condition, when the subgrade is excessively wet, or in a condition that may otherwise be detrimental to proper grading or proposed sodding or seeding.*
8. *Any and all fill material is to be free of brush, rubbish, timber, logs vegetative matter and stumps in amounts that will be detrimental to constructing stable fills. Maximum side slopes of exposed surfaces of earth to be 3:1 or as otherwise specified by local authorities.*
9. *Soil stabilization should be completed within 5 days of clearing or inactivity in construction.*
10. *Waste Materials – All waste materials (including wastewater) shall be disposed of in accordance with local, state and federal law. Litter shall be picked up at the end of each work day.*
11. *The Contractor shall maintain on-site additional erosion control materials as a contingency in the event of a failure or when required to shore up existing BMPs. At a minimum, the on-site contingency materials should include 30 feet of silt fence and 5 straw haybales with 10 stakes.*



SOURCE: U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, STORRS, CONNECTICUT

GEOTEXTILE SILT FENCE (GSF)

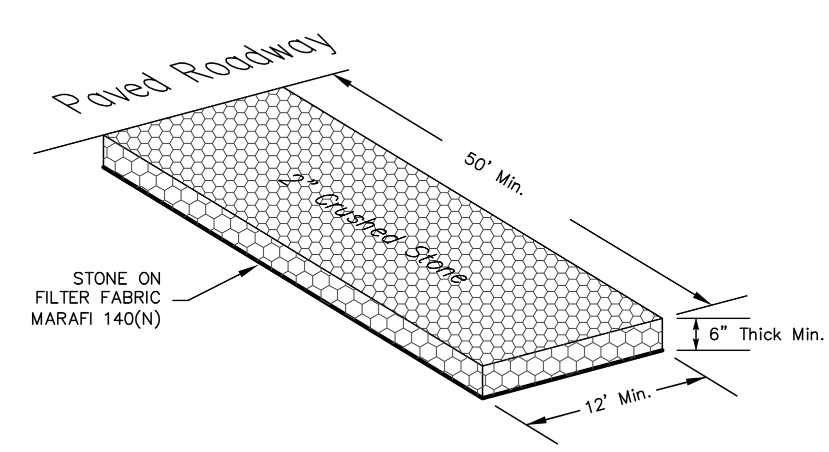
NOT TO SCALE



NOTE: MAY BE USED AS ALTERNATIVE TO GEOTEXTILE SILT FENCE.

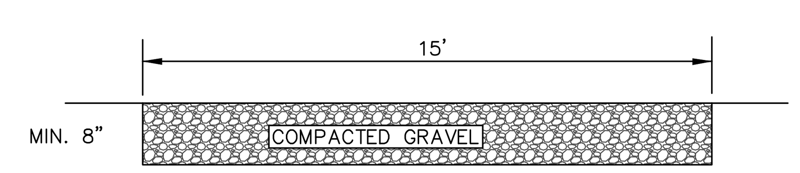
SILT SOCK (ALTERNATE SEDIMENT BARRIER)

NOT TO SCALE



ANTI-TRACKING EXIT PAD DETAIL (CE)

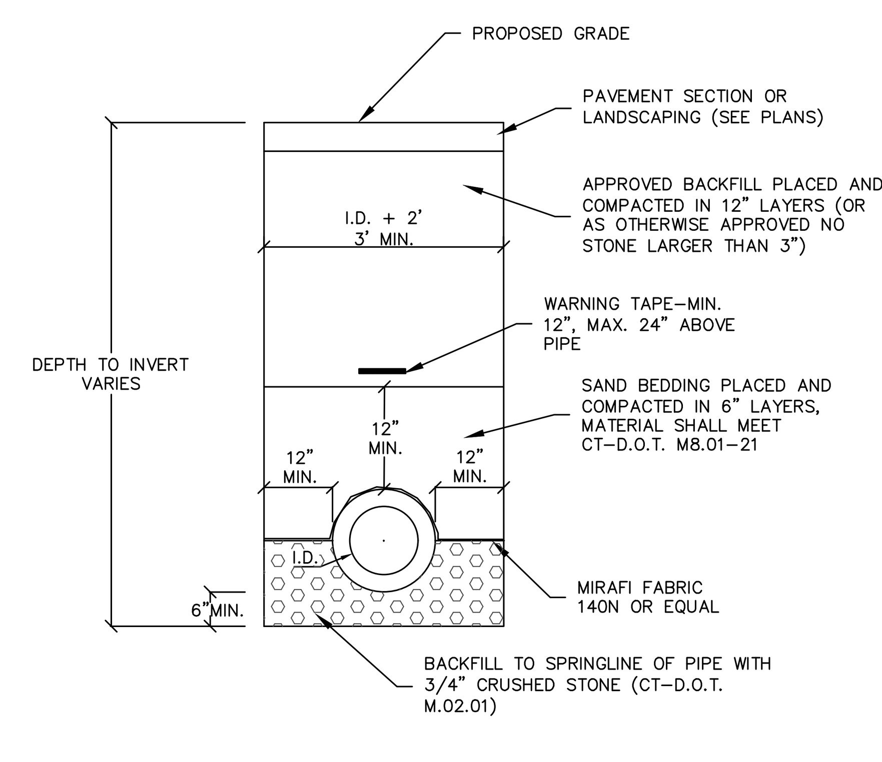
NOT TO SCALE



NOTES:
1. SUBGRADE SHALL BE EVALUATED IN THE FIELD FOR STABILITY. WHERE SUBGRADE IS WET OR CANNOT BE PROOF ROLLED WITHOUT SIGNIFICANT RUTTING OR MOVEMENT, ADDITIONAL STABILIZATION MEASURES WILL BE REQUIRED AND MAY INCLUDE EXCAVATION & INSTALLATION OF ADDITIONAL GRAVEL AND/OR INSTALLATION OF A GEOTEXTILE AS DIRECTED BY THE ENGINEER.
2. FINISH GRADE SHALL BE SET SO AS TO MAINTAIN EXISTING SHEET FLOW ACROSS THE DRIVEWAY.

GRAVEL DRIVEWAY DETAIL

NOT TO SCALE



STANDARD STORM DRAIN DETAIL

NOT TO SCALE

CHECKLIST FOR EROSION CONTROL PLAN

PROJECT: Lodestar Energy

LOCATION: 141 Town Farm Road & Abbe Road, Enfield, CT

PROJECT DESCRIPTION: Construction of a solar array

PARCEL AREA: 15.80± acres

RESPONSIBLE PERSONNEL: Kevin Midea, Lodestar Energy (410) 274-2716

EROSION AND SEDIMENT CONTROL PLAN PREPARER: J.R. Russo & Associates, LLC

CHECKLIST:

Work Description Erosion & Sediment Control Measures	Location	Date Installed	Initials	Date Removed	Initials
Install construction entrance	As shown on plan.				
Install perimeter sediment barriers	As shown on plan.				

MAINTENANCE OF MEASURES:

Location	Description or Number	Date	Initials

Project Dates:

Date of groundbreaking for project:

Date of final stabilization:

PROJECT NARRATIVE AND CONSTRUCTION SEQUENCE

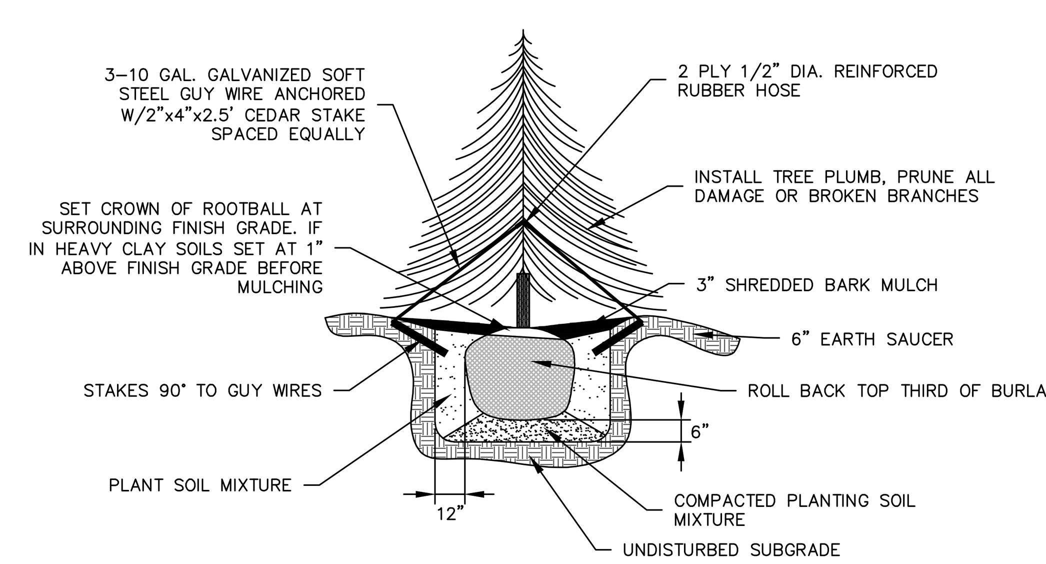
This project is located at 141 Town Farm Road & Abbe Road in Enfield, Connecticut. The proposed activity is the construction of a solar array. The suggested schedule of construction is as follows:

1. Conduct a pre-construction meeting on-site with the contractor to review the design and requirements of the Stormwater Pollution Control Plan.
2. Install perimeter silt fence/silt sock (GSF) downgradient of the construction activities as shown on the project plans.
3. Clear trees & grub stumps in the vicinity of Abbe Road entrance. Construct anti-tracking pad.
4. Install culvert & anti-tracking pad at Town Farm Road entrance.
5. Strip topsoil in the vicinity of the proposed water quality swale and access drives. Stockpile suitable amount of topsoil for reuse on-site in areas shown. Stockpiles shall be surrounded by sediment barriers (GSF).
6. Construct and stabilize access drives and water quality swale. Seed & mulch to establish vegetation as soon as practicable.
7. Install foundations and solar panels.
8. Install electrical equipment and distribution lines.
9. Install security fence.
10. Restore all disturbed areas with topsoil, seed mix and mulch as soon as practicable.
11. Remove silt fence after site is fully stabilized.

Construction of this site is anticipated to begin in the fall of 2024 and be complete by summer 2024, pending approvals. Temporary erosion control measures shall be installed prior to any soil disturbance and maintained throughout construction until soils have been stabilized with permanent vegetation.

The Contractor shall keep the area of disturbance to a minimum and establish vegetative cover on exposed soils as soon as practical. All soil and erosion control measures shall be installed and maintained in accordance with these plans and the "Connecticut DEP Guidelines for Soil Erosion and Sediment Control", as amended. The Contractor shall verify all conditions noted on the plans and shall immediately notify the Engineer of any discrepancies.

The developer shall be responsible for the repair/replacement/maintenance of all erosion control measures until all disturbed areas are stabilized. Accumulated sediment shall be removed as required to keep silt fence functional. In all cases, deposits shall be removed when the accumulated sediment has reached one-half above the ground height of the silt fence. This material is to be spread and stabilized in areas not subject to erosion, or to be used in areas which are not to be paved or built on. Silt fence (GSF) is to be replaced as necessary to maintain proper filtering action. Silt fence (GSF) are to remain in place and shall be maintained to insure efficient sediment capture until all areas above the erosion checks are stabilized and vegetation has been established.



EVERGREEN TREE PLANTING

NOT TO SCALE

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LODESTAR ENERGY

REVISIONS

BY: LF/TAC | CHK: JEU

Town Farm Solar

141 Town Farm Road & Abbe Road
Enfield, Connecticut
Map 086 Lots 321, 164, & 326 Zone: R-44

Erosion Control Notes & Details

DATE: 1-30-24

SCALE: As Shown

JOB NUMBER: 2022-083

SHEET: 5 of 7

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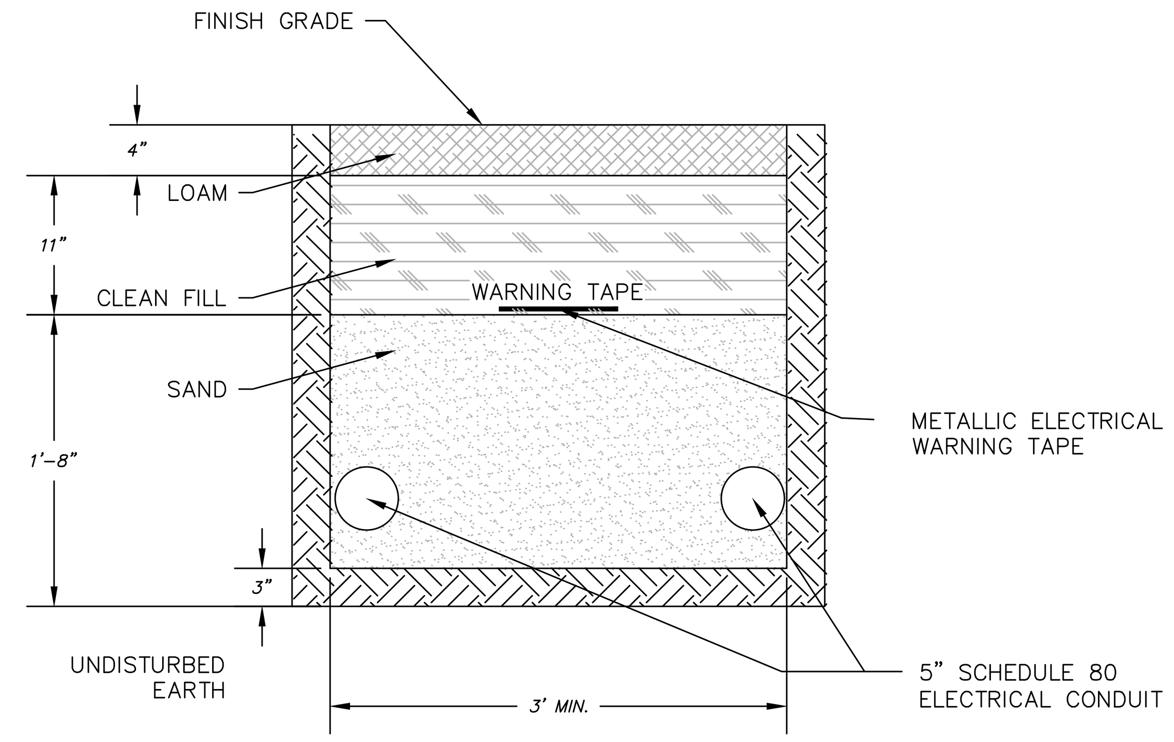
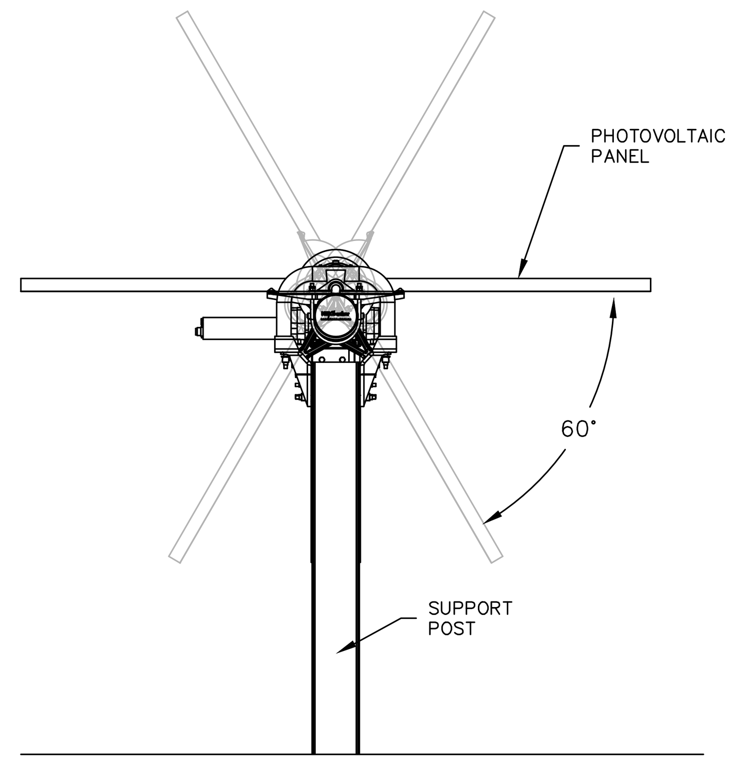


MEDIUM VOLTAGE CABLE TRENCH DETAIL (MV)

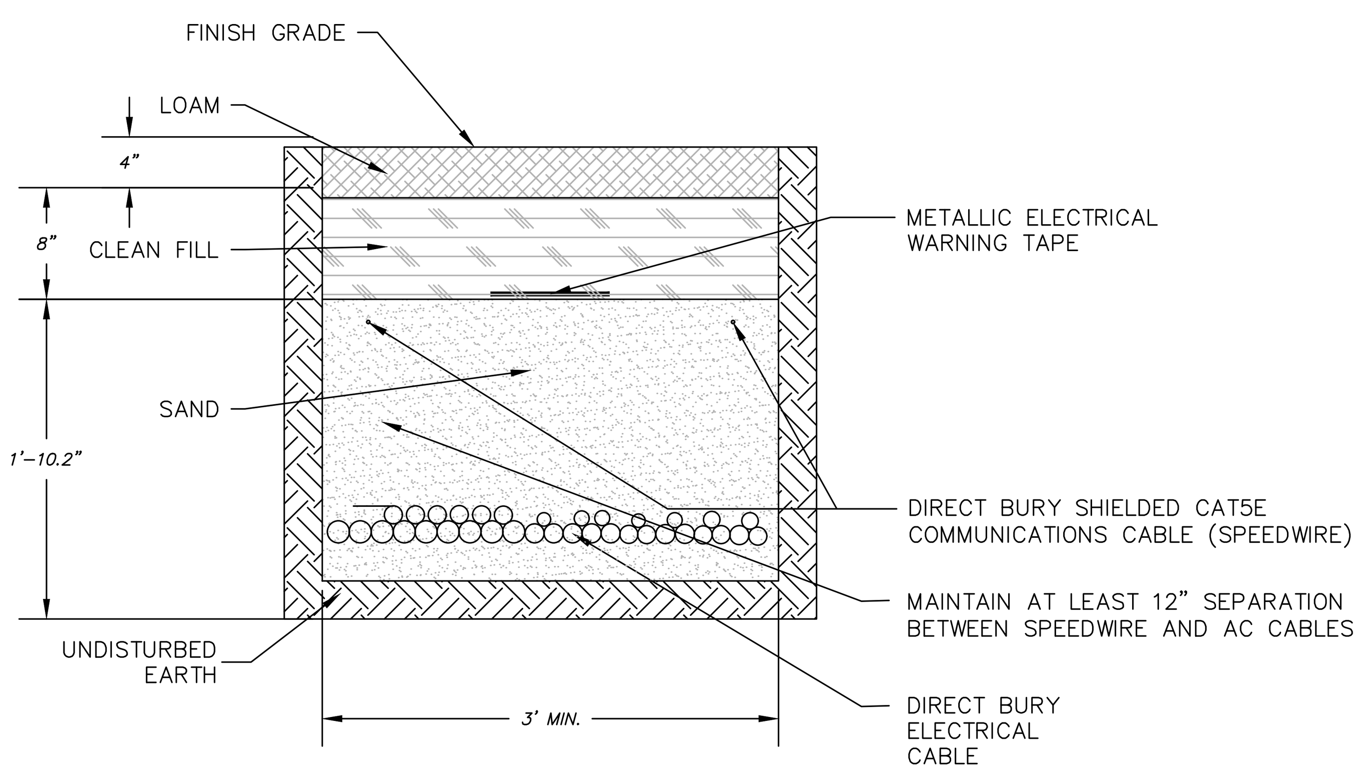
NOT TO SCALE



NOTE: NOT FOR CONSTRUCTION. SEE SPECIFIC POST & RACKING SYSTEM PLANS BY OTHERS.

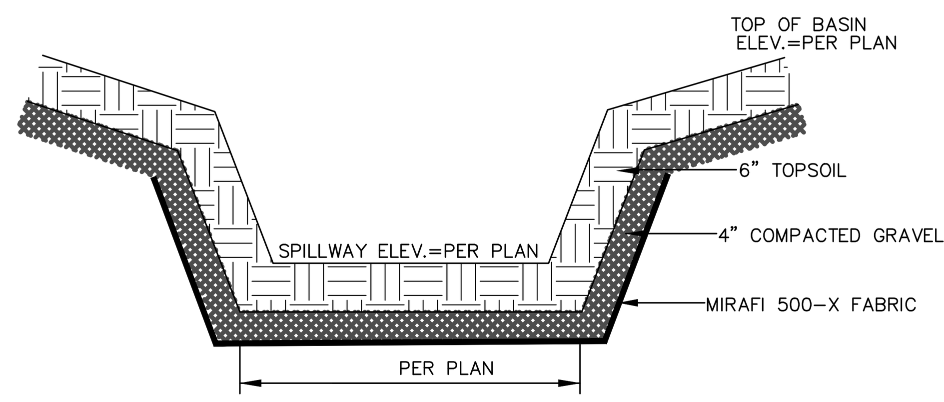
TYPICAL RACKING MOUNTED ON DRIVEN POST

NOT TO SCALE



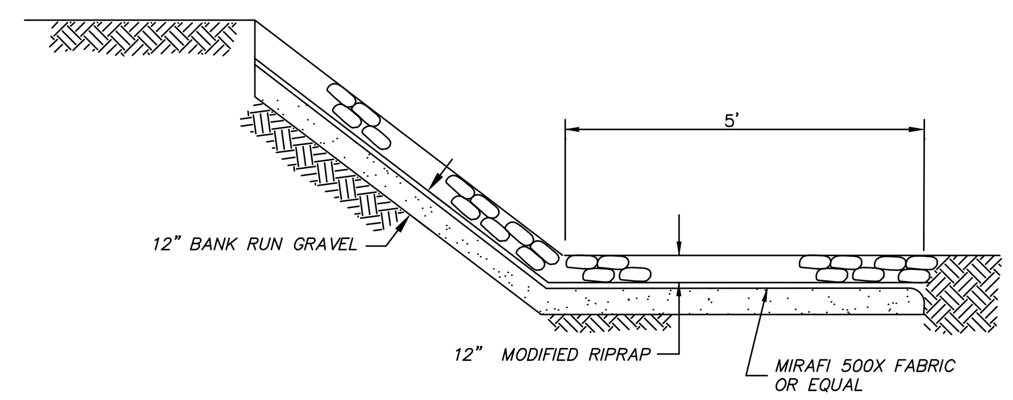
INVERTER POWER & COMMS CABLE TRENCH DETAIL (INV/C)

NOT TO SCALE



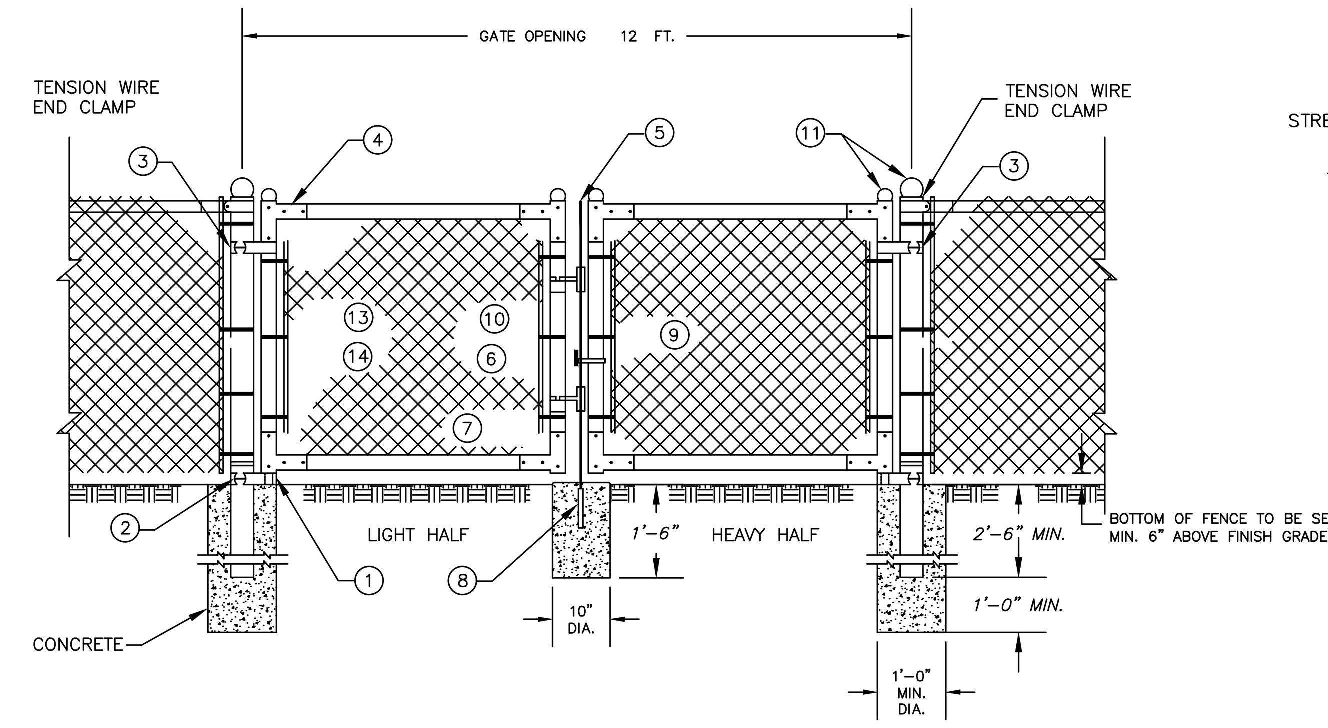
EARTHEN SPILLWAY

NOT TO SCALE



RIPRAP SLOPE PROTECTION AT SPILLWAY

NOT TO SCALE

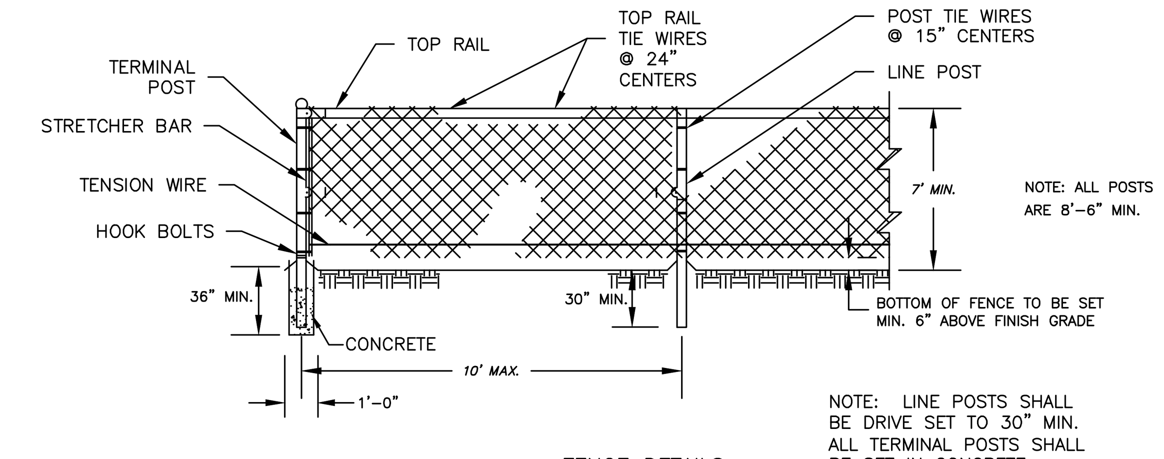


GATE DETAIL

LEGEND

PART NO.	DESCRIPTION	QUANTITY
1	STRAIGHT PLUG	2
2	BOTTOM HINGE	2
3	TOP HINGE	2
4	CORNER ELBOW	8
5	PLUNGER ROD	1
6	LATCH FORK	2
7	FORK CATCH	2
8	PLUNGER ROD CATCH	1
9	LOCK KEEPER GUIDE	1
10	LOCK KEEPER	1
11	ORNAMENTAL TOPS	6
12	TRUSS RODS	4
13	STRETCHER BAR	4
14	HOOK BOLTS	12

NOTE: THE FENCING SHALL BE #9 GAGE FENCE FABRIC, STANDARD 2-INCH CHAIN LINK DIAMOND MESH.



NOTE: LINE POSTS SHALL BE DRIVE SET TO 30" MIN. ALL TERMINAL POSTS SHALL BE SET IN CONCRETE

FENCE DETAILS

SHAPE, SIZE AND WEIGHT REQUIREMENTS FOR FENCE POSTS AND RAILS			
ITEM	SHAPE	OUTSIDE DIMENSIONS INCHES	WEIGHT LBS./LIN. FT.
** TERMINAL POSTS	ROUND *ROUND	2.375 2.375	3.65 3.12
LINE POSTS	ROUND *ROUND	1.90 1.90	2.72 2.28
TOP & BRACE RAILS	ROUND *ROUND	1.66 1.66	2.27 1.84

* GRADE B HIGH STRENGTH STEEL
** INCLUDES END, CORNER, ANGLE, INTERSECTION AND INTERMEDIATE BRACED POSTS

GATE FRAME MEMBERS SIZE AND WEIGHT		
GATE FRAME	OUTSIDE DIMENSIONS INCHES	WEIGHT LBS./LIN. FT.
ROUND	1.66	2.27
*ROUND	1.66	1.84

* GRADE B HIGH STRENGTH STEEL

GATE POST SIZE AND WEIGHT		
GATE LEAF WIDTH OF 6 FT. OR LESS	OUTSIDE DIMENSIONS INCHES	WEIGHT LBS./LIN. FT.
ROUND	2.875	5.79
*ROUND	2.875	4.64

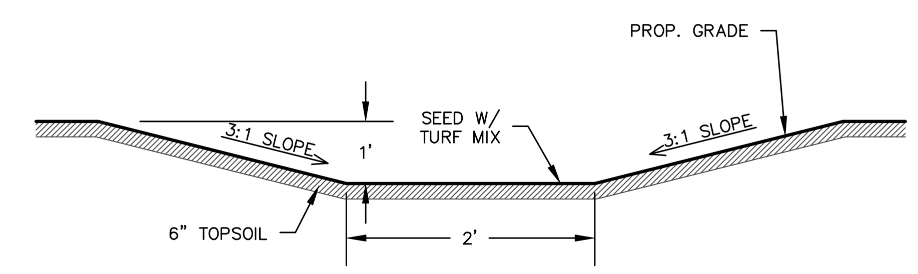
* GRADE B HIGH STRENGTH STEEL

CONSTRUCTION NOTES

1. MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE MANUFACTURER'S SPECIFICATIONS.
2. ALL POSTS SHALL BE INSTALLED VERTICALLY. WHERE POSTS ARE INSTALLED ON AN INCLINED SURFACE, THE ANGLE OF THE POST SHALL BE ADJUSTED SO THAT THE POST WILL BE VERTICAL.
3. THE FENCING SHALL BE #9 GAGE FENCE FABRIC, STANDARD 2-INCH CHAIN LINK DIAMOND MESH.

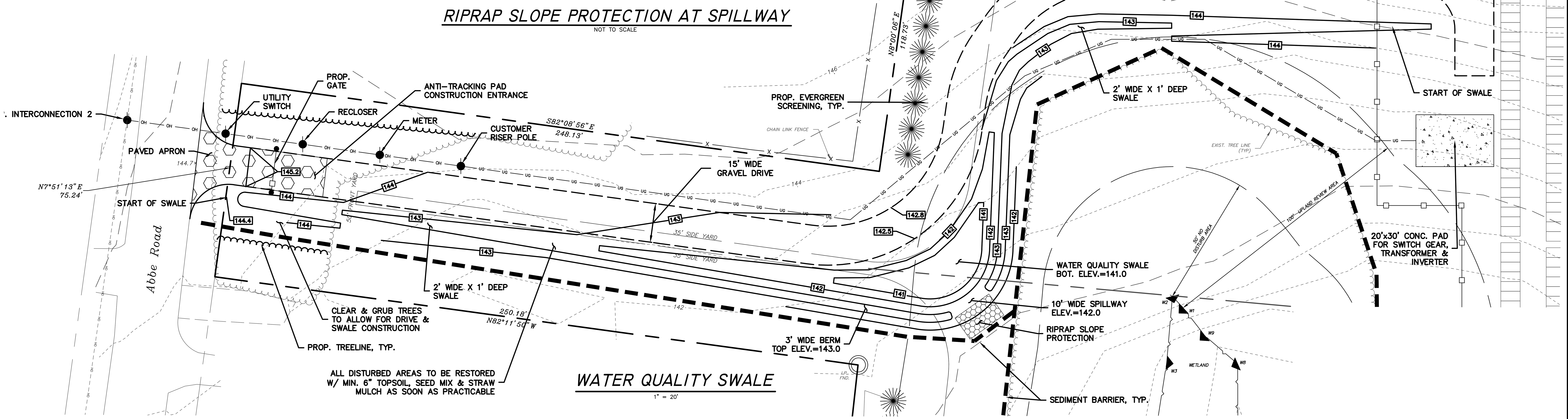
CHAIN LINK FENCE DETAIL

NOT TO SCALE



VEGETATED SWALE DETAIL

NOT TO SCALE



WATER QUALITY SWALE

1" = 20'

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LODESTAR ENERGY

REVISIONS

BY: LF/TAC | CHK: JEU

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Map 086 Lots 321, 164, & 326 Zone: R-44

Details

DATE: 1-30-24
SCALE: As Shown
JOB NUMBER: 2022-083
SHEET: 6 of 7

ENVIRONMENTAL NOTES – RESOURCES PROTECTION MEASURES

RESOURCE PROTECTION PROGRAM

As a result of the Facility's location in the vicinity of sensitive wetland habitat the following Protection Program shall be implemented by the Contractor to avoid unintentional impacts to these resources including proximate wetland resources during construction activities. Protection measures associated with wetlands shall be implemented regardless of the time of year.

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

VHB will serve as the Environmental Monitor for this project to ensure that these protection measures are implemented properly and will provide an education session on the project's proximity to sensitive wetlands prior to the start of construction activities. The Contractor shall contact Jeffrey Shamas, Senior Wetland Scientist at VHB, at least 5 business days prior to the pre construction meeting. Mr. Shamas can be reached by phone at (860) 807-4388 or via email at Jshamas@vhb.com.

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

1. Contractor Education:

   a. Prior to work on site and initial deployment/mobilization of equipment and materials, the Contractor shall attend an educational session at the pre-construction meeting with VHB. This orientation and educational session will consist of information such as, but not limited to, the identification of wetland resources proximate to work areas and the environmentally sensitive nature of the development site.

   b. The Contractor's Project Monitor will be provided with cell phone and email contacts for VHB personnel.

2. Erosion and Sedimentation Controls/Isolation Barriers

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

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

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

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

   e. No equipment, vehicles or construction materials shall be stored within 100 feet of wetland resources, if feasible. If storage is required within 100 feet of wetlands, vehicles, equipment, and materials that have the potential to release petroleum fluids and oils shall include secondary containment.

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

3. Petroleum Materials Storage and Spill Prevention

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

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

   c. Servicing of machinery shall not occur within 100 feet of wetlands, if feasible. If machinery servicing is required within 100 feet of wetlands, secondary containment shall be provided to contain any possible petroleum fluids and oils.

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

      A. Petroleum and Hazardous Materials Storage and Refueling

         A.1. Refueling of vehicles or machinery shall occur a minimum of 100 feet from wetlands, if feasible, and shall take place on an impervious pad with secondary containment designed to contain fuels.
         A.2. Any fuel or hazardous materials that must be kept on site shall be stored on an impervious surface utilizing secondary containment a minimum of 100 feet from wetlands.

      B. Initial Spill Response Procedures

         B.1. Stop operations and shut off equipment.
         B.2. Remove any sources of spark or flame.
         B.3. Contain the source of the spill.
         B.4. Determine the approximate volume of the spill.
         B.5. Identify the location of natural flow paths to prevent the release of the spill to sensitive nearby wetlands.
         B.6. Ensure that fellow workers are notified of the spill.

      C. Spill Clean Up & Containment

         C.1. Obtain spill response materials from the on site spill response kit. Place absorbent materials directly on the release area.
         C.2. Limit the spread of the spill by placing absorbent materials around the perimeter of the spill.
         C.3. Isolate and eliminate the spill source.
         C.4. Contact appropriate local, state and/or federal agencies, as necessary.
         C.5. Contact a disposal company to properly dispose of contaminated materials.

      D. Reporting

         D.1. Complete an incident report.
         D.2. Submit a completed incident report to local, state and federal agencies, as necessary, including the Connecticut Siting Council.

4. Wetland Protective Measures

   a. Following completion of the installation of the silt fencing barrier, an inspection will be conducted by VHB's Environmental Monitor to ensure proper installation. Periodic inspections will be performed by VHB's Environmental Monitor throughout the duration of the construction.

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

5. Herbicide, Pesticide, and Salt Restrictions

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

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

6. Reporting

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

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

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LODESTAR ENERGY

REVISIONS

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Environmental Notes

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SHEET: 7 of 7

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Appendix B Wetland Report

Ian T. Cole, LLC
Professional Registered Soil Scientist / Professional Wetland Scientist
PO BOX 619
Middletown, CT 06457
Itcole@gmail.com

November 20, 2022

Civil 1, Inc.
Mr. Curtis Jones, P.E., LEED, AP
President
Cornerstone Professional Park
43 Sherman Hill Road, Suite D 101
Woodbury, CT 06798

RE: ***Wetland Delineation Report: LODESTAR ENERGY LLC, 141 Town Farm Road & Abbe Road, 3- Parcels of Land, Parcel ID's L-129; L-135 & L-46, Enfield, Connecticut.***

Dear Mr. Jones:

At Civil 1's request, I completed a field survey of the jurisdictional freshwater inland wetland and watercourses boundaries at the above referenced 15.82 +/- acre project site on Town Farm Road and Abbe Road in Enfield, Connecticut.

DELIENATION METHODOLOGY

A wetland survey was completed in accordance with the standards of the Natural Resources Conservation Services (NRCS) National Cooperative Soil Survey and the definitions of inland wetlands and watercourses as found in the Connecticut General Statutes, Chapter 440, Sections 22a-36 through 22a-45 as amended. Wetlands, as defined by the Statute, are those soil types designated as poorly drained, very poorly drained, floodplain or alluvial in accordance with the NRCS National Cooperative Soil Survey. Such areas may also include disturbed areas that have been filled, graded, or excavated and which possess an aquic (saturated) soil moisture regime.

Watercourses means rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs, and all other bodies of water, natural or artificial, vernal, or intermittent, public, or private, which are contained within, flow through or border upon the Town of Enfield or any portion thereof not regulated pursuant to sections 22a-28 through 22a-35, inclusive, of the Connecticut General Statutes. Intermittent watercourses are defined permanent channel and bank and the occurrence of two or more of the following characteristics: (a) evidence of scour or deposits of recent alluvium or detritus, (b) the presence of standing or flowing water for duration longer than a particular storm incident, and (c) the presence of hydrophytic vegetation.

WETLAND DELINEATION FINDINGS

The wetland survey was completed in November 2022. The on-site wetland delineation examined the upper 20" of the soil profile for the presence of hydric soil conditions. Those areas meeting the wetland criteria noted above were marked in the field with sequentially numbered pink and blue wetland flagging labeled 1 through 9. Figure 1 illustrates the approximate locations and corresponding flag series. Please note this sketch is intended for planning purposes only and is subject to refinement once traditionally located and mapped.

SITE DESCRIPTION

The site consists of 3 parcels, totaling 15.82 +/- acres in size. In its present condition the site is active farmland. In reviewing CTDEEP Historic Archival 1934 Air Photos (Attached), the site has remained in similar condition for the better part of the last century. Single-family residential lots are located along the western property line on Abbe Road and along the opposite side of Town Farm Road. The landuse to the north and east is active agriculture.

The site is currently cropland, planted with corn. In the northwestern quadrant of the site is a .25-acre wooded island. Within the wooded island is a notable topographic depression that contains hydric soils and is seasonally ponded. There is edge habitat along the northern site boundary but otherwise the site is open farmland.

WETLAND OVERVIEW

Within the wooded island in the northwest corner of the cornfield is an isolated topographic depression. A wet basin occupies the lowest lying position of the depression.

This ephemeral wetland is seasonally flooded. At the time of the field survey the basin was dry, and fresh fall leaf litter obscured the otherwise strong eco-indicators of seasonal ponded water (i.e., waterline markings, water-stained leaves, algae covered rocks, etc.). The basin is largely absent of vegetation, a signature of standing water. Wetland vegetation is largely limited to wetland shrubs around the perimeter of the wetland boundary including species of winterberry, spicebush, and silky dogwood.

Most times of the year this depression is dry and to the casual observer may be unrecognizable as a wetland if not for subsurface soil morphology indicators which are present year-round. The basin has a thick layer of topsoil or colluvium that has migrated downslope from the farm fields above.

Often these ephemeral wetlands can provide special habitat for State-Listed species and can host obligate vernal pool specific amphibian species. However, given the physical attributes of this specific wetland and the surrounding quality of critical terrestrial habitat and landuses, it is expected that this wetland is likely low functioning in terms of quality vernal pool habitat. The low-ranking rational is based on the wetland's shallow and very ephemeral hydrology, providing limited breeding hydroperiods, landscape position far removed from other vernal pool complexes and populations, surrounding agricultural landuse and associated applied farming practices. That being stated, it should be acknowledged that wetland survey occurred outside the typical vernal pool spring survey window which is traditionally from April – May (*Although can be as early as late February*). "In season" springtime surveys are recommended to confirm if this pool provides habitat for obligate and facultative vernal pool species and if so, what species are utilizing the resource so that site specific vernal pool best management practices can be developed and incorporated into project designs to mitigate potential impacts to the resource.

CTDEEP NDDB

A review of Connecticut's Department of Energy and Environmental Protection (CTDEEP) Natural Diversity Data Base (NDDB) publicly available mapping for this site indicate that there are no known occurrences or records of state listed species associated with the property. The NDDB – Enfield Map is attached for reference.

NLEB

The site is not within, nor does it host hibernacula for Northern Long Eared Bats (NLEB). Trees are limited to the wooded island in the northwest corner of the project site and along the tree line that defines the northern project site boundary. Therefore, the removal or clearing of trees should not conflict with the United States Fish and Wildlife Service (USFWS) recommended NLEB guidelines.

CORE FORESTS

The site is active open agriculture lands. No portions of the site are mapped by UCONN's CLEAR program as core forests. A Core Forest is defined as an unfragmented block of forest habitat at least 250 acres in size that is also at least three hundred feet or greater from the boundary between forest and non-forested land.

Representative photos of the site are attached below in Appendix A

SOIL SRVEY

The soils identified on-site are a refinement of the Natural Resources Conservation Service (NRCS) Websoil Soil Survey.

The site is situated within the quaternary geology of Glacial Lake Hitchcock. The on-site soils have formed in coarse-silty eolian deposits over sandy and gravelly glaciofluvial deposits derived from granite, schist, and/or gneiss.

The site drains from north to south, with a high point elevation of 160' at the northern boundary and a low elevation of approximately 130' at the shoulder of Town Farm Road.

Wetland Soils

The wetlands soils are classified as Scitico, silt loams. These poorly drained soils are found within drainageways and depressions in outwash landscapes. These soils are seasonally flooded.

A typical soil profile along the wetland boundary consists of approximately 8"-0" of intermediately decomposed organic material (Oi), followed by 0"-10" of a thick dark topsoil horizon (A), underlain by 10-20" of a wet washed out gleyed subsoil horizon (Bg)) ranging from silt loam to clayey silt loam.

Upland Soils

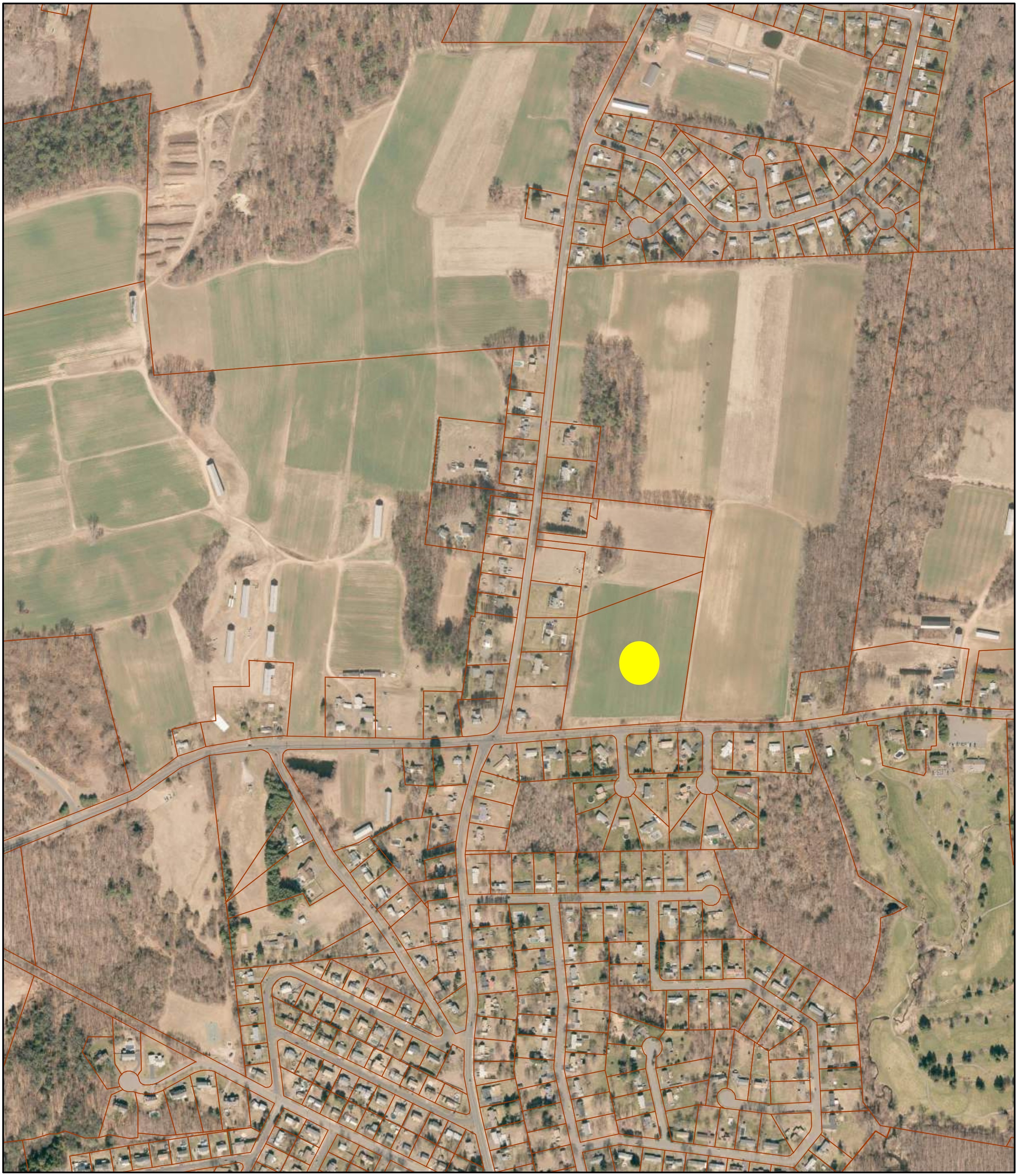
The upland soils are primarily mapped and classified as well-drained Enfield silt loams. These upland soils are mapped and noted as Prime Farmland soil by the NRCS. Additionally, a band of well-drained sandy loam Agawam soils runs along the northern limits of the project site. Be advised, often as an environmental permit condition, if prime farmland soils are slated for development, projects are often required to provide a decommissioning soil management plan to restore soils back to their pre-development condition, so they are available for future agricultural practices.

The NRCS Soil Survey is Attached.

If you have any questions or comments, please do not hesitate to contact me at itcole@gmail.com or (860) 514-5642

Sincerely,

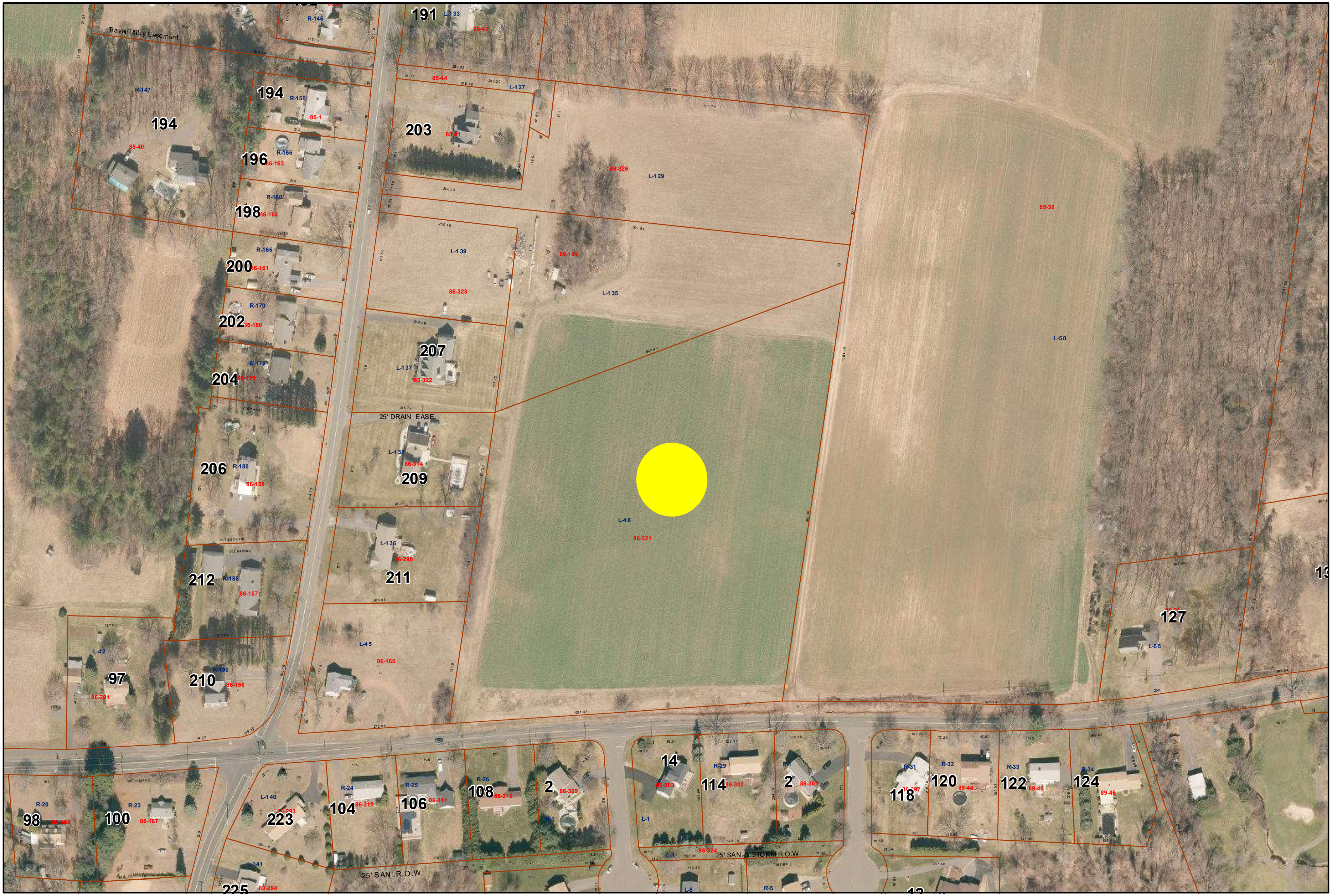
Ian T. Cole
Professional Registered Soil Scientist
Professional Wetland Scientist #2006



Enfield, CT

Feet
0 200 400 600 800 1,000

1 inch = 631 feet



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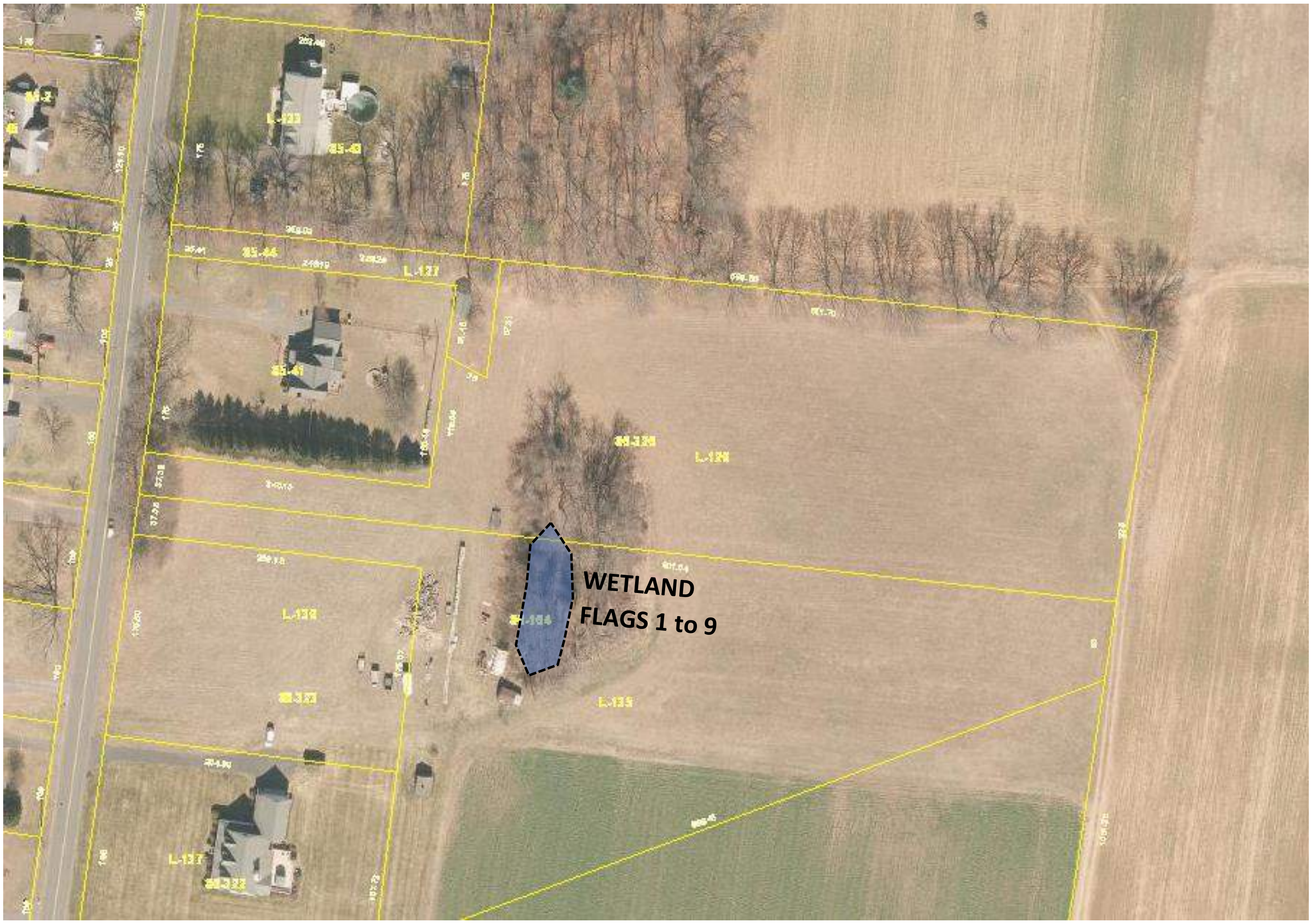
Enfield, CT

Feet
0 50 100 200 300 400

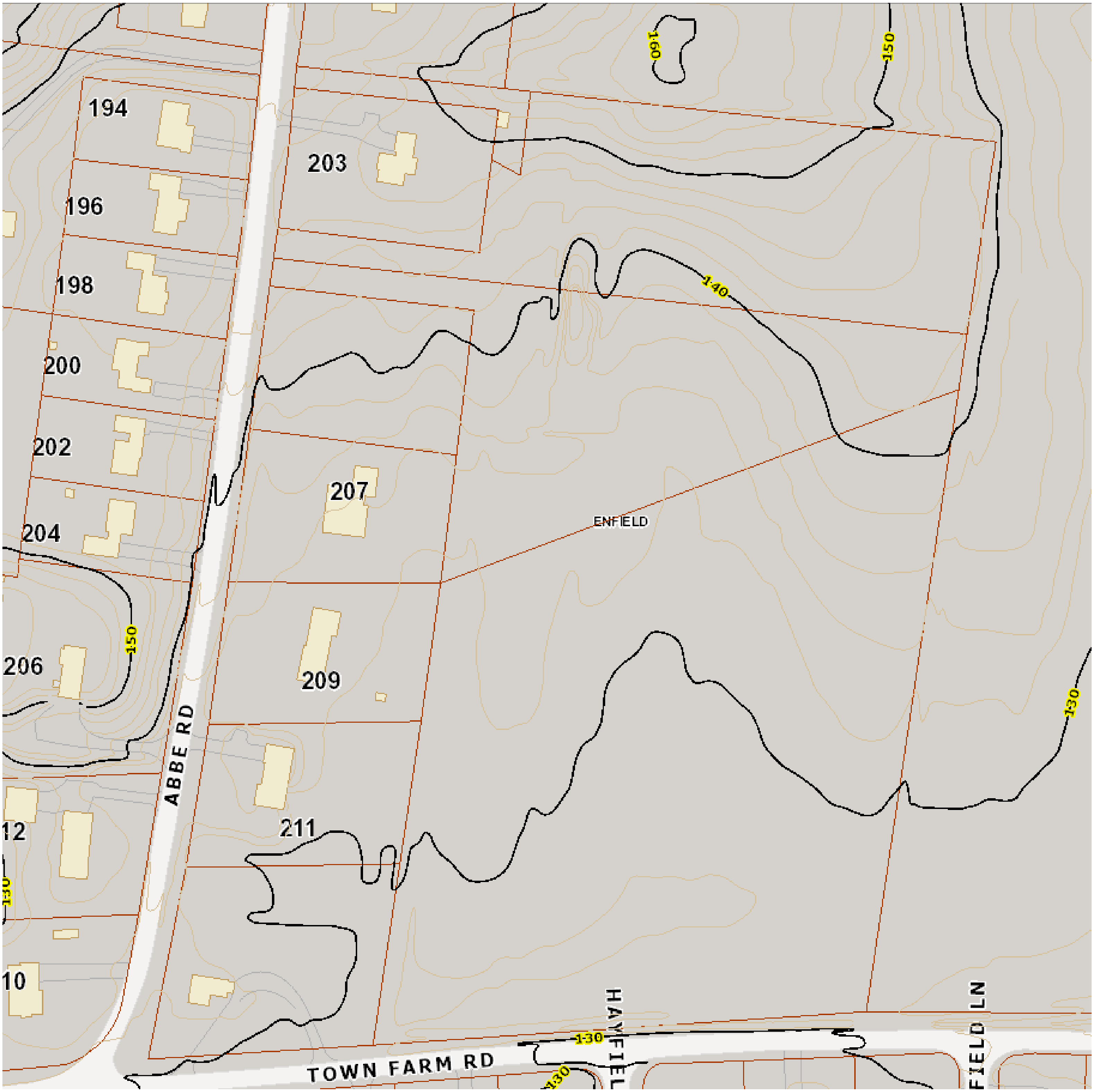
1 inch = 227 feet

WETLAND SKETCH: 141 TOWN FARM ROAD – ENFIELD, CT

LODESTAR ENERGY

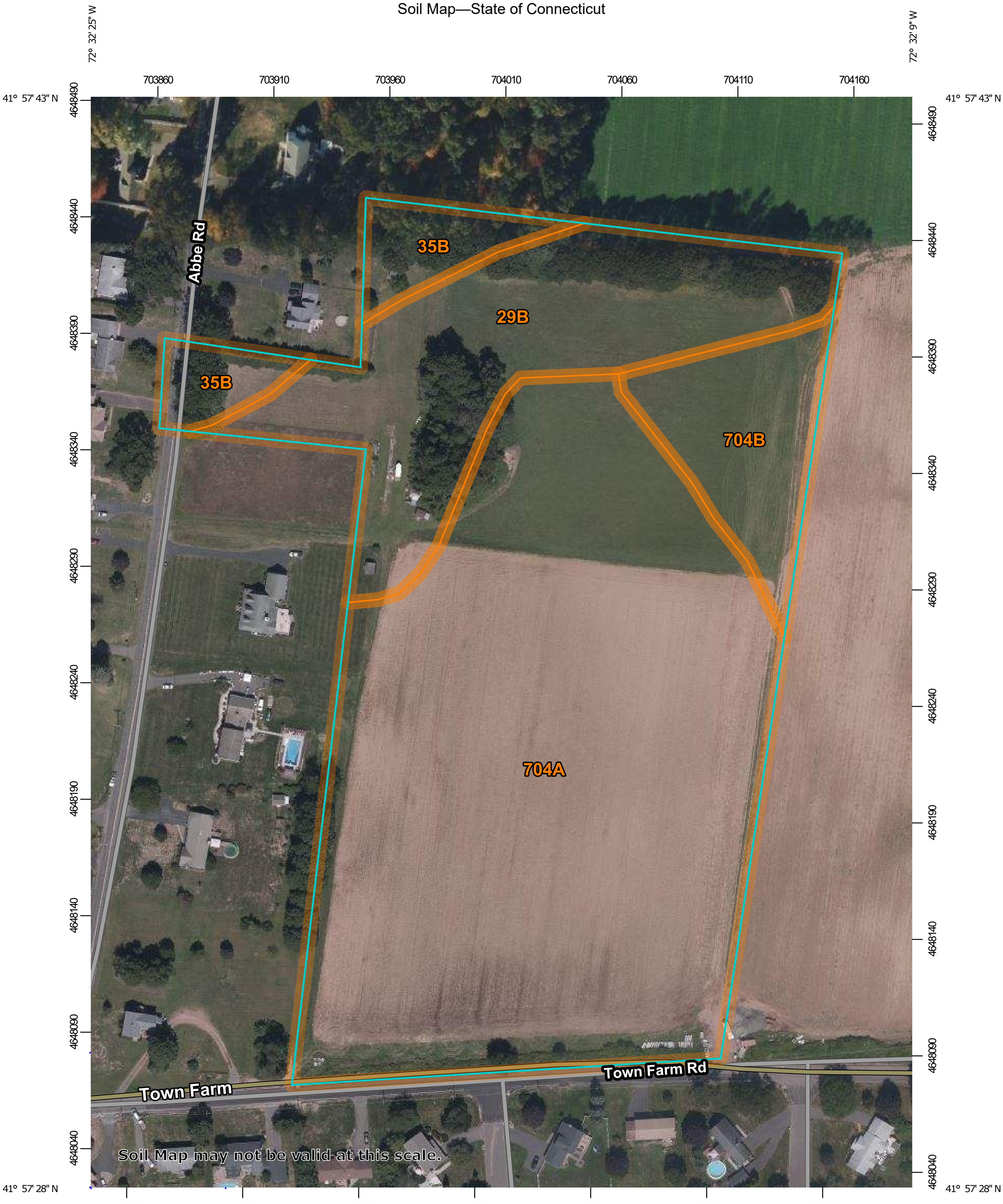


TOWN GIS TOPO MAP – TOWN FARM ROAD – ENFIELD



CTDEEP 1934 AIR PHOTO

Soil Map—State of Connecticut



Map Scale: 1:2,280 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 30, 60, 120, 180

Feet: 0, 100, 200, 400, 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 22, Sep 12, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 24, 2019—Oct 31, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
29B	Agawam fine sandy loam, 3 to 8 percent slopes	3.9	21.3%
35B	Penwood loamy sand, 3 to 8 percent slopes	1.0	5.4%
704A	Enfield silt loam, 0 to 3 percent slopes	11.7	65.1%
704B	Enfield silt loam, 3 to 8 percent slopes	1.5	8.2%
Totals for Area of Interest		**18.0**	**100.0%**

1DWXUDO 'LYHUVLW\ 'DWD %DVH
$UHDV

(1),(/' &7

-XQH

- 6WDWH DQG)HGHUDO /LVWHG 6SHFLHV
- &ULWLFDO +DELWDW
- 7RZQ %RXQGDU\

127(˛ 7KLV PDS VKRZV JHQHUDO ORFDWLRQV RI 6WDWH DQG)HGHUDO /LVWHG 6SHFLHV DQG &ULWLFDO +DELWDWV˛ ,QIRUPDWLRQ RQ OLVWHG VSHFLHV LV FROOHFWHG DQG FRPSLOHG E\ WKH 1DWXUDO 'LYHUVLW\ 'DWD %DVH 1''% IURP D YDULHW\ RI GDWD VRXUFHV˛ ([DFW ORFDWLRQV RI VSHFLHV KDYH EHHQ EXIIHUHG WR SURGXFH WKH JHQHUDOL]HG ORFDWLRQV˛

7KLV PDS LV LQWHQGHG IRU XVH DV D SUHOLPLQDU\ VFUHHQLQJ WRRO IRU FRQGXFWLQJ D 1DWXUDO 'LYHUVLW\ 'DWD %DVH 5HYLHZ 5HTXHVWV 7R XVH WKH PDS ORFDWH WKH SURMHFW ERXQGDULHV DQG DQ\ DGGLWLRQDO DIIHFWHG DUHDV ,I WKH SURMHFW LV ZLWKLQ D KDWFKHG DUHD WKHUH PD\ EH D SRWHQWLDO FRQIOLFW ZLWK D OLVWHG VSHFLHV)RU PRUH LQIRUPDWLRQ FRPSOHWH D 5HTXHVW IRU 1DWXUDO 'LYHUVLW\ 'DWD %DVH 6WDWH /LVWHG 6SHFLHV 5HYLHZ IRUP '(3 $33 ˆ DQG VXEPLW LW WR WKH 1''% DORQJ ZLWK WKH UHTXLUHG PDSV DQG LQIRUPDWLRQ 0RUH GHWDLOHG LQVWUXFWLRQV DUH SURYLGHG ZLWK WKH UHTXHVW IRUP RQ RXU ZHEVLWH KWWSV˛ SRUWDO FW JRY GHHS QGGEUHTXHVWV

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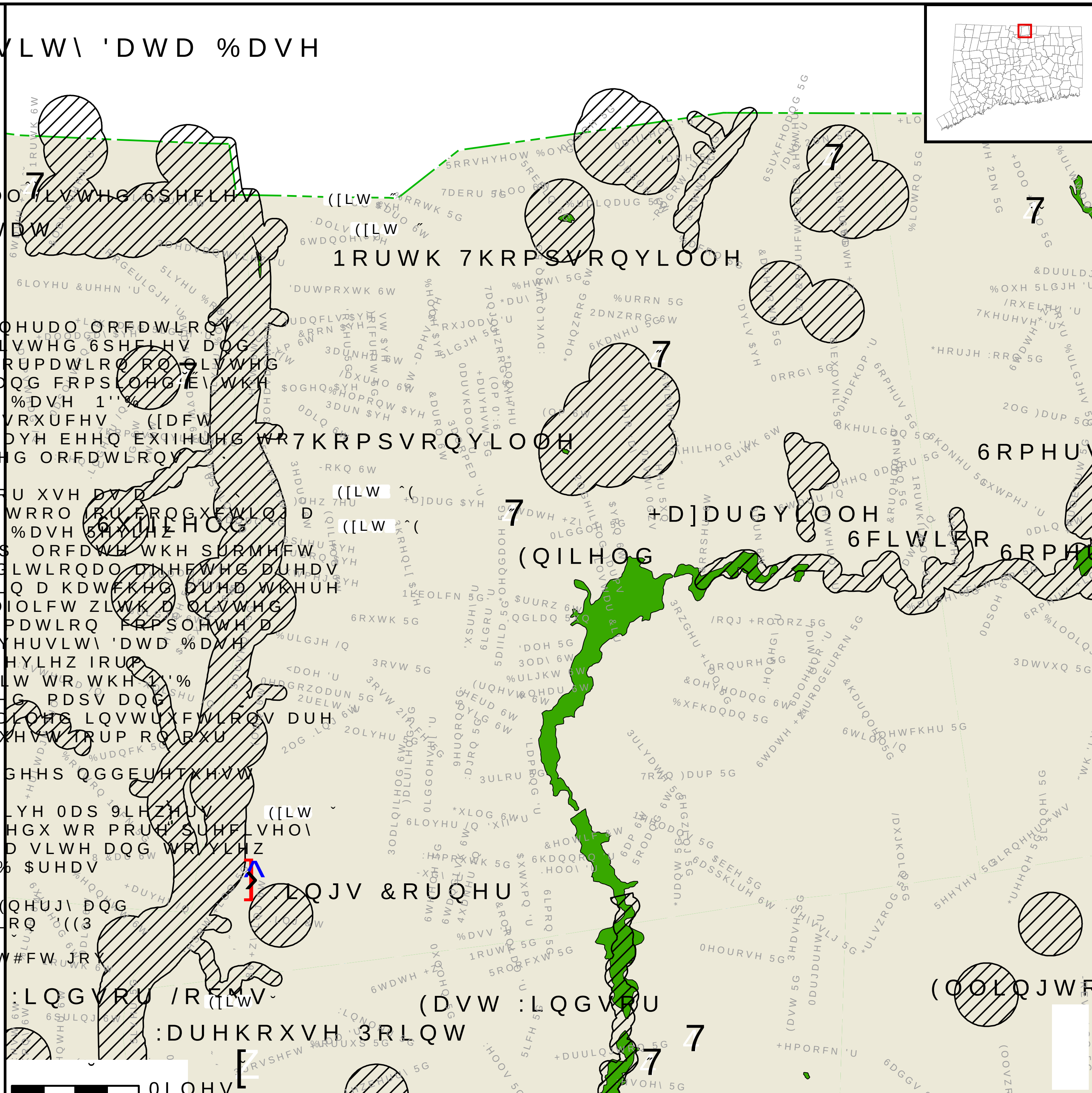
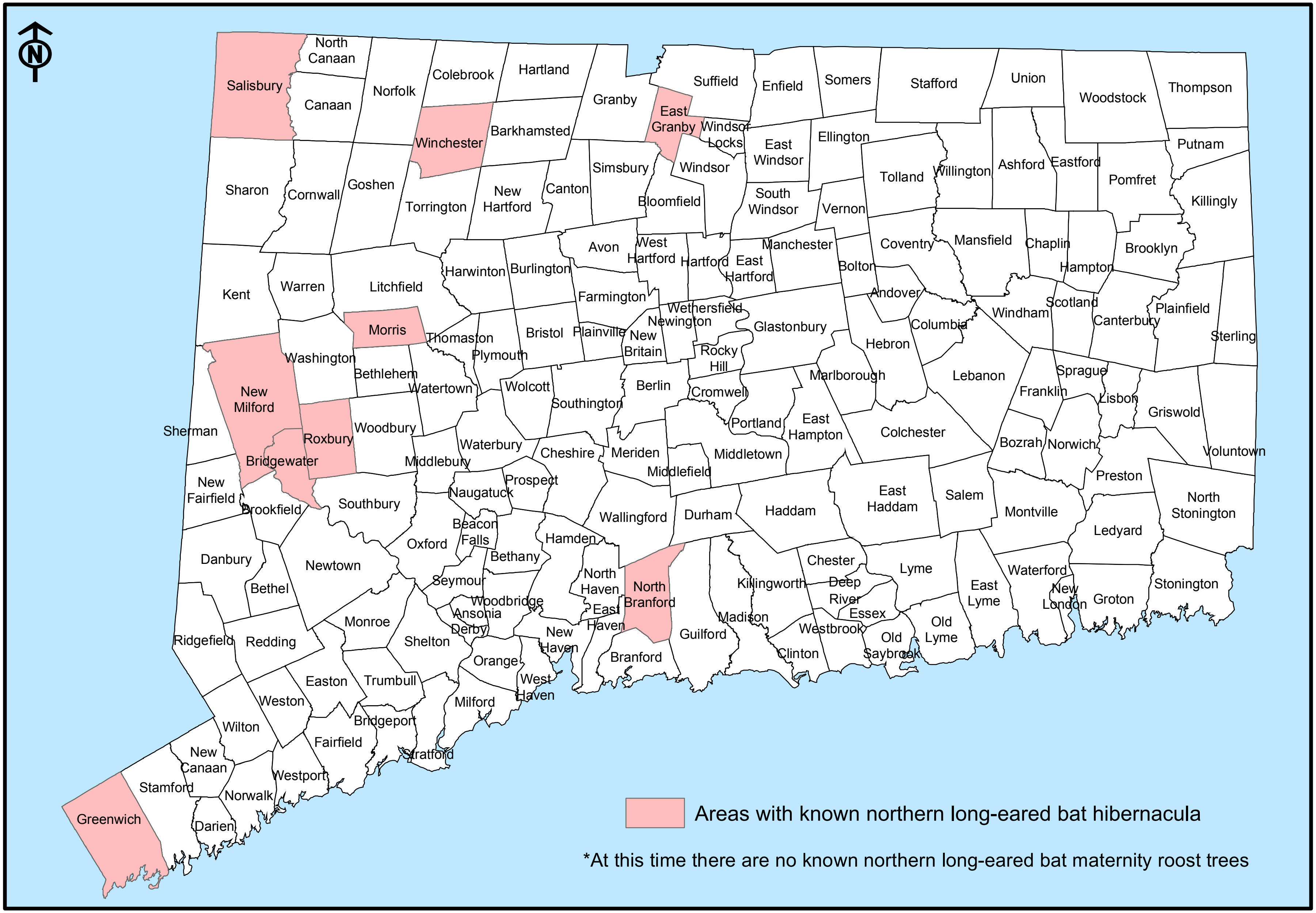
Connecticut Department of Energy & Environmental Protection
Bureau of Natural Resources
Wildlife Division



Northern long-eared bat areas of concern in Connecticut to assist with Federal Endangered Species Act Compliance



March 6, 2019

For information on federal requirements visit http://www.fws.gov/midwest/endangered/mammals/nleb/

APPENDIX A:

WETLAND DELINEATION PHOTOS

TOWN FARM ROAD & ABBE ROAD

ENFIELD , CONNECTICUT

NOVEMBER 2022

PREPARED FOR:

LODESTAR ENERGY LLC

PHOTO 1: Typical upland conditions of planted cornfield (view north)

PHOTO 2: Wooded Island in northwest corner of cornfield (view south).

PHOTO 3: Typical vegetated conditions at edge of wooded island, outer edge has numerous sun-loving invasive species. In contrast the interior is relatively open and moderately vegetated in comparison.

PHOTO 4: Typical conditions of flagged wetlands. Poorly drained soils occupy this isolated depression.

PHOTO 5: Example an eco-indicator of prolonged standing water in flagged wetland. Algae covered rocks indicate seasonal flooding.

PHOTO 6: Example of the field edge habitat along the northern site boundary.

Appendix C Vernal Pool Report

Ian Cole, LLC
Professional Registered Soil Scientist / Professional Wetland Scientist
PO BOX 619
Middletown, CT 06457
Itcole@gmail.com

Vernal Pool Survey

June 10, 2023

Prepared For:	LSE BOOTES LLC 40 Tower Lane, Suite 201 Avon, CT 06001
Project Name:	141 Town Farm Road & Abbe Road 3- Parcels of Land, Parcel ID's L-129; L-135 & L-46.
Project Location:	Enfield, Connecticut
Date(s) of Investigations:	April through May, 2023
Survey Methodology:	Visual and Audial Survey, and Dip Netting

The vernal pool survey was performed by:

Ian Cole, LLC

Ian T. Cole
Professional Registered Soil Scientist
Professional Wetland Scientist #2006

INTRODUCTION

This report details vernal pool surveys conducted by Ian Cole, LLC in support of The LSE Bootes LLC's (LSE) development of a solar array on a 15.82-acre Project site located at 141 Town Farm Road with an access strip to Abbe Road. Currently the portion of the property slated to host the solar array is agricultural cropland, in 2022 these fields were in corn production.

VERNAL POOL DEFINITION

Several vernal pool definitions have been developed by both regulatory authorities and conservation organizations. The Connecticut Department of Energy and Environmental Protection (CT DEEP) generally describes vernal pools on its website but cautions that the data provided is informational in nature and should not supplant regulations of municipal inland wetlands agencies. CT DEEP describes vernal pools as *"small bodies of standing fresh water found throughout the spring*" that are "*usually temporary"* and "*result from various combinations of snowmelt, precipitation and high-water tables associated with the spring season*".

Calhoun and Klemens (2002) *Best development practices: Conserving pool-breeding amphibians in residential and commercial developments in the northeastern United States* (BDP Manual) provides the following operational definition of vernal pools:

Vernal pools are seasonal bodies of water that attain maximum depths in the spring or fall and lack permanent surface water connections with other wetlands or water bodies. Pools fill with snowmelt or runoff in the spring, although some may be fed primarily by groundwater sources. The duration of surface flooding, known as hydroperiod, varies depending upon the pool and the year; vernal pool hydroperiods range along a continuum from less than 30 days to more than one year. Pools are generally small in size (<2 acres), with the extent of vegetation varying widely. They lack established fish populations, usually as a result of periodic drying, and support communities dominated by animals adapted to living in temporary, fishless pools. In the region, they provide essential breeding habitat for one or more wildlife species including Ambystomid salamanders (Ambystoma spp., called "mole salamanders" because they live in burrows), wood frogs (Rana sylvatica), and fairy shrimp (Eubranchipus spp.).

Vernal pool physical characteristics can vary widely while still providing habitat for indicator species. "Classic" vernal pools are natural depressions in a wooded upland with no permanent hydrologic connection to other wetland systems. Anthropogenic depressions such as quarry holes, old farm ponds and borrow pits can also provide similar habitat. Most commonly in Connecticut vernal pools are depressions or impoundments embedded within forested wetlands, most typically red maple-dominated swamps. These vernal pool habitats are commonly referred to as "cryptic" vernal pools. Examples of Classic and Cryptic vernal pools are provided below."

Classic Vernal Pool

Cryptic Vernal Pool

Several species of amphibians depend on vernal pools for reproduction and development. These species are referred to as indicator[1] vernal pool species, and their presence in a temporary wetland during the breeding season helps to identify that area as a vernal pool. Indicator species present in Connecticut include the following:

- Blue-spotted salamander *(Ambystoma laterale)*;
- Wood frog *(Rana sylvatica)*;
- Spotted salamander *(Ambystoma maculatum)*;
- Jefferson salamander *(Ambystoma jeffersonianum)*;
- Marbled salamander *(Ambystoma opacum)*; and
- Fairy shrimp *(Branchiopoda anostraca)*.

Facultative vernal pool species are fauna that utilize but do not necessarily require vernal pools for reproductive success. Examples of facultative species include spotted turtles *(Clemmys guttata)* and four-toed salamander *(Hemidactylium scutatum)*. These species may breed or feed in vernal pools but are also capable of carrying out all phases of their lifecycle in other types of wetlands or water bodies. Evidence of breeding by facultative species alone is not considered indicative of the presence of a vernal pool.

Common Vernal Pool Indicator Species Photos

Spotted salamander adult

Marbled salamander larvae

Marbled salamander adult

Wood frog adult

[1] Calhoun and Klemens (2002) argue that "indicator" species is a better word than the commonly used "obligate" species, as they will occasionally breed in roadside ditches and small ponds that are not vernal pools.

Table 1: Seasonal Activity Periods for Vernal Pool Indicator Species

	SPRING BREEDERS Wood Frog, Spotted Salamander, Jefferson Salamander, and Blue-spotted Salamander Complex	
	NOVEMBER - FEBRUARY	Pools are dormant
	MARCH - APRIL	Migration, breeding and egg deposition
	APRIL - JUNE	Egg hatching and larval development
	JUNE - OCTOBER	Metamorphosis and juvenile dispersal
HIGH SENSITIVITY PERIOD 0-100FT	MARCH – APRIL	High densities of adults migrating to and from breeding pools
	JUNE - JULY	High densities of metamorphs disperse from breeding pools into the adjacent forest

	FALL BREEDERS Marbled Salamander	
	AUGUST – SEPTEMBER	Migration, breeding and egg deposition
	NOVEMBER - MAY	Egg hatching and larval development
	MAY - JULY	Metamorphosis and juvenile dispersal
HIGH SENSITIVITY PERIOD 0-100FT	AUGUST-SEPTEMBER	Adults migrate to breeding pools
	MAY - JULY	High densities of metamorphs disperse from breeding pools into the adjacent forest

EXISTING NATURAL RESOURCES AND WETLANDS ON THE PROJECT SITE

The site consists of 3 parcels, totaling 15.82 +/- acres in size. In its present condition the site is active farmland. In reviewing CTDEEP Historic Archival 1934 Air Photos the site has remained in similar condition for the better part of the last century. Single-family residential lots are located along the western property line on Abbe Road and along the opposite side of Town Farm Road. The land use to the north and east is active agriculture.

In the 2022 growing season the site was active cropland, planted with corn. In the northwestern quadrant of the site is a .25-acre wooded island. Embedded within the wooded island is a notable topographic depression that contains hydric soils and is seasonally ponded. There is a narrow strip of forested edge habitat along the northern site boundary but otherwise the site is open farmland.

Within the wooded island in the northwest corner of the cornfield is an isolated topographic depression. A wet basin occupies the lowest lying position of the depression. This ephemeral wetland is seasonally flooded to a depth of 2-3 feet. The basin has been observed in dry conditions in November 2022 when strong eco-indicators of seasonal ponded water (i.e., waterline markings, water-stained leaves, algae covered rocks, etc.) were noted. The basin is largely absent of vegetation, a signature of prolonged standing water. Wetland vegetation is largely limited to wetland shrubs around the perimeter of the wetland boundary including species of winterberry, spicebush, and silky dogwood.

VERNAL POOL SURVEY RESULTS

In November 2022 and again in the spring of 2023 on 4/25 and 5/5, biologist, soil scientist and professional wetland scientist, Ian Cole of Ian Cole, LLC conducted field surveys of the wetlands within the Project area to identify vernal pool habitat. Field surveys were conducted to identify both species richness and abundance of indicator species. Survey methods used included visual surveys to identify adults, larvae and egg masses, audial surveys to record breeding choruses and dip-net surveys to identify amphibian larvae.

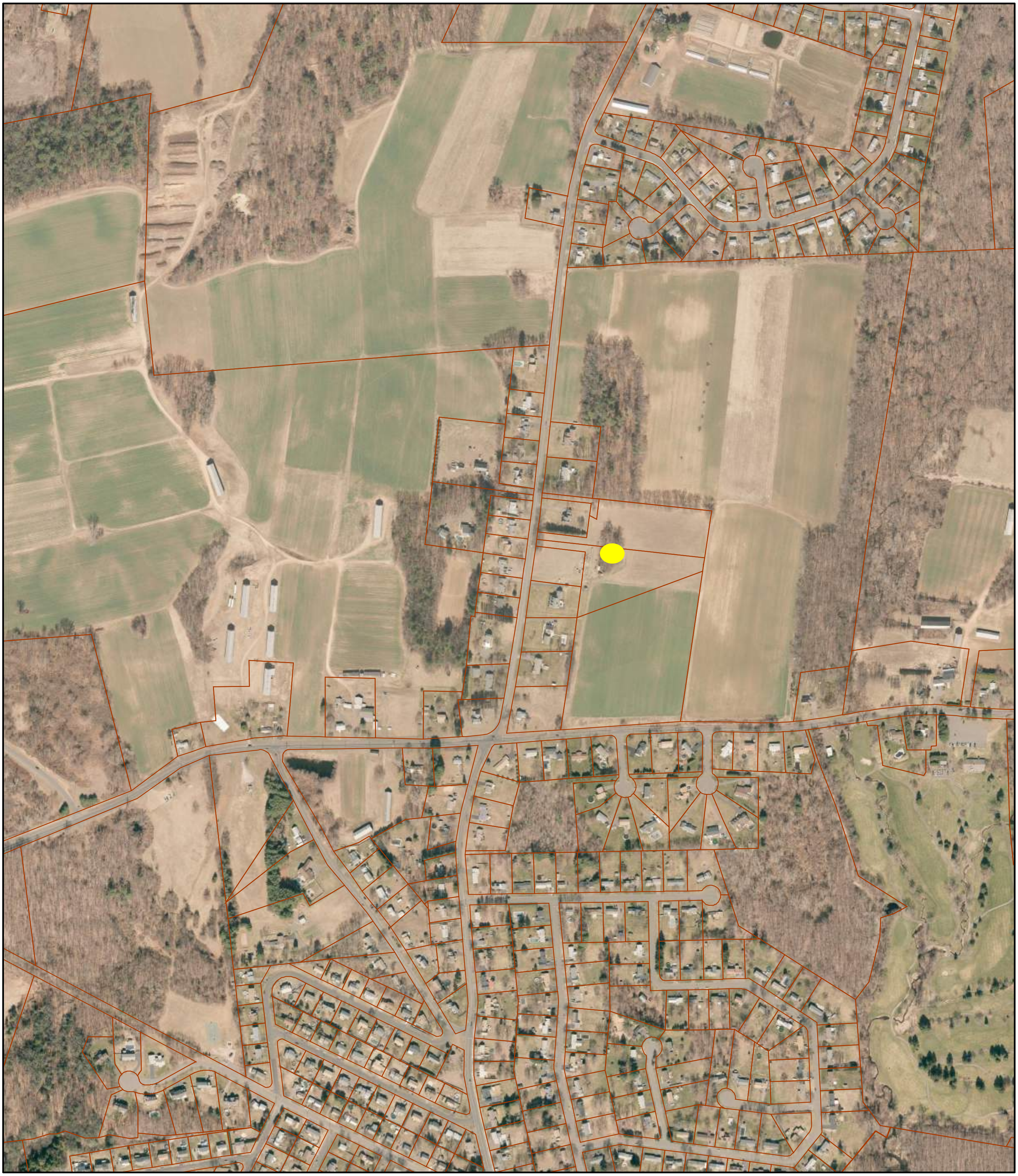
The vernal pool survey was completed in the prime survey window for vernal pool breeding observations. The field surveys were completed under blue sky conditions on warm (above 60 degrees) sunny days. No vernal pool frog breeding chorus calls were noted during the surveys and no amphibian egg masses were encountered in the wetland.

In summary it is my professional opinion that no functioning vernal pool habitat is identified in at the Project or within the identified wetland for the following reasons:

While the physical attributes of a classic vernal pool are present, this wetland has very low biological production. This is likely due to the geographical isolation of the area for a historical period of time. The CTDEEP 1934 Air photos demonstrate site has been in agriculture predating 1934.

The surrounding quality of critical terrestrial habitat and landuses is a key contributing factor of why this wetland is low functioning in terms of quality vernal pool habitat. The low-ranking rational is also based on the wetland's shallow and ephemeral hydrology, providing limited breeding hydroperiods, isolated landscape position far removed from other vernal pool complexes and populations, surrounding agricultural land use, and associated applied farming practices (such as the stockpiling of manure along the tree line in close proximity to the pool basin).

Attachments: GIS PARCEL MAP
WETLAND SKETCH
SITE PHOTOS



Enfield, CT

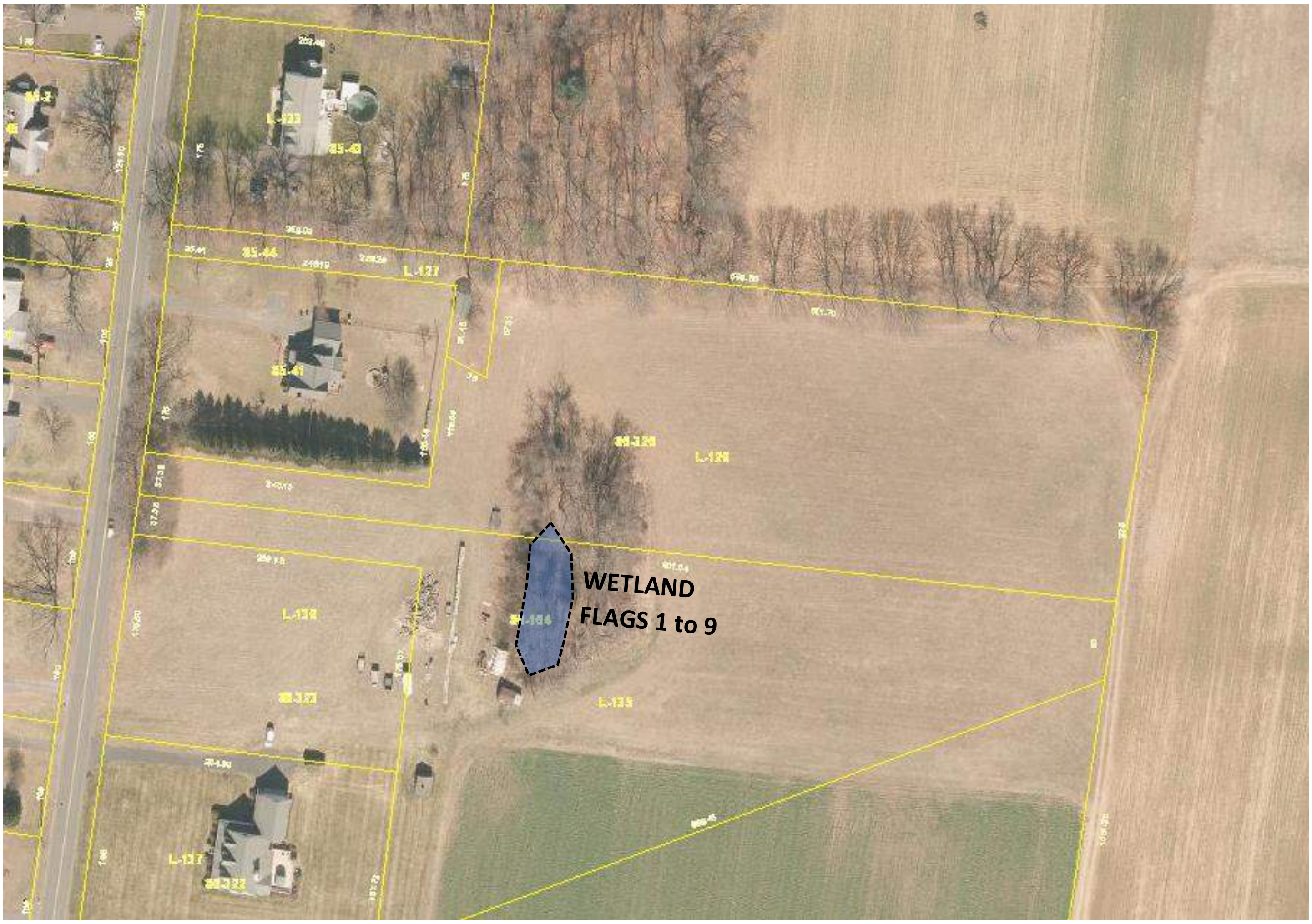
Feet

0 200 400 600 800 1,000

1 inch = 631 feet

WETLAND SKETCH: 141 TOWN FARM ROAD – ENFIELD, CT

LODESTAR ENERGY



VERNAL POOL SURVEY
PHOTOS

APRIL & MAY 2023

Prepared for:

LSE BOOTES LLC

141 TOWN FARM ROAD

&

ABBE ROAD

ENFIELD

CONNECTICUT

Photo 1: Dry basin conditions in November 2022.

Photo 2: Wet basin conditions in April 2023.

Photo 3: In April 2023 the basin was ponded, and the pool was surveyed for the presence / absence of vernal pool indictors. The pool was approximately 2 feet deep in the center and was approximately 50 feet long by 20 feet wide, sufficient hydrology to satisfy vernal pool requirements. The pool, however, was absent of any notable evidence of amphibian breeding. No egg masses, and no macro invertebrate were noted.

Photo 4: Subject wooded Island juxtaposition in the landscape November 2022.

Photo 5: Subject wooded island April 2023.

Photo 6: Surrounding land use and condition of critical terrestrial habitat - April 2023

Appendix D Drainage Report

DRAINAGE REPORT

Lodestar Energy

141 Town Farm Road & Abbe Road
Enfield, CT

January 30, 2024

Prepared for:

LSE Scutum LLC & LSE Bootes LLC
40 Tower Lane, Suite 201
Avon, CT 06001

Project No. 2022-083

Prepared by:

J.R. Russo & Associates
Land Surveyors & Professional Engineers
P.O. Box 938
East Windsor, CT 06088
(860) 623-0569

I. INTRODUCTION

A. Project Description

LSE Scutum LLC and LSE Bootes LLC are proposing to construct two solar arrays at the intersection of Town Farm Road & Abbe Road in Enfield. The proposed arrays will consist of 4,706 solar modules combined within an approximate 10.15-acre fenced area. The array area has historically been in agriculture as row crop. The development will include establishing vegetated cover to allow better infiltration and reduce site runoff in accordance with the CT Stormwater Quality Manual and Department of Energy & Environmental Protection's (DEEP's) Stormwater General Permit.

B. Existing Conditions

The project site is comprised of three parcels located north of Town Farm Road, at the rear of existing residential houses along Abbe Road. The parcel adjacent to Town Farm Road is identified as 141 Town Farm Road. The other two parcels are identified as undeveloped land to the rear of Abbe Road with an access strip that leads out to Abbe Road. The three parcels combined total 15.8 acres.

The subject site has historically been in agriculture as row crop. A small isolated wetland was identified on the northern portion of the site. A small patch of woods is also present along the frontage along Abbe Road. The site slopes from north to south. Runoff from the site collects in a swale at the edge of Town Farm Road. From there it is piped under Town Farm Road.

Based on a review of the USDA Soil Survey, the soils in the area of the proposed development are classified as Enfield silt loam or Agawam fine sandy loam (See Soils Map in Appendix 1). The USDA Soil Survey defines groups of soils into Hydrologic Soil Groups (HSG) according to their runoff-producing characteristics. Soils are assigned to four groups (A, B, C, and D Groups). In group A, are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They typically are deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a hardpan or clay layer at or near the surface, have a permanent high-water table, or are shallow over nearly impervious bedrock or other nearly impervious material. The HSG classification of Enfield silt loam and Agawam fine sandy loam is HSG B.

C. Proposed Array

The proposed arrays will consist of 4,706 solar modules combined within an approximate 10.15-acre fenced area. The first solar array will consist of 3,250 modules on the southern parcel of 141 Town Farm Road. The second array will consist of 1,456 modules on the two rear Abbe Road lots. Each array will have its own equipment pad and interconnection point. The equipment pad and interconnection point for Array 1 will be in the southeast corner of the site. This equipment pad will be accessed via a gravel access drive off Town Farm Road. A culvert is proposed to accommodate the new drive crossing the existing roadside swale. The interconnection will be via a series of poles and overhead wires to connect to the existing pole line on the south side of Town Farm Road. The equipment pad for Array 2 will be located at the northwest corner of the site. This pad will be accessed via a new gravel driveway from Abbe Road. The interconnection will be via a series of underground conduit and overhead wires to connect to the existing pole line on the west side of Abbe Road.

II. STORMWATER RUNOFF ANALYSIS

A. Methodology

Peak runoff flow rates were determined for pre- and post-development conditions using Applied Microcomputer System's HydroCAD™ Stormwater Modeling System. This computer software employs the SCS Technical Release 55 and 20 (TR-55 & TR-20) methodology. The potential stormwater impacts downstream were evaluated for the 2-yr, 25-yr, 50-yr, and 100-yr; 24-hour storm events. The rainfall for these storm events was taken from NOAA Atlas 14 provided in Appendix 2.

Based on the present drainage patterns, all runoff from the development area sheet flows into the existing roadside swale at the southern end of the site. As a result, the southern border of the development was selected as the design point.

B. Pre-Development Hydrology

The pre-development site was modeled as a single subcatchment (PRE) as shown on the pre-development drainage area map in Appendix 3. The pre-development runoff characteristics of the contributing area are provided on the HydroCAD data sheets in Appendix 4. The pre-development discharge rates from the site during the design storms are summarized in Table 1.

C. Post-Development Hydrology

The proposed solar array will be installed at existing grades within the field. Thus, existing drainage patterns will be maintained and the soil disturbance will be limited to the installation of the access roads, equipment pads, and a water quality swale constructed adjacent to the northern access drive. Disturbed, bare and fallow areas will be seeded with a pollinator seed mix to establish a vegetated cover. The proposed tracker panel solar arrays will be installed on elevated racks that provide adequate height above the ground to allow for infiltration, and promote the continued growth of the vegetative cover. Thus, upon completion of the project, the site can be considered pervious vegetated groundcover maintained as meadow.

In accordance with Appendix I of the DEEP's General Permit, the hydrologic analysis is required to account for the compaction of soils that result from extensive machinery traffic over the course of the construction of the array. To account for this, the runoff curve number must be increased by one full HSG category where grading within the array exceeds a 2-foot difference between existing and proposed grades and one half the difference between the on-site HSG and the next higher HSG for the remainder of the array. As discussed above, the proposed array at our site will utilize existing grades. Thus, to meet this requirement, the post construction runoff curve numbers within the proposed fence were increased from Meadow, HSG B (58) to Meadow, HSG B/C (65).

The post-development site was modeled as a single subcatchment (POST) as shown on the post-development drainage area map in Appendix 3. The post development runoff characteristics of the contributing area are provided on the HydroCAD data sheets in Appendix 4. The post-development discharge rates from the site during the design storms are summarized in Table 1. It should be noted that any infiltration provided in the water quality swale is ignored. Thus, the post development discharge rates are likely overestimated.

Using the characteristics described above, the Post Development peak flow rates for the site were calculated for the 2, 25, 50, and 100-year 24-hour rainfall design storms. Refer to Appendices 4 and 5 for pre-development and post-development HydroCAD data sheets. Table 1 compares the pre-development peak flows with the post-development peak flows at the design point. As shown, even without the implementation of stormwater measures to provide retention/detention, the resulting post-development peak flows are much less than the pre-development peak flows. This reduction is attributed to the change from the existing field of row crops, which have a high runoff coefficient, to a meadow which has a lower runoff coefficient and promotes infiltration.

TABLE 1 – COMPARISON OF PRE- & POST-DEVELOPMENT DISCHARGE RATES (CFS) TO DESIGN POINT

	2-year	25-year	50-year	100-year
Pre-Development	12.37	43.41	52.99	63.74
Post Development	4.05	24.30	31.31	39.40

D. Stormwater Treatment

Appendix I of the DEEP Stormwater General Permit requires that all solar panels in the array be considered effective impervious cover for the purposes of calculating Water Quality Volume if the proposed post-construction slopes at a site are 15% or more or if slopes less than 15% do not meet the four listed conditions:

a) The vegetated area receiving runoff between rows of solar panels is equal to or greater than the average width of the row of solar panels draining to the vegetated area;
b) Overall site conditions and solar panel configuration within the array are designed so stormwater runoff remains as sheet flows across the entire site towards the intended stormwater management controls;
c) The following conditions are satisfied regarding the design of the post-construction slope of the site:
   i. Slopes less than or equal to 5%:
      Appropriate vegetation shall be established that will ensure sheet flow conditions and that will provide sufficient ground cover throughout the site.
   ii. Slopes between 5% and 10%:
      Practices such as level spreaders, terraces, or berms shall be used to ensure long term sheet flow conditions.
   iii. Slopes greater than or equal to 10% and less than 15%:
      The plan must include specific engineered stormwater control measures with detailed specifications that are designed to provide permanent stabilization and non-erosive conveyance of runoff downgradient from the site.
   iv. Slopes greater than or equal to 8%:
      Erosion control blankets, stump grindings, erosion control mix mulch, or hydroseed with tackifier shall be applied within 72 hours of final grading, or when a rainfall of 0.5 inches or greater is predicted within 24 hours of final grading, whichever time period is less.
d) The solar panels shall be designed as to allow the growth of native vegetation beneath and between the panels.

The existing slopes at the site are less than or equal to 5%. These slopes require that conditions (a)-(d) be met in order to avoid treating the panels as impervious area. To satisfy condition (a), the proposed row spacing of 10.00’ will exceed the 7.47’ width of the panels. To satisfy condition (b), utilization of existing grades and the establishment of vegetated cover will maintain sheet flow conditions. For condition (c), the area will be seeded with a pollinator seed mix to establish a vegetated cover. This, will provide the appropriate vegetation to satisfy condition c. Finally, to satisfy condition (d), the proposed solar arrays will be installed on elevated racks that provide adequate height above the ground to promote the continued growth of the existing vegetative cover and allow for infiltration.

As a result of satisfying the conditions above, the panels need not be considered as impervious coverage for the calculation of the WQV. Thus, the only proposed surfaces required to be included in the calculation of the WQV are the equipment pads and adjacent gravel access drives. The southern equipment pad and access driveway are very small areas (3,305 s.f.) in relation to the overall site (15.8 acres), and not expected to generate any significant pollutants. The northern gravel access driveway is only slightly larger, but it contributes runoff directly to the existing on-site wetland. As a result, a small water quality swale is proposed to be constructed downgradient of the access drive to collect and treat the runoff from the driveway prior to discharge via a 10' wide earthen spillway upgradient of the wetland. The Water Quality Volume used for the sizing of the water quality swale was calculated based on one-inch of runoff over the entire area of the access drive, or:

WQV = (1") (9,581 sf)/(12"/ft) = 798 cubic feet

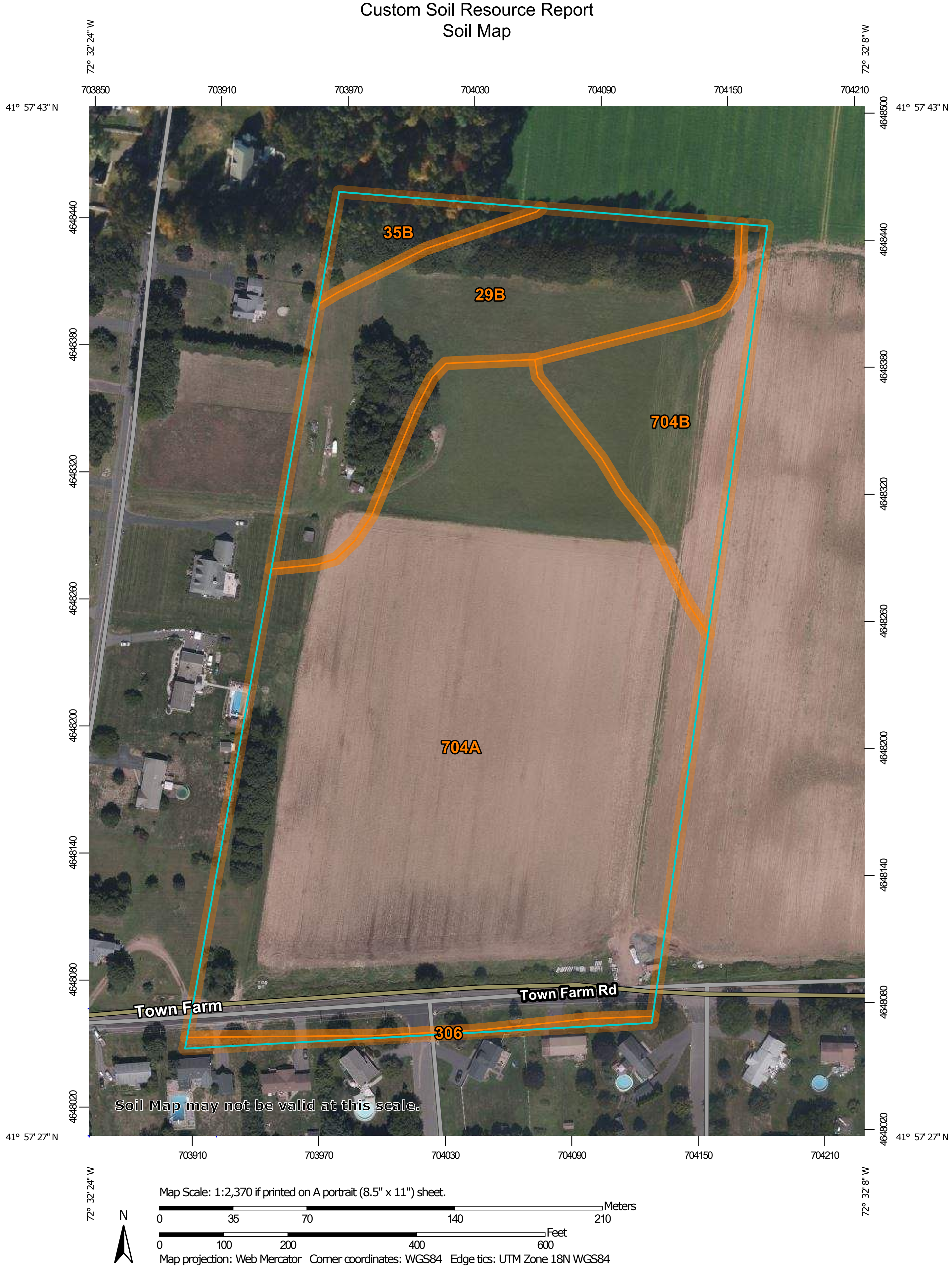
The capacity of the water quality swale below the outlet is 1,225 cubic feet, roughly three times the required water quality volume.

E. Summary of Results

The proposed design and analysis indicates that the proposed development will not result in negative flooding impacts downstream. In addition, the maintenance of existing grades, vegetation, and sheet flow drainage patterns during and after construction will prevent any negative impacts downstream resulting from erosion or sedimentation.

Appendix 1:
SOILS INFORMATION

Soil Map


72° 32' 24" W
72° 32' 8" W
703850
703910
703970
704030
704090
704150
704210
41° 57' 43" N
41° 57' 43" N
4648500
4648440
4648380
4648320
4648260
4648200
4648140
4648080
4648020
35B
29B
704B
704A
Town Farm
Town Farm Rd
306
Soil Map may not be valid at this scale.
41° 57' 27" N
41° 57' 27" N
703910
703970
704030
704090
704150
704210
72° 32' 24" W
72° 32' 8" W
Map Scale: 1:2,370 if printed on A portrait (8.5" x 11") sheet.
Meters
0
35
70
140
210
Feet
0
100
200
400
600
N
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
29B	Agawam fine sandy loam, 3 to 8 percent slopes	3.8	18.5%
35B	Penwood loamy sand, 3 to 8 percent slopes	0.6	2.8%
306	Udorthents-Urban land complex	0.1	0.7%
704A	Enfield silt loam, 0 to 3 percent slopes	14.0	68.1%
704B	Enfield silt loam, 3 to 8 percent slopes	2.0	9.9%
Totals for Area of Interest		**20.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

State of Connecticut

29B—Agawam fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyqx
Elevation: 0 to 820 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Agawam and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Agawam

Setting

Landform: Outwash plains, kames, kame terraces, outwash terraces, moraines
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Crest, side slope, riser, tread, rise, dip
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from gneiss, granite, schist, and/or phyllite

Typical profile

Ap - 0 to 11 inches: fine sandy loam
Bw1 - 11 to 16 inches: fine sandy loam
Bw2 - 16 to 26 inches: fine sandy loam
2C1 - 26 to 45 inches: loamy fine sand
2C2 - 45 to 55 inches: loamy fine sand
2C3 - 55 to 65 inches: loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 15 to 35 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Ecological site: F145XY008MA - Dry Outwash

Hydric soil rating: No

Minor Components

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, crest, side slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Merrimac

Percent of map unit: 3 percent
Landform: Outwash plains, outwash terraces, moraines, eskers, kames
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Crest, side slope, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Windsor

Percent of map unit: 2 percent
Landform: Dunes, outwash plains, deltas, outwash terraces
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

35B—Penwood loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9ln1
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Penwood and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Penwood

Setting

Landform: Terraces, outwash plains
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy glaciofluvial deposits derived from sandstone and shale

Typical profile

Ap - 0 to 8 inches: loamy sand
Bw1 - 8 to 18 inches: loamy sand
Bw2 - 18 to 30 inches: sand
C - 30 to 60 inches: sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 99.62 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Minor Components

Manchester

Percent of map unit: 5 percent
Landform: Terraces, outwash plains, kames, eskers
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Branford

Percent of map unit: 5 percent
Landform: Terraces, outwash plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hartford

Percent of map unit: 5 percent
Landform: Terraces, outwash plains

Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Ellington
Percent of map unit: 3 percent
Landform: Terraces, outwash plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Unnamed, gravelly substratum
Percent of map unit: 2 percent
Hydric soil rating: No

306—Udorthents-Urban land complex

Map Unit Setting

National map unit symbol: 9lmg
Elevation: 0 to 2,000 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 120 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 50 percent
Urban land: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Drift

Typical profile
A - 0 to 5 inches: loam
C1 - 5 to 21 inches: gravelly loam
C2 - 21 to 80 inches: very gravelly sandy loam

Properties and qualities
Slope: 0 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)
Depth to water table: About 54 to 72 inches

Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.8 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Urban Land

Typical profile
H - 0 to 6 inches: material

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Unnamed, undisturbed soils
Percent of map unit: 8 percent
Hydric soil rating: No

Udorthents, wet substratum
Percent of map unit: 5 percent
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Rock outcrop
Percent of map unit: 2 percent
Hydric soil rating: No

704A—Enfield silt loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 2y07p
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Enfield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Enfield

Setting

Landform: Outwash plains, outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-silty eolian deposits over sandy and gravelly glaciofluvial deposits derived from granite, schist, and/or gneiss

Typical profile

Ap - 0 to 7 inches: silt loam
Bw1 - 7 to 15 inches: silt loam
Bw2 - 15 to 25 inches: silt loam
2C - 25 to 60 inches: stratified very gravelly coarse sand to loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 16 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Ecological site: F145XY009CT - Well Drained Outwash
Hydric soil rating: No

Minor Components

Tisbury

Percent of map unit: 5 percent
Landform: Outwash terraces, valley trains, deltas, outwash plains
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Haven

Percent of map unit: 5 percent
Landform: Outwash plains, outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Agawam

Percent of map unit: 3 percent
Landform: Kame terraces, outwash plains, outwash terraces, moraines, kames

Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope, crest, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Raypol

Percent of map unit: 2 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

704B—Enfield silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2y07q
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Enfield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Enfield

Setting

Landform: Outwash plains, outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-silty eolian deposits over sandy and gravelly glaciofluvial deposits derived from granite, schist, and/or gneiss

Typical profile

Ap - 0 to 7 inches: silt loam
Bw1 - 7 to 15 inches: silt loam
Bw2 - 15 to 25 inches: silt loam
2C - 25 to 60 inches: stratified very gravelly coarse sand to loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 16 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F145XY009CT - Well Drained Outwash
Hydric soil rating: No

Minor Components

Tisbury

Percent of map unit: 5 percent
Landform: Outwash terraces, valley trains, deltas, outwash plains
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Haven

Percent of map unit: 5 percent
Landform: Outwash terraces, outwash plains
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Agawam

Percent of map unit: 3 percent
Landform: Kame terraces, outwash plains, outwash terraces, moraines, kames
Landform position (two-dimensional): Summit, shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Raypol

Percent of map unit: 2 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Appendix 2:
RAINFALL DATA

NOAA Atlas 14, Volume 10, Version 3
Location name: Town of Enfield, Connecticut, USA*
Latitude: 41.9596°, Longitude: -72.5378°
Elevation: 130.85 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.338 (0.259-0.440)	0.408 (0.312-0.532)	0.522 (0.398-0.683)	0.617 (0.468-0.811)	0.747 (0.550-1.03)	0.845 (0.611-1.19)	0.947 (0.668-1.38)	1.06 (0.711-1.59)	1.23 (0.794-1.90)	1.36 (0.861-2.15)
10-min	0.479 (0.367-0.624)	0.578 (0.442-0.754)	0.740 (0.564-0.969)	0.874 (0.663-1.15)	1.06 (0.780-1.46)	1.20 (0.866-1.68)	1.34 (0.946-1.96)	1.51 (1.01-2.25)	1.74 (1.12-2.69)	1.93 (1.22-3.05)
15-min	0.564 (0.432-0.734)	0.680 (0.520-0.887)	0.870 (0.664-1.14)	1.03 (0.780-1.35)	1.25 (0.917-1.71)	1.41 (1.02-1.98)	1.58 (1.11-2.31)	1.77 (1.19-2.65)	2.04 (1.32-3.17)	2.27 (1.44-3.58)
30-min	0.760 (0.582-0.990)	0.919 (0.703-1.20)	1.18 (0.899-1.54)	1.40 (1.06-1.84)	1.69 (1.25-2.33)	1.92 (1.39-2.69)	2.15 (1.51-3.14)	2.41 (1.62-3.60)	2.79 (1.80-4.31)	3.09 (1.96-4.88)
60-min	0.956 (0.733-1.25)	1.16 (0.886-1.51)	1.49 (1.14-1.95)	1.76 (1.34-2.32)	2.14 (1.58-2.94)	2.42 (1.75-3.41)	2.72 (1.92-3.97)	3.05 (2.05-4.56)	3.53 (2.28-5.46)	3.91 (2.48-6.18)
2-hr	1.23 (0.945-1.59)	1.48 (1.14-1.92)	1.89 (1.45-2.45)	2.23 (1.70-2.91)	2.69 (2.00-3.70)	3.04 (2.22-4.27)	3.41 (2.43-4.99)	3.85 (2.59-5.73)	4.51 (2.93-6.95)	5.07 (3.22-7.96)
3-hr	1.41 (1.09-1.82)	1.70 (1.31-2.19)	2.17 (1.67-2.81)	2.56 (1.96-3.34)	3.10 (2.31-4.24)	3.49 (2.56-4.90)	3.92 (2.81-5.75)	4.45 (3.00-6.59)	5.25 (3.41-8.05)	5.93 (3.77-9.28)
6-hr	1.77 (1.38-2.27)	2.15 (1.67-2.76)	2.76 (2.14-3.56)	3.27 (2.52-4.24)	3.97 (2.98-5.42)	4.49 (3.31-6.28)	5.05 (3.65-7.40)	5.76 (3.89-8.49)	6.87 (4.47-10.5)	7.83 (5.00-12.2)
12-hr	2.18 (1.70-2.78)	2.68 (2.09-3.42)	3.49 (2.71-4.47)	4.16 (3.22-5.37)	5.09 (3.84-6.92)	5.77 (4.28-8.05)	6.52 (4.75-9.52)	7.47 (5.07-11.0)	8.98 (5.87-13.6)	10.3 (6.59-15.9)
24-hr	2.55 (2.00-3.24)	3.18 (2.49-4.04)	4.20 (3.29-5.36)	5.05 (3.93-6.48)	6.22 (4.72-8.43)	7.08 (5.29-9.84)	8.03 (5.89-11.7)	9.25 (6.29-13.5)	11.2 (7.35-16.9)	12.9 (8.31-19.9)
2-day	2.86 (2.26-3.61)	3.61 (2.85-4.56)	4.82 (3.79-6.12)	5.83 (4.56-7.44)	7.22 (5.52-9.75)	8.23 (6.19-11.4)	9.36 (6.92-13.6)	10.9 (7.41-15.7)	13.3 (8.74-19.9)	15.5 (9.96-23.6)
3-day	3.12 (2.48-3.93)	3.94 (3.12-4.96)	5.27 (4.16-6.65)	6.37 (5.00-8.09)	7.89 (6.04-10.6)	8.99 (6.78-12.4)	10.2 (7.59-14.9)	11.9 (8.11-17.2)	14.6 (9.59-21.8)	17.0 (10.9-25.8)
4-day	3.36 (2.67-4.22)	4.23 (3.36-5.31)	5.65 (4.47-7.12)	6.82 (5.37-8.65)	8.44 (6.48-11.3)	9.62 (7.27-13.3)	10.9 (8.13-15.9)	12.7 (8.69-18.3)	15.6 (10.3-23.2)	18.1 (11.7-27.5)
7-day	4.03 (3.22-5.03)	5.01 (4.00-6.27)	6.62 (5.26-8.30)	7.95 (6.28-10.0)	9.78 (7.54-13.0)	11.1 (8.43-15.2)	12.6 (9.38-18.1)	14.6 (10.0-20.9)	17.7 (11.7-26.3)	20.5 (13.3-31.0)
10-day	4.69 (3.76-5.84)	5.73 (4.59-7.15)	7.44 (5.93-9.31)	8.86 (7.02-11.1)	10.8 (8.34-14.3)	12.2 (9.28-16.6)	13.8 (10.3-19.7)	15.8 (10.9-22.6)	19.1 (12.6-28.2)	21.9 (14.2-33.0)
20-day	6.75 (5.44-8.36)	7.87 (6.33-9.75)	9.68 (7.76-12.0)	11.2 (8.92-14.0)	13.3 (10.3-17.4)	14.8 (11.2-19.8)	16.5 (12.1-23.0)	18.4 (12.8-26.1)	21.4 (14.3-31.4)	24.0 (15.6-35.9)
30-day	8.50 (6.87-10.5)	9.64 (7.78-11.9)	11.5 (9.25-14.2)	13.0 (10.4-16.2)	15.2 (11.7-19.7)	16.8 (12.7-22.2)	18.4 (13.5-25.3)	20.3 (14.1-28.6)	23.0 (15.3-33.5)	25.1 (16.4-37.5)
45-day	10.7 (8.66-13.1)	11.9 (9.60-14.6)	13.8 (11.1-17.0)	15.4 (12.3-19.1)	17.5 (13.6-22.6)	19.2 (14.5-25.2)	20.9 (15.3-28.3)	22.6 (15.8-31.8)	24.9 (16.7-36.2)	26.6 (17.4-39.6)
60-day	12.5 (10.2-15.3)	13.7 (11.1-16.8)	15.7 (12.7-19.3)	17.3 (13.9-21.5)	19.6 (15.2-25.1)	21.4 (16.2-27.9)	23.1 (16.8-31.0)	24.7 (17.3-34.5)	26.7 (17.9-38.7)	28.1 (18.4-41.7)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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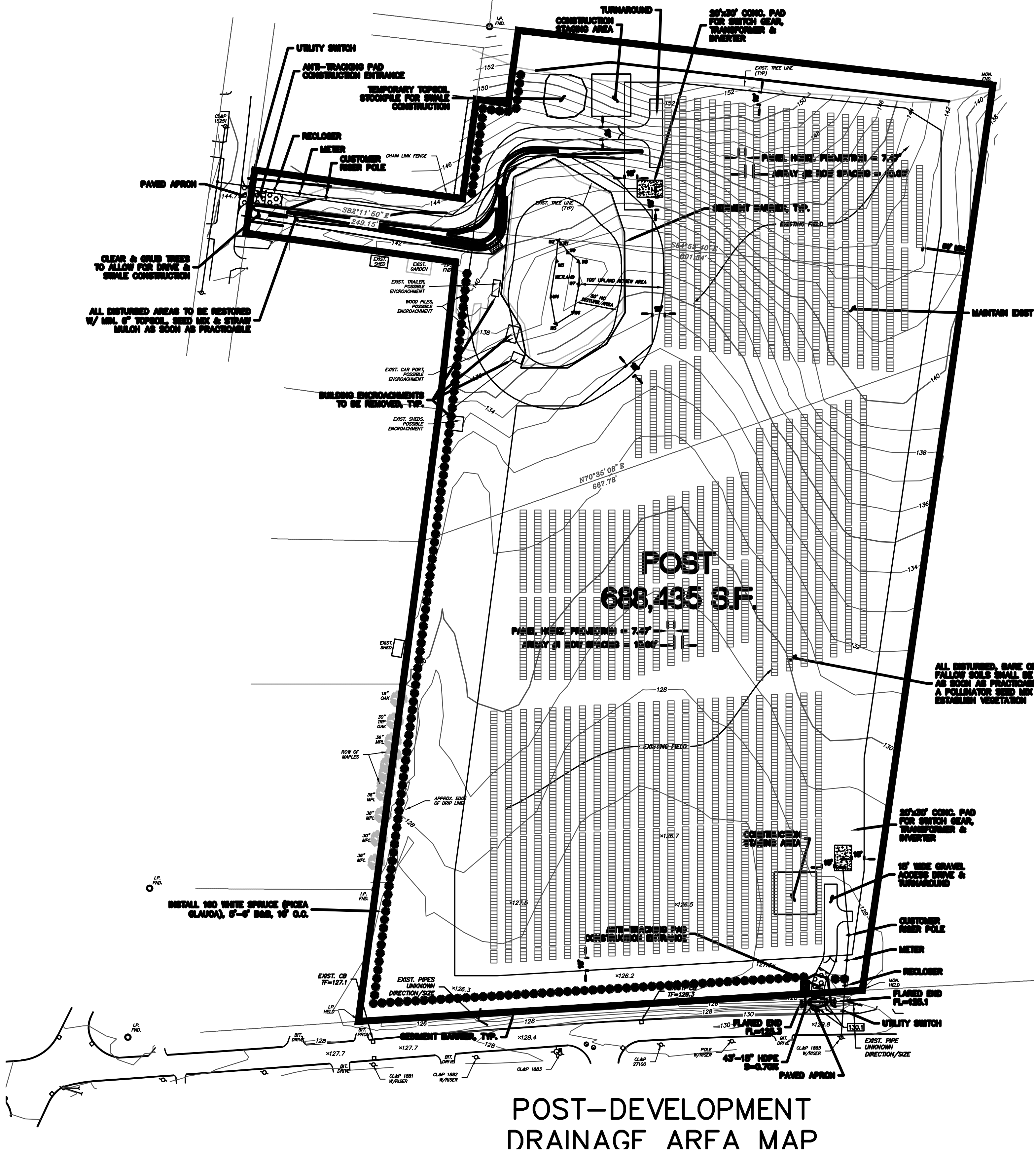
PF graphical

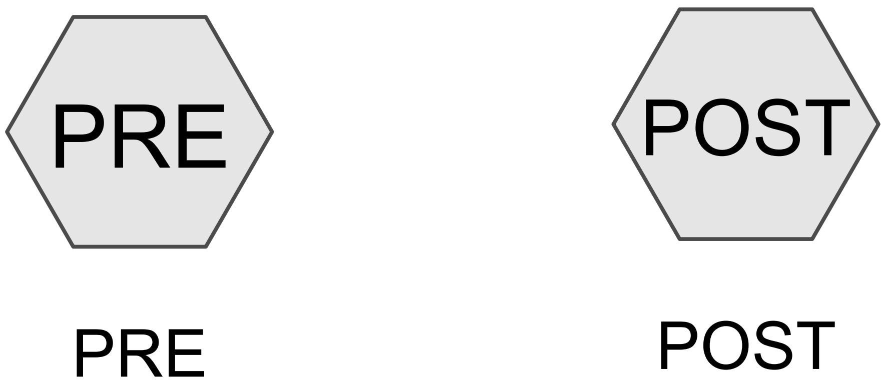
Appendix 3:
DRAINAGE AREA MAPS

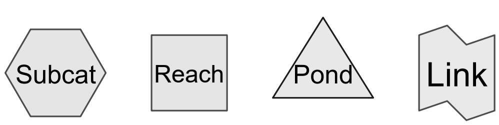
PRE-DEVELOPMENT DRAINAGE AREA MAP



POST-DEVELOPMENT DRAINAGE AREA MAP

Appendix 4:
HYDROCAD ANALYSIS





Routing Diagram for 2022-083 Lodestar - 141 Town Farm Rd, Enfield
Prepared by J.R. Russo & Associates LLC, Printed 10/19/2023

Summary for Subcatchment POST: POST

Runoff = 39.40 cfs @ 12.40 hrs, Volume= 4.863 af, Depth= 3.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.03"

	Area (sf)	CN	Description
	202,648	58	Meadow, non-grazed, HSG B
	42,770	55	Woods, Good, HSG B
*	429,170	65	Meadow, HSG B/C Adjusted
*	13,847	98	Unconnected impervious, HSG B
	688,435	63	Weighted Average
	674,588		97.99% Pervious Area
	13,847		2.01% Impervious Area
	13,847		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1050	0.23		**Sheet Flow, GR** Grass: Dense n= 0.240 P2= 3.20"
9.3	619	0.0250	1.11		**Shallow Concentrated Flow, GR** Short Grass Pasture Kv= 7.0 fps
11.5	336	0.0048	0.48		**Shallow Concentrated Flow, GR** Short Grass Pasture Kv= 7.0 fps
28.2	1,055	Total			

Summary for Subcatchment PRE: PRE

Runoff = 63.74 cfs @ 12.25 hrs, Volume= 6.523 af, Depth= 4.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.03"

Area (sf)	CN	Description
81,135	61	>75% Grass cover, Good, HSG B
556,367	78	Row crops, straight row, Good, HSG B
50,933	55	Woods, Good, HSG B
688,435	74	Weighted Average
688,435		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	100	0.1050	0.69		**Sheet Flow, CROP** Cultivated: Residue<=20% n= 0.060 P2= 3.20"
7.2	619	0.0250	1.42		**Shallow Concentrated Flow, CROP** Cultivated Straight Rows Kv= 9.0 fps
9.0	336	0.0048	0.62		**Shallow Concentrated Flow, CROP** Cultivated Straight Rows Kv= 9.0 fps
18.6	1,055	Total			

Time span=1.00-72.00 hrs, dt=0.01 hrs, 7101 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Sim-Route method - Pond routing by Sim-Route method

SubcatchmentPOST: POST Runoff Area=688,435 sf 2.01% Impervious Runoff Depth=0.51"
Flow Length=1,055' Tc=28.2 min CN=63 Runoff=4.05 cfs 0.672 af

SubcatchmentPRE: PRE Runoff Area=688,435 sf 0.00% Impervious Runoff Depth=1.02"
Flow Length=1,055' Tc=18.6 min CN=74 Runoff=12.37 cfs 1.349 af

Total Runoff Area = 31.609 ac Runoff Volume = 2.021 af Average Runoff Depth = 0.77"
98.99% Pervious = 31.291 ac 1.01% Impervious = 0.318 ac

Time span=1.00-72.00 hrs, dt=0.01 hrs, 7101 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Sim-Route method - Pond routing by Sim-Route method

SubcatchmentPOST: POST Runoff Area=688,435 sf 2.01% Impervious Runoff Depth=2.33"
Flow Length=1,055' Tc=28.2 min CN=63 Runoff=24.30 cfs 3.071 af

SubcatchmentPRE: PRE Runoff Area=688,435 sf 0.00% Impervious Runoff Depth=3.37"
Flow Length=1,055' Tc=18.6 min CN=74 Runoff=43.41 cfs 4.439 af

Total Runoff Area = 31.609 ac Runoff Volume = 7.510 af Average Runoff Depth = 2.85"
98.99% Pervious = 31.291 ac 1.01% Impervious = 0.318 ac

Time span=1.00-72.00 hrs, dt=0.01 hrs, 7101 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Sim-Route method - Pond routing by Sim-Route method

SubcatchmentPOST: POST Runoff Area=688,435 sf 2.01% Impervious Runoff Depth=2.96"
Flow Length=1,055' Tc=28.2 min CN=63 Runoff=31.31 cfs 3.899 af

SubcatchmentPRE: PRE Runoff Area=688,435 sf 0.00% Impervious Runoff Depth=4.11"
Flow Length=1,055' Tc=18.6 min CN=74 Runoff=52.99 cfs 5.415 af

Total Runoff Area = 31.609 ac Runoff Volume = 9.315 af Average Runoff Depth = 3.54"
98.99% Pervious = 31.291 ac 1.01% Impervious = 0.318 ac

Time span=1.00-72.00 hrs, dt=0.01 hrs, 7101 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Sim-Route method - Pond routing by Sim-Route method

SubcatchmentPOST: POST Runoff Area=688,435 sf 2.01% Impervious Runoff Depth=3.69"
Flow Length=1,055' Tc=28.2 min CN=63 Runoff=39.40 cfs 4.863 af

SubcatchmentPRE: PRE Runoff Area=688,435 sf 0.00% Impervious Runoff Depth=4.95"
Flow Length=1,055' Tc=18.6 min CN=74 Runoff=63.74 cfs 6.523 af

Total Runoff Area = 31.609 ac Runoff Volume = 11.385 af Average Runoff Depth = 4.32"
98.99% Pervious = 31.291 ac 1.01% Impervious = 0.318 ac

Appendix E Phase 1A Cultural Resources Report

JUNE 2023

PHASE IA CULTURAL RESOURCES ASSESSMENT FOR THE PROPOSED TOWN FARM SOLAR PROJECT IN ENFIELD, CONNECTICUT

PREPARED FOR:

vhb

100 GREAT MEADOW ROAD #200,
WETHERSFIELD, CONNECTICUT 06109

PREPARED BY:

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Abstract

This report presents the results of the Phase IA cultural resources assessment survey for the development of a solar facility in Enfield, Connecticut. The project will include construction of solar arrays and associated infrastructure on a 15.59 acre parcel of land at the northeastern corner of the intersection of Town Farm Road and Abbe Road in Enfield, Connecticut. The portion of the parcel to be impacted by the construction of solar arrays includes 10 acres of agricultural land. Heritage Consultants, LLC completed the Phase IA cultural resources assessment survey on behalf of Vanasse Hangen Brustlin, Inc., in June 2023. The investigation consisted of: 1) preparation of an overview of the region's natural, precontact era, and post-European Contact period settings; 2) a literature search to identify and discuss previously recorded cultural resources in the region; 3) a review of readily available maps and aerial imagery depicting the project area to identify potential post-European Contact period resources and/or areas of past disturbance; and 4) pedestrian survey and photo-documentation of the project area to determine its archaeological sensitivity. The Phase IA pedestrian survey revealed that the project area was characterized by a gently sloping topography with fallow agricultural fields. Aside from disturbance to the upper layers from plowing, the entirety of the project appears to have limited disturbance and retains a moderate/high archaeological sensitivity. It is recommended that the proposed area of impact be subjected to Phase IB cultural reconnaissance survey prior to development of the solar facility.

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CHAPTER I
INTRODUCTION

This report presents the results of a Phase IA cultural resources assessment survey associated with the development of a proposed solar facility (the Facility) located at 141 Town Farm Road & Abbe Road in Enfield, Connecticut (Figure 1). Vanasse Hangen Brustlin, Inc., (VHB) requested that Heritage Consultants, LLC (Heritage) complete the Phase IA survey as part of the planning process for the proposed development project. Heritage completed the investigation in June of 2023. All work associated with this project was performed in accordance with the *Environmental Review Primer for Connecticut's Archaeological Resources* (Poirier 1987) promulgated by the Connecticut State Historic Preservation Office (CT-SHPO).

Project Description and Methods Overview

The 15.59 acre development parcel is located along the northern side of Town Farm Road and the eastern side of Abbe Road in Enfield, Connecticut. The Facility will include construction of a solar array two 4.57 meter (15 foot) wide gravel access roads, interconnection poles, equipment pads, sediment barriers, and a chain link fence on a project parcel that measures 15.59 acres (Figure 2). Of the 15.59 acres of land, 10 acres will be impacted by the construction of the Facility. The Scantic River runs to the west of the proposed Facility, with Pierce Brook, Frog, and Buckhorn Brook running to the east and south of it. The project parcel is situated on elevations ranging between 39 to 45 m (128 to 148 ft) NGVD. The area of impact is primarily located in fallow agricultural fields. The parcel abuts residences along Town Farm Road and Abbe Road to the south and west and agricultural field to the north and east.

The current Phase IA cultural resources assessment survey consisted of the completion of the following tasks: 1) preparation of an overview of the region's natural, precontact era, and post-European Contact period settings; 2) a literature search to identify and discuss previously recorded cultural resources in the region; 3) a review of readily available maps and aerial imagery depicting the project area to identify potential post-European Contact period resources and/or areas of past disturbance; and 4) pedestrian survey and photo-documentation of the project area to determine its archaeological sensitivity.

Project Results and Management Recommendations Overview

The review of maps and aerial images depicting the study area, as well as files maintained by the CT-SHPO, failed to identify any archaeological sites within 1.6 kilometer (1 mile) of the project area; however, one National Register Historic District (Hazardville Historic District) and nine Connecticut State Register of Historic Places (SRHP) properties were identified within 1.6 kilometer (1 mile) of the proposed Facility. These properties suggest general historical nature of the region encompassing the proposed Facility. Heritage combined this data with those derived from map and aerial image analysis, as well as subsequent pedestrian survey, to assess the archaeological sensitivity of the development area.

The desktop portion of the Phase IA survey suggested that portions of the Facility may be archaeologically sensitive due to the presence of gentle slopes, well drained soils, and visible lack of disturbance. The pedestrian survey, which was completed on June 18, 2023, confirmed the results of the desktop survey; the entirety of the 10-acre proposed area of impact is of a moderate/high archaeological sensitivity. It is recommended that the proposed Facility be subjected to Phase IB cultural reconnaissance survey prior to construction .

Project Personnel

Key personnel who worked in this project included David R. George, M.A., RPA, (Principal Investigator); Renee Petruzelli, M.A., RPA (Project Manager); Tony Medina B.A., RPA (Operations Manager); Linda Seminario, B.A. (Project Archaeologist); Dr. David Naumec, Ph.D. (Historian); and Cole Peterson, B.A., (GIS Specialist).

CHAPTER II
NATURAL SETTING

Introduction

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

Ecoregions of Connecticut

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

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

Dowhan and Craig defined nine major ecoregions for the State of Connecticut. They are based on regional diversity in plant and animal indicator species (Dowhan and Craig 1976). Only one of the ecoregions is germane to the current investigation: North-Central Lowlands ecoregion. A 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 area.

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

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 very 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 Area

The Project area is situated within a region that contains several sources of freshwater, including the Scantic River, Pierce Brook, Buckhorn Brook, Frog Brook, and wetlands. These freshwater sources may have served as resource extraction areas for precontact and post-European contact populations. Previously completed archaeological investigations in Connecticut have demonstrated that streams, rivers, and wetlands were focal points for precontact 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 diagenic and taphonomic 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. In contrast, acidic soils enhance the preservation of charred plant remains.

The Project area is characterized by the presence of three major soil types: Haven and Enfield (32A: Haven and Enfield Soils, Haven and Enfield Soils, Agawam Soils, and Penwood Soils (Figure 3). All the soil types identified within the Project area are categorized as excessively to well drained. When left intact these soils may be correlated with precontact and post-European contact use and occupation, resulting in the possibility of archaeological deposits. All the identified soils series are classified as possessing steep grades, while the project area is relatively level with gradual sloping occurring toward the eastern edge. Descriptive profiles for each soil type found within the project area are presented below; they were gathered from the United States Department of Agriculture - National Resources Conservation Service.

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

The Agawam series consists of very deep, well drained soils formed in sandy, water deposited materials. They are level to steep soils on outwash plains and high stream terraces. Slope ranges from 0 to 15 percent. A typical profile associated with Agawam 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; **C1**--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 and Enfield Soils (Soil Code: 32A and 32B)</u>

The Haven series consists of very deep, well drained soils formed in loamy over sandy and gravelly outwash. They are nearly level through moderately sloping soils on outwash plains, valley trains, terraces, and water-sorted moraine deposits. Saturated hydraulic conductivity is moderately high or high in the mineral solum and very high in the substratum. 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.

The Enfield series consists of very deep, well drained loamy soils formed in a silty mantle overlying glacial outwash. They are nearly level to sloping soils on outwash plains and terraces. Slope ranges from 0 to 15 percent. 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.

Penwood Soils (Soil Code 35B):

The Penwood series consists of very deep, excessively drained soils formed in sandy outwash. They are nearly level to strongly sloping soils on glaciofluvial landforms. A typical profile of Penwood series soils is as follows: **Ap**--0 to 8 inches; dark brown (7.5YR 3/2) loamy sand; pinkish gray (7.5YR 6/2) dry; weak medium granular structure; very friable; many fine roots; strongly acid; clear smooth boundary; **Bw1**--8 to 18 inches; yellowish red (5YR 4/6) loamy sand; single grain; loose; common fine roots; strongly acid; gradual wavy boundary; **Bw2**--18 to 30 inches; reddish brown (5YR 4/4) sand; single grain; loose; few fine roots; strongly acid; gradual wavy boundary; and **C**--30 to 60 inches; reddish brown (5YR 4/3) medium sand with thin strata of fine sand; single grain; loose; few fine roots in upper part; strongly acid.

Summary

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

CHAPTER III
PRECONTACT ERA SETTING

Introduction

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

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

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

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

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

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

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

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

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

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

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

Pfeiffer 1984, 1990; Witthoft 1949, 1953).

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

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

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

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

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

By the onset of the Middle Archaic Period modern deciduous forests had developed in the region (Davis 1969). Increased numbers and types of sites associated with this period are noted in Connecticut (McBride 1984). The most well-known Middle Archaic site in New England is the Neville Site in Manchester, New Hampshire studied by Dincauze (1976). Careful analysis of the Neville Site indicated that the Middle Archaic occupation dated from between 7,700 and 6,000 years ago. In fact, Dincauze obtained several radiocarbon dates from the Middle Archaic component of the Neville Site associated with the then-newly named Neville type projectile point, ranging from 7,740±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, which lasted from ca., 3,700 to 2,700 BP, is perhaps the most interesting, yet confusing of the Archaic Periods in southern New England precontact period. Originally termed the "Transitional Archaic" by Witthoft (1953) and recognized by the introduction of technological innovations, e.g., broadspear projectile points and soapstone bowls, the Terminal Archaic has long posed problems for regional archeologists. While the Narrow-Stemmed Tradition persisted through the Terminal Archaic and into the Early Woodland Period, the Terminal Archaic is coeval with what appears to be a different technological adaptation, the Susquehanna Tradition (McBride 1984; Ritchie 1969b). The Susquehanna Tradition is recognized in southern New England by the presence of a new stone tool industry that was based on the use of high-quality raw materials for stone tool production and a settlement pattern different from the "coeval" Narrow-Stemmed Tradition.

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

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

Finally, while settlement patterns appeared to have changed, Terminal Archaic subsistence patterns were analogous to earlier patterns. The subsistence pattern was still 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. Archaeological investigations of Early Woodland sites in southern New England resulted in the recovery of narrow stemmed projectile points in association with ceramic sherds and subsistence remains, including specimens of white-tailed deer, soft and hard-shell clams, and oyster shells (Lavin and Salwen: 1983; McBride 1984:296-297; Pope 1952). McBride (1984) has argued that the combination of the subsistence remains and the recognition of multiple superimposed cultural features at various sites indicate that Early Woodland Period settlement patterns were characterized by multiple re-use of the same sites on a seasonal basis by small co-residential groups.

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

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

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

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

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

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

Summary of Connecticut Precontact Period

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

CHAPTER IV
POST EUROPEAN
CONTACT OVERVIEW

Introduction

The proposed Town Farm Solar project is located at 141 Town Farm Road & Abbe Road in the Town of Enfield, which is situated in Hartford County, Connecticut. This chapter provides a brief overview of Hartford County with a focus on the proposed project area. Most Connecticut towns, including Enfield, originated as Native American settlements and later became English colonial villages. Through the seventeenth and eighteenth century Enfield served as an agricultural hub with ties to both Massachusetts Bay and Connecticut Colonies. During the eighteenth century the town developed into a manufacturing center and experienced significant population growth. By the mid-twentieth century, Enfield developed both as a suburban and commercial area with ties to the nearby urban centers of Hartford and Springfield. Even so, in the twenty-first century, Enfield has largely become a suburban center home to significant commercial and industrial development while retaining aspects of its rural character.

Hartford County

Hartford was one of the four original counties established in 1666 following the merger of Connecticut Colony and Hartford Colony (Van Dusen 1961). Located in central-northern Connecticut, it is bounded north by the State of Massachusetts, east by Tolland County, south by Windham, Middlesex, and New Haven Counties and west by New Haven and Litchfield Counties. Bisected by the Connecticut River, the county is also the location of the City of Hartford, the capital of Connecticut. Although Hartford has the highest population in the county (an estimated 126,443 as of 2020), Glastonbury has the largest land area (52.3 sq. mi.) (Connecticut 2021). Hartford County is in the lower central Connecticut River Valley and the land rises in the western portion of the county on a low mountain range known as the Metacomet Range (Bell 1985). The landscape varies from densely populated urban areas in most of the county to rich farmland regions in its northern bounds and includes a long stretch of the Connecticut River as well as other significant freshwater rivers. Important waterways associated with Hartford County include the Connecticut, Farmington, Hockanum, Podunk, and Scantic Rivers (Trumbull 1886). The county's three largest cities are Hartford, New Britain, and West Hartford while other important population centers are located at Bristol, Manchester, East Hartford, and Glastonbury (Connecticut 2021). The proposed project is located in the Town of Enfield.

Woodland Period to the Seventeenth Century

During the Woodland Period of northeastern North American history (about 3000 to 2500 years ago) the indigenous peoples who resided in the vicinity of present-day Groton were part of the greater Algonquian culture of northeastern North America (Lavin 2013). They spoke local variations of Southern New England Algonquian (SNEA) languages and resided in extended kinship groups on lands they maintained for a variety of horticultural and resource extraction purposes (Goddard 1978). Native people in the region practiced subsistence activities including hunting, fowling, and fishing, along with the cultivation of various crops, the most important of which were maize, squash, and beans. They supplemented these foods seasonally by collecting shellfish, fruits, and plants during warmer periods, and gathering nuts, roots, and tubers during colder times (Lavin 2013). Additionally, these communities came together in large groups to conduct hunt deer in the fall and winter. Indigenous peoples lived with their immediate or extended families in large settlements often concentrated along rivers and/or wetlands. Some villages were fortified by wooden palisades. Their habitations, known as a *weetu* or *wigwam,* were generally constructed of a tree sapling frame and covered in reed matting during warm months and tree bark throughout the winter. These varied in size from a small, individual dwelling to an expansive "long house" which could accommodate several families. Native communities commonly traded among both their immediate neighbors and often maintained long-distance networks as well (Lavin 2013). Prior to the arrival of Europeans, the Native people who resided at present-day Enfield were affiliated with the Agawam who were closely connected with other Native groups through kinship, culture, language, and trade. The Agawam community resided on both sides of the Connecticut River from present-day Enfield north what is now Springfield, Massachusetts. (De Forest 1852; Lavin 2013; Trumbull 1886).

Seventeenth Century through Eighteenth Century

As Indigenous communities maintained oral tradition rather than a written record, most surviving information regarding Native American people of present-day Hartford County was recorded by European observers (Lavin 2013). The earliest Europeans known to have sailed to Long Island Sound and the Connecticut River were the Dutch in 1614 under Captain Adrian Block. They sailed as far north as the site of present-day Enfield and the "Enfield Falls" where they traded with the Indigenous people there (DeForest 1852; Stiles 1891). The Dutch quickly learned of the significance of *wampum,* polished tubular shell beads created from the white *whelk* shell and the purple *quahog* shell. (Hauptman & Wherry 2009; McBride 2013). They found they could exchange wampum for furs from Native peoples from the interior. The Dutch developed trade relationships with Native communities in valley including the Wangunk, Podunk, and Poquonnock. By the 1620's the Dutch and Pequot of present-day southeastern Connecticut traded wampum and furs for European goods. In 1624 the Dutch established New Netherland Colony centered around Manhattan (Jacobs 2009). The Pequot extended their dominance over the Connecticut shoreline, eastern Long Island, and the lower Connecticut River Valley bringing Native communities there into a tributary relationship under their leadership, including the Podunk (Hauptman & Wherry 2009; McBride 2013).

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

The community of Enfield was thought for many years to be within the Massachusetts Bay Colony based on the results of a 1642 survey of the boundary line with the Connecticut Colony. Following King Philip's War many changes in land titleship took place beginning in 1768 when several Indigenous men confirmed a 1675 sale of the part of Enfield lying north of Freshwater River, which was not recorded due to the war. In 1679, Springfield established a committee to form a new town in the vicinity of Freshwater River and the next year, an Agawam man sold land from the Freshwater River south to the falls on the Connecticut River (in what is now East Windsor) – reserving hunting and fishing rights on the common lands (Wright 1905). The first colonists arrived there in 1681, settling south of the river under the authority of Massachusetts. In 1703, Connecticut began asserting ownership of Enfield and other areas along the Massachusetts border due to errors found in the 1642 survey. As the southern boundary of the town was originally thought to be the colony line from 1642, a two-mile strip of land was claimed by both Enfield and the Town of Windsor, Connecticut. In 1713, the matter was finally settled, and Windsor relinquished its claim in exchange for land elsewhere. Officials in Enfield and other towns along the border soon concluded that they would prefer to be part of Connecticut, though it was not until 1747 that they petitioned the legislature of both colonies to be transferred. The government of Connecticut agreed but Massachusetts objected. In 1749, the British monarch decided in Connecticut's favor, although Enfield had already begun sending representatives to the Connecticut legislature (Winch 1886). As of the first federal census in 1756, the town was reported to have 1,050 residents (Connecticut 2022a).

Slavery existed in the region since the seventeenth century and by the eighteenth century it was primarily practiced by wealthy families, merchants, and ministers in larger towns. The 1774 Connecticut colonial census for Enfield recorded a "Negro" population of 7 and 0 "Indians" in town but it is unclear what proportion of the figure was enslaved (Hoadly 1887). In 1784, the State passed a gradual manumission law, but slavery was not fully abolished until 1848 (Normen 2013). During the American Revolution (1775-1783), the state of Connecticut played an important role in the process of recruiting soldiers, supplying food stores, and providing a variety of military goods for the war effort. Throughout the war, Connecticut was a leader in sourcing provisions for American forces, due to a rationing system set up by individual towns, including in Enfield (Van Dusen 1961). The town sent many of its citizens to fight as part of the Continental Army and at least 14 died in service (Winch 1886). Following the war, on January 9, 1788, Connecticut ratified the U.S. Constitution to become the fifth state (Van Dusen 1961).

Nineteenth Century through the Twenty-First Century

Enfield's industrial legacy began in the early 1800s with the manufacture of carpeting in the village of Thompsonville near the Connecticut River. By 1836, the factories had 120 looms and 300 adult employees. The town also had a village of followers of the Shaker religion, which started in England around 1770 and moved to New England in 1774. The Shaker community in Enfield was established in 1780 and was still alive and well into the 1830s (Barber 1836). Their commercial garden seed business grew, and Enfield seed was soon sold all over the country (Miller 2005). Transportation modernized and changed in Enfield as well. In June 1827 construction began on the Enfield Canal in order to circumvent the Enfield Falls and facilitate transportation along the Connecticut River (Roth 1981). With labor provided predominantly by recently arrived Irish immigrants, the canal was completed in 1829 and stretched 5.5 miles, designed with steamboat navigation in mind. Ultimately, increased rail transportation would come to replace the canals. In 1844, the Hartford & Springfield Railroad was built along the west bank of the Connecticut River. It crossed the east bank to the south of Enfield in East Windsor and passed through Thompsonville on its way to the state border (Turner and Jacobus 1989).

As industry took root in town, a second industrial village in Enfield, called Hazardville, developed around the manufacture of gunpowder (Winch 1886). Founded in 1843, the Hazard Powder Company in Enfield was the largest power factory in the state and one of the largest in the country. The facility encompassed 125 buildings and during the Civil War served the growing wartime need for gunpowder (Niven 1965). During the war Enfield was credited with having 402 men serve in the Union army (Hines 2002). In the post-war era, the industrial boon continued and as a result Enfield saw steady population growth through most of the nineteenth century. Along with industrial growth, agriculture remained important, particularly the growth of fruit trees, grains, dairying, and tobacco. By 1890, the population had increased to 7,199 (Connecticut 2022b).

Like towns throughout the United States, Enfield contributed personnel and resources during the First World War. The town saw 517 men and women who served in various capacities and contributed a total of nearly $46,500 in goods through different drives held in town (Enfield 1919). In the subsequent influenza outbreak of 1919 Enfield lost 104 individuals to the flu (Winslow and Rogers 1920). Despite these changes and challenges associated with modernization in the early twentieth century, manufacturing in Enfield progressed and the town continued to grow. As of 1920, Enfield had 11,719 residents and in addition to agriculture, the town's principal industries included the production of carpets, coffin hardware, papers, and textiles (Connecticut 1920, 2022c; Table 1). As in other parts of the Connecticut River Valley, tobacco was an important crop in Enfield at that time. The new technique of growing "shade tobacco" under tents had become standard, and it was both more profitable but also more expensive to grow than the open-field variety. As a result, large corporations began buying up small farms and over the century tobacco production declined (Alcorn 1970). By mid-century, the suburbanization trend began to take hold in the state, which was bolstered by the construction of highways. Interstate 91 had been built through Enfield in 1949, and over the following decades, the population grew dramatically (Oglesby 2014). In 1950, Enfield had 15,464 inhabitants and by 1970, this number had nearly tripled, reaching 46,189 (Table 1; Connecticut 2022c, 2022d). By the early twenty-first century, the economic base of the town had shifted away from industry and agriculture. As of 2021, the majority of jobs were in tertiary-sector areas, namely retail, health care, hotels, and finance. The population has fallen slightly from its peak in 1970 to 44,143 residents (AdvanceCT and CTData Collaborative 2021). While manufacturing was not as prevalent as it once was, a variety of items were still produced in Enfield in recent years, including water filtration systems, toys, wooden reels for wire and cables, electronic assemblies, envelopes, tools and gages, and ice cream. Vegetable and tobacco farming were still considered principal industries, as was evidenced by the agricultural fields present throughout the town, particularly in the eastern region (Connecticut 2021). Limited growth is projected for the town of Enfield as officials intend to encourage economic development, but in a manner that will preserve Enfield's agrarian roots and small-town character (Enfield 2021).

Table 1: Population of Enfield, Connecticut, Hartford County 1900-2010 (Connecticut 2022c, 2022d)

Town	1900	1910	1920	1930	1940	1950
Town of Enfield, Hartford County, Connecticut	6,699	9,719	11,719	13,404	13,561	15,464
	1960	**1970**	**1980**	**1990**	**2000**	**2010**
	31,464	46,189	42,695	45,532	45,212	44,654

History of the Project Area

The proposed Town Farm Solar project is located at 141 Town Farm Road & Abbe Road in the Town of Enfield. Woodford's 1855 map shows that the proposed project area was located in a rural part of Enfield without any properties in close proximity to the proposed site. At the time, the closest structures noted on the 1855 map belong to W&S Abbe about 300 meters on Town Farm Road and a Timothy Abbe around 300 meters north along Abbe Road (Figure 4). Baker and Tilden's 1869 map demonstrates that the project area was located in what was then "District 5" of Enfield, east of the Scantic River. The other properties closest to the project area did not change significantly since 1855 including the Abbe homes to the north and west along Abbe and Town Farm Roads (Figure 5)

During the first half of the twentieth century the surrounding environs of the proposed project area remained under agricultural cultivation with little signs of additional development. An aerial photograph from 1934 indicates that the proposed project parcel was utilized for agricultural purposes with two different field systems distinctly visible from the image (Figure 6). By 1951, the land remained under agricultural cultivation devoted to a single crop while a small grove of trees grew to the northwest corner of the proposed project area. The surrounding parcels had not changed significantly either at this time, the vast majority remaining cleared and under agricultural cultivation while wooded areas begin to appear to the east along Frog Brook (Figure 7). By 1970, the surrounding environment had changed with the trend towards suburbanization. Single family dwellings and commercial buildings were visible to the west of the proposed solar facility, along Abbe Road. Little development had occurred to the south, east, or north and the project area remained undeveloped and utilized for agricultural purposes (Figure 8). Twenty years later, an excerpt from a 1990 aerial photograph demonstrates significant suburban, residential development to the south along Town Farm Road as well as the west beyond Abbe Road. Heavily wooded areas are present along Frog Brook but the project parcel and properties immediately to the north and west remained active agricultural lands (Figure 9). Little had changed over a decade later as evident with an excerpt from a 2004 aerial image of the proposed project area looking nearly identical to the earlier 1990 example. The project area remains cleared, agricultural lands (Figure 10). In the 21st century, no changes to the proposed project area were evident as of a 2019 aerial image of the location. The parcel remained cleared and under agricultural cultivation although a small structure, perhaps a shed, is visible in the northeastern portion of the property (Figure 11).

Conclusions

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

CHAPTER V
PREVIOUS INVESTIGATIONS

Introduction

This chapter presents an overview of previous archaeological research completed within the vicinity of the Project area in Enfield, 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 and National/State Register of Historic Places properties situated in the project region. The discussions presented below are based on information currently on file at the Connecticut State Historic Preservation Office (CT-SHPO) in Hartford, Connecticut. In addition, the electronic site files maintained by Heritage 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 and National/State Register of Historic Places Districts/Properties in the Vicinity of the Project Area

A review of data currently on file at the CT-SHPO, as well as the electronic files maintained by Heritage identified no archaeological sites situated within 1.6 kilometer (1 mile) of the project area (Figure 12). In addition, one National Register Historic District (Hazardville Historic District) and nine SRHP properties were identified within 1.6 kilometer (1 mile) of the project area (Figure 13). A discussion of all cultural resources identified in the search area is provided below.

<u>Hazardville Historic District</u>

The Hazardville Historic District is the location of both the Hazard Powder Company gunpowder production facilities and an associated nineteenth century town (Figure 13). The Hazardville Historic District, which was added to the National Register of Historic Places in February of 1980, encompasses the locations of both the former powder company site, known as Powder Hollow, and the associated company town. Together, the former production facilities and town cover 1,075 acres of land and include 260 contributing sites and structures. The Hazard Powder Company was in operation between 1835 and 1913. When the site was added to the National Register of Historic Places, the dams, canals, and buildings that comprised Powder Hollow were no longer standing. They had been replaced by a wooded area and only a few buildings that comprised the Hazard Powder Company remained standing. The public school building in the district is now used as a day care center. A former horse barn of the Hazard Powder Company, located at 32 South Maple Avenue, was converted into a square dancing hall in 1959; it is still used as a venue for special events. The foundations of 21 buildings of the original gunpowder factory complex (originally 200 buildings) can still be found near the Scantic River within Scantic River State Park. The Hazardville Institute building, at the corner of Hazard and Maple Avenues, was used for many years as a public hall and community center. It was abandoned in the 1970s and was saved from demolition when it was leased to the Hazardville Institute Conservancy. The building is currently undergoing renovation. When renovation is complete, there are plans for the building to include an exhibit concerning the history of the Hazard Powder Company. One structure on the Connecticut State Historical Register, listed below, also falls within the limits of the Hazardville Historic District that are within 1.6 kilometers (1 mile) of the proposed Facility. Neither this residence nor the Hazardville Historic District will be impacted, directly or indirectly, by the construction of the proposed Facility.

c. 1830 Residence

This structure is located at 168 Abbe Road in Enfield, Connecticut (Figure 13). The house was built ca. 1830 and is a two-and-a-half-story, three bay wide, clapboard, Federal-style structure with plain pilasters decorating the corners and a rectangular pediment window. It has replacement six-over-six double-hung sash windows and a side-hall entry with a surround of pilasters and a multi-light transom. A one-and-a-half-story ell extends to the south and has been heavily modified. The structure is listed as being in fair condition. This structure was added to the Connecticut State Register of Historic Places by Elric J. Endersby on July 11, 1967. While not listed individually on the National Register of Historic Places, the Coleman House falls within the larger National Register Area of Hazardville Historic District and is considered a contributing element to that district. This property is located approximately 1.05 kilometers (0.65 miles) to the north of the Facility area. No impact to the property will result from the proposed Facility construction.

c. 1840 Residence

This structure is located at 347 Abbe Road in Enfield, Connecticut (Figure 13). The house was built ca. 1840 and is a two-and-a-half-story, clapboard, Greek Revival-style structure with a brick foundation and a shallow pitched roof. A one-and-a-half-story ell extends to the east. The structure is listed as being in fair condition. This structure was added to the Connecticut State Register of Historic Places by Elric J. Endersby on July 11, 1967. This property is located approximately 0.70 kilometers (0.43 miles) to the south of the Facility area. No impact to the property will result from the proposed Facility construction.

Abbe Farm

Abbe Farm is located at 167 Abbe Road in Enfield, Connecticut (Figure 13). The house was built in ca. 1792 and is a two story, five bay wide, clapboard early-Federal-style structure with a slightly recessed, central entrance and a pitched roof. The pedimented windows are decorated with plain pilasters while the other windows are replacement six-over-six double hung sash with shutters. It appears that many of the exterior finishes are new, such as the modern garage semi-attached to the southern side, and that the original chimney has been removed. The house was declared significant because the Abbe Family who lived there were some of the earliest settlers of Enfield. Abbe Farm was added to the Connecticut State Register of Historic Places by Elric J. Endersby on July 16 in 1967. This property is located approximately 0.75 kilometers (0.47 miles) to the north of the Facility area. No impact to the property will result from the proposed Facility construction.

c. 1830 Residence

This ca. 1830 Residence is located on the west side of Broad Brook Road in Enfield, Connecticut (Figure 13). The house was bult ca. 1830 and is a two-and-a-half-story, five bay wide, clapboard Greek revival-style structure with two central chimneys and a side gabled roof. It has six-over-six windows with wide trim, and a central entranceway that is framed in a triangular pedimented portico that is supported by a pair of Doric columns. The residence is considered to be an excellent example of Greek Revival-style architecture. The structure is listed as being in good condition and was added to the Connecticut State Register of historic Places by Elric J. Endersby on July 11, 1967. This property is located approximately 1.23 kilometers (0.76 miles) to the northeast of the Facility area. No impact to the property will result from the proposed Facility construction.

C. 1790 Residence
This ca. 1790 structure is located at the northwest corner of Fletcher, Town Farm, and Broad Brook Roads in Enfield, Connecticut (Figure 13). The house was built ca. 1790 and is a two-story, five bay wide, clapboard Georgian Colonial-style structure with a central chimney and a shallow pitched roof. Though there have been several additions over the years, the structure was considered significant due to its excellent use of fine dentil work in the cornice. The structure was listed as being in poor condition and was added to the Connecticut State Register of Historic Places by Elric J. Endersby on July 16 in 1967. This property is located approximately 0.79 kilometers (0.49 miles) to the east of the Facility area. No impact to the property will result from the proposed Facility construction.

C. 1830 Georgian-Colonial Residence
This structure is located on the south side of Town Farm Road in Enfield, Connecticut (Figure 13). The two-story, clapboard structure is considered an excellent example of Greek Revival-style architecture with its pediment façade, Doric-style pilasters, heavy plain entablature, and simple period doorway. The ell-shaped plan of the structure is typical for the period and resulted in a one-and-a-half-story, four bay wing that extends from the western side of the house. This building was determined to be architecturally significant due to its excellent use of the Greek Revival-style of architecture and was added to the Connecticut State Register of historic Places by Elric J. Endersby on July 11, 1967. This property is located approximately 0.55 kilometers (0.34 miles) to the east of the Facility area. No impact to the property will result from the proposed Facility construction.

Wallop School House
The Wallop School House is located at 250 Abbe Road in Enfield, Connecticut (Figure 13). Although the original schoolhouse was constructed in 1754, the current structure is a later iteration that was bult ca. 1800. The one room schoolhouse is a one story, brick structure in the Federal style. The Wallop School House was determined to be historically significant as it was one of the last one-room schoolhouses in use in Connecticut when it closed in ca. 1953. The structure is listed as being in good condition and is currently owned by the Enfield Historical Society. The Wallop School house was added to the Connecticut State Register of Historic Places by Elric J. Endersby on July 11, 1967. Wallop Scholl House is located approximately 0.60 kilometers (0.37 miles) to the southwest of the Facility area. No impact to the property will result from the proposed Facility construction.

Well Pumphouse
The Well Pumphouse is located along Town Farm Road in Enfield, Connecticut (Figure 13). Built in 1912 by a local farmer known as "Pierce", the well is a round, brick, 8-foot-high structure. This well sits atop the highest hill in the area and dominates the surrounding landscape. The well has a diameter of 10 feet with an inner depth of 18 feet. To the west of the structure lies a smaller circular hole of brick. This well was built to irrigate the fields surrounding it, although it is no longer in use. The Well Pumphouse was added to the Connecticut State Register of Historic Places by Elric J. Endersby on July 11, 1967. The well is located approximately 0.07 kilometers (0.04 miles) to the south of the Facility area. No impact to the property will result from the proposed Facility construction.

John Abbe House
The John Abbe House is located at 89 Town Farm Road in Enfield, Connecticut (Figure 13). Built in 1770 by John Abbe in the Colonial Saltbox Style, the house is a two-story, five bay, clapboard structure with a central chimney and a gabled roofline. Simple forms characterize the architectural details on the structure, including the sash windows, trim, and door. The central entrance to the house consists of a six-panel door with Doric molded pilasters. A lean-to addition was added to the rear elevation of the

structure at an unknown time, but likely in the nineteenth century. The John Abbe House was added to the Connecticut State Register of Historic Places by Elric J. Endersby on July 11 in 1967. The House is located approximately 1.23 kilometers (0.76 miles) to the west of the Facility area. No impact to the property will result from the proposed Facility construction.

CHAPTER VI
METHODS

Introduction

This chapter describes the research design and field methods used to complete the Phase IA cultural resources assessment survey of the Project area in Enfield, Connecticut. The following tasks were completed during this investigation: 1) an overview of the region's natural, precontact, and post-European Contact period background from both precontact and post-European contact periods, 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 maps, topographic quadrangles, and aerial imagery depicting the project area in order to identify potential post-European Contact period 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.

Research Design

The current Phase IA cultural resources reconnaissance survey was designed to identify all precontact and post-European Contact period cultural resources located within the Facility Area in Enfield, Connecticut. The undertaking was comprehensive in nature, and project planning considered the distribution of previously recorded cultural resources located within the larger region, local soil conditions, and a visual assessment of proposed project area. The methods used to complete this investigation were designed to provide coverage of all portions of the project area and considered both below and above ground resources. The fieldwork portion of this undertaking entailed pedestrian survey, photo-documentation, and mapping. These endeavors are described below.

Archival Research & Literature Review

Background research for this Project included a review of a variety of historical 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 and National and State Register of Historic Places 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 Facility area, and to provide a natural and cultural context for the Project region. This information then 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.

Background research materials, including historical maps, aerial imagery, and information related to previous archaeological investigations, were gathered from the CT-SHPO. Finally, electronic databases and Geographic Information System files maintained by Heritage were employed during the course of this project, and they provided valuable data related to the project region, as well as data concerning previously identified archaeological sites and National/State Register of Historic Places properties within the general vicinity of the Facility.

Field Methodology and Data Synthesis

The field methods for this project included pedestrian survey, photo-documentation, and mapping of the Project area. During the completion of the pedestrian survey, a representative from Heritage photo-documented all parts of the project parcel and assessed its archaeological sensitivity.

CHAPTER VII
RESULTS OF THE INVESTIGATION & MANAGEMENT SUMMARY

Introduction

This chapter presents the results of the Phase IA cultural resources assessment survey of the Facility area in Enfield, Connecticut. As stated in the introductory section of this report, the goals of the investigation included completion of the following tasks: 1) a contextual overview of the region's natural setting (e.g., soils, ecology, hydrology, etc.) and the background of both precontact era and post-European contact periods; 2) a literature search to identify and discuss previously completed cultural resources surveys and previously recorded cultural resources in the project region; 3) a review of readily available historical maps and aerial imagery depicting the project area in order to identify potential historical resources and/or areas of past disturbance; and 4) pedestrian survey and photo-documentation of the project area in order to determine its depositional integrity, post-European contact period associations, and archaeological sensitivity.

Determining Archaeological Sensitivity

The field data associated with soils, slopes, aspect, distance to water, and previous disturbance collected during the pedestrian survey and presented above was used in conjunction with the analysis of historical maps, aerial images, and data regarding previously identified archaeological sites and National/State Register of Historic Places properties to stratify the project items into zones of no/low and/or moderate/high archaeological sensitivity. In general, post-European Contact period archaeological 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.). Archaeological sites dating from the precontact era, on the other hand, are less often identified during pedestrian survey because they are buried, and predicting their locations relies more on the analysis and interpretation of environmental factors that would have informed precontact site choices.

With respect to the potential for identifying precontact archaeological sites, the project area 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 precontact 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 precontact 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 precontact 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 precontact archaeological sites.

In addition, the potential for a given area to yield evidence of historical period archaeological deposits is based not only on the above-defined landscape features but also on the presence or absence of previously identified historical period archaeological resources as identified during previous archaeological surveys, recorded on historical 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 historical period archaeological site or a National or State Register of Historic Places district/individually listed property 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 historical period archaeological sensitivity.

Results of Phase IA Survey and Management Summary

The project parcel in Enfield, Connecticut is a fallow agricultural parcel that is situated to the north of Town Farm Road and east of Abbe Road. The Scantic River runs to the west of the project parcel, with Pierce Brook, Frog, and Buckhorn Brook running to the east and south of the project area. The proposed development includes the construction of a solar facility, two 4.57 meter 15 foot (15 foot) wide gravel access roads, interconnection poles, equipment pads, sediment barriers, and a chain link fence. The project area is situated on elevations ranging between 39 to 45 m (128 to 148 ft) NGVD. At the time of the survey, the Facility area was characterized primarily as a fallow agricultural field and surrounded by active agricultural field to the east, a wooded area to the north, and residential areas lining Town Farm Road and Abbe Road to the west and south.

The predominant soil types identified throughout the project parcel and Facility area include Haven and Enfield and Agawam soils. These soil types are well drained soils, and where there is no presence of previous disturbance, they may be correlated with precontact era and post-European Contact period use and occupation. The location within close proximity to the feeder Buckhorn Brook and the Scantic River provides an optimal area for precontact and post-European Contact period occupation and past activities that may result in the formation of archaeological deposits.

Heritage personnel completed a pedestrian survey of the project area on June 18, 2023 (Figure 14 and Photos 1 through 4). The pedestrian survey revealed that the proposed project parcel and the Facility area consist of gently sloping, fallow agricultural fields. Aside from disturbance to the upper layers of soil due to plowing, these areas appear to have limited disturbance and to possess a moderate/high archaeological sensitivity. It is recommended that the Facility area be subjected to Phase IB cultural reconnaissance survey prior to construction.

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APPENDIX A

FIGURES

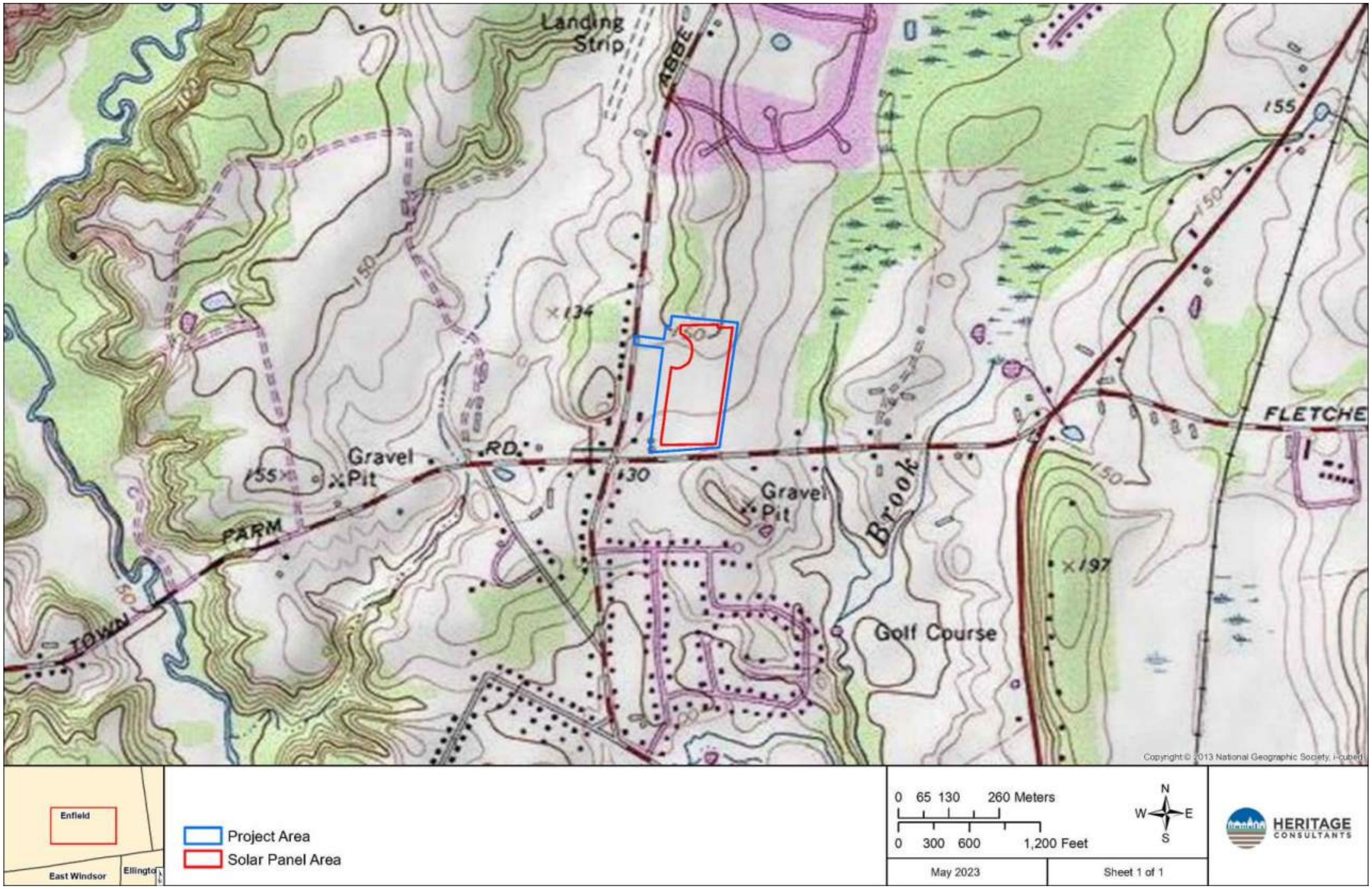

Figure 1. Excerpt from a USGS 7.5' series topographic quadrangle image showing the location of the project parcel in Enfield, Connecticut.

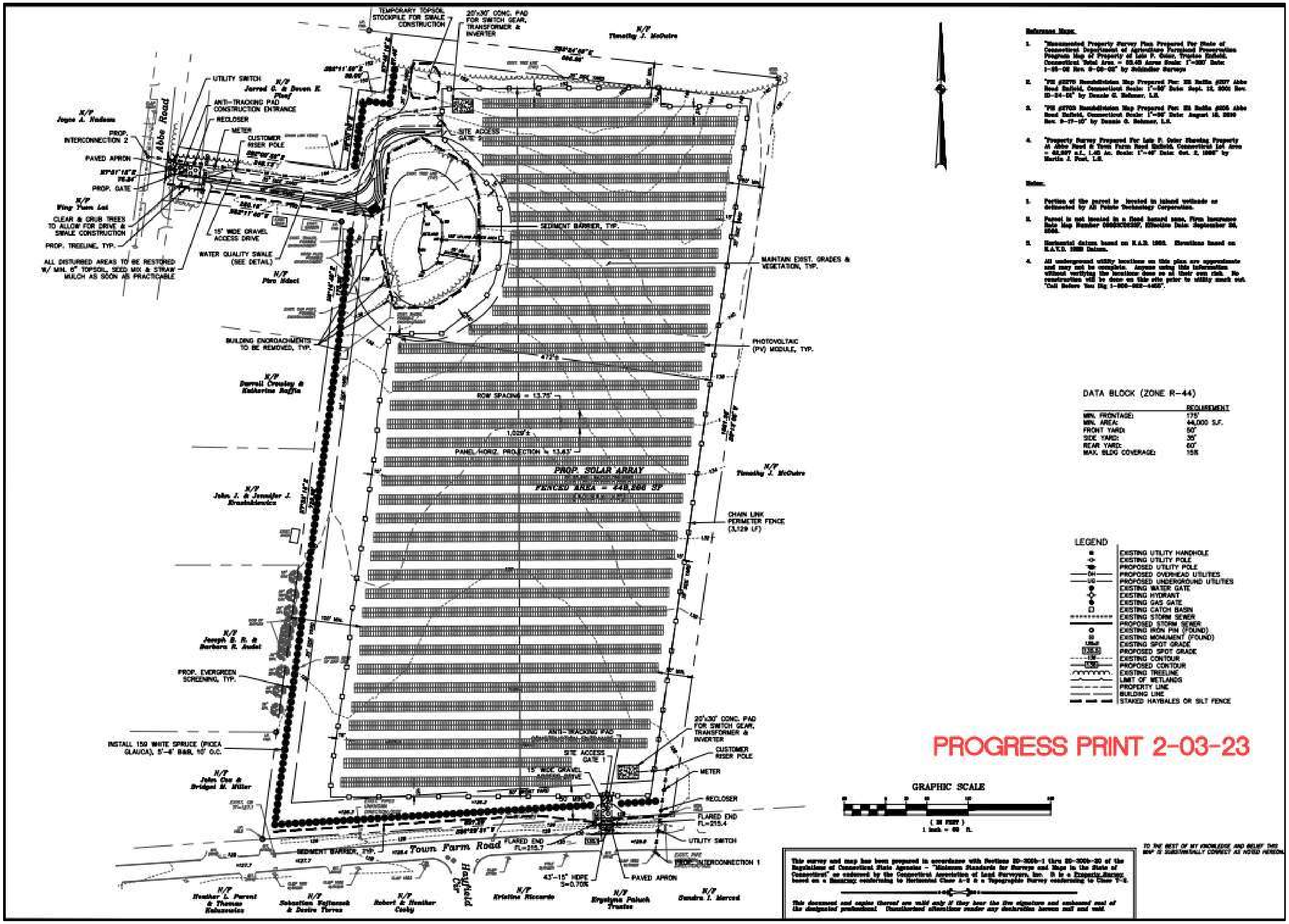

Figure 2. Digital map depicting the client's project plans for the solar Facility in Enfield, Connecticut.

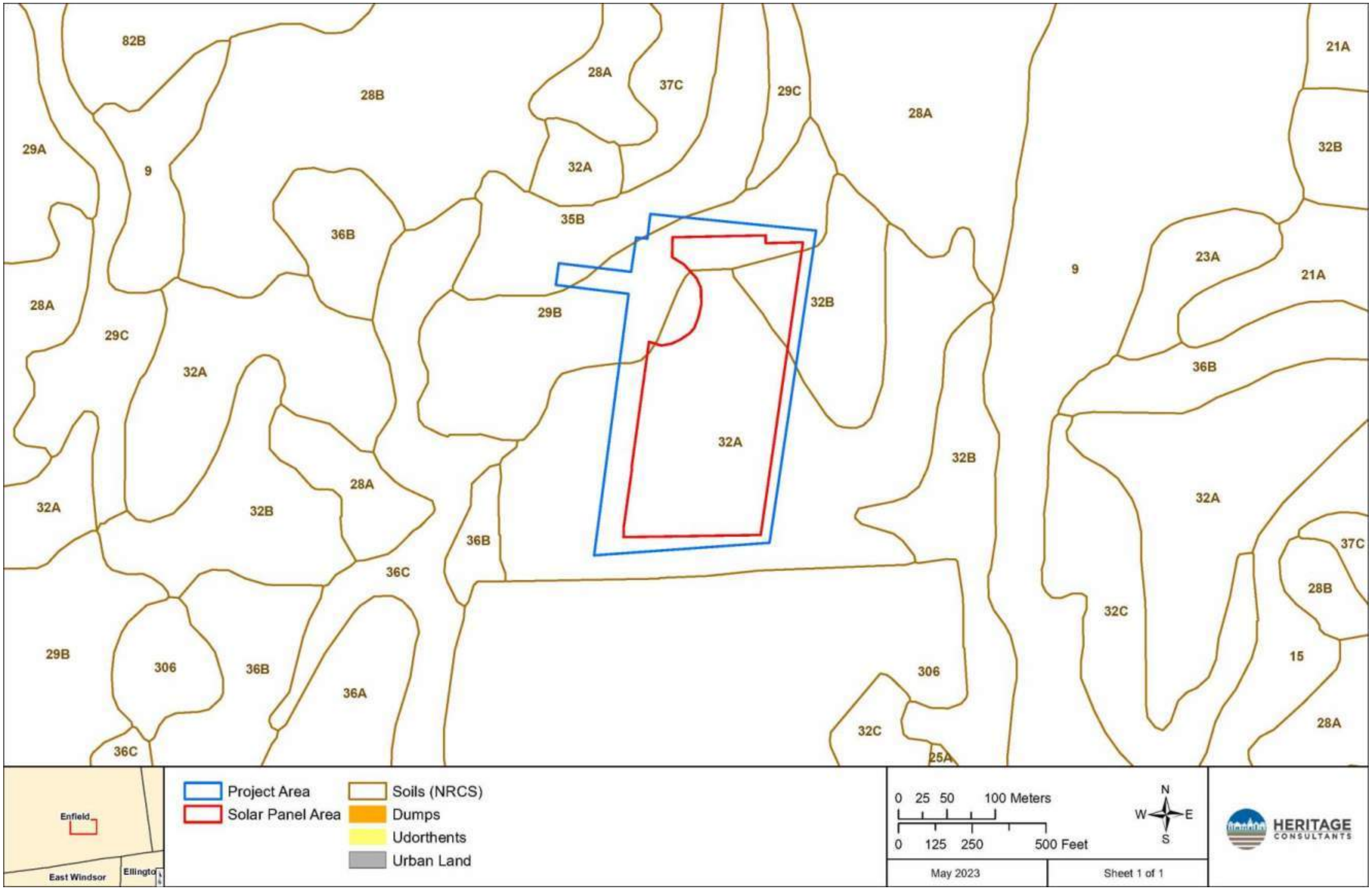

Figure 3. Digital map depicting the soil types present in the vicinity of the project parcel in Enfield, Connecticut.

Figure 4. Excerpt from an 1855 historical map showing the location of the project parcel in Enfield, Connecticut.

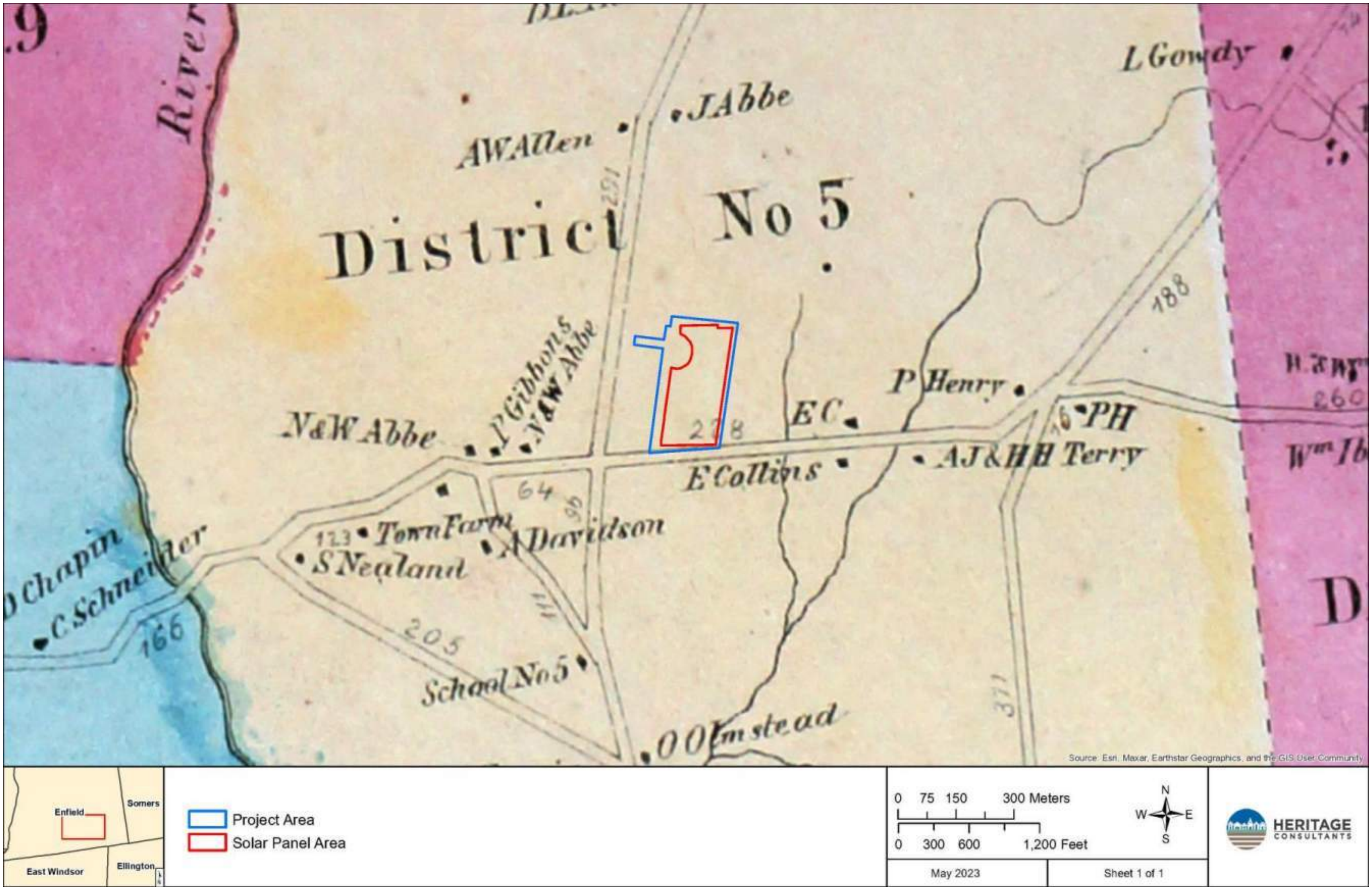

Figure 5. Excerpt from an 1869 historical map showing the location of the project parcel in Enfield, Connecticut.

Figure 6. Excerpt from a 1934 aerial photograph showing the location of the project parcel in Enfield, Connecticut.

Figure 7. Excerpt from a 1951 aerial photograph showing the location of the project parcel in Enfield, Connecticut.

Figure 8. Excerpt of a 1970 aerial photograph showing the location of the project parcel in Enfield, Connecticut.

Figure 9. Excerpt of a 1990 aerial photograph showing the location of the project parcel in Enfield, Connecticut.

Figure 10. Excerpt of a 2004 aerial photograph showing the location of the project parcel in Enfield, Connecticut.

Figure 11. Excerpt of a 2019 aerial photograph showing the location of the project parcel in Enfield, Connecticut.

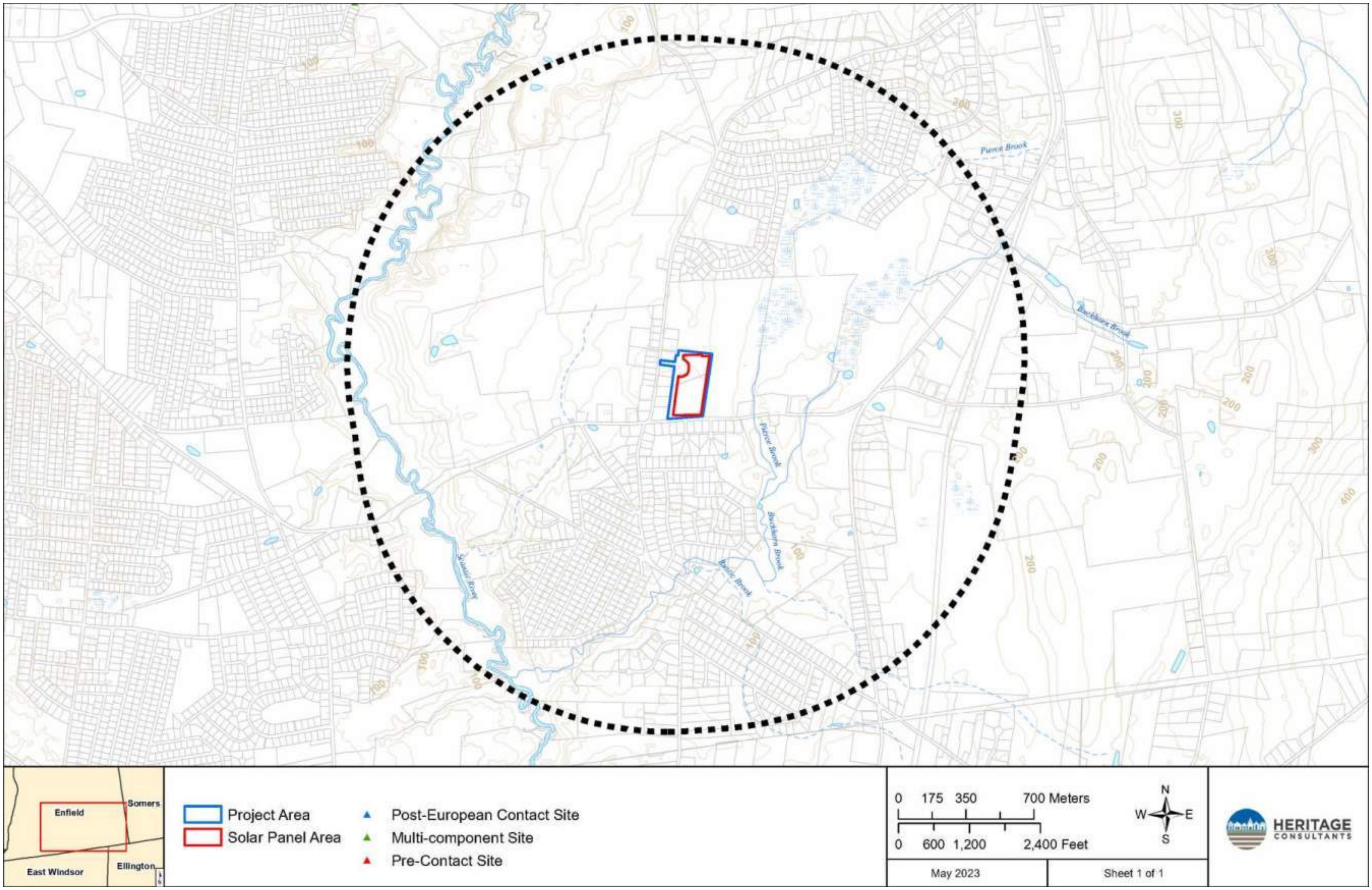

Figure 12. Digital map depicting the locations of the previously identified archaeological sites in the vicinity of the project parcel in Enfield, Connecticut.

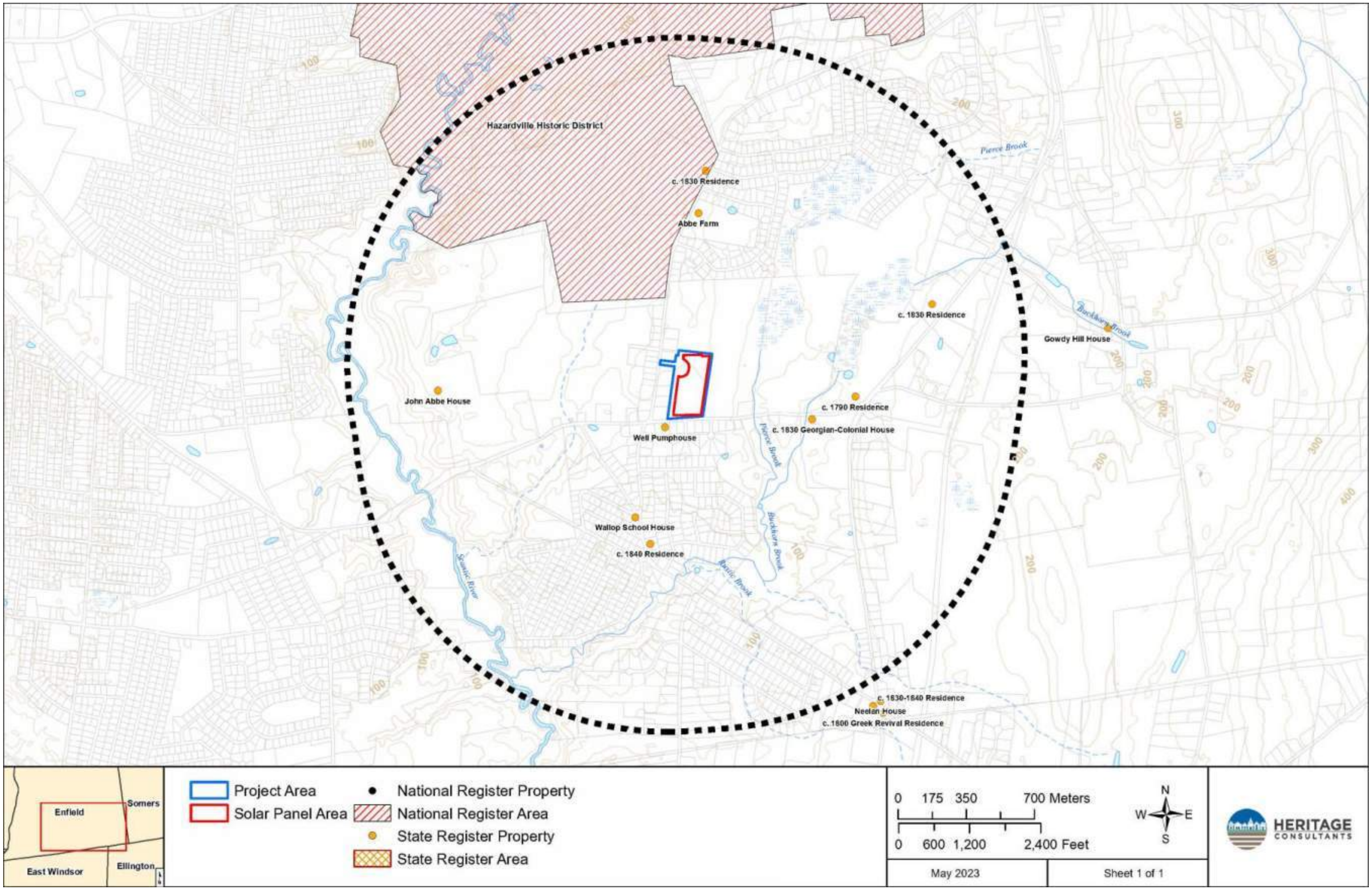

Figure 13. Digital map depicting the locations of the previously identified National Register of Historic Places and State Register of Historic Places properties in the vicinity of the project parcel in Enfield, Connecticut.

Figure 14. Digital map illustrating areas of finalized Moderate/High archaeological sensitivity (Red) and areas of No/Low Archaeological Sensitivity (Yellow) with directional arrows of photo points taken for the proposed Facility in Enfield, Connecticut.

APPENDIX B

PHOTOS

Photo 1. Overview of the area of impact from the northwest corner of Facility parcel. Photo facing to the east.

Photo 2. Overview of the area of impact from the southeast corner of the Facility parcel. Photo facing to the north.

Photo 3. Overview of the area of impact. Photo facing to the east.

Photo 4. Overview of the Facility parcel from Abbe Road. Photo facing to the east.

Appendix F Phase 1B Cultural Resources Reconnaissance Survey Report

DECEMBER 2023

PHASE IB CULTURAL RESOURCES RECONNISSANCE SURVEY FOR THE PROPOSED TOWN FARM SOLAR PROJECT IN ENFIELD, CONNECTICUT

PREPARED FOR:

vhb

100 GREAT MEADOW ROAD #200,
WETHERSFIELD, CONNECTICUT 06109

PREPARED BY:

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ABSTRACT

This report presents the results of the Phase IB Cultural Resources Reconnaissance survey of a proposed solar facility in Enfield, Connecticut. Heritage Consultants, LLC completed a previous Phase IA cultural resources assessment survey of the Project area and determined that all of the 15.6 acre project parcel retained moderate/high archaeological sensitivity with the exception of the field delineated wetland found in the northwest corner of the Project area. The Phase IB cultural reconnaissance survey was completed in November of 2023. A total of 136 of 138 (98.6 percent) planned shovel tests were excavated across the high/moderate archaeologically sensitive area. The two planned but unexcavated shovel test pits fell into an area of an existing gravel road. Of the excavated shovel tests, 12 (9 percent) yielded 15 post-European Contact Period cultural materials. The artifact assemblage included examples of various types of ceramic sherds, glass shards, and machine-cut nails. Laboratory analysis of the material indicated a general date of the late nineteenth century. Due to the lack of density and association with above or below ground features, the cultural material was classified as field scatter. As a result, the post-European Contact cultural material lacked integrity and was assessed as not eligible for listing on the National Register of Historic Places applying the criteria for evaluation (36 CFR 60.4 [a-d]). No additional archaeological investigation of the Project area is recommended and no significant archaeological deposits will be adversely impacted by project development.

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CHAPTER I
INTRODUCTION

This report presents the results of a Phase IB Cultural Resources Reconnaissance survey of a proposed solar facility (the Facility) located at 141 Town Farm Road & Abbe Road in Enfield, Connecticut (Figure 1). A previously conducted Phase IA cultural assessment survey indicated that almost all of the 15.6-acre Project area retained moderate to high archaeological sensitivity. The only area not deemed moderate/high sensitivity is a small wetland in a depression in the northwest corner of the Project area. Vanasse Hangen Brustlin, Inc., (VHB) requested that Heritage Consultants, LLC (Heritage) complete the Phase IB cultural resources reconnaissance survey of the moderate/high sensitivity areas prior to Project development. The Phase IB survey was completed by Heritage in November of 2023. All work associated with this project was performed in accordance with the *Environmental Review Primer for Connecticut's Archaeological Resources* (Poirier 1987) promulgated by the Connecticut State Historic Preservation Office (CT-SHPO).

Project Description, Methods, & Results Overview

The proposed Facility will be built on a parcel encompassing 15.6 acres of land in Enfield, Connecticut and include solar arrays, access roads, and an interconnection to the local electrical grid (Figure 2). The Facility area is situated at elevations ranging from 39 to 45 m (128 to 148 ft) NGVD. The Project parcel is bounded by residences along Town Farm Road and Abbe Road to the south and west and agricultural fields to the north and east. The Phase IB survey consisted of the archaeological examination of 15.6 acres of land that were previously identified as retaining a high/moderate archaeological sensitivity. The sensitivity area is characterized by gently sloping topography and fallow agricultural fields. The field methods employed during the Phase IB survey consisted of pedestrian survey, mapping, photo-documentation, and subsurface testing throughout the archaeologically sensitive areas. The details of the field methods used, as well as the results of the Phase IB survey, are reviewed below.

The examination of the moderate/high archaeologically sensitive area was completed through the excavation of shovel test pits spaced at 20 meter (65.6 foot) intervals located along survey transects positioned 20 meters (65.6 feet) apart. All shovel tests excavated measured 50 x 50 centimeters (19.4 x 19.4 inches) in size and were excavated until glacially derived C-Horizon soils or immovable objects (boulders, large tree roots) were encountered. Each shovel test was excavated in 10 centimeters (3.9 inches) levels within natural soil horizons, and the fill from each level was screened separately. All shovel test fill was screened through 0.635 centimeters (0.25 inches) hardware cloth and examined visually for cultural material. Soil characteristics were recorded using Munsell Soil Color Charts and standard soils nomenclature. Shovel tests were backfilled after being recorded.

The Phase IB survey effort resulted in the excavation of 136 of 138 (98.6 percent) planned shovel tests throughout the previously identified sensitivity area. The two planned but unexcavated shovel test pits fell into an area defined by an existing gravel road. Of the excavated shovel tests, 12 (9 percent) yielded 15 post-European Contact Period cultural materials. The artifact assemblage included examples of various types of ceramic sherds, glass shards, and machine-cut nails that originated from the Ap-Horizon (plowzone). Laboratory analysis of the material indicated a general date from the late nineteenth century. Due to the lack of dense artifact concentrations from stratified soils, as well as no association with architectural or cultural features, the cultural material was characterized as field scatter. The post-European Contact cultural material lacked integrity and was assessed as not retaining the qualities of significance applying the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). No additional archaeological investigation of the Project area is recommended and no significant archaeological deposits will be adversely impacted by project development.

Project Personnel

Key personnel for this investigation included David R. George, M.A., RPA, (Principal Investigator), Sam Spitzschuh, B.A, (Project Archaeologist), Linda Seminario, M.A., (Project Archaeologist), Dr. David Naumec, Ph.D. (Historian), and Sean Buckley, M.A., (GIS Specialist).

CHAPTER II
NATURAL SETTING

Introduction

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

Ecoregions of Connecticut

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

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

Dowhan and Craig defined nine major ecoregions for the State of Connecticut. They are based on regional diversity in plant and animal indicator species (Dowhan and Craig 1976). Only one of the ecoregions is germane to the current investigation: North-Central Lowlands ecoregion. A 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 area.

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

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 very 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 Area

The Project area is situated within a region that contains several sources of freshwater, including the Scantic River, Pierce Brook, Buckhorn Brook, Frog Brook, and wetlands. These freshwater sources may have served as resource extraction areas for precontact and post-European contact populations. Previously completed archaeological investigations in Connecticut have demonstrated that streams, rivers, and wetlands were focal points for precontact 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 diagenic and taphonomic 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. In contrast, acidic soils enhance the preservation of charred plant remains.

The Project area is characterized by the presence of three major soil types: Haven and Enfield Soils (32A and 32B) Agawam Soils (29B), and Penwood Soils (35B). All the soil types identified within the Project area are categorized as excessively to well drained. When left intact these soils may be correlated with precontact and post-European contact use and occupation, resulting in the possibility of archaeological deposits. All the identified soils series are classified as possessing steep grades, while the project area is relatively level with gradual sloping occurring toward the eastern edge. Descriptive profiles for each soil type found within the project area are presented below; they were gathered from the United States Department of Agriculture - National Resources Conservation Service.

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

The Agawam series consists of very deep, well drained soils formed in sandy, water deposited materials. They are level to steep soils on outwash plains and high stream terraces. Slope ranges from 0 to 15 percent. A typical profile associated with Agawam 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; **C1**--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 and Enfield Soils (Soil Code: 32A and 32B)</u>

The Haven series consists of very deep, well drained soils formed in loamy over sandy and gravelly outwash. They are nearly level through moderately sloping soils on outwash plains, valley trains, terraces, and water-sorted moraine deposits. Saturated hydraulic conductivity is moderately high or high in the mineral solum and very high in the substratum. 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.

The Enfield series consists of very deep, well drained loamy soils formed in a silty mantle overlying glacial outwash. They are nearly level to sloping soils on outwash plains and terraces. Slope ranges from 0 to 15 percent. 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.

<u>Penwood Soils (Soil Code 35B):</u>
The Penwood series consists of very deep, excessively drained soils formed in sandy outwash. They are nearly level to strongly sloping soils on glaciofluvial landforms. A typical profile of Penwood series soils is as follows: **Ap**--0 to 8 inches; dark brown (7.5YR 3/2) loamy sand; pinkish gray (7.5YR 6/2) dry; weak medium granular structure; very friable; many fine roots; strongly acid; clear smooth boundary; **Bw1**--8 to 18 inches; yellowish red (5YR 4/6) loamy sand; single grain; loose; common fine roots; strongly acid; gradual wavy boundary; **Bw2**--18 to 30 inches; reddish brown (5YR 4/4) sand; single grain; loose; few fine roots; strongly acid; gradual wavy boundary; and **C**--30 to 60 inches; reddish brown (5YR 4/3) medium sand with thin strata of fine sand; single grain; loose; few fine roots in upper part; strongly acid.

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

CHAPTER III
PRECONTACT ERA SETTING

Introduction

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

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

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

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

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

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

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

Excavations at the Brian D. Jones Site revealed 44 soil anomalies, 27 of which were characterized as cultural features used as hearths and post holes, among other uses. One hearth has been dated thus far (10,520 ± 30 14C yr BP; charred Pinus; 2-sigma 12,568 to 12,410 CAL BP) (Leslie et al. 2020:4). Further radiocarbon testing will be completed in the future. Artifact concentrations surrounded these features and were separated in two stratigraphic layers represented at least two temporally discrete Paleo-Indian occupations. The recovered lithic artifacts are fashioned from Normanskill chert, Hardyston jasper, Jefferson/Mount Jasper rhyolite, chalcedony, siltstone, and quartz (Leslie 2023). They include examples of a fluted point base, preforms, channel flakes, pièces esquillées, end scrapers, side scrapers, grinding stones, bifaces, utilized flakes, gravers, and a drilled stone pendant fragment. Lithic tools numbered over 100, while toolmaking debris was in the thousands. The channel flakes represent the production of spear points used in hunting. Scrapers, perforators, and grinding stones indicate animal butchering, plant food grinding, the production of wood and bone tools, and the processing of animal skins for clothing and tents. Other collected cultural materials included charred botanicals and calcined bone. Botanicals recovered in hearth features included burned remains of cattail, pin cherry, strawberry, acorn, sumac, water lily, and dogwood (Leslie 2023). In addition, pieces of ochre were recovered during the excavations; these, in combination with the drilled pendant fragment, are the earliest evidence of personal adornment and artistic expression identified in Connecticut (Leslie 2023). Approximately 15,000 artifacts were collected in total.

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

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

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

Pfeiffer 1984, 1990; Witthoft 1949, 1953).

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

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

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

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

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

By the onset of the Middle Archaic Period modern deciduous forests had developed in the region (Davis 1969). Increased numbers and types of sites associated with this period are noted in Connecticut (McBride 1984). The most well-known Middle Archaic site in New England is the Neville Site in Manchester, New Hampshire studied by Dincauze (1976). Careful analysis of the Neville Site indicated that the Middle Archaic occupation dated from between 7,700 and 6,000 years ago. In fact, Dincauze obtained several radiocarbon dates from the Middle Archaic component of the Neville Site associated with the then-newly named Neville type projectile point, ranging from 7,740±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$\pm$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 Narrow-Stemmed Tradition also marks one of the most prevalent manifestations of the archaeological record in southern New England, narrow-stemmed projectile points, often untyped, or typed as Lamoka, Wading River, or Squibnocket Stemmed forms. These are generally attributed to a form of projectile technology, but some (Boudreau 2008), have suggested that these tool forms might not be related to projectile technology, and may instead relate to graver or drill functions. Boudreau (2008) also drew important connections to the forms of these narrow-stemmed points with later Woodland era forms, such as Rossville points, which are nearly identical. Others (Lavin 2013; Zoto 2019) have similarly suggested a continuation of the Narrow-Stemmed Tradition into the Woodland era, with most of this evidence originating at coastal sites in southern New England. The vast majority of Narrow-Stemmed projectile points that are associated with cultural features suitable for radiocarbon dating, particularly Lamoka style projectile points, are associated with Late Archaic date ranges (Lavin 2013).

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

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

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

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

Finally, while settlement patterns appeared to have changed, Terminal Archaic subsistence patterns were analogous to earlier patterns. The subsistence pattern was still 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.

Early Woodland Period (ca., 2,700 to 2,000 B.P.)

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. Archaeological investigations of Early Woodland sites in southern New England resulted in the recovery of narrow stemmed projectile points in association with ceramic sherds and subsistence remains, including specimens of white-tailed deer, soft and hard-shell clams, and oyster shells (Lavin and Salwen: 1983; McBride 1984:296-297; Pope 1952). McBride (1984) has argued that the combination of the subsistence remains and the recognition of multiple superimposed cultural features at various sites indicate that Early Woodland Period settlement patterns were characterized by multiple re-use of the same sites on a seasonal basis by small co-residential groups.

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

The Middle Woodland Period is marked by an increase in the number of ceramic types and forms utilized (Lizee 1994a), as well as an increase in the amount of exotic lithic raw material used in stone tool manufacture (McBride 1984). The latter suggests that regional exchange networks were established, and that they were used to supply local populations with necessary raw materials (McBride 1984; Snow 1980). The Middle Woodland Period is represented archaeologically by narrow stemmed and Jack's Reef projectile points; increased amounts of exotic raw materials in recovered lithic assemblages, including chert, argillite, jasper, and hornfels; and conoidal ceramic vessels decorated with dentate stamping. Ceramic types that are indicative of the Middle Woodland Period 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 stylistically diverse than their predecessors with incision, shell stamping, punctation, single point, linear dentate, rocker dentate stamping, and stamp and drag impressions common (Lizee 1994a:216).

Summary of Connecticut Precontact Period

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

CHAPTER IV
POST EUROPEAN CONTACT OVERVIEW

Introduction
The proposed Town Farm Solar project is located at 141 Town Farm Road & Abbe Road in the Town of Enfield, which is situated in Hartford County, Connecticut. This chapter provides a brief overview of Hartford County with a focus on the proposed project area. Most Connecticut towns, including Enfield, originated as Native American settlements and later became English colonial villages. Through the seventeenth and eighteenth century Enfield served as an agricultural hub with ties to both Massachusetts Bay and Connecticut Colonies. During the eighteenth century the town developed into a manufacturing center and experienced significant population growth. By the mid-twentieth century, Enfield developed both as a suburban and commercial area with ties to the nearby urban centers of Hartford and Springfield. Even so, in the twenty-first century, Enfield has largely become a suburban center home to significant commercial and industrial development while retaining aspects of its rural character.

Hartford County
Hartford was one of the four original counties established in 1666 following the merger of Connecticut Colony and Hartford Colony (Van Dusen 1961). Located in central-northern Connecticut, it is bounded north by the State of Massachusetts, east by Tolland County, south by Windham, Middlesex, and New Haven Counties and west by New Haven and Litchfield Counties. Bisected by the Connecticut River, the county is also the location of the City of Hartford, the capital of Connecticut. Although Hartford has the highest population in the county (an estimated 126,443 as of 2020), Glastonbury has the largest land area (52.3 sq. mi.) (Connecticut 2021). Hartford County is in the lower central Connecticut River Valley and the land rises in the western portion of the county on a low mountain range known as the Metacomet Range (Bell 1985). The landscape varies from densely populated urban areas in most of the county to rich farmland regions in its northern bounds and includes a long stretch of the Connecticut River as well as other significant freshwater rivers. Important waterways associated with Hartford County include the Connecticut, Farmington, Hockanum, Podunk, and Scantic Rivers (Trumbull 1886). The county's three largest cities are Hartford, New Britain, and West Hartford while other important population centers are located at Bristol, Manchester, East Hartford, and Glastonbury (Connecticut 2021). The proposed project is located in the Town of Enfield.

Woodland Period to the Seventeenth Century
During the Woodland Period of northeastern North American history (about 3000 to 2500 years ago) the indigenous peoples who resided in the vicinity of present-day Groton were part of the greater Algonquian culture of northeastern North America (Lavin 2013). They spoke local variations of Southern New England Algonquian (SNEA) languages and resided in extended kinship groups on lands they maintained for a variety of horticultural and resource extraction purposes (Goddard 1978). Native people in the region practiced subsistence activities including hunting, fowling, and fishing, along with the cultivation of various crops, the most important of which were maize, squash, and beans. They supplemented these foods seasonally by collecting shellfish, fruits, and plants during warmer periods, and gathering nuts, roots, and tubers during colder times (Lavin 2013). Additionally, these communities came together in large groups to hunt deer in the fall and winter. Indigenous peoples lived with their immediate or extended families in large settlements often concentrated along rivers and/or wetlands. Some villages were fortified by wooden palisades. Their habitations, known as a *weetu* or *wigwam,* were generally

constructed of a tree sapling frame and covered in reed matting during warm months and tree bark throughout the winter. These varied in size from a small, individual dwelling to an expansive "long house" which could accommodate several families. Native communities commonly traded among both their immediate neighbors and often maintained long-distance networks as well (Lavin 2013). Prior to the arrival of Europeans, the Native people who resided at present-day Enfield were affiliated with the Agawam who were closely connected with other Native groups through kinship, culture, language, and trade. The Agawam community resided on both sides of the Connecticut River from present-day Enfield north what is now Springfield, Massachusetts. (De Forest 1852; Lavin 2013; Trumbull 1886).

Seventeenth Century through Eighteenth Century

As Indigenous communities maintained oral tradition rather than a written record, most surviving information regarding Native American people of present-day Hartford County was recorded by European observers (Lavin 2013). The earliest Europeans known to have sailed to Long Island Sound and the Connecticut River were the Dutch in 1614 under Captain Adrian Block. They sailed as far north as the site of present-day Enfield and the "Enfield Falls" where they traded with the Indigenous people there (DeForest 1852; Stiles 1891). The Dutch quickly learned of the significance of *wampum,* polished tubular shell beads created from the white *whelk* shell and the purple *quahog* shell. (Hauptman & Wherry 2009; McBride 2013). They found they could exchange wampum for furs from Native peoples from the interior. The Dutch developed trade relationships with Native communities in valley including the Wangunk, Podunk, and Poquonnock. By the 1620's the Dutch and Pequot of present-day southeastern Connecticut traded wampum and furs for European goods. In 1624 the Dutch established New Netherland Colony centered around Manhattan (Jacobs 2009). The Pequot extended their dominance over the Connecticut shoreline, eastern Long Island, and the lower Connecticut River Valley bringing Native communities there into a tributary relationship under their leadership, including the Podunk (Hauptman & Wherry 2009; McBride 2013).

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

The community of Enfield was thought for many years to be within the Massachusetts Bay Colony based on the results of a 1642 survey of the boundary line with the Connecticut Colony. Following King Philip's War many changes in land titleship took place beginning in 1768 when several Indigenous men confirmed a 1675 sale of the part of Enfield lying north of Freshwater River, which was not recorded due to the war. In 1679, Springfield established a committee to form a new town in the vicinity of Freshwater River and the next year, an Agawam man sold land from the Freshwater River south to the falls on the Connecticut River (in what is now East Windsor) – reserving hunting and fishing rights on the common lands (Wright 1905). The first colonists arrived there in 1681, settling south of the river under the authority of Massachusetts. In 1703, Connecticut began asserting ownership of Enfield and other areas along the Massachusetts border due to errors found in the 1642 survey. As the southern boundary of the town was originally thought to be the colony line from 1642, a two-mile strip of land was claimed by both Enfield and the Town of Windsor, Connecticut. In 1713, the matter was finally settled, and Windsor relinquished its claim in exchange for land elsewhere. Officials in Enfield and other towns along the border soon concluded that they would prefer to be part of Connecticut, though it was not until 1747 that they petitioned the legislature of both colonies to be transferred. The government of Connecticut agreed but Massachusetts objected. In 1749, the British monarch decided in Connecticut's favor, although Enfield had already begun sending representatives to the Connecticut legislature (Winch 1886). As of the first federal census in 1756, the town was reported to have 1,050 residents (Connecticut 2022a).

Slavery existed in the region since the seventeenth century and by the eighteenth century it was primarily practiced by wealthy families, merchants, and ministers in larger towns. The 1774 Connecticut colonial census for Enfield recorded a "Negro" population of 7 and 0 "Indians" in town but it is unclear what proportion of the figure was enslaved (Hoadly 1887). In 1784, the State passed a gradual manumission law, but slavery was not fully abolished until 1848 (Normen 2013). During the American Revolution (1775-1783), the state of Connecticut played an important role in the process of recruiting soldiers, supplying food stores, and providing a variety of military goods for the war effort. Throughout the war, Connecticut was a leader in sourcing provisions for American forces, due to a rationing system set up by individual towns, including in Enfield (Van Dusen 1961). The town sent many of its citizens to fight as part of the Continental Army and at least 14 died in service (Winch 1886). Following the war, on January 9, 1788, Connecticut ratified the U.S. Constitution to become the fifth state (Van Dusen 1961).

Nineteenth Century through the Twenty-First Century

Enfield's industrial legacy began in the early 1800s with the manufacture of carpeting in the village of Thompsonville near the Connecticut River. By 1836, the factories had 120 looms and 300 adult employees. The town also had a village of followers of the Shaker religion, which started in England around 1770 and moved to New England in 1774. The Shaker community in Enfield was established in 1780 and was still alive and well into the 1830s (Barber 1836). Their commercial garden seed business grew, and Enfield seed was soon sold all over the country (Miller 2005). Transportation modernized and changed in Enfield as well. In June 1827 construction began on the Enfield Canal in order to circumvent the Enfield Falls and facilitate transportation along the Connecticut River (Roth 1981). With labor provided predominantly by recently arrived Irish immigrants, the canal was completed in 1829 and stretched 5.5 miles, designed with steamboat navigation in mind. Ultimately, increased rail transportation would come to replace the canals. In 1844, the Hartford & Springfield Railroad was built along the west bank of the Connecticut River. It crossed the east bank to the south of Enfield in East Windsor and passed through Thompsonville on its way to the state border (Turner and Jacobus 1989).

As industry took root in town, a second industrial village in Enfield, called Hazardville, developed around the manufacture of gunpowder (Winch 1886). Founded in 1843, the Hazard Powder Company in Enfield was the largest power factory in the state and one of the largest in the country. The facility encompassed 125 buildings and during the Civil War served the growing wartime need for gunpowder (Niven 1965). During the war Enfield was credited with having 402 men serve in the Union army (Hines 2002). In the post-war era, the industrial boon continued and as a result Enfield saw steady population growth through most of the nineteenth century. Along with industrial growth, agriculture remained important, particularly the growth of fruit trees, grains, dairying, and tobacco. By 1890, the population had increased to 7,199 (Connecticut 2022b).

Like towns throughout the United States, Enfield contributed personnel and resources during the First World War. The town saw 517 men and women who served in various capacities and contributed a total of nearly $46,500 in goods through different drives held in town (Enfield 1919). In the subsequent influenza outbreak of 1919 Enfield lost 104 individuals to the flu (Winslow and Rogers 1920). Despite these changes and challenges associated with modernization in the early twentieth century, manufacturing in Enfield progressed and the town continued to grow. As of 1920, Enfield had 11,719 residents and in addition to agriculture, the town's principal industries included the production of carpets, coffin hardware, papers, and textiles (Connecticut 1920, 2022c; Table 1). As in other parts of the Connecticut River Valley, tobacco was an important crop in Enfield at that time. The new technique of growing "shade tobacco" under tents had become standard, and it was both more profitable but also more expensive to grow than the open-field variety. As a result, large corporations began buying up small farms and over the century tobacco production declined (Alcorn 1970). By mid-century, the suburbanization trend began to take hold in the state, which was bolstered by the construction of highways. Interstate 91 had been built through Enfield in 1949, and over the following decades, the population grew dramatically (Oglesby 2014). In 1950, Enfield had 15,464 inhabitants and by 1970, this number had nearly tripled, reaching 46,189 (Table 1; Connecticut 2022c, 2022d). By the early twenty-first century, the economic base of the town had shifted away from industry and agriculture. As of 2021, the majority of jobs were in tertiary-sector areas, namely retail, health care, hotels, and finance. The population has fallen slightly from its peak in 1970 to 44,143 residents (AdvanceCT and CTData Collaborative 2021). While manufacturing was not as prevalent as it once was, a variety of items were still produced in Enfield in recent years, including water filtration systems, toys, wooden reels for wire and cables, electronic assemblies, envelopes, tools and gages, and ice cream. Vegetable and tobacco farming were still considered principal industries, as was evidenced by the agricultural fields present throughout the town, particularly in the eastern region (Connecticut 2021). Limited growth is projected for the town of Enfield as officials intend to encourage economic development, but in a manner that will preserve Enfield's agrarian roots and small-town character (Enfield 2021).

Table 1: Population of Enfield, Connecticut, Hartford County 1900-2010 (Connecticut 2022c, 2022d)

Town	1900	1910	1920	1930	1940	1950
Town of Enfield, Hartford County, Connecticut	6,699	9,719	11,719	13,404	13,561	15,464
	1960	**1970**	**1980**	**1990**	**2000**	**2010**
	31,464	46,189	42,695	45,532	45,212	44,654

History of the Project Area

The proposed Town Farm Solar project is located at 141 Town Farm Road & Abbe Road in the Town of Enfield. Woodford's 1855 map shows that the proposed project area was located in a rural part of Enfield without any properties in close proximity to the proposed site. At the time, the closest structures noted on the 1855 map belong to W&S Abbe about 300 meters on Town Farm Road and a Timothy Abbe around 300 meters north along Abbe Road (Figure 3). Baker and Tilden's 1869 map demonstrates that the project area was located in what was then "District 5" of Enfield, east of the Scantic River. The other properties closest to the project area did not change significantly since 1855 including the Abbe homes to the north and west along Abbe and Town Farm Roads (Figure 4)

During the first half of the twentieth century the surrounding environs of the proposed project area remained under agricultural cultivation with little signs of additional development. An aerial photograph from 1934 indicates that the proposed project parcel was utilized for agricultural purposes with two different field systems distinctly visible from the image (Figure 5). By 1951, the land remained under agricultural cultivation devoted to a single crop while a small grove of trees grew to the northwest corner of the proposed project area. The surrounding parcels had not changed significantly either at this time, the vast majority remaining cleared and under agricultural cultivation while wooded areas begin to appear to the east along Frog Brook (Figure 6). By 1970, the surrounding environment had changed with the trend towards suburbanization. Single family dwellings and commercial buildings were visible to the west of the proposed solar facility, along Abbe Road. Little development had occurred to the south, east, or north and the project area remained undeveloped and utilized for agricultural purposes (Figure 7). Twenty years later, an excerpt from a 1990 aerial photograph demonstrates significant suburban, residential development to the south along Town Farm Road as well as the west beyond Abbe Road. Heavily wooded areas are present along Frog Brook but the project parcel and properties immediately to the north and west remained active agricultural lands (Figure 8). Little had changed over a decade later as evident with an excerpt from a 2004 aerial image of the proposed project area looking nearly identical to the earlier 1990 example. The project area remains cleared, agricultural lands (Figure 9). In the 21st century, no changes to the proposed project area were evident as of a 2019 aerial image of the location. The parcel remained cleared and under agricultural cultivation although a small structure, perhaps a shed, is visible in the northeastern portion of the property (Figure 10).

Conclusions

Based on the past use of the land for agriculture, there is the possibility of encountering remains of farmhouses, outbuildings, stonewalls, or other evidence of post European Contact farming. Any archaeological deposits associated with the site may be associated with the domestic and agricultural use of the land over time.

CHAPTER V
PREVIOUS INVESTIGATIONS

Introduction

This chapter presents an overview of previous archaeological research completed within the vicinity of the Project area in Enfield, 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 and National/State Register of Historic Places properties situated in the Project region (Figures 11 and 12). 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 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 and National/State Register of Historic Places Properties/Districts in the Vicinity of the Project Area

A review of data currently on file at the CT-SHPO, as well as the electronic files maintained by Heritage identified no archaeological sites situated within 1.6 kilometer (1 mile) of the project area (Figure 11). In addition, one National Register Historic District (Hazardville Historic District) and nine SRHP properties were identified within 1.6 kilometer (1 mile) of the project area (Figure 12). A discussion of all cultural resources identified in the search area is provided below.

<u>Hazardville Historic District</u>

The Hazardville Historic District is the location of both the Hazard Powder Company gunpowder production facilities and an associated nineteenth century town (Figure 12). The Hazardville Historic District, which was added to the National Register of Historic Places in February of 1980, encompasses the locations of both the former powder company site, known as Powder Hollow, and the associated company town. Together, the former production facilities and town cover 1,075 acres of land and include 260 contributing sites and structures. The Hazard Powder Company was in operation between 1835 and 1913. When the site was added to the National Register of Historic Places, the dams, canals, and buildings that comprised Powder Hollow were no longer standing. They had been replaced by a wooded area and only a few buildings that comprised the Hazard Powder Company remained standing. The public school building in the district is now used as a day care center. A former horse barn of the Hazard Powder Company, located at 32 South Maple Avenue, was converted into a square dancing hall in 1959; it is still used as a venue for special events. The foundations of 21 buildings of the original gunpowder factory complex (originally 200 buildings) can still be found near the Scantic River within Scantic River State Park. The Hazardville Institute building, at the corner of Hazard and Maple Avenues, was used for many years as a public hall and community center. It was abandoned in the 1970s and was saved from demolition when it was leased to the Hazardville Institute Conservancy. The building is currently undergoing renovation. When renovation is complete, there are plans for the building to include an exhibit concerning the history of the Hazard Powder Company. One structure on the Connecticut State Historical Register, listed below, also falls within the limits of the Hazardville Historic District that are within 1.6 kilometers (1 mile) of the proposed Facility. Neither this residence nor the Hazardville Historic District will be impacted, directly or indirectly, by the construction of the proposed Facility.

c. 1830 Residence

This structure is located at 168 Abbe Road in Enfield, Connecticut (Figure 12). The house was built ca. 1830 and is a two-and-a-half-story, three bays wide, clapboard, Federal-style structure with plain pilasters decorating the corners and a rectangular pediment window. It has replacement six-over-six double-hung sash windows and a side-hall entry with a surround of pilasters and a multi-light transom. A one-and-a-half-story ell extends to the south and has been heavily modified. The structure is listed as being in fair condition. This structure was added to the Connecticut State Register of Historic Places by Elric J. Endersby on July 11, 1967. While not listed individually on the National Register of Historic Places, the Coleman House falls within the larger National Register Area of Hazardville Historic District and is considered a contributing element to that district. This property is located approximately 1.05 kilometers (0.65 miles) to the north of the Facility area. No impact to this property will result from the proposed Facility construction.

c. 1840 Residence

This structure is located at 347 Abbe Road in Enfield, Connecticut (Figure 12). The house was built ca. 1840 and is a two-and-a-half-story, clapboard, Greek Revival-style structure with a brick foundation and a shallow pitched roof. A one-and-a-half-story ell extends to the east. The structure is listed as being in fair condition. This structure was added to the Connecticut State Register of Historic Places by Elric J. Endersby on July 11, 1967. This property is located approximately 0.70 kilometers (0.43 miles) to the south of the Facility area. No impact to this property will result from the proposed Facility construction.

Abbe Farm

Abbe Farm is located at 167 Abbe Road in Enfield, Connecticut (Figure 12). The house was built in ca. 1792 and is a two story, five bay wide, clapboard early-Federal-style structure with a slightly recessed, central entrance and a pitched roof. The pedimented windows are decorated with plain pilasters while the other windows are replacement six-over-six double hung sash with shutters. It appears that many of the exterior finishes are new, such as the modern garage semi-attached to the southern side, and that the original chimney has been removed. The house was declared significant because the Abbe Family who lived there were some of the earliest settlers of Enfield. Abbe Farm was added to the Connecticut State Register of Historic Places by Elric J. Endersby on July 16 in 1967. This property is located approximately 0.75 kilometers (0.47 miles) to the north of the Facility area. No impact to this property will result from the proposed Facility construction.

c. 1830 Residence

This ca. 1830 Residence is located on the west side of Broad Brook Road in Enfield, Connecticut (Figure 12). The house was bult ca. 1830 and is a two-and-a-half-story, five bay wide, clapboard Greek revival-style structure with two central chimneys and a side gabled roof. It has six-over-six windows with wide trim, and a central entranceway that is framed in a triangular pedimented portico that is supported by a pair of Doric columns. The residence is considered to be an excellent example of Greek Revival-style architecture. The structure is listed as being in good condition and was added to the Connecticut State Register of historic Places by Elric J. Endersby on July 11, 1967. This property is located approximately 1.23 kilometers (0.76 miles) to the northeast of the Facility area. No impact to this property will result from the proposed Facility construction.

C. 1790 Residence

This ca. 1790 structure is located at the northwest corner of Fletcher, Town Farm, and Broad Brook Roads in Enfield, Connecticut (Figure 12). The house was built ca. 1790 and is a two-story, five bay wide, clapboard Georgian Colonial-style structure with a central chimney and a shallow pitched roof. Though there have been several additions over the years, the structure was considered significant due to its excellent use of fine dentil work in the cornice. The structure was listed as being in poor condition and was added to the Connecticut State Register of Historic Places by Elric J. Endersby on July 16 in 1967. This property is located approximately 0.79 kilometers (0.49 miles) to the east of the Facility area. No impact to this property will result from the proposed Facility construction.

C. 1830 Georgian-Colonial Residence

This structure is located on the south side of Town Farm Road in Enfield, Connecticut (Figure 12). The two-story, clapboard structure is considered an excellent example of Greek Revival-style architecture with its pediment façade, Doric-style pilasters, heavy plain entablature, and simple period doorway. The ell-shaped plan of the structure is typical for the period and resulted in a one-and-a-half-story, four bay wing that extends from the western side of the house. This building was determined to be architecturally significant due to its excellent use of the Greek Revival-style of architecture and was added to the Connecticut State Register of historic Places by Elric J. Endersby on July 11, 1967. This property is located approximately 0.55 kilometers (0.34 miles) to the east of the Facility area. No impact to this property will result from the proposed Facility construction.

Wallop School House

The Wallop School House is located at 250 Abbe Road in Enfield, Connecticut (Figure 12). Although the original schoolhouse was constructed in 1754, the current structure is a later iteration that was bult ca. 1800. The one room schoolhouse is a one story, brick structure in the Federal style. The Wallop School House was determined to be historically significant as it was one of the last one-room schoolhouses in use in Connecticut when it closed in ca. 1953. The structure is listed as being in good condition and is currently owned by the Enfield Historical Society. The Wallop School house was added to the Connecticut State Register of Historic Places by Elric J. Endersby on July 11, 1967. Wallop Scholl House is located approximately 0.60 kilometers (0.37 miles) to the southwest of the Facility area. No impact to this property will result from the proposed Facility construction.

Well Pumphouse

The Well Pumphouse is located along Town Farm Road in Enfield, Connecticut (Figure 12). Built in 1912 by a local farmer known as "Pierce", the well is a round, brick, 8-foot-high structure. This well sits atop the highest hill in the area and dominates the surrounding landscape. The well has a diameter of 10 feet with an inner depth of 18 feet. To the west of the structure lies a smaller circular hole of brick. This well was built to irrigate the fields surrounding it, although it is no longer in use. The Well Pumphouse was added to the Connecticut State Register of Historic Places by Elric J. Endersby on July 11, 1967. The well is located approximately 0.07 kilometers (0.04 miles) to the south of the Facility area. No impact to this property will result from the proposed Facility construction.

John Abbe House

The John Abbe House is located at 89 Town Farm Road in Enfield, Connecticut (Figure 12). Built in 1770 by John Abbe in the Colonial Saltbox Style, the house is a two-story, five bay, clapboard structure with a central chimney and a gabled roofline. Simple forms characterize the architectural details on the structure, including the sash windows, trim, and door. The central entrance to the house consists of a six-panel door with Doric molded pilasters. A lean-to addition was added to the rear elevation of the structure at an unknown time, but likely in the nineteenth century. The John Abbe House was added to the Connecticut State Register of Historic Places by Elric J. Endersby on July 11 in 1967. The House is located approximately 1.23 kilometers (0.76 miles) to the west of the Facility area. No impact to this property will result from the proposed Facility construction.

CHAPTER VI
METHODS

Introduction

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

Research Design

The current Phase IB cultural resources reconnaissance survey was designed to identify all precontact and post-European Contact period cultural resources located within the previously identified high/moderate archaeologically sensitive areas in the Facility Area in Enfield, Connecticut. Fieldwork for the survey was comprehensive in nature and project planning considered the distribution of previously recorded archaeological sites located near the Facility area, as well as an assessment of the natural qualities of the proposed project area. The methods used to complete this investigation were designed to provide complete and thorough coverage of all portions of the Project area and considered both below and above ground resources. This undertaking entailed pedestrian survey, systematic subsurface testing, detailed mapping, and photo-documentation.

Field Methods

Following the completion of all background research, the previously identified high/moderate archaeologically sensitive areas were subjected to a Phase IB cultural resources reconnaissance survey utilizing pedestrian survey, photo-documentation, GPS recordation, and systematic shovel testing. The field strategy was designed such that the entirety of the sensitivity area was examined visually and photographed. The pedestrian survey portion of this investigation included visual reconnaissance of all of the archaeologically sensitive areas. The subsurface examination was completed through the excavation of shovel tests at 20 meter (65.6 foot) intervals along 17 survey transects positioned 20 meters (65.6 feet) apart throughout the archaeologically sensitive areas. Each shovel test measured 50 x 50 cm (19.7 x 19.7 in) in size, and each was excavated until glacially derived C-Horizon or immovable object (e.g., boulders, large tree roots) were encountered. Each shovel test was excavated in 10 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-centimeter (0.25 in) hardware cloth. Soil characteristics were recorded in the field using Munsell Soil Color Charts and standard soils nomenclature. Each shovel test was backfilled after it was fully documented.

Curation

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

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

CHAPTER VII
RESULTS OF THE INVESTIGATION & MANAGEMENT RECOMMENDATIONS

Introduction

This chapter presents the results of the Phase IB cultural resources reconnaissance survey of high/moderate archaeological sensitivity areas associated with the proposed Facility along Town Farm Road and Abbe Road in Enfield, Connecticut (Figure 13 and Photos 1 through 5). As discussed in Chapters I and IV, Phase IB survey included pedestrian survey, augmented by systematic shovel testing and photo-documentation throughout the limits of the sensitivity area (Figure 13). The results of the Phase IB survey effort is presented below.

Results of Phase IB Cultural Resources Reconnaissance Survey

As stated earlier, the proposed Project parcel encompasses 15.6 acres of land bounded by residential areas to the west and south and a mix of deciduous forest and agricultural land to the north and east. The project parcel is situated at elevations ranging from 38 to 46 meters (125 to 151 feet) NGVD. At the time of the survey, the southern portion of the Facility area was characterized by plowed agricultural field that was recently used to cultivate squash crops. The northern portion of the Facility area was defined by a gentle south facing slope and consisted of grassy field (Photos 1 through 4). A small wetland was located in the northwestern quadrant of the Facility area.

During the Phase IB survey, 136 of 138 (98.6 percent) planned shovel tests were excavated throughout the Facility area. They were spaced at 20 meters (65.6 feet) intervals along 17 parallel transects spaced 20 meters (65.6 feet) apart (Figure 13). The two planned but unexcavated shovel tests fell into an area defined by an existing gravel road. A typical shovel test excavated within the Facility area exhibited four soil horizons in profile. The Ap-Horizon (plowzone) extended from the ground surface to approximately 35 centimeters below surface (cmbs) (13.8 inches below the surface (inbs)) and consisted of a layer of dark brown (10YR 4/4) sand loam. The underlying B1-Horizon (upper subsoil) was described as a deposit of yellowish brown (10YR 5/4) sand loam that ranged in depth from 30 to 50 cmbs (11.8 to 19.7 inbs). The subsequent a B2-Horizon was described as a layer of yellowish brown (10YR 6/6) sandy loam that was observed from 50 to 66 cmbs (19.7 to 26 inbs). Finally, the glacially derived C-Horizon was identified as a layer of gray (10YR 6/1) fine sand that extended from 66 to 80 cmbs (26 to 31.5 inbs). This soil profile is exemplified within the southern profile of Transect 15, STP 1 as seen in Photo 5.

Of the 136 excavated shovel tests, 12 (9 percent) yielded post-European Contact Period cultural materials; none produced precontact er Native American cultural material. The subsurface testing resulted in the recovery of 15 artifact, including ceramic sherds (n=9), glass shards (n=4) and metal objects (n=3). (Table 3; Photo 6). The ceramic types recovered consisted of Albany slip stoneware (n=5), plain ironstone (n=1), plain whiteware (n=1), and a porcelain insulator fragment. The three shards of glass collected included a single dark green bottle glass shard, 1 colorless hand tooled patent finish, and 1 piece of glass slag. The metal artifacts recovered as a result of the subsurface testing included 1 iron bolt, 1 piece of unidentified iron fragment, and a single iron machine cut nail. Laboratory analysis of the artifacts indicated that they have a general date range from the late nineteenth century. Of the recovered artifacts 14 of 15 (93 percent) were recovered from the disturbed Ap-Horizon. This suggests that the artifacts were likely removed from their original context or soil matrix as a result of agricultural plowing of the land. The unidentified piece of iron recovered from the B-Horizon was an intrusive find.

Table 2. Overview of All Cultural Material Recovered During the Phase 1B Survey.

Area	Soil Horizon	Artifact Class	Artifact Type	Total
Project Area	Ap	Ceramic	Whiteware	2
			Porcelain	1
			Stoneware	5
			Ironstone	1
		Glass	Bottle Glass	2
			Glass Slag	1
		Metal	Machine-Cut Nail	1
			Bolt	1
	Ap Total			**14**
	B	Metal	Indeterminate	1
	B Total			**1**
Grand Total				**15**

Due to the lack of dense artifact concentrations from stratified soils, as well as no association with architectural or cultural features, the cultural material was characterized as field scatter. As a result, the post-European Contact cultural material lacked integrity and was assessed as not eligible for listing on the National Register of Historic Places applying the criteria for evaluation (36 CFR 60.4 [a-d]). No additional archaeological investigation of the Project area is recommended and no significant archaeological deposits will be adversely impacted by project development.

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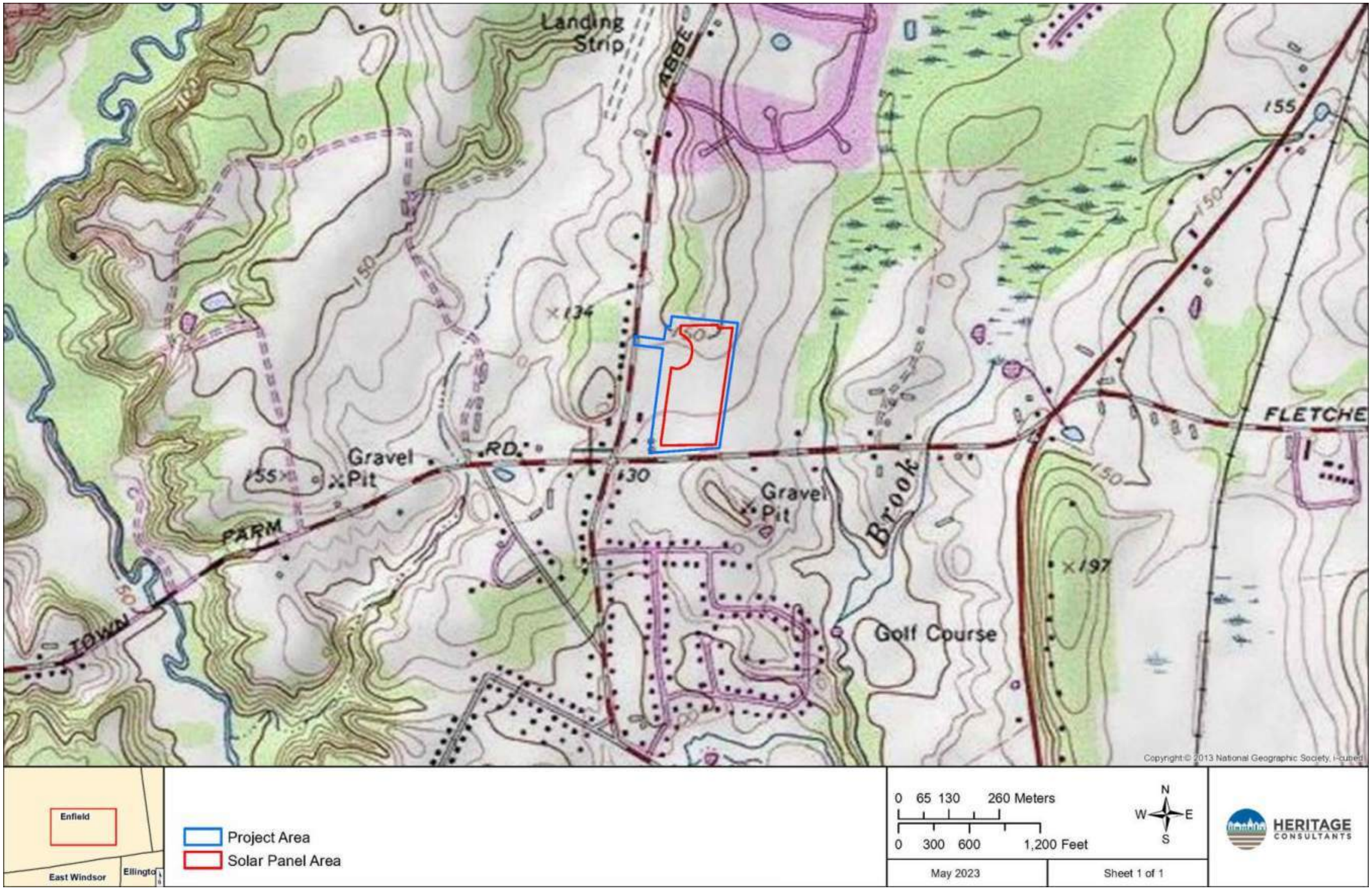


Figure 1. Excerpt from a USGS 7.5' series topographic quadrangle image showing the location of the project parcel in Enfield, Connecticut.

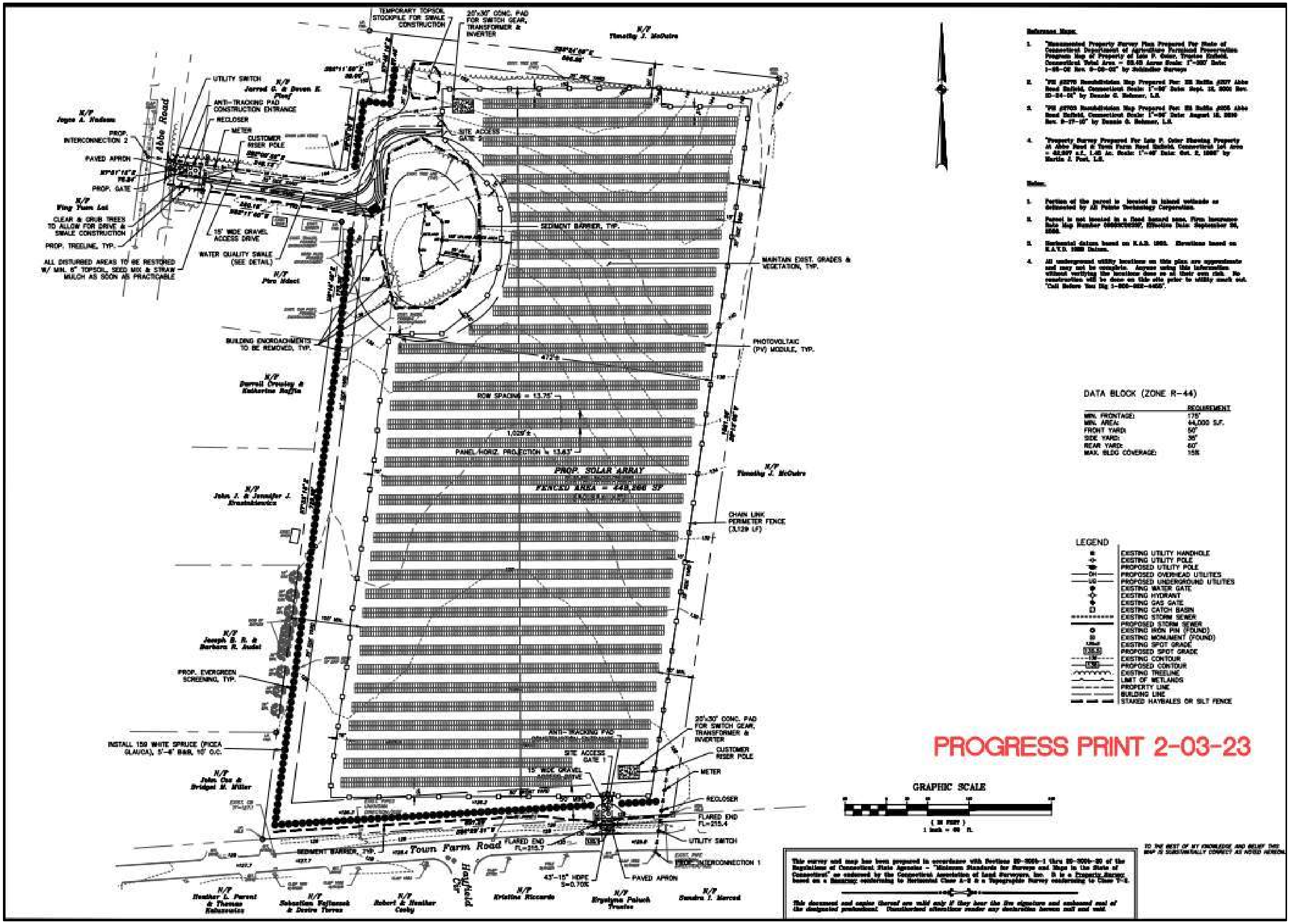


Figure 2. Digital map depicting the client's project plans for the solar Facility in Enfield, Connecticut.

Figure 3. Excerpt from an 1855 historical map showing the location of the project parcel in Enfield, Connecticut.

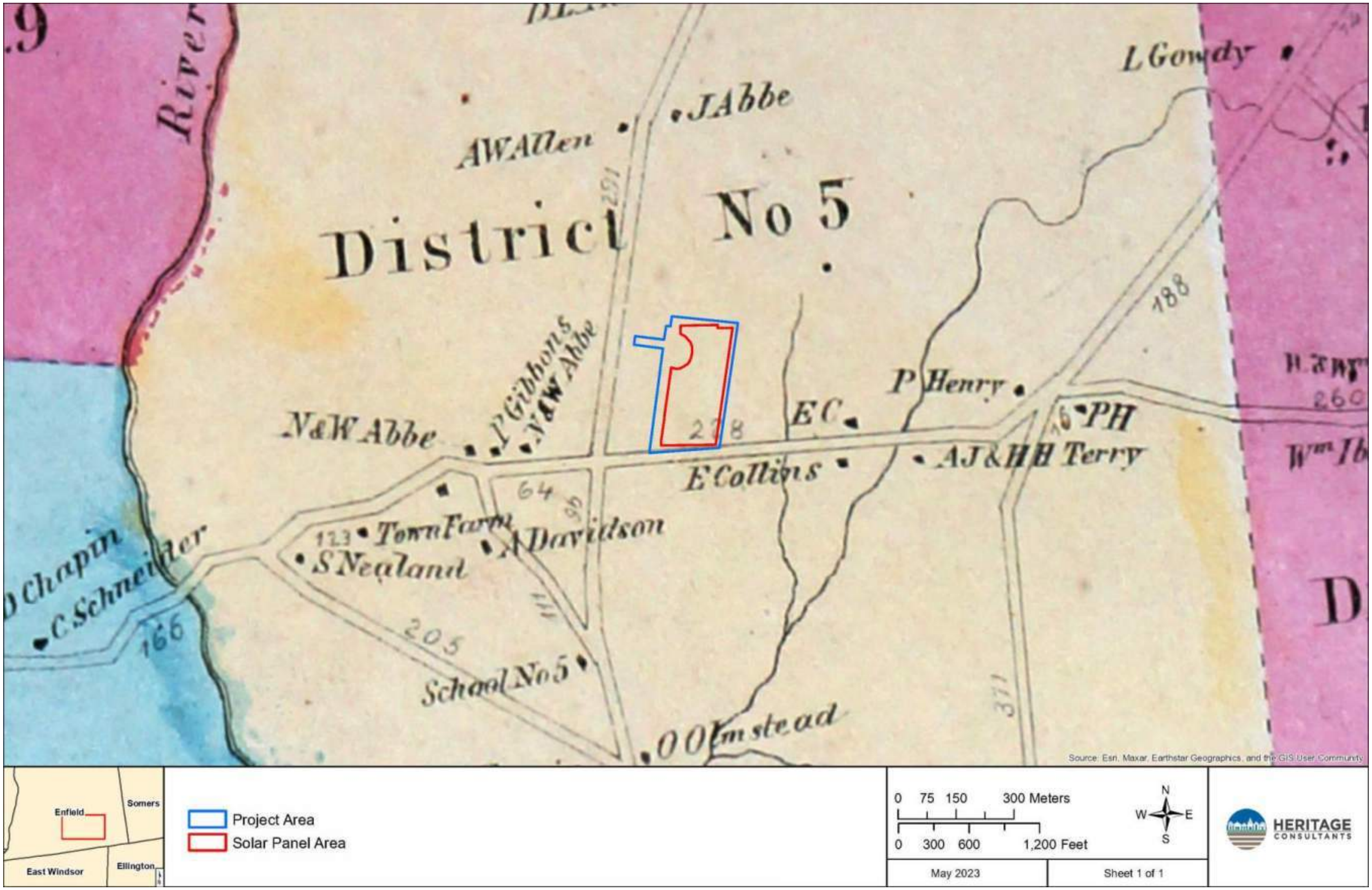


Figure 4. Excerpt from an 1869 historical map showing the location of the project parcel in Enfield, Connecticut.

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

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

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

Figure 8. Excerpt of a 1990 aerial photograph showing the location of the project parcel in Enfield, Connecticut.

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

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

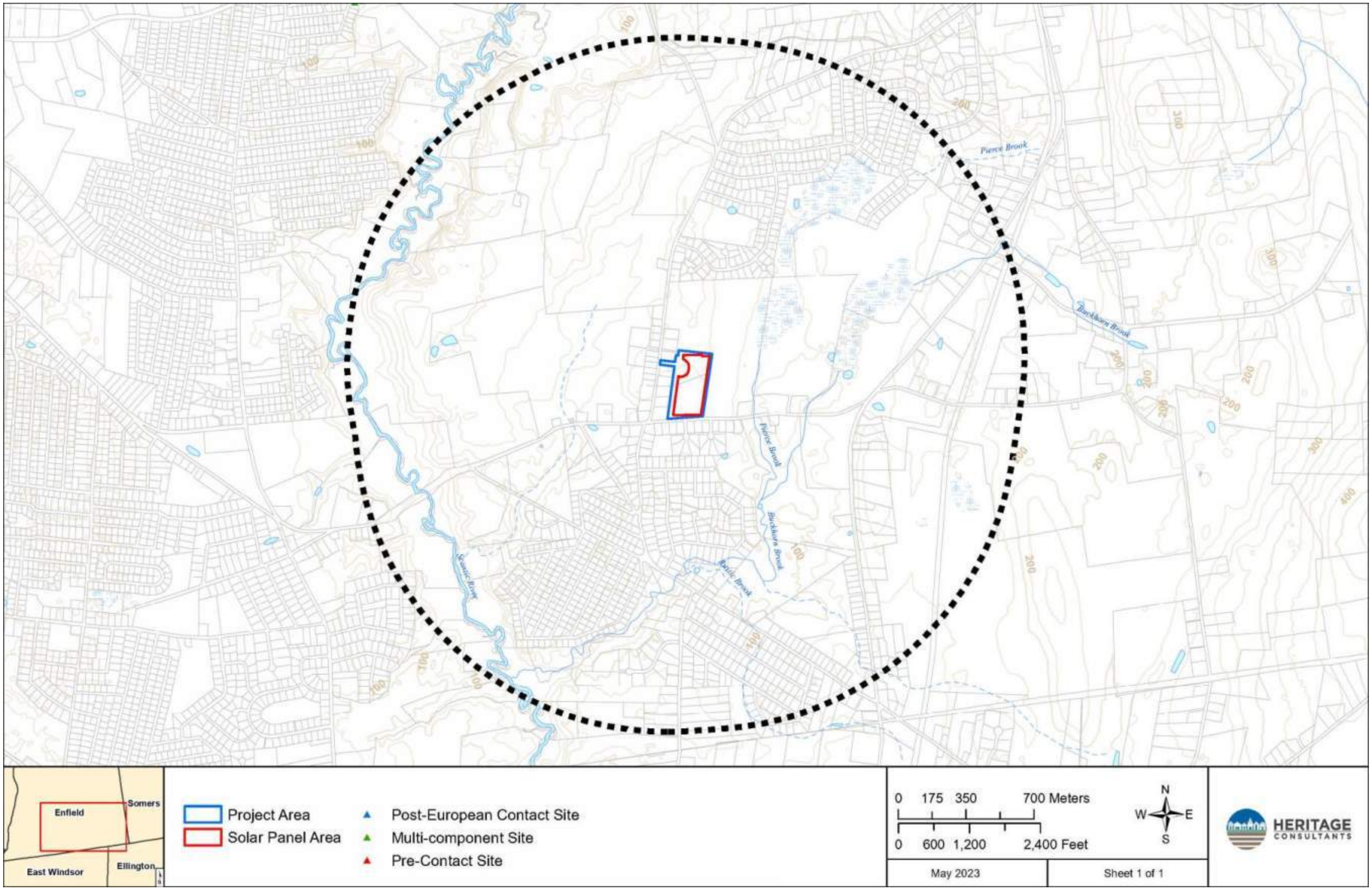


Figure 11. Digital map depicting the locations of the previously identified archaeological sites in the vicinity of the project parcel in Enfield, Connecticut.

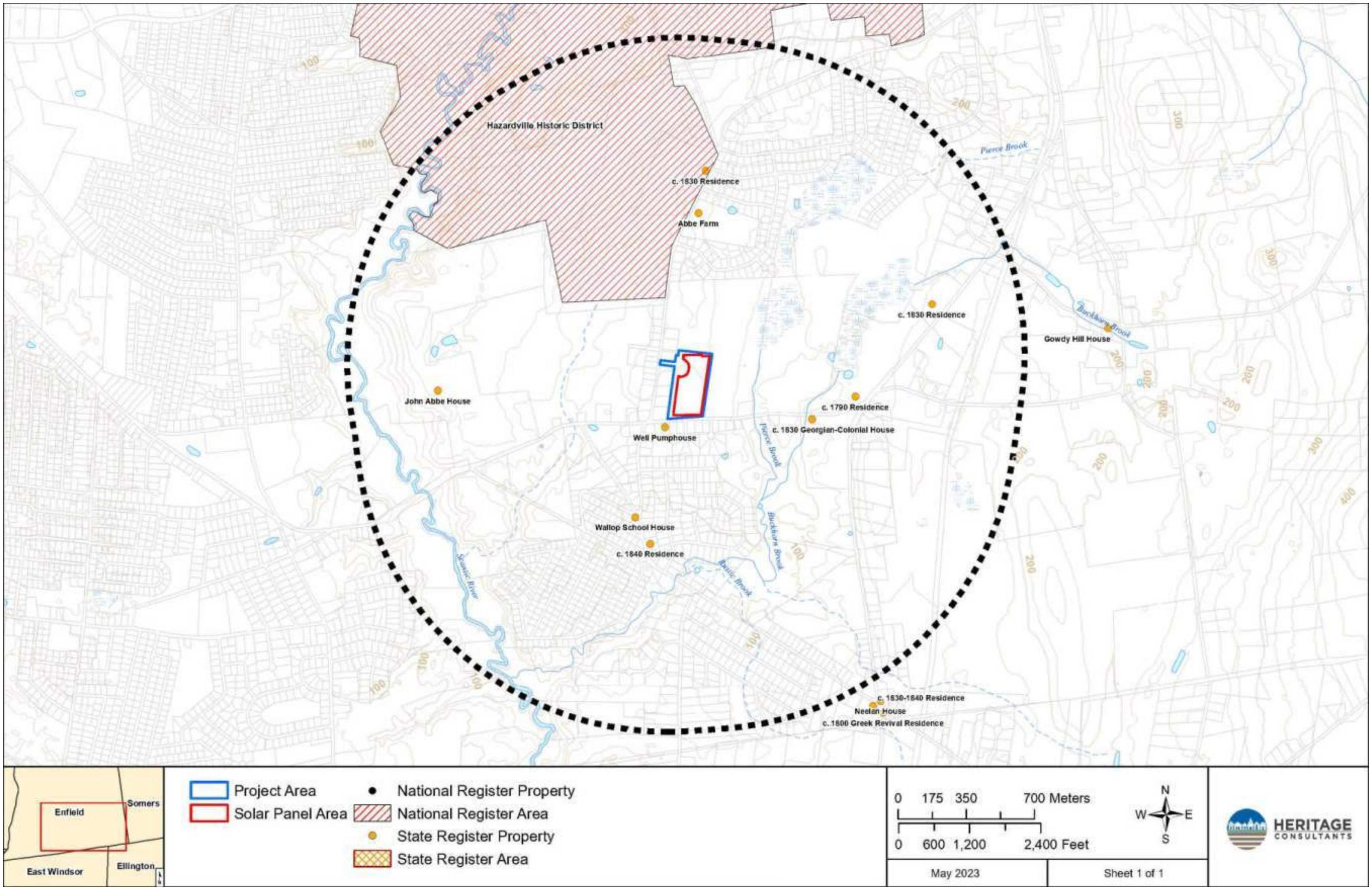


Figure 12. Digital map depicting the locations of the previously identified National Register of Historic Places and State Register of Historic Places properties in the vicinity of the project parcel in Enfield, Connecticut.

Figure 13. Excerpt of a 2021 aerial photograph showing the location of Phase IB Shovel Testing effort and results across the Project Area in Enfield, Connecticut.

Photo 1. Overview of the western segment of the project area that connects the parcel to Abbe Road. Photo facing to the west.

Photo 2. Overview of the Project area. Photo facing to the west.

Photo 3. Overview from the northern border of the Project area. Photo facing to the south.

Photo 4. Overview of the Project area. Photo facing to the northeast.

Photo 5. Soil profile of Transect 15, STP 1. Photo facing to the south.

Photo 6. Representative sample of post-European Contact period artifacts recovered during the Phase IB survey. A) Undecorated ironstone body sherd; B) Undecorated whiteware body fragment; C) Colorless glass patent finish; D) Albany-slipped Domestic Stoneware body sherd; E) Iron machine-cut nail.

Appendix G Federal Aviation Administration (FAA) Consultation

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

Aeronautical Study No.
2023-ANE-2982-OE

Issued Date: 05/22/2023

Sam Valone
Sam Valone
40 Tower Ln
Suite 201
Avon, CT 06001

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

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

Structure:	Solar Panel TownFarmRdSolar
Location:	Enfield, CT
Latitude:	41-57-30.60N NAD 83
Longitude:	72-32-13.70W
Heights:	124 feet site elevation (SE) 11 feet above ground level (AGL) 135 feet above mean sea level (AMSL)

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

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

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

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

This determination expires on 11/22/2024 unless:

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

6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

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

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

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

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

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

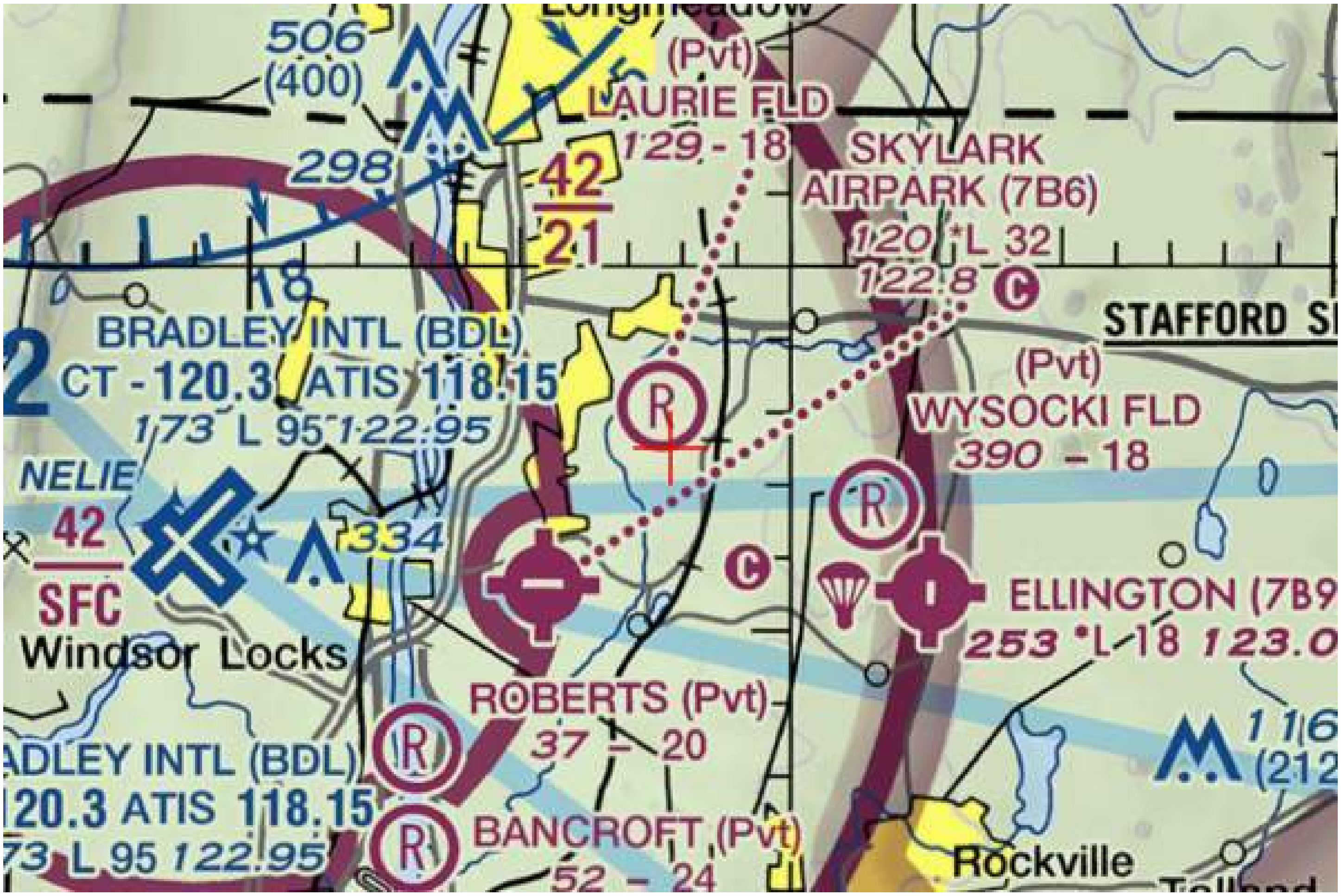
If we can be of further assistance, please contact our office at (404) 305-6582, or Stephanie.Kimmel@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2023-ANE-2982-OE.

Signature Control No: 586323977-587305507 (DNE)

Stephanie Kimmel
Specialist

Attachment(s)
Map(s)

Sectional Map for ASN 2023-ANE-2982-OE



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

Aeronautical Study No.
2023-ANE-2986-OE

Issued Date: 05/22/2023

Sam Valone
Sam Valone
40 Tower Ln
Suite 201
Avon, CT 06001

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

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

Structure:	Solar Panel TownFarmRdSolar
Location:	Enfield, CT
Latitude:	41-57-40.40N NAD 83
Longitude:	72-32-12.40W
Heights:	140 feet site elevation (SE)
	11 feet above ground level (AGL)
	151 feet above mean sea level (AMSL)

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

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

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

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If we can be of further assistance, please contact our office at (404) 305-6582, or Stephanie.Kimmel@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2023-ANE-2986-OE.

Signature Control No: 586338165-587305508 (DNE)
Stephanie Kimmel
Specialist

Attachment(s)
Map(s)

Sectional Map for ASN 2023-ANE-2986-OE

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

Aeronautical Study No.
2023-ANE-2983-OE

Issued Date: 05/22/2023

Sam Valone
Sam Valone
40 Tower Ln
Suite 201
Avon, CT 06001

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

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

Structure:	Solar Panel TownFarmRdSolar
Location:	Enfield, CT
Latitude:	41-57-30.50N NAD 83
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Heights:	124 feet site elevation (SE)
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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:

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

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

This determination expires on 11/22/2024 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
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If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

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

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

If we can be of further assistance, please contact our office at (404) 305-6582, or Stephanie.Kimmel@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2023-ANE-2983-OE.

Signature Control No: 586324360-587305509 (DNE)

Stephanie Kimmel
Specialist

Attachment(s)
Map(s)

Sectional Map for ASN 2023-ANE-2983-OE

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

Aeronautical Study No.
2023-ANE-2987-OE

Issued Date: 05/22/2023

Sam Valone
Sam Valone
40 Tower Ln
Suite 201
Avon, CT 06001

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

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

Structure:	Solar Panel TownFarmRdSolar
Location:	Enfield, CT
Latitude:	41-57-40.70N NAD 83
Longitude:	72-32-18.10W
Heights:	148 feet site elevation (SE) 11 feet above ground level (AGL) 159 feet above mean sea level (AMSL)

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

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

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

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

This determination expires on 11/22/2024 unless:

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

6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

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

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

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

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

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

If we can be of further assistance, please contact our office at (404) 305-6582, or Stephanie.Kimmel@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2023-ANE-2987-OE.

Signature Control No: 586340334-587305510 (DNE)

Stephanie Kimmel
Specialist

Attachment(s)
Map(s)

Sectional Map for ASN 2023-ANE-2987-OE